Computer Algebra
Independent Integration Tests

Summer 2024

5-Inverse-trig-functions/5.1-Inverse-sine/265-5.1.3

Nasser M. Abbasi

May 18, 2024 Compiled on May 18, 2024 at 1:48am

Contents

1 Introduction **9**

1.1 Listing of CAS systems tested 10
1.2 Results 11
1.3 Time and leaf size Performance 15
1.4 Performance based on number of rules Rubi used 17
1.5 Performance based on number of steps Rubi used 18
1.6 Solved integrals histogram based on leaf size of result 19
1.7 Solved integrals histogram based on CPU time used 20
1.8 Leaf size vs. CPU time used 21
1.9 list of integrals with no known antiderivative 22
1.10 List of integrals solved by CAS but has no known antiderivative 22
1.11 list of integrals solved by CAS but failed verification 22
1.12 Timing 23
1.13 Verification 23
1.14 Important notes about some of the results 24
1.15 Current tree layout of integration tests 27
1.16 Design of the test system 28

2 detailed summary tables of results **29**

2.1 List of integrals sorted by grade for each CAS 30
2.2 Detailed conclusion table per each integral for all CAS systems 35
2.3 Detailed conclusion table specific for Rubi results 85

3 Listing of integrals **92**

3.1 $\int \left(d-c^2dx^2\right)^3 \left(a+b\arcsin(cx)\right) dx$ 99
3.2 $\int \left(d-c^2dx^2\right)^2 \left(a+b\arcsin(cx)\right) dx$ 106
3.3 $\int \left(d-c^2dx^2\right) \left(a+b\arcsin(cx)\right) dx$ 113
3.4 $\int \frac{a+b\arcsin(cx)}{d-c^2dx^2}\, dx$ 120
3.5 $\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^2}\, dx$ 126
3.6 $\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^3}\, dx$ 134

3.7 $\int \left(d-c^2dx^2\right)^3 \left(a+b\arcsin(cx)\right)^2 dx$ . . . 143
3.8 $\int \left(d-c^2dx^2\right)^2 \left(a+b\arcsin(cx)\right)^2 dx$ . . . 155
3.9 $\int \left(d-c^2dx^2\right) \left(a+b\arcsin(cx)\right)^2 dx$ . . . 166
3.10 $\int \frac{\left(a+b\arcsin(cx)\right)^2}{d-c^2dx^2} dx$ . . . 174
3.11 $\int \frac{\left(a+b\arcsin(cx)\right)^2}{\left(d-c^2dx^2\right)^2} dx$ . . . 181
3.12 $\int \left(d-c^2dx^2\right)^3 \left(a+b\arcsin(cx)\right)^3 dx$ . . . 190
3.13 $\int \left(d-c^2dx^2\right)^2 \left(a+b\arcsin(cx)\right)^3 dx$ . . . 205
3.14 $\int \left(d-c^2dx^2\right) \left(a+b\arcsin(cx)\right)^3 dx$ . . . 218
3.15 $\int \frac{\left(a+b\arcsin(cx)\right)^3}{d-c^2dx^2} dx$ . . . 230
3.16 $\int \frac{\left(a+b\arcsin(cx)\right)^3}{\left(d-c^2dx^2\right)^2} dx$ . . . 238
3.17 $\int \frac{\left(c-a^2cx^2\right)^3}{\arcsin(ax)} dx$ . . . 250
3.18 $\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)} dx$ . . . 256
3.19 $\int \frac{c-a^2cx^2}{\arcsin(ax)} dx$ . . . 261
3.20 $\int \frac{1}{\left(c-a^2cx^2\right)\arcsin(ax)} dx$ . . . 266
3.21 $\int \frac{1}{\left(c-a^2cx^2\right)^2\arcsin(ax)} dx$ . . . 271
3.22 $\int \frac{\left(c-a^2cx^2\right)^3}{\arcsin(ax)^2} dx$ . . . 276
3.23 $\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)^2} dx$ . . . 283
3.24 $\int \frac{c-a^2cx^2}{\arcsin(ax)^2} dx$ . . . 289
3.25 $\int \frac{1}{\left(c-a^2cx^2\right)\arcsin(ax)^2} dx$ . . . 295
3.26 $\int \frac{1}{\left(c-a^2cx^2\right)^2\arcsin(ax)^2} dx$ . . . 300
3.27 $\int \frac{\left(d-c^2dx^2\right)^3}{a+b\arcsin(cx)} dx$ . . . 305
3.28 $\int \frac{\left(d-c^2dx^2\right)^2}{a+b\arcsin(cx)} dx$ . . . 312
3.29 $\int \frac{d-c^2dx^2}{a+b\arcsin(cx)} dx$ . . . 319
3.30 $\int \frac{1}{\left(d-c^2dx^2\right)\left(a+b\arcsin(cx)\right)} dx$ . . . 325
3.31 $\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)} dx$ . . . 330
3.32 $\int \frac{\left(d-c^2dx^2\right)^3}{\left(a+b\arcsin(cx)\right)^2} dx$ . . . 335
3.33 $\int \frac{\left(d-c^2dx^2\right)^2}{\left(a+b\arcsin(cx)\right)^2} dx$ . . . 343
3.34 $\int \frac{d-c^2dx^2}{\left(a+b\arcsin(cx)\right)^2} dx$ . . . 351
3.35 $\int \frac{1}{\left(d-c^2dx^2\right)\left(a+b\arcsin(cx)\right)^2} dx$ . . . 358
3.36 $\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^2} dx$ . . . 363
3.37 $\int \left(\pi-c^2\pi x^2\right)^{5/2} \left(a+b\arcsin(cx)\right) dx$ . . . 368
3.38 $\int \left(\pi-c^2\pi x^2\right)^{3/2} \left(a+b\arcsin(cx)\right) dx$ . . . 376
3.39 $\int \sqrt{\pi-c^2\pi x^2}\left(a+b\arcsin(cx)\right) dx$ . . . 383

3.40 $\int \frac{a+b\arcsin(cx)}{\sqrt{\pi-c^2\pi x^2}}\,dx$ . . . 389
3.41 $\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{3/2}}\,dx$ . . . 394
3.42 $\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{5/2}}\,dx$ . . . 399
3.43 $\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{7/2}}\,dx$ . . . 406
3.44 $\int (\pi-c^2\pi x^2)^{3/2}\,(a+b\arcsin(cx))^2\,dx$ . . . 413
3.45 $\int \sqrt{\pi-c^2\pi x^2}(a+b\arcsin(cx))^2\,dx$ . . . 422
3.46 $\int \frac{(a+b\arcsin(cx))^2}{\sqrt{\pi-c^2\pi x^2}}\,dx$ . . . 429
3.47 $\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{3/2}}\,dx$ . . . 434
3.48 $\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{5/2}}\,dx$ . . . 441
3.49 $\int \sqrt{1-x^2}\arcsin(x)\,dx$ . . . 451
3.50 $\int \frac{1}{\sqrt{1-a^2x^2}\arcsin(ax)^3}\,dx$ . . . 456
3.51 $\int (d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))\,dx$ . . . 461
3.52 $\int (d-c^2dx^2)^{3/2}\,(a+b\arcsin(cx))\,dx$ . . . 469
3.53 $\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))\,dx$ . . . 477
3.54 $\int \frac{a+b\arcsin(cx)}{\sqrt{d-c^2dx^2}}\,dx$ . . . 483
3.55 $\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{3/2}}\,dx$ . . . 488
3.56 $\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{5/2}}\,dx$ . . . 493
3.57 $\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{7/2}}\,dx$ . . . 500
3.58 $\int (d-c^2dx^2)^{3/2}\,(a+b\arcsin(cx))^2\,dx$ . . . 508
3.59 $\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2\,dx$ . . . 517
3.60 $\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d-c^2dx^2}}\,dx$ . . . 524
3.61 $\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}\,dx$ . . . 529
3.62 $\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{5/2}}\,dx$ . . . 536
3.63 $\int (c-a^2cx^2)^{3/2}\arcsin(ax)^3\,dx$ . . . 546
3.64 $\int \sqrt{c-a^2cx^2}\arcsin(ax)^3\,dx$ . . . 557
3.65 $\int \frac{\arcsin(ax)^3}{\sqrt{c-a^2cx^2}}\,dx$ . . . 564
3.66 $\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{3/2}}\,dx$ . . . 569
3.67 $\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{5/2}}\,dx$ . . . 576
3.68 $\int \frac{(d-c^2dx^2)^{5/2}}{a+b\arcsin(cx)}\,dx$ . . . 586
3.69 $\int \frac{(d-c^2dx^2)^{3/2}}{a+b\arcsin(cx)}\,dx$ . . . 593
3.70 $\int \frac{\sqrt{d-c^2dx^2}}{a+b\arcsin(cx)}\,dx$ . . . 599
3.71 $\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}\,dx$ . . . 605

3.72 $\int \frac{1}{(d-c^2dx^2)^{3/2}(a+b\arcsin(cx))}\,dx$ . . . 610
3.73 $\int \frac{1}{(d-c^2dx^2)^{5/2}(a+b\arcsin(cx))}\,dx$ . . . 615
3.74 $\int \frac{(d-c^2dx^2)^{5/2}}{(a+b\arcsin(cx))^2}\,dx$ . . . 620
3.75 $\int \frac{(d-c^2dx^2)^{3/2}}{(a+b\arcsin(cx))^2}\,dx$ . . . 628
3.76 $\int \frac{\sqrt{d-c^2dx^2}}{(a+b\arcsin(cx))^2}\,dx$ . . . 636
3.77 $\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}\,dx$ . . . 644
3.78 $\int \frac{1}{(d-c^2dx^2)^{3/2}(a+b\arcsin(cx))^2}\,dx$ . . . 649
3.79 $\int \frac{1}{(d-c^2dx^2)^{5/2}(a+b\arcsin(cx))^2}\,dx$ . . . 654
3.80 $\int (d-c^2dx^2)^2\sqrt{a+b\arcsin(cx)}\,dx$ . . . 659
3.81 $\int (d-c^2dx^2)\sqrt{a+b\arcsin(cx)}\,dx$ . . . 673
3.82 $\int \sqrt{a+b\arcsin(cx)}\,dx$ . . . 685
3.83 $\int \frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}\,dx$ . . . 693
3.84 $\int \frac{\sqrt{a+b\arcsin(cx)}}{(d-c^2dx^2)^2}\,dx$ . . . 698
3.85 $\int (d-c^2dx^2)^2(a+b\arcsin(cx))^{3/2}\,dx$ . . . 703
3.86 $\int (d-c^2dx^2)(a+b\arcsin(cx))^{3/2}\,dx$ . . . 717
3.87 $\int (a+b\arcsin(cx))^{3/2}\,dx$ . . . 731
3.88 $\int \frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}\,dx$ . . . 740
3.89 $\int \frac{(a+b\arcsin(cx))^{3/2}}{(d-c^2dx^2)^2}\,dx$ . . . 745
3.90 $\int \frac{(d-c^2dx^2)^3}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 751
3.91 $\int \frac{(d-c^2dx^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 760
3.92 $\int \frac{d-c^2dx^2}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 768
3.93 $\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 775
3.94 $\int \frac{1}{(d-c^2dx^2)\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 782
3.95 $\int \frac{1}{(d-c^2dx^2)^2\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 787
3.96 $\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 792
3.97 $\int \frac{(d-c^2dx^2)^2}{(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 802
3.98 $\int \frac{d-c^2dx^2}{(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 810
3.99 $\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 818
3.100 $\int \frac{1}{(d-c^2dx^2)(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 826
3.101 $\int \frac{1}{(d-c^2dx^2)^2(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 831
3.102 $\int (c-a^2cx^2)^{3/2}\sqrt{\arcsin(ax)}\,dx$ . . . 836
3.103 $\int \sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}\,dx$ . . . 845

3.104 $\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{c-a^2cx^2}}\,dx$ . . . 852
3.105 $\int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{3/2}}\,dx$ . . . 857
3.106 $\int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{5/2}}\,dx$ . . . 862
3.107 $\int (c-a^2cx^2)^{3/2}\arcsin(ax)^{3/2}\,dx$ . . . 867
3.108 $\int \sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}\,dx$ . . . 877
3.109 $\int \frac{\arcsin(ax)^{3/2}}{\sqrt{c-a^2cx^2}}\,dx$ . . . 884
3.110 $\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{3/2}}\,dx$ . . . 889
3.111 $\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}}\,dx$ . . . 894
3.112 $\int (c-a^2cx^2)^{3/2}\arcsin(ax)^{5/2}\,dx$ . . . 900
3.113 $\int \sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}\,dx$ . . . 916
3.114 $\int \frac{\arcsin(ax)^{5/2}}{\sqrt{c-a^2cx^2}}\,dx$ . . . 924
3.115 $\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{3/2}}\,dx$ . . . 929
3.116 $\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{5/2}}\,dx$ . . . 934
3.117 $\int (a^2-x^2)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx$ . . . 940
3.118 $\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx$ . . . 950
3.119 $\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx$ . . . 957
3.120 $\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{(a^2-x^2)^{3/2}}\,dx$ . . . 962
3.121 $\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{(a^2-x^2)^{5/2}}\,dx$ . . . 967
3.122 $\int (a^2-x^2)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}\,dx$ . . . 973
3.123 $\int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}\,dx$ . . . 984
3.124 $\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx$ . . . 991
3.125 $\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{(a^2-x^2)^{3/2}}\,dx$ . . . 996
3.126 $\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{(a^2-x^2)^{5/2}}\,dx$ . . . 1001
3.127 $\int \frac{(c-a^2cx^2)^{5/2}}{\sqrt{\arcsin(ax)}}\,dx$ . . . 1007
3.128 $\int \frac{(c-a^2cx^2)^{3/2}}{\sqrt{\arcsin(ax)}}\,dx$ . . . 1014
3.129 $\int \frac{\sqrt{c-a^2cx^2}}{\sqrt{\arcsin(ax)}}\,dx$ . . . 1020
3.130 $\int \frac{1}{\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}\,dx$ . . . 1026
3.131 $\int \frac{1}{(c-a^2cx^2)^{3/2}\sqrt{\arcsin(ax)}}\,dx$ . . . 1031
3.132 $\int \frac{1}{(c-a^2cx^2)^{5/2}\sqrt{\arcsin(ax)}}\,dx$ . . . 1036

3.133 $\int \frac{\left(c-a^2cx^2\right)^{5/2}}{\arcsin(ax)^{3/2}}\,dx$ . . . 1041
3.134 $\int \frac{\left(c-a^2cx^2\right)^{3/2}}{\arcsin(ax)^{3/2}}\,dx$ . . . 1047
3.135 $\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{3/2}}\,dx$ . . . 1053
3.136 $\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}\,dx$ . . . 1059
3.137 $\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}}\,dx$ . . . 1064
3.138 $\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{3/2}}\,dx$ . . . 1069
3.139 $\int \frac{\left(c-a^2cx^2\right)^{3/2}}{\arcsin(ax)^{5/2}}\,dx$ . . . 1074
3.140 $\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{5/2}}\,dx$ . . . 1082
3.141 $\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}}\,dx$ . . . 1088
3.142 $\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{5/2}}\,dx$ . . . 1093
3.143 $\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{5/2}}\,dx$ . . . 1098
3.144 $\int \left(d+ex^2\right)^4\left(a+b\arcsin(cx)\right)dx$ . . . 1103
3.145 $\int \left(d+ex^2\right)^3\left(a+b\arcsin(cx)\right)dx$ . . . 1112
3.146 $\int \left(d+ex^2\right)^2\left(a+b\arcsin(cx)\right)dx$ . . . 1122
3.147 $\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)dx$ . . . 1130
3.148 $\int \left(a+b\arcsin(cx)\right)dx$ . . . 1137
3.149 $\int \frac{a+b\arcsin(cx)}{d+ex^2}\,dx$ . . . 1142
3.150 $\int \left(d+ex^2\right)^3\left(a+b\arcsin(cx)\right)^2dx$ . . . 1149
3.151 $\int \left(d+ex^2\right)^2\left(a+b\arcsin(cx)\right)^2dx$ . . . 1161
3.152 $\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)^2dx$ . . . 1170
3.153 $\int \left(a+b\arcsin(cx)\right)^2dx$ . . . 1178
3.154 $\int \frac{\left(a+b\arcsin(cx)\right)^2}{d+ex^2}\,dx$ . . . 1184
3.155 $\int \frac{\left(d+ex^2\right)^2}{a+b\arcsin(cx)}\,dx$ . . . 1193
3.156 $\int \frac{d+ex^2}{a+b\arcsin(cx)}\,dx$ . . . 1201
3.157 $\int \frac{1}{a+b\arcsin(cx)}\,dx$ . . . 1207
3.158 $\int \frac{1}{(d+ex^2)(a+b\arcsin(cx))}\,dx$ . . . 1213
3.159 $\int \frac{1}{\left(d+ex^2\right)^2(a+b\arcsin(cx))}\,dx$ . . . 1218
3.160 $\int \frac{\left(d+ex^2\right)^2}{(a+b\arcsin(cx))^2}\,dx$ . . . 1223
3.161 $\int \frac{d+ex^2}{(a+b\arcsin(cx))^2}\,dx$ . . . 1232
3.162 $\int \frac{1}{(a+b\arcsin(cx))^2}\,dx$ . . . 1239
3.163 $\int \frac{1}{(d+ex^2)(a+b\arcsin(cx))^2}\,dx$ . . . 1246
3.164 $\int \frac{1}{\left(d+ex^2\right)^2(a+b\arcsin(cx))^2}\,dx$ . . . 1251
3.165 $\int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx$ . . . 1256
3.166 $\int \frac{a+b\arcsin(cx)}{\sqrt{d+ex^2}}\,dx$ . . . 1261

3.167 $\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{3/2}}\,dx$ . . . 1266
3.168 $\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{5/2}}\,dx$ . . . 1272
3.169 $\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{7/2}}\,dx$ . . . 1279
3.170 $\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx$ . . . 1288
3.171 $\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}\,dx$ . . . 1293
3.172 $\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}\,dx$ . . . 1298
3.173 $\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}\,dx$ . . . 1303
3.174 $\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx$ . . . 1308
3.175 $\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx$ . . . 1313
3.176 $\int \frac{1}{(d+ex^2)^{3/2}(a+b\arcsin(cx))}\,dx$ . . . 1318
3.177 $\int \frac{1}{(d+ex^2)^{5/2}(a+b\arcsin(cx))}\,dx$ . . . 1323
3.178 $\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx$ . . . 1328
3.179 $\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx$ . . . 1333
3.180 $\int \frac{1}{(d+ex^2)^{3/2}(a+b\arcsin(cx))^2}\,dx$ . . . 1338
3.181 $\int \frac{1}{(d+ex^2)^{5/2}(a+b\arcsin(cx))^2}\,dx$ . . . 1343
3.182 $\int (d+ex^2)^2\sqrt{a+b\arcsin(cx)}\,dx$ . . . 1348
3.183 $\int (d+ex^2)\sqrt{a+b\arcsin(cx)}\,dx$ . . . 1357
3.184 $\int \sqrt{a+b\arcsin(cx)}\,dx$ . . . 1365
3.185 $\int \frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}\,dx$ . . . 1373
3.186 $\int \frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}\,dx$ . . . 1378
3.187 $\int (d+ex^2)(a+b\arcsin(cx))^{3/2}\,dx$ . . . 1383
3.188 $\int (a+b\arcsin(cx))^{3/2}\,dx$ . . . 1393
3.189 $\int \frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}\,dx$ . . . 1402
3.190 $\int \frac{(a+b\arcsin(cx))^{3/2}}{(d+ex^2)^2}\,dx$ . . . 1407
3.191 $\int \frac{(d+ex^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 1412
3.192 $\int \frac{d+ex^2}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 1421
3.193 $\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 1428
3.194 $\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 1435
3.195 $\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 1440
3.196 $\int \frac{d+ex^2}{(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 1445
3.197 $\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 1452
3.198 $\int \frac{1}{(d+ex^2)(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 1460
3.199 $\int \frac{1}{(d+ex^2)^2(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 1465

4 Appendix **1470**
4.1 Listing of Grading functions 1470
4.2 Links to plain text integration problems used in this report for each CAS 1488

CHAPTER 1

Introduction

1.1 Listing of CAS systems tested 10
1.2 Results 11
1.3 Time and leaf size Performance 15
1.4 Performance based on number of rules Rubi used 17
1.5 Performance based on number of steps Rubi used 18
1.6 Solved integrals histogram based on leaf size of result 19
1.7 Solved integrals histogram based on CPU time used 20
1.8 Leaf size vs. CPU time used 21
1.9 list of integrals with no known antiderivative 22
1.10 List of integrals solved by CAS but has no known antiderivative 22
1.11 list of integrals solved by CAS but failed verification 22
1.12 Timing 23
1.13 Verification 23
1.14 Important notes about some of the results 24
1.15 Current tree layout of integration tests 27
1.16 Design of the test system 28

This report gives the result of running the computer algebra independent integration test.The download section in on the main webpage contains links to download the problems in plain text format used for all CAS systems. The number of integrals in this report is [**199**]. This is test number [265].

1.1 Listing of CAS systems tested

The following are the CAS systems tested:

1. Mathematica 14 (January 9, 2024) on windows 10 pro.
2. Rubi 4.17.3 (Sept 25, 2023) on Mathematica 14 on windows 10m pro.
3. Maple 2024 (March 1, 2024) on windows 10 pro.
4. Maxima 5.47 (June 1, 2023) using Lisp SBCL 2.4.0 on Linux Manjaro 23.1.2 KDE via sagemath 10.3.
5. FriCAS 1.3.10 built with sbcl 2.3.11 (January 10, 2024) on Linux Manjaro 23.1.2 KDE via sagemath 10.3.
6. Giac/Xcas 1.9.0-99 on Linux via sagemath 10.3.
7. Sympy 1.12 using Python 3.11.6 (Nov 14 2023, 09:36:21) [GCC 13.2.1 20230801] on Linux Manjaro 23.1.2 KDE.
8. Mupad using Matlab 2021a with Symbolic Math Toolbox Version 8.7 on windows 10.
9. Reduce CSL rev 6687 (January 9, 2024) on Linux Manjaro 23.1.2 KDE.

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

Sympy was run directly in Python not via sagemath.

Reduce was called directly.

1.2 Results

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

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

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

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

System	% solved	% Failed
Rubi	100.00 (199)	0.00 (0)
Mathematica	100.00 (199)	0.00 (0)
Maple	88.94 (177)	11.06 (22)
Giac	65.83 (131)	34.17 (68)
Reduce	43.72 (87)	56.28 (112)
Sympy	40.70 (81)	59.30 (118)
Maxima	35.18 (70)	64.82 (129)
Mupad	32.66 (65)	67.34 (134)
Fricas	29.65 (59)	70.35 (140)

Table 1.1: Percentage solved for each CAS

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

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

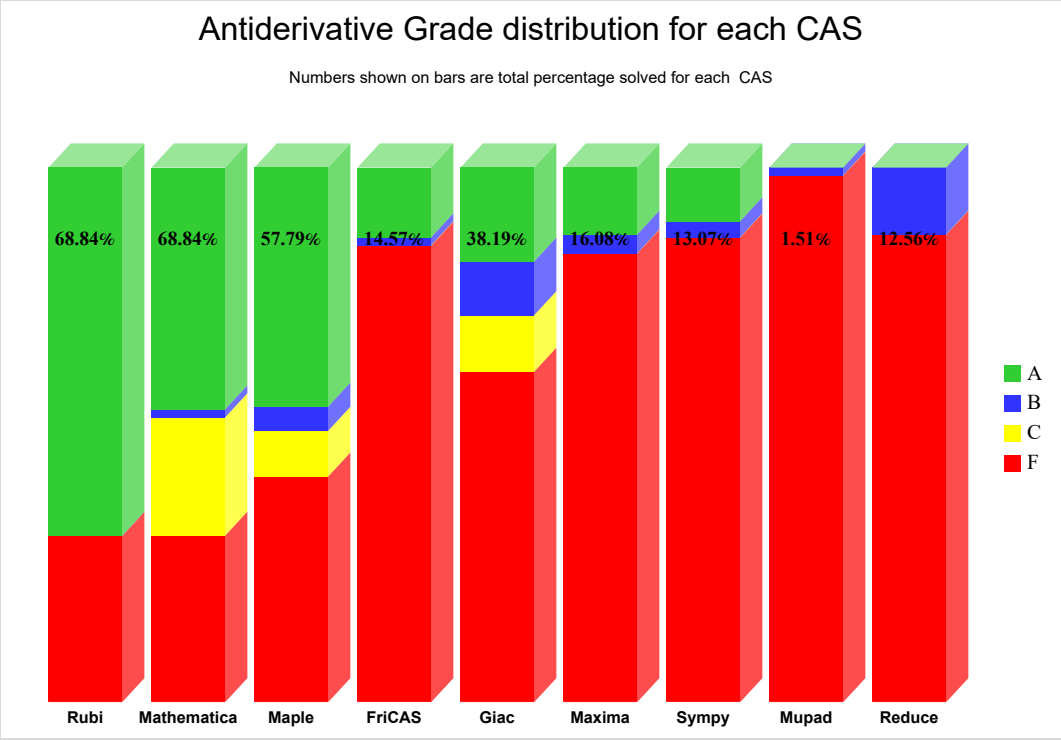
Table 1.2: Description of grading applied to integration result

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

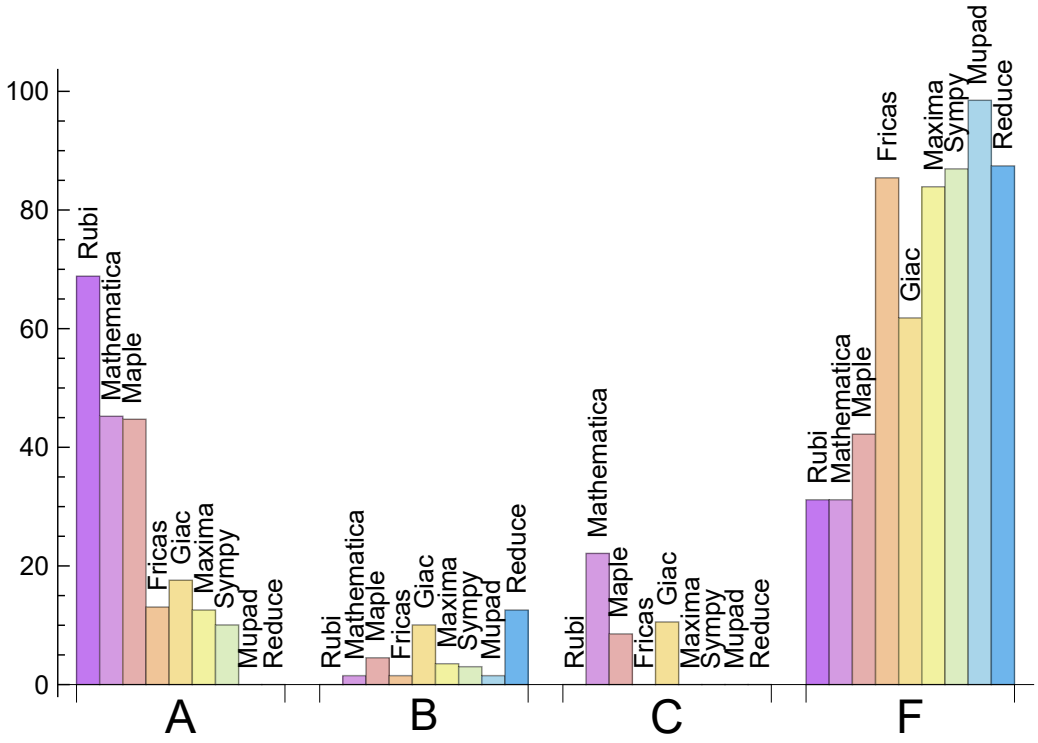
System	% A grade	% B grade	% C grade	% F grade
Rubi	68.844	0.000	0.000	31.156
Mathematica	45.226	1.508	22.111	31.156
Maple	44.724	4.523	8.543	42.211
Giac	17.588	10.050	10.553	61.809
Fricas	13.065	1.508	0.000	85.427
Maxima	12.563	3.518	0.000	83.920
Sympy	10.050	3.015	0.000	86.935
Mupad	0.000	1.508	0.000	98.492
Reduce	0.000	12.563	0.000	87.437

Table 1.3: Antiderivative Grade distribution of each CAS

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



The figure below compares the grades of the CAS systems.



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

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

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

System	Number failed	Percentage normal failure	Percentage timeout failure	Percentage exception failure
Rubi	0	0.00	0.00	0.00
Mathematica	0	0.00	0.00	0.00
Maple	22	100.00	0.00	0.00
Giac	68	23.53	2.94	73.53
Maxima	129	58.91	0.00	41.09
Fricas	140	44.29	0.00	55.71
Sympy	118	83.05	16.95	0.00
Reduce	112	100.00	0.00	0.00
Mupad	134	0.00	100.00	0.00

Table 1.4: Failure statistics for each CAS

1.3 Time and leaf size Performance

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

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

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

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

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

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

System	Mean time (sec)
Fricas	0.11
Mupad	0.18
Maple	0.42
Maxima	0.47
Rubi	0.69
Giac	2.31
Mathematica	3.11
Sympy	12.18
Reduce	16.50

Table 1.5: Time performance for each CAS

System	Mean size	Normalized mean	Median size	Normalized median
Mupad	24.69	1.02	22.00	1.00
Reduce	87.16	3.02	59.00	1.86
Sympy	122.85	1.48	27.00	1.12
Fricas	149.08	2.18	69.00	1.38
Rubi	150.02	0.97	102.00	1.00
Mathematica	156.85	1.04	111.00	1.07
Maxima	180.39	3.58	55.50	1.14
Maple	230.42	1.36	90.00	1.00
Giac	353.55	1.63	28.00	1.04

Table 1.6: Leaf size performance for each CAS

1.4 Performance based on number of rules Rubi used

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

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

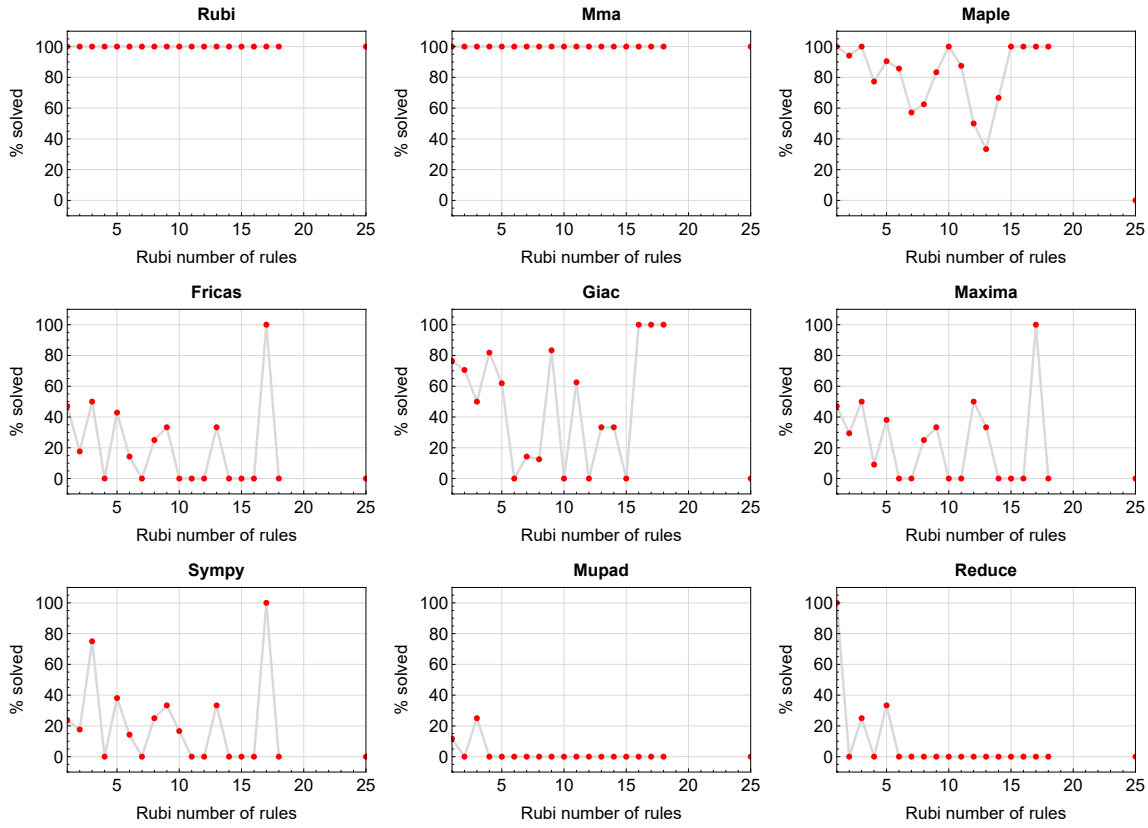


Figure 1.1: Solving statistics per number of Rubi rules used

1.5 Performance based on number of steps Rubi used

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

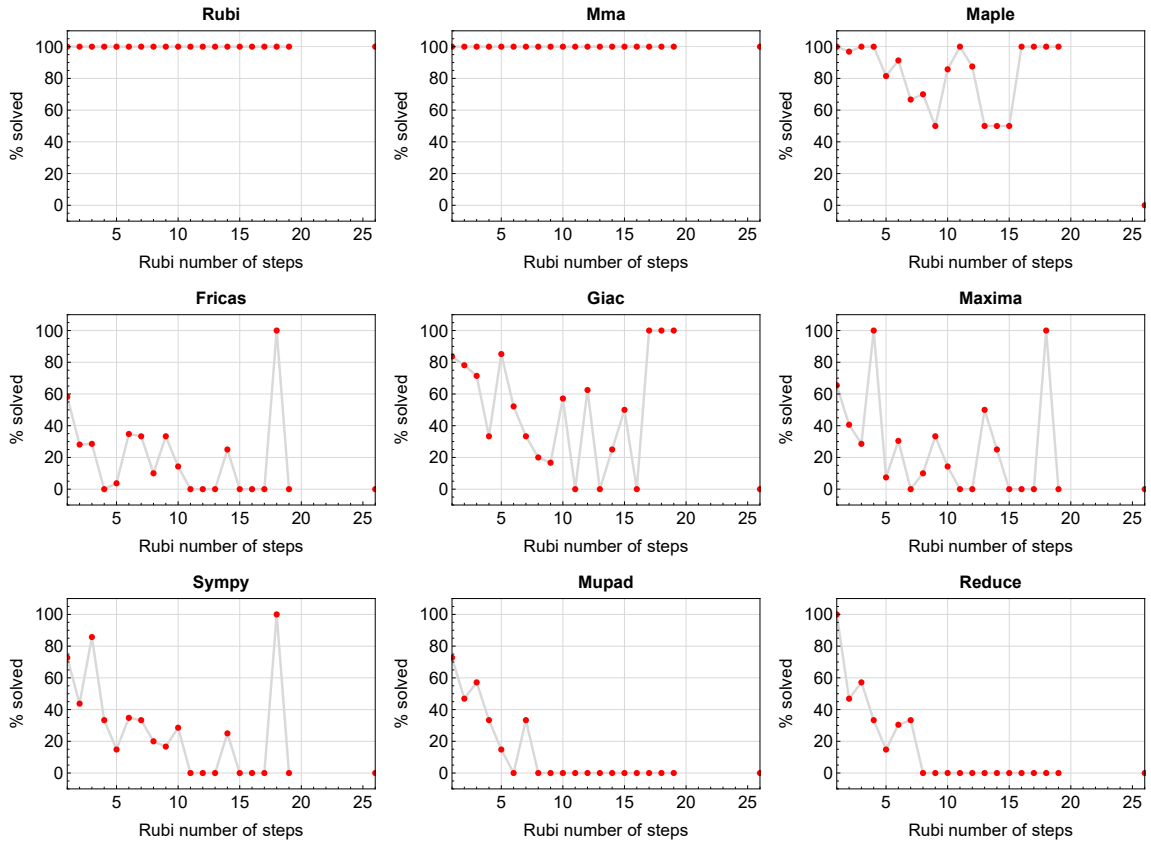


Figure 1.2: Solving statistics per number of Rubi steps used

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

1.6 Solved integrals histogram based on leaf size of result

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

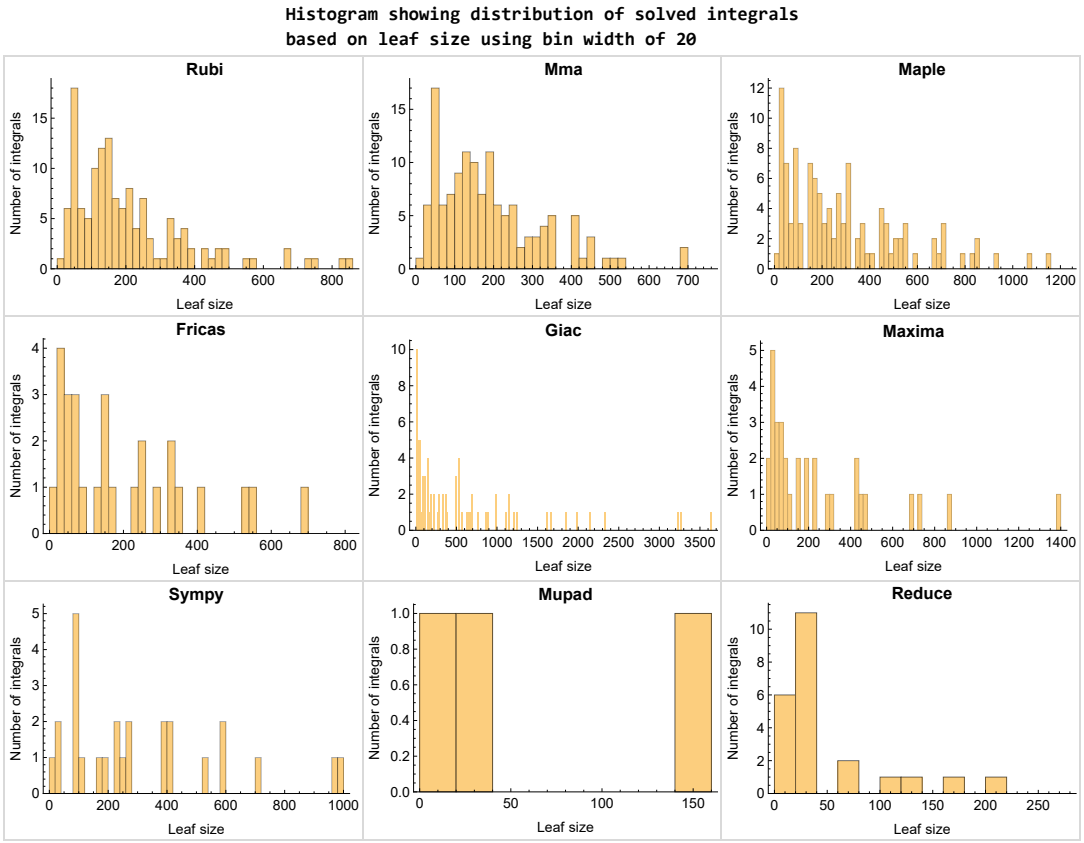


Figure 1.3: Solved integrals based on leaf size distribution

1.7 Solved integrals histogram based on CPU time used

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

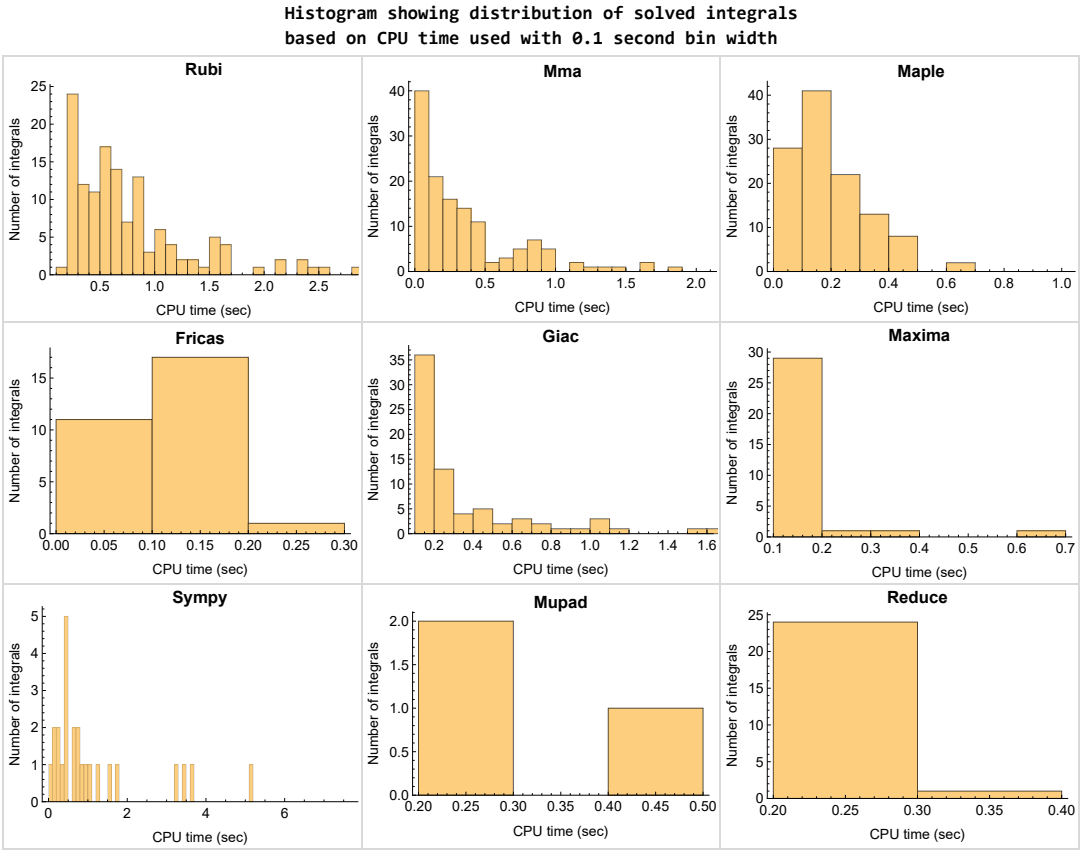


Figure 1.4: Solved integrals histogram based on CPU time used

1.8 Leaf size vs. CPU time used

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

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

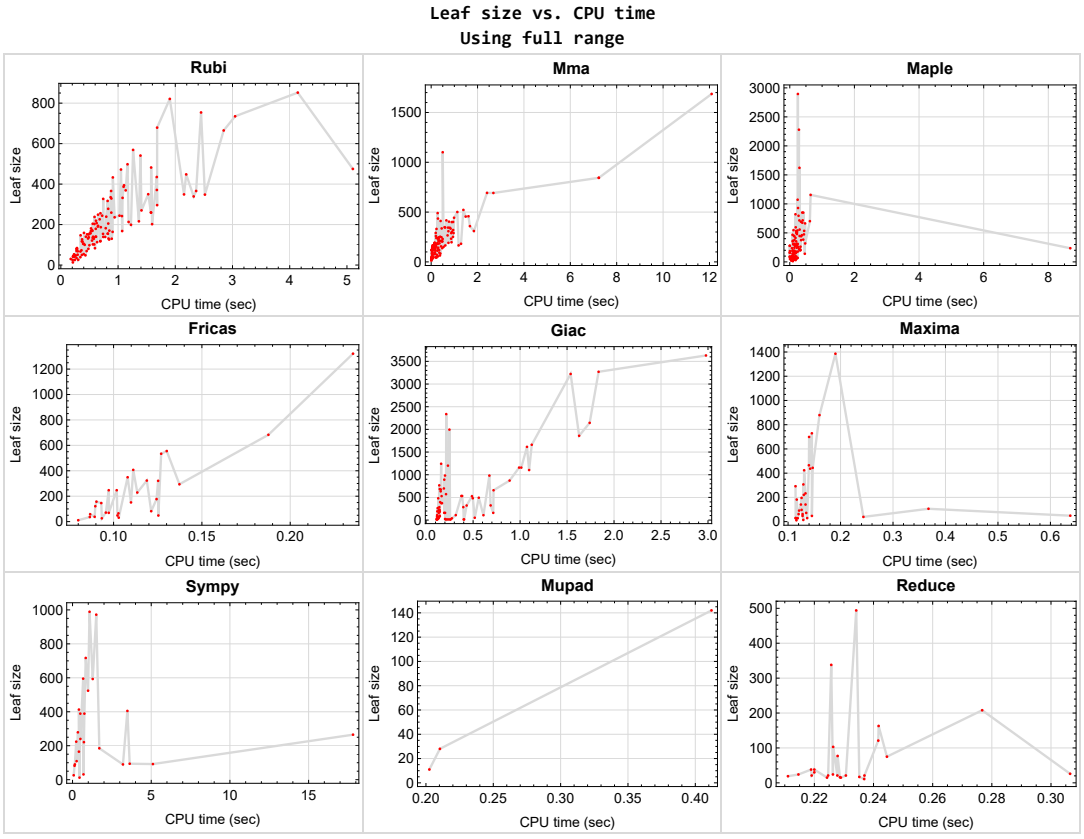


Figure 1.5: Leaf size vs. CPU time. Full range

1.9 list of integrals with no known antiderivative

{20, 21, 25, 26, 30, 31, 35, 36, 72, 73, 78, 79, 83, 84, 88, 89, 94, 95, 100, 101, 105, 106, 110, 111, 115, 116, 120, 121, 125, 126, 131, 132, 137, 138, 142, 143, 158, 159, 163, 164, 165, 166, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 185, 186, 189, 190, 194, 195, 198, 199}

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

Rubi {}

Mathematica {}

Maple {}

Maxima {}

Fricas {}

Sympy {}

Giac {}

Reduce {}

Mupad {}

1.11 list of integrals solved by CAS but failed verification

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

Rubi {}

Mathematica {169}

Maple {}

Maxima Verification phase not currently implemented.

Fricas Verification phase not currently implemented.

Sympy Verification phase not currently implemented.

Giac Verification phase not currently implemented.

Reduce Verification phase not currently implemented.

Mupad Verification phase not currently implemented.

1.12 Timing

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

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

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

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

1.13 Verification

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

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

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

1.14 Important notes about some of the results

Important note about Maxima results

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

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

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

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

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

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

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

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

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

Important note about FriCAS result

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

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

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

Important note about finding leaf size of antiderivative

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

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

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

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

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

  except Exception as ee:
        leafCount =1
```

Important note about Mupad results

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

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

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

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

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

1.15 Current tree layout of integration tests

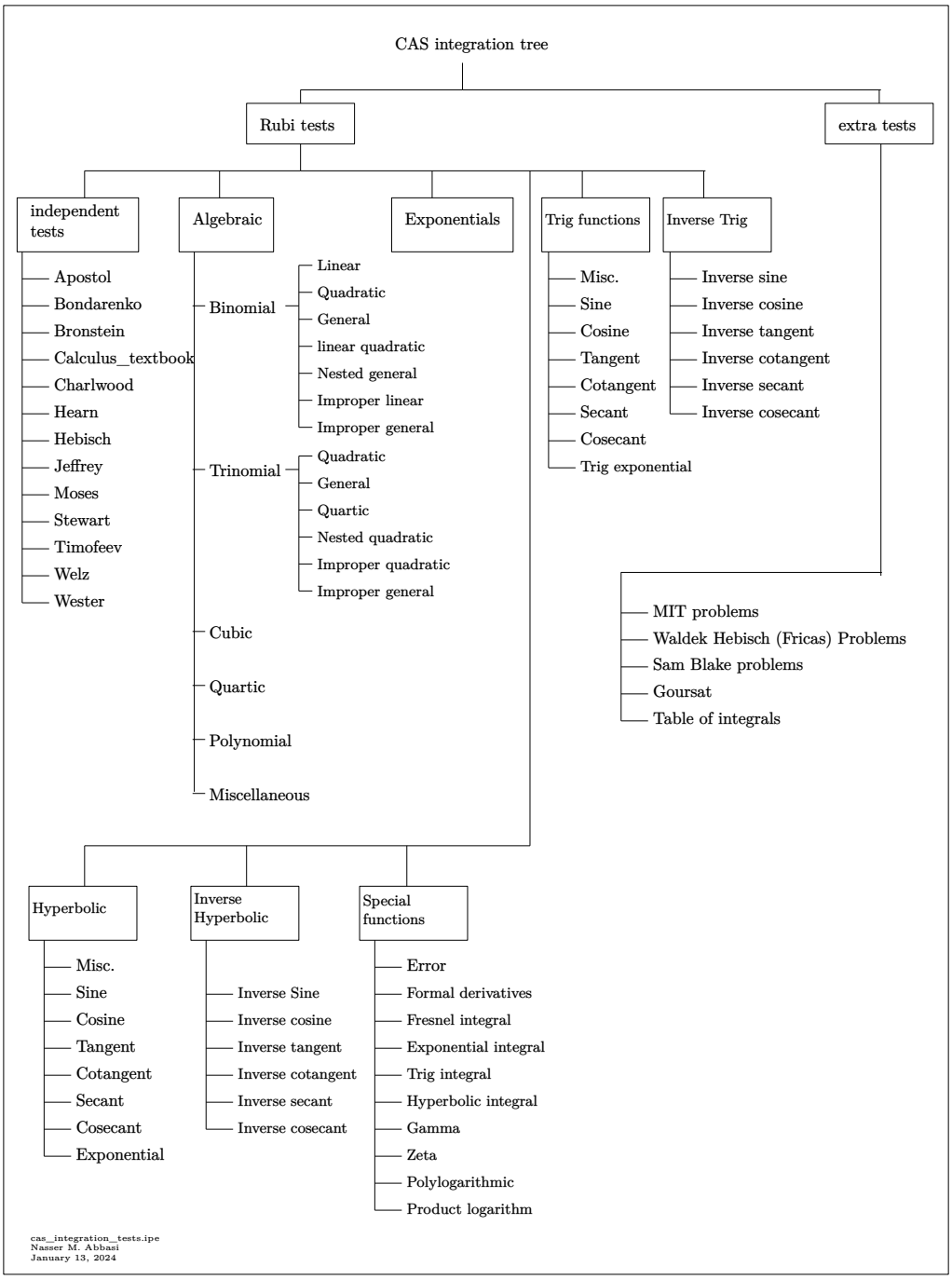
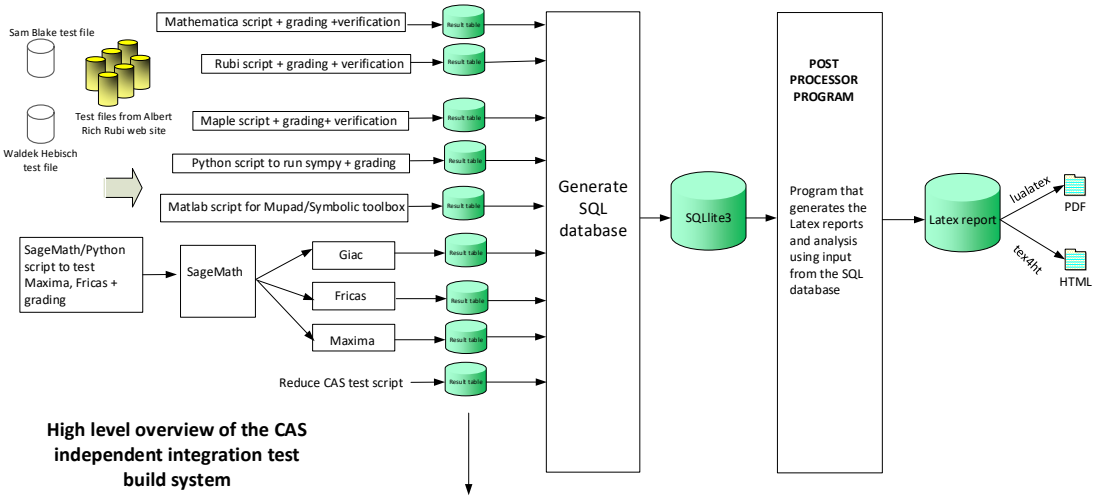


Figure 1.6: CAS integration tests tree

1.16 Design of the test system

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



High level overview of the CAS independent integration test build system

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

1. integer, the problem number.
2. integer. 0 for failed, 1 for passed, -1 for timeout, -2 for CAS specific exception. (this is not the grade field)
3. integer. Leaf size of result.
4. integer. Leaf size of the optimal antiderivative.
5. number. CPU time used to solve this integral. 0 if failed.
6. string. The integral in Latex format
7. string. The input used in CAS own syntax.
8. string. The result (antiderivative) produced by CAS in Latex format
9. string. The optimal antiderivative in Latex format.
10. integer. 0 or 1. Indicates if problem has known antiderivative or not
11. String. The result (antiderivative) in CAS own syntax.
12. String. The grade of the antiderivative. Can be “A”, “B”, “C”, or “F”
13. String. Small string description of why the grade was given.
14. integer. 1 if result was verified or 0 if not verified. (For mma, rubi and maple only)

*The following fields are present only in **Rubi** Table file*

15. integer. Number of steps used.
16. integer. Number of rules used.
17. integer. Integrand leaf size.
18. real number. Ratio. Field 16 over field 17
19. String of form “{n,n,..}” which is list of the rules used by Rubi
20. String. The optimal antiderivative in Mathematica syntx

Nasser M. Abbasi
January 13, 2024
Design.vsdx

CHAPTER 2

DETAILED SUMMARY TABLES OF RESULTS

2.1 List of integrals sorted by grade for each CAS 30
2.2 Detailed conclusion table per each integral for all CAS systems 35
2.3 Detailed conclusion table specific for Rubi results 85

2.1 List of integrals sorted by grade for each CAS

Rubi 30
Mma 31
Maple 31
Fricas 32
Maxima 32
Giac 33
Mupad 33
Sympy 34
Reduce 34

Rubi

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 27, 28, 29, 32, 33, 34, 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, 74, 75, 76, 77, 80, 81, 82, 85, 86, 87, 90, 91, 92, 93, 96, 97, 98, 99, 102, 103, 104, 107, 108, 109, 112, 113, 114, 117, 118, 119, 122, 123, 124, 127, 128, 129, 130, 133, 134, 135, 136, 139, 140, 141, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 160, 161, 162, 167, 168, 169, 182, 183, 184, 187, 188, 191, 192, 193, 196, 197 }

B grade { }

C grade { }

F normal fail { }

F(-1) timedout fail { }

F(-2) exception fail { }

Mma

A grade { 1, 2, 3, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 27, 28, 29, 32, 33, 34, 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, 74, 75, 76, 77, 104, 109, 114, 119, 124, 130, 135, 136, 141, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 160, 161, 162 }

B grade { 4, 5, 6 }

C grade { 80, 81, 82, 85, 86, 87, 90, 91, 92, 93, 96, 97, 98, 99, 102, 103, 107, 108, 112, 113, 117, 118, 122, 123, 127, 128, 129, 133, 134, 139, 140, 167, 168, 169, 182, 183, 184, 187, 188, 191, 192, 193, 196, 197 }

F normal fail { }

F(-1) timedout fail { }

F(-2) exception fail { }

Maple

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 22, 23, 24, 27, 28, 29, 32, 33, 34, 37, 38, 39, 41, 42, 43, 44, 45, 47, 49, 50, 54, 61, 65, 66, 67, 71, 77, 80, 81, 82, 85, 86, 90, 91, 92, 93, 96, 97, 98, 99, 104, 109, 114, 119, 124, 130, 136, 141, 144, 145, 146, 147, 148, 150, 151, 152, 153, 155, 156, 157, 160, 161, 162, 182, 183, 184, 191, 192, 193, 196, 197 }

B grade { 15, 40, 46, 48, 60, 62, 87, 187, 188 }

C grade { 51, 52, 53, 55, 56, 57, 58, 59, 63, 64, 68, 69, 70, 74, 75, 76, 149 }

F normal fail { 102, 103, 107, 108, 112, 113, 117, 118, 122, 123, 127, 128, 129, 133, 134, 135, 139, 140, 154, 167, 168, 169 }

F(-1) timedout fail { }

F(-2) exception fail { }

Fricas

A grade { 1, 2, 3, 7, 8, 9, 12, 13, 14, 49, 50, 71, 77, 119, 124, 136, 141, 144, 145, 146, 147, 148, 150, 151, 152, 153 }

B grade { 167, 168, 169 }

C grade { }

F normal fail { 4, 5, 6, 10, 11, 15, 16, 17, 18, 19, 22, 23, 24, 27, 28, 29, 32, 33, 34, 37, 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, 65, 66, 67, 68, 69, 70, 74, 75, 76, 149, 154, 155, 156, 157, 160, 161, 162 }

F(-1) timedout fail { }

F(-2) exception fail { 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, 120, 121, 122, 123, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 137, 138, 139, 140, 142, 143, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199 }

Maxima

A grade { 1, 2, 3, 40, 41, 42, 49, 50, 54, 55, 56, 60, 65, 66, 67, 77, 144, 145, 146, 147, 148, 150, 151, 152, 153 }

B grade { 7, 8, 9, 12, 13, 14, 46 }

C grade { }

F normal fail { 4, 5, 6, 10, 11, 15, 16, 17, 18, 19, 22, 23, 24, 27, 28, 29, 32, 33, 34, 37, 38, 39, 43, 44, 45, 47, 48, 51, 52, 53, 57, 58, 59, 61, 62, 63, 64, 68, 69, 70, 71, 74, 75, 76, 80, 81, 82, 85, 86, 87, 90, 91, 92, 93, 96, 97, 98, 99, 155, 156, 157, 160, 161, 162, 168, 169, 182, 183, 184, 187, 188, 191, 192, 193, 196, 197 }

F(-1) timedout fail { }

F(-2) exception fail { 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, 149, 154, 165, 166, 167, 170, 171, 172, 185, 189, 194 }

Giac

A grade { 1, 2, 3, 8, 9, 17, 18, 19, 22, 23, 24, 29, 49, 50, 54, 60, 65, 68, 69, 70, 104, 109, 114, 119, 124, 130, 136, 141, 146, 147, 148, 153, 155, 156, 157 }

B grade { 7, 12, 13, 14, 27, 28, 32, 33, 34, 74, 75, 76, 144, 145, 150, 151, 152, 160, 161, 162 }

C grade { 80, 81, 82, 85, 86, 87, 90, 91, 92, 93, 127, 128, 129, 182, 183, 184, 187, 188, 191, 192, 193 }

F normal fail { 66, 96, 97, 98, 99, 117, 118, 122, 123, 133, 134, 135, 139, 140, 196, 197 }

F(-1) timedout fail { 36, 101 }

F(-2) exception fail { 4, 5, 6, 10, 11, 15, 16, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 51, 52, 53, 55, 56, 57, 58, 59, 61, 62, 63, 64, 67, 71, 77, 102, 103, 107, 108, 112, 113, 149, 154, 166, 167, 168, 169, 171, 172, 173, 199 }

Mupad

A grade { }

B grade { 50, 148, 153 }

C grade { }

F normal fail { }

F(-1) timedout fail { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 27, 28, 29, 32, 33, 34, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 74, 75, 76, 77, 80, 81, 82, 85, 86, 87, 90, 91, 92, 93, 96, 97, 98, 99, 102, 103, 104, 107, 108, 109, 112, 113, 114, 117, 118, 119, 122, 123, 124, 127, 128, 129, 130, 133, 134, 135, 136, 139, 140, 141, 144, 145, 146, 147, 149, 150, 151, 152, 154, 155, 156, 157, 160, 161, 162, 167, 168, 169, 182, 183, 184, 187, 188, 191, 192, 193, 196, 197 }

F(-2) exception fail { }

Sympy

A grade { 1, 2, 3, 7, 8, 9, 37, 38, 39, 49, 50, 144, 145, 146, 147, 148, 150, 151, 152, 153 }

B grade { 12, 13, 14, 40, 44, 46 }

C grade { }

F normal fail { 4, 5, 10, 11, 15, 16, 17, 18, 19, 22, 23, 24, 27, 28, 29, 32, 33, 34, 41, 42, 45, 47, 48, 52, 53, 54, 55, 56, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 74, 75, 76, 77, 80, 81, 82, 85, 86, 87, 90, 91, 92, 93, 96, 97, 98, 99, 102, 103, 104, 108, 109, 117, 118, 119, 123, 124, 128, 129, 130, 134, 135, 136, 140, 141, 149, 154, 155, 156, 157, 160, 161, 162, 167, 168, 182, 183, 184, 187, 188, 191, 192, 193, 196, 197 }

F(-1) timedout fail { 6, 43, 51, 57, 107, 112, 113, 114, 115, 116, 122, 127, 133, 138, 139, 142, 143, 164, 169, 199 }

F(-2) exception fail { }

Reduce

A grade { }

B grade { 1, 2, 3, 40, 46, 50, 54, 60, 65, 71, 77, 104, 109, 114, 119, 124, 130, 136, 141, 144, 145, 146, 147, 148, 153 }

C grade { }

F normal fail { 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 27, 28, 29, 32, 33, 34, 37, 38, 39, 41, 42, 43, 44, 45, 47, 48, 49, 51, 52, 53, 55, 56, 57, 58, 59, 61, 62, 63, 64, 66, 67, 68, 69, 70, 74, 75, 76, 80, 81, 82, 85, 86, 87, 90, 91, 92, 93, 96, 97, 98, 99, 102, 103, 107, 108, 112, 113, 117, 118, 122, 123, 127, 128, 129, 133, 134, 135, 139, 140, 149, 150, 151, 152, 154, 155, 156, 157, 160, 161, 162, 167, 168, 169, 182, 183, 184, 187, 188, 191, 192, 193, 196, 197 }

F(-1) timedout fail { }

F(-2) exception fail { }

2.2 Detailed conclusion table per each integral for all CAS systems

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

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

Problem 1	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	175	167	119	162	307	157	221	224	163	0
N.S.	1	0.95	0.68	0.93	1.75	0.90	1.26	1.28	0.93	0.00
time (sec)	N/A	0.524	0.122	0.134	0.129	0.090	0.723	0.135	0.242	0.000

Problem 2	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	131	127	95	119	196	121	165	158	121	0
N.S.	1	0.97	0.73	0.91	1.50	0.92	1.26	1.21	0.92	0.00
time (sec)	N/A	0.371	0.059	0.117	0.126	0.090	0.404	0.134	0.242	0.000

Problem 3	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	77	79	88	80	97	71	90	80	77	0
N.S.	1	1.03	1.14	1.04	1.26	0.92	1.17	1.04	1.00	0.00
time (sec)	N/A	0.285	0.043	0.057	0.126	0.096	0.147	0.121	0.228	0.000

Problem 4	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	B	A	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	84	73	207	140	0	0	0	0	54	0
N.S.	1	0.87	2.46	1.67	0.00	0.00	0.00	0.00	0.64	0.00
time (sec)	N/A	0.360	0.479	0.465	0.000	0.000	0.000	0.000	0.206	0.000

Problem 5	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	B	A	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	141	130	334	201	0	0	0	0	148	0
N.S.	1	0.92	2.37	1.43	0.00	0.00	0.00	0.00	1.05	0.00
time (sec)	N/A	0.576	0.838	0.326	0.000	0.000	0.000	0.000	0.248	0.000

Problem 6	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	B	A	F	F	F(-1)	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	196	182	501	262	0	0	0	0	262	0
N.S.	1	0.93	2.56	1.34	0.00	0.00	0.00	0.00	1.34	0.00
time (sec)	N/A	0.784	1.128	0.332	0.000	0.000	0.000	0.000	0.221	0.000

Problem 7	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	A	A	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	298	350	241	384	729	323	524	528	279	0
N.S.	1	1.17	0.81	1.29	2.45	1.08	1.76	1.77	0.94	0.00
time (sec)	N/A	1.527	0.255	0.417	0.145	0.119	0.986	0.165	0.248	0.000

Problem 8	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	219	244	193	275	465	247	389	374	213	0
N.S.	1	1.11	0.88	1.26	2.12	1.13	1.78	1.71	0.97	0.00
time (sec)	N/A	1.025	0.148	0.184	0.140	0.097	0.494	0.162	0.227	0.000

Problem 9	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	128	140	137	173	233	146	224	196	145	0
N.S.	1	1.09	1.07	1.35	1.82	1.14	1.75	1.53	1.13	0.00
time (sec)	N/A	0.564	0.119	0.156	0.133	0.093	0.235	0.146	0.218	0.000

Problem 10	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	156	135	302	375	0	0	0	0	85	0
N.S.	1	0.87	1.94	2.40	0.00	0.00	0.00	0.00	0.54	0.00
time (sec)	N/A	0.575	0.894	0.350	0.000	0.000	0.000	0.000	0.219	0.000

Problem 11	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	230	213	458	446	0	0	0	0	233	0
N.S.	1	0.93	1.99	1.94	0.00	0.00	0.00	0.00	1.01	0.00
time (sec)	N/A	1.184	1.609	0.303	0.000	0.000	0.000	0.000	0.262	0.000

Problem 12	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	A	B	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	446	665	411	715	1386	534	972	982	423	0
N.S.	1	1.49	0.92	1.60	3.11	1.20	2.18	2.20	0.95	0.00
time (sec)	N/A	2.846	0.407	0.297	0.190	0.127	1.507	0.201	0.278	0.000

Problem 13	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	A	B	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	330	435	331	508	879	407	717	697	332	0
N.S.	1	1.32	1.00	1.54	2.66	1.23	2.17	2.11	1.01	0.00
time (sec)	N/A	1.676	0.230	0.223	0.160	0.111	0.838	0.189	0.237	0.000

Problem 14	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	B	A	B	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	196	236	239	313	444	247	413	372	239	0
N.S.	1	1.20	1.22	1.60	2.27	1.26	2.11	1.90	1.22	0.00
time (sec)	N/A	0.940	0.223	0.211	0.147	0.102	0.406	0.169	0.237	0.000

Problem 15	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	234	205	443	675	0	0	0	0	114	0
N.S.	1	0.88	1.89	2.88	0.00	0.00	0.00	0.00	0.49	0.00
time (sec)	N/A	0.829	0.988	0.387	0.000	0.000	0.000	0.000	0.234	0.000

Problem 16	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	393	349	693	851	0	0	0	0	312	0
N.S.	1	0.89	1.76	2.17	0.00	0.00	0.00	0.00	0.79	0.00
time (sec)	N/A	2.153	2.409	0.386	0.000	0.000	0.000	0.000	0.232	0.000

Problem 17	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	67	50	43	42	0	0	0	59	64	0
N.S.	1	0.75	0.64	0.63	0.00	0.00	0.00	0.88	0.96	0.00
time (sec)	N/A	0.368	0.230	0.128	0.000	0.000	0.000	0.129	0.222	0.000

Problem 18	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	50	39	34	33	0	0	0	44	46	0
N.S.	1	0.78	0.68	0.66	0.00	0.00	0.00	0.88	0.92	0.00
time (sec)	N/A	0.342	0.067	0.080	0.000	0.000	0.000	0.129	0.235	0.000

Problem 19	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	26	23	22	0	0	0	25	28	0
N.S.	1	0.90	0.79	0.76	0.00	0.00	0.00	0.86	0.97	0.00
time (sec)	N/A	0.304	0.020	0.046	0.000	0.000	0.000	0.127	0.261	0.000

Problem 20	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	22	20	25	24	22	24	27	22
N.S.	1	1.00	1.10	1.00	1.25	1.20	1.10	1.20	1.35	1.10
time (sec)	N/A	0.213	1.882	0.223	0.224	0.074	0.887	0.406	0.224	0.174

Problem 21	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	22	20	23	36	36	23	36	22
N.S.	1	1.00	1.10	1.00	1.15	1.80	1.80	1.15	1.80	1.10
time (sec)	N/A	0.203	5.388	0.407	0.218	0.082	1.242	1.504	0.225	0.177

Problem 22	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	80	83	105	0	0	0	95	64	0
N.S.	1	0.84	0.87	1.11	0.00	0.00	0.00	1.00	0.67	0.00
time (sec)	N/A	0.481	0.397	0.090	0.000	0.000	0.000	0.145	0.244	0.000

Problem 23	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	78	69	70	83	0	0	0	81	46	0
N.S.	1	0.88	0.90	1.06	0.00	0.00	0.00	1.04	0.59	0.00
time (sec)	N/A	0.451	0.256	0.070	0.000	0.000	0.000	0.146	0.228	0.000

Problem 24	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	55	54	55	59	0	0	0	49	28	0
N.S.	1	0.98	1.00	1.07	0.00	0.00	0.00	0.89	0.51	0.00
time (sec)	N/A	0.399	0.289	0.046	0.000	0.000	0.000	0.133	0.227	0.000

Problem 25	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	22	20	153	24	26	24	31	22
N.S.	1	1.00	1.10	1.00	7.65	1.20	1.30	1.20	1.55	1.10
time (sec)	N/A	0.353	3.122	0.220	0.432	0.086	1.099	0.484	0.213	0.176

Problem 26	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	22	20	202	36	41	23	42	22
N.S.	1	1.00	1.10	1.00	10.10	1.80	2.05	1.15	2.10	1.10
time (sec)	N/A	0.334	10.834	0.408	0.506	0.077	1.735	1.970	0.252	0.197

Problem 27	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	269	207	182	187	0	0	0	673	80	0
N.S.	1	0.77	0.68	0.70	0.00	0.00	0.00	2.50	0.30	0.00
time (sec)	N/A	0.626	1.288	0.092	0.000	0.000	0.000	0.156	0.261	0.000

Problem 28	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	201	157	138	141	0	0	0	395	58	0
N.S.	1	0.78	0.69	0.70	0.00	0.00	0.00	1.97	0.29	0.00
time (sec)	N/A	0.520	0.479	0.083	0.000	0.000	0.000	0.149	0.224	0.000

Problem 29	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	125	105	92	93	0	0	0	177	36	0
N.S.	1	0.84	0.74	0.74	0.00	0.00	0.00	1.42	0.29	0.00
time (sec)	N/A	0.400	0.158	0.050	0.000	0.000	0.000	0.143	0.210	0.000

Problem 30	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	24	29	39	36	28	40	26
N.S.	1	1.00	1.08	1.00	1.21	1.62	1.50	1.17	1.67	1.08
time (sec)	N/A	0.206	2.954	0.221	0.226	0.075	2.034	2.847	0.220	0.177

Problem 31	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	24	27	67	61	27	58	26
N.S.	1	1.00	1.08	1.00	1.12	2.79	2.54	1.12	2.42	1.08
time (sec)	N/A	0.209	22.430	0.530	0.241	0.079	3.534	175.921	0.223	0.181

Problem 32	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	304	244	310	467	0	0	0	1995	136	0
N.S.	1	0.80	1.02	1.54	0.00	0.00	0.00	6.56	0.45	0.00
time (sec)	N/A	0.722	1.843	0.084	0.000	0.000	0.000	0.248	0.251	0.000

Problem 33	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	236	194	233	353	0	0	0	1200	100	0
N.S.	1	0.82	0.99	1.50	0.00	0.00	0.00	5.08	0.42	0.00
time (sec)	N/A	0.651	0.861	0.089	0.000	0.000	0.000	0.232	0.257	0.000

Problem 34	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	140	122	237	0	0	0	571	64	0
N.S.	1	0.89	0.77	1.50	0.00	0.00	0.00	3.61	0.41	0.00
time (sec)	N/A	0.608	0.311	0.067	0.000	0.000	0.000	0.212	0.257	0.000

Problem 35	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	24	236	71	73	28	74	26
N.S.	1	1.00	1.08	1.00	9.83	2.96	3.04	1.17	3.08	1.08
time (sec)	N/A	0.397	21.791	0.225	0.537	0.078	4.848	8.055	0.247	0.176

Problem 36	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	F(-1)	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	24	345	119	121	0	112	26
N.S.	1	1.00	1.08	1.00	14.38	4.96	5.04	0.00	4.67	1.08
time (sec)	N/A	0.397	42.087	0.605	0.603	0.086	19.047	0.000	0.225	0.177

Problem 37	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	A	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	178	190	156	204	0	0	265	0	150	0
N.S.	1	1.07	0.88	1.15	0.00	0.00	1.49	0.00	0.84	0.00
time (sec)	N/A	0.647	0.427	0.332	0.000	0.000	17.822	0.000	0.254	0.000

Problem 38	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	A	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	131	112	152	0	0	185	0	101	0
N.S.	1	1.07	0.92	1.25	0.00	0.00	1.52	0.00	0.83	0.00
time (sec)	N/A	0.475	0.270	0.184	0.000	0.000	1.702	0.000	0.245	0.000

Problem 39	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	A	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	87	97	0	0	92	0	51	0
N.S.	1	1.00	1.28	1.43	0.00	0.00	1.35	0.00	0.75	0.00
time (sec)	N/A	0.295	0.031	0.172	0.000	0.000	5.106	0.000	0.224	0.000

Problem 40	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	F	B	F(-2)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	25	49	28	0	90	0	24	0
N.S.	1	1.00	1.00	1.96	1.12	0.00	3.60	0.00	0.96	0.00
time (sec)	N/A	0.206	0.008	0.170	0.118	0.000	3.202	0.000	0.226	0.000

Problem 41	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	53	53	92	62	0	0	0	80	0
N.S.	1	1.00	1.00	1.74	1.17	0.00	0.00	0.00	1.51	0.00
time (sec)	N/A	0.231	0.029	0.204	0.120	0.000	0.000	0.000	0.232	0.000

Problem 42	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	117	135	168	141	0	0	0	197	0
N.S.	1	1.04	1.21	1.50	1.26	0.00	0.00	0.00	1.76	0.00
time (sec)	N/A	0.367	0.175	0.209	0.133	0.000	0.000	0.000	0.248	0.000

Problem 43	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F(-1)	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	168	181	176	244	0	0	0	0	355	0
N.S.	1	1.08	1.05	1.45	0.00	0.00	0.00	0.00	2.11	0.00
time (sec)	N/A	0.528	0.191	0.217	0.000	0.000	0.000	0.000	0.224	0.000

Problem 44	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	B	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	215	259	204	293	0	0	405	0	166	0
N.S.	1	1.20	0.95	1.36	0.00	0.00	1.88	0.00	0.77	0.00
time (sec)	N/A	0.882	0.476	0.224	0.000	0.000	3.486	0.000	0.252	0.000

Problem 45	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	124	121	165	178	0	0	0	0	82	0
N.S.	1	0.98	1.33	1.44	0.00	0.00	0.00	0.00	0.66	0.00
time (sec)	N/A	0.545	0.056	0.247	0.000	0.000	0.000	0.000	0.255	0.000

Problem 46	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	B	F	B	F(-2)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	25	25	25	68	47	0	94	0	38	0
N.S.	1	1.00	1.00	2.72	1.88	0.00	3.76	0.00	1.52	0.00
time (sec)	N/A	0.243	0.011	0.246	0.128	0.000	3.632	0.000	0.220	0.000

Problem 47	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	114	113	166	224	0	0	0	0	142	0
N.S.	1	0.99	1.46	1.96	0.00	0.00	0.00	0.00	1.25	0.00
time (sec)	N/A	0.633	1.183	0.286	0.000	0.000	0.000	0.000	0.226	0.000

Problem 48	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	216	216	308	1622	0	0	0	0	361	0
N.S.	1	1.00	1.43	7.51	0.00	0.00	0.00	0.00	1.67	0.00
time (sec)	N/A	1.364	0.743	0.299	0.000	0.000	0.000	0.000	0.246	0.000

Problem 49	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	34	34	30	31	30	26	31	27	13	0
N.S.	1	1.00	0.88	0.91	0.88	0.76	0.91	0.79	0.38	0.00
time (sec)	N/A	0.275	0.007	0.181	0.115	0.093	0.696	0.119	0.236	0.000

Problem 50	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	13	13	13	12	11	11	12	11	11	11
N.S.	1	1.00	1.00	0.92	0.85	0.85	0.92	0.85	0.85	0.85
time (sec)	N/A	0.210	0.005	0.095	0.116	0.080	0.444	0.112	0.237	0.203

Problem 51	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F(-1)	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	262	278	266	691	0	0	0	0	150	0
N.S.	1	1.06	1.02	2.64	0.00	0.00	0.00	0.00	0.57	0.00
time (sec)	N/A	0.827	0.708	0.346	0.000	0.000	0.000	0.000	0.261	0.000

Problem 52	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	185	204	210	480	0	0	0	0	101	0
N.S.	1	1.10	1.14	2.59	0.00	0.00	0.00	0.00	0.55	0.00
time (sec)	N/A	0.557	0.422	0.223	0.000	0.000	0.000	0.000	0.233	0.000

Problem 53	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	116	116	111	280	0	0	0	0	51	0
N.S.	1	1.00	0.96	2.41	0.00	0.00	0.00	0.00	0.44	0.00
time (sec)	N/A	0.379	0.032	0.167	0.000	0.000	0.000	0.000	0.226	0.000

Problem 54	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	F	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	49	49	50	86	28	0	0	24	24	0
N.S.	1	1.00	1.02	1.76	0.57	0.00	0.00	0.49	0.49	0.00
time (sec)	N/A	0.234	0.082	0.123	0.114	0.000	0.000	0.202	0.215	0.000

Problem 55	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	A	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	80	80	77	177	62	0	0	0	80	0
N.S.	1	1.00	0.96	2.21	0.78	0.00	0.00	0.00	1.00	0.00
time (sec)	N/A	0.272	0.159	0.189	0.128	0.000	0.000	0.000	0.260	0.000

Problem 56	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	A	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	154	159	113	1072	141	0	0	0	197	0
N.S.	1	1.03	0.73	6.96	0.92	0.00	0.00	0.00	1.28	0.00
time (sec)	N/A	0.404	0.183	0.243	0.124	0.000	0.000	0.000	0.243	0.000

Problem 57	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F(-1)	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	225	238	154	2279	0	0	0	0	355	0
N.S.	1	1.06	0.68	10.13	0.00	0.00	0.00	0.00	1.58	0.00
time (sec)	N/A	0.589	0.216	0.283	0.000	0.000	0.000	0.000	0.231	0.000

Problem 58	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	296	332	247	929	0	0	0	0	166	0
N.S.	1	1.12	0.83	3.14	0.00	0.00	0.00	0.00	0.56	0.00
time (sec)	N/A	1.079	0.444	0.255	0.000	0.000	0.000	0.000	0.251	0.000

Problem 59	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	192	169	128	531	0	0	0	0	82	0
N.S.	1	0.88	0.67	2.77	0.00	0.00	0.00	0.00	0.43	0.00
time (sec)	N/A	0.552	0.140	0.197	0.000	0.000	0.000	0.000	0.242	0.000

Problem 60	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	A	F	F	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	49	49	64	143	47	0	0	38	38	0
N.S.	1	1.00	1.31	2.92	0.96	0.00	0.00	0.78	0.78	0.00
time (sec)	N/A	0.234	0.378	0.157	0.145	0.000	0.000	0.274	0.219	0.000

Problem 61	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	195	140	165	354	0	0	0	0	142	0
N.S.	1	0.72	0.85	1.82	0.00	0.00	0.00	0.00	0.73	0.00
time (sec)	N/A	0.615	0.610	0.198	0.000	0.000	0.000	0.000	0.235	0.000

Problem 62	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	B	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	311	270	320	2895	0	0	0	0	361	0
N.S.	1	0.87	1.03	9.31	0.00	0.00	0.00	0.00	1.16	0.00
time (sec)	N/A	1.409	0.948	0.251	0.000	0.000	0.000	0.000	0.269	0.000

Problem 63	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	351	366	138	474	0	0	0	0	53	0
N.S.	1	1.04	0.39	1.35	0.00	0.00	0.00	0.00	0.15	0.00
time (sec)	N/A	2.364	0.283	0.438	0.000	0.000	0.000	0.000	0.240	0.000

Problem 64	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	215	170	114	260	0	0	0	0	23	0
N.S.	1	0.79	0.53	1.21	0.00	0.00	0.00	0.00	0.11	0.00
time (sec)	N/A	0.847	0.038	0.262	0.000	0.000	0.000	0.000	0.230	0.000

Problem 65	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	F	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	42	52	14	0	0	14	16	0
N.S.	1	1.00	1.00	1.24	0.33	0.00	0.00	0.33	0.38	0.00
time (sec)	N/A	0.222	0.053	0.208	0.129	0.000	0.000	0.208	0.229	0.000

Problem 66	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	238	154	157	203	49	0	0	0	52	0
N.S.	1	0.65	0.66	0.85	0.21	0.00	0.00	0.00	0.22	0.00
time (sec)	N/A	0.737	0.196	0.304	0.638	0.000	0.000	0.000	0.245	0.000

Problem 67	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	388	296	211	535	106	0	0	0	68	0
N.S.	1	0.76	0.54	1.38	0.27	0.00	0.00	0.00	0.18	0.00
time (sec)	N/A	1.682	0.435	0.445	0.368	0.000	0.000	0.000	0.249	0.000

Problem 68	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	430	203	197	318	0	0	0	525	94	0
N.S.	1	0.47	0.46	0.74	0.00	0.00	0.00	1.22	0.22	0.00
time (sec)	N/A	0.588	0.878	0.476	0.000	0.000	0.000	0.488	0.258	0.000

Problem 69	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	294	151	151	243	0	0	0	285	61	0
N.S.	1	0.51	0.51	0.83	0.00	0.00	0.00	0.97	0.21	0.00
time (sec)	N/A	0.485	0.536	0.142	0.000	0.000	0.000	0.396	0.237	0.000

Problem 70	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	169	100	92	169	0	0	0	109	27	0
N.S.	1	0.59	0.54	1.00	0.00	0.00	0.00	0.64	0.16	0.00
time (sec)	N/A	0.417	0.352	0.126	0.000	0.000	0.000	0.316	0.249	0.000

Problem 71	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	A	F	F(-2)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	45	58	0	58	0	0	21	0
N.S.	1	1.00	1.00	1.29	0.00	1.29	0.00	0.00	0.47	0.00
time (sec)	N/A	0.242	0.183	0.120	0.000	0.087	0.000	0.000	0.228	0.000

Problem 72	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	28	24	26	81	27	26	88	26
N.S.	1	1.00	1.08	0.92	1.00	3.12	1.04	1.00	3.38	1.00
time (sec)	N/A	0.236	6.067	0.230	0.255	0.090	3.977	0.208	0.224	0.146

Problem 73	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	28	24	26	108	27	26	129	26
N.S.	1	1.00	1.08	0.92	1.00	4.15	1.04	1.00	4.96	1.00
time (sec)	N/A	0.231	3.713	0.670	0.295	0.096	9.047	0.236	0.237	0.145

Problem 74	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	429	239	343	716	0	0	0	1615	136	0
N.S.	1	0.56	0.80	1.67	0.00	0.00	0.00	3.76	0.32	0.00
time (sec)	N/A	0.794	0.805	0.400	0.000	0.000	0.000	1.074	0.262	0.000

Problem 75	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	288	187	230	500	0	0	0	871	89	0
N.S.	1	0.65	0.80	1.74	0.00	0.00	0.00	3.02	0.31	0.00
time (sec)	N/A	0.698	0.495	0.200	0.000	0.000	0.000	0.888	0.264	0.000

Problem 76	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F	F	F	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	163	131	118	281	0	0	0	323	41	0
N.S.	1	0.80	0.72	1.72	0.00	0.00	0.00	1.98	0.25	0.00
time (sec)	N/A	0.833	0.346	0.159	0.000	0.000	0.000	0.687	0.287	0.000

Problem 77	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	F	F(-2)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	47	47	47	58	39	69	0	0	26	0
N.S.	1	1.00	1.00	1.23	0.83	1.47	0.00	0.00	0.55	0.00
time (sec)	N/A	0.261	0.203	0.101	0.244	0.097	0.000	0.000	0.306	0.000

Problem 78	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	28	24	238	133	29	26	144	26
N.S.	1	1.00	1.08	0.92	9.15	5.12	1.12	1.00	5.54	1.00
time (sec)	N/A	0.440	11.681	0.210	0.665	0.083	14.142	0.312	0.285	0.171

Problem 79	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	28	24	318	178	29	26	216	26
N.S.	1	1.00	1.08	0.92	12.23	6.85	1.12	1.00	8.31	1.00
time (sec)	N/A	0.446	14.350	0.640	0.817	0.095	30.805	0.352	0.305	0.180

Problem 80	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	665	735	344	542	0	0	0	1859	55	0
N.S.	1	1.11	0.52	0.82	0.00	0.00	0.00	2.80	0.08	0.00
time (sec)	N/A	3.046	0.730	0.239	0.000	0.000	0.000	1.629	0.306	0.000

Problem 81	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	381	371	227	364	0	0	0	1103	34	0
N.S.	1	0.97	0.60	0.96	0.00	0.00	0.00	2.90	0.09	0.00
time (sec)	N/A	1.678	0.314	0.096	0.000	0.000	0.000	1.096	0.272	0.000

Problem 82	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	120	118	119	187	0	0	0	531	11	0
N.S.	1	0.98	0.99	1.56	0.00	0.00	0.00	4.42	0.09	0.00
time (sec)	N/A	0.689	0.024	0.003	0.000	0.000	0.000	0.375	0.232	0.000

Problem 83	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	28	24	29	0	24	28	28	26
N.S.	1	1.00	1.08	0.92	1.12	0.00	0.92	1.08	1.08	1.00
time (sec)	N/A	0.258	5.081	0.157	0.408	0.000	0.671	1.391	0.244	0.143

Problem 84	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	28	24	27	0	32	27	35	26
N.S.	1	1.00	1.08	0.92	1.04	0.00	1.23	1.04	1.35	1.00
time (sec)	N/A	0.731	43.796	0.229	0.473	0.000	1.816	8.736	0.242	0.177

Problem 85	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	680	852	1686	821	0	0	0	3630	126	0
N.S.	1	1.25	2.48	1.21	0.00	0.00	0.00	5.34	0.19	0.00
time (sec)	N/A	4.140	12.093	0.176	0.000	0.000	0.000	2.978	0.374	0.000

Problem 86	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	348	448	844	548	0	0	0	2144	80	0
N.S.	1	1.29	2.43	1.57	0.00	0.00	0.00	6.16	0.23	0.00
time (sec)	N/A	2.191	7.227	0.115	0.000	0.000	0.000	1.741	0.298	0.000

Problem 87	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	B	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	159	155	289	278	0	0	0	1157	32	0
N.S.	1	0.97	1.82	1.75	0.00	0.00	0.00	7.28	0.20	0.00
time (sec)	N/A	0.822	0.867	0.000	0.000	0.000	0.000	0.990	0.276	0.000

Problem 88	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	28	24	29	0	54	28	61	26
N.S.	1	1.00	1.08	0.92	1.12	0.00	2.08	1.08	2.35	1.00
time (sec)	N/A	0.234	7.364	0.148	0.563	0.000	5.709	1.354	0.246	0.147

Problem 89	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	28	24	27	0	71	27	75	26
N.S.	1	1.00	1.08	0.92	1.04	0.00	2.73	1.04	2.88	1.00
time (sec)	N/A	0.850	64.284	0.255	0.612	0.000	10.588	6.732	0.240	0.178

Problem 90	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	471	433	455	413	0	0	0	657	117	0
N.S.	1	0.92	0.97	0.88	0.00	0.00	0.00	1.39	0.25	0.00
time (sec)	N/A	0.909	1.487	0.177	0.000	0.000	0.000	0.718	0.276	0.000

Problem 91	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	353	327	345	307	0	0	0	493	86	0
N.S.	1	0.93	0.98	0.87	0.00	0.00	0.00	1.40	0.24	0.00
time (sec)	N/A	0.740	0.604	0.113	0.000	0.000	0.000	0.560	0.301	0.000

Problem 92	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	227	219	229	198	0	0	0	321	55	0
N.S.	1	0.96	1.01	0.87	0.00	0.00	0.00	1.41	0.24	0.00
time (sec)	N/A	0.614	0.314	0.092	0.000	0.000	0.000	0.431	0.245	0.000

Problem 93	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	102	121	90	0	0	0	159	22	0
N.S.	1	1.01	1.20	0.89	0.00	0.00	0.00	1.57	0.22	0.00
time (sec)	N/A	0.559	0.024	0.000	0.000	0.000	0.000	0.202	0.238	0.000

Problem 94	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	28	24	29	0	36	28	50	26
N.S.	1	1.00	1.08	0.92	1.12	0.00	1.38	1.08	1.92	1.00
time (sec)	N/A	0.253	0.519	0.153	0.422	0.000	1.833	1.584	0.246	0.143

Problem 95	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	28	24	27	0	56	27	68	26
N.S.	1	1.00	1.08	0.92	1.04	0.00	2.15	1.04	2.62	1.00
time (sec)	N/A	0.251	0.735	0.198	0.603	0.000	3.768	14.571	0.230	0.172

Problem 96	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	508	472	692	596	0	0	0	0	0	0
N.S.	1	0.93	1.36	1.17	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.051	2.683	0.184	0.000	0.000	0.000	0.000	0.573	0.000

Problem 97	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	390	366	522	451	0	0	0	0	0	0
N.S.	1	0.94	1.34	1.16	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.878	1.389	0.125	0.000	0.000	0.000	0.000	0.513	0.000

Problem 98	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	253	256	348	304	0	0	0	0	1522	0
N.S.	1	1.01	1.38	1.20	0.00	0.00	0.00	0.00	6.02	0.00
time (sec)	N/A	0.692	0.578	0.105	0.000	0.000	0.000	0.000	0.425	0.000

Problem 99	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	139	167	158	0	0	0	0	169	0
N.S.	1	1.01	1.22	1.15	0.00	0.00	0.00	0.00	1.23	0.00
time (sec)	N/A	0.741	0.094	0.000	0.000	0.000	0.000	0.000	0.267	0.000

Problem 100	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	28	24	29	0	83	28	84	26
N.S.	1	1.00	1.08	0.92	1.12	0.00	3.19	1.08	3.23	1.00
time (sec)	N/A	0.431	0.569	0.151	0.483	0.000	4.467	7.608	0.236	0.148

Problem 101	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	F(-1)	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	26	26	28	24	27	0	133	0	122	26
N.S.	1	1.00	1.08	0.92	1.04	0.00	5.12	0.00	4.69	1.00
time (sec)	N/A	0.442	0.781	0.256	0.520	0.000	16.281	0.000	0.311	0.176

Problem 102	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	227	260	166	0	0	0	0	0	51	0
N.S.	1	1.15	0.73	0.00	0.00	0.00	0.00	0.00	0.22	0.00
time (sec)	N/A	1.574	0.176	0.000	0.000	0.000	0.000	0.000	0.271	0.000

Problem 103	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	130	130	138	0	0	0	0	0	22	0
N.S.	1	1.00	1.06	0.00	0.00	0.00	0.00	0.00	0.17	0.00
time (sec)	N/A	0.889	0.043	0.000	0.000	0.000	0.000	0.000	0.235	0.000

Problem 104	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	F(-2)	F	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	44	38	0	0	0	14	19	0
N.S.	1	1.00	1.00	0.86	0.00	0.00	0.00	0.32	0.43	0.00
time (sec)	N/A	0.234	0.052	0.096	0.000	0.000	0.000	0.260	0.211	0.000

Problem 105	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	26	22	44	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	1.08	0.92	1.83	0.92
time (sec)	N/A	0.392	1.649	0.355	0.000	0.000	2.994	0.423	0.242	0.149

Problem 106	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	26	22	53	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	1.08	0.92	2.21	0.92
time (sec)	N/A	0.668	1.977	0.402	0.000	0.000	24.884	0.476	0.221	0.148

Problem 107	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F(-1)	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	363	339	186	0	0	0	0	0	59	0
N.S.	1	0.93	0.51	0.00	0.00	0.00	0.00	0.00	0.16	0.00
time (sec)	N/A	2.322	0.358	0.000	0.000	0.000	0.000	0.000	0.242	0.000

Problem 108	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	219	164	144	0	0	0	0	0	26	0
N.S.	1	0.75	0.66	0.00	0.00	0.00	0.00	0.00	0.12	0.00
time (sec)	N/A	0.905	0.055	0.000	0.000	0.000	0.000	0.000	0.224	0.000

Problem 109	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	F(-2)	F	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	44	38	0	0	0	14	21	0
N.S.	1	1.00	1.00	0.86	0.00	0.00	0.00	0.32	0.48	0.00
time (sec)	N/A	0.219	0.066	0.104	0.000	0.000	0.000	0.400	0.231	0.000

Problem 110	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	26	22	93	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	1.08	0.92	3.88	0.92
time (sec)	N/A	0.350	1.935	0.315	0.000	0.000	16.176	0.595	0.224	0.140

Problem 111	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	26	22	379	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	1.08	0.92	15.79	0.92
time (sec)	N/A	0.915	2.778	0.400	0.000	0.000	57.973	0.622	0.245	0.146

Problem 112	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F(-1)	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	431	475	180	0	0	0	0	0	63	0
N.S.	1	1.10	0.42	0.00	0.00	0.00	0.00	0.00	0.15	0.00
time (sec)	N/A	5.103	0.286	0.000	0.000	0.000	0.000	0.000	0.304	0.000

Problem 113	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F(-1)	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	247	202	140	0	0	0	0	0	28	0
N.S.	1	0.82	0.57	0.00	0.00	0.00	0.00	0.00	0.11	0.00
time (sec)	N/A	1.595	0.051	0.000	0.000	0.000	0.000	0.000	0.266	0.000

Problem 114	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	F(-2)	F(-1)	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	44	38	0	0	0	14	21	0
N.S.	1	1.00	1.00	0.86	0.00	0.00	0.00	0.32	0.48	0.00
time (sec)	N/A	0.217	0.057	0.105	0.000	0.000	0.000	0.404	0.237	0.000

Problem 115	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	F(-1)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	0	22	103	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	0.00	0.92	4.29	0.92
time (sec)	N/A	0.351	1.849	0.318	0.000	0.000	0.000	0.603	0.259	0.142

Problem 116	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	F(-1)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	0	22	320	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	0.00	0.92	13.33	0.92
time (sec)	N/A	0.994	1.786	0.388	0.000	0.000	0.000	0.642	0.258	0.142

Problem 117	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	226	259	183	0	0	0	0	0	50	0
N.S.	1	1.15	0.81	0.00	0.00	0.00	0.00	0.00	0.22	0.00
time (sec)	N/A	1.576	0.139	0.000	0.000	0.000	0.000	0.000	0.243	0.000

Problem 118	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	126	126	148	0	0	0	0	0	20	0
N.S.	1	1.00	1.17	0.00	0.00	0.00	0.00	0.00	0.16	0.00
time (sec)	N/A	0.844	0.048	0.000	0.000	0.000	0.000	0.000	0.276	0.000

Problem 119	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	A	F	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	42	38	0	36	0	15	15	0
N.S.	1	1.00	1.00	0.90	0.00	0.86	0.00	0.36	0.36	0.00
time (sec)	N/A	0.212	0.022	0.140	0.000	0.087	0.000	0.116	0.224	0.000

Problem 120	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	20	22	37	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	0.83	0.92	1.54	0.92
time (sec)	N/A	0.345	2.414	0.480	0.000	0.000	2.763	0.520	0.227	0.142

Problem 121	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	20	22	47	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	0.83	0.92	1.96	0.92
time (sec)	N/A	0.585	2.271	0.661	0.000	0.000	26.040	0.559	0.222	0.156

Problem 122	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	359	348	209	0	0	0	0	0	62	0
N.S.	1	0.97	0.58	0.00	0.00	0.00	0.00	0.00	0.17	0.00
time (sec)	N/A	2.518	0.330	0.000	0.000	0.000	0.000	0.000	0.300	0.000

Problem 123	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	215	168	154	0	0	0	0	0	26	0
N.S.	1	0.78	0.72	0.00	0.00	0.00	0.00	0.00	0.12	0.00
time (sec)	N/A	1.072	0.056	0.000	0.000	0.000	0.000	0.000	0.238	0.000

Problem 124	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	A	F	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	42	38	0	38	0	15	17	0
N.S.	1	1.00	1.00	0.90	0.00	0.90	0.00	0.36	0.40	0.00
time (sec)	N/A	0.242	0.028	0.146	0.000	0.089	0.000	0.117	0.235	0.000

Problem 125	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	20	22	97	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	0.83	0.92	4.04	0.92
time (sec)	N/A	0.374	2.676	0.589	0.000	0.000	18.302	0.640	0.255	0.146

Problem 126	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	20	22	407	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	0.83	0.92	16.96	0.92
time (sec)	N/A	0.948	2.736	0.685	0.000	0.000	62.912	0.698	0.267	0.148

Problem 127	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F(-1)	C	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	244	140	336	0	0	0	0	159	97	0
N.S.	1	0.57	1.38	0.00	0.00	0.00	0.00	0.65	0.40	0.00
time (sec)	N/A	0.437	0.453	0.000	0.000	0.000	0.000	0.714	0.263	0.000

Problem 128	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	170	105	182	0	0	0	0	107	63	0
N.S.	1	0.62	1.07	0.00	0.00	0.00	0.00	0.63	0.37	0.00
time (sec)	N/A	0.390	0.240	0.000	0.000	0.000	0.000	0.610	0.242	0.000

Problem 129	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	99	67	118	0	0	0	0	51	28	0
N.S.	1	0.68	1.19	0.00	0.00	0.00	0.00	0.52	0.28	0.00
time (sec)	N/A	0.342	0.123	0.000	0.000	0.000	0.000	0.518	0.259	0.000

Problem 130	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	F(-2)	F	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	42	38	0	0	0	14	15	0
N.S.	1	1.00	1.00	0.90	0.00	0.00	0.00	0.33	0.36	0.00
time (sec)	N/A	0.218	0.056	0.113	0.000	0.000	0.000	0.222	0.229	0.000

Problem 131	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	27	22	55	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	1.12	0.92	2.29	0.92
time (sec)	N/A	0.217	1.896	0.326	0.000	0.000	6.736	0.306	0.271	0.145

Problem 132	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	27	22	70	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	1.12	0.92	2.92	0.92
time (sec)	N/A	0.213	2.175	0.386	0.000	0.000	64.747	0.316	0.272	0.143

Problem 133	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	240	172	404	0	0	0	0	0	97	0
N.S.	1	0.72	1.68	0.00	0.00	0.00	0.00	0.00	0.40	0.00
time (sec)	N/A	0.545	0.769	0.000	0.000	0.000	0.000	0.000	0.253	0.000

Problem 134	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	164	137	211	0	0	0	0	0	63	0
N.S.	1	0.84	1.29	0.00	0.00	0.00	0.00	0.00	0.38	0.00
time (sec)	N/A	0.488	0.319	0.000	0.000	0.000	0.000	0.000	0.254	0.000

Problem 135	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	98	98	83	0	0	0	0	0	28	0
N.S.	1	1.00	0.85	0.00	0.00	0.00	0.00	0.00	0.29	0.00
time (sec)	N/A	0.499	0.177	0.000	0.000	0.000	0.000	0.000	0.249	0.000

Problem 136	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	A	F	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	42	38	0	48	0	14	21	0
N.S.	1	1.00	1.00	0.90	0.00	1.14	0.00	0.33	0.50	0.00
time (sec)	N/A	0.220	0.056	0.112	0.000	0.102	0.000	0.237	0.225	0.000

Problem 137	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	27	22	61	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	1.12	0.92	2.54	0.92
time (sec)	N/A	0.355	1.903	0.325	0.000	0.000	45.416	0.317	0.218	0.142

Problem 138	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	F(-1)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	0	22	78	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	0.00	0.92	3.25	0.92
time (sec)	N/A	0.351	2.076	0.421	0.000	0.000	0.000	0.336	0.250	0.146

Problem 139	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F(-1)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	196	199	251	0	0	0	0	0	63	0
N.S.	1	1.02	1.28	0.00	0.00	0.00	0.00	0.00	0.32	0.00
time (sec)	N/A	1.225	0.941	0.000	0.000	0.000	0.000	0.000	0.297	0.000

Problem 140	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	130	134	142	0	0	0	0	0	28	0
N.S.	1	1.03	1.09	0.00	0.00	0.00	0.00	0.00	0.22	0.00
time (sec)	N/A	0.556	0.305	0.000	0.000	0.000	0.000	0.000	0.233	0.000

Problem 141	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F(-2)	A	F	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	44	44	44	38	0	48	0	14	21	0
N.S.	1	1.00	1.00	0.86	0.00	1.09	0.00	0.32	0.48	0.00
time (sec)	N/A	0.244	0.050	0.106	0.000	0.125	0.000	0.255	0.219	0.000

Problem 142	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	F(-1)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	0	22	61	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	0.00	0.92	2.54	0.92
time (sec)	N/A	0.389	1.898	0.335	0.000	0.000	0.000	0.335	0.242	0.149

Problem 143	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	F(-1)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	24	24	26	20	0	0	0	22	78	22
N.S.	1	1.00	1.08	0.83	0.00	0.00	0.00	0.92	3.25	0.92
time (sec)	N/A	0.416	2.072	0.400	0.000	0.000	0.000	0.373	0.265	0.144

Problem 144	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	317	317	260	440	424	321	593	766	494	0
N.S.	1	1.00	0.82	1.39	1.34	1.01	1.87	2.42	1.56	0.00
time (sec)	N/A	0.818	0.206	0.144	0.131	0.125	1.283	0.140	0.234	0.000

Problem 145	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	225	226	187	305	292	229	389	480	338	0
N.S.	1	1.00	0.83	1.36	1.30	1.02	1.73	2.13	1.50	0.00
time (sec)	N/A	0.678	0.148	0.144	0.114	0.113	0.753	0.129	0.226	0.000

Problem 146	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	150	152	125	194	182	151	240	265	208	0
N.S.	1	1.01	0.83	1.29	1.21	1.01	1.60	1.77	1.39	0.00
time (sec)	N/A	0.459	0.102	0.140	0.117	0.110	0.499	0.123	0.277	0.000

Problem 147	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	81	84	71	100	91	82	109	109	103	0
N.S.	1	1.04	0.88	1.23	1.12	1.01	1.35	1.35	1.27	0.00
time (sec)	N/A	0.282	0.041	0.071	0.121	0.121	0.259	0.117	0.226	0.000

Problem 148	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	30	30	30	30	29	31	26	29	30	28
N.S.	1	1.00	1.00	1.00	0.97	1.03	0.87	0.97	1.00	0.93
time (sec)	N/A	0.173	0.006	0.047	0.136	0.103	0.073	0.113	0.220	0.210

Problem 149	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	541	541	490	236	0	0	0	0	46	0
N.S.	1	1.00	0.91	0.44	0.00	0.00	0.00	0.00	0.09	0.00
time (sec)	N/A	1.391	0.280	8.679	0.000	0.000	0.000	0.000	0.244	0.000

Problem 150	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	569	569	435	702	699	555	989	1242	487	0
N.S.	1	1.00	0.76	1.23	1.23	0.98	1.74	2.18	0.86	0.00
time (sec)	N/A	1.263	0.293	0.622	0.140	0.130	1.081	0.160	0.254	0.000

Problem 151	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	335	335	291	442	437	349	595	683	324	0
N.S.	1	1.00	0.87	1.32	1.30	1.04	1.78	2.04	0.97	0.00
time (sec)	N/A	0.870	0.198	0.349	0.142	0.108	0.675	0.145	0.251	0.000

Problem 152	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	156	156	148	221	221	177	279	285	184	0
N.S.	1	1.00	0.95	1.42	1.42	1.13	1.79	1.83	1.18	0.00
time (sec)	N/A	0.504	0.159	0.302	0.130	0.124	0.340	0.141	0.246	0.000

Problem 153	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	47	51	47	72	72	65	82	75	75	142
N.S.	1	1.09	1.00	1.53	1.53	1.38	1.74	1.60	1.60	3.02
time (sec)	N/A	0.294	0.024	0.152	0.135	0.103	0.127	0.117	0.245	0.412

Problem 154	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	F	F(-2)	F	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	821	821	1101	0	0	0	0	0	74	0
N.S.	1	1.00	1.34	0.00	0.00	0.00	0.00	0.00	0.09	0.00
time (sec)	N/A	1.904	0.498	0.000	0.000	0.000	0.000	0.000	0.244	0.000

Problem 155	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	387	387	253	310	0	0	0	633	57	0
N.S.	1	1.00	0.65	0.80	0.00	0.00	0.00	1.64	0.15	0.00
time (sec)	N/A	1.097	0.387	0.145	0.000	0.000	0.000	0.155	0.242	0.000

Problem 156	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	179	179	125	148	0	0	0	229	33	0
N.S.	1	1.00	0.70	0.83	0.00	0.00	0.00	1.28	0.18	0.00
time (sec)	N/A	0.610	0.171	0.122	0.000	0.000	0.000	0.143	0.226	0.000

Problem 157	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	53	48	44	48	0	0	0	49	12	0
N.S.	1	0.91	0.83	0.91	0.00	0.00	0.00	0.92	0.23	0.00
time (sec)	N/A	0.430	0.010	0.007	0.000	0.000	0.000	0.128	0.232	0.000

Problem 158	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	22	20	22	29	17	22	31	22
N.S.	1	1.00	1.10	1.00	1.10	1.45	0.85	1.10	1.55	1.10
time (sec)	N/A	0.236	0.599	0.719	0.195	0.101	3.581	0.376	0.265	0.163

Problem 159	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	22	20	22	53	19	22	59	22
N.S.	1	1.00	1.10	1.00	1.10	2.65	0.95	1.10	2.95	1.10
time (sec)	N/A	0.237	2.693	2.441	0.226	0.099	109.450	6.465	0.293	0.172

Problem 160	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	498	498	359	795	0	0	0	2337	99	0
N.S.	1	1.00	0.72	1.60	0.00	0.00	0.00	4.69	0.20	0.00
time (sec)	N/A	1.165	1.671	0.271	0.000	0.000	0.000	0.214	0.252	0.000

Problem 161	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	249	249	191	376	0	0	0	891	61	0
N.S.	1	1.00	0.77	1.51	0.00	0.00	0.00	3.58	0.24	0.00
time (sec)	N/A	0.650	0.745	0.144	0.000	0.000	0.000	0.193	0.234	0.000

Problem 162	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	A	A	F	F	F	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	83	72	76	0	0	0	192	26	0
N.S.	1	0.97	0.84	0.88	0.00	0.00	0.00	2.23	0.30	0.00
time (sec)	N/A	0.596	0.048	0.007	0.000	0.000	0.000	0.119	0.225	0.000

Problem 163	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	22	20	320	57	19	22	64	22
N.S.	1	1.00	1.10	1.00	16.00	2.85	0.95	1.10	3.20	1.10
time (sec)	N/A	0.213	26.817	0.849	1.946	0.090	46.372	0.765	0.269	0.171

Problem 164	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	F(-1)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	22	20	439	98	0	22	115	22
N.S.	1	1.00	1.10	1.00	21.95	4.90	0.00	1.10	5.75	1.10
time (sec)	N/A	0.213	46.195	2.688	2.785	0.100	0.000	11.678	0.334	0.178

Problem 165	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	22	18	0	20	19	20	61	20
N.S.	1	1.00	1.10	0.90	0.00	1.00	0.95	1.00	3.05	1.00
time (sec)	N/A	0.199	6.032	2.477	0.000	0.104	10.364	0.277	0.264	0.377

Problem 166	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	F(-2)	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	22	18	0	20	19	0	48	20
N.S.	1	1.00	1.10	0.90	0.00	1.00	0.95	0.00	2.40	1.00
time (sec)	N/A	0.197	2.911	1.592	0.000	0.123	5.318	0.000	0.291	0.336

Problem 167	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F(-2)	B	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	70	70	74	0	0	294	0	0	123	0
N.S.	1	1.00	1.06	0.00	0.00	4.20	0.00	0.00	1.76	0.00
time (sec)	N/A	0.274	0.079	0.000	0.000	0.137	0.000	0.000	0.287	0.000

Problem 168	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F	B	F	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	146	147	190	0	0	683	0	0	276	0
N.S.	1	1.01	1.30	0.00	0.00	4.68	0.00	0.00	1.89	0.00
time (sec)	N/A	0.345	0.164	0.000	0.000	0.188	0.000	0.000	0.279	0.000

Problem 169	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	F	F	B	F(-1)	F(-2)	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	226	242	188	0	0	1321	0	0	461	0
N.S.	1	1.07	0.83	0.00	0.00	5.85	0.00	0.00	2.04	0.00
time (sec)	N/A	1.068	0.272	0.000	0.000	0.236	0.000	0.000	0.407	0.000

Problem 170	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	0	34	20	22	89	22
N.S.	1	1.00	1.09	0.91	0.00	1.55	0.91	1.00	4.05	1.00
time (sec)	N/A	0.220	17.944	1.613	0.000	0.114	9.562	0.353	0.323	0.225

Problem 171	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	F(-2)	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	0	34	20	0	76	22
N.S.	1	1.00	1.09	0.91	0.00	1.55	0.91	0.00	3.45	1.00
time (sec)	N/A	0.217	8.079	1.125	0.000	0.099	5.606	0.000	0.302	0.216

Problem 172	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	F(-2)	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	0	54	20	0	222	22
N.S.	1	1.00	1.09	0.91	0.00	2.45	0.91	0.00	10.09	1.00
time (sec)	N/A	0.227	3.151	1.618	0.000	0.124	5.475	0.000	0.337	0.207

Problem 173	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	130	65	20	0	488	22
N.S.	1	1.00	1.09	0.91	5.91	2.95	0.91	0.00	22.18	1.00
time (sec)	N/A	0.221	7.384	1.805	0.399	0.120	64.218	0.000	0.360	0.241

Problem 174	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	22	19	22	22	22
N.S.	1	1.00	1.09	0.91	1.00	1.00	0.86	1.00	1.00	1.00
time (sec)	N/A	0.252	0.905	1.274	0.212	0.089	0.411	0.242	200.031	0.148

Problem 175	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	39	20	22	29	22
N.S.	1	1.00	1.09	0.91	1.00	1.77	0.91	1.00	1.32	1.00
time (sec)	N/A	0.244	0.746	1.102	0.196	0.109	0.660	0.195	0.634	0.150

Problem 176	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	63	20	22	63	22
N.S.	1	1.00	1.09	0.91	1.00	2.86	0.91	1.00	2.86	1.00
time (sec)	N/A	0.257	1.269	1.319	0.215	0.107	1.891	0.240	0.702	0.149

Problem 177	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	87	20	22	107	22
N.S.	1	1.00	1.09	0.91	1.00	3.95	0.91	1.00	4.86	1.00
time (sec)	N/A	0.256	2.572	1.337	0.222	0.097	8.211	0.282	0.994	0.155

Problem 178	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	236	36	20	22	22	22
N.S.	1	1.00	1.09	0.91	10.73	1.64	0.91	1.00	1.00	1.00
time (sec)	N/A	0.249	5.907	1.452	1.150	0.089	0.734	0.369	200.017	0.189

Problem 179	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	364	67	22	22	22	22
N.S.	1	1.00	1.09	0.91	16.55	3.05	1.00	1.00	1.00	1.00
time (sec)	N/A	0.244	13.047	1.174	1.431	0.117	1.306	0.292	200.032	0.181

Problem 180	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	457	108	22	22	22	22
N.S.	1	1.00	1.09	0.91	20.77	4.91	1.00	1.00	1.00	1.00
time (sec)	N/A	0.258	21.315	1.421	2.833	0.129	5.153	0.341	200.024	0.174

Problem 181	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	579	149	22	22	187	22
N.S.	1	1.00	1.09	0.91	26.32	6.77	1.00	1.00	8.50	1.00
time (sec)	N/A	0.249	39.740	1.356	4.314	0.112	29.050	0.410	0.756	0.182

Problem 182	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	754	754	400	1155	0	0	0	3222	54	0
N.S.	1	1.00	0.53	1.53	0.00	0.00	0.00	4.27	0.07	0.00
time (sec)	N/A	2.450	0.890	0.645	0.000	0.000	0.000	1.538	0.265	0.000

Problem 183	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	369	369	244	557	0	0	0	1661	31	0
N.S.	1	1.00	0.66	1.51	0.00	0.00	0.00	4.50	0.08	0.00
time (sec)	N/A	1.133	0.332	0.305	0.000	0.000	0.000	1.124	0.232	0.000

Problem 184	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	120	118	119	187	0	0	0	531	11	0
N.S.	1	0.98	0.99	1.56	0.00	0.00	0.00	4.42	0.09	0.00
time (sec)	N/A	0.692	0.023	0.086	0.000	0.000	0.000	0.383	0.212	0.000

Problem 185	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	0	0	19	22	21	22
N.S.	1	1.00	1.09	0.91	0.00	0.00	0.86	1.00	0.95	1.00
time (sec)	N/A	0.216	2.834	0.307	0.000	0.000	0.902	0.895	12.248	0.148

Problem 186	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	0	20	22	22	22
N.S.	1	1.00	1.09	0.91	1.00	0.00	0.91	1.00	1.00	1.00
time (sec)	N/A	0.218	15.955	0.562	0.464	0.000	17.373	1.135	200.028	0.175

Problem 187	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	B	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	482	482	844	850	0	0	0	3270	74	0
N.S.	1	1.00	1.75	1.76	0.00	0.00	0.00	6.78	0.15	0.00
time (sec)	N/A	1.578	7.231	0.418	0.000	0.000	0.000	1.836	0.336	0.000

Problem 188	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	B	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	159	155	289	278	0	0	0	1157	32	0
N.S.	1	0.97	1.82	1.75	0.00	0.00	0.00	7.28	0.20	0.00
time (sec)	N/A	0.819	0.966	0.000	0.000	0.000	0.000	1.013	0.298	0.000

Problem 189	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	0	0	19	22	22	22
N.S.	1	1.00	1.09	0.91	0.00	0.00	0.86	1.00	1.00	1.00
time (sec)	N/A	0.225	0.489	0.281	0.000	0.000	10.318	0.956	200.020	0.179

Problem 190	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	0	20	22	22	22
N.S.	1	1.00	1.09	0.91	1.00	0.00	0.91	1.00	1.00	1.00
time (sec)	N/A	0.232	9.390	0.619	0.564	0.000	87.325	1.203	200.023	0.172

Problem 191	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	679	679	401	664	0	0	0	981	85	0
N.S.	1	1.00	0.59	0.98	0.00	0.00	0.00	1.44	0.13	0.00
time (sec)	N/A	1.683	0.947	0.473	0.000	0.000	0.000	0.673	0.284	0.000

Problem 192	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	329	329	246	310	0	0	0	481	52	0
N.S.	1	1.00	0.75	0.94	0.00	0.00	0.00	1.46	0.16	0.00
time (sec)	N/A	0.883	0.334	0.247	0.000	0.000	0.000	0.497	0.220	0.000

Problem 193	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	102	121	90	0	0	0	159	22	0
N.S.	1	1.01	1.20	0.89	0.00	0.00	0.00	1.57	0.22	0.00
time (sec)	N/A	0.584	0.024	0.000	0.000	0.000	0.000	0.192	0.203	0.000

Problem 194	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	0	0	20	22	41	22
N.S.	1	1.00	1.09	0.91	0.00	0.00	0.91	1.00	1.86	1.00
time (sec)	N/A	0.250	0.138	0.297	0.000	0.000	2.172	0.526	0.262	0.159

Problem 195	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	0	22	22	69	22
N.S.	1	1.00	1.09	0.91	1.00	0.00	1.00	1.00	3.14	1.00
time (sec)	N/A	0.249	0.191	0.555	0.483	0.000	38.415	0.765	0.411	0.175

Problem 196	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	394	394	417	460	0	0	0	0	0	0
N.S.	1	1.00	1.06	1.17	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.104	0.655	0.375	0.000	0.000	0.000	0.000	0.462	0.000

Problem 197	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	A	C	A	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	139	167	158	0	0	0	0	169	0
N.S.	1	1.01	1.22	1.15	0.00	0.00	0.00	0.00	1.23	0.00
time (sec)	N/A	0.775	0.094	0.000	0.000	0.000	0.000	0.000	0.217	0.000

Problem 198	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	0	20	22	74	22
N.S.	1	1.00	1.09	0.91	1.00	0.00	0.91	1.00	3.36	1.00
time (sec)	N/A	0.229	0.153	0.285	0.479	0.000	9.373	0.678	0.288	0.152

Problem 199	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Reduce	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	F(-1)	F(-2)	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	0	0	0	125	22
N.S.	1	1.00	1.09	0.91	1.00	0.00	0.00	0.00	5.68	1.00
time (sec)	N/A	0.235	0.195	0.566	0.511	0.000	0.000	0.000	1.775	0.172

2.3 Detailed conclusion table specific for Rubi results

The following table is specific to Rubi only. It gives additional statistics for each integral. the column **steps** is the number of steps used by Rubi to obtain the antiderivative. The **rules** column is the number of unique rules used. The **integrand size** column is the leaf size of the integrand. Finally the ratio $\frac{\text{number of rules}}{\text{integrand size}}$ is also given. The larger this ratio is, the harder the integral is to solve. In this test file, problem number [112] had the largest ratio of [1.04167000000000010]

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	6	5	0.95	22	0.227
2	A	6	5	0.97	22	0.227
3	A	6	5	1.03	20	0.250
4	A	6	5	0.87	22	0.227
5	A	9	8	0.92	22	0.364
6	A	11	10	0.93	22	0.455
7	A	9	9	1.17	24	0.375
8	A	8	8	1.11	24	0.333
9	A	5	5	1.09	22	0.227
10	A	7	6	0.87	24	0.250
11	A	11	10	0.93	24	0.417
12	A	18	17	1.49	24	0.708
13	A	14	13	1.32	24	0.542
14	A	10	9	1.20	22	0.409
15	A	8	7	0.88	24	0.292
16	A	16	15	0.89	24	0.625
17	A	5	4	0.75	20	0.200
18	A	5	4	0.78	20	0.200
19	A	5	4	0.90	18	0.222
20	N/A	1	0	1.00	20	0.000
21	N/A	1	0	1.00	20	0.000

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
22	A	5	4	0.84	20	0.200
23	A	5	4	0.88	20	0.200
24	A	5	4	0.98	18	0.222
25	N/A	2	0	1.00	20	0.000
26	N/A	2	0	1.00	20	0.000
27	A	5	4	0.77	24	0.167
28	A	5	4	0.78	24	0.167
29	A	5	4	0.84	22	0.182
30	N/A	1	0	1.00	24	0.000
31	N/A	1	0	1.00	24	0.000
32	A	6	5	0.80	24	0.208
33	A	6	5	0.82	24	0.208
34	A	6	5	0.89	22	0.227
35	N/A	2	0	1.00	24	0.000
36	N/A	2	0	1.00	24	0.000
37	A	8	8	1.07	24	0.333
38	A	6	6	1.07	24	0.250
39	A	3	3	1.00	24	0.125
40	A	1	1	1.00	24	0.042
41	A	2	2	1.00	24	0.083
42	A	4	4	1.04	24	0.167
43	A	6	6	1.08	24	0.250
44	A	10	10	1.20	26	0.385
45	A	5	5	0.98	26	0.192
46	A	1	1	1.00	26	0.038
47	A	8	7	0.99	26	0.269
48	A	11	10	1.00	26	0.385
49	A	3	3	1.00	14	0.214
50	A	1	1	1.00	21	0.048
51	A	8	8	1.06	24	0.333
52	A	6	6	1.10	24	0.250
53	A	3	3	1.00	24	0.125

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
54	A	1	1	1.00	24	0.042
55	A	2	2	1.00	24	0.083
56	A	4	4	1.03	24	0.167
57	A	6	6	1.06	24	0.250
58	A	10	10	1.12	26	0.385
59	A	5	5	0.88	26	0.192
60	A	1	1	1.00	26	0.038
61	A	8	7	0.72	26	0.269
62	A	11	10	0.87	26	0.385
63	A	14	14	1.04	22	0.636
64	A	6	6	0.79	22	0.273
65	A	1	1	1.00	22	0.045
66	A	9	8	0.65	22	0.364
67	A	13	12	0.76	22	0.545
68	A	5	4	0.47	26	0.154
69	A	5	4	0.51	26	0.154
70	A	5	4	0.59	26	0.154
71	A	1	1	1.00	26	0.038
72	N/A	1	0	1.00	26	0.000
73	N/A	1	0	1.00	26	0.000
74	A	6	5	0.56	26	0.192
75	A	6	5	0.65	26	0.192
76	A	12	11	0.80	26	0.423
77	A	1	1	1.00	26	0.038
78	N/A	2	0	1.00	26	0.000
79	N/A	2	0	1.00	26	0.000
80	A	17	16	1.11	26	0.615
81	A	15	14	0.97	24	0.583
82	A	12	11	0.98	12	0.917
83	N/A	1	0	1.00	26	0.000
84	N/A	4	0	1.00	26	0.000
85	A	19	18	1.25	26	0.692

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
86	A	17	16	1.29	24	0.667
87	A	12	11	0.97	12	0.917
88	N/A	1	0	1.00	26	0.000
89	N/A	5	0	1.00	26	0.000
90	A	5	4	0.92	26	0.154
91	A	5	4	0.93	26	0.154
92	A	5	4	0.96	24	0.167
93	A	10	9	1.01	12	0.750
94	N/A	1	0	1.00	26	0.000
95	N/A	1	0	1.00	26	0.000
96	A	6	5	0.93	26	0.192
97	A	6	5	0.94	26	0.192
98	A	6	5	1.01	24	0.208
99	A	12	11	1.01	12	0.917
100	N/A	2	0	1.00	26	0.000
101	N/A	2	0	1.00	26	0.000
102	A	13	12	1.15	24	0.500
103	A	9	8	1.00	24	0.333
104	A	1	1	1.00	24	0.042
105	N/A	2	0	1.00	24	0.000
106	N/A	3	0	1.00	24	0.000
107	A	14	13	0.93	24	0.542
108	A	8	7	0.75	24	0.292
109	A	1	1	1.00	24	0.042
110	N/A	2	0	1.00	24	0.000
111	N/A	5	0	1.00	24	0.000
112	A	26	25	1.10	24	1.042
113	A	12	11	0.82	24	0.458
114	A	1	1	1.00	24	0.042
115	N/A	2	0	1.00	24	0.000
116	N/A	5	0	1.00	24	0.000

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
117	A	14	13	1.15	24	0.542
118	A	9	8	1.00	24	0.333
119	A	1	1	1.00	24	0.042
120	N/A	3	0	1.00	24	0.000
121	N/A	5	0	1.00	24	0.000
122	A	15	14	0.97	24	0.583
123	A	8	7	0.78	24	0.292
124	A	1	1	1.00	24	0.042
125	N/A	3	0	1.00	24	0.000
126	N/A	7	0	1.00	24	0.000
127	A	5	4	0.57	24	0.167
128	A	5	4	0.62	24	0.167
129	A	5	4	0.68	24	0.167
130	A	1	1	1.00	24	0.042
131	N/A	1	0	1.00	24	0.000
132	N/A	1	0	1.00	24	0.000
133	A	5	4	0.72	24	0.167
134	A	5	4	0.84	24	0.167
135	A	8	7	1.00	24	0.292
136	A	1	1	1.00	24	0.042
137	N/A	2	0	1.00	24	0.000
138	N/A	2	0	1.00	24	0.000
139	A	10	9	1.02	24	0.375
140	A	6	5	1.03	24	0.208
141	A	1	1	1.00	24	0.042
142	N/A	2	0	1.00	24	0.000
143	N/A	2	0	1.00	24	0.000
144	A	6	5	1.00	18	0.278
145	A	6	5	1.00	18	0.278
146	A	6	5	1.01	18	0.278
147	A	6	5	1.04	16	0.312

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
148	A	1	1	1.00	8	0.125
149	A	2	2	1.00	18	0.111
150	A	2	2	1.00	20	0.100
151	A	2	2	1.00	20	0.100
152	A	2	2	1.00	18	0.111
153	A	3	3	1.09	10	0.300
154	A	2	2	1.00	20	0.100
155	A	2	2	1.00	20	0.100
156	A	2	2	1.00	18	0.111
157	A	8	7	0.91	10	0.700
158	N/A	1	0	1.00	20	0.000
159	N/A	1	0	1.00	20	0.000
160	A	2	2	1.00	20	0.100
161	A	2	2	1.00	18	0.111
162	A	10	9	0.97	10	0.900
163	N/A	1	0	1.00	20	0.000
164	N/A	1	0	1.00	20	0.000
165	N/A	1	0	1.00	20	0.000
166	N/A	1	0	1.00	20	0.000
167	A	6	5	1.00	20	0.250
168	A	7	6	1.01	20	0.300
169	A	9	8	1.07	20	0.400
170	N/A	1	0	1.00	22	0.000
171	N/A	1	0	1.00	22	0.000
172	N/A	1	0	1.00	22	0.000
173	N/A	1	0	1.00	22	0.000
174	N/A	1	0	1.00	22	0.000
175	N/A	1	0	1.00	22	0.000
176	N/A	1	0	1.00	22	0.000
177	N/A	1	0	1.00	22	0.000

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
178	N/A	1	0	1.00	22	0.000
179	N/A	1	0	1.00	22	0.000
180	N/A	1	0	1.00	22	0.000
181	N/A	1	0	1.00	22	0.000
182	A	2	2	1.00	22	0.091
183	A	2	2	1.00	20	0.100
184	A	12	11	0.98	12	0.917
185	N/A	1	0	1.00	22	0.000
186	N/A	1	0	1.00	22	0.000
187	A	2	2	1.00	20	0.100
188	A	12	11	0.97	12	0.917
189	N/A	1	0	1.00	22	0.000
190	N/A	1	0	1.00	22	0.000
191	A	2	2	1.00	22	0.091
192	A	2	2	1.00	20	0.100
193	A	10	9	1.01	12	0.750
194	N/A	1	0	1.00	22	0.000
195	N/A	1	0	1.00	22	0.000
196	A	2	2	1.00	20	0.100
197	A	12	11	1.01	12	0.917
198	N/A	1	0	1.00	22	0.000
199	N/A	1	0	1.00	22	0.000

CHAPTER 3

Listing of integrals

3.1 $\int (d-c^2dx^2)^3 (a+b\arcsin(cx))\,dx$ . . . 99
3.2 $\int (d-c^2dx^2)^2 (a+b\arcsin(cx))\,dx$ . . . 106
3.3 $\int (d-c^2dx^2) (a+b\arcsin(cx))\,dx$ . . . 113
3.4 $\int \frac{a+b\arcsin(cx)}{d-c^2dx^2}\,dx$ . . . 120
3.5 $\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^2}\,dx$ . . . 126
3.6 $\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^3}\,dx$ . . . 134
3.7 $\int (d-c^2dx^2)^3 (a+b\arcsin(cx))^2\,dx$ . . . 143
3.8 $\int (d-c^2dx^2)^2 (a+b\arcsin(cx))^2\,dx$ . . . 155
3.9 $\int (d-c^2dx^2) (a+b\arcsin(cx))^2\,dx$ . . . 166
3.10 $\int \frac{(a+b\arcsin(cx))^2}{d-c^2dx^2}\,dx$ . . . 174
3.11 $\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^2}\,dx$ . . . 181
3.12 $\int (d-c^2dx^2)^3 (a+b\arcsin(cx))^3\,dx$ . . . 190
3.13 $\int (d-c^2dx^2)^2 (a+b\arcsin(cx))^3\,dx$ . . . 205
3.14 $\int (d-c^2dx^2) (a+b\arcsin(cx))^3\,dx$ . . . 218
3.15 $\int \frac{(a+b\arcsin(cx))^3}{d-c^2dx^2}\,dx$ . . . 230
3.16 $\int \frac{(a+b\arcsin(cx))^3}{(d-c^2dx^2)^2}\,dx$ . . . 238
3.17 $\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)}\,dx$ . . . 250
3.18 $\int \frac{(c-a^2cx^2)^2}{\arcsin(ax)}\,dx$ . . . 256
3.19 $\int \frac{c-a^2cx^2}{\arcsin(ax)}\,dx$ . . . 261
3.20 $\int \frac{1}{(c-a^2cx^2)\arcsin(ax)}\,dx$ . . . 266
3.21 $\int \frac{1}{(c-a^2cx^2)^2\arcsin(ax)}\,dx$ . . . 271
3.22 $\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)^2}\,dx$ . . . 276
3.23 $\int \frac{(c-a^2cx^2)^2}{\arcsin(ax)^2}\,dx$ . . . 283

3.24 $\int \frac{c-a^2cx^2}{\arcsin(ax)^2}\,dx$ . . . 289
3.25 $\int \frac{1}{(c-a^2cx^2)\arcsin(ax)^2}\,dx$ . . . 295
3.26 $\int \frac{1}{(c-a^2cx^2)^2\arcsin(ax)^2}\,dx$ . . . 300
3.27 $\int \frac{(d-c^2dx^2)^3}{a+b\arcsin(cx)}\,dx$ . . . 305
3.28 $\int \frac{(d-c^2dx^2)^2}{a+b\arcsin(cx)}\,dx$ . . . 312
3.29 $\int \frac{d-c^2dx^2}{a+b\arcsin(cx)}\,dx$ . . . 319
3.30 $\int \frac{1}{(d-c^2dx^2)(a+b\arcsin(cx))}\,dx$ . . . 325
3.31 $\int \frac{1}{(d-c^2dx^2)^2(a+b\arcsin(cx))}\,dx$ . . . 330
3.32 $\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^2}\,dx$ . . . 335
3.33 $\int \frac{(d-c^2dx^2)^2}{(a+b\arcsin(cx))^2}\,dx$ . . . 343
3.34 $\int \frac{d-c^2dx^2}{(a+b\arcsin(cx))^2}\,dx$ . . . 351
3.35 $\int \frac{1}{(d-c^2dx^2)(a+b\arcsin(cx))^2}\,dx$ . . . 358
3.36 $\int \frac{1}{(d-c^2dx^2)^2(a+b\arcsin(cx))^2}\,dx$ . . . 363
3.37 $\int (\pi-c^2\pi x^2)^{5/2}(a+b\arcsin(cx))\,dx$ . . . 368
3.38 $\int (\pi-c^2\pi x^2)^{3/2}(a+b\arcsin(cx))\,dx$ . . . 376
3.39 $\int \sqrt{\pi-c^2\pi x^2}(a+b\arcsin(cx))\,dx$ . . . 383
3.40 $\int \frac{a+b\arcsin(cx)}{\sqrt{\pi-c^2\pi x^2}}\,dx$ . . . 389
3.41 $\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{3/2}}\,dx$ . . . 394
3.42 $\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{5/2}}\,dx$ . . . 399
3.43 $\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{7/2}}\,dx$ . . . 406
3.44 $\int (\pi-c^2\pi x^2)^{3/2}(a+b\arcsin(cx))^2\,dx$ . . . 413
3.45 $\int \sqrt{\pi-c^2\pi x^2}(a+b\arcsin(cx))^2\,dx$ . . . 422
3.46 $\int \frac{(a+b\arcsin(cx))^2}{\sqrt{\pi-c^2\pi x^2}}\,dx$ . . . 429
3.47 $\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{3/2}}\,dx$ . . . 434
3.48 $\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{5/2}}\,dx$ . . . 441
3.49 $\int \sqrt{1-x^2}\arcsin(x)\,dx$ . . . 451
3.50 $\int \frac{1}{\sqrt{1-a^2x^2}\arcsin(ax)^3}\,dx$ . . . 456
3.51 $\int (d-c^2dx^2)^{5/2}(a+b\arcsin(cx))\,dx$ . . . 461
3.52 $\int (d-c^2dx^2)^{3/2}(a+b\arcsin(cx))\,dx$ . . . 469
3.53 $\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))\,dx$ . . . 477
3.54 $\int \frac{a+b\arcsin(cx)}{\sqrt{d-c^2dx^2}}\,dx$ . . . 483
3.55 $\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{3/2}}\,dx$ . . . 488
3.56 $\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{5/2}}\,dx$ . . . 493

3.57 $\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{7/2}}\,dx$ . . . 500
3.58 $\int (d-c^2dx^2)^{3/2}(a+b\arcsin(cx))^2\,dx$ . . . 508
3.59 $\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2\,dx$ . . . 517
3.60 $\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d-c^2dx^2}}\,dx$ . . . 524
3.61 $\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}\,dx$ . . . 529
3.62 $\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{5/2}}\,dx$ . . . 536
3.63 $\int (c-a^2cx^2)^{3/2}\arcsin(ax)^3\,dx$ . . . 546
3.64 $\int \sqrt{c-a^2cx^2}\arcsin(ax)^3\,dx$ . . . 557
3.65 $\int \frac{\arcsin(ax)^3}{\sqrt{c-a^2cx^2}}\,dx$ . . . 564
3.66 $\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{3/2}}\,dx$ . . . 569
3.67 $\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{5/2}}\,dx$ . . . 576
3.68 $\int \frac{(d-c^2dx^2)^{5/2}}{a+b\arcsin(cx)}\,dx$ . . . 586
3.69 $\int \frac{(d-c^2dx^2)^{3/2}}{a+b\arcsin(cx)}\,dx$ . . . 593
3.70 $\int \frac{\sqrt{d-c^2dx^2}}{a+b\arcsin(cx)}\,dx$ . . . 599
3.71 $\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}\,dx$ . . . 605
3.72 $\int \frac{1}{(d-c^2dx^2)^{3/2}(a+b\arcsin(cx))}\,dx$ . . . 610
3.73 $\int \frac{1}{(d-c^2dx^2)^{5/2}(a+b\arcsin(cx))}\,dx$ . . . 615
3.74 $\int \frac{(d-c^2dx^2)^{5/2}}{(a+b\arcsin(cx))^2}\,dx$ . . . 620
3.75 $\int \frac{(d-c^2dx^2)^{3/2}}{(a+b\arcsin(cx))^2}\,dx$ . . . 628
3.76 $\int \frac{\sqrt{d-c^2dx^2}}{(a+b\arcsin(cx))^2}\,dx$ . . . 636
3.77 $\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}\,dx$ . . . 644
3.78 $\int \frac{1}{(d-c^2dx^2)^{3/2}(a+b\arcsin(cx))^2}\,dx$ . . . 649
3.79 $\int \frac{1}{(d-c^2dx^2)^{5/2}(a+b\arcsin(cx))^2}\,dx$ . . . 654
3.80 $\int (d-c^2dx^2)^2\sqrt{a+b\arcsin(cx)}\,dx$ . . . 659
3.81 $\int (d-c^2dx^2)\sqrt{a+b\arcsin(cx)}\,dx$ . . . 673
3.82 $\int \sqrt{a+b\arcsin(cx)}\,dx$ . . . 685
3.83 $\int \frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}\,dx$ . . . 693
3.84 $\int \frac{\sqrt{a+b\arcsin(cx)}}{(d-c^2dx^2)^2}\,dx$ . . . 698
3.85 $\int (d-c^2dx^2)^2(a+b\arcsin(cx))^{3/2}\,dx$ . . . 703
3.86 $\int (d-c^2dx^2)(a+b\arcsin(cx))^{3/2}\,dx$ . . . 717
3.87 $\int (a+b\arcsin(cx))^{3/2}\,dx$ . . . 731
3.88 $\int \frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}\,dx$ . . . 740

3.89 $\int \frac{(a+b\arcsin(cx))^{3/2}}{(d-c^2dx^2)^2}\,dx$ . . . 745
3.90 $\int \frac{(d-c^2dx^2)^3}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 751
3.91 $\int \frac{(d-c^2dx^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 760
3.92 $\int \frac{d-c^2dx^2}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 768
3.93 $\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 775
3.94 $\int \frac{1}{(d-c^2dx^2)\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 782
3.95 $\int \frac{1}{(d-c^2dx^2)^2\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 787
3.96 $\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 792
3.97 $\int \frac{(d-c^2dx^2)^2}{(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 802
3.98 $\int \frac{d-c^2dx^2}{(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 810
3.99 $\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 818
3.100 $\int \frac{1}{(d-c^2dx^2)(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 826
3.101 $\int \frac{1}{(d-c^2dx^2)^2(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 831
3.102 $\int (c-a^2cx^2)^{3/2}\sqrt{\arcsin(ax)}\,dx$ . . . 836
3.103 $\int \sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}\,dx$ . . . 845
3.104 $\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{c-a^2cx^2}}\,dx$ . . . 852
3.105 $\int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{3/2}}\,dx$ . . . 857
3.106 $\int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{5/2}}\,dx$ . . . 862
3.107 $\int (c-a^2cx^2)^{3/2}\arcsin(ax)^{3/2}\,dx$ . . . 867
3.108 $\int \sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}\,dx$ . . . 877
3.109 $\int \frac{\arcsin(ax)^{3/2}}{\sqrt{c-a^2cx^2}}\,dx$ . . . 884
3.110 $\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{3/2}}\,dx$ . . . 889
3.111 $\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}}\,dx$ . . . 894
3.112 $\int (c-a^2cx^2)^{3/2}\arcsin(ax)^{5/2}\,dx$ . . . 900
3.113 $\int \sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}\,dx$ . . . 916
3.114 $\int \frac{\arcsin(ax)^{5/2}}{\sqrt{c-a^2cx^2}}\,dx$ . . . 924
3.115 $\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{3/2}}\,dx$ . . . 929
3.116 $\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{5/2}}\,dx$ . . . 934
3.117 $\int (a^2-x^2)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx$ . . . 940
3.118 $\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx$ . . . 950
3.119 $\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx$ . . . 957

3.120 $\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx$ . . . 962
3.121 $\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx$ . . . 967
3.122 $\int \left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}\,dx$ . . . 973
3.123 $\int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}\,dx$ . . . 984
3.124 $\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx$ . . . 991
3.125 $\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx$ . . . 996
3.126 $\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx$ . . . 1001
3.127 $\int \frac{\left(c-a^2cx^2\right)^{5/2}}{\sqrt{\arcsin(ax)}}\,dx$ . . . 1007
3.128 $\int \frac{\left(c-a^2cx^2\right)^{3/2}}{\sqrt{\arcsin(ax)}}\,dx$ . . . 1014
3.129 $\int \frac{\sqrt{c-a^2cx^2}}{\sqrt{\arcsin(ax)}}\,dx$ . . . 1020
3.130 $\int \frac{1}{\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}\,dx$ . . . 1026
3.131 $\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\sqrt{\arcsin(ax)}}\,dx$ . . . 1031
3.132 $\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\sqrt{\arcsin(ax)}}\,dx$ . . . 1036
3.133 $\int \frac{\left(c-a^2cx^2\right)^{5/2}}{\arcsin(ax)^{3/2}}\,dx$ . . . 1041
3.134 $\int \frac{\left(c-a^2cx^2\right)^{3/2}}{\arcsin(ax)^{3/2}}\,dx$ . . . 1047
3.135 $\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{3/2}}\,dx$ . . . 1053
3.136 $\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}\,dx$ . . . 1059
3.137 $\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}}\,dx$ . . . 1064
3.138 $\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{3/2}}\,dx$ . . . 1069
3.139 $\int \frac{\left(c-a^2cx^2\right)^{3/2}}{\arcsin(ax)^{5/2}}\,dx$ . . . 1074
3.140 $\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{5/2}}\,dx$ . . . 1082
3.141 $\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}}\,dx$ . . . 1088
3.142 $\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{5/2}}\,dx$ . . . 1093
3.143 $\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{5/2}}\,dx$ . . . 1098
3.144 $\int \left(d+ex^2\right)^4\left(a+b\arcsin(cx)\right)\,dx$ . . . 1103
3.145 $\int \left(d+ex^2\right)^3\left(a+b\arcsin(cx)\right)\,dx$ . . . 1112
3.146 $\int \left(d+ex^2\right)^2\left(a+b\arcsin(cx)\right)\,dx$ . . . 1122
3.147 $\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)\,dx$ . . . 1130
3.148 $\int \left(a+b\arcsin(cx)\right)\,dx$ . . . 1137
3.149 $\int \frac{a+b\arcsin(cx)}{d+ex^2}\,dx$ . . . 1142
3.150 $\int \left(d+ex^2\right)^3\left(a+b\arcsin(cx)\right)^2\,dx$ . . . 1149

3.151 $\int (d+ex^2)^2 (a+b\arcsin(cx))^2\,dx$ . . . 1161
3.152 $\int (d+ex^2) (a+b\arcsin(cx))^2\,dx$ . . . 1170
3.153 $\int (a+b\arcsin(cx))^2\,dx$ . . . 1178
3.154 $\int \frac{(a+b\arcsin(cx))^2}{d+ex^2}\,dx$ . . . 1184
3.155 $\int \frac{(d+ex^2)^2}{a+b\arcsin(cx)}\,dx$ . . . 1193
3.156 $\int \frac{d+ex^2}{a+b\arcsin(cx)}\,dx$ . . . 1201
3.157 $\int \frac{1}{a+b\arcsin(cx)}\,dx$ . . . 1207
3.158 $\int \frac{1}{(d+ex^2)(a+b\arcsin(cx))}\,dx$ . . . 1213
3.159 $\int \frac{1}{(d+ex^2)^2(a+b\arcsin(cx))}\,dx$ . . . 1218
3.160 $\int \frac{(d+ex^2)^2}{(a+b\arcsin(cx))^2}\,dx$ . . . 1223
3.161 $\int \frac{d+ex^2}{(a+b\arcsin(cx))^2}\,dx$ . . . 1232
3.162 $\int \frac{1}{(a+b\arcsin(cx))^2}\,dx$ . . . 1239
3.163 $\int \frac{1}{(d+ex^2)(a+b\arcsin(cx))^2}\,dx$ . . . 1246
3.164 $\int \frac{1}{(d+ex^2)^2(a+b\arcsin(cx))^2}\,dx$ . . . 1251
3.165 $\int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx$ . . . 1256
3.166 $\int \frac{a+b\arcsin(cx)}{\sqrt{d+ex^2}}\,dx$ . . . 1261
3.167 $\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{3/2}}\,dx$ . . . 1266
3.168 $\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{5/2}}\,dx$ . . . 1272
3.169 $\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{7/2}}\,dx$ . . . 1279
3.170 $\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx$ . . . 1288
3.171 $\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}\,dx$ . . . 1293
3.172 $\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}\,dx$ . . . 1298
3.173 $\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}\,dx$ . . . 1303
3.174 $\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx$ . . . 1308
3.175 $\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx$ . . . 1313
3.176 $\int \frac{1}{(d+ex^2)^{3/2}(a+b\arcsin(cx))}\,dx$ . . . 1318
3.177 $\int \frac{1}{(d+ex^2)^{5/2}(a+b\arcsin(cx))}\,dx$ . . . 1323
3.178 $\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx$ . . . 1328
3.179 $\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx$ . . . 1333
3.180 $\int \frac{1}{(d+ex^2)^{3/2}(a+b\arcsin(cx))^2}\,dx$ . . . 1338
3.181 $\int \frac{1}{(d+ex^2)^{5/2}(a+b\arcsin(cx))^2}\,dx$ . . . 1343
3.182 $\int (d+ex^2)^2 \sqrt{a+b\arcsin(cx)}\,dx$ . . . 1348
3.183 $\int (d+ex^2) \sqrt{a+b\arcsin(cx)}\,dx$ . . . 1357
3.184 $\int \sqrt{a+b\arcsin(cx)}\,dx$ . . . 1365

3.185 $\int \frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}\,dx$ . . . 1373
3.186 $\int \frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}\,dx$ . . . 1378
3.187 $\int (d+ex^2)\,(a+b\arcsin(cx))^{3/2}\,dx$ . . . 1383
3.188 $\int (a+b\arcsin(cx))^{3/2}\,dx$ . . . 1393
3.189 $\int \frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}\,dx$ . . . 1402
3.190 $\int \frac{(a+b\arcsin(cx))^{3/2}}{(d+ex^2)^2}\,dx$ . . . 1407
3.191 $\int \frac{(d+ex^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 1412
3.192 $\int \frac{d+ex^2}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 1421
3.193 $\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 1428
3.194 $\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 1435
3.195 $\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx$ . . . 1440
3.196 $\int \frac{d+ex^2}{(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 1445
3.197 $\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 1452
3.198 $\int \frac{1}{(d+ex^2)(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 1460
3.199 $\int \frac{1}{(d+ex^2)^2(a+b\arcsin(cx))^{3/2}}\,dx$ . . . 1465

3.1 $\int (d - c^2 dx^2)^3 (a + b \arcsin(cx))\, dx$

Optimal result . . . 99
Mathematica [A] (verified) . . . 99
Rubi [A] (verified) . . . 100
Maple [A] (verified) . . . 102
Fricas [A] (verification not implemented) . . . 102
Sympy [A] (verification not implemented) . . . 103
Maxima [A] (verification not implemented) . . . 103
Giac [A] (verification not implemented) . . . 104
Mupad [F(-1)] . . . 105
Reduce [B] (verification not implemented) . . . 105

Optimal result

Integrand size = 22, antiderivative size = 175

$$\int (d - c^2 dx^2)^3 (a + b \arcsin(cx))\, dx$$
$$= \frac{16bd^3\sqrt{1-c^2x^2}}{35c} + \frac{8bd^3(1-c^2x^2)^{3/2}}{105c} + \frac{6bd^3(1-c^2x^2)^{5/2}}{175c} + \frac{bd^3(1-c^2x^2)^{7/2}}{49c}$$
$$+ d^3x(a+b\arcsin(cx)) - c^2d^3x^3(a+b\arcsin(cx)) + \frac{3}{5}c^4d^3x^5(a+b\arcsin(cx)) - \frac{1}{7}c^6d^3x^7(a+b\arcsin(cx))$$

output

```
16/35*b*d^3*(-c^2*x^2+1)^(1/2)/c+8/105*b*d^3*(-c^2*x^2+1)^(3/2)/c+6/175*b*
d^3*(-c^2*x^2+1)^(5/2)/c+1/49*b*d^3*(-c^2*x^2+1)^(7/2)/c+d^3*x*(a+b*arcsin
(c*x))-c^2*d^3*x^3*(a+b*arcsin(c*x))+3/5*c^4*d^3*x^5*(a+b*arcsin(c*x))-1/7
*c^6*d^3*x^7*(a+b*arcsin(c*x))
```

Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 119, normalized size of antiderivative = 0.68

$$\int (d - c^2 dx^2)^3 (a + b \arcsin(cx))\, dx =$$
$$-\frac{d^3\left(105acx(-35 + 35c^2x^2 - 21c^4x^4 + 5c^6x^6) + b\sqrt{1-c^2x^2}(-2161 + 757c^2x^2 - 351c^4x^4 + 75c^6x^6) + \right.}{3675c}$$

input
```
Integrate[(d - c^2*d*x^2)^3*(a + b*ArcSin[c*x]),x]
```

output
```
-1/3675*(d^3*(105*a*c*x*(-35 + 35*c^2*x^2 - 21*c^4*x^4 + 5*c^6*x^6) + b*Sq
rt[1 - c^2*x^2]*(-2161 + 757*c^2*x^2 - 351*c^4*x^4 + 75*c^6*x^6) + 105*b*c
*x*(-35 + 35*c^2*x^2 - 21*c^4*x^4 + 5*c^6*x^6)*ArcSin[c*x]))/c
```

Rubi [A] (verified)

Time = 0.52 (sec) , antiderivative size = 167, normalized size of antiderivative = 0.95, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$, Rules used = {5154, 27, 2331, 2389, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d - c^2 d x^2\right)^3 (a + b \arcsin(cx))\, dx$$

$$\downarrow 5154$$

$$-bc \int \frac{d^3 x\left(-5c^6x^6 + 21c^4x^4 - 35c^2x^2 + 35\right)}{35\sqrt{1 - c^2x^2}} dx - \frac{1}{7}c^6 d^3 x^7 (a + b \arcsin(cx)) + \frac{3}{5}c^4 d^3 x^5 (a + b \arcsin(cx)) - c^2 d^3 x^3 (a + b \arcsin(cx)) + d^3 x (a + b \arcsin(cx))$$

$$\downarrow 27$$

$$-\frac{1}{35}bcd^3 \int \frac{x\left(-5c^6x^6 + 21c^4x^4 - 35c^2x^2 + 35\right)}{\sqrt{1 - c^2x^2}} dx - \frac{1}{7}c^6 d^3 x^7 (a + b \arcsin(cx)) + \frac{3}{5}c^4 d^3 x^5 (a + b \arcsin(cx)) - c^2 d^3 x^3 (a + b \arcsin(cx)) + d^3 x (a + b \arcsin(cx))$$

$$\downarrow 2331$$

$$-\frac{1}{70}bcd^3 \int \frac{-5c^6x^6 + 21c^4x^4 - 35c^2x^2 + 35}{\sqrt{1 - c^2x^2}} dx^2 - \frac{1}{7}c^6 d^3 x^7 (a + b \arcsin(cx)) + \frac{3}{5}c^4 d^3 x^5 (a + b \arcsin(cx)) - c^2 d^3 x^3 (a + b \arcsin(cx)) + d^3 x (a + b \arcsin(cx))$$

$$\downarrow 2389$$

$$-\frac{1}{70}bcd^3 \int \left(5\left(1 - c^2x^2\right)^{5/2} + 6\left(1 - c^2x^2\right)^{3/2} + 8\sqrt{1 - c^2x^2} + \frac{16}{\sqrt{1 - c^2x^2}}\right) dx^2 - \frac{1}{7}c^6 d^3 x^7 (a + b \arcsin(cx)) + \frac{3}{5}c^4 d^3 x^5 (a + b \arcsin(cx)) - c^2 d^3 x^3 (a + b \arcsin(cx)) + d^3 x (a + b \arcsin(cx))$$

$$\downarrow 2009$$

$$-\frac{1}{7}c^6d^3x^7(a+b\arcsin(cx))+\frac{3}{5}c^4d^3x^5(a+b\arcsin(cx))-c^2d^3x^3(a+b\arcsin(cx))+d^3x(a+b\arcsin(cx))-\frac{1}{70}bcd^3\left(-\frac{10\left(1-c^2x^2\right)^{7/2}}{7c^2}-\frac{12\left(1-c^2x^2\right)^{5/2}}{5c^2}-\frac{16\left(1-c^2x^2\right)^{3/2}}{3c^2}-\frac{32\sqrt{1-c^2x^2}}{c^2}\right)$$

input
```
Int[(d - c^2*d*x^2)^3*(a + b*ArcSin[c*x]),x]
```

output
```
-1/70*(b*c*d^3*((-32*Sqrt[1 - c^2*x^2])/c^2 - (16*(1 - c^2*x^2)^(3/2))/(3*
c^2) - (12*(1 - c^2*x^2)^(5/2))/(5*c^2) - (10*(1 - c^2*x^2)^(7/2))/(7*c^2)
)) + d^3*x*(a + b*ArcSin[c*x]) - c^2*d^3*x^3*(a + b*ArcSin[c*x]) + (3*c^4*
d^3*x^5*(a + b*ArcSin[c*x]))/5 - (c^6*d^3*x^7*(a + b*ArcSin[c*x]))/7
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2331
```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/2   S
ubst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x)^p, x], x, x^2], x] /;
 FreeQ[{a, b, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]
```

rule 2389
```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[ExpandIntegrand
[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p
, 0] || EqQ[n, 1])
```

rule 5154
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])   u, x
] - Simp[b*c   Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 162, normalized size of antiderivative = 0.93

method	result
parts	$-d^3a\left(\frac{1}{7}c^6x^7-\frac{3}{5}c^4x^5+c^2x^3-x\right)-\frac{d^3b\left(\frac{\arcsin(cx)c^7x^7}{7}-\frac{3c^5x^5\arcsin(cx)}{5}+c^3x^3\arcsin(cx)-cx\arcsin(cx)\right.}{}$
derivativedivides	$\frac{-d^3a\left(\frac{1}{7}c^7x^7-\frac{3}{5}c^5x^5+c^3x^3-cx\right)-d^3b\left(\frac{\arcsin(cx)c^7x^7}{7}-\frac{3c^5x^5\arcsin(cx)}{5}+c^3x^3\arcsin(cx)-cx\arcsin(cx)-\frac{2161\sqrt{-c^2x^2}}{3675}\right.}{c}$
default	$\frac{-d^3a\left(\frac{1}{7}c^7x^7-\frac{3}{5}c^5x^5+c^3x^3-cx\right)-d^3b\left(\frac{\arcsin(cx)c^7x^7}{7}-\frac{3c^5x^5\arcsin(cx)}{5}+c^3x^3\arcsin(cx)-cx\arcsin(cx)-\frac{2161\sqrt{-c^2x^2}}{3675}\right.}{c}$
orering	$\frac{x\left(325c^6x^6-1437c^4x^4+2739c^2x^2-5547\right)\left(-c^2dx^2+d\right)^3(a+b\arcsin(cx))}{1225(cx-1)^2(cx+1)^2(c^2x^2-1)}-\frac{(75c^6x^6-351c^4x^4+757c^2x^2-2161)\left(-6\right.}{3675}$

input
```
int((-c^2*d*x^2+d)^3*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
-d^3*a*(1/7*c^6*x^7-3/5*c^4*x^5+c^2*x^3-x)-d^3*b/c*(1/7*arcsin(c*x)*c^7*x^
7-3/5*c^5*x^5*arcsin(c*x)+c^3*x^3*arcsin(c*x)-c*x*arcsin(c*x)-2161/3675*(-
c^2*x^2+1)^(1/2)+757/3675*c^2*x^2*(-c^2*x^2+1)^(1/2)-117/1225*c^4*x^4*(-c^
2*x^2+1)^(1/2)+1/49*c^6*x^6*(-c^2*x^2+1)^(1/2))
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 157, normalized size of antiderivative = 0.90

$$\int \left(d-c^2dx^2\right)^3\left(a+b\arcsin(cx)\right)dx =$$
$$-\frac{525\,ac^7d^3x^7-2205\,ac^5d^3x^5+3675\,ac^3d^3x^3-3675\,acd^3x+105\left(5\,bc^7d^3x^7-21\,bc^5d^3x^5+35\,bc^3d^3x^3-\right.}{3675\,c}$$

input
```
integrate((-c^2*d*x^2+d)^3*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
-1/3675*(525*a*c^7*d^3*x^7 - 2205*a*c^5*d^3*x^5 + 3675*a*c^3*d^3*x^3 - 367
5*a*c*d^3*x + 105*(5*b*c^7*d^3*x^7 - 21*b*c^5*d^3*x^5 + 35*b*c^3*d^3*x^3 -
 35*b*c*d^3*x)*arcsin(c*x) + (75*b*c^6*d^3*x^6 - 351*b*c^4*d^3*x^4 + 757*b
*c^2*d^3*x^2 - 2161*b*d^3)*sqrt(-c^2*x^2 + 1))/c
```

Sympy [A] (verification not implemented)

Time = 0.72 (sec) , antiderivative size = 221, normalized size of antiderivative = 1.26

$$\int \left(d - c^2 d x^2\right)^3 \left(a + b \arcsin(cx)\right) dx$$

$$= \begin{cases} -\frac{ac^6 d^3 x^7}{7} + \frac{3ac^4 d^3 x^5}{5} - ac^2 d^3 x^3 + ad^3 x - \frac{bc^6 d^3 x^7 \operatorname{asin}(cx)}{7} - \frac{bc^5 d^3 x^6 \sqrt{-c^2x^2+1}}{49} + \frac{3bc^4 d^3 x^5 \operatorname{asin}(cx)}{5} + \frac{117bc^3 d^3 x^4 \sqrt{-c} \\ ad^3 x \end{cases}$$

input
```
integrate((-c**2*d*x**2+d)**3*(a+b*asin(c*x)),x)
```

output
```
Piecewise((-a*c**6*d**3*x**7/7 + 3*a*c**4*d**3*x**5/5 - a*c**2*d**3*x**3 +
 a*d**3*x - b*c**6*d**3*x**7*asin(c*x)/7 - b*c**5*d**3*x**6*sqrt(-c**2*x**
2 + 1)/49 + 3*b*c**4*d**3*x**5*asin(c*x)/5 + 117*b*c**3*d**3*x**4*sqrt(-c*
*2*x**2 + 1)/1225 - b*c**2*d**3*x**3*asin(c*x) - 757*b*c*d**3*x**2*sqrt(-c
**2*x**2 + 1)/3675 + b*d**3*x*asin(c*x) + 2161*b*d**3*sqrt(-c**2*x**2 + 1)
/(3675*c), Ne(c, 0)), (a*d**3*x, True))
```

Maxima [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 307, normalized size of antiderivative = 1.75

$$\int \left(d - c^2 d x^2\right)^3 \left(a + b \arcsin(cx)\right) dx = -\frac{1}{7} ac^6 d^3 x^7 + \frac{3}{5} ac^4 d^3 x^5$$
$$- \frac{1}{245}\left(35\, x^7 \arcsin(cx) + \left(\frac{5\sqrt{-c^2x^2+1}x^6}{c^2} + \frac{6\sqrt{-c^2x^2+1}x^4}{c^4} + \frac{8\sqrt{-c^2x^2+1}x^2}{c^6} + \frac{16\sqrt{-c^2x^2+1}}{c^8}\right.\right.$$
$$+ \frac{1}{25}\left(15\, x^5 \arcsin(cx) + \left(\frac{3\sqrt{-c^2x^2+1}x^4}{c^2} + \frac{4\sqrt{-c^2x^2+1}x^2}{c^4} + \frac{8\sqrt{-c^2x^2+1}}{c^6}\right)c\right) bc^4 d^3$$
$$- ac^2 d^3 x^3 - \frac{1}{3}\left(3\, x^3 \arcsin(cx) + c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right) bc^2 d^3$$
$$+ ad^3 x + \frac{\left(cx \arcsin(cx) + \sqrt{-c^2x^2+1}\right) bd^3}{c}$$

input
```
integrate((-c^2*d*x^2+d)^3*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output

```
-1/7*a*c^6*d^3*x^7 + 3/5*a*c^4*d^3*x^5 - 1/245*(35*x^7*arcsin(c*x) + (5*sq
rt(-c^2*x^2 + 1)*x^6/c^2 + 6*sqrt(-c^2*x^2 + 1)*x^4/c^4 + 8*sqrt(-c^2*x^2
 + 1)*x^2/c^6 + 16*sqrt(-c^2*x^2 + 1)/c^8)*c)*b*c^6*d^3 + 1/25*(15*x^5*arcs
in(c*x) + (3*sqrt(-c^2*x^2 + 1)*x^4/c^2 + 4*sqrt(-c^2*x^2 + 1)*x^2/c^4 + 8
*sqrt(-c^2*x^2 + 1)/c^6)*c)*b*c^4*d^3 - a*c^2*d^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))*b*c^2*d^
3 + a*d^3*x + (c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))*b*d^3/c
```

Giac [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 224, normalized size of antiderivative = 1.28

$$\begin{aligned}\int \left(d-c^2dx^2\right)^3\left(a+b\arcsin(cx)\right)dx = &-\frac{1}{7}ac^6d^3x^7+\frac{3}{5}ac^4d^3x^5-ac^2d^3x^3\\&-\frac{1}{7}\left(c^2x^2-1\right)^3bd^3x\arcsin\left(cx\right)\\&+\frac{6}{35}\left(c^2x^2-1\right)^2bd^3x\arcsin\left(cx\right)\\&-\frac{8}{35}\left(c^2x^2-1\right)bd^3x\arcsin\left(cx\right)\\&-\frac{\left(c^2x^2-1\right)^3\sqrt{-c^2x^2+1}bd^3}{49\,c}\\&+\frac{16}{35}bd^3x\arcsin\left(cx\right)\\&+\frac{6\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}bd^3}{175\,c}+ad^3x\\&+\frac{8\left(-c^2x^2+1\right)^{\frac{3}{2}}bd^3}{105\,c}+\frac{16\sqrt{-c^2x^2+1}bd^3}{35\,c}\end{aligned}$$

input

```
integrate((-c^2*d*x^2+d)^3*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output

```
-1/7*a*c^6*d^3*x^7 + 3/5*a*c^4*d^3*x^5 - a*c^2*d^3*x^3 - 1/7*(c^2*x^2 - 1)
^3*b*d^3*x*arcsin(c*x) + 6/35*(c^2*x^2 - 1)^2*b*d^3*x*arcsin(c*x) - 8/35*(
c^2*x^2 - 1)*b*d^3*x*arcsin(c*x) - 1/49*(c^2*x^2 - 1)^3*sqrt(-c^2*x^2 + 1)
*b*d^3/c + 16/35*b*d^3*x*arcsin(c*x) + 6/175*(c^2*x^2 - 1)^2*sqrt(-c^2*x^2
 + 1)*b*d^3/c + a*d^3*x + 8/105*(-c^2*x^2 + 1)^(3/2)*b*d^3/c + 16/35*sqrt(
-c^2*x^2 + 1)*b*d^3/c
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right)^3 (a + b \arcsin(cx))\, dx = \int (a + b\,\mathrm{asin}(c\,x))\, \left(d - c^2\, d\, x^2\right)^3 dx$$

input
```
int((a + b*asin(c*x))*(d - c^2*d*x^2)^3,x)
```

output
```
int((a + b*asin(c*x))*(d - c^2*d*x^2)^3, x)
```

Reduce [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 163, normalized size of antiderivative = 0.93

$$\int \left(d - c^2 dx^2\right)^3 (a + b \arcsin(cx))\, dx$$
$$= \frac{d^3\left(-525 asin(cx)\, b\, c^7 x^7 + 2205 asin(cx)\, b\, c^5 x^5 - 3675 asin(cx)\, b\, c^3 x^3 + 3675 asin(cx)\, bcx - 75\sqrt{-c^2x^2 +}\right.}{}$$

input
```
int((-c^2*d*x^2+d)^3*(a+b*asin(c*x)),x)
```

output
```
(d**3*( - 525*asin(c*x)*b*c**7*x**7 + 2205*asin(c*x)*b*c**5*x**5 - 3675*as
in(c*x)*b*c**3*x**3 + 3675*asin(c*x)*b*c*x - 75*sqrt( - c**2*x**2 + 1)*b*c
**6*x**6 + 351*sqrt( - c**2*x**2 + 1)*b*c**4*x**4 - 757*sqrt( - c**2*x**2
+ 1)*b*c**2*x**2 + 2161*sqrt( - c**2*x**2 + 1)*b - 525*a*c**7*x**7 + 2205*
a*c**5*x**5 - 3675*a*c**3*x**3 + 3675*a*c*x))/(3675*c)
```

3.2 $\int (d - c^2 dx^2)^2 (a + b \arcsin(cx))\, dx$

Optimal result . . . 106
Mathematica [A] (verified) . . . 107
Rubi [A] (verified) . . . 107
Maple [A] (verified) . . . 109
Fricas [A] (verification not implemented) . . . 110
Sympy [A] (verification not implemented) . . . 110
Maxima [A] (verification not implemented) . . . 111
Giac [A] (verification not implemented) . . . 111
Mupad [F(-1)] . . . 112
Reduce [B] (verification not implemented) . . . 112

Optimal result

Integrand size = 22, antiderivative size = 131

$$\begin{aligned}\int (d - c^2 dx^2)^2 (a + b \arcsin(cx))\, dx = {} & \frac{8bd^2\sqrt{1 - c^2x^2}}{15c} + \frac{4bd^2(1 - c^2x^2)^{3/2}}{45c} \\ & + \frac{bd^2(1 - c^2x^2)^{5/2}}{25c} + d^2x(a + b \arcsin(cx)) \\ & - \frac{2}{3}c^2d^2x^3(a + b \arcsin(cx)) \\ & + \frac{1}{5}c^4d^2x^5(a + b \arcsin(cx))\end{aligned}$$

output

```
8/15*b*d^2*(-c^2*x^2+1)^(1/2)/c+4/45*b*d^2*(-c^2*x^2+1)^(3/2)/c+1/25*b*d^2
*(-c^2*x^2+1)^(5/2)/c+d^2*x*(a+b*arcsin(c*x))-2/3*c^2*d^2*x^3*(a+b*arcsin(
c*x))+1/5*c^4*d^2*x^5*(a+b*arcsin(c*x))
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 95, normalized size of antiderivative = 0.73

$$\int \left(d - c^2 dx^2\right)^2 (a + b \arcsin(cx))\, dx$$
$$= \frac{d^2\left(15acx(15 - 10c^2x^2 + 3c^4x^4) + b\sqrt{1 - c^2x^2}(149 - 38c^2x^2 + 9c^4x^4) + 15bcx(15 - 10c^2x^2 + 3c^4x^4)\arcs\right.}{225c}$$

input
```
Integrate[(d - c^2*d*x^2)^2*(a + b*ArcSin[c*x]),x]
```

output
```
(d^2*(15*a*c*x*(15 - 10*c^2*x^2 + 3*c^4*x^4) + b*Sqrt[1 - c^2*x^2]*(149 -
38*c^2*x^2 + 9*c^4*x^4) + 15*b*c*x*(15 - 10*c^2*x^2 + 3*c^4*x^4)*ArcSin[c*
x]))/(225*c)
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 127, normalized size of antiderivative = 0.97, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$, Rules used = {5154, 27, 1576, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d - c^2 dx^2\right)^2 (a + b \arcsin(cx))\, dx$$
$$\downarrow 5154$$
$$-bc \int \frac{d^2 x\left(3c^4x^4 - 10c^2x^2 + 15\right)}{15\sqrt{1 - c^2x^2}} dx + \frac{1}{5}c^4 d^2 x^5 (a + b \arcsin(cx)) - \frac{2}{3}c^2 d^2 x^3 (a + b \arcsin(cx)) + d^2 x (a + b \arcsin(cx))$$
$$\downarrow 27$$
$$-\frac{1}{15}bcd^2 \int \frac{x\left(3c^4x^4 - 10c^2x^2 + 15\right)}{\sqrt{1 - c^2x^2}} dx + \frac{1}{5}c^4 d^2 x^5 (a + b \arcsin(cx)) - \frac{2}{3}c^2 d^2 x^3 (a + b \arcsin(cx)) + d^2 x (a + b \arcsin(cx))$$
$$\downarrow 1576$$

$$-\frac{1}{30}bcd^2\int\frac{3c^4x^4-10c^2x^2+15}{\sqrt{1-c^2x^2}}dx^2+\frac{1}{5}c^4d^2x^5(a+b\arcsin(cx))-\frac{2}{3}c^2d^2x^3(a+b\arcsin(cx))+d^2x(a+b\arcsin(cx))$$

$$\downarrow 1140$$

$$-\frac{1}{30}bcd^2\int\left(3\left(1-c^2x^2\right)^{3/2}+4\sqrt{1-c^2x^2}+\frac{8}{\sqrt{1-c^2x^2}}\right)dx^2+\frac{1}{5}c^4d^2x^5(a+b\arcsin(cx))-\frac{2}{3}c^2d^2x^3(a+b\arcsin(cx))+d^2x(a+b\arcsin(cx))$$

$$\downarrow 2009$$

$$\frac{1}{5}c^4d^2x^5(a+b\arcsin(cx))-\frac{2}{3}c^2d^2x^3(a+b\arcsin(cx))+d^2x(a+b\arcsin(cx))-\frac{1}{30}bcd^2\left(-\frac{6\left(1-c^2x^2\right)^{5/2}}{5c^2}-\frac{8\left(1-c^2x^2\right)^{3/2}}{3c^2}-\frac{16\sqrt{1-c^2x^2}}{c^2}\right)$$

input
```
Int[(d - c^2*d*x^2)^2*(a + b*ArcSin[c*x]),x]
```

output
```
-1/30*(b*c*d^2*((-16*Sqrt[1 - c^2*x^2])/c^2 - (8*(1 - c^2*x^2)^(3/2))/(3*c
^2) - (6*(1 - c^2*x^2)^(5/2))/(5*c^2))) + d^2*x*(a + b*ArcSin[c*x]) - (2*c
^2*d^2*x^3*(a + b*ArcSin[c*x]))/3 + (c^4*d^2*x^5*(a + b*ArcSin[c*x]))/5
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 1576
```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Simp[1/2   Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x]
, x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5154
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])   u, x
] - Simp[b*c   Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 119, normalized size of antiderivative = 0.91

method	result
parts	$d^2a\left(\frac{1}{5}c^4x^5-\frac{2}{3}c^2x^3+x\right)+\frac{d^2b\left(\frac{c^5x^5\arcsin(cx)}{5}-\frac{2c^3x^3\arcsin(cx)}{3}+cx\arcsin(cx)+\frac{149\sqrt{-c^2x^2+1}}{225}-\frac{38c^2x^2\sqrt{-}}{225}\right.}{c}$
derivativedivides	$\frac{d^2a\left(\frac{1}{5}c^5x^5-\frac{2}{3}c^3x^3+cx\right)+d^2b\left(\frac{c^5x^5\arcsin(cx)}{5}-\frac{2c^3x^3\arcsin(cx)}{3}+cx\arcsin(cx)+\frac{149\sqrt{-c^2x^2+1}}{225}-\frac{38c^2x^2\sqrt{-c^2x^2+1}}{225}+\frac{c^4}{}\right.}{c}$
default	$\frac{d^2a\left(\frac{1}{5}c^5x^5-\frac{2}{3}c^3x^3+cx\right)+d^2b\left(\frac{c^5x^5\arcsin(cx)}{5}-\frac{2c^3x^3\arcsin(cx)}{3}+cx\arcsin(cx)+\frac{149\sqrt{-c^2x^2+1}}{225}-\frac{38c^2x^2\sqrt{-c^2x^2+1}}{225}+\frac{c^4}{}\right.}{c}$
orering	$\frac{x\left(81c^4x^4-302c^2x^2+821\right)\left(-c^2dx^2+d\right)^2(a+b\arcsin(cx))}{225(cx-1)(cx+1)(c^2x^2-1)}-\frac{\left(9c^4x^4-38c^2x^2+149\right)\left(-4\left(-c^2dx^2+d\right)(a+b\arcsin(cx)\right.}{225c^2(cx-1)(cx+1)}$

input
```
int((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
d^2*a*(1/5*c^4*x^5-2/3*c^2*x^3+x)+d^2*b/c*(1/5*c^5*x^5*arcsin(c*x)-2/3*c^3
*x^3*arcsin(c*x)+c*x*arcsin(c*x)+149/225*(-c^2*x^2+1)^(1/2)-38/225*c^2*x^2
*(-c^2*x^2+1)^(1/2)+1/25*c^4*x^4*(-c^2*x^2+1)^(1/2))
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.92

$$\int \left(d - c^2 d x^2\right)^2 (a + b \arcsin(cx))\, dx$$
$$= \frac{45\, ac^5 d^2 x^5 - 150\, ac^3 d^2 x^3 + 225\, acd^2 x + 15\left(3\, bc^5 d^2 x^5 - 10\, bc^3 d^2 x^3 + 15\, bcd^2 x\right) \arcsin(cx) + (9\, bc^4 d^2 x^4 -}{225\, c}$$

input
```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
1/225*(45*a*c^5*d^2*x^5 - 150*a*c^3*d^2*x^3 + 225*a*c*d^2*x + 15*(3*b*c^5*
d^2*x^5 - 10*b*c^3*d^2*x^3 + 15*b*c*d^2*x)*arcsin(c*x) + (9*b*c^4*d^2*x^4
- 38*b*c^2*d^2*x^2 + 149*b*d^2)*sqrt(-c^2*x^2 + 1))/c
```

Sympy [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 165, normalized size of antiderivative = 1.26

$$\int \left(d - c^2 d x^2\right)^2 (a + b \arcsin(cx))\, dx$$
$$= \begin{cases} \frac{ac^4 d^2 x^5}{5} - \frac{2ac^2 d^2 x^3}{3} + ad^2 x + \frac{bc^4 d^2 x^5 \operatorname{asin}(cx)}{5} + \frac{bc^3 d^2 x^4 \sqrt{-c^2 x^2+1}}{25} - \frac{2bc^2 d^2 x^3 \operatorname{asin}(cx)}{3} - \frac{38bcd^2 x^2 \sqrt{-c^2 x^2+1}}{225} + bd^2 x \, a \\ ad^2 x \end{cases}$$

input
```
integrate((-c**2*d*x**2+d)**2*(a+b*asin(c*x)),x)
```

output
```
Piecewise((a*c**4*d**2*x**5/5 - 2*a*c**2*d**2*x**3/3 + a*d**2*x + b*c**4*d
**2*x**5*asin(c*x)/5 + b*c**3*d**2*x**4*sqrt(-c**2*x**2 + 1)/25 - 2*b*c**2
*d**2*x**3*asin(c*x)/3 - 38*b*c*d**2*x**2*sqrt(-c**2*x**2 + 1)/225 + b*d**
2*x*asin(c*x) + 149*b*d**2*sqrt(-c**2*x**2 + 1)/(225*c), Ne(c, 0)), (a*d**
2*x, True))
```

Maxima [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 196, normalized size of antiderivative = 1.50

$$\int \left(d - c^2 d x^2\right)^2 (a + b \arcsin(cx))\, dx = \frac{1}{5} a c^4 d^2 x^5 + \frac{1}{75}\left(15\, x^5 \arcsin(cx) + \left(\frac{3\sqrt{-c^2x^2+1}x^4}{c^2} + \frac{4\sqrt{-c^2x^2+1}x^2}{c^4} + \frac{8\sqrt{-c^2x^2+1}}{c^6}\right)c\right) b c^4 d^2 - \frac{2}{3} a c^2 d^2 x^3 - \frac{2}{9}\left(3\, x^3 \arcsin(cx) + c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right) b c^2 d^2 + a d^2 x + \frac{\left(cx \arcsin(cx) + \sqrt{-c^2x^2+1}\right) b d^2}{c}$$

input
```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
1/5*a*c^4*d^2*x^5 + 1/75*(15*x^5*arcsin(c*x) + (3*sqrt(-c^2*x^2 + 1)*x^4/c
^2 + 4*sqrt(-c^2*x^2 + 1)*x^2/c^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c)*b*c^4*d^2
 - 2/3*a*c^2*d^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))*b*c^2*d^2 + a*d^2*x + (c*x*arcsin(c*x) +
sqrt(-c^2*x^2 + 1))*b*d^2/c
```

Giac [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 158, normalized size of antiderivative = 1.21

$$\begin{aligned}\int \left(d - c^2 d x^2\right)^2 (a + b \arcsin(cx))\, dx = {} & \frac{1}{5} a c^4 d^2 x^5 - \frac{2}{3} a c^2 d^2 x^3 \\ & + \frac{1}{5}\left(c^2x^2 - 1\right)^2 b d^2 x \arcsin(cx) \\ & - \frac{4}{15}\left(c^2x^2 - 1\right) b d^2 x \arcsin(cx) \\ & + \frac{8}{15} b d^2 x \arcsin(cx) \\ & + \frac{\left(c^2x^2-1\right)^2 \sqrt{-c^2x^2+1}\, b d^2}{25\, c} + a d^2 x \\ & + \frac{4\left(-c^2x^2+1\right)^{\frac{3}{2}} b d^2}{45\, c} + \frac{8\sqrt{-c^2x^2+1}\, b d^2}{15\, c}\end{aligned}$$

input
```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
1/5*a*c^4*d^2*x^5 - 2/3*a*c^2*d^2*x^3 + 1/5*(c^2*x^2 - 1)^2*b*d^2*x*arcsin
(c*x) - 4/15*(c^2*x^2 - 1)*b*d^2*x*arcsin(c*x) + 8/15*b*d^2*x*arcsin(c*x)
+ 1/25*(c^2*x^2 - 1)^2*sqrt(-c^2*x^2 + 1)*b*d^2/c + a*d^2*x + 4/45*(-c^2*x
^2 + 1)^(3/2)*b*d^2/c + 8/15*sqrt(-c^2*x^2 + 1)*b*d^2/c
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right)^2 (a + b \arcsin(cx))\, dx = \int (a + b\,\mathrm{asin}(c\,x))\, \left(d - c^2\, d\, x^2\right)^2 dx$$

input
```
int((a + b*asin(c*x))*(d - c^2*d*x^2)^2,x)
```

output
```
int((a + b*asin(c*x))*(d - c^2*d*x^2)^2, x)
```

Reduce [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.92

$$\int \left(d - c^2 dx^2\right)^2 (a + b \arcsin(cx))\, dx$$
$$= \frac{d^2\left(45 asin(cx)\, b\, c^5 x^5 - 150 asin(cx)\, b\, c^3 x^3 + 225 asin(cx)\, bcx + 9\sqrt{-c^2x^2+1}\, b\, c^4 x^4 - 38\sqrt{-c^2x^2+1}\, b\, c^2\right.}{225c}$$

input
```
int((-c^2*d*x^2+d)^2*(a+b*asin(c*x)),x)
```

output
```
(d**2*(45*asin(c*x)*b*c**5*x**5 - 150*asin(c*x)*b*c**3*x**3 + 225*asin(c*x
)*b*c*x + 9*sqrt( - c**2*x**2 + 1)*b*c**4*x**4 - 38*sqrt( - c**2*x**2 + 1)
*b*c**2*x**2 + 149*sqrt( - c**2*x**2 + 1)*b + 45*a*c**5*x**5 - 150*a*c**3*
x**3 + 225*a*c*x))/(225*c)
```

3.3 $\int (d - c^2 dx^2)(a + b \arcsin(cx))\, dx$

Optimal result . . . 113
Mathematica [A] (verified) . . . 113
Rubi [A] (verified) . . . 114
Maple [A] (verified) . . . 116
Fricas [A] (verification not implemented) . . . 116
Sympy [A] (verification not implemented) . . . 117
Maxima [A] (verification not implemented) . . . 117
Giac [A] (verification not implemented) . . . 118
Mupad [F(-1)] . . . 118
Reduce [B] (verification not implemented) . . . 119

Optimal result

Integrand size = 20, antiderivative size = 77

$$\int (d - c^2 dx^2)(a + b \arcsin(cx))\, dx = \frac{2bd\sqrt{1 - c^2x^2}}{3c} + \frac{bd(1 - c^2x^2)^{3/2}}{9c} + dx(a + b \arcsin(cx)) - \frac{1}{3}c^2 dx^3 (a + b \arcsin(cx))$$

output
```
2/3*b*d*(-c^2*x^2+1)^(1/2)/c+1/9*b*d*(-c^2*x^2+1)^(3/2)/c+d*x*(a+b*arcsin(
c*x))-1/3*c^2*d*x^3*(a+b*arcsin(c*x))
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 88, normalized size of antiderivative = 1.14

$$\int (d - c^2 dx^2)(a + b \arcsin(cx))\, dx = adx - \frac{1}{3}ac^2 dx^3 + \frac{7bd\sqrt{1 - c^2x^2}}{9c} - \frac{1}{9}bcdx^2\sqrt{1 - c^2x^2} + bdx \arcsin(cx) - \frac{1}{3}bc^2 dx^3 \arcsin(cx)$$

input
```
Integrate[(d - c^2*d*x^2)*(a + b*ArcSin[c*x]),x]
```

output
```
a*d*x - (a*c^2*d*x^3)/3 + (7*b*d*Sqrt[1 - c^2*x^2])/(9*c) - (b*c*d*x^2*Sqr
t[1 - c^2*x^2])/9 + b*d*x*ArcSin[c*x] - (b*c^2*d*x^3*ArcSin[c*x])/3
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 79, normalized size of antiderivative = 1.03, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {5154, 27, 353, 53, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d - c^2 dx^2\right)(a + b\arcsin(cx))\,dx$$

$$\downarrow 5154$$

$$-bc\int \frac{dx\left(3 - c^2x^2\right)}{3\sqrt{1 - c^2x^2}}dx - \frac{1}{3}c^2dx^3(a + b\arcsin(cx)) + dx(a + b\arcsin(cx))$$

$$\downarrow 27$$

$$-\frac{1}{3}bcd\int \frac{x\left(3 - c^2x^2\right)}{\sqrt{1 - c^2x^2}}dx - \frac{1}{3}c^2dx^3(a + b\arcsin(cx)) + dx(a + b\arcsin(cx))$$

$$\downarrow 353$$

$$-\frac{1}{6}bcd\int \frac{3 - c^2x^2}{\sqrt{1 - c^2x^2}}dx^2 - \frac{1}{3}c^2dx^3(a + b\arcsin(cx)) + dx(a + b\arcsin(cx))$$

$$\downarrow 53$$

$$-\frac{1}{6}bcd\int \left(\sqrt{1 - c^2x^2} + \frac{2}{\sqrt{1 - c^2x^2}}\right)dx^2 - \frac{1}{3}c^2dx^3(a + b\arcsin(cx)) + dx(a + b\arcsin(cx))$$

$$\downarrow 2009$$

$$-\frac{1}{3}c^2dx^3(a + b\arcsin(cx)) + dx(a + b\arcsin(cx)) - \frac{1}{6}bcd\left(-\frac{2\left(1 - c^2x^2\right)^{3/2}}{3c^2} - \frac{4\sqrt{1 - c^2x^2}}{c^2}\right)$$

input
```
Int[(d - c^2*d*x^2)*(a + b*ArcSin[c*x]),x]
```

output
```
-1/6*(b*c*d*((-4*Sqrt[1 - c^2*x^2])/c^2 - (2*(1 - c^2*x^2)^(3/2))/(3*c^2))
) + d*x*(a + b*ArcSin[c*x]) - (c^2*d*x^3*(a + b*ArcSin[c*x]))/3
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 53
```
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] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && LeQ[7*m + 4*n + 4, 0])
|| LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

rule 353
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_Symbol]
 :> Simp[1/2   Subst[Int[(a + b*x)^p*(c + d*x)^q, x], x, x^2], x] /; FreeQ[
{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5154
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])   u, x
] - Simp[b*c   Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 80, normalized size of antiderivative = 1.04

method	result	size
parts	$-ad\left(\frac{1}{3}c^2x^3-x\right)-\frac{bd\left(\frac{c^3x^3\arcsin(cx)}{3}-cx\arcsin(cx)+\frac{c^2x^2\sqrt{-c^2x^2+1}}{9}-\frac{7\sqrt{-c^2x^2+1}}{9}\right)}{c}$	80
derivativedivides	$\frac{-ad\left(\frac{1}{3}c^3x^3-cx\right)-bd\left(\frac{c^3x^3\arcsin(cx)}{3}-cx\arcsin(cx)+\frac{c^2x^2\sqrt{-c^2x^2+1}}{9}-\frac{7\sqrt{-c^2x^2+1}}{9}\right)}{c}$	82
default	$\frac{-ad\left(\frac{1}{3}c^3x^3-cx\right)-bd\left(\frac{c^3x^3\arcsin(cx)}{3}-cx\arcsin(cx)+\frac{c^2x^2\sqrt{-c^2x^2+1}}{9}-\frac{7\sqrt{-c^2x^2+1}}{9}\right)}{c}$	82
orering	$\frac{x\left(5c^2x^2-23\right)\left(-c^2dx^2+d\right)\left(a+b\arcsin(cx)\right)}{9c^2x^2-9}-\frac{\left(c^2x^2-7\right)\left(-2c^2dx(a+b\arcsin(cx))+\frac{\left(-c^2dx^2+d\right)bc}{\sqrt{-c^2x^2+1}}\right)}{9c^2}$	101

input
```
int((-c^2*d*x^2+d)*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
-a*d*(1/3*c^2*x^3-x)-b*d/c*(1/3*c^3*x^3*arcsin(c*x)-c*x*arcsin(c*x)+1/9*c^
2*x^2*(-c^2*x^2+1)^(1/2)-7/9*(-c^2*x^2+1)^(1/2))
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 71, normalized size of antiderivative = 0.92

$$\int \left(d-c^2dx^2\right)\left(a+b\arcsin(cx)\right)dx$$
$$=-\frac{3\,ac^3dx^3-9\,acdx+3\left(bc^3dx^3-3\,bcdx\right)\arcsin\left(cx\right)+\left(bc^2dx^2-7\,bd\right)\sqrt{-c^2x^2+1}}{9\,c}$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
-1/9*(3*a*c^3*d*x^3 - 9*a*c*d*x + 3*(b*c^3*d*x^3 - 3*b*c*d*x)*arcsin(c*x)
+ (b*c^2*d*x^2 - 7*b*d)*sqrt(-c^2*x^2 + 1))/c
```

Sympy [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.17

$$\int \left(d - c^2 dx^2\right)\left(a + b\arcsin(cx)\right) dx$$
$$= \begin{cases} -\frac{ac^2dx^3}{3} + adx - \frac{bc^2dx^3\operatorname{asin}(cx)}{3} - \frac{bcdx^2\sqrt{-c^2x^2+1}}{9} + bdx\operatorname{asin}(cx) + \frac{7bd\sqrt{-c^2x^2+1}}{9c} & \text{for } c \neq 0 \\ adx & \text{otherwise} \end{cases}$$

input
```
integrate((-c**2*d*x**2+d)*(a+b*asin(c*x)),x)
```

output
```
Piecewise((-a*c**2*d*x**3/3 + a*d*x - b*c**2*d*x**3*asin(c*x)/3 - b*c*d*x*
**2*sqrt(-c**2*x**2 + 1)/9 + b*d*x*asin(c*x) + 7*b*d*sqrt(-c**2*x**2 + 1)/(
9*c), Ne(c, 0)), (a*d*x, True))
```

Maxima [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.26

$$\int \left(d - c^2 dx^2\right)\left(a + b\arcsin(cx)\right) dx$$
$$= -\frac{1}{3}ac^2dx^3 - \frac{1}{9}\left(3x^3\arcsin(cx) + c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right)bc^2d + adx + \frac{\left(cx\arcsin(cx) + \sqrt{-c^2x^2+1}\right)bd}{c}$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
-1/3*a*c^2*d*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*c^2*d + a*d*x + (c*x*arcsin(c*x) + sqrt(-c^
2*x^2 + 1))*b*d/c
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 80, normalized size of antiderivative = 1.04

$$\int \left(d - c^2 dx^2\right)\left(a + b\arcsin(cx)\right) dx = -\frac{1}{3} ac^2 dx^3 - \frac{1}{3}\left(c^2x^2 - 1\right) bdx \arcsin\left(cx\right) + \frac{2}{3} bdx \arcsin\left(cx\right) + adx + \frac{\left(-c^2x^2 + 1\right)^{\frac{3}{2}} bd}{9\,c} + \frac{2\sqrt{-c^2x^2 + 1}\, bd}{3\,c}$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
-1/3*a*c^2*d*x^3 - 1/3*(c^2*x^2 - 1)*b*d*x*arcsin(c*x) + 2/3*b*d*x*arcsin(
c*x) + a*d*x + 1/9*(-c^2*x^2 + 1)^(3/2)*b*d/c + 2/3*sqrt(-c^2*x^2 + 1)*b*d
/c
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right)\left(a + b\arcsin(cx)\right) dx$$

$$= \begin{cases} \frac{b\,d\left(\sqrt{1-c^2\,x^2}+c\,x\,\mathrm{asin}(c\,x)\right)}{c} - b\,c^2\,d\left(\frac{\sqrt{\frac{1}{c^2}-x^2}\left(\frac{2}{c^2}+x^2\right)}{9} + \frac{x^3\,\mathrm{asin}(c\,x)}{3}\right) - \frac{a\,d\,x\,\left(c^2\,x^2-3\right)}{3} & \text{if } 0 < c \\ \int \left(a + b\,\mathrm{asin}(c\,x)\right)\,\left(d - c^2\,d\,x^2\right)\,dx & \text{if } \neg 0 < c \end{cases}$$

input
```
int((a + b*asin(c*x))*(d - c^2*d*x^2),x)
```

output
```
piecewise(0 < c, - b*c^2*d*(((1/c^2 - x^2)^(1/2)*(2/c^2 + x^2))/9 + (x^3*a
sin(c*x))/3) + (b*d*((- c^2*x^2 + 1)^(1/2) + c*x*asin(c*x)))/c - (a*d*x*(c
^2*x^2 - 3))/3, ~0 < c, int((a + b*asin(c*x))*(d - c^2*d*x^2), x))
```

Reduce [B] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 77, normalized size of antiderivative = 1.00

$$\int \left(d - c^2 d x^2\right)\left(a + b\arcsin(cx)\right) dx$$
$$= \frac{d\left(-3asin(cx)\, b\, c^3 x^3 + 9asin(cx)\, bcx - \sqrt{-c^2x^2+1}\, b\, c^2x^2 + 7\sqrt{-c^2x^2+1}\, b - 3a\, c^3x^3 + 9acx\right)}{9c}$$

input
```
int((-c^2*d*x^2+d)*(a+b*asin(c*x)),x)
```

output
```
(d*( - 3*asin(c*x)*b*c**3*x**3 + 9*asin(c*x)*b*c*x - sqrt( - c**2*x**2 + 1
)*b*c**2*x**2 + 7*sqrt( - c**2*x**2 + 1)*b - 3*a*c**3*x**3 + 9*a*c*x))/(9*
c)
```

3.4 $\int \frac{a+b\arcsin(cx)}{d-c^2dx^2}\,dx$

Optimal result . . . 120
Mathematica [B] (verified) . . . 120
Rubi [A] (verified) . . . 121
Maple [A] (verified) . . . 123
Fricas [F] . . . 123
Sympy [F] . . . 124
Maxima [F] . . . 124
Giac [F(-2)] . . . 124
Mupad [F(-1)] . . . 125
Reduce [F] . . . 125

Optimal result

Integrand size = 22, antiderivative size = 84

$$\int \frac{a+b\arcsin(cx)}{d-c^2dx^2}\,dx = -\frac{2i(a+b\arcsin(cx))\arctan\left(e^{i\arcsin(cx)}\right)}{cd} + \frac{ib\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)}{cd} - \frac{ib\,\mathrm{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)}{cd}$$

output

```
-2*I*(a+b*arcsin(c*x))*arctan(I*c*x+(-c^2*x^2+1)^(1/2))/c/d+I*b*polylog(2,
-I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d-I*b*polylog(2,I*(I*c*x+(-c^2*x^2+1)^(1/
2)))/c/d
```

Mathematica [B] (verified)

Both result and optimal contain complex but leaf count is larger than twice the leaf count of optimal. 207 vs. 2(84) = 168.

Time = 0.48 (sec) , antiderivative size = 207, normalized size of antiderivative = 2.46

$$\int \frac{a+b\arcsin(cx)}{d-c^2dx^2}\,dx = \frac{-ib\pi\arcsin(cx)+b\pi\log\left(1-ie^{i\arcsin(cx)}\right)+2b\arcsin(cx)\log\left(1-ie^{i\arcsin(cx)}\right)+b\pi\log\left(1+ie^{i\arcsin(cx)}\right)}{}$$

input
```
Integrate[(a + b*ArcSin[c*x])/(d - c^2*d*x^2),x]
```

output
```
((-I)*b*Pi*ArcSin[c*x] + b*Pi*Log[1 - I*E^(I*ArcSin[c*x])] + 2*b*ArcSin[c*
x]*Log[1 - I*E^(I*ArcSin[c*x])] + b*Pi*Log[1 + I*E^(I*ArcSin[c*x])] - 2*b*
ArcSin[c*x]*Log[1 + I*E^(I*ArcSin[c*x])] - a*Log[1 - c*x] + a*Log[1 + c*x]
 - b*Pi*Log[-Cos[(Pi + 2*ArcSin[c*x])/4]] - b*Pi*Log[Sin[(Pi + 2*ArcSin[c*
x])/4]] + (2*I)*b*PolyLog[2, (-I)*E^(I*ArcSin[c*x])] - (2*I)*b*PolyLog[2,
I*E^(I*ArcSin[c*x])])/(2*c*d)
```

Rubi [A] (verified)

Time $= 0.36$ (sec) , antiderivative size $= 73$, normalized size of antiderivative $= 0.87$, number of steps used $= 6$, number of rules used $= 5$, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$, Rules used $= \{5164, 3042, 4669, 2715, 2838\}$

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a + b\arcsin(cx)}{d - c^2dx^2}\,dx$$

$$\downarrow 5164$$

$$\frac{\int \frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}\,d\arcsin(cx)}{cd}$$

$$\downarrow 3042$$

$$\frac{\int (a + b\arcsin(cx))\csc\left(\arcsin(cx) + \frac{\pi}{2}\right)\,d\arcsin(cx)}{cd}$$

$$\downarrow 4669$$

$$\frac{-b\int \log\left(1 - ie^{i\arcsin(cx)}\right)\,d\arcsin(cx) + b\int \log\left(1 + ie^{i\arcsin(cx)}\right)\,d\arcsin(cx) - 2i\arctan\left(e^{i\arcsin(cx)}\right)(a + b\arcs}{cd}$$

$$\downarrow 2715$$

$$\frac{ib\int e^{-i\arcsin(cx)}\log\left(1 - ie^{i\arcsin(cx)}\right)\,de^{i\arcsin(cx)} - ib\int e^{-i\arcsin(cx)}\log\left(1 + ie^{i\arcsin(cx)}\right)\,de^{i\arcsin(cx)} - 2i\arctan}{cd}$$

$$\downarrow 2838$$

$$\frac{-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx))+ib\,\text{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)-ib\,\text{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)}{cd}$$

input
```
Int[(a + b*ArcSin[c*x])/(d - c^2*d*x^2),x]
```

output
```
((-2*I)*(a + b*ArcSin[c*x])*ArcTan[E^(I*ArcSin[c*x])] + I*b*PolyLog[2, (-I
)*E^(I*ArcSin[c*x])] - I*b*PolyLog[2, I*E^(I*ArcSin[c*x])])/(c*d)
```

Defintions of rubi rules used

rule 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[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 2838
```
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 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4669
```
Int[csc[(e_.) + Pi*(k_.) + (f_.)*(x_)]*((c_.) + (d_.)*(x_))^(m_.), x_Symbol
] :> Simp[-2*(c + d*x)^m*(ArcTanh[E^(I*k*Pi)*E^(I*(e + f*x))]/f), x] + (-Si
mp[d*(m/f)   Int[(c + d*x)^(m - 1)*Log[1 - E^(I*k*Pi)*E^(I*(e + f*x))], x],
 x] + Simp[d*(m/f)   Int[(c + d*x)^(m - 1)*Log[1 + E^(I*k*Pi)*E^(I*(e + f*x
))], x], x]) /; FreeQ[{c, d, e, f}, x] && IntegerQ[2*k] && IGtQ[m, 0]
```

rule 5164
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2), x_Symbo
l] :> Simp[1/(c*d)   Subst[Int[(a + b*x)^n*Sec[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[n, 0]
```

Maple [A] (verified)

Time = 0.46 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.67

method	result
derivativedivides	$\frac{\frac{a\ \mathrm{arctanh}(cx)}{d}-\frac{b\left(-\mathrm{arctanh}(cx)\arcsin(cx)+i\,\mathrm{arctanh}(cx)\left(\ln\left(1-\frac{i(cx+1)}{\sqrt{-c^2x^2+1}}\right)-\ln\left(1+\frac{i(cx+1)}{\sqrt{-c^2x^2+1}}\right)\right)-i\,\mathrm{dilog}\left(1+\frac{i(cx+1)}{\sqrt{-c^2x^2+1}}\right)\right.}{d}}{c}$
default	$\frac{\frac{a\ \mathrm{arctanh}(cx)}{d}-\frac{b\left(-\mathrm{arctanh}(cx)\arcsin(cx)+i\,\mathrm{arctanh}(cx)\left(\ln\left(1-\frac{i(cx+1)}{\sqrt{-c^2x^2+1}}\right)-\ln\left(1+\frac{i(cx+1)}{\sqrt{-c^2x^2+1}}\right)\right)-i\,\mathrm{dilog}\left(1+\frac{i(cx+1)}{\sqrt{-c^2x^2+1}}\right)\right.}{d}}{c}$
parts	$-\frac{a\ln(cx-1)}{2dc}+\frac{a\ln(cx+1)}{2dc}-\frac{b\left(-\mathrm{arctanh}(cx)\arcsin(cx)+i\,\mathrm{arctanh}(cx)\left(\ln\left(1-\frac{i(cx+1)}{\sqrt{-c^2x^2+1}}\right)-\ln\left(1+\frac{i(cx+1)}{\sqrt{-c^2x^2+1}}\right.\right.\right.}{dc}$

input
```
int((a+b*arcsin(c*x))/(-c^2*d*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
1/c*(a/d*arctanh(c*x)-b/d*(-arctanh(c*x)*arcsin(c*x)+I*arctanh(c*x)*(ln(1-
I*(c*x+1)/(-c^2*x^2+1)^(1/2))-ln(1+I*(c*x+1)/(-c^2*x^2+1)^(1/2)))-I*dilog(
1+I*(c*x+1)/(-c^2*x^2+1)^(1/2))+I*dilog(1-I*(c*x+1)/(-c^2*x^2+1)^(1/2))))
```

Fricas [F]

$$\int \frac{a+b\arcsin(cx)}{d-c^2dx^2}\,dx = \int -\frac{b\arcsin(cx)+a}{c^2dx^2-d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d),x, algorithm="fricas")
```

output
```
integral(-(b*arcsin(c*x) + a)/(c^2*d*x^2 - d), x)
```

Sympy [F]

$$\int \frac{a+b\arcsin(cx)}{d-c^2dx^2}\,dx = -\frac{\int \frac{a}{c^2x^2-1}\,dx + \int \frac{b\operatorname{asin}(cx)}{c^2x^2-1}\,dx}{d}$$

input
```
integrate((a+b*asin(c*x))/(-c**2*d*x**2+d),x)
```

output
```
-(Integral(a/(c**2*x**2 - 1), x) + Integral(b*asin(c*x)/(c**2*x**2 - 1), x
))/d
```

Maxima [F]

$$\int \frac{a+b\arcsin(cx)}{d-c^2dx^2}\,dx = \int -\frac{b\arcsin(cx)+a}{c^2dx^2-d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d),x, algorithm="maxima")
```

output
```
1/2*a*(log(c*x + 1)/(c*d) - log(c*x - 1)/(c*d)) + 1/2*(2*c*d*integrate(1/2
*sqrt(c*x + 1)*sqrt(-c*x + 1)*(log(c*x + 1) - log(-c*x + 1))/(c^2*d*x^2 -
d), x) + arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))*log(c*x + 1) - arctan2
(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))*log(-c*x + 1))*b/(c*d)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a+b\arcsin(cx)}{d-c^2dx^2}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\arcsin(cx)}{d-c^2dx^2}\,dx = \int \frac{a+b\,\text{asin}(c\,x)}{d-c^2\,d\,x^2}\,dx$$

input
```
int((a + b*asin(c*x))/(d - c^2*d*x^2),x)
```

output
```
int((a + b*asin(c*x))/(d - c^2*d*x^2), x)
```

Reduce [F]

$$\int \frac{a+b\arcsin(cx)}{d-c^2dx^2}\,dx = \frac{-2\left(\int \frac{asin(cx)}{c^2x^2-1}dx\right)bc - \log(c^2x-c)\,a + \log(c^2x+c)\,a}{2cd}$$

input
```
int((a+b*asin(c*x))/(-c^2*d*x^2+d),x)
```

output
```
( - 2*int(asin(c*x)/(c**2*x**2 - 1),x)*b*c - log(c**2*x - c)*a + log(c**2*
x + c)*a)/(2*c*d)
```

3.5 $\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^2}\,dx$

Optimal result . . . 126
Mathematica [B] (verified) . . . 127
Rubi [A] (verified) . . . 127
Maple [A] (verified) . . . 130
Fricas [F] . . . 131
Sympy [F] . . . 131
Maxima [F] . . . 131
Giac [F(-2)] . . . 132
Mupad [F(-1)] . . . 132
Reduce [F] . . . 133

Optimal result

Integrand size = 22, antiderivative size = 141

$$\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^2}\,dx = -\frac{b}{2cd^2\sqrt{1-c^2x^2}} + \frac{x(a+b\arcsin(cx))}{2d^2\left(1-c^2x^2\right)} - \frac{i(a+b\arcsin(cx))\arctan\left(e^{i\arcsin(cx)}\right)}{cd^2} + \frac{ib\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)}{2cd^2} - \frac{ib\,\mathrm{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)}{2cd^2}$$

output

```
-1/2*b/c/d^2/(-c^2*x^2+1)^(1/2)+1/2*x*(a+b*arcsin(c*x))/d^2/(-c^2*x^2+1)-I
*(a+b*arcsin(c*x))*arctan(I*c*x+(-c^2*x^2+1)^(1/2))/c/d^2+1/2*I*b*polylog(
2,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d^2-1/2*I*b*polylog(2,I*(I*c*x+(-c^2*x^
2+1)^(1/2)))/c/d^2
```

Mathematica [B] (verified)

Both result and optimal contain complex but leaf count is larger than twice the leaf count of optimal. 334 vs. $2(141) = 282$.

Time = 0.84 (sec) , antiderivative size = 334, normalized size of antiderivative = 2.37

$$\int \frac{a + b\arcsin(cx)}{\left(d - c^2dx^2\right)^2}\,dx =$$

$$-\frac{\frac{b\sqrt{1-c^2x^2}}{c-c^2x} + \frac{b\sqrt{1-c^2x^2}}{c+c^2x} + \frac{2ax}{-1+c^2x^2} + \frac{ib\pi\arcsin(cx)}{c} + \frac{b\arcsin(cx)}{c(-1+cx)} + \frac{b\arcsin(cx)}{c+c^2x} - \frac{b\pi\log\left(1-ie^{i\arcsin(cx)}\right)}{c} - \frac{2b\arcsin(cx)\log}{}$$

input
```
Integrate[(a + b*ArcSin[c*x])/(d - c^2*d*x^2)^2,x]
```

output
```
-1/4*((b*Sqrt[1 - c^2*x^2])/(c - c^2*x) + (b*Sqrt[1 - c^2*x^2])/(c + c^2*x
) + (2*a*x)/(-1 + c^2*x^2) + (I*b*Pi*ArcSin[c*x])/c + (b*ArcSin[c*x])/(c*(
-1 + c*x)) + (b*ArcSin[c*x])/(c + c^2*x) - (b*Pi*Log[1 - I*E^(I*ArcSin[c*x
])])/c - (2*b*ArcSin[c*x]*Log[1 - I*E^(I*ArcSin[c*x])])/c - (b*Pi*Log[1 +
I*E^(I*ArcSin[c*x])])/c + (2*b*ArcSin[c*x]*Log[1 + I*E^(I*ArcSin[c*x])])/c
 + (a*Log[1 - c*x])/c - (a*Log[1 + c*x])/c + (b*Pi*Log[-Cos[(Pi + 2*ArcSin
[c*x])/4]])/c + (b*Pi*Log[Sin[(Pi + 2*ArcSin[c*x])/4]])/c - ((2*I)*b*PolyL
og[2, (-I)*E^(I*ArcSin[c*x])])/c + ((2*I)*b*PolyLog[2, I*E^(I*ArcSin[c*x])
])/c)/d^2
```

Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 130, normalized size of antiderivative = 0.92, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.364$, Rules used = {5162, 27, 241, 5164, 3042, 4669, 2715, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a + b\arcsin(cx)}{\left(d - c^2dx^2\right)^2}\,dx$$

$$\downarrow 5162$$

$$\frac{\int \frac{a+b\arcsin(cx)}{d(1-c^2x^2)}dx}{2d} - \frac{bc\int \frac{x}{(1-c^2x^2)^{3/2}}dx}{2d^2} + \frac{x(a+b\arcsin(cx))}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 27$$

$$\frac{\int \frac{a+b\arcsin(cx)}{1-c^2x^2}dx}{2d^2} - \frac{bc\int \frac{x}{(1-c^2x^2)^{3/2}}dx}{2d^2} + \frac{x(a+b\arcsin(cx))}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 241$$

$$\frac{\int \frac{a+b\arcsin(cx)}{1-c^2x^2}dx}{2d^2} + \frac{x(a+b\arcsin(cx))}{2d^2\left(1-c^2x^2\right)} - \frac{b}{2cd^2\sqrt{1-c^2x^2}}$$

$$\downarrow 5164$$

$$\frac{\int \frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}d\arcsin(cx)}{2cd^2} + \frac{x(a+b\arcsin(cx))}{2d^2\left(1-c^2x^2\right)} - \frac{b}{2cd^2\sqrt{1-c^2x^2}}$$

$$\downarrow 3042$$

$$\frac{\int (a+b\arcsin(cx))\csc\left(\arcsin(cx)+\frac{\pi}{2}\right)d\arcsin(cx)}{2cd^2} + \frac{x(a+b\arcsin(cx))}{2d^2\left(1-c^2x^2\right)} - \frac{b}{2cd^2\sqrt{1-c^2x^2}}$$

$$\downarrow 4669$$

$$\frac{-b\int \log\left(1-ie^{i\arcsin(cx)}\right)d\arcsin(cx) + b\int \log\left(1+ie^{i\arcsin(cx)}\right)d\arcsin(cx) - 2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcs}{2cd^2}$$
$$\frac{x(a+b\arcsin(cx))}{2d^2\left(1-c^2x^2\right)} - \frac{b}{2cd^2\sqrt{1-c^2x^2}}$$

$$\downarrow 2715$$

$$\frac{ib\int e^{-i\arcsin(cx)}\log\left(1-ie^{i\arcsin(cx)}\right)de^{i\arcsin(cx)} - ib\int e^{-i\arcsin(cx)}\log\left(1+ie^{i\arcsin(cx)}\right)de^{i\arcsin(cx)} - 2i\arctan}{2cd^2}$$
$$\frac{x(a+b\arcsin(cx))}{2d^2\left(1-c^2x^2\right)} - \frac{b}{2cd^2\sqrt{1-c^2x^2}}$$

$$\downarrow 2838$$

$$\frac{-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx)) + ib\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right) - ib\,\mathrm{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)}{2cd^2} +$$
$$\frac{x(a+b\arcsin(cx))}{2d^2\left(1-c^2x^2\right)} - \frac{b}{2cd^2\sqrt{1-c^2x^2}}$$

input
```
Int[(a + b*ArcSin[c*x])/(d - c^2*d*x^2)^2,x]
```

output
```
-1/2*b/(c*d^2*Sqrt[1 - c^2*x^2]) + (x*(a + b*ArcSin[c*x]))/(2*d^2*(1 - c^2
*x^2)) + ((-2*I)*(a + b*ArcSin[c*x])*ArcTan[E^(I*ArcSin[c*x])] + I*b*PolyL
og[2, (-I)*E^(I*ArcSin[c*x])] - I*b*PolyLog[2, I*E^(I*ArcSin[c*x])])/(2*c*
d^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 241
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(a + b*x^2)^(p + 1)/
(2*b*(p + 1)), x] /; FreeQ[{a, b, p}, x] && NeQ[p, -1]
```

rule 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[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 2838
```
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 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4669
```
Int[csc[(e_.) + Pi*(k_.) + (f_.)*(x_)]*((c_.) + (d_.)*(x_))^(m_.), x_Symbol
] :> Simp[-2*(c + d*x)^m*(ArcTanh[E^(I*k*Pi)*E^(I*(e + f*x))]/f), x] + (-Si
mp[d*(m/f)   Int[(c + d*x)^(m - 1)*Log[1 - E^(I*k*Pi)*E^(I*(e + f*x))], x],
 x] + Simp[d*(m/f)   Int[(c + d*x)^(m - 1)*Log[1 + E^(I*k*Pi)*E^(I*(e + f*x
))], x], x]) /; FreeQ[{c, d, e, f}, x] && IntegerQ[2*k] && IGtQ[m, 0]
```

rule 5162

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_), x_
Symbol] :> Simp[(-x)*(d + e*x^2)^(p + 1)*((a + b*ArcSin[c*x])^n/(2*d*(p + 1
))), x] + (Simp[(2*p + 3)/(2*d*(p + 1))   Int[(d + e*x^2)^(p + 1)*(a + b*Ar
cSin[c*x])^n, x], x] + Simp[b*c*(n/(2*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2
*x^2)^p]   Int[x*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x
]) /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && LtQ[p,
 -1] && NeQ[p, -3/2]
```

rule 5164

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2), x_Symbo
l] :> Simp[1/(c*d)   Subst[Int[(a + b*x)^n*Sec[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[n, 0]
```

Maple [A] (verified)

Time = 0.33 (sec) , antiderivative size = 201, normalized size of antiderivative = 1.43

method	result
derivativedivides	$\frac{a\left(-\frac{1}{4(cx+1)}+\frac{\ln(cx+1)}{4}-\frac{1}{4(cx-1)}-\frac{\ln(cx-1)}{4}\right)}{d^2}+\frac{b\left(-\frac{cx\arcsin(cx)-\sqrt{-c^2x^2+1}}{2\left(c^2x^2-1\right)}-\frac{\arcsin(cx)\ln\left(1+i\left(icx+\sqrt{-c^2x^2+1}\right)\right)}{2}+\frac{\arcsin}{c}\right.$
default	$\frac{a\left(-\frac{1}{4(cx+1)}+\frac{\ln(cx+1)}{4}-\frac{1}{4(cx-1)}-\frac{\ln(cx-1)}{4}\right)}{d^2}+\frac{b\left(-\frac{cx\arcsin(cx)-\sqrt{-c^2x^2+1}}{2\left(c^2x^2-1\right)}-\frac{\arcsin(cx)\ln\left(1+i\left(icx+\sqrt{-c^2x^2+1}\right)\right)}{2}+\frac{\arcsin}{c}\right.$
parts	$\frac{a\left(-\frac{1}{4c(cx-1)}-\frac{\ln(cx-1)}{4c}-\frac{1}{4c(cx+1)}+\frac{\ln(cx+1)}{4c}\right)}{d^2}+\frac{b\left(-\frac{cx\arcsin(cx)-\sqrt{-c^2x^2+1}}{2\left(c^2x^2-1\right)}-\frac{\arcsin(cx)\ln\left(1+i\left(icx+\sqrt{-c^2x^2+1}\right)\right)}{2}\right.$

input

```
int((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output

```
1/c*(a/d^2*(-1/4/(c*x+1)+1/4*ln(c*x+1)-1/4/(c*x-1)-1/4*ln(c*x-1))+b/d^2*(-
1/2*(c*x*arcsin(c*x)-(-c^2*x^2+1)^(1/2))/(c^2*x^2-1)-1/2*arcsin(c*x)*ln(1+
I*(I*c*x+(-c^2*x^2+1)^(1/2)))+1/2*arcsin(c*x)*ln(1-I*(I*c*x+(-c^2*x^2+1)^(
1/2)))+1/2*I*dilog(1+I*(I*c*x+(-c^2*x^2+1)^(1/2)))-1/2*I*dilog(1-I*(I*c*x+
(-c^2*x^2+1)^(1/2)))))
```

Fricas [F]

$$\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^2}\,dx = \int \frac{b\arcsin(cx)+a}{\left(c^2dx^2-d\right)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*arcsin(c*x) + a)/(c^4*d^2*x^4 - 2*c^2*d^2*x^2 + d^2), x)
```

Sympy [F]

$$\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^2}\,dx = \frac{\int \frac{a}{c^4x^4-2c^2x^2+1}\,dx + \int \frac{b\operatorname{asin}(cx)}{c^4x^4-2c^2x^2+1}\,dx}{d^2}$$

input
```
integrate((a+b*asin(c*x))/(-c**2*d*x**2+d)**2,x)
```

output
```
(Integral(a/(c**4*x**4 - 2*c**2*x**2 + 1), x) + Integral(b*asin(c*x)/(c**4
*x**4 - 2*c**2*x**2 + 1), x))/d**2
```

Maxima [F]

$$\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^2}\,dx = \int \frac{b\arcsin(cx)+a}{\left(c^2dx^2-d\right)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^2,x, algorithm="maxima")
```

output
```
-1/4*a*(2*x/(c^2*d^2*x^2 - d^2) - log(c*x + 1)/(c*d^2) + log(c*x - 1)/(c*d
^2)) - 1/4*(2*c*x*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) - (c^2*x^2 -
1)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))*log(c*x + 1) + (c^2*x^2 - 1)
*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))*log(-c*x + 1) - 4*(c^3*d^2*x^2
 - c*d^2)*integrate(-1/4*(2*c*x - (c^2*x^2 - 1)*log(c*x + 1) + (c^2*x^2 -
1)*log(-c*x + 1))*sqrt(c*x + 1)*sqrt(-c*x + 1)/(c^4*d^2*x^4 - 2*c^2*d^2*x^
2 + d^2), x))*b/(c^3*d^2*x^2 - c*d^2)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a + b \arcsin(cx)}{(d - c^2 dx^2)^2}\, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^2,x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b \arcsin(cx)}{(d - c^2 dx^2)^2}\, dx = \int \frac{a + b \operatorname{asin}(c\,x)}{(d - c^2\, d\, x^2)^2}\, dx$$

input
```
int((a + b*asin(c*x))/(d - c^2*d*x^2)^2,x)
```

output
```
int((a + b*asin(c*x))/(d - c^2*d*x^2)^2, x)
```

Reduce [F]

$$\int \frac{a + b\arcsin(cx)}{\left(d - c^2 dx^2\right)^2}\, dx$$

$$= \frac{4\left(\int \frac{asin(cx)}{c^4x^4-2c^2x^2+1}dx\right) b\, c^3x^2 - 4\left(\int \frac{asin(cx)}{c^4x^4-2c^2x^2+1}dx\right) bc - \log(c^2x - c)\, a\, c^2x^2 + \log(c^2x - c)\, a + \log(c^2x +$$

$$4c\, d^2\, (c^2x^2 - 1)$$

input
```
int((a+b*asin(c*x))/(-c^2*d*x^2+d)^2,x)
```

output
```
(4*int(asin(c*x)/(c**4*x**4 - 2*c**2*x**2 + 1),x)*b*c**3*x**2 - 4*int(asin
(c*x)/(c**4*x**4 - 2*c**2*x**2 + 1),x)*b*c - log(c**2*x - c)*a*c**2*x**2 +
 log(c**2*x - c)*a + log(c**2*x + c)*a*c**2*x**2 - log(c**2*x + c)*a - 2*a
*c*x)/(4*c*d**2*(c**2*x**2 - 1))
```

3.6 $\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^3}\,dx$

Optimal result . . . 134
Mathematica [B] (verified) . . . 135
Rubi [A] (verified) . . . 135
Maple [A] (verified) . . . 139
Fricas [F] . . . 139
Sympy [F(-1)] . . . 140
Maxima [F] . . . 140
Giac [F(-2)] . . . 141
Mupad [F(-1)] . . . 141
Reduce [F] . . . 141

Optimal result

Integrand size = 22, antiderivative size = 196

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^3}\,dx = -\frac{b}{12cd^3\left(1-c^2x^2\right)^{3/2}} - \frac{3b}{8cd^3\sqrt{1-c^2x^2}} + \frac{x(a+b\arcsin(cx))}{4d^3\left(1-c^2x^2\right)^2} + \frac{3x(a+b\arcsin(cx))}{8d^3\left(1-c^2x^2\right)} - \frac{3i(a+b\arcsin(cx))\arctan\left(e^{i\arcsin(cx)}\right)}{4cd^3} + \frac{3ib\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)}{8cd^3} - \frac{3ib\,\mathrm{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)}{8cd^3}$$

output

```
-1/12*b/c/d^3/(-c^2*x^2+1)^(3/2)-3/8*b/c/d^3/(-c^2*x^2+1)^(1/2)+1/4*x*(a+b
*arcsin(c*x))/d^3/(-c^2*x^2+1)^2+3/8*x*(a+b*arcsin(c*x))/d^3/(-c^2*x^2+1)-
3/4*I*(a+b*arcsin(c*x))*arctan(I*c*x+(-c^2*x^2+1)^(1/2))/c/d^3+3/8*I*b*pol
ylog(2,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d^3-3/8*I*b*polylog(2,I*(I*c*x+(-c
^2*x^2+1)^(1/2)))/c/d^3
```

Mathematica [B] (verified)

Both result and optimal contain complex but leaf count is larger than twice the leaf count of optimal. 501 vs. $2(196) = 392$.

Time = 1.13 (sec) , antiderivative size = 501, normalized size of antiderivative = 2.56

$$\int \frac{a + b \arcsin(cx)}{\left(d - c^2 d x^2\right)^3}\, dx =$$

$$-\frac{\frac{2b\sqrt{1-c^2x^2}}{3c(-1+cx)^2} - \frac{bx\sqrt{1-c^2x^2}}{3(-1+cx)^2} + \frac{2b\sqrt{1-c^2x^2}}{3c(1+cx)^2} + \frac{bx\sqrt{1-c^2x^2}}{3(1+cx)^2} + \frac{3b\sqrt{1-c^2x^2}}{c-c^2x} + \frac{3b\sqrt{1-c^2x^2}}{c+c^2x} - \frac{4ax}{\left(-1+c^2x^2\right)^2} + \frac{6ax}{-1+c^2x^2} + \frac{3ib\pi \text{ arc}}{c}$$

input

```
Integrate[(a + b*ArcSin[c*x])/(d - c^2*d*x^2)^3,x]
```

output

```
-1/16*((2*b*Sqrt[1 - c^2*x^2])/(3*c*(-1 + c*x)^2) - (b*x*Sqrt[1 - c^2*x^2]
)/(3*(-1 + c*x)^2) + (2*b*Sqrt[1 - c^2*x^2])/(3*c*(1 + c*x)^2) + (b*x*Sqrt
[1 - c^2*x^2])/(3*(1 + c*x)^2) + (3*b*Sqrt[1 - c^2*x^2])/(c - c^2*x) + (3*
b*Sqrt[1 - c^2*x^2])/(c + c^2*x) - (4*a*x)/(-1 + c^2*x^2)^2 + (6*a*x)/(-1
+ c^2*x^2) + ((3*I)*b*Pi*ArcSin[c*x])/c - (b*ArcSin[c*x])/(c*(-1 + c*x)^2)
 + (b*ArcSin[c*x])/(c*(1 + c*x)^2) - (3*b*ArcSin[c*x])/(c - c^2*x) + (3*b*
ArcSin[c*x])/(c + c^2*x) - (3*b*Pi*Log[1 - I*E^(I*ArcSin[c*x])])/c - (6*b*
ArcSin[c*x]*Log[1 - I*E^(I*ArcSin[c*x])])/c - (3*b*Pi*Log[1 + I*E^(I*ArcSi
n[c*x])])/c + (6*b*ArcSin[c*x]*Log[1 + I*E^(I*ArcSin[c*x])])/c + (3*a*Log[
1 - c*x])/c - (3*a*Log[1 + c*x])/c + (3*b*Pi*Log[-Cos[(Pi + 2*ArcSin[c*x])
/4]])/c + (3*b*Pi*Log[Sin[(Pi + 2*ArcSin[c*x])/4]])/c - ((6*I)*b*PolyLog[2
, (-I)*E^(I*ArcSin[c*x])])/c + ((6*I)*b*PolyLog[2, I*E^(I*ArcSin[c*x])])/c
)/d^3
```

Rubi [A] (verified)

Time = 0.78 (sec) , antiderivative size = 182, normalized size of antiderivative = 0.93, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.455$, Rules used = {5162, 27, 241, 5162, 241, 5164, 3042, 4669, 2715, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^3}\,dx$$

$$\downarrow 5162$$

$$\frac{3\int \frac{a+b\arcsin(cx)}{d^2(1-c^2x^2)^2}dx}{4d} - \frac{bc\int \frac{x}{(1-c^2x^2)^{5/2}}dx}{4d^3} + \frac{x(a+b\arcsin(cx))}{4d^3\left(1-c^2x^2\right)^2}$$

$$\downarrow 27$$

$$\frac{3\int \frac{a+b\arcsin(cx)}{(1-c^2x^2)^2}dx}{4d^3} - \frac{bc\int \frac{x}{(1-c^2x^2)^{5/2}}dx}{4d^3} + \frac{x(a+b\arcsin(cx))}{4d^3\left(1-c^2x^2\right)^2}$$

$$\downarrow 241$$

$$\frac{3\int \frac{a+b\arcsin(cx)}{(1-c^2x^2)^2}dx}{4d^3} + \frac{x(a+b\arcsin(cx))}{4d^3\left(1-c^2x^2\right)^2} - \frac{b}{12cd^3\left(1-c^2x^2\right)^{3/2}}$$

$$\downarrow 5162$$

$$\frac{3\left(\frac{1}{2}\int \frac{a+b\arcsin(cx)}{1-c^2x^2}dx - \frac{1}{2}bc\int \frac{x}{(1-c^2x^2)^{3/2}}dx + \frac{x(a+b\arcsin(cx))}{2(1-c^2x^2)}\right)}{4d^3} + \frac{x(a+b\arcsin(cx))}{4d^3\left(1-c^2x^2\right)^2} - \frac{b}{12cd^3\left(1-c^2x^2\right)^{3/2}}$$

$$\downarrow 241$$

$$\frac{3\left(\frac{1}{2}\int \frac{a+b\arcsin(cx)}{1-c^2x^2}dx + \frac{x(a+b\arcsin(cx))}{2(1-c^2x^2)} - \frac{b}{2c\sqrt{1-c^2x^2}}\right)}{4d^3} + \frac{x(a+b\arcsin(cx))}{4d^3\left(1-c^2x^2\right)^2} - \frac{b}{12cd^3\left(1-c^2x^2\right)^{3/2}}$$

$$\downarrow 5164$$

$$\frac{3\left(\frac{\int \frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}d\arcsin(cx)}{2c} + \frac{x(a+b\arcsin(cx))}{2(1-c^2x^2)} - \frac{b}{2c\sqrt{1-c^2x^2}}\right)}{4d^3} + \frac{x(a+b\arcsin(cx))}{4d^3\left(1-c^2x^2\right)^2} - \frac{b}{12cd^3\left(1-c^2x^2\right)^{3/2}}$$

$$\downarrow 3042$$

$$\frac{3\left(\frac{\int (a+b\arcsin(cx))\csc\left(\arcsin(cx)+\frac{\pi}{2}\right)d\arcsin(cx)}{2c}+\frac{x(a+b\arcsin(cx))}{2(1-c^2x^2)}-\frac{b}{2c\sqrt{1-c^2x^2}}\right)}{4d^3}+\frac{x(a+b\arcsin(cx))}{4d^3\left(1-c^2x^2\right)^2}-\frac{b}{12cd^3\left(1-c^2x^2\right)^{3/2}}$$

$$\downarrow 4669$$

$$\frac{3\left(\frac{-b\int \log\left(1-ie^{i\arcsin(cx)}\right)d\arcsin(cx)+b\int \log\left(1+ie^{i\arcsin(cx)}\right)d\arcsin(cx)-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx))}{2c}+\frac{x(a+b\arcsin(cx))}{2(1-c^2x^2)}-\right.}{4d^3}+\frac{x(a+b\arcsin(cx))}{4d^3\left(1-c^2x^2\right)^2}-\frac{b}{12cd^3\left(1-c^2x^2\right)^{3/2}}$$

$$\downarrow 2715$$

$$\frac{3\left(\frac{ib\int e^{-i\arcsin(cx)}\log\left(1-ie^{i\arcsin(cx)}\right)de^{i\arcsin(cx)}-ib\int e^{-i\arcsin(cx)}\log\left(1+ie^{i\arcsin(cx)}\right)de^{i\arcsin(cx)}-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx)\right.}{2c}}{4d^3}+\frac{x(a+b\arcsin(cx))}{4d^3\left(1-c^2x^2\right)^2}-\frac{b}{12cd^3\left(1-c^2x^2\right)^{3/2}}$$

$$\downarrow 2838$$

$$\frac{3\left(\frac{-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx))+ib\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)-ib\,\mathrm{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)}{2c}+\frac{x(a+b\arcsin(cx))}{2(1-c^2x^2)}-\frac{b}{2c\sqrt{1-c^2x^2}}\right)}{4d^3}+\frac{x(a+b\arcsin(cx))}{4d^3\left(1-c^2x^2\right)^2}-\frac{b}{12cd^3\left(1-c^2x^2\right)^{3/2}}$$

input

```
Int[(a + b*ArcSin[c*x])/(d - c^2*d*x^2)^3,x]
```

output

```
-1/12*b/(c*d^3*(1 - c^2*x^2)^(3/2)) + (x*(a + b*ArcSin[c*x]))/(4*d^3*(1 -
c^2*x^2)^2) + (3*(-1/2*b/(c*Sqrt[1 - c^2*x^2]) + (x*(a + b*ArcSin[c*x]))/(
2*(1 - c^2*x^2)) + ((-2*I)*(a + b*ArcSin[c*x])*ArcTan[E^(I*ArcSin[c*x])] +
 I*b*PolyLog[2, (-I)*E^(I*ArcSin[c*x])] - I*b*PolyLog[2, I*E^(I*ArcSin[c*x
])])/(2*c)))/(4*d^3)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 241
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(a + b*x^2)^(p + 1)/
(2*b*(p + 1)), x] /; FreeQ[{a, b, p}, x] && NeQ[p, -1]
```

rule 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[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 2838
```
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 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4669
```
Int[csc[(e_.) + Pi*(k_.) + (f_.)*(x_)]*((c_.) + (d_.)*(x_))^(m_.), x_Symbol
] :> Simp[-2*(c + d*x)^m*(ArcTanh[E^(I*k*Pi)*E^(I*(e + f*x))]/f), x] + (-Si
mp[d*(m/f)   Int[(c + d*x)^(m - 1)*Log[1 - E^(I*k*Pi)*E^(I*(e + f*x))], x],
 x] + Simp[d*(m/f)   Int[(c + d*x)^(m - 1)*Log[1 + E^(I*k*Pi)*E^(I*(e + f*x
))], x], x]) /; FreeQ[{c, d, e, f}, x] && IntegerQ[2*k] && IGtQ[m, 0]
```

rule 5162
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_), x_
Symbol] :> Simp[(-x)*(d + e*x^2)^(p + 1)*((a + b*ArcSin[c*x])^n/(2*d*(p + 1
))), x] + (Simp[(2*p + 3)/(2*d*(p + 1))   Int[(d + e*x^2)^(p + 1)*(a + b*Ar
cSin[c*x])^n, x], x] + Simp[b*c*(n/(2*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2
*x^2)^p]   Int[x*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x
]) /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && LtQ[p,
 -1] && NeQ[p, -3/2]
```

rule 5164

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2), x_Symbo
l] :> Simp[1/(c*d)   Subst[Int[(a + b*x)^n*Sec[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[n, 0]
```

Maple [A] (verified)

Time = 0.33 (sec) , antiderivative size = 262, normalized size of antiderivative = 1.34

method	result
derivativedivides	$-\frac{a\left(\frac{1}{16(cx+1)^2}+\frac{3}{16(cx+1)}-\frac{3\ln(cx+1)}{16}-\frac{1}{16(cx-1)^2}+\frac{3}{16(cx-1)}+\frac{3\ln(cx-1)}{16}\right)}{d^3}-\frac{b\left(\frac{9c^3x^3\arcsin(cx)-9c^2x^2\sqrt{-c^2x^2+1}-15cx\,a}{24c^4x^4-48c^2x^2+24}\right.}{}$
default	$-\frac{a\left(\frac{1}{16(cx+1)^2}+\frac{3}{16(cx+1)}-\frac{3\ln(cx+1)}{16}-\frac{1}{16(cx-1)^2}+\frac{3}{16(cx-1)}+\frac{3\ln(cx-1)}{16}\right)}{d^3}-\frac{b\left(\frac{9c^3x^3\arcsin(cx)-9c^2x^2\sqrt{-c^2x^2+1}-15cx\,a}{24c^4x^4-48c^2x^2+24}\right.}{}$
parts	$-\frac{a\left(-\frac{1}{16c(cx-1)^2}+\frac{3}{16c(cx-1)}+\frac{3\ln(cx-1)}{16c}+\frac{1}{16c(cx+1)^2}+\frac{3}{16c(cx+1)}-\frac{3\ln(cx+1)}{16c}\right)}{d^3}-\frac{b\left(\frac{9c^3x^3\arcsin(cx)-9c^2x^2\sqrt{-c^2x^2}}{24c^4x^4-}\right.}{}$

input

```
int((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output

```
1/c*(-a/d^3*(1/16/(c*x+1)^2+3/16/(c*x+1)-3/16*ln(c*x+1)-1/16/(c*x-1)^2+3/1
6/(c*x-1)+3/16*ln(c*x-1))-b/d^3*(1/24*(9*c^3*x^3*arcsin(c*x)-9*c^2*x^2*(-c
^2*x^2+1)^(1/2)-15*c*x*arcsin(c*x)+11*(-c^2*x^2+1)^(1/2))/(c^4*x^4-2*c^2*x
^2+1)+3/8*arcsin(c*x)*ln(1+I*(I*c*x+(-c^2*x^2+1)^(1/2)))-3/8*arcsin(c*x)*l
n(1-I*(I*c*x+(-c^2*x^2+1)^(1/2)))-3/8*I*dilog(1+I*(I*c*x+(-c^2*x^2+1)^(1/2
)))+3/8*I*dilog(1-I*(I*c*x+(-c^2*x^2+1)^(1/2))))
```

Fricas [F]

$$\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^3}\,dx = \int -\frac{b\arcsin(cx)+a}{\left(c^2dx^2-d\right)^3}\,dx$$

input

```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral(-(b*arcsin(c*x) + a)/(c^6*d^3*x^6 - 3*c^4*d^3*x^4 + 3*c^2*d^3*x^2
 - d^3), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a + b \arcsin(cx)}{(d - c^2 dx^2)^3}\, dx = \text{Timed out}$$

input
```
integrate((a+b*asin(c*x))/(-c**2*d*x**2+d)**3,x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{a + b \arcsin(cx)}{(d - c^2 dx^2)^3}\, dx = \int -\frac{b \arcsin(cx) + a}{(c^2 dx^2 - d)^3}\, dx$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^3,x, algorithm="maxima")
```

output
```
-1/16*a*(2*(3*c^2*x^3 - 5*x)/(c^4*d^3*x^4 - 2*c^2*d^3*x^2 + d^3) - 3*log(c
*x + 1)/(c*d^3) + 3*log(c*x - 1)/(c*d^3)) + 1/16*(3*(c^4*x^4 - 2*c^2*x^2 +
 1)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))*log(c*x + 1) - 3*(c^4*x^4 -
 2*c^2*x^2 + 1)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))*log(-c*x + 1) -
 2*(3*c^3*x^3 - 5*c*x)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + 16*(c^
5*d^3*x^4 - 2*c^3*d^3*x^2 + c*d^3)*integrate(-1/16*(6*c^3*x^3 - 10*c*x - 3
*(c^4*x^4 - 2*c^2*x^2 + 1)*log(c*x + 1) + 3*(c^4*x^4 - 2*c^2*x^2 + 1)*log(
-c*x + 1))*sqrt(c*x + 1)*sqrt(-c*x + 1)/(c^6*d^3*x^6 - 3*c^4*d^3*x^4 + 3*c
^2*d^3*x^2 - d^3), x))*b/(c^5*d^3*x^4 - 2*c^3*d^3*x^2 + c*d^3)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^3}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^3,x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^3}\,dx = \int \frac{a+b\,\text{asin}(c\,x)}{(d-c^2\,d\,x^2)^3}\,dx$$

input
```
int((a + b*asin(c*x))/(d - c^2*d*x^2)^3,x)
```

output
```
int((a + b*asin(c*x))/(d - c^2*d*x^2)^3, x)
```

Reduce [F]

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^3}\,dx$$
$$= \frac{-16\left(\int \frac{asin(cx)}{c^6x^6-3c^4x^4+3c^2x^2-1}dx\right)bc^5x^4+32\left(\int \frac{asin(cx)}{c^6x^6-3c^4x^4+3c^2x^2-1}dx\right)bc^3x^2-16\left(\int \frac{asin(cx)}{c^6x^6-3c^4x^4+3c^2x^2-1}dx\right)bc}{}$$

input
```
int((a+b*asin(c*x))/(-c^2*d*x^2+d)^3,x)
```

output

```
( - 16*int(asin(c*x)/(c**6*x**6 - 3*c**4*x**4 + 3*c**2*x**2 - 1),x)*b*c**5
*x**4 + 32*int(asin(c*x)/(c**6*x**6 - 3*c**4*x**4 + 3*c**2*x**2 - 1),x)*b*
c**3*x**2 - 16*int(asin(c*x)/(c**6*x**6 - 3*c**4*x**4 + 3*c**2*x**2 - 1),x
)*b*c - 3*log(c**2*x - c)*a*c**4*x**4 + 6*log(c**2*x - c)*a*c**2*x**2 - 3*
log(c**2*x - c)*a + 3*log(c**2*x + c)*a*c**4*x**4 - 6*log(c**2*x + c)*a*c*
*2*x**2 + 3*log(c**2*x + c)*a - 6*a*c**3*x**3 + 10*a*c*x)/(16*c*d**3*(c**4
*x**4 - 2*c**2*x**2 + 1))
```

3.7 $\int (d - c^2 dx^2)^3 (a + b \arcsin(cx))^2 \, dx$

Optimal result . . . 143
Mathematica [A] (verified) . . . 144
Rubi [A] (verified) . . . 144
Maple [A] (verified) . . . 147
Fricas [A] (verification not implemented) . . . 148
Sympy [A] (verification not implemented) . . . 149
Maxima [B] (verification not implemented) . . . 150
Giac [B] (verification not implemented) . . . 151
Mupad [F(-1)] . . . 153
Reduce [F] . . . 153

Optimal result

Integrand size = 24, antiderivative size = 298

$$
\begin{aligned}
&\int (d - c^2 dx^2)^3 (a + b \arcsin(cx))^2 \, dx \\
&= -\frac{4322 b^2 d^3 x}{3675} + \frac{1514 b^2 c^2 d^3 x^3}{11025} - \frac{234 b^2 c^4 d^3 x^5}{6125} + \frac{2}{343} b^2 c^6 d^3 x^7 \\
&\quad + \frac{32 b d^3 \sqrt{1 - c^2 x^2} (a + b \arcsin(cx))}{35c} + \frac{16 b d^3 (1 - c^2 x^2)^{3/2} (a + b \arcsin(cx))}{105c} \\
&\quad + \frac{12 b d^3 (1 - c^2 x^2)^{5/2} (a + b \arcsin(cx))}{175c} + \frac{2 b d^3 (1 - c^2 x^2)^{7/2} (a + b \arcsin(cx))}{49c} \\
&\quad + \frac{16}{35} d^3 x (a + b \arcsin(cx))^2 + \frac{8}{35} d^3 x (1 - c^2 x^2) (a + b \arcsin(cx))^2 + \frac{6}{35} d^3 x (1 - c^2 x^2)^2 (a + b \arcsin(cx))^2 + \frac{1}{7}
\end{aligned}
$$

output

```
-4322/3675*b^2*d^3*x+1514/11025*b^2*c^2*d^3*x^3-234/6125*b^2*c^4*d^3*x^5+2
/343*b^2*c^6*d^3*x^7+32/35*b*d^3*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c+16
/105*b*d^3*(-c^2*x^2+1)^(3/2)*(a+b*arcsin(c*x))/c+12/175*b*d^3*(-c^2*x^2+1
)^(5/2)*(a+b*arcsin(c*x))/c+2/49*b*d^3*(-c^2*x^2+1)^(7/2)*(a+b*arcsin(c*x)
)/c+16/35*d^3*x*(a+b*arcsin(c*x))^2+8/35*d^3*x*(-c^2*x^2+1)*(a+b*arcsin(c*
x))^2+6/35*d^3*x*(-c^2*x^2+1)^2*(a+b*arcsin(c*x))^2+1/7*d^3*x*(-c^2*x^2+1)
^3*(a+b*arcsin(c*x))^2
```

Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 241, normalized size of antiderivative = 0.81

$$\int \left(d-c^2dx^2\right)^3 (a+b\arcsin(cx))^2\,dx =$$
$$-\frac{d^3\left(2b^2cx(226905-26495c^2x^2+7371c^4x^4-1125c^6x^6)+11025a^2cx(-35+35c^2x^2-21c^4x^4+5c^6x^6)\right.}{}$$

input
```
Integrate[(d - c^2*d*x^2)^3*(a + b*ArcSin[c*x])^2,x]
```

output
```
-1/385875*(d^3*(2*b^2*c*x*(226905 - 26495*c^2*x^2 + 7371*c^4*x^4 - 1125*c^
6*x^6) + 11025*a^2*c*x*(-35 + 35*c^2*x^2 - 21*c^4*x^4 + 5*c^6*x^6) + 210*a
*b*Sqrt[1 - c^2*x^2]*(-2161 + 757*c^2*x^2 - 351*c^4*x^4 + 75*c^6*x^6) + 21
0*b*(105*a*c*x*(-35 + 35*c^2*x^2 - 21*c^4*x^4 + 5*c^6*x^6) + b*Sqrt[1 - c^
2*x^2]*(-2161 + 757*c^2*x^2 - 351*c^4*x^4 + 75*c^6*x^6))*ArcSin[c*x] + 110
25*b^2*c*x*(-35 + 35*c^2*x^2 - 21*c^4*x^4 + 5*c^6*x^6)*ArcSin[c*x]^2))/c
```

Rubi [A] (verified)

Time = 1.53 (sec) , antiderivative size = 350, normalized size of antiderivative = 1.17, number of steps used = 9, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.375$, Rules used = {5158, 27, 5158, 5158, 5130, 5182, 24, 210, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d-c^2dx^2\right)^3 (a+b\arcsin(cx))^2\,dx$$
$$\downarrow 5158$$
$$-\frac{2}{7}bcd^3\int x\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))dx+\frac{6}{7}d\int d^2\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^2dx+$$
$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^2$$
$$\downarrow 27$$

$$-\frac{2}{7}bcd^3\int x\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))dx+\frac{6}{7}d^3\int\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^2dx+$$
$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^2$$

$$\downarrow 5158$$

$$-\frac{2}{7}bcd^3\int x\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))dx+$$
$$\frac{6}{7}d^3\left(-\frac{2}{5}bc\int x\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))dx+\frac{4}{5}\int\left(1-c^2x^2\right)(a+b\arcsin(cx))^2dx+\frac{1}{5}x\left(1-c^2x^2\right)^2(a+\right.$$
$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^2$$

$$\downarrow 5158$$

$$-\frac{2}{7}bcd^3\int x\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))dx+$$
$$\frac{6}{7}d^3\left(-\frac{2}{5}bc\int x\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))dx+\frac{4}{5}\left(-\frac{2}{3}bc\int x\sqrt{1-c^2x^2}(a+b\arcsin(cx))dx+\frac{2}{3}\int(a+b\right.\right.$$
$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^2$$

$$\downarrow 5130$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(\frac{2}{3}\left(x(a+b\arcsin(cx))^2-2bc\int\frac{x(a+b\arcsin(cx))}{\sqrt{1-c^2x^2}}dx\right)-\frac{2}{3}bc\int x\sqrt{1-c^2x^2}(a+b\arcsin(cx))dx+\frac{1}{3}\right.\right.$$
$$\frac{2}{7}bcd^3\int x\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))dx+\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^2$$

$$\downarrow 5182$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(\frac{2}{3}\left(x(a+b\arcsin(cx))^2-2bc\left(\frac{b\int 1dx}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c^2}\right)\right)-\frac{2}{3}bc\left(\frac{b\int\left(1-c^2x^2\right)dx}{3c}-\right.\right.\right.$$
$$\frac{2}{7}bcd^3\left(\frac{b\int\left(1-c^2x^2\right)^3dx}{7c}-\frac{\left(1-c^2x^2\right)^{7/2}(a+b\arcsin(cx))}{7c^2}\right)+\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+$$
$$b\arcsin(cx))^2$$

$$\downarrow 24$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(-\frac{2}{3}bc\left(\frac{b\int\left(1-c^2x^2\right)dx}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))}{3c^2}\right)+\frac{1}{3}x\left(1-c^2x^2\right)(a+b\arcsin(cx))^2+\frac{2}{3}\right.\right.$$
$$\frac{2}{7}bcd^3\left(\frac{b\int\left(1-c^2x^2\right)^3dx}{7c}-\frac{\left(1-c^2x^2\right)^{7/2}(a+b\arcsin(cx))}{7c^2}\right)+\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+$$
$$b\arcsin(cx))^2$$

$$\downarrow 210$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(-\frac{2}{3}bc\left(\frac{b\int\left(1-c^2x^2\right)dx}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}\left(a+b\arcsin(cx)\right)}{3c^2}\right)+\frac{1}{3}x\left(1-c^2x^2\right)\left(a+b\arcsin(cx)\right)^2+\frac{2}{3}\right.\right.$$
$$\left.\frac{2}{7}bcd^3\left(\frac{b\int\left(-c^6x^6+3c^4x^4-3c^2x^2+1\right)dx}{7c}-\frac{\left(1-c^2x^2\right)^{7/2}\left(a+b\arcsin(cx)\right)}{7c^2}\right)+$$
$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3\left(a+b\arcsin(cx)\right)^2$$

$$\downarrow 2009$$

$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3\left(a+b\arcsin(cx)\right)^2+$$
$$\frac{6}{7}d^3\left(\frac{1}{5}x\left(1-c^2x^2\right)^2\left(a+b\arcsin(cx)\right)^2+\frac{4}{5}\left(\frac{1}{3}x\left(1-c^2x^2\right)\left(a+b\arcsin(cx)\right)^2+\frac{2}{3}\left(x(a+b\arcsin(cx))^2-2bc\right.\right.\right.$$
$$\left.\left.\left.\frac{2}{7}bcd^3\left(\frac{b\left(-\frac{1}{7}c^6x^7+\frac{3c^4x^5}{5}-c^2x^3+x\right)}{7c}-\frac{\left(1-c^2x^2\right)^{7/2}\left(a+b\arcsin(cx)\right)}{7c^2}\right)\right.\right.\right.$$

input
```
Int[(d - c^2*d*x^2)^3*(a + b*ArcSin[c*x])^2,x]
```

output
```
(d^3*x*(1 - c^2*x^2)^3*(a + b*ArcSin[c*x])^2)/7 - (2*b*c*d^3*((b*(x - c^2*
x^3 + (3*c^4*x^5)/5 - (c^6*x^7)/7))/(7*c) - ((1 - c^2*x^2)^(7/2)*(a + b*Ar
cSin[c*x]))/(7*c^2)))/7 + (6*d^3*((x*(1 - c^2*x^2)^2*(a + b*ArcSin[c*x])^2
)/5 - (2*b*c*((b*(x - (2*c^2*x^3)/3 + (c^4*x^5)/5))/(5*c) - ((1 - c^2*x^2)
^(5/2)*(a + b*ArcSin[c*x]))/(5*c^2)))/5 + (4*((x*(1 - c^2*x^2)*(a + b*ArcS
in[c*x])^2)/3 - (2*b*c*((b*(x - (c^2*x^3)/3))/(3*c) - ((1 - c^2*x^2)^(3/2)
*(a + b*ArcSin[c*x]))/(3*c^2)))/3 + (2*(x*(a + b*ArcSin[c*x])^2 - 2*b*c*((
b*x)/c - (Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/c^2)))/3))/5))/7
```

Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 210
```
Int[((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Int[ExpandIntegrand[(a + b*x^2
)^p, x], x] /; FreeQ[{a, b}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5182
```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 384, normalized size of antiderivative = 1.29

method	result
derivativedivides	$\frac{-d^3a^2\left(\frac{1}{7}c^7x^7-\frac{3}{5}c^5x^5+c^3x^3-cx\right)-d^3b^2\left(\frac{\arcsin(cx)^2\left(5c^6x^6-21c^4x^4+35c^2x^2-35\right)cx}{35}+\frac{2\arcsin(cx)\left(c^2x^2-1\right)^3\sqrt{-c^2x^2+1}}{49}-\right.}{}$
default	$\frac{-d^3a^2\left(\frac{1}{7}c^7x^7-\frac{3}{5}c^5x^5+c^3x^3-cx\right)-d^3b^2\left(\frac{\arcsin(cx)^2\left(5c^6x^6-21c^4x^4+35c^2x^2-35\right)cx}{35}+\frac{2\arcsin(cx)\left(c^2x^2-1\right)^3\sqrt{-c^2x^2+1}}{49}-\right.}{}$
parts	$-d^3a^2\left(\frac{1}{7}c^6x^7-\frac{3}{5}c^4x^5+c^2x^3-x\right)-\frac{d^3b^2\left(\frac{\arcsin(cx)^2\left(5c^6x^6-21c^4x^4+35c^2x^2-35\right)cx}{35}+\frac{2\arcsin(cx)\left(c^2x^2-\right.}{49}\right.}{}$
orering	$\frac{x\left(47625c^8x^8-271212c^6x^6+741678c^4x^4-3539900c^2x^2+128625\right)\left(-c^2dx^2+d\right)^3(a+b\arcsin(cx))^2}{128625(cx-1)^2(cx+1)^2(c^2x^2-1)^2}-\frac{(20250c^8x^8-12}{}$

input
```
int((-c^2*d*x^2+d)^3*(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
1/c*(-d^3*a^2*(1/7*c^7*x^7-3/5*c^5*x^5+c^3*x^3-c*x)-d^3*b^2*(1/35*arcsin(c
*x)^2*(5*c^6*x^6-21*c^4*x^4+35*c^2*x^2-35)*c*x+2/49*arcsin(c*x)*(c^2*x^2-1
)^3*(-c^2*x^2+1)^(1/2)-2/1715*(5*c^6*x^6-21*c^4*x^4+35*c^2*x^2-35)*c*x-12/
175*arcsin(c*x)*(c^2*x^2-1)^2*(-c^2*x^2+1)^(1/2)+4/875*(3*c^4*x^4-10*c^2*x
^2+15)*c*x+16/105*arcsin(c*x)*(c^2*x^2-1)*(-c^2*x^2+1)^(1/2)-16/315*(c^2*x
^2-3)*c*x+32/35*c*x-32/35*arcsin(c*x)*(-c^2*x^2+1)^(1/2))-2*d^3*a*b*(1/7*a
rcsin(c*x)*c^7*x^7-3/5*c^5*x^5*arcsin(c*x)+c^3*x^3*arcsin(c*x)-c*x*arcsin(
c*x)-2161/3675*(-c^2*x^2+1)^(1/2)+757/3675*c^2*x^2*(-c^2*x^2+1)^(1/2)-117/
1225*c^4*x^4*(-c^2*x^2+1)^(1/2)+1/49*c^6*x^6*(-c^2*x^2+1)^(1/2)))
```

Fricas [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 323, normalized size of antiderivative = 1.08

$$\int \left(d-c^2dx^2\right)^3(a+b\arcsin(cx))^2\,dx =$$
$$-\frac{1125\,(49\,a^2-2\,b^2)c^7d^3x^7-189\,(1225\,a^2-78\,b^2)c^5d^3x^5+35\,(11025\,a^2-1514\,b^2)c^3d^3x^3-105\,(3675\,a$$

input
```
integrate((-c^2*d*x^2+d)^3*(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output

```
-1/385875*(1125*(49*a^2 - 2*b^2)*c^7*d^3*x^7 - 189*(1225*a^2 - 78*b^2)*c^5
*d^3*x^5 + 35*(11025*a^2 - 1514*b^2)*c^3*d^3*x^3 - 105*(3675*a^2 - 4322*b^
2)*c*d^3*x + 11025*(5*b^2*c^7*d^3*x^7 - 21*b^2*c^5*d^3*x^5 + 35*b^2*c^3*d^
3*x^3 - 35*b^2*c*d^3*x)*arcsin(c*x)^2 + 22050*(5*a*b*c^7*d^3*x^7 - 21*a*b*
c^5*d^3*x^5 + 35*a*b*c^3*d^3*x^3 - 35*a*b*c*d^3*x)*arcsin(c*x) + 210*(75*a
*b*c^6*d^3*x^6 - 351*a*b*c^4*d^3*x^4 + 757*a*b*c^2*d^3*x^2 - 2161*a*b*d^3
+ (75*b^2*c^6*d^3*x^6 - 351*b^2*c^4*d^3*x^4 + 757*b^2*c^2*d^3*x^2 - 2161*b
^2*d^3)*arcsin(c*x))*sqrt(-c^2*x^2 + 1))/c
```

Sympy [A] (verification not implemented)

Time = 0.99 (sec) , antiderivative size = 524, normalized size of antiderivative = 1.76

$$\int \left(d - c^2 d x^2\right)^3 \left(a + b \arcsin(cx)\right)^2 dx$$

$$= \begin{cases} -\frac{a^2 c^6 d^3 x^7}{7} + \frac{3 a^2 c^4 d^3 x^5}{5} - a^2 c^2 d^3 x^3 + a^2 d^3 x - \frac{2abc^6 d^3 x^7 \operatorname{asin}(cx)}{7} - \frac{2abc^5 d^3 x^6 \sqrt{-c^2x^2+1}}{49} + \frac{6abc^4 d^3 x^5 \operatorname{asin}(cx)}{5} + \frac{234a}{} \\ a^2 d^3 x \end{cases}$$

input

```
integrate((-c**2*d*x**2+d)**3*(a+b*asin(c*x))**2,x)
```

output

```
Piecewise((-a**2*c**6*d**3*x**7/7 + 3*a**2*c**4*d**3*x**5/5 - a**2*c**2*d*
*3*x**3 + a**2*d**3*x - 2*a*b*c**6*d**3*x**7*asin(c*x)/7 - 2*a*b*c**5*d**3
*x**6*sqrt(-c**2*x**2 + 1)/49 + 6*a*b*c**4*d**3*x**5*asin(c*x)/5 + 234*a*b
*c**3*d**3*x**4*sqrt(-c**2*x**2 + 1)/1225 - 2*a*b*c**2*d**3*x**3*asin(c*x)
 - 1514*a*b*c*d**3*x**2*sqrt(-c**2*x**2 + 1)/3675 + 2*a*b*d**3*x*asin(c*x)
 + 4322*a*b*d**3*sqrt(-c**2*x**2 + 1)/(3675*c) - b**2*c**6*d**3*x**7*asin(
c*x)**2/7 + 2*b**2*c**6*d**3*x**7/343 - 2*b**2*c**5*d**3*x**6*sqrt(-c**2*x
**2 + 1)*asin(c*x)/49 + 3*b**2*c**4*d**3*x**5*asin(c*x)**2/5 - 234*b**2*c*
*4*d**3*x**5/6125 + 234*b**2*c**3*d**3*x**4*sqrt(-c**2*x**2 + 1)*asin(c*x)
/1225 - b**2*c**2*d**3*x**3*asin(c*x)**2 + 1514*b**2*c**2*d**3*x**3/11025
- 1514*b**2*c*d**3*x**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/3675 + b**2*d**3*x*
asin(c*x)**2 - 4322*b**2*d**3*x/3675 + 4322*b**2*d**3*sqrt(-c**2*x**2 + 1)
*asin(c*x)/(3675*c), Ne(c, 0)), (a**2*d**3*x, True))
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 729 vs. $2(263) = 526$.

Time $= 0.15$ (sec) , antiderivative size $= 729$, normalized size of antiderivative $= 2.45$

$$\int \left(d - c^2 dx^2\right)^3 \left(a + b \arcsin(cx)\right)^2 dx = \text{Too large to display}$$

input

```
integrate((-c^2*d*x^2+d)^3*(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output

```
-1/7*b^2*c^6*d^3*x^7*arcsin(c*x)^2 - 1/7*a^2*c^6*d^3*x^7 + 3/5*b^2*c^4*d^3
*x^5*arcsin(c*x)^2 + 3/5*a^2*c^4*d^3*x^5 - 2/245*(35*x^7*arcsin(c*x) + (5*
sqrt(-c^2*x^2 + 1)*x^6/c^2 + 6*sqrt(-c^2*x^2 + 1)*x^4/c^4 + 8*sqrt(-c^2*x^
2 + 1)*x^2/c^6 + 16*sqrt(-c^2*x^2 + 1)/c^8)*c)*a*b*c^6*d^3 - 2/25725*(105*
(5*sqrt(-c^2*x^2 + 1)*x^6/c^2 + 6*sqrt(-c^2*x^2 + 1)*x^4/c^4 + 8*sqrt(-c^2
*x^2 + 1)*x^2/c^6 + 16*sqrt(-c^2*x^2 + 1)/c^8)*c*arcsin(c*x) - (75*c^6*x^7
 + 126*c^4*x^5 + 280*c^2*x^3 + 1680*x)/c^6)*b^2*c^6*d^3 - b^2*c^2*d^3*x^3*
arcsin(c*x)^2 + 2/25*(15*x^5*arcsin(c*x) + (3*sqrt(-c^2*x^2 + 1)*x^4/c^2 +
 4*sqrt(-c^2*x^2 + 1)*x^2/c^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c)*a*b*c^4*d^3 +
 2/375*(15*(3*sqrt(-c^2*x^2 + 1)*x^4/c^2 + 4*sqrt(-c^2*x^2 + 1)*x^2/c^4 +
8*sqrt(-c^2*x^2 + 1)/c^6)*c*arcsin(c*x) - (9*c^4*x^5 + 20*c^2*x^3 + 120*x)
/c^4)*b^2*c^4*d^3 - a^2*c^2*d^3*x^3 - 2/3*(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*b*c^2*d^3 - 2/9*(3*c*(sq
rt(-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*c^2*d^3 + b^2*d^3*x*arcsin(c*x)^2 - 2*b^2*d^3*(x - sqrt(
-c^2*x^2 + 1)*arcsin(c*x)/c) + a^2*d^3*x + 2*(c*x*arcsin(c*x) + sqrt(-c^2*
x^2 + 1))*a*b*d^3/c
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 528 vs. $2(263) = 526$.

Time = 0.16 (sec) , antiderivative size = 528, normalized size of antiderivative = 1.77

$$\begin{aligned}\int \left(d-c^2dx^2\right)^3 (a+b\arcsin(cx))^2\,dx = &-\frac{1}{7}a^2c^6d^3x^7+\frac{3}{5}a^2c^4d^3x^5\\&-\frac{1}{7}\left(c^2x^2-1\right)^3b^2d^3x\arcsin\left(cx\right)^2\\&-a^2c^2d^3x^3-\frac{2}{7}\left(c^2x^2-1\right)^3abd^3x\arcsin\left(cx\right)\\&+\frac{6}{35}\left(c^2x^2-1\right)^2b^2d^3x\arcsin\left(cx\right)^2\\&+\frac{2}{343}\left(c^2x^2-1\right)^3b^2d^3x\\&+\frac{12}{35}\left(c^2x^2-1\right)^2abd^3x\arcsin\left(cx\right)\\&-\frac{8}{35}\left(c^2x^2-1\right)b^2d^3x\arcsin\left(cx\right)^2\\&-\frac{2\left(c^2x^2-1\right)^3\sqrt{-c^2x^2+1}b^2d^3\arcsin\left(cx\right)}{49\,c}\\&-\frac{888}{42875}\left(c^2x^2-1\right)^2b^2d^3x\\&-\frac{16}{35}\left(c^2x^2-1\right)abd^3x\arcsin\left(cx\right)\\&+\frac{16}{35}b^2d^3x\arcsin\left(cx\right)^2\\&-\frac{2\left(c^2x^2-1\right)^3\sqrt{-c^2x^2+1}abd^3}{49\,c}\\&+\frac{12\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}b^2d^3\arcsin\left(cx\right)}{175\,c}\\&+\frac{30256}{385875}\left(c^2x^2-1\right)b^2d^3x\\&+\frac{32}{35}abd^3x\arcsin\left(cx\right)\\&+\frac{12\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}abd^3}{175\,c}\\&+\frac{16\left(-c^2x^2+1\right)^{\frac{3}{2}}b^2d^3\arcsin\left(cx\right)}{105\,c}+a^2d^3x\\&-\frac{413312}{385875}b^2d^3x+\frac{16\left(-c^2x^2+1\right)^{\frac{3}{2}}abd^3}{105\,c}\\&+\frac{32\sqrt{-c^2x^2+1}b^2d^3\arcsin\left(cx\right)}{35\,c}\\&+\frac{32\sqrt{-c^2x^2+1}abd^3}{35\,c}\end{aligned}$$

input
```
integrate((-c^2*d*x^2+d)^3*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
-1/7*a^2*c^6*d^3*x^7 + 3/5*a^2*c^4*d^3*x^5 - 1/7*(c^2*x^2 - 1)^3*b^2*d^3*x
*arcsin(c*x)^2 - a^2*c^2*d^3*x^3 - 2/7*(c^2*x^2 - 1)^3*a*b*d^3*x*arcsin(c*
x) + 6/35*(c^2*x^2 - 1)^2*b^2*d^3*x*arcsin(c*x)^2 + 2/343*(c^2*x^2 - 1)^3*
b^2*d^3*x + 12/35*(c^2*x^2 - 1)^2*a*b*d^3*x*arcsin(c*x) - 8/35*(c^2*x^2 -
1)*b^2*d^3*x*arcsin(c*x)^2 - 2/49*(c^2*x^2 - 1)^3*sqrt(-c^2*x^2 + 1)*b^2*d
^3*arcsin(c*x)/c - 888/42875*(c^2*x^2 - 1)^2*b^2*d^3*x - 16/35*(c^2*x^2 -
1)*a*b*d^3*x*arcsin(c*x) + 16/35*b^2*d^3*x*arcsin(c*x)^2 - 2/49*(c^2*x^2 -
 1)^3*sqrt(-c^2*x^2 + 1)*a*b*d^3/c + 12/175*(c^2*x^2 - 1)^2*sqrt(-c^2*x^2
+ 1)*b^2*d^3*arcsin(c*x)/c + 30256/385875*(c^2*x^2 - 1)*b^2*d^3*x + 32/35*
a*b*d^3*x*arcsin(c*x) + 12/175*(c^2*x^2 - 1)^2*sqrt(-c^2*x^2 + 1)*a*b*d^3/
c + 16/105*(-c^2*x^2 + 1)^(3/2)*b^2*d^3*arcsin(c*x)/c + a^2*d^3*x - 413312
/385875*b^2*d^3*x + 16/105*(-c^2*x^2 + 1)^(3/2)*a*b*d^3/c + 32/35*sqrt(-c^
2*x^2 + 1)*b^2*d^3*arcsin(c*x)/c + 32/35*sqrt(-c^2*x^2 + 1)*a*b*d^3/c
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right)^3 \left(a + b \arcsin(cx)\right)^2 dx = \int \left(a + b \operatorname{asin}(c\,x)\right)^2 \left(d - c^2\, d\, x^2\right)^3 dx$$

input
```
int((a + b*asin(c*x))^2*(d - c^2*d*x^2)^3,x)
```

output
```
int((a + b*asin(c*x))^2*(d - c^2*d*x^2)^3, x)
```

Reduce [F]

$$\int \left(d - c^2 dx^2\right)^3 \left(a + b \arcsin(cx)\right)^2 dx$$
$$= \frac{d^3\left(3675 asin(cx)^2 b^2 cx + 7350\sqrt{-c^2x^2+1}\, asin(cx)\, b^2 - 1050 asin(cx)\, ab\, c^7x^7 + 4410 asin(cx)\, ab\, c^5x^5 -}{}$$

input
```
int((-c^2*d*x^2+d)^3*(a+b*asin(c*x))^2,x)
```

output

```
(d**3*(3675*asin(c*x)**2*b**2*c*x + 7350*sqrt( - c**2*x**2 + 1)*asin(c*x)*
b**2 - 1050*asin(c*x)*a*b*c**7*x**7 + 4410*asin(c*x)*a*b*c**5*x**5 - 7350*
asin(c*x)*a*b*c**3*x**3 + 7350*asin(c*x)*a*b*c*x - 150*sqrt( - c**2*x**2 +
 1)*a*b*c**6*x**6 + 702*sqrt( - c**2*x**2 + 1)*a*b*c**4*x**4 - 1514*sqrt(
- c**2*x**2 + 1)*a*b*c**2*x**2 + 4322*sqrt( - c**2*x**2 + 1)*a*b - 3675*in
t(asin(c*x)**2*x**6,x)*b**2*c**7 + 11025*int(asin(c*x)**2*x**4,x)*b**2*c**
5 - 11025*int(asin(c*x)**2*x**2,x)*b**2*c**3 - 525*a**2*c**7*x**7 + 2205*a
**2*c**5*x**5 - 3675*a**2*c**3*x**3 + 3675*a**2*c*x - 7350*b**2*c*x))/(367
5*c)
```

3.8 $\int (d - c^2 d x^2)^2 (a + b \arcsin(cx))^2 \, dx$

Optimal result . . . 155
Mathematica [A] (verified) . . . 156
Rubi [A] (verified) . . . 156
Maple [A] (verified) . . . 159
Fricas [A] (verification not implemented) . . . 160
Sympy [A] (verification not implemented) . . . 160
Maxima [B] (verification not implemented) . . . 161
Giac [A] (verification not implemented) . . . 163
Mupad [F(-1)] . . . 164
Reduce [F] . . . 164

Optimal result

Integrand size = 24, antiderivative size = 219

$$\begin{aligned}\int (d - c^2 d x^2)^2 (a + b \arcsin(cx))^2 \, dx = &-\frac{298}{225} b^2 d^2 x + \frac{76}{675} b^2 c^2 d^2 x^3 - \frac{2}{125} b^2 c^4 d^2 x^5 \\ &+ \frac{16 b d^2 \sqrt{1 - c^2 x^2} (a + b \arcsin(cx))}{15c} \\ &+ \frac{8 b d^2 (1 - c^2 x^2)^{3/2} (a + b \arcsin(cx))}{45c} \\ &+ \frac{2 b d^2 (1 - c^2 x^2)^{5/2} (a + b \arcsin(cx))}{25c} \\ &+ \frac{8}{15} d^2 x (a + b \arcsin(cx))^2 \\ &+ \frac{4}{15} d^2 x (1 - c^2 x^2) (a + b \arcsin(cx))^2 \\ &+ \frac{1}{5} d^2 x (1 - c^2 x^2)^2 (a + b \arcsin(cx))^2\end{aligned}$$

output

```
-298/225*b^2*d^2*x+76/675*b^2*c^2*d^2*x^3-2/125*b^2*c^4*d^2*x^5+16/15*b*d^
2*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c+8/45*b*d^2*(-c^2*x^2+1)^(3/2)*(a+
b*arcsin(c*x))/c+2/25*b*d^2*(-c^2*x^2+1)^(5/2)*(a+b*arcsin(c*x))/c+8/15*d^
2*x*(a+b*arcsin(c*x))^2+4/15*d^2*x*(-c^2*x^2+1)*(a+b*arcsin(c*x))^2+1/5*d^
2*x*(-c^2*x^2+1)^2*(a+b*arcsin(c*x))^2
```

Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 193, normalized size of antiderivative = 0.88

$$\int \left(d - c^2 d x^2\right)^2 (a + b \arcsin(cx))^2 \, dx$$
$$= \frac{d^2\left(225a^2cx(15 - 10c^2x^2 + 3c^4x^4) + 30ab\sqrt{1 - c^2x^2}(149 - 38c^2x^2 + 9c^4x^4) - 2b^2cx(2235 - 190c^2x^2 + 2\right.}{}$$

input
```
Integrate[(d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])^2,x]
```

output
```
(d^2*(225*a^2*c*x*(15 - 10*c^2*x^2 + 3*c^4*x^4) + 30*a*b*Sqrt[1 - c^2*x^2]
*(149 - 38*c^2*x^2 + 9*c^4*x^4) - 2*b^2*c*x*(2235 - 190*c^2*x^2 + 27*c^4*x
^4) + 30*b*(15*a*c*x*(15 - 10*c^2*x^2 + 3*c^4*x^4) + b*Sqrt[1 - c^2*x^2]*(
149 - 38*c^2*x^2 + 9*c^4*x^4))*ArcSin[c*x] + 225*b^2*c*x*(15 - 10*c^2*x^2
+ 3*c^4*x^4)*ArcSin[c*x]^2))/(3375*c)
```

Rubi [A] (verified)

Time = 1.02 (sec) , antiderivative size = 244, normalized size of antiderivative = 1.11, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {5158, 27, 5158, 5130, 5182, 24, 210, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d - c^2 d x^2\right)^2 (a + b \arcsin(cx))^2 \, dx$$
$$\downarrow 5158$$
$$-\frac{2}{5}bcd^2 \int x\left(1 - c^2x^2\right)^{3/2} (a + b \arcsin(cx)) dx + \frac{4}{5}d \int d\left(1 - c^2x^2\right) (a + b \arcsin(cx))^2 dx + \frac{1}{5}d^2 x\left(1 - c^2x^2\right)^2 (a + b \arcsin(cx))^2$$
$$\downarrow 27$$
$$-\frac{2}{5}bcd^2 \int x\left(1 - c^2x^2\right)^{3/2} (a + b \arcsin(cx)) dx + \frac{4}{5}d^2 \int \left(1 - c^2x^2\right) (a + b \arcsin(cx))^2 dx + \frac{1}{5}d^2 x\left(1 - c^2x^2\right)^2 (a + b \arcsin(cx))^2$$

$$\downarrow 5158$$

$$-\frac{2}{5}bcd^2\int x\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))dx+$$

$$\frac{4}{5}d^2\left(-\frac{2}{3}bc\int x\sqrt{1-c^2x^2}(a+b\arcsin(cx))dx+\frac{2}{3}\int(a+b\arcsin(cx))^2dx+\frac{1}{3}x\left(1-c^2x^2\right)(a+b\arcsin(cx))^2\right)$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^2$$

$$\downarrow 5130$$

$$\frac{4}{5}d^2\left(\frac{2}{3}\left(x(a+b\arcsin(cx))^2-2bc\int\frac{x(a+b\arcsin(cx))}{\sqrt{1-c^2x^2}}dx\right)-\frac{2}{3}bc\int x\sqrt{1-c^2x^2}(a+b\arcsin(cx))dx+\frac{1}{3}x(1\right.$$

$$\frac{2}{5}bcd^2\int x\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))dx+\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^2$$

$$\downarrow 5182$$

$$\frac{4}{5}d^2\left(\frac{2}{3}\left(x(a+b\arcsin(cx))^2-2bc\left(\frac{b\int 1dx}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c^2}\right)\right)-\frac{2}{3}bc\left(\frac{b\int\left(1-c^2x^2\right)dx}{3c}-\frac{(1\right.\right.$$

$$\frac{2}{5}bcd^2\left(\frac{b\int\left(1-c^2x^2\right)^2dx}{5c}-\frac{\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))}{5c^2}\right)+\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+$$

$$b\arcsin(cx))^2$$

$$\downarrow 24$$

$$\frac{4}{5}d^2\left(-\frac{2}{3}bc\left(\frac{b\int\left(1-c^2x^2\right)dx}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))}{3c^2}\right)+\frac{1}{3}x\left(1-c^2x^2\right)(a+b\arcsin(cx))^2+\frac{2}{3}\left(x(c\right.\right.$$

$$\frac{2}{5}bcd^2\left(\frac{b\int\left(1-c^2x^2\right)^2dx}{5c}-\frac{\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))}{5c^2}\right)+\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+$$

$$b\arcsin(cx))^2$$

$$\downarrow 210$$

$$\frac{4}{5}d^2\left(-\frac{2}{3}bc\left(\frac{b\int\left(1-c^2x^2\right)dx}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))}{3c^2}\right)+\frac{1}{3}x\left(1-c^2x^2\right)(a+b\arcsin(cx))^2+\frac{2}{3}\left(x(c\right.\right.$$

$$\frac{2}{5}bcd^2\left(\frac{b\int\left(c^4x^4-2c^2x^2+1\right)dx}{5c}-\frac{\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))}{5c^2}\right)+\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+$$

$$b\arcsin(cx))^2$$

$$\downarrow 2009$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\left(a+b\arcsin(cx)\right)^2+$$

$$\frac{4}{5}d^2\left(\frac{1}{3}x\left(1-c^2x^2\right)\left(a+b\arcsin(cx)\right)^2+\frac{2}{3}\left(x(a+b\arcsin(cx))^2-2bc\left(\frac{bx}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c^2}\right)\right)\right)+$$

$$\frac{2}{5}bcd^2\left(\frac{b\left(\frac{c^4x^5}{5}-\frac{2c^2x^3}{3}+x\right)}{5c}-\frac{\left(1-c^2x^2\right)^{5/2}\left(a+b\arcsin(cx)\right)}{5c^2}\right)$$

input
```
Int[(d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])^2,x]
```

output
```
(d^2*x*(1 - c^2*x^2)^2*(a + b*ArcSin[c*x])^2)/5 - (2*b*c*d^2*((b*(x - (2*c
^2*x^3)/3 + (c^4*x^5)/5))/(5*c) - ((1 - c^2*x^2)^(5/2)*(a + b*ArcSin[c*x])
)/(5*c^2)))/5 + (4*d^2*((x*(1 - c^2*x^2)*(a + b*ArcSin[c*x])^2)/3 - (2*b*c
*((b*(x - (c^2*x^3)/3))/(3*c) - ((1 - c^2*x^2)^(3/2)*(a + b*ArcSin[c*x]))/
(3*c^2)))/3 + (2*(x*(a + b*ArcSin[c*x])^2 - 2*b*c*((b*x)/c - (Sqrt[1 - c^2
*x^2]*(a + b*ArcSin[c*x]))/c^2)))/3))/5
```

Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 210
```
Int[((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Int[ExpandIntegrand[(a + b*x^2
)^p, x], x] /; FreeQ[{a, b}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5158

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

rule 5182

```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 275, normalized size of antiderivative = 1.26

method	result
derivativedivides	$\frac{d^2a^2\left(\frac{1}{5}c^5x^5-\frac{2}{3}c^3x^3+cx\right)+d^2b^2\left(\frac{\arcsin(cx)^2\left(3c^4x^4-10c^2x^2+15\right)cx}{15}+\frac{2\arcsin(cx)\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}}{25}-\frac{2\left(3c^4x^4-10c^2x^2\right.}{375}}$
default	$\frac{d^2a^2\left(\frac{1}{5}c^5x^5-\frac{2}{3}c^3x^3+cx\right)+d^2b^2\left(\frac{\arcsin(cx)^2\left(3c^4x^4-10c^2x^2+15\right)cx}{15}+\frac{2\arcsin(cx)\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}}{25}-\frac{2\left(3c^4x^4-10c^2x^2\right.}{375}}$
parts	$d^2a^2\left(\frac{1}{5}c^4x^5-\frac{2}{3}c^2x^3+x\right)+\frac{d^2b^2\left(\frac{\arcsin(cx)^2\left(3c^4x^4-10c^2x^2+15\right)cx}{15}+\frac{2\arcsin(cx)\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}}{25}-\frac{2\left(3c\right.}{}}$
orering	$\frac{x\left(1647c^6x^6-8677c^4x^4+51845c^2x^2-3375\right)\left(-c^2dx^2+d\right)^2\left(a+b\arcsin(cx)\right)^2}{3375(cx-1)(cx+1)\left(c^2x^2-1\right)^2}-\frac{\left(324c^6x^6-2035c^4x^4+18450c^2x^2-22\right.}{}$

input

```
int((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
1/c*(d^2*a^2*(1/5*c^5*x^5-2/3*c^3*x^3+c*x)+d^2*b^2*(1/15*arcsin(c*x)^2*(3*
c^4*x^4-10*c^2*x^2+15)*c*x+2/25*arcsin(c*x)*(c^2*x^2-1)^2*(-c^2*x^2+1)^(1/
2)-2/375*(3*c^4*x^4-10*c^2*x^2+15)*c*x-8/45*arcsin(c*x)*(c^2*x^2-1)*(-c^2*
x^2+1)^(1/2)+8/135*(c^2*x^2-3)*c*x-16/15*c*x+16/15*arcsin(c*x)*(-c^2*x^2+1
)^(1/2))+2*d^2*a*b*(1/5*c^5*x^5*arcsin(c*x)-2/3*c^3*x^3*arcsin(c*x)+c*x*ar
csin(c*x)+149/225*(-c^2*x^2+1)^(1/2)-38/225*c^2*x^2*(-c^2*x^2+1)^(1/2)+1/2
5*c^4*x^4*(-c^2*x^2+1)^(1/2)))
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 247, normalized size of antiderivative = 1.13

$$\int \left(d - c^2 d x^2\right)^2 \left(a + b \arcsin(cx)\right)^2 dx$$
$$= \frac{27\left(25\,a^2 - 2\,b^2\right)c^5 d^2 x^5 - 10\left(225\,a^2 - 38\,b^2\right)c^3 d^2 x^3 + 15\left(225\,a^2 - 298\,b^2\right)c d^2 x + 225\left(3\,b^2 c^5 d^2 x^5 - 10\,b^2 c$$

input
```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
1/3375*(27*(25*a^2 - 2*b^2)*c^5*d^2*x^5 - 10*(225*a^2 - 38*b^2)*c^3*d^2*x^
3 + 15*(225*a^2 - 298*b^2)*c*d^2*x + 225*(3*b^2*c^5*d^2*x^5 - 10*b^2*c^3*d
^2*x^3 + 15*b^2*c*d^2*x)*arcsin(c*x)^2 + 450*(3*a*b*c^5*d^2*x^5 - 10*a*b*c
^3*d^2*x^3 + 15*a*b*c*d^2*x)*arcsin(c*x) + 30*(9*a*b*c^4*d^2*x^4 - 38*a*b*
c^2*d^2*x^2 + 149*a*b*d^2 + (9*b^2*c^4*d^2*x^4 - 38*b^2*c^2*d^2*x^2 + 149*
b^2*d^2)*arcsin(c*x))*sqrt(-c^2*x^2 + 1))/c
```

Sympy [A] (verification not implemented)

Time = 0.49 (sec) , antiderivative size = 389, normalized size of antiderivative = 1.78

$$\int \left(d - c^2 d x^2\right)^2 \left(a + b \arcsin(cx)\right)^2 dx$$
$$= \begin{cases} \frac{a^2 c^4 d^2 x^5}{5} - \frac{2a^2 c^2 d^2 x^3}{3} + a^2 d^2 x + \frac{2abc^4 d^2 x^5 \operatorname{asin}(cx)}{5} + \frac{2abc^3 d^2 x^4 \sqrt{-c^2x^2+1}}{25} - \frac{4abc^2 d^2 x^3 \operatorname{asin}(cx)}{3} - \frac{76abcd^2 x^2 \sqrt{-c^2x^2+1}}{225} - \\ a^2 d^2 x \end{cases}$$

input
```
integrate((-c**2*d*x**2+d)**2*(a+b*asin(c*x))**2,x)
```

output

```
Piecewise((a**2*c**4*d**2*x**5/5 - 2*a**2*c**2*d**2*x**3/3 + a**2*d**2*x +
 2*a*b*c**4*d**2*x**5*asin(c*x)/5 + 2*a*b*c**3*d**2*x**4*sqrt(-c**2*x**2 +
 1)/25 - 4*a*b*c**2*d**2*x**3*asin(c*x)/3 - 76*a*b*c*d**2*x**2*sqrt(-c**2*
x**2 + 1)/225 + 2*a*b*d**2*x*asin(c*x) + 298*a*b*d**2*sqrt(-c**2*x**2 + 1)
/(225*c) + b**2*c**4*d**2*x**5*asin(c*x)**2/5 - 2*b**2*c**4*d**2*x**5/125
+ 2*b**2*c**3*d**2*x**4*sqrt(-c**2*x**2 + 1)*asin(c*x)/25 - 2*b**2*c**2*d*
*2*x**3*asin(c*x)**2/3 + 76*b**2*c**2*d**2*x**3/675 - 76*b**2*c*d**2*x**2*
sqrt(-c**2*x**2 + 1)*asin(c*x)/225 + b**2*d**2*x*asin(c*x)**2 - 298*b**2*d
**2*x/225 + 298*b**2*d**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/(225*c), Ne(c, 0)
), (a**2*d**2*x, True))
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 465 vs. $2(193) = 386$.

Time = 0.14 (sec) , antiderivative size = 465, normalized size of antiderivative = 2.12

$$
\begin{aligned}
&\int \left(d - c^2 d x^2\right)^2 \left(a + b \arcsin(cx)\right)^2 dx \\
&= \frac{1}{5} b^2 c^4 d^2 x^5 \arcsin\left(cx\right)^2 + \frac{1}{5} a^2 c^4 d^2 x^5 - \frac{2}{3} b^2 c^2 d^2 x^3 \arcsin\left(cx\right)^2 \\
&\quad + \frac{2}{75}\left(15 x^5 \arcsin\left(cx\right) + \left(\frac{3\sqrt{-c^2x^2+1}x^4}{c^2} + \frac{4\sqrt{-c^2x^2+1}x^2}{c^4} + \frac{8\sqrt{-c^2x^2+1}}{c^6}\right)c\right) abc^4 d^2 \\
&\quad + \frac{2}{1125}\left(15\left(\frac{3\sqrt{-c^2x^2+1}x^4}{c^2} + \frac{4\sqrt{-c^2x^2+1}x^2}{c^4} + \frac{8\sqrt{-c^2x^2+1}}{c^6}\right)c \arcsin\left(cx\right) - \frac{9c^4x^5 + 20c^2x^3 +}{c^4}\right. \\
&\quad - \frac{2}{3} a^2 c^2 d^2 x^3 - \frac{4}{9}\left(3x^3 \arcsin\left(cx\right) + c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right) abc^2 d^2 \\
&\quad - \frac{4}{27}\left(3c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\arcsin\left(cx\right) - \frac{c^2x^3 + 6x}{c^2}\right) b^2 c^2 d^2 \\
&\quad + b^2 d^2 x \arcsin\left(cx\right)^2 - 2 b^2 d^2 \left(x - \frac{\sqrt{-c^2x^2+1}\arcsin\left(cx\right)}{c}\right) \\
&\quad + a^2 d^2 x + \frac{2\left(cx \arcsin\left(cx\right) + \sqrt{-c^2x^2+1}\right) abd^2}{c}
\end{aligned}
$$

input

```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output

```
1/5*b^2*c^4*d^2*x^5*arcsin(c*x)^2 + 1/5*a^2*c^4*d^2*x^5 - 2/3*b^2*c^2*d^2*
x^3*arcsin(c*x)^2 + 2/75*(15*x^5*arcsin(c*x) + (3*sqrt(-c^2*x^2 + 1)*x^4/c
^2 + 4*sqrt(-c^2*x^2 + 1)*x^2/c^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c)*a*b*c^4*d
^2 + 2/1125*(15*(3*sqrt(-c^2*x^2 + 1)*x^4/c^2 + 4*sqrt(-c^2*x^2 + 1)*x^2/c
^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c*arcsin(c*x) - (9*c^4*x^5 + 20*c^2*x^3 + 1
20*x)/c^4)*b^2*c^4*d^2 - 2/3*a^2*c^2*d^2*x^3 - 4/9*(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*c^2*d^2 - 4/2
7*(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*c^2*d^2 + b^2*d^2*x*arcsin(c*x)^2 - 2*b^2*d^2*
(x - sqrt(-c^2*x^2 + 1)*arcsin(c*x)/c) + a^2*d^2*x + 2*(c*x*arcsin(c*x) +
sqrt(-c^2*x^2 + 1))*a*b*d^2/c
```

Giac [A] (verification not implemented)

Time = 0.16 (sec) , antiderivative size = 374, normalized size of antiderivative = 1.71

$$\begin{aligned}\int \left(d-c^2dx^2\right)^2 (a+b\arcsin(cx))^2\,dx = {} & \frac{1}{5}a^2c^4d^2x^5-\frac{2}{3}a^2c^2d^2x^3 \\ & +\frac{1}{5}\left(c^2x^2-1\right)^2b^2d^2x\arcsin\left(cx\right)^2 \\ & +\frac{2}{5}\left(c^2x^2-1\right)^2abd^2x\arcsin\left(cx\right) \\ & -\frac{4}{15}\left(c^2x^2-1\right)b^2d^2x\arcsin\left(cx\right)^2 \\ & -\frac{2}{125}\left(c^2x^2-1\right)^2b^2d^2x \\ & -\frac{8}{15}\left(c^2x^2-1\right)abd^2x\arcsin\left(cx\right) \\ & +\frac{8}{15}b^2d^2x\arcsin\left(cx\right)^2 \\ & +\frac{2\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}b^2d^2\arcsin\left(cx\right)}{25\,c} \\ & +\frac{272}{3375}\left(c^2x^2-1\right)b^2d^2x+\frac{16}{15}abd^2x\arcsin\left(cx\right) \\ & +\frac{2\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}abd^2}{25\,c} \\ & +\frac{8\left(-c^2x^2+1\right)^{\frac{3}{2}}b^2d^2\arcsin\left(cx\right)}{45\,c}+a^2d^2x \\ & -\frac{4144}{3375}b^2d^2x+\frac{8\left(-c^2x^2+1\right)^{\frac{3}{2}}abd^2}{45\,c} \\ & +\frac{16\sqrt{-c^2x^2+1}b^2d^2\arcsin\left(cx\right)}{15\,c} \\ & +\frac{16\sqrt{-c^2x^2+1}abd^2}{15\,c}\end{aligned}$$

input

```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
1/5*a^2*c^4*d^2*x^5 - 2/3*a^2*c^2*d^2*x^3 + 1/5*(c^2*x^2 - 1)^2*b^2*d^2*x*
arcsin(c*x)^2 + 2/5*(c^2*x^2 - 1)^2*a*b*d^2*x*arcsin(c*x) - 4/15*(c^2*x^2
- 1)*b^2*d^2*x*arcsin(c*x)^2 - 2/125*(c^2*x^2 - 1)^2*b^2*d^2*x - 8/15*(c^2
*x^2 - 1)*a*b*d^2*x*arcsin(c*x) + 8/15*b^2*d^2*x*arcsin(c*x)^2 + 2/25*(c^2
*x^2 - 1)^2*sqrt(-c^2*x^2 + 1)*b^2*d^2*arcsin(c*x)/c + 272/3375*(c^2*x^2 -
 1)*b^2*d^2*x + 16/15*a*b*d^2*x*arcsin(c*x) + 2/25*(c^2*x^2 - 1)^2*sqrt(-c
^2*x^2 + 1)*a*b*d^2/c + 8/45*(-c^2*x^2 + 1)^(3/2)*b^2*d^2*arcsin(c*x)/c +
a^2*d^2*x - 4144/3375*b^2*d^2*x + 8/45*(-c^2*x^2 + 1)^(3/2)*a*b*d^2/c + 16
/15*sqrt(-c^2*x^2 + 1)*b^2*d^2*arcsin(c*x)/c + 16/15*sqrt(-c^2*x^2 + 1)*a*
b*d^2/c
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right)^2 (a + b \arcsin(cx))^2 \, dx = \int (a + b \operatorname{asin}(c\,x))^2 \left(d - c^2\, d\, x^2\right)^2 dx$$

input
```
int((a + b*asin(c*x))^2*(d - c^2*d*x^2)^2,x)
```

output
```
int((a + b*asin(c*x))^2*(d - c^2*d*x^2)^2, x)
```

Reduce [F]

$$\int \left(d - c^2 dx^2\right)^2 (a + b \arcsin(cx))^2 \, dx$$
$$= \frac{d^2\left(225 asin(cx)^2 b^2 cx + 450\sqrt{-c^2x^2+1}\, asin(cx)\, b^2 + 90 asin(cx)\, ab\, c^5x^5 - 300 asin(cx)\, ab\, c^3x^3 + 450 as\right.}{}$$

input
```
int((-c^2*d*x^2+d)^2*(a+b*asin(c*x))^2,x)
```

output

```
(d**2*(225*asin(c*x)**2*b**2*c*x + 450*sqrt( - c**2*x**2 + 1)*asin(c*x)*b*
*2 + 90*asin(c*x)*a*b*c**5*x**5 - 300*asin(c*x)*a*b*c**3*x**3 + 450*asin(c
*x)*a*b*c*x + 18*sqrt( - c**2*x**2 + 1)*a*b*c**4*x**4 - 76*sqrt( - c**2*x*
*2 + 1)*a*b*c**2*x**2 + 298*sqrt( - c**2*x**2 + 1)*a*b + 225*int(asin(c*x)
**2*x**4,x)*b**2*c**5 - 450*int(asin(c*x)**2*x**2,x)*b**2*c**3 + 45*a**2*c
**5*x**5 - 150*a**2*c**3*x**3 + 225*a**2*c*x - 450*b**2*c*x))/(225*c)
```

3.9 $\int (d - c^2 dx^2) (a + b \arcsin(cx))^2 \, dx$

Optimal result . . . 166
Mathematica [A] (verified) . . . 167
Rubi [A] (verified) . . . 167
Maple [A] (verified) . . . 169
Fricas [A] (verification not implemented) . . . 170
Sympy [A] (verification not implemented) . . . 171
Maxima [B] (verification not implemented) . . . 171
Giac [A] (verification not implemented) . . . 172
Mupad [F(-1)] . . . 173
Reduce [F] . . . 173

Optimal result

Integrand size = 22, antiderivative size = 128

$$\begin{aligned}\int (d - c^2 dx^2) (a + b \arcsin(cx))^2 \, dx = &-\frac{14}{9} b^2 dx + \frac{2}{27} b^2 c^2 dx^3 \\ &+ \frac{4bd\sqrt{1 - c^2x^2}(a + b \arcsin(cx))}{3c} \\ &+ \frac{2bd(1 - c^2x^2)^{3/2} (a + b \arcsin(cx))}{9c} \\ &+ \frac{2}{3} dx (a + b \arcsin(cx))^2 \\ &+ \frac{1}{3} dx (1 - c^2x^2) (a + b \arcsin(cx))^2\end{aligned}$$

output

```
-14/9*b^2*d*x+2/27*b^2*c^2*d*x^3+4/3*b*d*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*
x))/c+2/9*b*d*(-c^2*x^2+1)^(3/2)*(a+b*arcsin(c*x))/c+2/3*d*x*(a+b*arcsin(c
*x))^2+1/3*d*x*(-c^2*x^2+1)*(a+b*arcsin(c*x))^2
```

Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.07

$$\int \left(d - c^2 d x^2\right) \left(a + b \arcsin(cx)\right)^2 dx =$$
$$-\frac{d\left(-2b^2 cx(-21 + c^2x^2) + 6ab\sqrt{1 - c^2x^2}(-7 + c^2x^2) + 9a^2 cx(-3 + c^2x^2) + 6b\left(b\sqrt{1 - c^2x^2}(-7 + c^2x^2\right.\right.}{27c}$$

input
```
Integrate[(d - c^2*d*x^2)*(a + b*ArcSin[c*x])^2,x]
```

output
```
-1/27*(d*(-2*b^2*c*x*(-21 + c^2*x^2) + 6*a*b*Sqrt[1 - c^2*x^2]*(-7 + c^2*x
^2) + 9*a^2*c*x*(-3 + c^2*x^2) + 6*b*(b*Sqrt[1 - c^2*x^2]*(-7 + c^2*x^2) +
 3*a*c*x*(-3 + c^2*x^2))*ArcSin[c*x] + 9*b^2*c*x*(-3 + c^2*x^2)*ArcSin[c*x
]^2))/c
```

Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.09, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$, Rules used = {5158, 5130, 5182, 24, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d - c^2 d x^2\right) \left(a + b \arcsin(cx)\right)^2 dx$$
$$\downarrow 5158$$
$$-\frac{2}{3}bcd \int x\sqrt{1 - c^2x^2}(a + b\arcsin(cx))dx + \frac{2}{3}d\int (a + b\arcsin(cx))^2 dx + \frac{1}{3}dx\left(1 - c^2x^2\right)(a + b\arcsin(cx))^2$$
$$\downarrow 5130$$
$$\frac{2}{3}d\left(x(a + b\arcsin(cx))^2 - 2bc\int \frac{x(a + b\arcsin(cx))}{\sqrt{1 - c^2x^2}}dx\right) - \frac{2}{3}bcd\int x\sqrt{1 - c^2x^2}(a + b\arcsin(cx))dx + \frac{1}{3}dx\left(1 - c^2x^2\right)(a + b\arcsin(cx))^2$$

$$\downarrow 5182$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^2-2bc\left(\frac{b\int 1dx}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c^2}\right)\right)-\frac{2}{3}bcd\left(\frac{b\int\left(1-c^2x^2\right)dx}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))}{3c^2}\right)+\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^2$$

$$\downarrow 24$$

$$-\frac{2}{3}bcd\left(\frac{b\int\left(1-c^2x^2\right)dx}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))}{3c^2}\right)+\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^2+\frac{2}{3}d\left(x(a+b\arcsin(cx))^2-2bc\left(\frac{bx}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c^2}\right)\right)$$

$$\downarrow 2009$$

$$\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^2+\frac{2}{3}d\left(x(a+b\arcsin(cx))^2-2bc\left(\frac{bx}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c^2}\right)\right)-\frac{2}{3}bcd\left(\frac{b\left(x-\frac{c^2x^3}{3}\right)}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))}{3c^2}\right)$$

input

```
Int[(d - c^2*d*x^2)*(a + b*ArcSin[c*x])^2,x]
```

output

```
(d*x*(1 - c^2*x^2)*(a + b*ArcSin[c*x])^2)/3 - (2*b*c*d*((b*(x - (c^2*x^3)/
3))/(3*c) - ((1 - c^2*x^2)^(3/2)*(a + b*ArcSin[c*x]))/(3*c^2)))/3 + (2*d*(
x*(a + b*ArcSin[c*x])^2 - 2*b*c*((b*x)/c - (Sqrt[1 - c^2*x^2]*(a + b*ArcSi
n[c*x]))/c^2)))/3
```

Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5182
```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 173, normalized size of antiderivative = 1.35

method	result
derivativedivides	$\frac{-d\,a^2\left(\frac{1}{3}c^3x^3-cx\right)-d\,b^2\left(\frac{\arcsin(cx)^2\left(c^2x^2-3\right)cx}{3}+\frac{4cx}{3}-\frac{4\arcsin(cx)\sqrt{-c^2x^2+1}}{3}+\frac{2\arcsin(cx)\left(c^2x^2-1\right)\sqrt{-c^2x^2+1}}{9}-\frac{2\left(c^2x\right.}{c}$
default	$\frac{-d\,a^2\left(\frac{1}{3}c^3x^3-cx\right)-d\,b^2\left(\frac{\arcsin(cx)^2\left(c^2x^2-3\right)cx}{3}+\frac{4cx}{3}-\frac{4\arcsin(cx)\sqrt{-c^2x^2+1}}{3}+\frac{2\arcsin(cx)\left(c^2x^2-1\right)\sqrt{-c^2x^2+1}}{9}-\frac{2\left(c^2x\right.}{c}$
parts	$-d\,a^2\left(\frac{1}{3}c^2x^3-x\right)-\frac{d\,b^2\left(\frac{\arcsin(cx)^2\left(c^2x^2-3\right)cx}{3}+\frac{4cx}{3}-\frac{4\arcsin(cx)\sqrt{-c^2x^2+1}}{3}+\frac{2\arcsin(cx)\left(c^2x^2-1\right)\sqrt{-c^2x^2+1}}{9}\right.}{c}$
orering	$\frac{x\left(19c^4x^4-166c^2x^2+27\right)\left(-c^2dx^2+d\right)\left(a+b\arcsin(cx)\right)^2}{27\left(c^2x^2-1\right)^2}-\frac{\left(2c^4x^4-29c^2x^2+7\right)\left(-2c^2dx(a+b\arcsin(cx))^2+\frac{2\left(-c^2d\right.}{9c^2\left(c^2x^2-1\right)}$

input
```
int((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
1/c*(-d*a^2*(1/3*c^3*x^3-c*x)-d*b^2*(1/3*arcsin(c*x)^2*(c^2*x^2-3)*c*x+4/3
*c*x-4/3*arcsin(c*x)*(-c^2*x^2+1)^(1/2)+2/9*arcsin(c*x)*(c^2*x^2-1)*(-c^2*
x^2+1)^(1/2)-2/27*(c^2*x^2-3)*c*x)-2*d*a*b*(1/3*c^3*x^3*arcsin(c*x)-c*x*ar
csin(c*x)+1/9*c^2*x^2*(-c^2*x^2+1)^(1/2)-7/9*(-c^2*x^2+1)^(1/2)))
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.14

$$\int \left(d-c^2dx^2\right)\left(a+b\arcsin(cx)\right)^2dx =$$
$$-\frac{(9\,a^2-2\,b^2)c^3dx^3-3\,(9\,a^2-14\,b^2)cdx+9\,(b^2c^3dx^3-3\,b^2cdx)\arcsin\left(cx\right)^2+18\,(abc^3dx^3-3\,abcdx)\,a}{27\,c}$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
-1/27*((9*a^2 - 2*b^2)*c^3*d*x^3 - 3*(9*a^2 - 14*b^2)*c*d*x + 9*(b^2*c^3*d
*x^3 - 3*b^2*c*d*x)*arcsin(c*x)^2 + 18*(a*b*c^3*d*x^3 - 3*a*b*c*d*x)*arcsi
n(c*x) + 6*(a*b*c^2*d*x^2 - 7*a*b*d + (b^2*c^2*d*x^2 - 7*b^2*d)*arcsin(c*x
))*sqrt(-c^2*x^2 + 1))/c
```

Sympy [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 224, normalized size of antiderivative = 1.75

$$\int \left(d - c^2 dx^2\right) \left(a + b \arcsin(cx)\right)^2 dx$$

$$= \begin{cases} -\frac{a^2 c^2 dx^3}{3} + a^2 dx - \frac{2abc^2 dx^3 \operatorname{asin}(cx)}{3} - \frac{2abcdx^2\sqrt{-c^2x^2+1}}{9} + 2abdx \operatorname{asin}(cx) + \frac{14abd\sqrt{-c^2x^2+1}}{9c} - \frac{b^2c^2dx^3 \operatorname{asin}^2(cx)}{3} \\ a^2 dx \end{cases}$$

input
```
integrate((-c**2*d*x**2+d)*(a+b*asin(c*x))**2,x)
```

output
```
Piecewise((-a**2*c**2*d*x**3/3 + a**2*d*x - 2*a*b*c**2*d*x**3*asin(c*x)/3
- 2*a*b*c*d*x**2*sqrt(-c**2*x**2 + 1)/9 + 2*a*b*d*x*asin(c*x) + 14*a*b*d*s
qrt(-c**2*x**2 + 1)/(9*c) - b**2*c**2*d*x**3*asin(c*x)**2/3 + 2*b**2*c**2*
d*x**3/27 - 2*b**2*c*d*x**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/9 + b**2*d*x*as
in(c*x)**2 - 14*b**2*d*x/9 + 14*b**2*d*sqrt(-c**2*x**2 + 1)*asin(c*x)/(9*c
), Ne(c, 0)), (a**2*d*x, True))
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 233 vs. 2(111) = 222.

Time = 0.13 (sec) , antiderivative size = 233, normalized size of antiderivative = 1.82

$$\begin{aligned} &\int \left(d - c^2 dx^2\right) \left(a + b \arcsin(cx)\right)^2 dx \\ &= -\frac{1}{3} b^2 c^2 dx^3 \arcsin(cx)^2 - \frac{1}{3} a^2 c^2 dx^3 \\ &\quad - \frac{2}{9}\left(3x^3 \arcsin(cx) + c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right) abc^2 d \\ &\quad - \frac{2}{27}\left(3c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\arcsin(cx) - \frac{c^2x^3 + 6x}{c^2}\right) b^2 c^2 d \\ &\quad + b^2 dx \arcsin(cx)^2 - 2b^2 d\left(x - \frac{\sqrt{-c^2x^2+1}\arcsin(cx)}{c}\right) \\ &\quad + a^2 dx + \frac{2\left(cx\arcsin(cx) + \sqrt{-c^2x^2+1}\right)abd}{c} \end{aligned}$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
-1/3*b^2*c^2*d*x^3*arcsin(c*x)^2 - 1/3*a^2*c^2*d*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*c^2*d
 - 2/27*(3*c*(sqrt(-c^2*x^2 + 1)*x^2/c^2 + 2*sqrt(-c^2*x^2 + 1)/c^4)*arcsi
n(c*x) - (c^2*x^3 + 6*x)/c^2)*b^2*c^2*d + b^2*d*x*arcsin(c*x)^2 - 2*b^2*d*
(x - sqrt(-c^2*x^2 + 1)*arcsin(c*x)/c) + a^2*d*x + 2*(c*x*arcsin(c*x) + sq
rt(-c^2*x^2 + 1))*a*b*d/c
```

Giac [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 196, normalized size of antiderivative = 1.53

$$
\begin{aligned}
&\int \left(d - c^2 dx^2\right)\left(a + b\arcsin(cx)\right)^2 dx \\
&= -\frac{1}{3}\,a^2c^2dx^3 - \frac{1}{3}\left(c^2x^2 - 1\right)b^2dx\arcsin\left(cx\right)^2 - \frac{2}{3}\left(c^2x^2 - 1\right)abdx\arcsin\left(cx\right) \\
&\quad + \frac{2}{3}\,b^2dx\arcsin\left(cx\right)^2 + \frac{2}{27}\left(c^2x^2 - 1\right)b^2dx + \frac{4}{3}\,abdx\arcsin\left(cx\right) \\
&\quad + \frac{2\left(-c^2x^2 + 1\right)^{\frac{3}{2}}b^2d\arcsin\left(cx\right)}{9\,c} + a^2dx - \frac{40}{27}\,b^2dx + \frac{2\left(-c^2x^2 + 1\right)^{\frac{3}{2}}abd}{9\,c} \\
&\quad + \frac{4\sqrt{-c^2x^2 + 1}b^2d\arcsin\left(cx\right)}{3\,c} + \frac{4\sqrt{-c^2x^2 + 1}abd}{3\,c}
\end{aligned}
$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
-1/3*a^2*c^2*d*x^3 - 1/3*(c^2*x^2 - 1)*b^2*d*x*arcsin(c*x)^2 - 2/3*(c^2*x^
2 - 1)*a*b*d*x*arcsin(c*x) + 2/3*b^2*d*x*arcsin(c*x)^2 + 2/27*(c^2*x^2 - 1
)*b^2*d*x + 4/3*a*b*d*x*arcsin(c*x) + 2/9*(-c^2*x^2 + 1)^(3/2)*b^2*d*arcsi
n(c*x)/c + a^2*d*x - 40/27*b^2*d*x + 2/9*(-c^2*x^2 + 1)^(3/2)*a*b*d/c + 4/
3*sqrt(-c^2*x^2 + 1)*b^2*d*arcsin(c*x)/c + 4/3*sqrt(-c^2*x^2 + 1)*a*b*d/c
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right) (a + b \arcsin(cx))^2 \, dx = \int (a + b \operatorname{asin}(c\,x))^2 \left(d - c^2\, d\, x^2\right) \, dx$$

input
```
int((a + b*asin(c*x))^2*(d - c^2*d*x^2),x)
```

output
```
int((a + b*asin(c*x))^2*(d - c^2*d*x^2), x)
```

Reduce [F]

$$\int \left(d - c^2 dx^2\right) (a + b \arcsin(cx))^2 \, dx$$
$$= \frac{d\left(9asin(cx)^2 b^2 cx + 18\sqrt{-c^2x^2+1}\, asin(cx)\, b^2 - 6asin(cx)\, ab\, c^3x^3 + 18asin(cx)\, abcx - 2\sqrt{-c^2x^2+1}\, a\right.}{9c}$$

input
```
int((-c^2*d*x^2+d)*(a+b*asin(c*x))^2,x)
```

output
```
(d*(9*asin(c*x)**2*b**2*c*x + 18*sqrt( - c**2*x**2 + 1)*asin(c*x)*b**2 - 6
*asin(c*x)*a*b*c**3*x**3 + 18*asin(c*x)*a*b*c*x - 2*sqrt( - c**2*x**2 + 1)
*a*b*c**2*x**2 + 14*sqrt( - c**2*x**2 + 1)*a*b - 9*int(asin(c*x)**2*x**2,x
)*b**2*c**3 - 3*a**2*c**3*x**3 + 9*a**2*c*x - 18*b**2*c*x))/(9*c)
```

3.10 $\int \frac{(a+b\arcsin(cx))^2}{d-c^2dx^2}\,dx$

Optimal result . . . 174
Mathematica [A] (verified) . . . 175
Rubi [A] (verified) . . . 175
Maple [A] (verified) . . . 177
Fricas [F] . . . 178
Sympy [F] . . . 178
Maxima [F] . . . 179
Giac [F(-2)] . . . 179
Mupad [F(-1)] . . . 180
Reduce [F] . . . 180

Optimal result

Integrand size = 24, antiderivative size = 156

$$\begin{aligned}\int \frac{(a+b\arcsin(cx))^2}{d-c^2dx^2}\,dx = &-\frac{2i(a+b\arcsin(cx))^2\arctan\left(e^{i\arcsin(cx)}\right)}{cd}\\ &+\frac{2ib(a+b\arcsin(cx))\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)}{cd}\\ &-\frac{2ib(a+b\arcsin(cx))\operatorname{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)}{cd}\\ &-\frac{2b^2\operatorname{PolyLog}\left(3,-ie^{i\arcsin(cx)}\right)}{cd}\\ &+\frac{2b^2\operatorname{PolyLog}\left(3,ie^{i\arcsin(cx)}\right)}{cd}\end{aligned}$$

output

```
-2*I*(a+b*arcsin(c*x))^2*arctan(I*c*x+(-c^2*x^2+1)^(1/2))/c/d+2*I*b*(a+b*a
rcsin(c*x))*polylog(2,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d-2*I*b*(a+b*arcsin
(c*x))*polylog(2,I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d-2*b^2*polylog(3,-I*(I*c
*x+(-c^2*x^2+1)^(1/2)))/c/d+2*b^2*polylog(3,I*(I*c*x+(-c^2*x^2+1)^(1/2)))/
c/d
```

Mathematica [A] (verified)

Time = 0.89 (sec) , antiderivative size = 302, normalized size of antiderivative = 1.94

$$\int \frac{(a+b\arcsin(cx))^2}{d-c^2dx^2}\,dx =$$
$$-\frac{2iab\pi\arcsin(cx)+4ib^2\arcsin(cx)^2\arctan\left(e^{i\arcsin(cx)}\right)-2ab\pi\log\left(1-ie^{i\arcsin(cx)}\right)-4ab\arcsin(cx)\log$$

input
```
Integrate[(a + b*ArcSin[c*x])^2/(d - c^2*d*x^2),x]
```

output
```
-1/2*((2*I)*a*b*Pi*ArcSin[c*x] + (4*I)*b^2*ArcSin[c*x]^2*ArcTan[E^(I*ArcSi
n[c*x])] - 2*a*b*Pi*Log[1 - I*E^(I*ArcSin[c*x])] - 4*a*b*ArcSin[c*x]*Log[1
 - I*E^(I*ArcSin[c*x])] - 2*a*b*Pi*Log[1 + I*E^(I*ArcSin[c*x])] + 4*a*b*Ar
cSin[c*x]*Log[1 + I*E^(I*ArcSin[c*x])] + a^2*Log[1 - c*x] - a^2*Log[1 + c*
x] + 2*a*b*Pi*Log[-Cos[(Pi + 2*ArcSin[c*x])/4]] + 2*a*b*Pi*Log[Sin[(Pi + 2
*ArcSin[c*x])/4]] - (4*I)*b*(a + b*ArcSin[c*x])*PolyLog[2, (-I)*E^(I*ArcSi
n[c*x])] + (4*I)*b*(a + b*ArcSin[c*x])*PolyLog[2, I*E^(I*ArcSin[c*x])] + 4
*b^2*PolyLog[3, (-I)*E^(I*ArcSin[c*x])] - 4*b^2*PolyLog[3, I*E^(I*ArcSin[c
*x])])/(c*d)
```

Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 135, normalized size of antiderivative = 0.87, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {5164, 3042, 4669, 3011, 2720, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\arcsin(cx))^2}{d-c^2dx^2}\,dx$$
$$\downarrow 5164$$
$$\frac{\int \frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}\,d\arcsin(cx)}{cd}$$
$$\downarrow 3042$$

$$\frac{\int (a+b\arcsin(cx))^2 \csc\left(\arcsin(cx)+\frac{\pi}{2}\right) d\arcsin(cx)}{cd}$$

$$\downarrow 4669$$

$$\frac{-2b\int (a+b\arcsin(cx))\log\left(1-ie^{i\arcsin(cx)}\right) d\arcsin(cx) + 2b\int (a+b\arcsin(cx))\log\left(1+ie^{i\arcsin(cx)}\right) d\arcsin(c}{cd}$$

$$\downarrow 3011$$

$$2b\left(i\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx)) - ib\int \mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right) d\arcsin(cx)\right) - 2b\left(i\,\mathrm{PolyLog}\left(\right.\right.$$

$$\downarrow 2720$$

$$2b\left(i\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx)) - b\int e^{-i\arcsin(cx)}\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right) de^{i\arcsin(cx)}\right) - 2b\left(i\right.$$

$$\downarrow 7143$$

$$\frac{-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2 + 2b\left(i\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx)) - b\,\mathrm{PolyLog}\left(3,-\right.\right.}{cd}$$

input
```
Int[(a + b*ArcSin[c*x])^2/(d - c^2*d*x^2),x]
```

output
```
((-2*I)*(a + b*ArcSin[c*x])^2*ArcTan[E^(I*ArcSin[c*x])] + 2*b*(I*(a + b*Ar
cSin[c*x])*PolyLog[2, (-I)*E^(I*ArcSin[c*x])] - b*PolyLog[3, (-I)*E^(I*Arc
Sin[c*x])]) - 2*b*(I*(a + b*ArcSin[c*x])*PolyLog[2, I*E^(I*ArcSin[c*x])] -
 b*PolyLog[3, I*E^(I*ArcSin[c*x])]))/(c*d)
```

Defintions of rubi rules used

rule 2720
```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[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 3011
```
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] + Simp[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 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4669
```
Int[csc[(e_.) + Pi*(k_.) + (f_.)*(x_)]*((c_.) + (d_.)*(x_))^(m_.), x_Symbol
] :> Simp[-2*(c + d*x)^m*(ArcTanh[E^(I*k*Pi)*E^(I*(e + f*x))]/f), x] + (-Si
mp[d*(m/f)  Int[(c + d*x)^(m - 1)*Log[1 - E^(I*k*Pi)*E^(I*(e + f*x))], x],
 x] + Simp[d*(m/f)  Int[(c + d*x)^(m - 1)*Log[1 + E^(I*k*Pi)*E^(I*(e + f*x
))], x], x]) /; FreeQ[{c, d, e, f}, x] && IntegerQ[2*k] && IGtQ[m, 0]
```

rule 5164
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2), x_Symbo
l] :> Simp[1/(c*d)  Subst[Int[(a + b*x)^n*Sec[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[n, 0]
```

rule 7143
```
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]
```

Maple [A] (verified)

Time = 0.35 (sec) , antiderivative size = 375, normalized size of antiderivative = 2.40

method	result
derivativedivides	$\frac{b^2 \arcsin(cx)^2 \ln\left(1-i\left(icx+\sqrt{-c^2x^2+1}\right)\right)}{d} - \frac{2ib^2 \arcsin(cx) \operatorname{polylog}\left(2,i\left(icx+\sqrt{-c^2x^2+1}\right)\right)}{d} + \frac{2b^2 \operatorname{polylog}\left(3,i\left(icx+\sqrt{-c^2x^2+1}\right)\right)}{d}$
default	$\frac{b^2 \arcsin(cx)^2 \ln\left(1-i\left(icx+\sqrt{-c^2x^2+1}\right)\right)}{d} - \frac{2ib^2 \arcsin(cx) \operatorname{polylog}\left(2,i\left(icx+\sqrt{-c^2x^2+1}\right)\right)}{d} + \frac{2b^2 \operatorname{polylog}\left(3,i\left(icx+\sqrt{-c^2x^2+1}\right)\right)}{d}$

input
```
int((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
1/c*(1/d*b^2*arcsin(c*x)^2*ln(1-I*(I*c*x+(-c^2*x^2+1)^(1/2)))-2*I/d*b^2*ar
csin(c*x)*polylog(2,I*(I*c*x+(-c^2*x^2+1)^(1/2)))+2/d*b^2*polylog(3,I*(I*c
*x+(-c^2*x^2+1)^(1/2)))-1/d*b^2*arcsin(c*x)^2*ln(1+I*(I*c*x+(-c^2*x^2+1)^(
1/2)))+2*I/d*b^2*arcsin(c*x)*polylog(2,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))-2/d*
b^2*polylog(3,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))+2/d*a*b*arcsin(c*x)*ln(1-I*(I
*c*x+(-c^2*x^2+1)^(1/2)))-2*I/d*a*b*polylog(2,I*(I*c*x+(-c^2*x^2+1)^(1/2))
)-2/d*a*b*arcsin(c*x)*ln(1+I*(I*c*x+(-c^2*x^2+1)^(1/2)))+2*I/d*a*b*polylog
(2,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))-2*I/d*a^2*arctan(I*c*x+(-c^2*x^2+1)^(1/2
)))
```

Fricas [F]

$$\int \frac{(a+b\arcsin(cx))^2}{d-c^2dx^2}\,dx = \int -\frac{(b\arcsin(cx)+a)^2}{c^2dx^2-d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d),x, algorithm="fricas")
```

output
```
integral(-(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)/(c^2*d*x^2 - d), x
)
```

Sympy [F]

$$\int \frac{(a+b\arcsin(cx))^2}{d-c^2dx^2}\,dx = -\frac{\int \frac{a^2}{c^2x^2-1}\,dx + \int \frac{b^2\operatorname{asin}^2(cx)}{c^2x^2-1}\,dx + \int \frac{2ab\operatorname{asin}(cx)}{c^2x^2-1}\,dx}{d}$$

input
```
integrate((a+b*asin(c*x))**2/(-c**2*d*x**2+d),x)
```

output
```
-(Integral(a**2/(c**2*x**2 - 1), x) + Integral(b**2*asin(c*x)**2/(c**2*x**
2 - 1), x) + Integral(2*a*b*asin(c*x)/(c**2*x**2 - 1), x))/d
```

Maxima [F]

$$\int \frac{(a+b\arcsin(cx))^2}{d-c^2dx^2}\,dx = \int -\frac{(b\arcsin(cx)+a)^2}{c^2dx^2-d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d),x, algorithm="maxima")
```

output
```
1/2*a^2*(log(c*x + 1)/(c*d) - log(c*x - 1)/(c*d)) + 1/2*(b^2*arctan2(c*x,
sqrt(c*x + 1)*sqrt(-c*x + 1))^2*log(c*x + 1) - b^2*arctan2(c*x, sqrt(c*x +
 1)*sqrt(-c*x + 1))^2*log(-c*x + 1) + 2*c*d*integrate(-(2*a*b*arctan2(c*x,
 sqrt(c*x + 1)*sqrt(-c*x + 1)) - (b^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x
 + 1))*log(c*x + 1) - b^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))*log(-
c*x + 1))*sqrt(c*x + 1)*sqrt(-c*x + 1))/(c^2*d*x^2 - d), x))/(c*d)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{d-c^2dx^2}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\arcsin(cx))^2}{d-c^2dx^2}\,dx = \int \frac{(a+b\,\mathrm{asin}(c\,x))^2}{d-c^2\,d\,x^2}\,dx$$

input
```
int((a + b*asin(c*x))^2/(d - c^2*d*x^2),x)
```

output
```
int((a + b*asin(c*x))^2/(d - c^2*d*x^2), x)
```

Reduce [F]

$$\int \frac{(a+b\arcsin(cx))^2}{d-c^2dx^2}\,dx$$
$$= \frac{-4\left(\int \frac{asin(cx)}{c^2x^2-1}dx\right)abc - 2\left(\int \frac{asin(cx)^2}{c^2x^2-1}dx\right)b^2c - \log(c^2x-c)\,a^2 + \log(c^2x+c)\,a^2}{2cd}$$

input
```
int((a+b*asin(c*x))^2/(-c^2*d*x^2+d),x)
```

output
```
( - 4*int(asin(c*x)/(c**2*x**2 - 1),x)*a*b*c - 2*int(asin(c*x)**2/(c**2*x*
*2 - 1),x)*b**2*c - log(c**2*x - c)*a**2 + log(c**2*x + c)*a**2)/(2*c*d)
```

3.11 $\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^2}\,dx$

Optimal result . . . 181
Mathematica [A] (verified) . . . 182
Rubi [A] (verified) . . . 182
Maple [A] (verified) . . . 186
Fricas [F] . . . 187
Sympy [F] . . . 187
Maxima [F] . . . 188
Giac [F(-2)] . . . 188
Mupad [F(-1)] . . . 189
Reduce [F] . . . 189

Optimal result

Integrand size = 24, antiderivative size = 230

$$\begin{aligned}\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^2}\,dx = &-\frac{b(a+b\arcsin(cx))}{cd^2\sqrt{1-c^2x^2}}+\frac{x(a+b\arcsin(cx))^2}{2d^2\left(1-c^2x^2\right)}\\ &-\frac{i(a+b\arcsin(cx))^2\arctan\left(e^{i\arcsin(cx)}\right)}{cd^2}+\frac{b^2\operatorname{arctanh}(cx)}{cd^2}\\ &+\frac{ib(a+b\arcsin(cx))\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)}{cd^2}\\ &-\frac{ib(a+b\arcsin(cx))\operatorname{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)}{cd^2}\\ &-\frac{b^2\operatorname{PolyLog}\left(3,-ie^{i\arcsin(cx)}\right)}{cd^2}+\frac{b^2\operatorname{PolyLog}\left(3,ie^{i\arcsin(cx)}\right)}{cd^2}\end{aligned}$$

output

```
-b*(a+b*arcsin(c*x))/c/d^2/(-c^2*x^2+1)^(1/2)+1/2*x*(a+b*arcsin(c*x))^2/d^
2/(-c^2*x^2+1)-I*(a+b*arcsin(c*x))^2*arctan(I*c*x+(-c^2*x^2+1)^(1/2))/c/d^
2+b^2*arctanh(c*x)/c/d^2+I*b*(a+b*arcsin(c*x))*polylog(2,-I*(I*c*x+(-c^2*x
^2+1)^(1/2)))/c/d^2-I*b*(a+b*arcsin(c*x))*polylog(2,I*(I*c*x+(-c^2*x^2+1)^
(1/2)))/c/d^2-b^2*polylog(3,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d^2+b^2*polyl
og(3,I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d^2
```

Mathematica [A] (verified)

Time = 1.61 (sec) , antiderivative size = 458, normalized size of antiderivative = 1.99

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^2}\,dx$$

$$= \frac{-\frac{2a^2x}{-1+c^2x^2} - \frac{a^2\log(1-cx)}{c} + \frac{a^2\log(1+cx)}{c} + \frac{2ab\left(\frac{\sqrt{1-c^2x^2}}{-1+cx} - \frac{\sqrt{1-c^2x^2}}{1+cx} - i\pi\arcsin(cx) + \frac{\arcsin(cx)}{1-cx} - \frac{\arcsin(cx)}{1+cx} + \pi\log\left(1-ie^{i\arcsin(cx)}\right)+2\right.}{}$$

input
```
Integrate[(a + b*ArcSin[c*x])^2/(d - c^2*d*x^2)^2,x]
```

output
```
((-2*a^2*x)/(-1 + c^2*x^2) - (a^2*Log[1 - c*x])/c + (a^2*Log[1 + c*x])/c +
 (2*a*b*(Sqrt[1 - c^2*x^2]/(-1 + c*x) - Sqrt[1 - c^2*x^2]/(1 + c*x) - I*Pi
*ArcSin[c*x] + ArcSin[c*x]/(1 - c*x) - ArcSin[c*x]/(1 + c*x) + Pi*Log[1 -
I*E^(I*ArcSin[c*x])] + 2*ArcSin[c*x]*Log[1 - I*E^(I*ArcSin[c*x])] + Pi*Log
[1 + I*E^(I*ArcSin[c*x])] - 2*ArcSin[c*x]*Log[1 + I*E^(I*ArcSin[c*x])] - P
i*Log[-Cos[(Pi + 2*ArcSin[c*x])/4]] - Pi*Log[Sin[(Pi + 2*ArcSin[c*x])/4]]
+ (2*I)*PolyLog[2, (-I)*E^(I*ArcSin[c*x])] - (2*I)*PolyLog[2, I*E^(I*ArcSi
n[c*x])]))/c + (4*b^2*(ArcCoth[c*x] - ArcSin[c*x]/Sqrt[1 - c^2*x^2] + (c*x
*ArcSin[c*x]^2)/(2 - 2*c^2*x^2) - I*ArcSin[c*x]^2*ArcTan[E^(I*ArcSin[c*x])
] + I*ArcSin[c*x]*PolyLog[2, (-I)*E^(I*ArcSin[c*x])] - I*ArcSin[c*x]*PolyL
og[2, I*E^(I*ArcSin[c*x])] - PolyLog[3, (-I)*E^(I*ArcSin[c*x])] + PolyLog[
3, I*E^(I*ArcSin[c*x])]))/c)/(4*d^2)
```

Rubi [A] (verified)

Time = 1.18 (sec) , antiderivative size = 213, normalized size of antiderivative = 0.93, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.417$, Rules used = {5162, 27, 5164, 3042, 4669, 3011, 2720, 5182, 219, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^2}\,dx$$

$$\downarrow 5162$$

$$-\frac{bc\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^{3/2}}dx}{d^2}+\frac{\int\frac{(a+b\arcsin(cx))^2}{d(1-c^2x^2)}dx}{2d}+\frac{x(a+b\arcsin(cx))^2}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 27$$

$$-\frac{bc\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^{3/2}}dx}{d^2}+\frac{\int\frac{(a+b\arcsin(cx))^2}{1-c^2x^2}dx}{2d^2}+\frac{x(a+b\arcsin(cx))^2}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 5164$$

$$-\frac{bc\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^{3/2}}dx}{d^2}+\frac{\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}d\arcsin(cx)}{2cd^2}+\frac{x(a+b\arcsin(cx))^2}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 3042$$

$$-\frac{bc\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^{3/2}}dx}{d^2}+\frac{\int(a+b\arcsin(cx))^2\csc\left(\arcsin(cx)+\frac{\pi}{2}\right)d\arcsin(cx)}{2cd^2}+\frac{x(a+b\arcsin(cx))^2}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 4669$$

$$\frac{-2b\int(a+b\arcsin(cx))\log\left(1-ie^{i\arcsin(cx)}\right)d\arcsin(cx)+2b\int(a+b\arcsin(cx))\log\left(1+ie^{i\arcsin(cx)}\right)d\arcsin(c}{2cd^2}$$

$$\frac{bc\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^{3/2}}dx}{d^2}+\frac{x(a+b\arcsin(cx))^2}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 3011$$

$$\frac{2b\left(i\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))-ib\int\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)d\arcsin(cx)\right)-2b\left(i\operatorname{PolyLog}\left(\right.\right.}{}$$

$$\frac{bc\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^{3/2}}dx}{d^2}+\frac{x(a+b\arcsin(cx))^2}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 2720$$

$$\frac{2b\left(i\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))-b\int e^{-i\arcsin(cx)}\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)de^{i\arcsin(cx)}\right)-2b\left(i\right.}{}$$

$$\frac{bc\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^{3/2}}dx}{d^2}+\frac{x(a+b\arcsin(cx))^2}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 5182$$

$$\frac{2b\left(i\,\text{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))-b\int e^{-i\arcsin(cx)}\,\text{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)de^{i\arcsin(cx)}\right)-2b(i}{bc\left(\frac{a+b\arcsin(cx)}{c^2\sqrt{1-c^2x^2}}-\frac{b\int\frac{1}{1-c^2x^2}dx}{c}\right)}{d^2}+\frac{x(a+b\arcsin(cx))^2}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 219$$

$$\frac{2b\left(i\,\text{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))-b\int e^{-i\arcsin(cx)}\,\text{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)de^{i\arcsin(cx)}\right)-2b(i}{bc\left(\frac{a+b\arcsin(cx)}{c^2\sqrt{1-c^2x^2}}-\frac{b\text{arctanh}(cx)}{c^2}\right)}{d^2}+\frac{x(a+b\arcsin(cx))^2}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 7143$$

$$\frac{-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2+2b\left(i\,\text{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))-b\,\text{PolyLog}\left(3,-\right.\right.}{2cd^2}$$

$$\frac{bc\left(\frac{a+b\arcsin(cx)}{c^2\sqrt{1-c^2x^2}}-\frac{b\text{arctanh}(cx)}{c^2}\right)}{d^2}+\frac{x(a+b\arcsin(cx))^2}{2d^2\left(1-c^2x^2\right)}$$

input
```
Int[(a + b*ArcSin[c*x])^2/(d - c^2*d*x^2)^2,x]
```

output
```
(x*(a + b*ArcSin[c*x])^2)/(2*d^2*(1 - c^2*x^2)) - (b*c*((a + b*ArcSin[c*x]
)/(c^2*Sqrt[1 - c^2*x^2]) - (b*ArcTanh[c*x])/c^2))/d^2 + ((-2*I)*(a + b*Ar
cSin[c*x])^2*ArcTan[E^(I*ArcSin[c*x])] + 2*b*(I*(a + b*ArcSin[c*x])*PolyLo
g[2, (-I)*E^(I*ArcSin[c*x])] - b*PolyLog[3, (-I)*E^(I*ArcSin[c*x])]) - 2*b
*(I*(a + b*ArcSin[c*x])*PolyLog[2, I*E^(I*ArcSin[c*x])] - b*PolyLog[3, I*E
^(I*ArcSin[c*x])]))/(2*c*d^2)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219

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

rule 2720

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[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 3011

```
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] + Simp[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 3042

```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4669

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

rule 5162

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_), x_
Symbol] :> Simp[(-x)*(d + e*x^2)^(p + 1)*((a + b*ArcSin[c*x])^n/(2*d*(p + 1
))), x] + (Simp[(2*p + 3)/(2*d*(p + 1))   Int[(d + e*x^2)^(p + 1)*(a + b*Ar
cSin[c*x])^n, x], x] + Simp[b*c*(n/(2*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2
*x^2)^p]   Int[x*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x
]) /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && LtQ[p,
 -1] && NeQ[p, -3/2]
```

rule 5164
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2), x_Symbo
l] :> Simp[1/(c*d)   Subst[Int[(a + b*x)^n*Sec[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[n, 0]
```

rule 5182
```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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 7143
```
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]
```

Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 446, normalized size of antiderivative = 1.94

method	result
derivativedivides	$\frac{a^2\left(-\frac{1}{4(cx+1)}+\frac{\ln(cx+1)}{4}-\frac{1}{4(cx-1)}-\frac{\ln(cx-1)}{4}\right)}{d^2}+\frac{b^2\left(-\frac{\arcsin(cx)\left(cx\arcsin(cx)-2\sqrt{-c^2x^2+1}\right)}{2\left(c^2x^2-1\right)}+\frac{\arcsin(cx)^2\ln\left(1-i\left(icx+\sqrt{-}\right.\right.}{2}\right.$
default	$\frac{a^2\left(-\frac{1}{4(cx+1)}+\frac{\ln(cx+1)}{4}-\frac{1}{4(cx-1)}-\frac{\ln(cx-1)}{4}\right)}{d^2}+\frac{b^2\left(-\frac{\arcsin(cx)\left(cx\arcsin(cx)-2\sqrt{-c^2x^2+1}\right)}{2\left(c^2x^2-1\right)}+\frac{\arcsin(cx)^2\ln\left(1-i\left(icx+\sqrt{-}\right.\right.}{2}\right.$
parts	$\frac{a^2\left(-\frac{1}{4c(cx-1)}-\frac{\ln(cx-1)}{4c}-\frac{1}{4c(cx+1)}+\frac{\ln(cx+1)}{4c}\right)}{d^2}+\frac{b^2\left(-\frac{\arcsin(cx)\left(cx\arcsin(cx)-2\sqrt{-c^2x^2+1}\right)}{2\left(c^2x^2-1\right)}+\frac{\arcsin(cx)^2\ln\left(1-i\left(icx\right.\right.}{2}\right.$

input
```
int((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/c*(a^2/d^2*(-1/4/(c*x+1)+1/4*ln(c*x+1)-1/4/(c*x-1)-1/4*ln(c*x-1))+b^2/d^
2*(-1/2/(c^2*x^2-1)*arcsin(c*x)*(c*x*arcsin(c*x)-2*(-c^2*x^2+1)^(1/2))+1/2
*arcsin(c*x)^2*ln(1-I*(I*c*x+(-c^2*x^2+1)^(1/2)))-I*arcsin(c*x)*polylog(2,
I*(I*c*x+(-c^2*x^2+1)^(1/2)))+polylog(3,I*(I*c*x+(-c^2*x^2+1)^(1/2)))-1/2*
arcsin(c*x)^2*ln(1+I*(I*c*x+(-c^2*x^2+1)^(1/2)))+I*arcsin(c*x)*polylog(2,-
I*(I*c*x+(-c^2*x^2+1)^(1/2)))-polylog(3,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))-2*I
*arctan(I*c*x+(-c^2*x^2+1)^(1/2)))+2*a*b/d^2*(-1/2*(c*x*arcsin(c*x)-(-c^2*
x^2+1)^(1/2))/(c^2*x^2-1)-1/2*arcsin(c*x)*ln(1+I*(I*c*x+(-c^2*x^2+1)^(1/2)
))+1/2*arcsin(c*x)*ln(1-I*(I*c*x+(-c^2*x^2+1)^(1/2)))+1/2*I*dilog(1+I*(I*c
*x+(-c^2*x^2+1)^(1/2)))-1/2*I*dilog(1-I*(I*c*x+(-c^2*x^2+1)^(1/2))))
```

Fricas [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^2}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(c^2dx^2-d)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)/(c^4*d^2*x^4 - 2*c^
2*d^2*x^2 + d^2), x)
```

Sympy [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^2}\,dx = \frac{\int \frac{a^2}{c^4x^4-2c^2x^2+1}\,dx + \int \frac{b^2\operatorname{asin}^2(cx)}{c^4x^4-2c^2x^2+1}\,dx + \int \frac{2ab\operatorname{asin}(cx)}{c^4x^4-2c^2x^2+1}\,dx}{d^2}$$

input
```
integrate((a+b*asin(c*x))**2/(-c**2*d*x**2+d)**2,x)
```

output
```
(Integral(a**2/(c**4*x**4 - 2*c**2*x**2 + 1), x) + Integral(b**2*asin(c*x)
**2/(c**4*x**4 - 2*c**2*x**2 + 1), x) + Integral(2*a*b*asin(c*x)/(c**4*x**
4 - 2*c**2*x**2 + 1), x))/d**2
```

Maxima [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^2}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(c^2dx^2-d)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^2,x, algorithm="maxima")
```

output
```
-1/4*a^2*(2*x/(c^2*d^2*x^2 - d^2) - log(c*x + 1)/(c*d^2) + log(c*x - 1)/(c
*d^2)) - 1/4*(2*b^2*c*x*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 - (b^
2*c^2*x^2 - b^2)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2*log(c*x + 1)
 + (b^2*c^2*x^2 - b^2)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2*log(-c
*x + 1) - 4*(c^3*d^2*x^2 - c*d^2)*integrate(1/2*(4*a*b*arctan2(c*x, sqrt(c
*x + 1)*sqrt(-c*x + 1)) - (2*b^2*c*x*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x
+ 1)) - (b^2*c^2*x^2 - b^2)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))*log
(c*x + 1) + (b^2*c^2*x^2 - b^2)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))
*log(-c*x + 1))*sqrt(c*x + 1)*sqrt(-c*x + 1))/(c^4*d^2*x^4 - 2*c^2*d^2*x^2
 + d^2), x))/(c^3*d^2*x^2 - c*d^2)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^2}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^2,x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^2}\,dx = \int \frac{(a+b\,\mathrm{asin}(c\,x))^2}{(d-c^2\,d\,x^2)^2}\,dx$$

input
```
int((a + b*asin(c*x))^2/(d - c^2*d*x^2)^2,x)
```

output
```
int((a + b*asin(c*x))^2/(d - c^2*d*x^2)^2, x)
```

Reduce [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^2}\,dx$$
$$= \frac{8\left(\int \frac{asin(cx)}{c^4x^4-2c^2x^2+1}dx\right)ab\,c^3x^2 - 8\left(\int \frac{asin(cx)}{c^4x^4-2c^2x^2+1}dx\right)abc + 4\left(\int \frac{asin(cx)^2}{c^4x^4-2c^2x^2+1}dx\right)b^2c^3x^2 - 4\left(\int \frac{asin(cx)^2}{c^4x^4-2c^2x^2+1}\right.}{4c\,d^2\,(c^2x^2 -}$$

input
```
int((a+b*asin(c*x))^2/(-c^2*d*x^2+d)^2,x)
```

output
```
(8*int(asin(c*x)/(c**4*x**4 - 2*c**2*x**2 + 1),x)*a*b*c**3*x**2 - 8*int(as
in(c*x)/(c**4*x**4 - 2*c**2*x**2 + 1),x)*a*b*c + 4*int(asin(c*x)**2/(c**4*
x**4 - 2*c**2*x**2 + 1),x)*b**2*c**3*x**2 - 4*int(asin(c*x)**2/(c**4*x**4
 - 2*c**2*x**2 + 1),x)*b**2*c - log(c**2*x - c)*a**2*c**2*x**2 + log(c**2*x
 - c)*a**2 + log(c**2*x + c)*a**2*c**2*x**2 - log(c**2*x + c)*a**2 - 2*a**
2*c*x)/(4*c*d**2*(c**2*x**2 - 1))
```

3.12 $\int (d - c^2 dx^2)^3 (a + b \arcsin(cx))^3 \, dx$

Optimal result . . . 190
Mathematica [A] (verified) . . . 191
Rubi [A] (verified) . . . 191
Maple [A] (verified) . . . 198
Fricas [A] (verification not implemented) . . . 199
Sympy [B] (verification not implemented) . . . 200
Maxima [B] (verification not implemented) . . . 201
Giac [B] (verification not implemented) . . . 202
Mupad [F(-1)] . . . 203
Reduce [F] . . . 204

Optimal result

Integrand size = 24, antiderivative size = 446

$$\int (d-c^2dx^2)^3 (a+b\arcsin(cx))^3 \, dx = -\frac{413312b^3d^3\sqrt{1-c^2x^2}}{128625c} - \frac{30256b^3d^3(1-c^2x^2)^{3/2}}{385875c}$$
$$- \frac{2664b^3d^3(1-c^2x^2)^{5/2}}{214375c} - \frac{6b^3d^3(1-c^2x^2)^{7/2}}{2401c} - \frac{4322b^2d^3x(a+b\arcsin(cx))}{1225}$$
$$+ \frac{1514b^2c^2d^3x^3(a+b\arcsin(cx))}{3675} - \frac{702b^2c^4d^3x^5(a+b\arcsin(cx))}{6125}$$
$$+ \frac{6}{343}b^2c^6d^3x^7(a+b\arcsin(cx)) + \frac{48bd^3\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2}{35c} + \frac{8bd^3(1-c^2x^2)^{3/2}(a+b\arcsin(cx)}{35c}$$

output

```
-413312/128625*b^3*d^3*(-c^2*x^2+1)^(1/2)/c-30256/385875*b^3*d^3*(-c^2*x^2
+1)^(3/2)/c-2664/214375*b^3*d^3*(-c^2*x^2+1)^(5/2)/c-6/2401*b^3*d^3*(-c^2*
x^2+1)^(7/2)/c-4322/1225*b^2*d^3*x*(a+b*arcsin(c*x))+1514/3675*b^2*c^2*d^3
*x^3*(a+b*arcsin(c*x))-702/6125*b^2*c^4*d^3*x^5*(a+b*arcsin(c*x))+6/343*b^
2*c^6*d^3*x^7*(a+b*arcsin(c*x))+48/35*b*d^3*(-c^2*x^2+1)^(1/2)*(a+b*arcsin
(c*x))^2/c+8/35*b*d^3*(-c^2*x^2+1)^(3/2)*(a+b*arcsin(c*x))^2/c+18/175*b*d^
3*(-c^2*x^2+1)^(5/2)*(a+b*arcsin(c*x))^2/c+3/49*b*d^3*(-c^2*x^2+1)^(7/2)*(
a+b*arcsin(c*x))^2/c+16/35*d^3*x*(a+b*arcsin(c*x))^3+8/35*d^3*x*(-c^2*x^2+
1)*(a+b*arcsin(c*x))^3+6/35*d^3*x*(-c^2*x^2+1)^2*(a+b*arcsin(c*x))^3+1/7*d
^3*x*(-c^2*x^2+1)^3*(a+b*arcsin(c*x))^3
```

Mathematica [A] (verified)

Time = 0.41 (sec) , antiderivative size = 411, normalized size of antiderivative = 0.92

$$\int \left(d - c^2 d x^2\right)^3 (a + b \arcsin(cx))^3 \, dx =$$

$$-\frac{d^3\left(2b^3\sqrt{1-c^2x^2}(22329151 - 747937c^2x^2 + 134541c^4x^4 - 16875c^6x^6) + 385875a^3cx(-35 + 35c^2x^2 -$$

input

```
Integrate[(d - c^2*d*x^2)^3*(a + b*ArcSin[c*x])^3,x]
```

output

```
-1/13505625*(d^3*(2*b^3*Sqrt[1 - c^2*x^2]*(22329151 - 747937*c^2*x^2 + 134
541*c^4*x^4 - 16875*c^6*x^6) + 385875*a^3*c*x*(-35 + 35*c^2*x^2 - 21*c^4*x
^4 + 5*c^6*x^6) + 11025*a^2*b*Sqrt[1 - c^2*x^2]*(-2161 + 757*c^2*x^2 - 351
*c^4*x^4 + 75*c^6*x^6) - 210*a*b^2*c*x*(-226905 + 26495*c^2*x^2 - 7371*c^4
*x^4 + 1125*c^6*x^6) + 105*b*(2*b^2*c*x*(226905 - 26495*c^2*x^2 + 7371*c^4
*x^4 - 1125*c^6*x^6) + 11025*a^2*c*x*(-35 + 35*c^2*x^2 - 21*c^4*x^4 + 5*c^
6*x^6) + 210*a*b*Sqrt[1 - c^2*x^2]*(-2161 + 757*c^2*x^2 - 351*c^4*x^4 + 75
*c^6*x^6))*ArcSin[c*x] + 11025*b^2*(105*a*c*x*(-35 + 35*c^2*x^2 - 21*c^4*x
^4 + 5*c^6*x^6) + b*Sqrt[1 - c^2*x^2]*(-2161 + 757*c^2*x^2 - 351*c^4*x^4 +
 75*c^6*x^6))*ArcSin[c*x]^2 + 385875*b^3*c*x*(-35 + 35*c^2*x^2 - 21*c^4*x^
4 + 5*c^6*x^6)*ArcSin[c*x]^3))/c
```

Rubi [A] (verified)

Time = 2.85 (sec) , antiderivative size = 665, normalized size of antiderivative = 1.49, number of steps used = 18, number of rules used = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.708$, Rules used = {5158, 27, 5158, 5158, 5130, 5182, 2009, 5154, 27, 353, 53, 1576, 1140, 2009, 2331, 2389, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d - c^2 d x^2\right)^3 (a + b \arcsin(cx))^3 \, dx$$

$$\downarrow 5158$$

$$-\frac{3}{7}bcd^3\int x\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))^2dx+\frac{6}{7}d\int d^2\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3dx+$$
$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3$$

$$\downarrow 27$$

$$-\frac{3}{7}bcd^3\int x\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))^2dx+\frac{6}{7}d^3\int\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3dx+$$
$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3$$

$$\downarrow 5158$$

$$-\frac{3}{7}bcd^3\int x\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))^2dx+$$
$$\frac{6}{7}d^3\left(-\frac{3}{5}bc\int x\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))^2dx+\frac{4}{5}\int\left(1-c^2x^2\right)(a+b\arcsin(cx))^3dx+\frac{1}{5}x\left(1-c^2x^2\right)^2(a+\right.$$
$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3$$

$$\downarrow 5158$$

$$-\frac{3}{7}bcd^3\int x\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))^2dx+$$
$$\frac{6}{7}d^3\left(-\frac{3}{5}bc\int x\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))^2dx+\frac{4}{5}\left(-bc\int x\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2dx+\frac{2}{3}\int(a+b\right.\right.$$
$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3$$

$$\downarrow 5130$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(\frac{2}{3}\left(x(a+b\arcsin(cx))^3-3bc\int\frac{x(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx\right)-bc\int x\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2dx+\frac{1}{3}\right.\right.$$
$$\frac{3}{7}bcd^3\int x\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))^2dx+\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3$$

$$\downarrow 5182$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(\frac{2}{3}\left(x(a+b\arcsin(cx))^3-3bc\left(\frac{2b\int(a+b\arcsin(cx))dx}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2}{c^2}\right)\right)-bc\left(\frac{2b\int}{}\right.\right.\right.$$
$$\frac{3}{7}bcd^3\left(\frac{2b\int\left(1-c^2x^2\right)^3(a+b\arcsin(cx))dx}{7c}-\frac{\left(1-c^2x^2\right)^{7/2}(a+b\arcsin(cx))^2}{7c^2}\right)+$$
$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3$$

$$\downarrow 2009$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(-bc\left(\frac{2b\int\left(1-c^2x^2\right)(a+b\arcsin(cx))dx}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))^2}{3c^2}\right)+\frac{1}{3}x\left(1-c^2x^2\right)(a+b\right.\right.$$
$$\left.\frac{3}{7}bcd^3\left(\frac{2b\int\left(1-c^2x^2\right)^3(a+b\arcsin(cx))dx}{7c}-\frac{\left(1-c^2x^2\right)^{7/2}(a+b\arcsin(cx))^2}{7c^2}\right)+\right.$$
$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3$$

$$\downarrow 5154$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(-bc\left(\frac{2b\left(-bc\int\frac{x\left(3-c^2x^2\right)}{3\sqrt{1-c^2x^2}}dx-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\,a\right.\right.\right.$$
$$\left.\left.\frac{3}{7}bcd^3\left(\frac{2b\left(-bc\int\frac{x\left(-5c^6x^6+21c^4x^4-35c^2x^2+35\right)}{35\sqrt{1-c^2x^2}}dx-\frac{1}{7}c^6x^7(a+b\arcsin(cx))+\frac{3}{5}c^4x^5(a+b\arcsin(cx))-c^2x^3(a+b\right.\right.\right.\right.$$
$$\left.\left.\left.\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3\right.\right.\right.$$

$$\downarrow 27$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(-bc\left(\frac{2b\left(-\frac{1}{3}bc\int\frac{x\left(3-c^2x^2\right)}{\sqrt{1-c^2x^2}}dx-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\right.\right.\right.$$
$$\left.\left.\frac{3}{7}bcd^3\left(\frac{2b\left(-\frac{1}{35}bc\int\frac{x\left(-5c^6x^6+21c^4x^4-35c^2x^2+35\right)}{\sqrt{1-c^2x^2}}dx-\frac{1}{7}c^6x^7(a+b\arcsin(cx))+\frac{3}{5}c^4x^5(a+b\arcsin(cx))-c^2x^3(a\right.\right.\right.\right.$$
$$\left.\left.\left.\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3\right.\right.\right.$$

$$\downarrow 353$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(-bc\left(\frac{2b\left(-\frac{1}{6}bc\int\frac{3-c^2x^2}{\sqrt{1-c^2x^2}}dx^2-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\right.\right.\right.$$
$$\left.\left.\frac{3}{7}bcd^3\left(\frac{2b\left(-\frac{1}{35}bc\int\frac{x\left(-5c^6x^6+21c^4x^4-35c^2x^2+35\right)}{\sqrt{1-c^2x^2}}dx-\frac{1}{7}c^6x^7(a+b\arcsin(cx))+\frac{3}{5}c^4x^5(a+b\arcsin(cx))-c^2x^3(a\right.\right.\right.\right.$$
$$\left.\left.\left.\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3\right.\right.\right.$$

$$\downarrow 53$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(-bc\left(\frac{2b\left(-\frac{1}{6}bc\int\left(\sqrt{1-c^2x^2}+\frac{2}{\sqrt{1-c^2x^2}}\right)dx^2-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{(1-}{}\right.\right.\right.$$

$$\frac{3}{7}bcd^3\left(\frac{2b\left(-\frac{1}{35}bc\int\frac{x\left(-5c^6x^6+21c^4x^4-35c^2x^2+35\right)}{\sqrt{1-c^2x^2}}dx-\frac{1}{7}c^6x^7(a+b\arcsin(cx))+\frac{3}{5}c^4x^5(a+b\arcsin(cx))-c^2x^3(a+\right.\right.$$

$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3$$

$$\downarrow 1576$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(-bc\left(\frac{2b\left(-\frac{1}{6}bc\int\left(\sqrt{1-c^2x^2}+\frac{2}{\sqrt{1-c^2x^2}}\right)dx^2-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{(1-}{}\right.\right.\right.$$

$$\frac{3}{7}bcd^3\left(\frac{2b\left(-\frac{1}{35}bc\int\frac{x\left(-5c^6x^6+21c^4x^4-35c^2x^2+35\right)}{\sqrt{1-c^2x^2}}dx-\frac{1}{7}c^6x^7(a+b\arcsin(cx))+\frac{3}{5}c^4x^5(a+b\arcsin(cx))-c^2x^3(a+\right.\right.$$

$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3$$

$$\downarrow 1140$$

$$\frac{6}{7}d^3\left(\frac{4}{5}\left(-bc\left(\frac{2b\left(-\frac{1}{6}bc\int\left(\sqrt{1-c^2x^2}+\frac{2}{\sqrt{1-c^2x^2}}\right)dx^2-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{(1-}{}\right.\right.\right.$$

$$\frac{3}{7}bcd^3\left(\frac{2b\left(-\frac{1}{35}bc\int\frac{x\left(-5c^6x^6+21c^4x^4-35c^2x^2+35\right)}{\sqrt{1-c^2x^2}}dx-\frac{1}{7}c^6x^7(a+b\arcsin(cx))+\frac{3}{5}c^4x^5(a+b\arcsin(cx))-c^2x^3(a+\right.\right.$$

$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3$$

$$\downarrow 2009$$

$$-\frac{3}{7}bcd^3\left(\frac{2b\left(-\frac{1}{35}bc\int\frac{x\left(-5c^6x^6+21c^4x^4-35c^2x^2+35\right)}{\sqrt{1-c^2x^2}}dx-\frac{1}{7}c^6x^7(a+b\arcsin(cx))+\frac{3}{5}c^4x^5(a+b\arcsin(cx))-c^2x^3(\right.\right.$$

$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3+$$

$$\frac{6}{7}d^3\left(\frac{1}{5}x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3+\frac{4}{5}\left(\frac{1}{3}x\left(1-c^2x^2\right)(a+b\arcsin(cx))^3+\frac{2}{3}\left(x(a+b\arcsin(cx))^3-3bc\right.\right.\right.$$

$$\downarrow 2331$$

$$-\frac{3}{7}bcd^3\left(\frac{2b\left(-\frac{1}{70}bc\int\frac{-5c^6x^6+21c^4x^4-35c^2x^2+35}{\sqrt{1-c^2x^2}}dx^2-\frac{1}{7}c^6x^7(a+b\arcsin(cx))+\frac{3}{5}c^4x^5(a+b\arcsin(cx))-c^2x^3(a+\right.\right.$$

$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3+$$

$$\frac{6}{7}d^3\left(\frac{1}{5}x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3+\frac{4}{5}\left(\frac{1}{3}x\left(1-c^2x^2\right)(a+b\arcsin(cx))^3+\frac{2}{3}\left(x(a+b\arcsin(cx))^3-3bc\right.\right.\right.$$

$$\downarrow 2389$$

$$-\frac{3}{7}bcd^3\left(\frac{2b\left(-\frac{1}{70}bc\int\left(5\left(1-c^2x^2\right)^{5/2}+6\left(1-c^2x^2\right)^{3/2}+8\sqrt{1-c^2x^2}+\frac{16}{\sqrt{1-c^2x^2}}\right)dx^2-\frac{1}{7}c^6x^7(a+b\arcsin(cx)\right.\right.$$

$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3+$$

$$\frac{6}{7}d^3\left(\frac{1}{5}x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3+\frac{4}{5}\left(\frac{1}{3}x\left(1-c^2x^2\right)(a+b\arcsin(cx))^3+\frac{2}{3}\left(x(a+b\arcsin(cx))^3-3bc\right.\right.\right.$$

$$\downarrow 2009$$

$$\frac{1}{7}d^3x\left(1-c^2x^2\right)^3(a+b\arcsin(cx))^3+$$

$$\frac{6}{7}d^3\left(\frac{1}{5}x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3+\frac{4}{5}\left(\frac{1}{3}x\left(1-c^2x^2\right)(a+b\arcsin(cx))^3+\frac{2}{3}\left(x(a+b\arcsin(cx))^3-3bc\right.\right.\right.$$

$$\frac{3}{7}bcd^3\left(\frac{2b\left(-\frac{1}{7}c^6x^7(a+b\arcsin(cx))+\frac{3}{5}c^4x^5(a+b\arcsin(cx))-c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))-\right.\right.$$

input
```
Int[(d - c^2*d*x^2)^3*(a + b*ArcSin[c*x])^3,x]
```

output
```
(d^3*x*(1 - c^2*x^2)^3*(a + b*ArcSin[c*x])^3)/7 - (3*b*c*d^3*(-1/7*((1 - c
^2*x^2)^(7/2)*(a + b*ArcSin[c*x])^2)/c^2 + (2*b*(-1/70*(b*c*((-32*Sqrt[1 -
 c^2*x^2])/c^2 - (16*(1 - c^2*x^2)^(3/2))/(3*c^2) - (12*(1 - c^2*x^2)^(5/2
))/(5*c^2) - (10*(1 - c^2*x^2)^(7/2))/(7*c^2))) + x*(a + b*ArcSin[c*x]) -
c^2*x^3*(a + b*ArcSin[c*x]) + (3*c^4*x^5*(a + b*ArcSin[c*x]))/5 - (c^6*x^7
*(a + b*ArcSin[c*x]))/7))/(7*c)))/7 + (6*d^3*((x*(1 - c^2*x^2)^2*(a + b*Ar
cSin[c*x])^3)/5 - (3*b*c*(-1/5*((1 - c^2*x^2)^(5/2)*(a + b*ArcSin[c*x])^2)
/c^2 + (2*b*(-1/30*(b*c*((-16*Sqrt[1 - c^2*x^2])/c^2 - (8*(1 - c^2*x^2)^(3
/2))/(3*c^2) - (6*(1 - c^2*x^2)^(5/2))/(5*c^2))) + x*(a + b*ArcSin[c*x]) -
 (2*c^2*x^3*(a + b*ArcSin[c*x]))/3 + (c^4*x^5*(a + b*ArcSin[c*x]))/5))/(5*
c)))/5 + (4*((x*(1 - c^2*x^2)*(a + b*ArcSin[c*x])^3)/3 - b*c*(-1/3*((1 - c
^2*x^2)^(3/2)*(a + b*ArcSin[c*x])^2)/c^2 + (2*b*(-1/6*(b*c*((-4*Sqrt[1 - c
^2*x^2])/c^2 - (2*(1 - c^2*x^2)^(3/2))/(3*c^2))) + x*(a + b*ArcSin[c*x]) -
 (c^2*x^3*(a + b*ArcSin[c*x]))/3))/(3*c)) + (2*(x*(a + b*ArcSin[c*x])^3 -
3*b*c*(-((Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^2)/c^2) + (2*b*(a*x + (b*S
qrt[1 - c^2*x^2])/c + b*x*ArcSin[c*x]))/c)))/3))/5))/7
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 53
```
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] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && LeQ[7*m + 4*n + 4, 0])
|| LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

rule 353
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_Symbol]
 :> Simp[1/2   Subst[Int[(a + b*x)^p*(c + d*x)^q, x], x, x^2], x] /; FreeQ[
{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 1576
```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Simp[1/2   Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x]
, x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2331
```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/2   S
ubst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x)^p, x], x, x^2], x] /;
 FreeQ[{a, b, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]
```

rule 2389
```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[ExpandIntegrand
[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p
, 0] || EqQ[n, 1])
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5154
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])   u, x
] - Simp[b*c   Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5182

```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 715, normalized size of antiderivative = 1.60

method	result
derivativedivides	$\frac{-d^3a^3\left(\frac{1}{7}c^7x^7-\frac{3}{5}c^5x^5+c^3x^3-cx\right)-d^3b^3\left(\frac{\arcsin(cx)^3\left(5c^6x^6-21c^4x^4+35c^2x^2-35\right)cx}{35}+\frac{3\arcsin(cx)^2\left(c^2x^2-1\right)^3\sqrt{-c^2x^2+1}}{49}\right.}{}$
default	$\frac{-d^3a^3\left(\frac{1}{7}c^7x^7-\frac{3}{5}c^5x^5+c^3x^3-cx\right)-d^3b^3\left(\frac{\arcsin(cx)^3\left(5c^6x^6-21c^4x^4+35c^2x^2-35\right)cx}{35}+\frac{3\arcsin(cx)^2\left(c^2x^2-1\right)^3\sqrt{-c^2x^2+1}}{49}\right.}{}$
parts	$-d^3a^3\left(\frac{1}{7}c^6x^7-\frac{3}{5}c^4x^5+c^2x^3-x\right)-\frac{d^3b^3\left(\frac{\arcsin(cx)^3\left(5c^6x^6-21c^4x^4+35c^2x^2-35\right)cx}{35}+\frac{3\arcsin(cx)^2\left(c^2x^2\right.}{49}\right.}{}$
orering	$\frac{x\left(6215625c^8x^8-37489212c^6x^6+126346014c^4x^4-1949470892c^2x^2-879660415\right)\left(-c^2dx^2+d\right)^3(a+b\arcsin(cx))^3}{13505625(cx-1)(cx+1)(c^2x^2-1)^3}$ _

input

```
int((-c^2*d*x^2+d)^3*(a+b*arcsin(c*x))^3,x,method=_RETURNVERBOSE)
```

output
```
1/c*(-d^3*a^3*(1/7*c^7*x^7-3/5*c^5*x^5+c^3*x^3-c*x)-d^3*b^3*(1/35*arcsin(c
*x)^3*(5*c^6*x^6-21*c^4*x^4+35*c^2*x^2-35)*c*x+3/49*arcsin(c*x)^2*(c^2*x^2
-1)^3*(-c^2*x^2+1)^(1/2)-6/1715*arcsin(c*x)*(5*c^6*x^6-21*c^4*x^4+35*c^2*x
^2-35)*c*x-6/2401*(c^2*x^2-1)^3*(-c^2*x^2+1)^(1/2)+2664/214375*(c^2*x^2-1)
^2*(-c^2*x^2+1)^(1/2)-30256/385875*(c^2*x^2-1)*(-c^2*x^2+1)^(1/2)+413312/1
28625*(-c^2*x^2+1)^(1/2)-18/175*arcsin(c*x)^2*(c^2*x^2-1)^2*(-c^2*x^2+1)^(
1/2)+12/875*arcsin(c*x)*(3*c^4*x^4-10*c^2*x^2+15)*c*x+8/35*arcsin(c*x)^2*(
c^2*x^2-1)*(-c^2*x^2+1)^(1/2)-16/105*arcsin(c*x)*(c^2*x^2-3)*c*x-48/35*arc
sin(c*x)^2*(-c^2*x^2+1)^(1/2)+96/35*c*x*arcsin(c*x))-3*d^3*a*b^2*(1/35*arc
sin(c*x)^2*(5*c^6*x^6-21*c^4*x^4+35*c^2*x^2-35)*c*x+2/49*arcsin(c*x)*(c^2*
x^2-1)^3*(-c^2*x^2+1)^(1/2)-2/1715*(5*c^6*x^6-21*c^4*x^4+35*c^2*x^2-35)*c*
x-12/175*arcsin(c*x)*(c^2*x^2-1)^2*(-c^2*x^2+1)^(1/2)+4/875*(3*c^4*x^4-10*
c^2*x^2+15)*c*x+16/105*arcsin(c*x)*(c^2*x^2-1)*(-c^2*x^2+1)^(1/2)-16/315*(
c^2*x^2-3)*c*x+32/35*c*x-32/35*arcsin(c*x)*(-c^2*x^2+1)^(1/2))-3*d^3*a^2*b
*(1/7*arcsin(c*x)*c^7*x^7-3/5*c^5*x^5*arcsin(c*x)+c^3*x^3*arcsin(c*x)-c*x*
arcsin(c*x)-2161/3675*(-c^2*x^2+1)^(1/2)+757/3675*c^2*x^2*(-c^2*x^2+1)^(1/
2)-117/1225*c^4*x^4*(-c^2*x^2+1)^(1/2)+1/49*c^6*x^6*(-c^2*x^2+1)^(1/2)))
```

Fricas [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 534, normalized size of antiderivative = 1.20

$$\int \left(d - c^2 d x^2\right)^3 \left(a + b \arcsin(cx)\right)^3 dx =$$

$$-\frac{39375\left(49\,a^3 - 6\,ab^2\right)c^7 d^3 x^7 - 6615\left(1225\,a^3 - 234\,ab^2\right)c^5 d^3 x^5 + 3675\left(3675\,a^3 - 1514\,ab^2\right)c^3 d^3 x^3 - 11}{}$$

input
```
integrate((-c^2*d*x^2+d)^3*(a+b*arcsin(c*x))^3,x, algorithm="fricas")
```

output

```
-1/13505625*(39375*(49*a^3 - 6*a*b^2)*c^7*d^3*x^7 - 6615*(1225*a^3 - 234*a
*b^2)*c^5*d^3*x^5 + 3675*(3675*a^3 - 1514*a*b^2)*c^3*d^3*x^3 - 11025*(1225
*a^3 - 4322*a*b^2)*c*d^3*x + 385875*(5*b^3*c^7*d^3*x^7 - 21*b^3*c^5*d^3*x^
5 + 35*b^3*c^3*d^3*x^3 - 35*b^3*c*d^3*x)*arcsin(c*x)^3 + 1157625*(5*a*b^2*
c^7*d^3*x^7 - 21*a*b^2*c^5*d^3*x^5 + 35*a*b^2*c^3*d^3*x^3 - 35*a*b^2*c*d^3
*x)*arcsin(c*x)^2 + 105*(1125*(49*a^2*b - 2*b^3)*c^7*d^3*x^7 - 189*(1225*a
^2*b - 78*b^3)*c^5*d^3*x^5 + 35*(11025*a^2*b - 1514*b^3)*c^3*d^3*x^3 - 105
*(3675*a^2*b - 4322*b^3)*c*d^3*x)*arcsin(c*x) + (16875*(49*a^2*b - 2*b^3)*
c^6*d^3*x^6 - 81*(47775*a^2*b - 3322*b^3)*c^4*d^3*x^4 + (8345925*a^2*b - 1
495874*b^3)*c^2*d^3*x^2 - (23825025*a^2*b - 44658302*b^3)*d^3 + 11025*(75*
b^3*c^6*d^3*x^6 - 351*b^3*c^4*d^3*x^4 + 757*b^3*c^2*d^3*x^2 - 2161*b^3*d^3
)*arcsin(c*x)^2 + 22050*(75*a*b^2*c^6*d^3*x^6 - 351*a*b^2*c^4*d^3*x^4 + 75
7*a*b^2*c^2*d^3*x^2 - 2161*a*b^2*d^3)*arcsin(c*x))*sqrt(-c^2*x^2 + 1))/c
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 972 vs. $2(422) = 844$.

Time = 1.51 (sec) , antiderivative size = 972, normalized size of antiderivative = 2.18

$$\int \left(d - c^2 dx^2\right)^3 \left(a + b \arcsin(cx)\right)^3 dx = \text{Too large to display}$$

input

```
integrate((-c**2*d*x**2+d)**3*(a+b*asin(c*x))**3,x)
```

output

```
Piecewise((-a**3*c**6*d**3*x**7/7 + 3*a**3*c**4*d**3*x**5/5 - a**3*c**2*d*
*3*x**3 + a**3*d**3*x - 3*a**2*b*c**6*d**3*x**7*asin(c*x)/7 - 3*a**2*b*c**
5*d**3*x**6*sqrt(-c**2*x**2 + 1)/49 + 9*a**2*b*c**4*d**3*x**5*asin(c*x)/5
+ 351*a**2*b*c**3*d**3*x**4*sqrt(-c**2*x**2 + 1)/1225 - 3*a**2*b*c**2*d**3
*x**3*asin(c*x) - 757*a**2*b*c*d**3*x**2*sqrt(-c**2*x**2 + 1)/1225 + 3*a**
2*b*d**3*x*asin(c*x) + 2161*a**2*b*d**3*sqrt(-c**2*x**2 + 1)/(1225*c) - 3*
a*b**2*c**6*d**3*x**7*asin(c*x)**2/7 + 6*a*b**2*c**6*d**3*x**7/343 - 6*a*b
**2*c**5*d**3*x**6*sqrt(-c**2*x**2 + 1)*asin(c*x)/49 + 9*a*b**2*c**4*d**3*
x**5*asin(c*x)**2/5 - 702*a*b**2*c**4*d**3*x**5/6125 + 702*a*b**2*c**3*d**
3*x**4*sqrt(-c**2*x**2 + 1)*asin(c*x)/1225 - 3*a*b**2*c**2*d**3*x**3*asin(
c*x)**2 + 1514*a*b**2*c**2*d**3*x**3/3675 - 1514*a*b**2*c*d**3*x**2*sqrt(-
c**2*x**2 + 1)*asin(c*x)/1225 + 3*a*b**2*d**3*x*asin(c*x)**2 - 4322*a*b**2
*d**3*x/1225 + 4322*a*b**2*d**3*sqrt(-c**2*x**2 + 1)*asin(c*x)/(1225*c) -
b**3*c**6*d**3*x**7*asin(c*x)**3/7 + 6*b**3*c**6*d**3*x**7*asin(c*x)/343 -
 3*b**3*c**5*d**3*x**6*sqrt(-c**2*x**2 + 1)*asin(c*x)**2/49 + 6*b**3*c**5*
d**3*x**6*sqrt(-c**2*x**2 + 1)/2401 + 3*b**3*c**4*d**3*x**5*asin(c*x)**3/5
 - 702*b**3*c**4*d**3*x**5*asin(c*x)/6125 + 351*b**3*c**3*d**3*x**4*sqrt(-
c**2*x**2 + 1)*asin(c*x)**2/1225 - 29898*b**3*c**3*d**3*x**4*sqrt(-c**2*x*
*2 + 1)/1500625 - b**3*c**2*d**3*x**3*asin(c*x)**3 + 1514*b**3*c**2*d**3*x
**3*asin(c*x)/3675 - 757*b**3*c*d**3*x**2*sqrt(-c**2*x**2 + 1)*asin(c*x...
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1386 vs. $2(395) = 790$.

Time $= 0.19$ (sec) , antiderivative size $= 1386$, normalized size of antiderivative $= 3.11$

$$\int \left(d - c^2 d x^2\right)^3 \left(a + b \arcsin(cx)\right)^3 dx = \text{Too large to display}$$

input

```
integrate((-c^2*d*x^2+d)^3*(a+b*arcsin(c*x))^3,x, algorithm="maxima")
```

output

```
-1/7*b^3*c^6*d^3*x^7*arcsin(c*x)^3 - 3/7*a*b^2*c^6*d^3*x^7*arcsin(c*x)^2 -
 1/7*a^3*c^6*d^3*x^7 + 3/5*b^3*c^4*d^3*x^5*arcsin(c*x)^3 + 9/5*a*b^2*c^4*d
^3*x^5*arcsin(c*x)^2 + 3/5*a^3*c^4*d^3*x^5 - b^3*c^2*d^3*x^3*arcsin(c*x)^3
 - 3/245*(35*x^7*arcsin(c*x) + (5*sqrt(-c^2*x^2 + 1)*x^6/c^2 + 6*sqrt(-c^2
*x^2 + 1)*x^4/c^4 + 8*sqrt(-c^2*x^2 + 1)*x^2/c^6 + 16*sqrt(-c^2*x^2 + 1)/c
^8)*c)*a^2*b*c^6*d^3 - 2/8575*(105*(5*sqrt(-c^2*x^2 + 1)*x^6/c^2 + 6*sqrt(
-c^2*x^2 + 1)*x^4/c^4 + 8*sqrt(-c^2*x^2 + 1)*x^2/c^6 + 16*sqrt(-c^2*x^2 +
1)/c^8)*c*arcsin(c*x) - (75*c^6*x^7 + 126*c^4*x^5 + 280*c^2*x^3 + 1680*x)/
c^6)*a*b^2*c^6*d^3 - 1/900375*(11025*(5*sqrt(-c^2*x^2 + 1)*x^6/c^2 + 6*sqr
t(-c^2*x^2 + 1)*x^4/c^4 + 8*sqrt(-c^2*x^2 + 1)*x^2/c^6 + 16*sqrt(-c^2*x^2
+ 1)/c^8)*c*arcsin(c*x)^2 - 2*c*((1125*sqrt(-c^2*x^2 + 1)*c^4*x^6 + 3996*s
qrt(-c^2*x^2 + 1)*c^2*x^4 + 15128*sqrt(-c^2*x^2 + 1)*x^2 + 206656*sqrt(-c^
2*x^2 + 1)/c^2)/c^6 + 105*(75*c^6*x^7 + 126*c^4*x^5 + 280*c^2*x^3 + 1680*x
)*arcsin(c*x)/c^7))*b^3*c^6*d^3 - 3*a*b^2*c^2*d^3*x^3*arcsin(c*x)^2 + 3/25
*(15*x^5*arcsin(c*x) + (3*sqrt(-c^2*x^2 + 1)*x^4/c^2 + 4*sqrt(-c^2*x^2 + 1
)*x^2/c^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c)*a^2*b*c^4*d^3 + 2/125*(15*(3*sqrt
(-c^2*x^2 + 1)*x^4/c^2 + 4*sqrt(-c^2*x^2 + 1)*x^2/c^4 + 8*sqrt(-c^2*x^2 +
1)/c^6)*c*arcsin(c*x) - (9*c^4*x^5 + 20*c^2*x^3 + 120*x)/c^4)*a*b^2*c^4*d^
3 + 1/1875*(225*(3*sqrt(-c^2*x^2 + 1)*x^4/c^2 + 4*sqrt(-c^2*x^2 + 1)*x^2/c
^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c*arcsin(c*x)^2 - 2*c*((27*sqrt(-c^2*x^2...
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 982 vs. $2(395) = 790$.

Time $= 0.20$ (sec) , antiderivative size $= 982$, normalized size of antiderivative $= 2.20$

$$\int \left(d - c^2 dx^2\right)^3 (a + b \arcsin(cx))^3 \, dx = \text{Too large to display}$$

input

```
integrate((-c^2*d*x^2+d)^3*(a+b*arcsin(c*x))^3,x, algorithm="giac")
```

output

```
-1/7*a^3*c^6*d^3*x^7 + 3/5*a^3*c^4*d^3*x^5 - 1/7*(c^2*x^2 - 1)^3*b^3*d^3*x
*arcsin(c*x)^3 - 3/7*(c^2*x^2 - 1)^3*a*b^2*d^3*x*arcsin(c*x)^2 + 6/35*(c^2
*x^2 - 1)^2*b^3*d^3*x*arcsin(c*x)^3 - a^3*c^2*d^3*x^3 - 3/7*(c^2*x^2 - 1)^
3*a^2*b*d^3*x*arcsin(c*x) + 6/343*(c^2*x^2 - 1)^3*b^3*d^3*x*arcsin(c*x) +
18/35*(c^2*x^2 - 1)^2*a*b^2*d^3*x*arcsin(c*x)^2 - 8/35*(c^2*x^2 - 1)*b^3*d
^3*x*arcsin(c*x)^3 - 3/49*(c^2*x^2 - 1)^3*sqrt(-c^2*x^2 + 1)*b^3*d^3*arcsi
n(c*x)^2/c + 6/343*(c^2*x^2 - 1)^3*a*b^2*d^3*x + 18/35*(c^2*x^2 - 1)^2*a^2
*b*d^3*x*arcsin(c*x) - 2664/42875*(c^2*x^2 - 1)^2*b^3*d^3*x*arcsin(c*x) -
24/35*(c^2*x^2 - 1)*a*b^2*d^3*x*arcsin(c*x)^2 + 16/35*b^3*d^3*x*arcsin(c*x
)^3 - 6/49*(c^2*x^2 - 1)^3*sqrt(-c^2*x^2 + 1)*a*b^2*d^3*arcsin(c*x)/c + 18
/175*(c^2*x^2 - 1)^2*sqrt(-c^2*x^2 + 1)*b^3*d^3*arcsin(c*x)^2/c - 2664/428
75*(c^2*x^2 - 1)^2*a*b^2*d^3*x - 24/35*(c^2*x^2 - 1)*a^2*b*d^3*x*arcsin(c*
x) + 30256/128625*(c^2*x^2 - 1)*b^3*d^3*x*arcsin(c*x) + 48/35*a*b^2*d^3*x*
arcsin(c*x)^2 - 3/49*(c^2*x^2 - 1)^3*sqrt(-c^2*x^2 + 1)*a^2*b*d^3/c + 6/24
01*(c^2*x^2 - 1)^3*sqrt(-c^2*x^2 + 1)*b^3*d^3/c + 36/175*(c^2*x^2 - 1)^2*s
qrt(-c^2*x^2 + 1)*a*b^2*d^3*arcsin(c*x)/c + 8/35*(-c^2*x^2 + 1)^(3/2)*b^3*
d^3*arcsin(c*x)^2/c + 30256/128625*(c^2*x^2 - 1)*a*b^2*d^3*x + 48/35*a^2*b
*d^3*x*arcsin(c*x) - 413312/128625*b^3*d^3*x*arcsin(c*x) + 18/175*(c^2*x^2
 - 1)^2*sqrt(-c^2*x^2 + 1)*a^2*b*d^3/c - 2664/214375*(c^2*x^2 - 1)^2*sqrt(
-c^2*x^2 + 1)*b^3*d^3/c + 16/35*(-c^2*x^2 + 1)^(3/2)*a*b^2*d^3*arcsin(c...
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 d x^2\right)^3 \left(a + b \arcsin(c x)\right)^3 dx = \int \left(a + b \operatorname{asin}(c x)\right)^3 \left(d - c^2\, d\, x^2\right)^3 dx$$

input

```
int((a + b*asin(c*x))^3*(d - c^2*d*x^2)^3,x)
```

output

```
int((a + b*asin(c*x))^3*(d - c^2*d*x^2)^3, x)
```

Reduce [F]

$$\int \left(d - c^2 dx^2\right)^3 (a + b \arcsin(cx))^3 \, dx$$

$$= \frac{d^3\left(1225 asin(cx)^3 b^3 cx + 1225 a^3 cx + 7350\sqrt{-c^2x^2+1}\, asin(cx)\, a\, b^2 - 7350 asin(cx)\, b^3 cx - 7350 a\, b^2 cx - \right.$$

input
```
int((-c^2*d*x^2+d)^3*(a+b*asin(c*x))^3,x)
```

output
```
(d**3*(1225*asin(c*x)**3*b**3*c*x + 3675*sqrt( - c**2*x**2 + 1)*asin(c*x)*
*2*b**3 + 3675*asin(c*x)**2*a*b**2*c*x + 7350*sqrt( - c**2*x**2 + 1)*asin(
c*x)*a*b**2 - 525*asin(c*x)*a**2*b*c**7*x**7 + 2205*asin(c*x)*a**2*b*c**5*
x**5 - 3675*asin(c*x)*a**2*b*c**3*x**3 + 3675*asin(c*x)*a**2*b*c*x - 7350*
asin(c*x)*b**3*c*x - 75*sqrt( - c**2*x**2 + 1)*a**2*b*c**6*x**6 + 351*sqrt
( - c**2*x**2 + 1)*a**2*b*c**4*x**4 - 757*sqrt( - c**2*x**2 + 1)*a**2*b*c*
*2*x**2 + 2161*sqrt( - c**2*x**2 + 1)*a**2*b - 7350*sqrt( - c**2*x**2 + 1)
*b**3 - 1225*int(asin(c*x)**3*x**6,x)*b**3*c**7 + 3675*int(asin(c*x)**3*x*
*4,x)*b**3*c**5 - 3675*int(asin(c*x)**3*x**2,x)*b**3*c**3 - 3675*int(asin(
c*x)**2*x**6,x)*a*b**2*c**7 + 11025*int(asin(c*x)**2*x**4,x)*a*b**2*c**5 -
 11025*int(asin(c*x)**2*x**2,x)*a*b**2*c**3 - 175*a**3*c**7*x**7 + 735*a**
3*c**5*x**5 - 1225*a**3*c**3*x**3 + 1225*a**3*c*x - 7350*a*b**2*c*x))/(122
5*c)
```

3.13 $\int (d - c^2 dx^2)^2 (a + b \arcsin(cx))^3 \, dx$

Optimal result . . . 205
Mathematica [A] (verified) . . . 206
Rubi [A] (verified) . . . 206
Maple [A] (verified) . . . 211
Fricas [A] (verification not implemented) . . . 212
Sympy [B] (verification not implemented) . . . 213
Maxima [B] (verification not implemented) . . . 214
Giac [B] (verification not implemented) . . . 215
Mupad [F(-1)] . . . 216
Reduce [F] . . . 216

Optimal result

Integrand size = 24, antiderivative size = 330

$$\int (d - c^2 dx^2)^2 (a + b \arcsin(cx))^3 \, dx = -\frac{4144 b^3 d^2 \sqrt{1 - c^2 x^2}}{1125 c} - \frac{272 b^3 d^2 (1 - c^2 x^2)^{3/2}}{3375 c}$$
$$- \frac{6 b^3 d^2 (1 - c^2 x^2)^{5/2}}{625 c} - \frac{298}{75} b^2 d^2 x (a + b \arcsin(cx)) + \frac{76}{225} b^2 c^2 d^2 x^3 (a + b \arcsin(cx))$$
$$- \frac{6}{125} b^2 c^4 d^2 x^5 (a + b \arcsin(cx)) + \frac{8 b d^2 \sqrt{1 - c^2 x^2} (a + b \arcsin(cx))^2}{5 c}$$
$$+ \frac{4 b d^2 (1 - c^2 x^2)^{3/2} (a + b \arcsin(cx))^2}{15 c} + \frac{3 b d^2 (1 - c^2 x^2)^{5/2} (a + b \arcsin(cx))^2}{25 c}$$
$$+ \frac{8}{15} d^2 x (a + b \arcsin(cx))^3 + \frac{4}{15} d^2 x (1 - c^2 x^2) (a + b \arcsin(cx))^3 + \frac{1}{5} d^2 x (1 - c^2 x^2)^2 (a + b \arcsin(cx))^3$$

output

```
-4144/1125*b^3*d^2*(-c^2*x^2+1)^(1/2)/c-272/3375*b^3*d^2*(-c^2*x^2+1)^(3/2
)/c-6/625*b^3*d^2*(-c^2*x^2+1)^(5/2)/c-298/75*b^2*d^2*x*(a+b*arcsin(c*x))+
76/225*b^2*c^2*d^2*x^3*(a+b*arcsin(c*x))-6/125*b^2*c^4*d^2*x^5*(a+b*arcsin
(c*x))+8/5*b*d^2*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))^2/c+4/15*b*d^2*(-c^2
*x^2+1)^(3/2)*(a+b*arcsin(c*x))^2/c+3/25*b*d^2*(-c^2*x^2+1)^(5/2)*(a+b*arc
sin(c*x))^2/c+8/15*d^2*x*(a+b*arcsin(c*x))^3+4/15*d^2*x*(-c^2*x^2+1)*(a+b*
arcsin(c*x))^3+1/5*d^2*x*(-c^2*x^2+1)^2*(a+b*arcsin(c*x))^3
```

Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 331, normalized size of antiderivative = 1.00

$$\int \left(d - c^2 d x^2\right)^2 (a + b \arcsin(cx))^3 \, dx$$
$$= \frac{d^2\left(1125a^3cx(15 - 10c^2x^2 + 3c^4x^4) + 225a^2b\sqrt{1 - c^2x^2}(149 - 38c^2x^2 + 9c^4x^4) - 30ab^2cx(2235 - 190c^2$$

input
```
Integrate[(d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])^3,x]
```

output
```
(d^2*(1125*a^3*c*x*(15 - 10*c^2*x^2 + 3*c^4*x^4) + 225*a^2*b*Sqrt[1 - c^2*
x^2]*(149 - 38*c^2*x^2 + 9*c^4*x^4) - 30*a*b^2*c*x*(2235 - 190*c^2*x^2 + 2
7*c^4*x^4) - 2*b^3*Sqrt[1 - c^2*x^2]*(31841 - 842*c^2*x^2 + 81*c^4*x^4) +
15*b*(225*a^2*c*x*(15 - 10*c^2*x^2 + 3*c^4*x^4) + 30*a*b*Sqrt[1 - c^2*x^2]
*(149 - 38*c^2*x^2 + 9*c^4*x^4) - 2*b^2*c*x*(2235 - 190*c^2*x^2 + 27*c^4*x
^4))*ArcSin[c*x] + 225*b^2*(15*a*c*x*(15 - 10*c^2*x^2 + 3*c^4*x^4) + b*Sqr
t[1 - c^2*x^2]*(149 - 38*c^2*x^2 + 9*c^4*x^4))*ArcSin[c*x]^2 + 1125*b^3*c*
x*(15 - 10*c^2*x^2 + 3*c^4*x^4)*ArcSin[c*x]^3))/(16875*c)
```

Rubi [A] (verified)

Time = 1.68 (sec) , antiderivative size = 435, normalized size of antiderivative = 1.32, number of steps used = 14, number of rules used = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.542$, Rules used = {5158, 27, 5158, 5130, 5182, 2009, 5154, 27, 353, 53, 1576, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d - c^2 d x^2\right)^2 (a + b \arcsin(cx))^3 \, dx$$
$$\downarrow 5158$$
$$-\frac{3}{5}bcd^2 \int x\left(1 - c^2x^2\right)^{3/2} (a + b \arcsin(cx))^2 dx + \frac{4}{5}d \int d\left(1 - c^2x^2\right) (a + b \arcsin(cx))^3 dx + \frac{1}{5}d^2 x\left(1 - c^2x^2\right)^2 (a + b \arcsin(cx))^3$$
$$\downarrow 27$$

$$-\frac{3}{5}bcd^2\int x\left(1-c^2x^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2dx+\frac{4}{5}d^2\int\left(1-c^2x^2\right)\left(a+b\arcsin(cx)\right)^3dx+$$
$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\left(a+b\arcsin(cx)\right)^3$$

$$\downarrow 5158$$

$$-\frac{3}{5}bcd^2\int x\left(1-c^2x^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2dx+$$
$$\frac{4}{5}d^2\left(-bc\int x\sqrt{1-c^2x^2}\left(a+b\arcsin(cx)\right)^2dx+\frac{2}{3}\int\left(a+b\arcsin(cx)\right)^3dx+\frac{1}{3}x\left(1-c^2x^2\right)\left(a+b\arcsin(cx)\right)^3\right)+$$
$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\left(a+b\arcsin(cx)\right)^3$$

$$\downarrow 5130$$

$$\frac{4}{5}d^2\left(\frac{2}{3}\left(x\left(a+b\arcsin(cx)\right)^3-3bc\int\frac{x\left(a+b\arcsin(cx)\right)^2}{\sqrt{1-c^2x^2}}dx\right)-bc\int x\sqrt{1-c^2x^2}\left(a+b\arcsin(cx)\right)^2dx+\frac{1}{3}x\left(1\right.\right.$$
$$\frac{3}{5}bcd^2\int x\left(1-c^2x^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2dx+\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\left(a+b\arcsin(cx)\right)^3$$

$$\downarrow 5182$$

$$\frac{4}{5}d^2\left(\frac{2}{3}\left(x\left(a+b\arcsin(cx)\right)^3-3bc\left(\frac{2b\int\left(a+b\arcsin(cx)\right)dx}{c}-\frac{\sqrt{1-c^2x^2}\left(a+b\arcsin(cx)\right)^2}{c^2}\right)\right)-bc\left(\frac{2b\int\left(1\right.\right.\right.$$
$$\frac{3}{5}bcd^2\left(\frac{2b\int\left(1-c^2x^2\right)^2\left(a+b\arcsin(cx)\right)dx}{5c}-\frac{\left(1-c^2x^2\right)^{5/2}\left(a+b\arcsin(cx)\right)^2}{5c^2}\right)+$$
$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\left(a+b\arcsin(cx)\right)^3$$

$$\downarrow 2009$$

$$\frac{4}{5}d^2\left(-bc\left(\frac{2b\int\left(1-c^2x^2\right)\left(a+b\arcsin(cx)\right)dx}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2}{3c^2}\right)+\frac{1}{3}x\left(1-c^2x^2\right)\left(a+b\arc\right.\right.$$
$$\frac{3}{5}bcd^2\left(\frac{2b\int\left(1-c^2x^2\right)^2\left(a+b\arcsin(cx)\right)dx}{5c}-\frac{\left(1-c^2x^2\right)^{5/2}\left(a+b\arcsin(cx)\right)^2}{5c^2}\right)+$$
$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\left(a+b\arcsin(cx)\right)^3$$

$$\downarrow 5154$$

$$\frac{4}{5}d^2\left(-bc\left(\frac{2b\left(-bc\int\frac{x\left(3-c^2x^2\right)}{3\sqrt{1-c^2x^2}}dx-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin\right.\right.$$

$$\frac{3}{5}bcd^2\left(\frac{2b\left(-bc\int\frac{x\left(3c^4x^4-10c^2x^2+15\right)}{15\sqrt{1-c^2x^2}}dx+\frac{1}{5}c^4x^5(a+b\arcsin(cx))-\frac{2}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx)\right.\right.\right.$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3$$

$$\downarrow 27$$

$$\frac{4}{5}d^2\left(-bc\left(\frac{2b\left(-\frac{1}{3}bc\int\frac{x\left(3-c^2x^2\right)}{\sqrt{1-c^2x^2}}dx-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcs\right.\right.$$

$$\frac{3}{5}bcd^2\left(\frac{2b\left(-\frac{1}{15}bc\int\frac{x\left(3c^4x^4-10c^2x^2+15\right)}{\sqrt{1-c^2x^2}}dx+\frac{1}{5}c^4x^5(a+b\arcsin(cx))-\frac{2}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(c\right.\right.\right.$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3$$

$$\downarrow 353$$

$$\frac{4}{5}d^2\left(-bc\left(\frac{2b\left(-\frac{1}{6}bc\int\frac{3-c^2x^2}{\sqrt{1-c^2x^2}}dx^2-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcs\right.\right.$$

$$\frac{3}{5}bcd^2\left(\frac{2b\left(-\frac{1}{15}bc\int\frac{x\left(3c^4x^4-10c^2x^2+15\right)}{\sqrt{1-c^2x^2}}dx+\frac{1}{5}c^4x^5(a+b\arcsin(cx))-\frac{2}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(c\right.\right.\right.$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3$$

$$\downarrow 53$$

$$\frac{4}{5}d^2\left(-bc\left(\frac{2b\left(-\frac{1}{6}bc\int\left(\sqrt{1-c^2x^2}+\frac{2}{\sqrt{1-c^2x^2}}\right)dx^2-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{(1-c^2\right.\right.$$

$$\frac{3}{5}bcd^2\left(\frac{2b\left(-\frac{1}{15}bc\int\frac{x\left(3c^4x^4-10c^2x^2+15\right)}{\sqrt{1-c^2x^2}}dx+\frac{1}{5}c^4x^5(a+b\arcsin(cx))-\frac{2}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(c\right.\right.\right.$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3$$

$$\downarrow 1576$$

$$\frac{4}{5}d^2\left(-bc\left(\frac{2b\left(-\frac{1}{6}bc\int\left(\sqrt{1-c^2x^2}+\frac{2}{\sqrt{1-c^2x^2}}\right)dx^2-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{(1-c^2x^2)^2}{3c}\right)\right.$$

$$\left.\frac{3}{5}bcd^2\left(\frac{2b\left(-\frac{1}{30}bc\int\frac{3c^4x^4-10c^2x^2+15}{\sqrt{1-c^2x^2}}dx^2+\frac{1}{5}c^4x^5(a+b\arcsin(cx))-\frac{2}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx)\right.\right.\right.$$

$$\left.\left.\left.\frac{}{5c}\right.\right.\right.$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3$$

$$\downarrow 1140$$

$$\frac{4}{5}d^2\left(-bc\left(\frac{2b\left(-\frac{1}{6}bc\int\left(\sqrt{1-c^2x^2}+\frac{2}{\sqrt{1-c^2x^2}}\right)dx^2-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{(1-c^2x^2)^2}{3c}\right)\right.$$

$$\left.\frac{3}{5}bcd^2\left(\frac{2b\left(-\frac{1}{30}bc\int\left(3\left(1-c^2x^2\right)^{3/2}+4\sqrt{1-c^2x^2}+\frac{8}{\sqrt{1-c^2x^2}}\right)dx^2+\frac{1}{5}c^4x^5(a+b\arcsin(cx))-\frac{2}{3}c^2x^3(a+b\arcsin(cx)\right.\right.\right.$$

$$\left.\left.\left.\frac{}{5c}\right.\right.\right.$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3$$

$$\downarrow 2009$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^3+$$

$$\frac{4}{5}d^2\left(\frac{1}{3}x\left(1-c^2x^2\right)(a+b\arcsin(cx))^3+\frac{2}{3}\left(x(a+b\arcsin(cx))^3-3bc\left(\frac{2b\left(ax+bx\arcsin(cx)+\frac{b\sqrt{1-c^2x^2}}{c}\right)}{c}-\right.\right.\right.$$

$$\left.\left.\left.\frac{3}{5}bcd^2\left(\frac{2b\left(\frac{1}{5}c^4x^5(a+b\arcsin(cx))-\frac{2}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))-\frac{1}{30}bc\left(-\frac{6\left(1-c^2x^2\right)^{5/2}}{5c^2}-\right.\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\left.\frac{}{5c}\right.\right.\right.\right.\right.$$

input
```
Int[(d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])^3,x]
```

output
```
(d^2*x*(1 - c^2*x^2)^2*(a + b*ArcSin[c*x])^3)/5 - (3*b*c*d^2*(-1/5*((1 - c
^2*x^2)^(5/2)*(a + b*ArcSin[c*x])^2)/c^2 + (2*b*(-1/30*(b*c*((-16*Sqrt[1 -
 c^2*x^2])/c^2 - (8*(1 - c^2*x^2)^(3/2))/(3*c^2) - (6*(1 - c^2*x^2)^(5/2))
/(5*c^2))) + x*(a + b*ArcSin[c*x]) - (2*c^2*x^3*(a + b*ArcSin[c*x]))/3 + (
c^4*x^5*(a + b*ArcSin[c*x]))/5))/(5*c)))/5 + (4*d^2*((x*(1 - c^2*x^2)*(a +
 b*ArcSin[c*x])^3)/3 - b*c*(-1/3*((1 - c^2*x^2)^(3/2)*(a + b*ArcSin[c*x])^
2)/c^2 + (2*b*(-1/6*(b*c*((-4*Sqrt[1 - c^2*x^2])/c^2 - (2*(1 - c^2*x^2)^(3
/2))/(3*c^2))) + x*(a + b*ArcSin[c*x]) - (c^2*x^3*(a + b*ArcSin[c*x]))/3))
/(3*c)) + (2*(x*(a + b*ArcSin[c*x])^3 - 3*b*c*(-((Sqrt[1 - c^2*x^2]*(a + b
*ArcSin[c*x])^2)/c^2) + (2*b*(a*x + (b*Sqrt[1 - c^2*x^2])/c + b*x*ArcSin[c
*x]))/c)))/3))/5
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 53
```
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] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && LeQ[7*m + 4*n + 4, 0])
|| LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

rule 353
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_Symbol]
 :> Simp[1/2   Subst[Int[(a + b*x)^p*(c + d*x)^q, x], x, x^2], x] /; FreeQ[
{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 1576
```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Simp[1/2   Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x]
, x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5154
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])   u, x
] - Simp[b*c   Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5182
```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 508, normalized size of antiderivative = 1.54

method	result
derivativedivides	$\frac{d^2a^3\left(\frac{1}{5}c^5x^5-\frac{2}{3}c^3x^3+cx\right)+d^2b^3\left(\frac{\arcsin(cx)^3\left(3c^4x^4-10c^2x^2+15\right)cx}{15}+\frac{3\arcsin(cx)^2\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}}{25}-\frac{2\arcsin(cx)\left(3c^4\right.}{}$
default	$\frac{d^2a^3\left(\frac{1}{5}c^5x^5-\frac{2}{3}c^3x^3+cx\right)+d^2b^3\left(\frac{\arcsin(cx)^3\left(3c^4x^4-10c^2x^2+15\right)cx}{15}+\frac{3\arcsin(cx)^2\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}}{25}-\frac{2\arcsin(cx)\left(3c^4\right.}{}$
parts	$d^2a^3\left(\frac{1}{5}c^4x^5-\frac{2}{3}c^2x^3+x\right)+\frac{d^2b^3\left(\frac{\arcsin(cx)^3\left(3c^4x^4-10c^2x^2+15\right)cx}{15}+\frac{3\arcsin(cx)^2\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}}{25}-\frac{2\arc}{}$
orering	$\frac{x\left(29889c^6x^6-179507c^4x^4+2768347c^2x^2+1732471\right)\left(-c^2dx^2+d\right)^2(a+b\arcsin(cx))^3}{50625\left(c^2x^2-1\right)^3}-\frac{\left(7857c^6x^6-60788c^4x^4+144\right.}{}$

input
```
int((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^3,x,method=_RETURNVERBOSE)
```

output
```
1/c*(d^2*a^3*(1/5*c^5*x^5-2/3*c^3*x^3+c*x)+d^2*b^3*(1/15*arcsin(c*x)^3*(3*
c^4*x^4-10*c^2*x^2+15)*c*x+3/25*arcsin(c*x)^2*(c^2*x^2-1)^2*(-c^2*x^2+1)^(
1/2)-2/125*arcsin(c*x)*(3*c^4*x^4-10*c^2*x^2+15)*c*x-6/625*(c^2*x^2-1)^2*(
-c^2*x^2+1)^(1/2)+272/3375*(c^2*x^2-1)*(-c^2*x^2+1)^(1/2)-4144/1125*(-c^2*
x^2+1)^(1/2)-4/15*arcsin(c*x)^2*(c^2*x^2-1)*(-c^2*x^2+1)^(1/2)+8/45*arcsin
(c*x)*(c^2*x^2-3)*c*x+8/5*arcsin(c*x)^2*(-c^2*x^2+1)^(1/2)-16/5*c*x*arcsin
(c*x))+3*d^2*a*b^2*(1/15*arcsin(c*x)^2*(3*c^4*x^4-10*c^2*x^2+15)*c*x+2/25*
arcsin(c*x)*(c^2*x^2-1)^2*(-c^2*x^2+1)^(1/2)-2/375*(3*c^4*x^4-10*c^2*x^2+1
5)*c*x-8/45*arcsin(c*x)*(c^2*x^2-1)*(-c^2*x^2+1)^(1/2)+8/135*(c^2*x^2-3)*c
*x-16/15*c*x+16/15*arcsin(c*x)*(-c^2*x^2+1)^(1/2))+3*d^2*a^2*b*(1/5*c^5*x^
5*arcsin(c*x)-2/3*c^3*x^3*arcsin(c*x)+c*x*arcsin(c*x)+149/225*(-c^2*x^2+1)
^(1/2)-38/225*c^2*x^2*(-c^2*x^2+1)^(1/2)+1/25*c^4*x^4*(-c^2*x^2+1)^(1/2)))
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 407, normalized size of antiderivative = 1.23

$$\int \left(d-c^2dx^2\right)^2(a+b\arcsin(cx))^3\,dx$$
$$=\frac{135\left(25\,a^3-6\,ab^2\right)c^5d^2x^5-150\left(75\,a^3-38\,ab^2\right)c^3d^2x^3+225\left(75\,a^3-298\,ab^2\right)cd^2x+1125\left(3\,b^3c^5d^2x^5-\right.}{}$$

input
```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^3,x, algorithm="fricas")
```

output

```
1/16875*(135*(25*a^3 - 6*a*b^2)*c^5*d^2*x^5 - 150*(75*a^3 - 38*a*b^2)*c^3*
d^2*x^3 + 225*(75*a^3 - 298*a*b^2)*c*d^2*x + 1125*(3*b^3*c^5*d^2*x^5 - 10*
b^3*c^3*d^2*x^3 + 15*b^3*c*d^2*x)*arcsin(c*x)^3 + 3375*(3*a*b^2*c^5*d^2*x^
5 - 10*a*b^2*c^3*d^2*x^3 + 15*a*b^2*c*d^2*x)*arcsin(c*x)^2 + 15*(27*(25*a^
2*b - 2*b^3)*c^5*d^2*x^5 - 10*(225*a^2*b - 38*b^3)*c^3*d^2*x^3 + 15*(225*a
^2*b - 298*b^3)*c*d^2*x)*arcsin(c*x) + (81*(25*a^2*b - 2*b^3)*c^4*d^2*x^4
- 2*(4275*a^2*b - 842*b^3)*c^2*d^2*x^2 + (33525*a^2*b - 63682*b^3)*d^2 + 2
25*(9*b^3*c^4*d^2*x^4 - 38*b^3*c^2*d^2*x^2 + 149*b^3*d^2)*arcsin(c*x)^2 +
450*(9*a*b^2*c^4*d^2*x^4 - 38*a*b^2*c^2*d^2*x^2 + 149*a*b^2*d^2)*arcsin(c*
x))*sqrt(-c^2*x^2 + 1))/c
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 717 vs. $2(311) = 622$.

Time = 0.84 (sec) , antiderivative size = 717, normalized size of antiderivative = 2.17

$$\int \left(d - c^2 dx^2\right)^2 \left(a + b \arcsin(cx)\right)^3 dx = \text{Too large to display}$$

input

```
integrate((-c**2*d*x**2+d)**2*(a+b*asin(c*x))**3,x)
```

output

```
Piecewise((a**3*c**4*d**2*x**5/5 - 2*a**3*c**2*d**2*x**3/3 + a**3*d**2*x +
 3*a**2*b*c**4*d**2*x**5*asin(c*x)/5 + 3*a**2*b*c**3*d**2*x**4*sqrt(-c**2*
x**2 + 1)/25 - 2*a**2*b*c**2*d**2*x**3*asin(c*x) - 38*a**2*b*c*d**2*x**2*s
qrt(-c**2*x**2 + 1)/75 + 3*a**2*b*d**2*x*asin(c*x) + 149*a**2*b*d**2*sqrt(
-c**2*x**2 + 1)/(75*c) + 3*a*b**2*c**4*d**2*x**5*asin(c*x)**2/5 - 6*a*b**2
*c**4*d**2*x**5/125 + 6*a*b**2*c**3*d**2*x**4*sqrt(-c**2*x**2 + 1)*asin(c*
x)/25 - 2*a*b**2*c**2*d**2*x**3*asin(c*x)**2 + 76*a*b**2*c**2*d**2*x**3/22
5 - 76*a*b**2*c*d**2*x**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/75 + 3*a*b**2*d**
2*x*asin(c*x)**2 - 298*a*b**2*d**2*x/75 + 298*a*b**2*d**2*sqrt(-c**2*x**2
+ 1)*asin(c*x)/(75*c) + b**3*c**4*d**2*x**5*asin(c*x)**3/5 - 6*b**3*c**4*d
**2*x**5*asin(c*x)/125 + 3*b**3*c**3*d**2*x**4*sqrt(-c**2*x**2 + 1)*asin(c
*x)**2/25 - 6*b**3*c**3*d**2*x**4*sqrt(-c**2*x**2 + 1)/625 - 2*b**3*c**2*d
**2*x**3*asin(c*x)**3/3 + 76*b**3*c**2*d**2*x**3*asin(c*x)/225 - 38*b**3*c
*d**2*x**2*sqrt(-c**2*x**2 + 1)*asin(c*x)**2/75 + 1684*b**3*c*d**2*x**2*sq
rt(-c**2*x**2 + 1)/16875 + b**3*d**2*x*asin(c*x)**3 - 298*b**3*d**2*x*asin
(c*x)/75 + 149*b**3*d**2*sqrt(-c**2*x**2 + 1)*asin(c*x)**2/(75*c) - 63682*
b**3*d**2*sqrt(-c**2*x**2 + 1)/(16875*c), Ne(c, 0)), (a**3*d**2*x, True))
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 879 vs. $2(292) = 584$.

Time $= 0.16$ (sec) , antiderivative size $= 879$, normalized size of antiderivative $= 2.66$

$$\int \left(d - c^2 dx^2\right)^2 (a + b \arcsin(cx))^3 \, dx = \text{Too large to display}$$

input

```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^3,x, algorithm="maxima")
```

output

```
1/5*b^3*c^4*d^2*x^5*arcsin(c*x)^3 + 3/5*a*b^2*c^4*d^2*x^5*arcsin(c*x)^2 +
1/5*a^3*c^4*d^2*x^5 - 2/3*b^3*c^2*d^2*x^3*arcsin(c*x)^3 - 2*a*b^2*c^2*d^2*
x^3*arcsin(c*x)^2 + 1/25*(15*x^5*arcsin(c*x) + (3*sqrt(-c^2*x^2 + 1)*x^4/c
^2 + 4*sqrt(-c^2*x^2 + 1)*x^2/c^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c)*a^2*b*c^4
*d^2 + 2/375*(15*(3*sqrt(-c^2*x^2 + 1)*x^4/c^2 + 4*sqrt(-c^2*x^2 + 1)*x^2/
c^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c*arcsin(c*x) - (9*c^4*x^5 + 20*c^2*x^3 +
120*x)/c^4)*a*b^2*c^4*d^2 + 1/5625*(225*(3*sqrt(-c^2*x^2 + 1)*x^4/c^2 + 4*
sqrt(-c^2*x^2 + 1)*x^2/c^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c*arcsin(c*x)^2 - 2
*c*((27*sqrt(-c^2*x^2 + 1)*c^2*x^4 + 136*sqrt(-c^2*x^2 + 1)*x^2 + 2072*sqr
t(-c^2*x^2 + 1)/c^2)/c^4 + 15*(9*c^4*x^5 + 20*c^2*x^3 + 120*x)*arcsin(c*x)
/c^5))*b^3*c^4*d^2 - 2/3*a^3*c^2*d^2*x^3 + b^3*d^2*x*arcsin(c*x)^3 - 2/3*(
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*c^2*d^2 - 4/9*(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*c^2*d^2 - 2/27*(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*c^2*d^2 + 3*a*b^2*d^2*x*arcsin(c*x)^2 + 3*(sqrt
(-c^2*x^2 + 1)*arcsin(c*x)^2/c - 2*(c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))/
c)*b^3*d^2 - 6*a*b^2*d^2*(x - sqrt(-c^2*x^2 + 1)*arcsin(c*x)/c) + a^3*d^2*
x + 3*(c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))*a^2*b*d^2/c
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 697 vs. $2(292) = 584$.

Time $= 0.19$ (sec) , antiderivative size $= 697$, normalized size of antiderivative $= 2.11$

$$\int \left(d - c^2 dx^2\right)^2 (a + b \arcsin(cx))^3 \, dx = \text{Too large to display}$$

input

```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^3,x, algorithm="giac")
```

output

```
1/5*a^3*c^4*d^2*x^5 + 1/5*(c^2*x^2 - 1)^2*b^3*d^2*x*arcsin(c*x)^3 - 2/3*a^
3*c^2*d^2*x^3 + 3/5*(c^2*x^2 - 1)^2*a*b^2*d^2*x*arcsin(c*x)^2 - 4/15*(c^2*
x^2 - 1)*b^3*d^2*x*arcsin(c*x)^3 + 3/5*(c^2*x^2 - 1)^2*a^2*b*d^2*x*arcsin(
c*x) - 6/125*(c^2*x^2 - 1)^2*b^3*d^2*x*arcsin(c*x) - 4/5*(c^2*x^2 - 1)*a*b
^2*d^2*x*arcsin(c*x)^2 + 8/15*b^3*d^2*x*arcsin(c*x)^3 + 3/25*(c^2*x^2 - 1)
^2*sqrt(-c^2*x^2 + 1)*b^3*d^2*arcsin(c*x)^2/c - 6/125*(c^2*x^2 - 1)^2*a*b^
2*d^2*x - 4/5*(c^2*x^2 - 1)*a^2*b*d^2*x*arcsin(c*x) + 272/1125*(c^2*x^2 -
1)*b^3*d^2*x*arcsin(c*x) + 8/5*a*b^2*d^2*x*arcsin(c*x)^2 + 6/25*(c^2*x^2 -
 1)^2*sqrt(-c^2*x^2 + 1)*a*b^2*d^2*arcsin(c*x)/c + 4/15*(-c^2*x^2 + 1)^(3/
2)*b^3*d^2*arcsin(c*x)^2/c + 272/1125*(c^2*x^2 - 1)*a*b^2*d^2*x + 8/5*a^2*
b*d^2*x*arcsin(c*x) - 4144/1125*b^3*d^2*x*arcsin(c*x) + 3/25*(c^2*x^2 - 1)
^2*sqrt(-c^2*x^2 + 1)*a^2*b*d^2/c - 6/625*(c^2*x^2 - 1)^2*sqrt(-c^2*x^2 +
1)*b^3*d^2/c + 8/15*(-c^2*x^2 + 1)^(3/2)*a*b^2*d^2*arcsin(c*x)/c + 8/5*sqr
t(-c^2*x^2 + 1)*b^3*d^2*arcsin(c*x)^2/c + a^3*d^2*x - 4144/1125*a*b^2*d^2*
x + 4/15*(-c^2*x^2 + 1)^(3/2)*a^2*b*d^2/c - 272/3375*(-c^2*x^2 + 1)^(3/2)*
b^3*d^2/c + 16/5*sqrt(-c^2*x^2 + 1)*a*b^2*d^2*arcsin(c*x)/c + 8/5*sqrt(-c^
2*x^2 + 1)*a^2*b*d^2/c - 4144/1125*sqrt(-c^2*x^2 + 1)*b^3*d^2/c
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right)^2 \left(a + b \arcsin(cx)\right)^3 dx = \int \left(a + b \operatorname{asin}(c\,x)\right)^3 \left(d - c^2\, d\, x^2\right)^2 dx$$

input

```
int((a + b*asin(c*x))^3*(d - c^2*d*x^2)^2,x)
```

output

```
int((a + b*asin(c*x))^3*(d - c^2*d*x^2)^2, x)
```

Reduce [F]

$$\int \left(d - c^2 dx^2\right)^2 \left(a + b \arcsin(cx)\right)^3 dx$$

$$= \frac{d^2\left(75 asin(cx)^3 b^3 cx + 225\sqrt{-c^2x^2+1}\, asin(cx)^2 b^3 + 225 asin(cx)^2 a\, b^2 cx + 450\sqrt{-c^2x^2+1}\, asin(cx)\, a\, b\right.}{}$$

input
```
int((-c^2*d*x^2+d)^2*(a+b*asin(c*x))^3,x)
```

output
```
(d**2*(75*asin(c*x)**3*b**3*c*x + 225*sqrt( - c**2*x**2 + 1)*asin(c*x)**2*
b**3 + 225*asin(c*x)**2*a*b**2*c*x + 450*sqrt( - c**2*x**2 + 1)*asin(c*x)*
a*b**2 + 45*asin(c*x)*a**2*b*c**5*x**5 - 150*asin(c*x)*a**2*b*c**3*x**3 +
225*asin(c*x)*a**2*b*c*x - 450*asin(c*x)*b**3*c*x + 9*sqrt( - c**2*x**2 +
1)*a**2*b*c**4*x**4 - 38*sqrt( - c**2*x**2 + 1)*a**2*b*c**2*x**2 + 149*sqr
t( - c**2*x**2 + 1)*a**2*b - 450*sqrt( - c**2*x**2 + 1)*b**3 + 75*int(asin
(c*x)**3*x**4,x)*b**3*c**5 - 150*int(asin(c*x)**3*x**2,x)*b**3*c**3 + 225*
int(asin(c*x)**2*x**4,x)*a*b**2*c**5 - 450*int(asin(c*x)**2*x**2,x)*a*b**2
*c**3 + 15*a**3*c**5*x**5 - 50*a**3*c**3*x**3 + 75*a**3*c*x - 450*a*b**2*c
*x))/(75*c)
```

3.14 $\int (d - c^2 dx^2) (a + b \arcsin(cx))^3 \, dx$

Optimal result . . . 218
Mathematica [A] (verified) . . . 219
Rubi [A] (verified) . . . 219
Maple [A] (verified) . . . 223
Fricas [A] (verification not implemented) . . . 224
Sympy [B] (verification not implemented) . . . 224
Maxima [B] (verification not implemented) . . . 225
Giac [B] (verification not implemented) . . . 226
Mupad [F(-1)] . . . 228
Reduce [F] . . . 228

Optimal result

Integrand size = 22, antiderivative size = 196

$$\begin{aligned}\int (d - c^2 dx^2) (a + b \arcsin(cx))^3 \, dx = &-\frac{40 b^3 d \sqrt{1 - c^2 x^2}}{9c} - \frac{2 b^3 d (1 - c^2 x^2)^{3/2}}{27c} \\ &- \frac{14}{3} b^2 dx (a + b \arcsin(cx)) \\ &+ \frac{2}{9} b^2 c^2 dx^3 (a + b \arcsin(cx)) \\ &+ \frac{2bd\sqrt{1 - c^2 x^2} (a + b \arcsin(cx))^2}{c} \\ &+ \frac{bd(1 - c^2 x^2)^{3/2} (a + b \arcsin(cx))^2}{3c} \\ &+ \frac{2}{3} dx (a + b \arcsin(cx))^3 \\ &+ \frac{1}{3} dx (1 - c^2 x^2) (a + b \arcsin(cx))^3\end{aligned}$$

output

```
-40/9*b^3*d*(-c^2*x^2+1)^(1/2)/c-2/27*b^3*d*(-c^2*x^2+1)^(3/2)/c-14/3*b^2*
d*x*(a+b*arcsin(c*x))+2/9*b^2*c^2*d*x^3*(a+b*arcsin(c*x))+2*b*d*(-c^2*x^2+
1)^(1/2)*(a+b*arcsin(c*x))^2/c+1/3*b*d*(-c^2*x^2+1)^(3/2)*(a+b*arcsin(c*x)
)^2/c+2/3*d*x*(a+b*arcsin(c*x))^3+1/3*d*x*(-c^2*x^2+1)*(a+b*arcsin(c*x))^3
```

Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 239, normalized size of antiderivative = 1.22

$$\int \left(d - c^2 d x^2\right) \left(a + b \arcsin(cx)\right)^3 dx =$$

$$-\frac{d(-2b^3\sqrt{1-c^2x^2}(-61+c^2x^2) - 6ab^2cx(-21+c^2x^2) + 9a^2b\sqrt{1-c^2x^2}(-7+c^2x^2) + 9a^3cx(-3+c^2$$

input

```
Integrate[(d - c^2*d*x^2)*(a + b*ArcSin[c*x])^3,x]
```

output

```
-1/27*(d*(-2*b^3*Sqrt[1 - c^2*x^2]*(-61 + c^2*x^2) - 6*a*b^2*c*x*(-21 + c^
2*x^2) + 9*a^2*b*Sqrt[1 - c^2*x^2]*(-7 + c^2*x^2) + 9*a^3*c*x*(-3 + c^2*x^
2) + 3*b*(-2*b^2*c*x*(-21 + c^2*x^2) + 6*a*b*Sqrt[1 - c^2*x^2]*(-7 + c^2*x
^2) + 9*a^2*c*x*(-3 + c^2*x^2))*ArcSin[c*x] + 9*b^2*(b*Sqrt[1 - c^2*x^2]*(
-7 + c^2*x^2) + 3*a*c*x*(-3 + c^2*x^2))*ArcSin[c*x]^2 + 9*b^3*c*x*(-3 + c^
2*x^2)*ArcSin[c*x]^3))/c
```

Rubi [A] (verified)

Time = 0.94 (sec) , antiderivative size = 236, normalized size of antiderivative = 1.20, number of steps used = 10, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.409$, Rules used = {5158, 5130, 5182, 2009, 5154, 27, 353, 53, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d - c^2 d x^2\right) \left(a + b \arcsin(cx)\right)^3 dx$$

$$\downarrow 5158$$

$$-bcd \int x\sqrt{1-c^2x^2}(a + b\arcsin(cx))^2 dx + \frac{2}{3}d\int (a + b\arcsin(cx))^3 dx + \frac{1}{3}dx\left(1-c^2x^2\right)(a + b\arcsin(cx))^3$$

$$\downarrow 5130$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^3-3bc\int\frac{x(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx\right)-bcd\int x\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2dx+\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^3$$

$$\downarrow 5182$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^3-3bc\left(\frac{2b\int(a+b\arcsin(cx))dx}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2}{c^2}\right)\right)-bcd\left(\frac{2b\int\left(1-c^2x^2\right)(a+b\arcsin(cx))dx}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))^2}{3c^2}\right)+\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^3$$

$$\downarrow 2009$$

$$-bcd\left(\frac{2b\int\left(1-c^2x^2\right)(a+b\arcsin(cx))dx}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx))^2}{3c^2}\right)+\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^3+\frac{2}{3}d\left(x(a+b\arcsin(cx))^3-3bc\left(\frac{2b\left(ax+bx\arcsin(cx)+\frac{b\sqrt{1-c^2x^2}}{c}\right)}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2}{c^2}\right)\right)$$

$$\downarrow 5154$$

$$-bcd\left(\frac{2b\left(-bc\int\frac{x\left(3-c^2x^2\right)}{3\sqrt{1-c^2x^2}}dx-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx)}{3c^2}\right.$$

$$\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^3+\frac{2}{3}d\left(x(a+b\arcsin(cx))^3-3bc\left(\frac{2b\left(ax+bx\arcsin(cx)+\frac{b\sqrt{1-c^2x^2}}{c}\right)}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2}{c^2}\right)\right)$$

$$\downarrow 27$$

$$-bcd\left(\frac{2b\left(-\frac{1}{3}bc\int\frac{x\left(3-c^2x^2\right)}{\sqrt{1-c^2x^2}}dx-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx)}{3c^2}\right.$$

$$\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^3+\frac{2}{3}d\left(x(a+b\arcsin(cx))^3-3bc\left(\frac{2b\left(ax+bx\arcsin(cx)+\frac{b\sqrt{1-c^2x^2}}{c}\right)}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2}{c^2}\right)\right)$$

$$\downarrow 353$$

$$-bcd\left(\frac{2b\left(-\frac{1}{6}bc\int\frac{3-c^2x^2}{\sqrt{1-c^2x^2}}dx^2-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(a+b\arcsin(cx)}{3c^2}\right.$$

$$\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^3+$$

$$\left.\frac{2}{3}d\left(x(a+b\arcsin(cx))^3-3bc\left(\frac{2b\left(ax+bx\arcsin(cx)+\frac{b\sqrt{1-c^2x^2}}{c}\right)}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2}{c^2}\right)\right)\right)$$

$$\downarrow 53$$

$$-bcd\left(\frac{2b\left(-\frac{1}{6}bc\int\left(\sqrt{1-c^2x^2}+\frac{2}{\sqrt{1-c^2x^2}}\right)dx^2-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))\right)}{3c}-\frac{\left(1-c^2x^2\right)^{3/}}{}\right.$$

$$\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^3+$$

$$\left.\frac{2}{3}d\left(x(a+b\arcsin(cx))^3-3bc\left(\frac{2b\left(ax+bx\arcsin(cx)+\frac{b\sqrt{1-c^2x^2}}{c}\right)}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2}{c^2}\right)\right)\right)$$

$$\downarrow 2009$$

$$\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^3+$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^3-3bc\left(\frac{2b\left(ax+bx\arcsin(cx)+\frac{b\sqrt{1-c^2x^2}}{c}\right)}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2}{c^2}\right)\right)-$$

$$bcd\left(\frac{2b\left(-\frac{1}{3}c^2x^3(a+b\arcsin(cx))+x(a+b\arcsin(cx))-\frac{1}{6}bc\left(-\frac{2\left(1-c^2x^2\right)^{3/2}}{3c^2}-\frac{4\sqrt{1-c^2x^2}}{c^2}\right)\right)}{3c}-\frac{\left(1-c^2x^2\right)^{3/2}(}{3}\right.$$

input

```
Int[(d - c^2*d*x^2)*(a + b*ArcSin[c*x])^3,x]
```

output

```
(d*x*(1 - c^2*x^2)*(a + b*ArcSin[c*x])^3)/3 - b*c*d*(-1/3*((1 - c^2*x^2)^(
3/2)*(a + b*ArcSin[c*x])^2)/c^2 + (2*b*(-1/6*(b*c*((-4*Sqrt[1 - c^2*x^2])/
c^2 - (2*(1 - c^2*x^2)^(3/2))/(3*c^2))) + x*(a + b*ArcSin[c*x]) - (c^2*x^3
*(a + b*ArcSin[c*x]))/3))/(3*c)) + (2*d*(x*(a + b*ArcSin[c*x])^3 - 3*b*c*(
-((Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^2)/c^2) + (2*b*(a*x + (b*Sqrt[1 -
 c^2*x^2])/c + b*x*ArcSin[c*x]))/c)))/3
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 53
```
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] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && LeQ[7*m + 4*n + 4, 0])
|| LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

rule 353
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_Symbol]
 :> Simp[1/2   Subst[Int[(a + b*x)^p*(c + d*x)^q, x], x, x^2], x] /; FreeQ[
{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5154
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])   u, x
] - Simp[b*c   Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5182

```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 313, normalized size of antiderivative = 1.60

method	result
derivativedivides	$\frac{-d\,a^3\left(\frac{1}{3}c^3x^3-cx\right)-d\,b^3\left(\frac{\arcsin(cx)^3\left(c^2x^2-3\right)cx}{3}-2\arcsin(cx)^2\sqrt{-c^2x^2+1}+\frac{40\sqrt{-c^2x^2+1}}{9}+4cx\arcsin(cx)+\frac{\arcsin(cx)^2}{}\right.}{}$
default	$\frac{-d\,a^3\left(\frac{1}{3}c^3x^3-cx\right)-d\,b^3\left(\frac{\arcsin(cx)^3\left(c^2x^2-3\right)cx}{3}-2\arcsin(cx)^2\sqrt{-c^2x^2+1}+\frac{40\sqrt{-c^2x^2+1}}{9}+4cx\arcsin(cx)+\frac{\arcsin(cx)^2}{}\right.}{}$
parts	$-d\,a^3\left(\frac{1}{3}c^2x^3-x\right)-\frac{d\,b^3\left(\frac{\arcsin(cx)^3\left(c^2x^2-3\right)cx}{3}-2\arcsin(cx)^2\sqrt{-c^2x^2+1}+\frac{40\sqrt{-c^2x^2+1}}{9}+4cx\arcsin(cx)+\frac{a}{}\right.}{c}$
orering	$\frac{5x\left(13c^4x^4-194c^2x^2-179\right)\left(-c^2dx^2+d\right)(a+b\arcsin(cx))^3}{81\left(c^2x^2-1\right)^2}-\frac{\left(25c^4x^4-683c^2x^2-242\right)\left(-2c^2dx(a+b\arcsin(cx))^3+\right.}{81c^2\left(c^2x^2-1\right)}$

input

```
int((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^3,x,method=_RETURNVERBOSE)
```

output

```
1/c*(-d*a^3*(1/3*c^3*x^3-c*x)-d*b^3*(1/3*arcsin(c*x)^3*(c^2*x^2-3)*c*x-2*a
rcsin(c*x)^2*(-c^2*x^2+1)^(1/2)+40/9*(-c^2*x^2+1)^(1/2)+4*c*x*arcsin(c*x)+
1/3*arcsin(c*x)^2*(c^2*x^2-1)*(-c^2*x^2+1)^(1/2)-2/9*arcsin(c*x)*(c^2*x^2-
3)*c*x-2/27*(c^2*x^2-1)*(-c^2*x^2+1)^(1/2))-3*d*a*b^2*(1/3*arcsin(c*x)^2*(
c^2*x^2-3)*c*x+4/3*c*x-4/3*arcsin(c*x)*(-c^2*x^2+1)^(1/2)+2/9*arcsin(c*x)*
(c^2*x^2-1)*(-c^2*x^2+1)^(1/2)-2/27*(c^2*x^2-3)*c*x)-3*d*a^2*b*(1/3*c^3*x^
3*arcsin(c*x)-c*x*arcsin(c*x)+1/9*c^2*x^2*(-c^2*x^2+1)^(1/2)-7/9*(-c^2*x^2
+1)^(1/2)))
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 247, normalized size of antiderivative = 1.26

$$\int \left(d - c^2 dx^2\right) \left(a + b \arcsin(cx)\right)^3 dx =$$

$$-\frac{3\left(3\,a^3 - 2\,ab^2\right)c^3 dx^3 - 9\left(3\,a^3 - 14\,ab^2\right)cdx + 9\left(b^3 c^3 dx^3 - 3\,b^3 cdx\right)\arcsin\left(cx\right)^3 + 27\left(ab^2 c^3 dx^3 - 3\,ab\right.$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^3,x, algorithm="fricas")
```

output
```
-1/27*(3*(3*a^3 - 2*a*b^2)*c^3*d*x^3 - 9*(3*a^3 - 14*a*b^2)*c*d*x + 9*(b^3
*c^3*d*x^3 - 3*b^3*c*d*x)*arcsin(c*x)^3 + 27*(a*b^2*c^3*d*x^3 - 3*a*b^2*c*
d*x)*arcsin(c*x)^2 + 3*((9*a^2*b - 2*b^3)*c^3*d*x^3 - 3*(9*a^2*b - 14*b^3)
*c*d*x)*arcsin(c*x) + ((9*a^2*b - 2*b^3)*c^2*d*x^2 + 9*(b^3*c^2*d*x^2 - 7*
b^3*d)*arcsin(c*x)^2 - (63*a^2*b - 122*b^3)*d + 18*(a*b^2*c^2*d*x^2 - 7*a*
b^2*d)*arcsin(c*x))*sqrt(-c^2*x^2 + 1))/c
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 413 vs. 2(184) = 368.

Time = 0.41 (sec) , antiderivative size = 413, normalized size of antiderivative = 2.11

$$\int \left(d - c^2 dx^2\right) \left(a + b \arcsin(cx)\right)^3 dx$$

$$= \begin{cases} -\frac{a^3 c^2 dx^3}{3} + a^3 dx - a^2 bc^2 dx^3 \operatorname{asin}\left(cx\right) - \frac{a^2 bcdx^2\sqrt{-c^2x^2+1}}{3} + 3a^2 bdx \operatorname{asin}\left(cx\right) + \frac{7a^2 bd\sqrt{-c^2x^2+1}}{3c} - ab^2 c^2 dx^3 \\ a^3 dx \end{cases}$$

input
```
integrate((-c**2*d*x**2+d)*(a+b*asin(c*x))**3,x)
```

output

```
Piecewise((-a**3*c**2*d*x**3/3 + a**3*d*x - a**2*b*c**2*d*x**3*asin(c*x) -
 a**2*b*c*d*x**2*sqrt(-c**2*x**2 + 1)/3 + 3*a**2*b*d*x*asin(c*x) + 7*a**2*
b*d*sqrt(-c**2*x**2 + 1)/(3*c) - a*b**2*c**2*d*x**3*asin(c*x)**2 + 2*a*b**
2*c**2*d*x**3/9 - 2*a*b**2*c*d*x**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/3 + 3*a
*b**2*d*x*asin(c*x)**2 - 14*a*b**2*d*x/3 + 14*a*b**2*d*sqrt(-c**2*x**2 + 1
)*asin(c*x)/(3*c) - b**3*c**2*d*x**3*asin(c*x)**3/3 + 2*b**3*c**2*d*x**3*a
sin(c*x)/9 - b**3*c*d*x**2*sqrt(-c**2*x**2 + 1)*asin(c*x)**2/3 + 2*b**3*c*
d*x**2*sqrt(-c**2*x**2 + 1)/27 + b**3*d*x*asin(c*x)**3 - 14*b**3*d*x*asin(
c*x)/3 + 7*b**3*d*sqrt(-c**2*x**2 + 1)*asin(c*x)**2/(3*c) - 122*b**3*d*sqr
t(-c**2*x**2 + 1)/(27*c), Ne(c, 0)), (a**3*d*x, True))
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 444 vs. $2(173) = 346$.

Time $= 0.15$ (sec) , antiderivative size $= 444$, normalized size of antiderivative $= 2.27$

$$
\begin{aligned}
&\int \left(d - c^2 d x^2\right)\left(a + b\arcsin(cx)\right)^3 dx \\
&= -\frac{1}{3} b^3 c^2 d x^3 \arcsin\left(cx\right)^3 - a b^2 c^2 d x^3 \arcsin\left(cx\right)^2 - \frac{1}{3} a^3 c^2 d x^3 + b^3 d x \arcsin\left(cx\right)^3 \\
&\quad - \frac{1}{3}\left(3\, x^3 \arcsin\left(cx\right) + c\left(\frac{\sqrt{-c^2x^2+1}\,x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right) a^2 b c^2 d \\
&\quad - \frac{2}{9}\left(3\, c\left(\frac{\sqrt{-c^2x^2+1}\,x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\arcsin\left(cx\right) - \frac{c^2x^3 + 6\,x}{c^2}\right) a b^2 c^2 d \\
&\quad - \frac{1}{27}\left(9\, c\left(\frac{\sqrt{-c^2x^2+1}\,x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\arcsin\left(cx\right)^2 - 2\, c\left(\frac{\sqrt{-c^2x^2+1}\,x^2 + \frac{20\sqrt{-c^2x^2+1}}{c^2}}{c^2} + \frac{3\,(c^2x^3
\end{aligned}
$$

$$
\begin{aligned}
&\quad + 3\, a b^2 d x \arcsin\left(cx\right)^2 \\
&\quad + 3\left(\frac{\sqrt{-c^2x^2+1}\arcsin\left(cx\right)^2}{c} - \frac{2\left(cx\arcsin\left(cx\right) + \sqrt{-c^2x^2+1}\right)}{c}\right) b^3 d \\
&\quad - 6\, a b^2 d\left(x - \frac{\sqrt{-c^2x^2+1}\arcsin\left(cx\right)}{c}\right) + a^3 d x \\
&\quad + \frac{3\left(cx\arcsin\left(cx\right) + \sqrt{-c^2x^2+1}\right) a^2 b d}{c}
\end{aligned}
$$

input

```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^3,x, algorithm="maxima")
```

output

```
-1/3*b^3*c^2*d*x^3*arcsin(c*x)^3 - a*b^2*c^2*d*x^3*arcsin(c*x)^2 - 1/3*a^3
*c^2*d*x^3 + b^3*d*x*arcsin(c*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*c^2*d - 2/9*(3*c*(sqr
t(-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*c^2*d - 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*c^2*d + 3
*a*b^2*d*x*arcsin(c*x)^2 + 3*(sqrt(-c^2*x^2 + 1)*arcsin(c*x)^2/c - 2*(c*x*
arcsin(c*x) + sqrt(-c^2*x^2 + 1))/c)*b^3*d - 6*a*b^2*d*(x - sqrt(-c^2*x^2
+ 1)*arcsin(c*x)/c) + a^3*d*x + 3*(c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))*a
^2*b*d/c
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 372 vs. $2(173) = 346$.

Time = 0.17 (sec) , antiderivative size = 372, normalized size of antiderivative = 1.90

$$\begin{aligned}\int \left(d - c^2 dx^2\right)\left(a + b\arcsin(cx)\right)^3 dx = &-\frac{1}{3}a^3c^2dx^3 - \frac{1}{3}\left(c^2x^2-1\right)b^3dx\arcsin\left(cx\right)^3 \\ &- \left(c^2x^2-1\right)ab^2dx\arcsin\left(cx\right)^2 \\ &+ \frac{2}{3}b^3dx\arcsin\left(cx\right)^3 \\ &- \left(c^2x^2-1\right)a^2bdx\arcsin\left(cx\right) \\ &+ \frac{2}{9}\left(c^2x^2-1\right)b^3dx\arcsin\left(cx\right) \\ &+ 2\,ab^2dx\arcsin\left(cx\right)^2 \\ &+ \frac{\left(-c^2x^2+1\right)^{\frac{3}{2}}b^3d\arcsin\left(cx\right)^2}{3\,c} \\ &+ \frac{2}{9}\left(c^2x^2-1\right)ab^2dx + 2\,a^2bdx\arcsin\left(cx\right) \\ &- \frac{40}{9}b^3dx\arcsin\left(cx\right) \\ &+ \frac{2\left(-c^2x^2+1\right)^{\frac{3}{2}}ab^2d\arcsin\left(cx\right)}{3\,c} \\ &+ \frac{2\sqrt{-c^2x^2+1}b^3d\arcsin\left(cx\right)^2}{c} + a^3dx \\ &- \frac{40}{9}ab^2dx + \frac{\left(-c^2x^2+1\right)^{\frac{3}{2}}a^2bd}{3\,c} \\ &- \frac{2\left(-c^2x^2+1\right)^{\frac{3}{2}}b^3d}{27\,c} \\ &+ \frac{4\sqrt{-c^2x^2+1}ab^2d\arcsin\left(cx\right)}{c} \\ &+ \frac{2\sqrt{-c^2x^2+1}a^2bd}{c} - \frac{40\sqrt{-c^2x^2+1}b^3d}{9\,c}\end{aligned}$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^3,x, algorithm="giac")
```

output
```
-1/3*a^3*c^2*d*x^3 - 1/3*(c^2*x^2 - 1)*b^3*d*x*arcsin(c*x)^3 - (c^2*x^2 -
1)*a*b^2*d*x*arcsin(c*x)^2 + 2/3*b^3*d*x*arcsin(c*x)^3 - (c^2*x^2 - 1)*a^2
*b*d*x*arcsin(c*x) + 2/9*(c^2*x^2 - 1)*b^3*d*x*arcsin(c*x) + 2*a*b^2*d*x*a
rcsin(c*x)^2 + 1/3*(-c^2*x^2 + 1)^(3/2)*b^3*d*arcsin(c*x)^2/c + 2/9*(c^2*x
^2 - 1)*a*b^2*d*x + 2*a^2*b*d*x*arcsin(c*x) - 40/9*b^3*d*x*arcsin(c*x) + 2
/3*(-c^2*x^2 + 1)^(3/2)*a*b^2*d*arcsin(c*x)/c + 2*sqrt(-c^2*x^2 + 1)*b^3*d
*arcsin(c*x)^2/c + a^3*d*x - 40/9*a*b^2*d*x + 1/3*(-c^2*x^2 + 1)^(3/2)*a^2
*b*d/c - 2/27*(-c^2*x^2 + 1)^(3/2)*b^3*d/c + 4*sqrt(-c^2*x^2 + 1)*a*b^2*d*
arcsin(c*x)/c + 2*sqrt(-c^2*x^2 + 1)*a^2*b*d/c - 40/9*sqrt(-c^2*x^2 + 1)*b
^3*d/c
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right) \left(a + b \arcsin(cx)\right)^3 dx = \int \left(a + b \operatorname{asin}(c\,x)\right)^3 \left(d - c^2\, d\, x^2\right)\, dx$$

input
```
int((a + b*asin(c*x))^3*(d - c^2*d*x^2),x)
```

output
```
int((a + b*asin(c*x))^3*(d - c^2*d*x^2), x)
```

Reduce [F]

$$\int \left(d - c^2 dx^2\right) \left(a + b \arcsin(cx)\right)^3 dx$$
$$= \frac{d\left(3 asin(cx)^3 b^3 cx + 9\sqrt{-c^2x^2+1}\, asin(cx)^2 b^3 + 9 asin(cx)^2 a b^2 cx + 18\sqrt{-c^2x^2+1}\, asin(cx) a b^2 - 3 as\right.}{}$$

input
```
int((-c^2*d*x^2+d)*(a+b*asin(c*x))^3,x)
```

output

```
(d*(3*asin(c*x)**3*b**3*c*x + 9*sqrt( - c**2*x**2 + 1)*asin(c*x)**2*b**3 +
 9*asin(c*x)**2*a*b**2*c*x + 18*sqrt( - c**2*x**2 + 1)*asin(c*x)*a*b**2 -
3*asin(c*x)*a**2*b*c**3*x**3 + 9*asin(c*x)*a**2*b*c*x - 18*asin(c*x)*b**3*
c*x - sqrt( - c**2*x**2 + 1)*a**2*b*c**2*x**2 + 7*sqrt( - c**2*x**2 + 1)*a
**2*b - 18*sqrt( - c**2*x**2 + 1)*b**3 - 3*int(asin(c*x)**3*x**2,x)*b**3*c
**3 - 9*int(asin(c*x)**2*x**2,x)*a*b**2*c**3 - a**3*c**3*x**3 + 3*a**3*c*x
 - 18*a*b**2*c*x))/(3*c)
```

3.15 $\int \frac{(a+b\arcsin(cx))^3}{d-c^2dx^2}\,dx$

Optimal result . . . 230
Mathematica [A] (verified) . . . 231
Rubi [A] (verified) . . . 231
Maple [B] (verified) . . . 234
Fricas [F] . . . 235
Sympy [F] . . . 235
Maxima [F] . . . 235
Giac [F(-2)] . . . 236
Mupad [F(-1)] . . . 236
Reduce [F] . . . 237

Optimal result

Integrand size = 24, antiderivative size = 234

$$\begin{aligned}\int \frac{(a+b\arcsin(cx))^3}{d-c^2dx^2}\,dx = &-\frac{2i(a+b\arcsin(cx))^3\arctan\left(e^{i\arcsin(cx)}\right)}{cd}\\ &+\frac{3ib(a+b\arcsin(cx))^2\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)}{cd}\\ &-\frac{3ib(a+b\arcsin(cx))^2\operatorname{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)}{cd}\\ &-\frac{6b^2(a+b\arcsin(cx))\operatorname{PolyLog}\left(3,-ie^{i\arcsin(cx)}\right)}{cd}\\ &+\frac{6b^2(a+b\arcsin(cx))\operatorname{PolyLog}\left(3,ie^{i\arcsin(cx)}\right)}{cd}\\ &-\frac{6ib^3\operatorname{PolyLog}\left(4,-ie^{i\arcsin(cx)}\right)}{cd}\\ &+\frac{6ib^3\operatorname{PolyLog}\left(4,ie^{i\arcsin(cx)}\right)}{cd}\end{aligned}$$

output

```
-2*I*(a+b*arcsin(c*x))^3*arctan(I*c*x+(-c^2*x^2+1)^(1/2))/c/d+3*I*b*(a+b*a
rcsin(c*x))^2*polylog(2,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d-3*I*b*(a+b*arcs
in(c*x))^2*polylog(2,I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d-6*b^2*(a+b*arcsin(c
*x))*polylog(3,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d+6*b^2*(a+b*arcsin(c*x))*
polylog(3,I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d-6*I*b^3*polylog(4,-I*(I*c*x+(-
c^2*x^2+1)^(1/2)))/c/d+6*I*b^3*polylog(4,I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d
```

Mathematica [A] (verified)

Time = 0.99 (sec) , antiderivative size = 443, normalized size of antiderivative = 1.89

$$\int \frac{(a+b\arcsin(cx))^3}{d-c^2dx^2}\,dx =$$
$$-\frac{3ia^2b\pi\arcsin(cx)+12iab^2\arcsin(cx)^2\arctan\left(e^{i\arcsin(cx)}\right)+4ib^3\arcsin(cx)^3\arctan\left(e^{i\arcsin(cx)}\right)-3a^2$$

input
```
Integrate[(a + b*ArcSin[c*x])^3/(d - c^2*d*x^2),x]
```

output
```
-1/2*((3*I)*a^2*b*Pi*ArcSin[c*x] + (12*I)*a*b^2*ArcSin[c*x]^2*ArcTan[E^(I*
ArcSin[c*x])] + (4*I)*b^3*ArcSin[c*x]^3*ArcTan[E^(I*ArcSin[c*x])] - 3*a^2*
b*Pi*Log[1 - I*E^(I*ArcSin[c*x])] - 6*a^2*b*ArcSin[c*x]*Log[1 - I*E^(I*Arc
Sin[c*x])] - 3*a^2*b*Pi*Log[1 + I*E^(I*ArcSin[c*x])] + 6*a^2*b*ArcSin[c*x]
*Log[1 + I*E^(I*ArcSin[c*x])] + a^3*Log[1 - c*x] - a^3*Log[1 + c*x] + 3*a^
2*b*Pi*Log[-Cos[(Pi + 2*ArcSin[c*x])/4]] + 3*a^2*b*Pi*Log[Sin[(Pi + 2*ArcS
in[c*x])/4]] - (6*I)*b*(a + b*ArcSin[c*x])^2*PolyLog[2, (-I)*E^(I*ArcSin[c
*x])] + (6*I)*b*(a + b*ArcSin[c*x])^2*PolyLog[2, I*E^(I*ArcSin[c*x])] + 12
*a*b^2*PolyLog[3, (-I)*E^(I*ArcSin[c*x])] + 12*b^3*ArcSin[c*x]*PolyLog[3,
(-I)*E^(I*ArcSin[c*x])] - 12*a*b^2*PolyLog[3, I*E^(I*ArcSin[c*x])] - 12*b^
3*ArcSin[c*x]*PolyLog[3, I*E^(I*ArcSin[c*x])] + (12*I)*b^3*PolyLog[4, (-I)
*E^(I*ArcSin[c*x])] - (12*I)*b^3*PolyLog[4, I*E^(I*ArcSin[c*x])])/(c*d)
```

Rubi [A] (verified)

Time = 0.83 (sec) , antiderivative size = 205, normalized size of antiderivative = 0.88, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.292$, Rules used = {5164, 3042, 4669, 3011, 7163, 2720, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\arcsin(cx))^3}{d-c^2dx^2}\,dx$$
$$\downarrow 5164$$

$$\frac{\int \frac{(a+b\arcsin(cx))^3}{\sqrt{1-c^2x^2}}d\arcsin(cx)}{cd}$$

$$\downarrow 3042$$

$$\frac{\int (a+b\arcsin(cx))^3 \csc\left(\arcsin(cx)+\frac{\pi}{2}\right) d\arcsin(cx)}{cd}$$

$$\downarrow 4669$$

$$\frac{-3b\int (a+b\arcsin(cx))^2 \log\left(1-ie^{i\arcsin(cx)}\right) d\arcsin(cx) + 3b\int (a+b\arcsin(cx))^2 \log\left(1+ie^{i\arcsin(cx)}\right) d\arcsin}{cd}$$

$$\downarrow 3011$$

$$3b\left(i\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2 - 2ib\int (a+b\arcsin(cx))\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right) d\arcsin(cx\right.$$

$$\downarrow 7163$$

$$3b\left(i\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2 - 2ib\left(ib\int \operatorname{PolyLog}\left(3,-ie^{i\arcsin(cx)}\right) d\arcsin(cx) - i\operatorname{PolyLog}\right.\right.$$

$$\downarrow 2720$$

$$3b\left(i\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2 - 2ib\left(b\int e^{-i\arcsin(cx)}\operatorname{PolyLog}\left(3,-ie^{i\arcsin(cx)}\right) de^{i\arcsin(cx)} -\right.\right.$$

$$\downarrow 7143$$

$$-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^3 + 3b\left(i\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2 - 2ib\left(b\operatorname{PolyLog}\right.\right.$$

input

```
Int[(a + b*ArcSin[c*x])^3/(d - c^2*d*x^2),x]
```

output

```
((-2*I)*(a + b*ArcSin[c*x])^3*ArcTan[E^(I*ArcSin[c*x])] + 3*b*(I*(a + b*Ar
cSin[c*x])^2*PolyLog[2, (-I)*E^(I*ArcSin[c*x])] - (2*I)*b*((-I)*(a + b*Arc
Sin[c*x])*PolyLog[3, (-I)*E^(I*ArcSin[c*x])] + b*PolyLog[4, (-I)*E^(I*ArcS
in[c*x])])) - 3*b*(I*(a + b*ArcSin[c*x])^2*PolyLog[2, I*E^(I*ArcSin[c*x])]
 - (2*I)*b*((-I)*(a + b*ArcSin[c*x])*PolyLog[3, I*E^(I*ArcSin[c*x])] + b*P
olyLog[4, I*E^(I*ArcSin[c*x])])))/(c*d)
```

Defintions of rubi rules used

rule 2720

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[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 3011

```
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] + Simp[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 3042

```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4669

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

rule 5164

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2), x_Symbo
l] :> Simp[1/(c*d)   Subst[Int[(a + b*x)^n*Sec[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[n, 0]
```

rule 7143

```
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 7163

```
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] - Simp[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]
```

Maple [B] (verified)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 674 vs. $2(279) = 558$.

Time = 0.39 (sec) , antiderivative size = 675, normalized size of antiderivative = 2.88

method	result
derivativedivides	$-\frac{3ib^3 \arcsin(cx)^2 \operatorname{polylog}\left(2,i\left(icx+\sqrt{-c^2x^2+1}\right)\right)}{d}-\frac{2ia^3 \arctan\left(icx+\sqrt{-c^2x^2+1}\right)}{d}+\frac{6ia\,b^2 \arcsin(cx) \operatorname{polylog}\left(2,-i\left(icx+\sqrt{-c^2x^2}\right.\right.}$
default	$-\frac{3ib^3 \arcsin(cx)^2 \operatorname{polylog}\left(2,i\left(icx+\sqrt{-c^2x^2+1}\right)\right)}{d}-\frac{2ia^3 \arctan\left(icx+\sqrt{-c^2x^2+1}\right)}{d}+\frac{6ia\,b^2 \arcsin(cx) \operatorname{polylog}\left(2,-i\left(icx+\sqrt{-c^2x^2}\right.\right.}$

input

```
int((a+b*arcsin(c*x))^3/(-c^2*d*x^2+d),x,method=_RETURNVERBOSE)
```

output

```
1/c*(-3*I/d*b^3*arcsin(c*x)^2*polylog(2,I*(I*c*x+(-c^2*x^2+1)^(1/2)))-2*I/
d*a^3*arctan(I*c*x+(-c^2*x^2+1)^(1/2))+6*I/d*a*b^2*arcsin(c*x)*polylog(2,-
I*(I*c*x+(-c^2*x^2+1)^(1/2)))-6*I/d*a*b^2*arcsin(c*x)*polylog(2,I*(I*c*x+(
-c^2*x^2+1)^(1/2)))+3*I/d*a^2*b*polylog(2,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))-3
*I/d*a^2*b*polylog(2,I*(I*c*x+(-c^2*x^2+1)^(1/2)))+6*I/d*b^3*polylog(4,I*(
I*c*x+(-c^2*x^2+1)^(1/2)))+1/d*b^3*arcsin(c*x)^3*ln(1-I*(I*c*x+(-c^2*x^2+1
)^(1/2)))+6/d*a*b^2*polylog(3,I*(I*c*x+(-c^2*x^2+1)^(1/2)))-3/d*a^2*b*arcs
in(c*x)*ln(1+I*(I*c*x+(-c^2*x^2+1)^(1/2)))-3/d*a*b^2*arcsin(c*x)^2*ln(1+I*
(I*c*x+(-c^2*x^2+1)^(1/2)))-1/d*b^3*arcsin(c*x)^3*ln(1+I*(I*c*x+(-c^2*x^2+
1)^(1/2)))-6/d*b^3*arcsin(c*x)*polylog(3,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))+3/
d*a^2*b*arcsin(c*x)*ln(1-I*(I*c*x+(-c^2*x^2+1)^(1/2)))+3*I/d*b^3*arcsin(c*
x)^2*polylog(2,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))+3/d*a*b^2*arcsin(c*x)^2*ln(1
-I*(I*c*x+(-c^2*x^2+1)^(1/2)))-6*I/d*b^3*polylog(4,-I*(I*c*x+(-c^2*x^2+1)^
(1/2)))+6/d*b^3*arcsin(c*x)*polylog(3,I*(I*c*x+(-c^2*x^2+1)^(1/2)))-6/d*a*
b^2*polylog(3,-I*(I*c*x+(-c^2*x^2+1)^(1/2))))
```

Fricas [F]

$$\int \frac{(a+b\arcsin(cx))^3}{d-c^2dx^2}\,dx = \int -\frac{(b\arcsin(cx)+a)^3}{c^2dx^2-d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^3/(-c^2*d*x^2+d),x, algorithm="fricas")
```

output
```
integral(-(b^3*arcsin(c*x)^3 + 3*a*b^2*arcsin(c*x)^2 + 3*a^2*b*arcsin(c*x)
 + a^3)/(c^2*d*x^2 - d), x)
```

Sympy [F]

$$\int \frac{(a+b\arcsin(cx))^3}{d-c^2dx^2}\,dx = -\frac{\int \frac{a^3}{c^2x^2-1}\,dx + \int \frac{b^3\operatorname{asin}^3(cx)}{c^2x^2-1}\,dx + \int \frac{3ab^2\operatorname{asin}^2(cx)}{c^2x^2-1}\,dx + \int \frac{3a^2b\operatorname{asin}(cx)}{c^2x^2-1}\,dx}{d}$$

input
```
integrate((a+b*asin(c*x))**3/(-c**2*d*x**2+d),x)
```

output
```
-(Integral(a**3/(c**2*x**2 - 1), x) + Integral(b**3*asin(c*x)**3/(c**2*x**
2 - 1), x) + Integral(3*a*b**2*asin(c*x)**2/(c**2*x**2 - 1), x) + Integral
(3*a**2*b*asin(c*x)/(c**2*x**2 - 1), x))/d
```

Maxima [F]

$$\int \frac{(a+b\arcsin(cx))^3}{d-c^2dx^2}\,dx = \int -\frac{(b\arcsin(cx)+a)^3}{c^2dx^2-d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^3/(-c^2*d*x^2+d),x, algorithm="maxima")
```

output
```
1/2*a^3*(log(c*x + 1)/(c*d) - log(c*x - 1)/(c*d)) + 1/2*(b^3*arctan2(c*x,
sqrt(c*x + 1)*sqrt(-c*x + 1))^3*log(c*x + 1) - b^3*arctan2(c*x, sqrt(c*x +
 1)*sqrt(-c*x + 1))^3*log(-c*x + 1) + 2*c*d*integrate(-3/2*(2*a*b^2*arctan
2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 + 2*a^2*b*arctan2(c*x, sqrt(c*x + 1
)*sqrt(-c*x + 1)) - (b^3*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2*log(
c*x + 1) - b^3*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2*log(-c*x + 1))
*sqrt(c*x + 1)*sqrt(-c*x + 1))/(c^2*d*x^2 - d), x))/(c*d)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a + b \arcsin(cx))^3}{d - c^2 dx^2}\, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))^3/(-c^2*d*x^2+d),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a + b \arcsin(cx))^3}{d - c^2 dx^2}\, dx = \int \frac{(a + b \operatorname{asin}(c\,x))^3}{d - c^2\, d\, x^2}\, dx$$

input
```
int((a + b*asin(c*x))^3/(d - c^2*d*x^2),x)
```

output
```
int((a + b*asin(c*x))^3/(d - c^2*d*x^2), x)
```

Reduce [F]

$$\int \frac{(a+b\arcsin(cx))^3}{d-c^2dx^2}\,dx$$
$$= \frac{-6\left(\int \frac{asin(cx)}{c^2x^2-1}dx\right)a^2bc-2\left(\int \frac{asin(cx)^3}{c^2x^2-1}dx\right)b^3c-6\left(\int \frac{asin(cx)^2}{c^2x^2-1}dx\right)ab^2c-\log(c^2x-c)\,a^3+\log(c^2x+c)\,a^3}{2cd}$$

input
```
int((a+b*asin(c*x))^3/(-c^2*d*x^2+d),x)
```

output
```
( - 6*int(asin(c*x)/(c**2*x**2 - 1),x)*a**2*b*c - 2*int(asin(c*x)**3/(c**2
*x**2 - 1),x)*b**3*c - 6*int(asin(c*x)**2/(c**2*x**2 - 1),x)*a*b**2*c - lo
g(c**2*x - c)*a**3 + log(c**2*x + c)*a**3)/(2*c*d)
```

3.16 $\int \frac{(a+b\arcsin(cx))^3}{\left(d-c^2dx^2\right)^2}\,dx$

Optimal result . . . 238
Mathematica [A] (verified) . . . 239
Rubi [A] (verified) . . . 240
Maple [A] (verified) . . . 246
Fricas [F] . . . 247
Sympy [F] . . . 247
Maxima [F] . . . 247
Giac [F(-2)] . . . 248
Mupad [F(-1)] . . . 248
Reduce [F] . . . 249

Optimal result

Integrand size = 24, antiderivative size = 393

$$\begin{aligned}\int \frac{(a+b\arcsin(cx))^3}{(d-c^2dx^2)^2}\,dx &= -\frac{3b(a+b\arcsin(cx))^2}{2cd^2\sqrt{1-c^2x^2}}+\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}\\ &-\frac{6ib^2(a+b\arcsin(cx))\arctan\left(e^{i\arcsin(cx)}\right)}{cd^2}\\ &-\frac{i(a+b\arcsin(cx))^3\arctan\left(e^{i\arcsin(cx)}\right)}{cd^2}\\ &+\frac{3ib^3\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)}{cd^2}\\ &+\frac{3ib(a+b\arcsin(cx))^2\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)}{2cd^2}\\ &-\frac{3ib^3\operatorname{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)}{cd^2}\\ &-\frac{3ib(a+b\arcsin(cx))^2\operatorname{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)}{2cd^2}\\ &-\frac{3b^2(a+b\arcsin(cx))\operatorname{PolyLog}\left(3,-ie^{i\arcsin(cx)}\right)}{cd^2}\\ &+\frac{3b^2(a+b\arcsin(cx))\operatorname{PolyLog}\left(3,ie^{i\arcsin(cx)}\right)}{cd^2}\\ &-\frac{3ib^3\operatorname{PolyLog}\left(4,-ie^{i\arcsin(cx)}\right)}{cd^2}\\ &+\frac{3ib^3\operatorname{PolyLog}\left(4,ie^{i\arcsin(cx)}\right)}{cd^2}\end{aligned}$$

output

```
-3/2*b*(a+b*arcsin(c*x))^2/c/d^2/(-c^2*x^2+1)^(1/2)+1/2*x*(a+b*arcsin(c*x)
)^3/d^2/(-c^2*x^2+1)-6*I*b^2*(a+b*arcsin(c*x))*arctan(I*c*x+(-c^2*x^2+1)^(
1/2))/c/d^2-I*(a+b*arcsin(c*x))^3*arctan(I*c*x+(-c^2*x^2+1)^(1/2))/c/d^2+3
*I*b^3*polylog(2,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d^2+3/2*I*b*(a+b*arcsin(
c*x))^2*polylog(2,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d^2-3*I*b^3*polylog(2,I
*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d^2-3/2*I*b*(a+b*arcsin(c*x))^2*polylog(2,I
*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d^2-3*b^2*(a+b*arcsin(c*x))*polylog(3,-I*(I
*c*x+(-c^2*x^2+1)^(1/2)))/c/d^2+3*b^2*(a+b*arcsin(c*x))*polylog(3,I*(I*c*x
+(-c^2*x^2+1)^(1/2)))/c/d^2-3*I*b^3*polylog(4,-I*(I*c*x+(-c^2*x^2+1)^(1/2)
))/c/d^2+3*I*b^3*polylog(4,I*(I*c*x+(-c^2*x^2+1)^(1/2)))/c/d^2
```

Mathematica [A] (verified)

Time = 2.41 (sec) , antiderivative size = 693, normalized size of antiderivative = 1.76

$$\int \frac{(a+b\arcsin(cx))^3}{\left(d-c^2dx^2\right)^2}\,dx$$

$$= -\frac{2a^3x}{-1+c^2x^2} - \frac{a^3\log(1-cx)}{c} + \frac{a^3\log(1+cx)}{c} + \frac{3a^2b\left(\frac{\sqrt{1-c^2x^2}}{-1+cx} - \frac{\sqrt{1-c^2x^2}}{1+cx} - i\pi\arcsin(cx) + \frac{\arcsin(cx)}{1-cx} - \frac{\arcsin(cx)}{1+cx} + \pi\log\left(1-ie^{i\arcsin(cx)}\right) +\right.}{}$$

input

```
Integrate[(a + b*ArcSin[c*x])^3/(d - c^2*d*x^2)^2,x]
```

output

```
((-2*a^3*x)/(-1 + c^2*x^2) - (a^3*Log[1 - c*x])/c + (a^3*Log[1 + c*x])/c +
 (3*a^2*b*(Sqrt[1 - c^2*x^2]/(-1 + c*x) - Sqrt[1 - c^2*x^2]/(1 + c*x) - I*
Pi*ArcSin[c*x] + ArcSin[c*x]/(1 - c*x) - ArcSin[c*x]/(1 + c*x) + Pi*Log[1
 - I*E^(I*ArcSin[c*x])] + 2*ArcSin[c*x]*Log[1 - I*E^(I*ArcSin[c*x])] + Pi*L
og[1 + I*E^(I*ArcSin[c*x])] - 2*ArcSin[c*x]*Log[1 + I*E^(I*ArcSin[c*x])] -
 Pi*Log[-Cos[(Pi + 2*ArcSin[c*x])/4]] - Pi*Log[Sin[(Pi + 2*ArcSin[c*x])/4]
] + (2*I)*PolyLog[2, (-I)*E^(I*ArcSin[c*x])] - (2*I)*PolyLog[2, I*E^(I*Arc
Sin[c*x])]))/c + (12*a*b^2*(ArcCoth[c*x] - ArcSin[c*x]/Sqrt[1 - c^2*x^2] +
 (c*x*ArcSin[c*x]^2)/(2 - 2*c^2*x^2) - I*ArcSin[c*x]^2*ArcTan[E^(I*ArcSin[
c*x])] + I*ArcSin[c*x]*PolyLog[2, (-I)*E^(I*ArcSin[c*x])] - I*ArcSin[c*x]*
PolyLog[2, I*E^(I*ArcSin[c*x])] - PolyLog[3, (-I)*E^(I*ArcSin[c*x])] + Pol
yLog[3, I*E^(I*ArcSin[c*x])]))/c + (2*b^3*((-3*ArcSin[c*x]^2)/Sqrt[1 - c^2
*x^2] + (c*x*ArcSin[c*x]^3)/(1 - c^2*x^2) - (12*I)*ArcSin[c*x]*ArcTan[E^(I
*ArcSin[c*x])] - (2*I)*ArcSin[c*x]^3*ArcTan[E^(I*ArcSin[c*x])] + (3*I)*(2
+ ArcSin[c*x]^2)*PolyLog[2, (-I)*E^(I*ArcSin[c*x])] - (3*I)*(2 + ArcSin[c*
x]^2)*PolyLog[2, I*E^(I*ArcSin[c*x])] - 6*ArcSin[c*x]*PolyLog[3, (-I)*E^(I
*ArcSin[c*x])] + 6*ArcSin[c*x]*PolyLog[3, I*E^(I*ArcSin[c*x])] - (6*I)*Pol
yLog[4, (-I)*E^(I*ArcSin[c*x])] + (6*I)*PolyLog[4, I*E^(I*ArcSin[c*x])]))/
c)/(4*d^2)
```

Rubi [A] (verified)

Time = 2.15 (sec) , antiderivative size = 349, normalized size of antiderivative = 0.89, number of steps used = 16, number of rules used = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.625$, Rules used = {5162, 27, 5164, 3042, 4669, 3011, 5182, 5164, 3042, 4669, 2715, 2838, 7163, 2720, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\arcsin(cx))^3}{\left(d-c^2dx^2\right)^2}\,dx$$

$$\downarrow 5162$$

$$-\frac{3bc\int \frac{x(a+b\arcsin(cx))^2}{(1-c^2x^2)^{3/2}}dx}{2d^2}+\frac{\int \frac{(a+b\arcsin(cx))^3}{d(1-c^2x^2)}dx}{2d}+\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 27$$

$$-\frac{3bc\int\frac{x(a+b\arcsin(cx))^2}{(1-c^2x^2)^{3/2}}dx}{2d^2}+\frac{\int\frac{(a+b\arcsin(cx))^3}{1-c^2x^2}dx}{2d^2}+\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 5164$$

$$-\frac{3bc\int\frac{x(a+b\arcsin(cx))^2}{(1-c^2x^2)^{3/2}}dx}{2d^2}+\frac{\int\frac{(a+b\arcsin(cx))^3}{\sqrt{1-c^2x^2}}d\arcsin(cx)}{2cd^2}+\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 3042$$

$$-\frac{3bc\int\frac{x(a+b\arcsin(cx))^2}{(1-c^2x^2)^{3/2}}dx}{2d^2}+\frac{\int(a+b\arcsin(cx))^3\csc\left(\arcsin(cx)+\frac{\pi}{2}\right)d\arcsin(cx)}{2cd^2}+\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 4669$$

$$\frac{-3b\int(a+b\arcsin(cx))^2\log\left(1-ie^{i\arcsin(cx)}\right)d\arcsin(cx)+3b\int(a+b\arcsin(cx))^2\log\left(1+ie^{i\arcsin(cx)}\right)d\arcsin}{2cd^2}$$

$$\frac{3bc\int\frac{x(a+b\arcsin(cx))^2}{(1-c^2x^2)^{3/2}}dx}{2d^2}+\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 3011$$

$$\frac{3b\left(i\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2-2ib\int(a+b\arcsin(cx))\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)d\arcsin(c\right.}{2cd^2}$$

$$\frac{3bc\int\frac{x(a+b\arcsin(cx))^2}{(1-c^2x^2)^{3/2}}dx}{2d^2}+\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 5182$$

$$\frac{3b\left(i\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2-2ib\int(a+b\arcsin(cx))\operatorname{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)d\arcsin(c\right.}{2cd^2}$$

$$\frac{3bc\left(\frac{(a+b\arcsin(cx))^2}{c^2\sqrt{1-c^2x^2}}-\frac{2b\int\frac{a+b\arcsin(cx)}{1-c^2x^2}dx}{c}\right)}{2d^2}+\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 5164$$

$$\frac{3b\left(i\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2-2ib\int(a+b\arcsin(cx))\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)d\arcsin(cx\right.}{\frac{3bc\left(\frac{(a+b\arcsin(cx))^2}{c^2\sqrt{1-c^2x^2}}-\frac{2b\int\frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}d\arcsin(cx)}{c^2}\right)}{2d^2}+\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}}$$

$$\downarrow 3042$$

$$\frac{3b\left(i\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2-2ib\int(a+b\arcsin(cx))\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)d\arcsin(cx\right.}{\frac{3bc\left(\frac{(a+b\arcsin(cx))^2}{c^2\sqrt{1-c^2x^2}}-\frac{2b\int(a+b\arcsin(cx))\csc\left(\arcsin(cx)+\frac{\pi}{2}\right)d\arcsin(cx)}{c^2}\right)}{2d^2}+\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}}$$

$$\downarrow 4669$$

$$-\frac{3bc\left(\frac{(a+b\arcsin(cx))^2}{c^2\sqrt{1-c^2x^2}}-\frac{2b\left(-b\int\log\left(1-ie^{i\arcsin(cx)}\right)d\arcsin(cx)+b\int\log\left(1+ie^{i\arcsin(cx)}\right)d\arcsin(cx)-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin\right.}{c^2}\right)}{2d^2}$$

$$\frac{3b\left(i\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2-2ib\int(a+b\arcsin(cx))\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)d\arcsin(cx\right.}{\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}}$$

$$\downarrow 2715$$

$$-\frac{3bc\left(\frac{(a+b\arcsin(cx))^2}{c^2\sqrt{1-c^2x^2}}-\frac{2b\left(ib\int e^{-i\arcsin(cx)}\log\left(1-ie^{i\arcsin(cx)}\right)de^{i\arcsin(cx)}-ib\int e^{-i\arcsin(cx)}\log\left(1+ie^{i\arcsin(cx)}\right)de^{i\arcsin(cx)}-2i\,\mathrm{arct}\right.}{c^2}\right)}{2d^2}$$

$$\frac{3b\left(i\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2-2ib\int(a+b\arcsin(cx))\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)d\arcsin(cx\right.}{\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}}$$

$$\downarrow 2838$$

$$\frac{3b\left(i\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2-2ib\int(a+b\arcsin(cx))\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)d\arcsin(cx\right.}{\frac{3bc\left(\frac{(a+b\arcsin(cx))^2}{c^2\sqrt{1-c^2x^2}}-\frac{2b\left(-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx))+ib\,\mathrm{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)-ib\,\mathrm{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)\right)}{c^2}\right)}{2d^2}+}$$

$$\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 7163$$

$$\frac{3b\left(i\,\text{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2-2ib\left(ib\int\text{PolyLog}\left(3,-ie^{i\arcsin(cx)}\right)d\arcsin(cx)-i\,\text{PolyLog}\right.\right.}{\left.\left.3bc\left(\frac{(a+b\arcsin(cx))^2}{c^2\sqrt{1-c^2x^2}}-\frac{2b\left(-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx))+ib\,\text{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)-ib\,\text{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)\right)}{c^2}\right)\right)}+$$

$$\frac{2d^2}{\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}}$$

$$\downarrow 2720$$

$$\frac{3b\left(i\,\text{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2-2ib\left(b\int e^{-i\arcsin(cx)}\,\text{PolyLog}\left(3,-ie^{i\arcsin(cx)}\right)de^{i\arcsin(cx)}-\right.\right.}{\left.\left.3bc\left(\frac{(a+b\arcsin(cx))^2}{c^2\sqrt{1-c^2x^2}}-\frac{2b\left(-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx))+ib\,\text{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)-ib\,\text{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)\right)}{c^2}\right)\right)}+$$

$$\frac{2d^2}{\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}}$$

$$\downarrow 7143$$

$$-\frac{3bc\left(\frac{(a+b\arcsin(cx))^2}{c^2\sqrt{1-c^2x^2}}-\frac{2b\left(-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx))+ib\,\text{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)-ib\,\text{PolyLog}\left(2,ie^{i\arcsin(cx)}\right)\right)}{c^2}\right)}{2d^2}+$$

$$\frac{-2i\arctan\left(e^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^3+3b\left(i\,\text{PolyLog}\left(2,-ie^{i\arcsin(cx)}\right)(a+b\arcsin(cx))^2-2ib\left(b\,\text{PolyLog}\right.\right.}{\left.\left.\frac{x(a+b\arcsin(cx))^3}{2d^2\left(1-c^2x^2\right)}\right)\right)}$$

input
```
Int[(a + b*ArcSin[c*x])^3/(d - c^2*d*x^2)^2,x]
```

output
```
(x*(a + b*ArcSin[c*x])^3)/(2*d^2*(1 - c^2*x^2)) - (3*b*c*((a + b*ArcSin[c*
x])^2/(c^2*Sqrt[1 - c^2*x^2]) - (2*b*((-2*I)*(a + b*ArcSin[c*x])*ArcTan[E^
(I*ArcSin[c*x])] + I*b*PolyLog[2, (-I)*E^(I*ArcSin[c*x])] - I*b*PolyLog[2,
 I*E^(I*ArcSin[c*x])]))/c^2))/(2*d^2) + ((-2*I)*(a + b*ArcSin[c*x])^3*ArcT
an[E^(I*ArcSin[c*x])] + 3*b*(I*(a + b*ArcSin[c*x])^2*PolyLog[2, (-I)*E^(I*
ArcSin[c*x])] - (2*I)*b*((-I)*(a + b*ArcSin[c*x])*PolyLog[3, (-I)*E^(I*Arc
Sin[c*x])] + b*PolyLog[4, (-I)*E^(I*ArcSin[c*x])])) - 3*b*(I*(a + b*ArcSin
[c*x])^2*PolyLog[2, I*E^(I*ArcSin[c*x])] - (2*I)*b*((-I)*(a + b*ArcSin[c*x
])*PolyLog[3, I*E^(I*ArcSin[c*x])] + b*PolyLog[4, I*E^(I*ArcSin[c*x])])))/
(2*c*d^2)
```

Defintions of rubi rules used

rule 27

```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2715

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[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 2720

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[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 2838

```
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 3011

```
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] + Simp[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 3042

```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4669

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

rule 5162

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_), x_
Symbol] :> Simp[(-x)*(d + e*x^2)^(p + 1)*((a + b*ArcSin[c*x])^n/(2*d*(p + 1
))), x] + (Simp[(2*p + 3)/(2*d*(p + 1))   Int[(d + e*x^2)^(p + 1)*(a + b*Ar
cSin[c*x])^n, x], x] + Simp[b*c*(n/(2*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2
*x^2)^p]   Int[x*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x
]) /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && LtQ[p,
 -1] && NeQ[p, -3/2]
```

rule 5164

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2), x_Symbo
l] :> Simp[1/(c*d)   Subst[Int[(a + b*x)^n*Sec[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[n, 0]
```

rule 5182

```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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 7143

```
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 7163

```
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] - Simp[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]
```

Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 851, normalized size of antiderivative = 2.17

method	result
derivativedivides	$\frac{a^3\left(-\frac{1}{4(cx+1)}+\frac{\ln(cx+1)}{4}-\frac{1}{4(cx-1)}-\frac{\ln(cx-1)}{4}\right)}{d^2}+\frac{b^3\left(-\frac{\arcsin(cx)^2\left(cx\arcsin(cx)-3\sqrt{-c^2x^2+1}\right)}{2\left(c^2x^2-1\right)}+\frac{\arcsin(cx)^3\ln\left(1-i\left(icx+\sqrt{-}\right.\right.\right.}{2}$
default	$\frac{a^3\left(-\frac{1}{4(cx+1)}+\frac{\ln(cx+1)}{4}-\frac{1}{4(cx-1)}-\frac{\ln(cx-1)}{4}\right)}{d^2}+\frac{b^3\left(-\frac{\arcsin(cx)^2\left(cx\arcsin(cx)-3\sqrt{-c^2x^2+1}\right)}{2\left(c^2x^2-1\right)}+\frac{\arcsin(cx)^3\ln\left(1-i\left(icx+\sqrt{-}\right.\right.\right.}{2}$
parts	$\frac{a^3\left(-\frac{1}{4c(cx-1)}-\frac{\ln(cx-1)}{4c}-\frac{1}{4c(cx+1)}+\frac{\ln(cx+1)}{4c}\right)}{d^2}+\frac{b^3\left(-\frac{\arcsin(cx)^2\left(cx\arcsin(cx)-3\sqrt{-c^2x^2+1}\right)}{2\left(c^2x^2-1\right)}+\frac{\arcsin(cx)^3\ln\left(1-i\left(ic\right.\right.\right.}{2}$

input
```
int((a+b*arcsin(c*x))^3/(-c^2*d*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/c*(a^3/d^2*(-1/4/(c*x+1)+1/4*ln(c*x+1)-1/4/(c*x-1)-1/4*ln(c*x-1))+b^3/d^
2*(-1/2/(c^2*x^2-1)*arcsin(c*x)^2*(c*x*arcsin(c*x)-3*(-c^2*x^2+1)^(1/2))+1
/2*arcsin(c*x)^3*ln(1-I*(I*c*x+(-c^2*x^2+1)^(1/2)))-3/2*I*polylog(2,I*(I*c
*x+(-c^2*x^2+1)^(1/2)))*arcsin(c*x)^2+3*arcsin(c*x)*polylog(3,I*(I*c*x+(-c
^2*x^2+1)^(1/2)))+3*I*polylog(4,I*(I*c*x+(-c^2*x^2+1)^(1/2)))-1/2*arcsin(c
*x)^3*ln(1+I*(I*c*x+(-c^2*x^2+1)^(1/2)))+3/2*I*polylog(2,-I*(I*c*x+(-c^2*x
^2+1)^(1/2)))*arcsin(c*x)^2-3*arcsin(c*x)*polylog(3,-I*(I*c*x+(-c^2*x^2+1)
^(1/2)))-3*I*polylog(4,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))-3*arcsin(c*x)*ln(1+I
*(I*c*x+(-c^2*x^2+1)^(1/2)))+3*arcsin(c*x)*ln(1-I*(I*c*x+(-c^2*x^2+1)^(1/2
)))+3*I*dilog(1+I*(I*c*x+(-c^2*x^2+1)^(1/2)))-3*I*dilog(1-I*(I*c*x+(-c^2*x
^2+1)^(1/2))))+3*a*b^2/d^2*(-1/2/(c^2*x^2-1)*arcsin(c*x)*(c*x*arcsin(c*x)-
2*(-c^2*x^2+1)^(1/2))+1/2*arcsin(c*x)^2*ln(1-I*(I*c*x+(-c^2*x^2+1)^(1/2)))
-I*arcsin(c*x)*polylog(2,I*(I*c*x+(-c^2*x^2+1)^(1/2)))+polylog(3,I*(I*c*x+
(-c^2*x^2+1)^(1/2)))-1/2*arcsin(c*x)^2*ln(1+I*(I*c*x+(-c^2*x^2+1)^(1/2)))+
I*arcsin(c*x)*polylog(2,-I*(I*c*x+(-c^2*x^2+1)^(1/2)))-polylog(3,-I*(I*c*x
+(-c^2*x^2+1)^(1/2)))-2*I*arctan(I*c*x+(-c^2*x^2+1)^(1/2)))+3*a^2*b/d^2*(-
1/2*(c*x*arcsin(c*x)-(-c^2*x^2+1)^(1/2))/(c^2*x^2-1)-1/2*arcsin(c*x)*ln(1+
I*(I*c*x+(-c^2*x^2+1)^(1/2)))+1/2*arcsin(c*x)*ln(1-I*(I*c*x+(-c^2*x^2+1)^(
1/2)))+1/2*I*dilog(1+I*(I*c*x+(-c^2*x^2+1)^(1/2)))-1/2*I*dilog(1-I*(I*c*x+
(-c^2*x^2+1)^(1/2)))))
```

Fricas [F]

$$\int \frac{(a+b\arcsin(cx))^3}{(d-c^2dx^2)^2}\,dx = \int \frac{(b\arcsin(cx)+a)^3}{(c^2dx^2-d)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^3/(-c^2*d*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b^3*arcsin(c*x)^3 + 3*a*b^2*arcsin(c*x)^2 + 3*a^2*b*arcsin(c*x)
+ a^3)/(c^4*d^2*x^4 - 2*c^2*d^2*x^2 + d^2), x)
```

Sympy [F]

$$\int \frac{(a+b\arcsin(cx))^3}{(d-c^2dx^2)^2}\,dx = \frac{\int \frac{a^3}{c^4x^4-2c^2x^2+1}\,dx + \int \frac{b^3\operatorname{asin}^3(cx)}{c^4x^4-2c^2x^2+1}\,dx + \int \frac{3ab^2\operatorname{asin}^2(cx)}{c^4x^4-2c^2x^2+1}\,dx + \int \frac{3a^2b\operatorname{asin}(cx)}{c^4x^4-2c^2x^2+1}\,dx}{d^2}$$

input
```
integrate((a+b*asin(c*x))**3/(-c**2*d*x**2+d)**2,x)
```

output
```
(Integral(a**3/(c**4*x**4 - 2*c**2*x**2 + 1), x) + Integral(b**3*asin(c*x)
**3/(c**4*x**4 - 2*c**2*x**2 + 1), x) + Integral(3*a*b**2*asin(c*x)**2/(c*
*4*x**4 - 2*c**2*x**2 + 1), x) + Integral(3*a**2*b*asin(c*x)/(c**4*x**4 -
2*c**2*x**2 + 1), x))/d**2
```

Maxima [F]

$$\int \frac{(a+b\arcsin(cx))^3}{(d-c^2dx^2)^2}\,dx = \int \frac{(b\arcsin(cx)+a)^3}{(c^2dx^2-d)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^3/(-c^2*d*x^2+d)^2,x, algorithm="maxima")
```

output
```
-1/4*a^3*(2*x/(c^2*d^2*x^2 - d^2) - log(c*x + 1)/(c*d^2) + log(c*x - 1)/(c
*d^2)) - 1/4*(2*b^3*c*x*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^3 - (b^
3*c^2*x^2 - b^3)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^3*log(c*x + 1)
 + (b^3*c^2*x^2 - b^3)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^3*log(-c
*x + 1) - 4*(c^3*d^2*x^2 - c*d^2)*integrate(3/4*(4*a*b^2*arctan2(c*x, sqrt
(c*x + 1)*sqrt(-c*x + 1))^2 + 4*a^2*b*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x
 + 1)) - (2*b^3*c*x*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 - (b^3*c^
2*x^2 - b^3)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2*log(c*x + 1) + (
b^3*c^2*x^2 - b^3)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2*log(-c*x +
 1))*sqrt(c*x + 1)*sqrt(-c*x + 1))/(c^4*d^2*x^4 - 2*c^2*d^2*x^2 + d^2), x)
)/(c^3*d^2*x^2 - c*d^2)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a + b \arcsin(cx))^3}{(d - c^2 dx^2)^2}\, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))^3/(-c^2*d*x^2+d)^2,x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a + b \arcsin(cx))^3}{(d - c^2 dx^2)^2}\, dx = \int \frac{(a + b \operatorname{asin}(c\, x))^3}{(d - c^2\, d\, x^2)^2}\, dx$$

input
```
int((a + b*asin(c*x))^3/(d - c^2*d*x^2)^2,x)
```

output
```
int((a + b*asin(c*x))^3/(d - c^2*d*x^2)^2, x)
```

Reduce [F]

$$\int \frac{(a+b\arcsin(cx))^3}{\left(d-c^2dx^2\right)^2}\,dx$$

$$= \frac{12\left(\int \frac{asin(cx)}{c^4x^4-2c^2x^2+1}dx\right)a^2bc^3x^2 - 12\left(\int \frac{asin(cx)}{c^4x^4-2c^2x^2+1}dx\right)a^2bc + 4\left(\int \frac{asin(cx)^3}{c^4x^4-2c^2x^2+1}dx\right)b^3c^3x^2 - 4\left(\int \frac{asin(cx}{c^4x^4-2c^2}\right.$$

input
```
int((a+b*asin(c*x))^3/(-c^2*d*x^2+d)^2,x)
```

output
```
(12*int(asin(c*x)/(c**4*x**4 - 2*c**2*x**2 + 1),x)*a**2*b*c**3*x**2 - 12*i
nt(asin(c*x)/(c**4*x**4 - 2*c**2*x**2 + 1),x)*a**2*b*c + 4*int(asin(c*x)**
3/(c**4*x**4 - 2*c**2*x**2 + 1),x)*b**3*c**3*x**2 - 4*int(asin(c*x)**3/(c*
*4*x**4 - 2*c**2*x**2 + 1),x)*b**3*c + 12*int(asin(c*x)**2/(c**4*x**4 - 2*
c**2*x**2 + 1),x)*a*b**2*c**3*x**2 - 12*int(asin(c*x)**2/(c**4*x**4 - 2*c*
*2*x**2 + 1),x)*a*b**2*c - log(c**2*x - c)*a**3*c**2*x**2 + log(c**2*x - c
)*a**3 + log(c**2*x + c)*a**3*c**2*x**2 - log(c**2*x + c)*a**3 - 2*a**3*c*
x)/(4*c*d**2*(c**2*x**2 - 1))
```

3.17 $\int \frac{\left(c-a^2cx^2\right)^3}{\arcsin(ax)}\,dx$

Optimal result . . . 250
Mathematica [A] (verified) . . . 250
Rubi [A] (verified) . . . 251
Maple [A] (verified) . . . 252
Fricas [F] . . . 253
Sympy [F] . . . 253
Maxima [F] . . . 253
Giac [A] (verification not implemented) . . . 254
Mupad [F(-1)] . . . 254
Reduce [F] . . . 254

Optimal result

Integrand size = 20, antiderivative size = 67

$$\int \frac{\left(c-a^2cx^2\right)^3}{\arcsin(ax)}\,dx = \frac{35c^3\,\mathrm{CosIntegral}(\arcsin(ax))}{64a} + \frac{21c^3\,\mathrm{CosIntegral}(3\arcsin(ax))}{64a} + \frac{7c^3\,\mathrm{CosIntegral}(5\arcsin(ax))}{64a} + \frac{c^3\,\mathrm{CosIntegral}(7\arcsin(ax))}{64a}$$

output

```
35/64*c^3*Ci(arcsin(a*x))/a+21/64*c^3*Ci(3*arcsin(a*x))/a+7/64*c^3*Ci(5*ar
csin(a*x))/a+1/64*c^3*Ci(7*arcsin(a*x))/a
```

Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.64

$$\int \frac{\left(c-a^2cx^2\right)^3}{\arcsin(ax)}\,dx = \frac{c^3(35\,\mathrm{CosIntegral}(\arcsin(ax)) + 21\,\mathrm{CosIntegral}(3\arcsin(ax)) + 7\,\mathrm{CosIntegral}(5\arcsin(ax)) + \mathrm{CosInteg}}{64a}$$

input

```
Integrate[(c - a^2*c*x^2)^3/ArcSin[a*x],x]
```

output
```
(c^3*(35*CosIntegral[ArcSin[a*x]] + 21*CosIntegral[3*ArcSin[a*x]] + 7*CosI
ntegral[5*ArcSin[a*x]] + CosIntegral[7*ArcSin[a*x]]))/(64*a)
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 50, normalized size of antiderivative = 0.75, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(c-a^2cx^2\right)^3}{\arcsin(ax)}\,dx$$

$$\downarrow 5168$$

$$\frac{c^3\int \frac{\left(1-a^2x^2\right)^{7/2}}{\arcsin(ax)}d\arcsin(ax)}{a}$$

$$\downarrow 3042$$

$$\frac{c^3\int \frac{\sin\left(\arcsin(ax)+\frac{\pi}{2}\right)^7}{\arcsin(ax)}d\arcsin(ax)}{a}$$

$$\downarrow 3793$$

$$\frac{c^3\int \left(\frac{21\cos(3\arcsin(ax))}{64\arcsin(ax)}+\frac{7\cos(5\arcsin(ax))}{64\arcsin(ax)}+\frac{\cos(7\arcsin(ax))}{64\arcsin(ax)}+\frac{35\sqrt{1-a^2x^2}}{64\arcsin(ax)}\right)d\arcsin(ax)}{a}$$

$$\downarrow 2009$$

$$\frac{c^3\left(\frac{35}{64}\,\text{CosIntegral}(\arcsin(ax))+\frac{21}{64}\,\text{CosIntegral}(3\arcsin(ax))+\frac{7}{64}\,\text{CosIntegral}(5\arcsin(ax))+\frac{1}{64}\,\text{CosIntegral}(7\right.}{a}$$

input
```
Int[(c - a^2*c*x^2)^3/ArcSin[a*x],x]
```

output
```
(c^3*((35*CosIntegral[ArcSin[a*x]])/64 + (21*CosIntegral[3*ArcSin[a*x]])/6
4 + (7*CosIntegral[5*ArcSin[a*x]])/64 + CosIntegral[7*ArcSin[a*x]]/64))/a
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 42, normalized size of antiderivative = 0.63

method	result	size
derivativedivides	$\frac{c^3(35\ \mathrm{Ci}(\arcsin(ax))+21\ \mathrm{Ci}(3\arcsin(ax))+7\ \mathrm{Ci}(5\arcsin(ax))+\mathrm{Ci}(7\arcsin(ax)))}{64a}$	42
default	$\frac{c^3(35\ \mathrm{Ci}(\arcsin(ax))+21\ \mathrm{Ci}(3\arcsin(ax))+7\ \mathrm{Ci}(5\arcsin(ax))+\mathrm{Ci}(7\arcsin(ax)))}{64a}$	42

input
```
int((-a^2*c*x^2+c)^3/arcsin(a*x),x,method=_RETURNVERBOSE)
```

output
```
1/64/a*c^3*(35*Ci(arcsin(a*x))+21*Ci(3*arcsin(a*x))+7*Ci(5*arcsin(a*x))+Ci
(7*arcsin(a*x)))
```

Fricas [F]

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)}\,dx = \int -\frac{(a^2cx^2-c)^3}{\arcsin(ax)}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^3/arcsin(a*x),x, algorithm="fricas")
```

output
```
integral(-(a^6*c^3*x^6 - 3*a^4*c^3*x^4 + 3*a^2*c^3*x^2 - c^3)/arcsin(a*x),
 x)
```

Sympy [F]

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)}\,dx = -c^3\left(\int \frac{3a^2x^2}{\operatorname{asin}(ax)}\,dx + \int \left(-\frac{3a^4x^4}{\operatorname{asin}(ax)}\right)\,dx + \int \frac{a^6x^6}{\operatorname{asin}(ax)}\,dx + \int \left(-\frac{1}{\operatorname{asin}(ax)}\right)\,dx\right)$$

input
```
integrate((-a**2*c*x**2+c)**3/asin(a*x),x)
```

output
```
-c**3*(Integral(3*a**2*x**2/asin(a*x), x) + Integral(-3*a**4*x**4/asin(a*x
), x) + Integral(a**6*x**6/asin(a*x), x) + Integral(-1/asin(a*x), x))
```

Maxima [F]

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)}\,dx = \int -\frac{(a^2cx^2-c)^3}{\arcsin(ax)}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^3/arcsin(a*x),x, algorithm="maxima")
```

output
```
-integrate((a^2*c*x^2 - c)^3/arcsin(a*x), x)
```

Giac [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 59, normalized size of antiderivative = 0.88

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)}\,dx = \frac{c^3\,\mathrm{Ci}\left(7\,\arcsin\left(ax\right)\right)}{64\,a} + \frac{7\,c^3\,\mathrm{Ci}\left(5\,\arcsin\left(ax\right)\right)}{64\,a} + \frac{21\,c^3\,\mathrm{Ci}\left(3\,\arcsin\left(ax\right)\right)}{64\,a} + \frac{35\,c^3\,\mathrm{Ci}\left(\arcsin\left(ax\right)\right)}{64\,a}$$

input
```
integrate((-a^2*c*x^2+c)^3/arcsin(a*x),x, algorithm="giac")
```

output
```
1/64*c^3*cos_integral(7*arcsin(a*x))/a + 7/64*c^3*cos_integral(5*arcsin(a*
x))/a + 21/64*c^3*cos_integral(3*arcsin(a*x))/a + 35/64*c^3*cos_integral(a
rcsin(a*x))/a
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)}\,dx = \int \frac{(c-a^2\,c\,x^2)^3}{\mathrm{asin}\left(a\,x\right)}\,dx$$

input
```
int((c - a^2*c*x^2)^3/asin(a*x),x)
```

output
```
int((c - a^2*c*x^2)^3/asin(a*x), x)
```

Reduce [F]

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)}\,dx = c^3\left(-\left(\int \frac{x^6}{asin\left(ax\right)}dx\right)a^6 + 3\left(\int \frac{x^4}{asin\left(ax\right)}dx\right)a^4 - 3\left(\int \frac{x^2}{asin\left(ax\right)}dx\right)a^2 + \int \frac{1}{asin\left(ax\right)}dx\right)$$

input
```
int((-a^2*c*x^2+c)^3/asin(a*x),x)
```

output

```
c**3*( - int(x**6/asin(a*x),x)*a**6 + 3*int(x**4/asin(a*x),x)*a**4 - 3*int
(x**2/asin(a*x),x)*a**2 + int(1/asin(a*x),x))
```

3.18 $\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)}\,dx$

Optimal result . . . 256
Mathematica [A] (verified) . . . 256
Rubi [A] (verified) . . . 257
Maple [A] (verified) . . . 258
Fricas [F] . . . 259
Sympy [F] . . . 259
Maxima [F] . . . 259
Giac [A] (verification not implemented) . . . 260
Mupad [F(-1)] . . . 260
Reduce [F] . . . 260

Optimal result

Integrand size = 20, antiderivative size = 50

$$\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)}\,dx = \frac{5c^2\,\mathrm{CosIntegral}(\arcsin(ax))}{8a} + \frac{5c^2\,\mathrm{CosIntegral}(3\arcsin(ax))}{16a} + \frac{c^2\,\mathrm{CosIntegral}(5\arcsin(ax))}{16a}$$

output

```
5/8*c^2*Ci(arcsin(a*x))/a+5/16*c^2*Ci(3*arcsin(a*x))/a+1/16*c^2*Ci(5*arcsi
n(a*x))/a
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 34, normalized size of antiderivative = 0.68

$$\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)}\,dx = \frac{c^2(10\,\mathrm{CosIntegral}(\arcsin(ax)) + 5\,\mathrm{CosIntegral}(3\arcsin(ax)) + \mathrm{CosIntegral}(5\arcsin(ax)))}{16a}$$

input

```
Integrate[(c - a^2*c*x^2)^2/ArcSin[a*x],x]
```

output
```
(c^2*(10*CosIntegral[ArcSin[a*x]] + 5*CosIntegral[3*ArcSin[a*x]] + CosInte
gral[5*ArcSin[a*x]]))/(16*a)
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 39, normalized size of antiderivative = 0.78, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(c - a^2 c x^2\right)^2}{\arcsin(ax)}\, dx$$

$$\downarrow 5168$$

$$\frac{c^2 \int \frac{\left(1-a^2x^2\right)^{5/2}}{\arcsin(ax)} d\arcsin(ax)}{a}$$

$$\downarrow 3042$$

$$\frac{c^2 \int \frac{\sin\left(\arcsin(ax)+\frac{\pi}{2}\right)^5}{\arcsin(ax)} d\arcsin(ax)}{a}$$

$$\downarrow 3793$$

$$\frac{c^2 \int \left(\frac{5\cos(3\arcsin(ax))}{16\arcsin(ax)} + \frac{\cos(5\arcsin(ax))}{16\arcsin(ax)} + \frac{5\sqrt{1-a^2x^2}}{8\arcsin(ax)}\right) d\arcsin(ax)}{a}$$

$$\downarrow 2009$$

$$\frac{c^2\left(\frac{5}{8}\,\text{CosIntegral}(\arcsin(ax)) + \frac{5}{16}\,\text{CosIntegral}(3\arcsin(ax)) + \frac{1}{16}\,\text{CosIntegral}(5\arcsin(ax))\right)}{a}$$

input
```
Int[(c - a^2*c*x^2)^2/ArcSin[a*x],x]
```

output
```
(c^2*((5*CosIntegral[ArcSin[a*x]])/8 + (5*CosIntegral[3*ArcSin[a*x]])/16 +
 CosIntegral[5*ArcSin[a*x]]/16))/a
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 33, normalized size of antiderivative = 0.66

method	result	size
derivativedivides	$\frac{c^2(10\ \mathrm{Ci}(\arcsin(ax))+5\ \mathrm{Ci}(3\arcsin(ax))+\mathrm{Ci}(5\arcsin(ax)))}{16a}$	33
default	$\frac{c^2(10\ \mathrm{Ci}(\arcsin(ax))+5\ \mathrm{Ci}(3\arcsin(ax))+\mathrm{Ci}(5\arcsin(ax)))}{16a}$	33

input
```
int((-a^2*c*x^2+c)^2/arcsin(a*x),x,method=_RETURNVERBOSE)
```

output
```
1/16/a*c^2*(10*Ci(arcsin(a*x))+5*Ci(3*arcsin(a*x))+Ci(5*arcsin(a*x)))
```

Fricas [F]

$$\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)}\,dx = \int \frac{\left(a^2cx^2-c\right)^2}{\arcsin\left(ax\right)}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^2/arcsin(a*x),x, algorithm="fricas")
```

output
```
integral((a^4*c^2*x^4 - 2*a^2*c^2*x^2 + c^2)/arcsin(a*x), x)
```

Sympy [F]

$$\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)}\,dx = c^2\left(\int \left(-\frac{2a^2x^2}{\operatorname{asin}\left(ax\right)}\right)\,dx + \int \frac{a^4x^4}{\operatorname{asin}\left(ax\right)}\,dx + \int \frac{1}{\operatorname{asin}\left(ax\right)}\,dx\right)$$

input
```
integrate((-a**2*c*x**2+c)**2/asin(a*x),x)
```

output
```
c**2*(Integral(-2*a**2*x**2/asin(a*x), x) + Integral(a**4*x**4/asin(a*x),
x) + Integral(1/asin(a*x), x))
```

Maxima [F]

$$\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)}\,dx = \int \frac{\left(a^2cx^2-c\right)^2}{\arcsin\left(ax\right)}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^2/arcsin(a*x),x, algorithm="maxima")
```

output
```
integrate((a^2*c*x^2 - c)^2/arcsin(a*x), x)
```

Giac [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.88

$$\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)}\,dx = \frac{c^2\,\mathrm{Ci}\left(5\,\arcsin\left(ax\right)\right)}{16\,a} + \frac{5\,c^2\,\mathrm{Ci}\left(3\,\arcsin\left(ax\right)\right)}{16\,a} + \frac{5\,c^2\,\mathrm{Ci}\left(\arcsin\left(ax\right)\right)}{8\,a}$$

input
```
integrate((-a^2*c*x^2+c)^2/arcsin(a*x),x, algorithm="giac")
```

output
```
1/16*c^2*cos_integral(5*arcsin(a*x))/a + 5/16*c^2*cos_integral(3*arcsin(a*
x))/a + 5/8*c^2*cos_integral(arcsin(a*x))/a
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)}\,dx = \int \frac{\left(c-a^2\,c\,x^2\right)^2}{\mathrm{asin}\left(a\,x\right)}\,dx$$

input
```
int((c - a^2*c*x^2)^2/asin(a*x),x)
```

output
```
int((c - a^2*c*x^2)^2/asin(a*x), x)
```

Reduce [F]

$$\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)}\,dx = c^2\left(\left(\int \frac{x^4}{asin\left(ax\right)}dx\right)a^4 - 2\left(\int \frac{x^2}{asin\left(ax\right)}dx\right)a^2 + \int \frac{1}{asin\left(ax\right)}dx\right)$$

input
```
int((-a^2*c*x^2+c)^2/asin(a*x),x)
```

output
```
c**2*(int(x**4/asin(a*x),x)*a**4 - 2*int(x**2/asin(a*x),x)*a**2 + int(1/as
in(a*x),x))
```

3.19 $\int \frac{c-a^2cx^2}{\arcsin(ax)}\,dx$

Optimal result . . . 261
Mathematica [A] (verified) . . . 261
Rubi [A] (verified) . . . 262
Maple [A] (verified) . . . 263
Fricas [F] . . . 264
Sympy [F] . . . 264
Maxima [F] . . . 264
Giac [A] (verification not implemented) . . . 265
Mupad [F(-1)] . . . 265
Reduce [F] . . . 265

Optimal result

Integrand size = 18, antiderivative size = 29

$$\int \frac{c-a^2cx^2}{\arcsin(ax)}\,dx = \frac{3c\,\mathrm{CosIntegral}(\arcsin(ax))}{4a} + \frac{c\,\mathrm{CosIntegral}(3\arcsin(ax))}{4a}$$

output
```
3/4*c*Ci(arcsin(a*x))/a+1/4*c*Ci(3*arcsin(a*x))/a
```

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

$$\int \frac{c-a^2cx^2}{\arcsin(ax)}\,dx = \frac{c(3\,\mathrm{CosIntegral}(\arcsin(ax)) + \mathrm{CosIntegral}(3\arcsin(ax)))}{4a}$$

input
```
Integrate[(c - a^2*c*x^2)/ArcSin[a*x],x]
```

output
```
(c*(3*CosIntegral[ArcSin[a*x]] + CosIntegral[3*ArcSin[a*x]]))/(4*a)
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.90, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{c - a^2 c x^2}{\arcsin(ax)}\, dx$$

$$\downarrow 5168$$

$$\frac{c \int \frac{(1-a^2x^2)^{3/2}}{\arcsin(ax)} d\arcsin(ax)}{a}$$

$$\downarrow 3042$$

$$\frac{c \int \frac{\sin\left(\arcsin(ax)+\frac{\pi}{2}\right)^3}{\arcsin(ax)} d\arcsin(ax)}{a}$$

$$\downarrow 3793$$

$$\frac{c \int \left(\frac{\cos(3\arcsin(ax))}{4\arcsin(ax)} + \frac{3\sqrt{1-a^2x^2}}{4\arcsin(ax)}\right) d\arcsin(ax)}{a}$$

$$\downarrow 2009$$

$$\frac{c\left(\frac{3}{4}\,\text{CosIntegral}(\arcsin(ax)) + \frac{1}{4}\,\text{CosIntegral}(3\arcsin(ax))\right)}{a}$$

input
```
Int[(c - a^2*c*x^2)/ArcSin[a*x],x]
```

output
```
(c*((3*CosIntegral[ArcSin[a*x]])/4 + CosIntegral[3*ArcSin[a*x]]/4))/a
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.76

method	result	size
derivativedivides	$\frac{c(3\ \mathrm{Ci}(\arcsin(ax))+\mathrm{Ci}(3\arcsin(ax)))}{4a}$	22
default	$\frac{c(3\ \mathrm{Ci}(\arcsin(ax))+\mathrm{Ci}(3\arcsin(ax)))}{4a}$	22

input
```
int((-a^2*c*x^2+c)/arcsin(a*x),x,method=_RETURNVERBOSE)
```

output
```
1/4/a*c*(3*Ci(arcsin(a*x))+Ci(3*arcsin(a*x)))
```

Fricas [F]

$$\int \frac{c - a^2cx^2}{\arcsin(ax)}\,dx = \int -\frac{a^2cx^2 - c}{\arcsin(ax)}\,dx$$

input
```
integrate((-a^2*c*x^2+c)/arcsin(a*x),x, algorithm="fricas")
```

output
```
integral(-(a^2*c*x^2 - c)/arcsin(a*x), x)
```

Sympy [F]

$$\int \frac{c - a^2cx^2}{\arcsin(ax)}\,dx = -c\left(\int \frac{a^2x^2}{\operatorname{asin}(ax)}\,dx + \int \left(-\frac{1}{\operatorname{asin}(ax)}\right)\,dx\right)$$

input
```
integrate((-a**2*c*x**2+c)/asin(a*x),x)
```

output
```
-c*(Integral(a**2*x**2/asin(a*x), x) + Integral(-1/asin(a*x), x))
```

Maxima [F]

$$\int \frac{c - a^2cx^2}{\arcsin(ax)}\,dx = \int -\frac{a^2cx^2 - c}{\arcsin(ax)}\,dx$$

input
```
integrate((-a^2*c*x^2+c)/arcsin(a*x),x, algorithm="maxima")
```

output
```
-integrate((a^2*c*x^2 - c)/arcsin(a*x), x)
```

Giac [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

$$\int \frac{c - a^2 c x^2}{\arcsin(ax)}\,dx = \frac{c\,\mathrm{Ci}\left(3\,\arcsin\left(ax\right)\right)}{4\,a} + \frac{3\,c\,\mathrm{Ci}\left(\arcsin\left(ax\right)\right)}{4\,a}$$

input
```
integrate((-a^2*c*x^2+c)/arcsin(a*x),x, algorithm="giac")
```

output
```
1/4*c*cos_integral(3*arcsin(a*x))/a + 3/4*c*cos_integral(arcsin(a*x))/a
```

Mupad [F(-1)]

Timed out.

$$\int \frac{c - a^2 c x^2}{\arcsin(ax)}\,dx = \int \frac{c - a^2\,c\,x^2}{\mathrm{asin}\left(a\,x\right)}\,dx$$

input
```
int((c - a^2*c*x^2)/asin(a*x),x)
```

output
```
int((c - a^2*c*x^2)/asin(a*x), x)
```

Reduce [F]

$$\int \frac{c - a^2 c x^2}{\arcsin(ax)}\,dx = c\left(-\left(\int \frac{x^2}{asin\left(ax\right)}dx\right)a^2 + \int \frac{1}{asin\left(ax\right)}dx\right)$$

input
```
int((-a^2*c*x^2+c)/asin(a*x),x)
```

output
```
c*( - int(x**2/asin(a*x),x)*a**2 + int(1/asin(a*x),x))
```

3.20 $\int \frac{1}{(c-a^2cx^2)\arcsin(ax)}\,dx$

Optimal result 266
Mathematica [N/A] 266
Rubi [N/A] 267
Maple [N/A] 267
Fricas [N/A] 268
Sympy [N/A] 268
Maxima [N/A] 268
Giac [N/A] 269
Mupad [N/A] 269
Reduce [N/A] 270

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)}\,dx = \text{Int}\left(\frac{1}{(c-a^2cx^2)\arcsin(ax)},x\right)$$

output
```
Defer(Int)(1/(-a^2*c*x^2+c)/arcsin(a*x),x)
```

Mathematica [N/A]

Not integrable

Time = 1.88 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)}\,dx = \int \frac{1}{(c-a^2cx^2)\arcsin(ax)}\,dx$$

input
```
Integrate[1/((c - a^2*c*x^2)*ArcSin[a*x]),x]
```

output
```
Integrate[1/((c - a^2*c*x^2)*ArcSin[a*x]), x]
```

Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\arcsin(ax)\left(c - a^2cx^2\right)}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{\arcsin(ax)\left(c - a^2cx^2\right)}dx$$

input
```
Int[1/((c - a^2*c*x^2)*ArcSin[a*x]),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

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

input
```
int(1/(-a^2*c*x^2+c)/arcsin(a*x),x)
```

output
```
int(1/(-a^2*c*x^2+c)/arcsin(a*x),x)
```

Fricas [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)}\,dx = \int -\frac{1}{(a^2cx^2-c)\arcsin(ax)}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)/arcsin(a*x),x, algorithm="fricas")
```

output
```
integral(-1/((a^2*c*x^2 - c)*arcsin(a*x)), x)
```

Sympy [N/A]

Not integrable

Time = 0.89 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)}\,dx = -\frac{\int \frac{1}{a^2x^2\operatorname{asin}(ax)-\operatorname{asin}(ax)}\,dx}{c}$$

input
```
integrate(1/(-a**2*c*x**2+c)/asin(a*x),x)
```

output
```
-Integral(1/(a**2*x**2*asin(a*x) - asin(a*x)), x)/c
```

Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.25

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)}\,dx = \int -\frac{1}{(a^2cx^2-c)\arcsin(ax)}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)/arcsin(a*x),x, algorithm="maxima")
```

output
```
-integrate(1/((a^2*c*x^2 - c)*arcsin(a*x)), x)
```

Giac [N/A]

Not integrable

Time = 0.41 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

$$\int \frac{1}{(c - a^2cx^2)\arcsin(ax)}\,dx = \int -\frac{1}{(a^2cx^2 - c)\arcsin(ax)}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)/arcsin(a*x),x, algorithm="giac")
```

output
```
integrate(-1/((a^2*c*x^2 - c)*arcsin(a*x)), x)
```

Mupad [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(c - a^2cx^2)\arcsin(ax)}\,dx = \int \frac{1}{\operatorname{asin}(a\,x)\,(c - a^2\,c\,x^2)}\,dx$$

input
```
int(1/(asin(a*x)*(c - a^2*c*x^2)),x)
```

output
```
int(1/(asin(a*x)*(c - a^2*c*x^2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.35

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)}\,dx = -\frac{\int \frac{1}{asin(ax)a^2x^2-asin(ax)}dx}{c}$$

input
```
int(1/(-a^2*c*x^2+c)/asin(a*x),x)
```

output
```
( - int(1/(asin(a*x)*a**2*x**2 - asin(a*x)),x))/c
```

3.21 $\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)}\,dx$

Optimal result 271
Mathematica [N/A] 271
Rubi [N/A] 272
Maple [N/A] 272
Fricas [N/A] 273
Sympy [N/A] 273
Maxima [N/A] 273
Giac [N/A] 274
Mupad [N/A] 274
Reduce [N/A] 275

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)}\,dx = \text{Int}\left(\frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)}, x\right)$$

output
```
Defer(Int)(1/(-a^2*c*x^2+c)^2/arcsin(a*x),x)
```

Mathematica [N/A]

Not integrable

Time = 5.39 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)}\,dx = \int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)}\,dx$$

input
```
Integrate[1/((c - a^2*c*x^2)^2*ArcSin[a*x]),x]
```

output
```
Integrate[1/((c - a^2*c*x^2)^2*ArcSin[a*x]), x]
```

Rubi [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\arcsin(ax)\left(c-a^2cx^2\right)^2}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{\arcsin(ax)\left(c-a^2cx^2\right)^2}dx$$

input
```
Int[1/((c - a^2*c*x^2)^2*ArcSin[a*x]),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.41 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

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

input
```
int(1/(-a^2*c*x^2+c)^2/arcsin(a*x),x)
```

output
```
int(1/(-a^2*c*x^2+c)^2/arcsin(a*x),x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)}\,dx = \int \frac{1}{\left(a^2cx^2-c\right)^2 \arcsin\left(ax\right)}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)^2/arcsin(a*x),x, algorithm="fricas")
```

output
```
integral(1/((a^4*c^2*x^4 - 2*a^2*c^2*x^2 + c^2)*arcsin(a*x)), x)
```

Sympy [N/A]

Not integrable

Time = 1.24 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)}\,dx = \frac{\int \frac{1}{a^4x^4 \operatorname{asin}\left(ax\right)-2a^2x^2 \operatorname{asin}\left(ax\right)+\operatorname{asin}\left(ax\right)}\,dx}{c^2}$$

input
```
integrate(1/(-a**2*c*x**2+c)**2/asin(a*x),x)
```

output
```
Integral(1/(a**4*x**4*asin(a*x) - 2*a**2*x**2*asin(a*x) + asin(a*x)), x)/c
**2
```

Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)}\,dx = \int \frac{1}{\left(a^2cx^2-c\right)^2 \arcsin\left(ax\right)}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)^2/arcsin(a*x),x, algorithm="maxima")
```

output
```
integrate(1/((a^2*c*x^2 - c)^2*arcsin(a*x)), x)
```

Giac [N/A]

Not integrable

Time = 1.50 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{1}{\left(c - a^2 c x^2\right)^2 \arcsin(ax)}\, dx = \int \frac{1}{\left(a^2 c x^2 - c\right)^2 \arcsin\left(ax\right)}\, dx$$

input
```
integrate(1/(-a^2*c*x^2+c)^2/arcsin(a*x),x, algorithm="giac")
```

output
```
integrate(1/((a^2*c*x^2 - c)^2*arcsin(a*x)), x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{\left(c - a^2 c x^2\right)^2 \arcsin(ax)}\, dx = \int \frac{1}{\operatorname{asin}\left(a\,x\right)\,\left(c - a^2\,c\,x^2\right)^2}\, dx$$

input
```
int(1/(asin(a*x)*(c - a^2*c*x^2)^2),x)
```

output
```
int(1/(asin(a*x)*(c - a^2*c*x^2)^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)}\,dx = \frac{\int \frac{1}{asin(ax)a^4x^4-2asin(ax)a^2x^2+asin(ax)}dx}{c^2}$$

input
```
int(1/(-a^2*c*x^2+c)^2/asin(a*x),x)
```

output
```
int(1/(asin(a*x)*a**4*x**4 - 2*asin(a*x)*a**2*x**2 + asin(a*x)),x)/c**2
```

3.22 $\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)^2}\,dx$

Optimal result . . . 276
Mathematica [A] (verified) . . . 276
Rubi [A] (verified) . . . 277
Maple [A] (verified) . . . 279
Fricas [F] . . . 279
Sympy [F] . . . 280
Maxima [F] . . . 280
Giac [A] (verification not implemented) . . . 281
Mupad [F(-1)] . . . 281
Reduce [F] . . . 282

Optimal result

Integrand size = 20, antiderivative size = 95

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)^2}\,dx = -\frac{c^3(1-a^2x^2)^{7/2}}{a\arcsin(ax)} - \frac{35c^3\mathrm{Si}(\arcsin(ax))}{64a} - \frac{63c^3\mathrm{Si}(3\arcsin(ax))}{64a} - \frac{35c^3\mathrm{Si}(5\arcsin(ax))}{64a} - \frac{7c^3\mathrm{Si}(7\arcsin(ax))}{64a}$$

output

```
-c^3*(-a^2*x^2+1)^(7/2)/a/arcsin(a*x)-35/64*c^3*Si(arcsin(a*x))/a-63/64*c^
3*Si(3*arcsin(a*x))/a-35/64*c^3*Si(5*arcsin(a*x))/a-7/64*c^3*Si(7*arcsin(a
*x))/a
```

Mathematica [A] (verified)

Time = 0.40 (sec) , antiderivative size = 83, normalized size of antiderivative = 0.87

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)^2}\,dx = -\frac{c^3\Big(64(1-a^2x^2)^{7/2} + 35\arcsin(ax)\mathrm{Si}(\arcsin(ax)) + 63\arcsin(ax)\mathrm{Si}(3\arcsin(ax)) + 35\arcsin(ax)\mathrm{Si}(5\arcsin(ax)) + 7\arcsin(ax)\mathrm{Si}(7\arcsin(ax))\Big)}{64a\arcsin(ax)}$$

input

```
Integrate[(c - a^2*c*x^2)^3/ArcSin[a*x]^2,x]
```

output

```
-1/64*(c^3*(64*(1 - a^2*x^2)^(7/2) + 35*ArcSin[a*x]*SinIntegral[ArcSin[a*x
]] + 63*ArcSin[a*x]*SinIntegral[3*ArcSin[a*x]] + 35*ArcSin[a*x]*SinIntegra
l[5*ArcSin[a*x]] + 7*ArcSin[a*x]*SinIntegral[7*ArcSin[a*x]]))/(a*ArcSin[a*
x])
```

Rubi [A] (verified)

Time = 0.48 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.84, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {5166, 5224, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(c-a^2cx^2\right)^3}{\arcsin(ax)^2}\,dx$$

$$\downarrow 5166$$

$$-7ac^3\int \frac{x\left(1-a^2x^2\right)^{5/2}}{\arcsin(ax)}dx - \frac{c^3\left(1-a^2x^2\right)^{7/2}}{a\arcsin(ax)}$$

$$\downarrow 5224$$

$$-\frac{7c^3\int \frac{ax\left(1-a^2x^2\right)^3}{\arcsin(ax)}d\arcsin(ax)}{a} - \frac{c^3\left(1-a^2x^2\right)^{7/2}}{a\arcsin(ax)}$$

$$\downarrow 4906$$

$$-\frac{7c^3\int \left(\frac{5ax}{64\arcsin(ax)} + \frac{9\sin(3\arcsin(ax))}{64\arcsin(ax)} + \frac{5\sin(5\arcsin(ax))}{64\arcsin(ax)} + \frac{\sin(7\arcsin(ax))}{64\arcsin(ax)}\right)d\arcsin(ax)}{a} - \frac{c^3\left(1-a^2x^2\right)^{7/2}}{a\arcsin(ax)}$$

$$\downarrow 2009$$

$$-\frac{c^3\left(1-a^2x^2\right)^{7/2}}{a\arcsin(ax)} - \frac{7c^3\left(\frac{5}{64}\text{Si}(\arcsin(ax)) + \frac{9}{64}\text{Si}(3\arcsin(ax)) + \frac{5}{64}\text{Si}(5\arcsin(ax)) + \frac{1}{64}\text{Si}(7\arcsin(ax))\right)}{a}$$

input
```
Int[(c - a^2*c*x^2)^3/ArcSin[a*x]^2,x]
```

output
```
-((c^3*(1 - a^2*x^2)^(7/2))/(a*ArcSin[a*x])) - (7*c^3*((5*SinIntegral[ArcS
in[a*x]])/64 + (9*SinIntegral[3*ArcSin[a*x]])/64 + (5*SinIntegral[5*ArcSin
[a*x]])/64 + SinIntegral[7*ArcSin[a*x]]/64))/a
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 105, normalized size of antiderivative = 1.11

method	result
derivativedivides	$-\frac{c^3\left(35\ \mathrm{Si}(\arcsin(ax))\arcsin(ax)+63\ \mathrm{Si}(3\arcsin(ax))\arcsin(ax)+35\ \mathrm{Si}(5\arcsin(ax))\arcsin(ax)+7\ \mathrm{Si}(7\arcsin(ax))\right.}{64a\arcsin(ax)}$
default	$-\frac{c^3\left(35\ \mathrm{Si}(\arcsin(ax))\arcsin(ax)+63\ \mathrm{Si}(3\arcsin(ax))\arcsin(ax)+35\ \mathrm{Si}(5\arcsin(ax))\arcsin(ax)+7\ \mathrm{Si}(7\arcsin(ax))\right.}{64a\arcsin(ax)}$

input
```
int((-a^2*c*x^2+c)^3/arcsin(a*x)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/64/a*c^3*(35*Si(arcsin(a*x))*arcsin(a*x)+63*Si(3*arcsin(a*x))*arcsin(a*
x)+35*Si(5*arcsin(a*x))*arcsin(a*x)+7*Si(7*arcsin(a*x))*arcsin(a*x)+35*(-a
^2*x^2+1)^(1/2)+21*cos(3*arcsin(a*x))+7*cos(5*arcsin(a*x))+cos(7*arcsin(a*
x)))/arcsin(a*x)
```

Fricas [F]

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)^2}\,dx = \int -\frac{(a^2cx^2-c)^3}{\arcsin(ax)^2}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^3/arcsin(a*x)^2,x, algorithm="fricas")
```

output
```
integral(-(a^6*c^3*x^6 - 3*a^4*c^3*x^4 + 3*a^2*c^3*x^2 - c^3)/arcsin(a*x)^
2, x)
```

Sympy [F]

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)^2}\,dx = -c^3\left(\int \frac{3a^2x^2}{\operatorname{asin}^2(ax)}\,dx + \int\left(-\frac{3a^4x^4}{\operatorname{asin}^2(ax)}\right)dx + \int \frac{a^6x^6}{\operatorname{asin}^2(ax)}\,dx + \int\left(-\frac{1}{\operatorname{asin}^2(ax)}\right)dx\right)$$

input
```
integrate((-a**2*c*x**2+c)**3/asin(a*x)**2,x)
```

output
```
-c**3*(Integral(3*a**2*x**2/asin(a*x)**2, x) + Integral(-3*a**4*x**4/asin(
a*x)**2, x) + Integral(a**6*x**6/asin(a*x)**2, x) + Integral(-1/asin(a*x)*
*2, x))
```

Maxima [F]

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)^2}\,dx = \int -\frac{(a^2cx^2-c)^3}{\arcsin(ax)^2}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^3/arcsin(a*x)^2,x, algorithm="maxima")
```

output
```
-(a*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))*integrate(7*(a^5*c^3*x^5 -
2*a^3*c^3*x^3 + a*c^3*x)*sqrt(a*x + 1)*sqrt(-a*x + 1)/arctan2(a*x, sqrt(a*
x + 1)*sqrt(-a*x + 1)), x) - (a^6*c^3*x^6 - 3*a^4*c^3*x^4 + 3*a^2*c^3*x^2
- c^3)*sqrt(a*x + 1)*sqrt(-a*x + 1))/(a*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a
*x + 1)))
```

Giac [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 95, normalized size of antiderivative = 1.00

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)^2}\,dx = \frac{(a^2x^2-1)^3\sqrt{-a^2x^2+1}c^3}{a\arcsin(ax)} - \frac{7\,c^3\,\mathrm{Si}(7\arcsin(ax))}{64\,a} - \frac{35\,c^3\,\mathrm{Si}(5\arcsin(ax))}{64\,a} - \frac{63\,c^3\,\mathrm{Si}(3\arcsin(ax))}{64\,a} - \frac{35\,c^3\,\mathrm{Si}(\arcsin(ax))}{64\,a}$$

input
```
integrate((-a^2*c*x^2+c)^3/arcsin(a*x)^2,x, algorithm="giac")
```

output
```
(a^2*x^2 - 1)^3*sqrt(-a^2*x^2 + 1)*c^3/(a*arcsin(a*x)) - 7/64*c^3*sin_integral(7*arcsin(a*x))/a - 35/64*c^3*sin_integral(5*arcsin(a*x))/a - 63/64*c^3*sin_integral(3*arcsin(a*x))/a - 35/64*c^3*sin_integral(arcsin(a*x))/a
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)^2}\,dx = \int \frac{(c-a^2\,c\,x^2)^3}{\mathrm{asin}(a\,x)^2}\,dx$$

input
```
int((c - a^2*c*x^2)^3/asin(a*x)^2,x)
```

output
```
int((c - a^2*c*x^2)^3/asin(a*x)^2, x)
```

Reduce [F]

$$\int \frac{(c-a^2cx^2)^3}{\arcsin(ax)^2}\,dx = c^3\left(-\left(\int \frac{x^6}{asin\,(ax)^2}dx\right)a^6 + 3\left(\int \frac{x^4}{asin\,(ax)^2}dx\right)a^4 - 3\left(\int \frac{x^2}{asin\,(ax)^2}dx\right)a^2 + \int \frac{1}{asin\,(ax)^2}dx\right)$$

input

```
int((-a^2*c*x^2+c)^3/asin(a*x)^2,x)
```

output

```
c**3*( - int(x**6/asin(a*x)**2,x)*a**6 + 3*int(x**4/asin(a*x)**2,x)*a**4 -
 3*int(x**2/asin(a*x)**2,x)*a**2 + int(1/asin(a*x)**2,x))
```

3.23 $\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)^2}\,dx$

Optimal result . . . 283
Mathematica [A] (verified) . . . 283
Rubi [A] (verified) . . . 284
Maple [A] (verified) . . . 285
Fricas [F] . . . 286
Sympy [F] . . . 286
Maxima [F] . . . 287
Giac [A] (verification not implemented) . . . 287
Mupad [F(-1)] . . . 288
Reduce [F] . . . 288

Optimal result

Integrand size = 20, antiderivative size = 78

$$\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)^2}\,dx = -\frac{c^2(1-a^2x^2)^{5/2}}{a\arcsin(ax)} - \frac{5c^2\mathrm{Si}(\arcsin(ax))}{8a} - \frac{15c^2\mathrm{Si}(3\arcsin(ax))}{16a} - \frac{5c^2\mathrm{Si}(5\arcsin(ax))}{16a}$$

output

```
-c^2*(-a^2*x^2+1)^(5/2)/a/arcsin(a*x)-5/8*c^2*Si(arcsin(a*x))/a-15/16*c^2*
Si(3*arcsin(a*x))/a-5/16*c^2*Si(5*arcsin(a*x))/a
```

Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 70, normalized size of antiderivative = 0.90

$$\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)^2}\,dx = -\frac{c^2\Big(16(1-a^2x^2)^{5/2} + 10\arcsin(ax)\mathrm{Si}(\arcsin(ax)) + 15\arcsin(ax)\mathrm{Si}(3\arcsin(ax)) + 5\arcsin(ax)\mathrm{Si}(5\,a\Big)}{16a\arcsin(ax)}$$

input

```
Integrate[(c - a^2*c*x^2)^2/ArcSin[a*x]^2,x]
```

output
```
-1/16*(c^2*(16*(1 - a^2*x^2)^(5/2) + 10*ArcSin[a*x]*SinIntegral[ArcSin[a*x
]] + 15*ArcSin[a*x]*SinIntegral[3*ArcSin[a*x]] + 5*ArcSin[a*x]*SinIntegral
[5*ArcSin[a*x]]))/(a*ArcSin[a*x])
```

Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 69, normalized size of antiderivative = 0.88, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {5166, 5224, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(c - a^2 c x^2\right)^2}{\arcsin(ax)^2}\, dx$$

$$\downarrow 5166$$

$$-5ac^2 \int \frac{x\left(1 - a^2x^2\right)^{3/2}}{\arcsin(ax)} dx - \frac{c^2\left(1 - a^2x^2\right)^{5/2}}{a \arcsin(ax)}$$

$$\downarrow 5224$$

$$-\frac{5c^2 \int \frac{ax\left(1-a^2x^2\right)^2}{\arcsin(ax)} d\arcsin(ax)}{a} - \frac{c^2\left(1 - a^2x^2\right)^{5/2}}{a \arcsin(ax)}$$

$$\downarrow 4906$$

$$-\frac{5c^2 \int \left(\frac{ax}{8\arcsin(ax)} + \frac{3\sin(3\arcsin(ax))}{16\arcsin(ax)} + \frac{\sin(5\arcsin(ax))}{16\arcsin(ax)}\right) d\arcsin(ax)}{a} - \frac{c^2\left(1 - a^2x^2\right)^{5/2}}{a \arcsin(ax)}$$

$$\downarrow 2009$$

$$-\frac{c^2\left(1 - a^2x^2\right)^{5/2}}{a \arcsin(ax)} - \frac{5c^2\left(\frac{1}{8}\text{Si}(\arcsin(ax)) + \frac{3}{16}\text{Si}(3\arcsin(ax)) + \frac{1}{16}\text{Si}(5\arcsin(ax))\right)}{a}$$

input
```
Int[(c - a^2*c*x^2)^2/ArcSin[a*x]^2,x]
```

output
```
-((c^2*(1 - a^2*x^2)^(5/2))/(a*ArcSin[a*x])) - (5*c^2*(SinIntegral[ArcSin[
a*x]]/8 + (3*SinIntegral[3*ArcSin[a*x]])/16 + SinIntegral[5*ArcSin[a*x]]/1
6))/a
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 83, normalized size of antiderivative = 1.06

method	result
derivativedivides	$-\frac{c^2\left(10\ \mathrm{Si}(\arcsin(ax))\arcsin(ax)+15\ \mathrm{Si}(3\arcsin(ax))\arcsin(ax)+5\ \mathrm{Si}(5\arcsin(ax))\arcsin(ax)+10\sqrt{-a^2x^2+1}+5\,c\right.}{16a\arcsin(ax)}$
default	$-\frac{c^2\left(10\ \mathrm{Si}(\arcsin(ax))\arcsin(ax)+15\ \mathrm{Si}(3\arcsin(ax))\arcsin(ax)+5\ \mathrm{Si}(5\arcsin(ax))\arcsin(ax)+10\sqrt{-a^2x^2+1}+5\,c\right.}{16a\arcsin(ax)}$

input
```
int((-a^2*c*x^2+c)^2/arcsin(a*x)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/16/a*c^2*(10*Si(arcsin(a*x))*arcsin(a*x)+15*Si(3*arcsin(a*x))*arcsin(a*
x)+5*Si(5*arcsin(a*x))*arcsin(a*x)+10*(-a^2*x^2+1)^(1/2)+5*cos(3*arcsin(a*
x))+cos(5*arcsin(a*x)))/arcsin(a*x)
```

Fricas [F]

$$\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)^2}\,dx = \int \frac{\left(a^2cx^2-c\right)^2}{\arcsin\left(ax\right)^2}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^2/arcsin(a*x)^2,x, algorithm="fricas")
```

output
```
integral((a^4*c^2*x^4 - 2*a^2*c^2*x^2 + c^2)/arcsin(a*x)^2, x)
```

Sympy [F]

$$\int \frac{\left(c-a^2cx^2\right)^2}{\arcsin(ax)^2}\,dx = c^2\left(\int \left(-\frac{2a^2x^2}{\operatorname{asin}^2\left(ax\right)}\right)\,dx + \int \frac{a^4x^4}{\operatorname{asin}^2\left(ax\right)}\,dx + \int \frac{1}{\operatorname{asin}^2\left(ax\right)}\,dx\right)$$

input
```
integrate((-a**2*c*x**2+c)**2/asin(a*x)**2,x)
```

output
```
c**2*(Integral(-2*a**2*x**2/asin(a*x)**2, x) + Integral(a**4*x**4/asin(a*x
)**2, x) + Integral(asin(a*x)**(-2), x))
```

Maxima [F]

$$\int \frac{\left(c - a^2 c x^2\right)^2}{\arcsin(ax)^2}\,dx = \int \frac{\left(a^2 c x^2 - c\right)^2}{\arcsin\left(ax\right)^2}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^2/arcsin(a*x)^2,x, algorithm="maxima")
```

output
```
(a*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))*integrate(5*(a^3*c^2*x^3 - a
*c^2*x)*sqrt(a*x + 1)*sqrt(-a*x + 1)/arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x
+ 1)), x) - (a^4*c^2*x^4 - 2*a^2*c^2*x^2 + c^2)*sqrt(a*x + 1)*sqrt(-a*x +
1))/(a*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)))
```

Giac [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.04

$$\int \frac{\left(c - a^2 c x^2\right)^2}{\arcsin(ax)^2}\,dx = -\frac{\left(a^2x^2 - 1\right)^2\sqrt{-a^2x^2 + 1}c^2}{a\arcsin\left(ax\right)} - \frac{5\,c^2\,\mathrm{Si}\left(5\,\arcsin\left(ax\right)\right)}{16\,a} - \frac{15\,c^2\,\mathrm{Si}\left(3\,\arcsin\left(ax\right)\right)}{16\,a} - \frac{5\,c^2\,\mathrm{Si}\left(\arcsin\left(ax\right)\right)}{8\,a}$$

input
```
integrate((-a^2*c*x^2+c)^2/arcsin(a*x)^2,x, algorithm="giac")
```

output
```
-(a^2*x^2 - 1)^2*sqrt(-a^2*x^2 + 1)*c^2/(a*arcsin(a*x)) - 5/16*c^2*sin_int
egral(5*arcsin(a*x))/a - 15/16*c^2*sin_integral(3*arcsin(a*x))/a - 5/8*c^2
*sin_integral(arcsin(a*x))/a
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(c-a^2cx^2)^2}{\arcsin(ax)^2}\,dx = \int \frac{(c-a^2\,c\,x^2)^2}{\operatorname{asin}(a\,x)^2}\,dx$$

input
```
int((c - a^2*c*x^2)^2/asin(a*x)^2,x)
```

output
```
int((c - a^2*c*x^2)^2/asin(a*x)^2, x)
```

Reduce [F]

$$\int \frac{(c-a^2cx^2)^2}{\arcsin(ax)^2}\,dx = c^2\left(\left(\int \frac{x^4}{asin\,(ax)^2}dx\right)a^4 - 2\left(\int \frac{x^2}{asin\,(ax)^2}dx\right)a^2 + \int \frac{1}{asin\,(ax)^2}dx\right)$$

input
```
int((-a^2*c*x^2+c)^2/asin(a*x)^2,x)
```

output
```
c**2*(int(x**4/asin(a*x)**2,x)*a**4 - 2*int(x**2/asin(a*x)**2,x)*a**2 + in
t(1/asin(a*x)**2,x))
```

3.24 $\int \frac{c-a^2cx^2}{\arcsin(ax)^2}\,dx$

Optimal result . . . 289
Mathematica [A] (verified) . . . 289
Rubi [A] (verified) . . . 290
Maple [A] (verified) . . . 291
Fricas [F] . . . 292
Sympy [F] . . . 292
Maxima [F] . . . 292
Giac [A] (verification not implemented) . . . 293
Mupad [F(-1)] . . . 293
Reduce [F] . . . 294

Optimal result

Integrand size = 18, antiderivative size = 55

$$\int \frac{c-a^2cx^2}{\arcsin(ax)^2}\,dx = -\frac{c(1-a^2x^2)^{3/2}}{a\arcsin(ax)} - \frac{3c\mathrm{Si}(\arcsin(ax))}{4a} - \frac{3c\mathrm{Si}(3\arcsin(ax))}{4a}$$

output

```
-c*(-a^2*x^2+1)^(3/2)/a/arcsin(a*x)-3/4*c*Si(arcsin(a*x))/a-3/4*c*Si(3*arc
sin(a*x))/a
```

Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.00

$$\int \frac{c-a^2cx^2}{\arcsin(ax)^2}\,dx = -\frac{c\left(4(1-a^2x^2)^{3/2} + 3\arcsin(ax)\mathrm{Si}(\arcsin(ax)) + 3\arcsin(ax)\mathrm{Si}(3\arcsin(ax))\right)}{4a\arcsin(ax)}$$

input

```
Integrate[(c - a^2*c*x^2)/ArcSin[a*x]^2,x]
```

output
```
-1/4*(c*(4*(1 - a^2*x^2)^(3/2) + 3*ArcSin[a*x]*SinIntegral[ArcSin[a*x]] +
3*ArcSin[a*x]*SinIntegral[3*ArcSin[a*x]]))/(a*ArcSin[a*x])
```

Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 54, normalized size of antiderivative = 0.98, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$, Rules used = {5166, 5224, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{c - a^2 c x^2}{\arcsin(ax)^2}\,dx$$

$$\downarrow 5166$$

$$-3ac\int \frac{x\sqrt{1-a^2x^2}}{\arcsin(ax)}dx - \frac{c\left(1-a^2x^2\right)^{3/2}}{a\arcsin(ax)}$$

$$\downarrow 5224$$

$$-\frac{3c\int \frac{ax\left(1-a^2x^2\right)}{\arcsin(ax)}d\arcsin(ax)}{a} - \frac{c\left(1-a^2x^2\right)^{3/2}}{a\arcsin(ax)}$$

$$\downarrow 4906$$

$$-\frac{3c\int \left(\frac{ax}{4\arcsin(ax)} + \frac{\sin(3\arcsin(ax))}{4\arcsin(ax)}\right)d\arcsin(ax)}{a} - \frac{c\left(1-a^2x^2\right)^{3/2}}{a\arcsin(ax)}$$

$$\downarrow 2009$$

$$-\frac{c\left(1-a^2x^2\right)^{3/2}}{a\arcsin(ax)} - \frac{3c\left(\frac{1}{4}\text{Si}(\arcsin(ax)) + \frac{1}{4}\text{Si}(3\arcsin(ax))\right)}{a}$$

input
```
Int[(c - a^2*c*x^2)/ArcSin[a*x]^2,x]
```

output
```
-((c*(1 - a^2*x^2)^(3/2))/(a*ArcSin[a*x])) - (3*c*(SinIntegral[ArcSin[a*x]
]/4 + SinIntegral[3*ArcSin[a*x]]/4))/a
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.07

method	result	size
derivativedivides	$-\frac{c\left(3\ \mathrm{Si}(\arcsin(ax))\arcsin(ax)+3\ \mathrm{Si}(3\arcsin(ax))\arcsin(ax)+3\sqrt{-a^2x^2+1}+\cos(3\arcsin(ax))\right)}{4a\arcsin(ax)}$	59
default	$-\frac{c\left(3\ \mathrm{Si}(\arcsin(ax))\arcsin(ax)+3\ \mathrm{Si}(3\arcsin(ax))\arcsin(ax)+3\sqrt{-a^2x^2+1}+\cos(3\arcsin(ax))\right)}{4a\arcsin(ax)}$	59

input
```
int((-a^2*c*x^2+c)/arcsin(a*x)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/4/a*c*(3*Si(arcsin(a*x))*arcsin(a*x)+3*Si(3*arcsin(a*x))*arcsin(a*x)+3*
(-a^2*x^2+1)^(1/2)+cos(3*arcsin(a*x)))/arcsin(a*x)
```

Fricas [F]

$$\int \frac{c - a^2 c x^2}{\arcsin(ax)^2}\,dx = \int -\frac{a^2 c x^2 - c}{\arcsin\left(ax\right)^2}\,dx$$

input
```
integrate((-a^2*c*x^2+c)/arcsin(a*x)^2,x, algorithm="fricas")
```

output
```
integral(-(a^2*c*x^2 - c)/arcsin(a*x)^2, x)
```

Sympy [F]

$$\int \frac{c - a^2 c x^2}{\arcsin(ax)^2}\,dx = -c\left(\int \frac{a^2 x^2}{\operatorname{asin}^2\left(ax\right)}\,dx + \int \left(-\frac{1}{\operatorname{asin}^2\left(ax\right)}\right)\,dx\right)$$

input
```
integrate((-a**2*c*x**2+c)/asin(a*x)**2,x)
```

output
```
-c*(Integral(a**2*x**2/asin(a*x)**2, x) + Integral(-1/asin(a*x)**2, x))
```

Maxima [F]

$$\int \frac{c - a^2 c x^2}{\arcsin(ax)^2}\,dx = \int -\frac{a^2 c x^2 - c}{\arcsin\left(ax\right)^2}\,dx$$

input
```
integrate((-a^2*c*x^2+c)/arcsin(a*x)^2,x, algorithm="maxima")
```

output
```
-(3*a^2*c*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))*integrate(sqrt(a*x +
1)*sqrt(-a*x + 1)*x/arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)), x) - (a^2*
c*x^2 - c)*sqrt(a*x + 1)*sqrt(-a*x + 1))/(a*arctan2(a*x, sqrt(a*x + 1)*sqr
t(-a*x + 1)))
```

Giac [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.89

$$\int \frac{c - a^2 c x^2}{\arcsin(ax)^2}\,dx = -\frac{3\,c\,\mathrm{Si}\left(3\,\arcsin\left(ax\right)\right)}{4\,a} - \frac{3\,c\,\mathrm{Si}\left(\arcsin\left(ax\right)\right)}{4\,a} - \frac{\left(-a^2x^2+1\right)^{\frac{3}{2}}c}{a\,\arcsin\left(ax\right)}$$

input
```
integrate((-a^2*c*x^2+c)/arcsin(a*x)^2,x, algorithm="giac")
```

output
```
-3/4*c*sin_integral(3*arcsin(a*x))/a - 3/4*c*sin_integral(arcsin(a*x))/a -
 (-a^2*x^2 + 1)^(3/2)*c/(a*arcsin(a*x))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{c - a^2 c x^2}{\arcsin(ax)^2}\,dx = \int \frac{c - a^2\,c\,x^2}{\mathrm{asin}\left(a\,x\right)^2}\,dx$$

input
```
int((c - a^2*c*x^2)/asin(a*x)^2,x)
```

output
```
int((c - a^2*c*x^2)/asin(a*x)^2, x)
```

Reduce [F]

$$\int \frac{c - a^2 c x^2}{\arcsin(ax)^2}\,dx = c\left(-\left(\int \frac{x^2}{asin\,(ax)^2}dx\right)a^2 + \int \frac{1}{asin\,(ax)^2}dx\right)$$

input
```
int((-a^2*c*x^2+c)/asin(a*x)^2,x)
```

output
```
c*( - int(x**2/asin(a*x)**2,x)*a**2 + int(1/asin(a*x)**2,x))
```

3.25 $\int \frac{1}{(c-a^2cx^2)\arcsin(ax)^2}\,dx$

Optimal result . . . 295
Mathematica [N/A] . . . 295
Rubi [N/A] . . . 296
Maple [N/A] . . . 296
Fricas [N/A] . . . 297
Sympy [N/A] . . . 297
Maxima [N/A] . . . 298
Giac [N/A] . . . 298
Mupad [N/A] . . . 299
Reduce [N/A] . . . 299

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)^2}\,dx = \text{Int}\left(\frac{1}{(c-a^2cx^2)\arcsin(ax)^2},x\right)$$

output
```
Defer(Int)(1/(-a^2*c*x^2+c)/arcsin(a*x)^2,x)
```

Mathematica [N/A]

Not integrable

Time = 3.12 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)^2}\,dx = \int \frac{1}{(c-a^2cx^2)\arcsin(ax)^2}\,dx$$

input
```
Integrate[1/((c - a^2*c*x^2)*ArcSin[a*x]^2),x]
```

output
```
Integrate[1/((c - a^2*c*x^2)*ArcSin[a*x]^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\arcsin(ax)^2\,(c-a^2cx^2)}\,dx$$

$$\downarrow 5166$$

$$\frac{a\int \frac{x}{(1-a^2x^2)^{3/2}\arcsin(ax)}dx}{c} - \frac{1}{ac\sqrt{1-a^2x^2}\arcsin(ax)}$$

$$\downarrow 5234$$

$$\frac{a\int \frac{x}{(1-a^2x^2)^{3/2}\arcsin(ax)}dx}{c} - \frac{1}{ac\sqrt{1-a^2x^2}\arcsin(ax)}$$

input
```
Int[1/((c - a^2*c*x^2)*ArcSin[a*x]^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

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

input
```
int(1/(-a^2*c*x^2+c)/arcsin(a*x)^2,x)
```

output
```
int(1/(-a^2*c*x^2+c)/arcsin(a*x)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)^2}\,dx = \int -\frac{1}{(a^2cx^2-c)\arcsin(ax)^2}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)/arcsin(a*x)^2,x, algorithm="fricas")
```

output
```
integral(-1/((a^2*c*x^2 - c)*arcsin(a*x)^2), x)
```

Sympy [N/A]

Not integrable

Time = 1.10 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.30

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)^2}\,dx = -\frac{\int \frac{1}{a^2x^2\operatorname{asin}^2(ax)-\operatorname{asin}^2(ax)}\,dx}{c}$$

input
```
integrate(1/(-a**2*c*x**2+c)/asin(a*x)**2,x)
```

output
```
-Integral(1/(a**2*x**2*asin(a*x)**2 - asin(a*x)**2), x)/c
```

Maxima [N/A]

Not integrable

Time = 0.43 (sec) , antiderivative size = 153, normalized size of antiderivative = 7.65

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)^2}\,dx = \int -\frac{1}{(a^2cx^2-c)\arcsin(ax)^2}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)/arcsin(a*x)^2,x, algorithm="maxima")
```

output
```
((a^4*c*x^2 - a^2*c)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))*integrate(
sqrt(a*x + 1)*sqrt(-a*x + 1)*x/((a^4*c*x^4 - 2*a^2*c*x^2 + c)*arctan2(a*x,
 sqrt(a*x + 1)*sqrt(-a*x + 1))), x) + sqrt(a*x + 1)*sqrt(-a*x + 1))/((a^3*
c*x^2 - a*c)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)))
```

Giac [N/A]

Not integrable

Time = 0.48 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.20

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)^2}\,dx = \int -\frac{1}{(a^2cx^2-c)\arcsin(ax)^2}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)/arcsin(a*x)^2,x, algorithm="giac")
```

output
```
integrate(-1/((a^2*c*x^2 - c)*arcsin(a*x)^2), x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)^2}\,dx = \int \frac{1}{\text{asin}\left(a\,x\right)^2\,\left(c-a^2\,c\,x^2\right)}\,dx$$

input
```
int(1/(asin(a*x)^2*(c - a^2*c*x^2)),x)
```

output
```
int(1/(asin(a*x)^2*(c - a^2*c*x^2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.55

$$\int \frac{1}{(c-a^2cx^2)\arcsin(ax)^2}\,dx = -\frac{\int \frac{1}{asin(ax)^2a^2x^2-asin(ax)^2}dx}{c}$$

input
```
int(1/(-a^2*c*x^2+c)/asin(a*x)^2,x)
```

output
```
( - int(1/(asin(a*x)**2*a**2*x**2 - asin(a*x)**2),x))/c
```

3.26 $\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)^2}\,dx$

Optimal result 300
Mathematica [N/A] 300
Rubi [N/A] 301
Maple [N/A] 301
Fricas [N/A] 302
Sympy [N/A] 302
Maxima [N/A] 303
Giac [N/A] 303
Mupad [N/A] 304
Reduce [N/A] 304

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)^2}\,dx = \text{Int}\left(\frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)^2}, x\right)$$

output
```
Defer(Int)(1/(-a^2*c*x^2+c)^2/arcsin(a*x)^2,x)
```

Mathematica [N/A]

Not integrable

Time = 10.83 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)^2}\,dx = \int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)^2}\,dx$$

input
```
Integrate[1/((c - a^2*c*x^2)^2*ArcSin[a*x]^2),x]
```

output
```
Integrate[1/((c - a^2*c*x^2)^2*ArcSin[a*x]^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.33 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\arcsin(ax)^2 \left(c - a^2 c x^2\right)^2} \, dx$$

$$\downarrow 5166$$

$$\frac{3a \int \frac{x}{\left(1-a^2x^2\right)^{5/2} \arcsin(ax)} dx}{c^2} - \frac{1}{ac^2 \left(1 - a^2x^2\right)^{3/2} \arcsin(ax)}$$

$$\downarrow 5234$$

$$\frac{3a \int \frac{x}{\left(1-a^2x^2\right)^{5/2} \arcsin(ax)} dx}{c^2} - \frac{1}{ac^2 \left(1 - a^2x^2\right)^{3/2} \arcsin(ax)}$$

input
```
Int[1/((c - a^2*c*x^2)^2*ArcSin[a*x]^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.41 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

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

input
```
int(1/(-a^2*c*x^2+c)^2/arcsin(a*x)^2,x)
```

output
```
int(1/(-a^2*c*x^2+c)^2/arcsin(a*x)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.80

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)^2}\,dx = \int \frac{1}{\left(a^2cx^2-c\right)^2 \arcsin\left(ax\right)^2}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)^2/arcsin(a*x)^2,x, algorithm="fricas")
```

output
```
integral(1/((a^4*c^2*x^4 - 2*a^2*c^2*x^2 + c^2)*arcsin(a*x)^2), x)
```

Sympy [N/A]

Not integrable

Time = 1.73 (sec) , antiderivative size = 41, normalized size of antiderivative = 2.05

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)^2}\,dx = \frac{\int \frac{1}{a^4x^4 \operatorname{asin}^2(ax)-2a^2x^2 \operatorname{asin}^2(ax)+\operatorname{asin}^2(ax)}\,dx}{c^2}$$

input
```
integrate(1/(-a**2*c*x**2+c)**2/asin(a*x)**2,x)
```

output
```
Integral(1/(a**4*x**4*asin(a*x)**2 - 2*a**2*x**2*asin(a*x)**2 + asin(a*x)*
**2), x)/c**2
```

Maxima [N/A]

Not integrable

Time = 0.51 (sec) , antiderivative size = 202, normalized size of antiderivative = 10.10

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)^2}\,dx = \int \frac{1}{\left(a^2cx^2-c\right)^2 \arcsin\left(ax\right)^2}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)^2/arcsin(a*x)^2,x, algorithm="maxima")
```

output
```
-(3*(a^6*c^2*x^4 - 2*a^4*c^2*x^2 + a^2*c^2)*arctan2(a*x, sqrt(a*x + 1)*sqr
t(-a*x + 1))*integrate(sqrt(a*x + 1)*sqrt(-a*x + 1)*x/((a^6*c^2*x^6 - 3*a^
4*c^2*x^4 + 3*a^2*c^2*x^2 - c^2)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)
)), x) + sqrt(a*x + 1)*sqrt(-a*x + 1))/((a^5*c^2*x^4 - 2*a^3*c^2*x^2 + a*c
^2)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)))
```

Giac [N/A]

Not integrable

Time = 1.97 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.15

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)^2}\,dx = \int \frac{1}{\left(a^2cx^2-c\right)^2 \arcsin\left(ax\right)^2}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)^2/arcsin(a*x)^2,x, algorithm="giac")
```

output
```
integrate(1/((a^2*c*x^2 - c)^2*arcsin(a*x)^2), x)
```

Mupad [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)^2}\,dx = \int \frac{1}{\operatorname{asin}\left(a\,x\right)^2 \left(c-a^2\,c\,x^2\right)^2}\,dx$$

input
```
int(1/(asin(a*x)^2*(c - a^2*c*x^2)^2),x)
```

output
```
int(1/(asin(a*x)^2*(c - a^2*c*x^2)^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 42, normalized size of antiderivative = 2.10

$$\int \frac{1}{\left(c-a^2cx^2\right)^2 \arcsin(ax)^2}\,dx = \frac{\int \frac{1}{asin(ax)^2a^4x^4-2asin(ax)^2a^2x^2+asin(ax)^2}dx}{c^2}$$

input
```
int(1/(-a^2*c*x^2+c)^2/asin(a*x)^2,x)
```

output
```
int(1/(asin(a*x)**2*a**4*x**4 - 2*asin(a*x)**2*a**2*x**2 + asin(a*x)**2),x
)/c**2
```

3.27 $\int \frac{(d-c^2dx^2)^3}{a+b\arcsin(cx)}\,dx$

Optimal result . . . 305
Mathematica [A] (verified) . . . 306
Rubi [A] (verified) . . . 306
Maple [A] (verified) . . . 308
Fricas [F] . . . 309
Sympy [F] . . . 309
Maxima [F] . . . 309
Giac [B] (verification not implemented) . . . 310
Mupad [F(-1)] . . . 310
Reduce [F] . . . 311

Optimal result

Integrand size = 24, antiderivative size = 269

$$\begin{aligned}\int \frac{(d-c^2dx^2)^3}{a+b\arcsin(cx)}\,dx = &\frac{35d^3\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{64bc}\\ &+\frac{21d^3\cos\left(\frac{3a}{b}\right)\operatorname{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{64bc}\\ &+\frac{7d^3\cos\left(\frac{5a}{b}\right)\operatorname{CosIntegral}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{64bc}\\ &+\frac{d^3\cos\left(\frac{7a}{b}\right)\operatorname{CosIntegral}\left(\frac{7(a+b\arcsin(cx))}{b}\right)}{64bc}\\ &+\frac{35d^3\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{64bc}\\ &+\frac{21d^3\sin\left(\frac{3a}{b}\right)\operatorname{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{64bc}\\ &+\frac{7d^3\sin\left(\frac{5a}{b}\right)\operatorname{Si}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{64bc}\\ &+\frac{d^3\sin\left(\frac{7a}{b}\right)\operatorname{Si}\left(\frac{7(a+b\arcsin(cx))}{b}\right)}{64bc}\end{aligned}$$

output
```
35/64*d^3*cos(a/b)*Ci((a+b*arcsin(c*x))/b)/b/c+21/64*d^3*cos(3*a/b)*Ci(3*(
a+b*arcsin(c*x))/b)/b/c+7/64*d^3*cos(5*a/b)*Ci(5*(a+b*arcsin(c*x))/b)/b/c+
1/64*d^3*cos(7*a/b)*Ci(7*(a+b*arcsin(c*x))/b)/b/c+35/64*d^3*sin(a/b)*Si((a
+b*arcsin(c*x))/b)/b/c+21/64*d^3*sin(3*a/b)*Si(3*(a+b*arcsin(c*x))/b)/b/c+
7/64*d^3*sin(5*a/b)*Si(5*(a+b*arcsin(c*x))/b)/b/c+1/64*d^3*sin(7*a/b)*Si(7
*(a+b*arcsin(c*x))/b)/b/c
```

Mathematica [A] (verified)

Time = 1.29 (sec) , antiderivative size = 182, normalized size of antiderivative = 0.68

$$\int \frac{(d-c^2dx^2)^3}{a+b\arcsin(cx)}\,dx$$
$$= \frac{d^3\left(35\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a}{b}+\arcsin(cx)\right)+21\cos\left(\frac{3a}{b}\right)\text{CosIntegral}\left(3\left(\frac{a}{b}+\arcsin(cx)\right)\right)+7\cos\left(\frac{5a}{b}\right)\text{C}}{}$$

input
```
Integrate[(d - c^2*d*x^2)^3/(a + b*ArcSin[c*x]),x]
```

output
```
(d^3*(35*Cos[a/b]*CosIntegral[a/b + ArcSin[c*x]] + 21*Cos[(3*a)/b]*CosInte
gral[3*(a/b + ArcSin[c*x])] + 7*Cos[(5*a)/b]*CosIntegral[5*(a/b + ArcSin[c
*x])] + Cos[(7*a)/b]*CosIntegral[7*(a/b + ArcSin[c*x])] + 35*Sin[a/b]*SinI
ntegral[a/b + ArcSin[c*x]] + 21*Sin[(3*a)/b]*SinIntegral[3*(a/b + ArcSin[c
*x])] + 7*Sin[(5*a)/b]*SinIntegral[5*(a/b + ArcSin[c*x])] + Sin[(7*a)/b]*S
inIntegral[7*(a/b + ArcSin[c*x])]))/(64*b*c)
```

Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 207, normalized size of antiderivative = 0.77, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d-c^2dx^2\right)^3}{a+b\arcsin(cx)}\,dx$$

$$\downarrow 5168$$

$$\frac{d^3\int \frac{\cos^7\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 3042$$

$$\frac{d^3\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)^7}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 3793$$

$$\frac{d^3\int \left(\frac{\cos\left(\frac{7a}{b}-\frac{7(a+b\arcsin(cx))}{b}\right)}{64(a+b\arcsin(cx))}+\frac{7\cos\left(\frac{5a}{b}-\frac{5(a+b\arcsin(cx))}{b}\right)}{64(a+b\arcsin(cx))}+\frac{21\cos\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{64(a+b\arcsin(cx))}+\frac{35\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{64(a+b\arcsin(cx))}\right)d(a+b}{bc}$$

$$\downarrow 2009$$

$$d^3\left(\frac{35}{64}\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)+\frac{21}{64}\cos\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)+\frac{7}{64}\cos\left(\frac{5a}{b}\right)\text{CosIntegral}\left($$

input

```
Int[(d - c^2*d*x^2)^3/(a + b*ArcSin[c*x]),x]
```

output

```
(d^3*((35*Cos[a/b]*CosIntegral[(a + b*ArcSin[c*x])/b])/64 + (21*Cos[(3*a)/
b]*CosIntegral[(3*(a + b*ArcSin[c*x]))/b])/64 + (7*Cos[(5*a)/b]*CosIntegra
l[(5*(a + b*ArcSin[c*x]))/b])/64 + (Cos[(7*a)/b]*CosIntegral[(7*(a + b*Arc
Sin[c*x]))/b])/64 + (35*Sin[a/b]*SinIntegral[(a + b*ArcSin[c*x])/b])/64 +
(21*Sin[(3*a)/b]*SinIntegral[(3*(a + b*ArcSin[c*x]))/b])/64 + (7*Sin[(5*a)
/b]*SinIntegral[(5*(a + b*ArcSin[c*x]))/b])/64 + (Sin[(7*a)/b]*SinIntegral
[(7*(a + b*ArcSin[c*x]))/b])/64))/(b*c)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 187, normalized size of antiderivative = 0.70

method	result
derivativedivides	$\frac{d^3\left(\mathrm{Si}\left(7\arcsin(cx)+\frac{7a}{b}\right)\sin\left(\frac{7a}{b}\right)+\mathrm{Ci}\left(7\arcsin(cx)+\frac{7a}{b}\right)\cos\left(\frac{7a}{b}\right)+7\ \mathrm{Si}\left(5\arcsin(cx)+\frac{5a}{b}\right)\sin\left(\frac{5a}{b}\right)+7\ \mathrm{Ci}\left(5\arcsin(cx)+\right.\right.}$
default	$\frac{d^3\left(\mathrm{Si}\left(7\arcsin(cx)+\frac{7a}{b}\right)\sin\left(\frac{7a}{b}\right)+\mathrm{Ci}\left(7\arcsin(cx)+\frac{7a}{b}\right)\cos\left(\frac{7a}{b}\right)+7\ \mathrm{Si}\left(5\arcsin(cx)+\frac{5a}{b}\right)\sin\left(\frac{5a}{b}\right)+7\ \mathrm{Ci}\left(5\arcsin(cx)+\right.\right.}$

input
```
int((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
1/64/c*d^3*(Si(7*arcsin(c*x)+7*a/b)*sin(7*a/b)+Ci(7*arcsin(c*x)+7*a/b)*cos
(7*a/b)+7*Si(5*arcsin(c*x)+5*a/b)*sin(5*a/b)+7*Ci(5*arcsin(c*x)+5*a/b)*cos
(5*a/b)+21*Si(3*arcsin(c*x)+3*a/b)*sin(3*a/b)+21*Ci(3*arcsin(c*x)+3*a/b)*c
os(3*a/b)+35*Si(arcsin(c*x)+a/b)*sin(a/b)+35*Ci(arcsin(c*x)+a/b)*cos(a/b))
/b
```

Fricas [F]

$$\int \frac{(d-c^2dx^2)^3}{a+b\arcsin(cx)}\,dx = \int -\frac{(c^2dx^2-d)^3}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(-(c^6*d^3*x^6 - 3*c^4*d^3*x^4 + 3*c^2*d^3*x^2 - d^3)/(b*arcsin(c*
x) + a), x)
```

Sympy [F]

$$\int \frac{(d-c^2dx^2)^3}{a+b\arcsin(cx)}\,dx = -d^3\left(\int \frac{3c^2x^2}{a+b\operatorname{asin}(cx)}\,dx + \int \left(-\frac{3c^4x^4}{a+b\operatorname{asin}(cx)}\right)\,dx + \int \frac{c^6x^6}{a+b\operatorname{asin}(cx)}\,dx + \int \left(-\frac{1}{a+b\operatorname{asin}(cx)}\right)\,dx\right)$$

input
```
integrate((-c**2*d*x**2+d)**3/(a+b*asin(c*x)),x)
```

output
```
-d**3*(Integral(3*c**2*x**2/(a + b*asin(c*x)), x) + Integral(-3*c**4*x**4/
(a + b*asin(c*x)), x) + Integral(c**6*x**6/(a + b*asin(c*x)), x) + Integra
l(-1/(a + b*asin(c*x)), x))
```

Maxima [F]

$$\int \frac{(d-c^2dx^2)^3}{a+b\arcsin(cx)}\,dx = \int -\frac{(c^2dx^2-d)^3}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
-integrate((c^2*d*x^2 - d)^3/(b*arcsin(c*x) + a), x)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 673 vs. 2(253) = 506.

Time = 0.16 (sec) , antiderivative size = 673, normalized size of antiderivative = 2.50

$$\int \frac{(d-c^2dx^2)^3}{a+b\arcsin(cx)}\,dx = \text{Too large to display}$$

input
```
integrate((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
d^3*cos(a/b)^7*cos_integral(7*a/b + 7*arcsin(c*x))/(b*c) + d^3*cos(a/b)^6*
sin(a/b)*sin_integral(7*a/b + 7*arcsin(c*x))/(b*c) - 7/4*d^3*cos(a/b)^5*co
s_integral(7*a/b + 7*arcsin(c*x))/(b*c) + 7/4*d^3*cos(a/b)^5*cos_integral(
5*a/b + 5*arcsin(c*x))/(b*c) - 5/4*d^3*cos(a/b)^4*sin(a/b)*sin_integral(7*
a/b + 7*arcsin(c*x))/(b*c) + 7/4*d^3*cos(a/b)^4*sin(a/b)*sin_integral(5*a/
b + 5*arcsin(c*x))/(b*c) + 7/8*d^3*cos(a/b)^3*cos_integral(7*a/b + 7*arcsi
n(c*x))/(b*c) - 35/16*d^3*cos(a/b)^3*cos_integral(5*a/b + 5*arcsin(c*x))/(
b*c) + 21/16*d^3*cos(a/b)^3*cos_integral(3*a/b + 3*arcsin(c*x))/(b*c) + 3/
8*d^3*cos(a/b)^2*sin(a/b)*sin_integral(7*a/b + 7*arcsin(c*x))/(b*c) - 21/1
6*d^3*cos(a/b)^2*sin(a/b)*sin_integral(5*a/b + 5*arcsin(c*x))/(b*c) + 21/1
6*d^3*cos(a/b)^2*sin(a/b)*sin_integral(3*a/b + 3*arcsin(c*x))/(b*c) - 7/64
*d^3*cos(a/b)*cos_integral(7*a/b + 7*arcsin(c*x))/(b*c) + 35/64*d^3*cos(a/
b)*cos_integral(5*a/b + 5*arcsin(c*x))/(b*c) - 63/64*d^3*cos(a/b)*cos_inte
gral(3*a/b + 3*arcsin(c*x))/(b*c) + 35/64*d^3*cos(a/b)*cos_integral(a/b +
arcsin(c*x))/(b*c) - 1/64*d^3*sin(a/b)*sin_integral(7*a/b + 7*arcsin(c*x))
/(b*c) + 7/64*d^3*sin(a/b)*sin_integral(5*a/b + 5*arcsin(c*x))/(b*c) - 21/
64*d^3*sin(a/b)*sin_integral(3*a/b + 3*arcsin(c*x))/(b*c) + 35/64*d^3*sin(
a/b)*sin_integral(a/b + arcsin(c*x))/(b*c)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d-c^2dx^2)^3}{a+b\arcsin(cx)}\,dx = \int \frac{(d-c^2\,d\,x^2)^3}{a+b\,\mathrm{asin}\,(c\,x)}\,dx$$

input
```
int((d - c^2*d*x^2)^3/(a + b*asin(c*x)),x)
```

output
```
int((d - c^2*d*x^2)^3/(a + b*asin(c*x)), x)
```

Reduce [F]

$$\int \frac{(d-c^2dx^2)^3}{a+b\arcsin(cx)}\,dx = d^3\left(-\left(\int \frac{x^6}{asin\,(cx)\,b+a}dx\right)c^6+3\left(\int \frac{x^4}{asin\,(cx)\,b+a}dx\right)c^4 - 3\left(\int \frac{x^2}{asin\,(cx)\,b+a}dx\right)c^2+\int \frac{1}{asin\,(cx)\,b+a}dx\right)$$

input
```
int((-c^2*d*x^2+d)^3/(a+b*asin(c*x)),x)
```

output
```
d**3*( - int(x**6/(asin(c*x)*b + a),x)*c**6 + 3*int(x**4/(asin(c*x)*b + a)
,x)*c**4 - 3*int(x**2/(asin(c*x)*b + a),x)*c**2 + int(1/(asin(c*x)*b + a),
x))
```

3.28 $\int \frac{\left(d-c^2dx^2\right)^2}{a+b\arcsin(cx)}\,dx$

Optimal result . . . 312
Mathematica [A] (verified) . . . 313
Rubi [A] (verified) . . . 313
Maple [A] (verified) . . . 315
Fricas [F] . . . 315
Sympy [F] . . . 316
Maxima [F] . . . 316
Giac [B] (verification not implemented) . . . 316
Mupad [F(-1)] . . . 318
Reduce [F] . . . 318

Optimal result

Integrand size = 24, antiderivative size = 201

$$\begin{aligned}\int \frac{\left(d-c^2dx^2\right)^2}{a+b\arcsin(cx)}\,dx = &\frac{5d^2\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{8bc}\\ &+\frac{5d^2\cos\left(\frac{3a}{b}\right)\operatorname{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{16bc}\\ &+\frac{d^2\cos\left(\frac{5a}{b}\right)\operatorname{CosIntegral}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{16bc}\\ &+\frac{5d^2\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{8bc}+\frac{5d^2\sin\left(\frac{3a}{b}\right)\operatorname{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{16bc}\\ &+\frac{d^2\sin\left(\frac{5a}{b}\right)\operatorname{Si}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{16bc}\end{aligned}$$

output

```
5/8*d^2*cos(a/b)*Ci((a+b*arcsin(c*x))/b)/b/c+5/16*d^2*cos(3*a/b)*Ci(3*(a+b
*arcsin(c*x))/b)/b/c+1/16*d^2*cos(5*a/b)*Ci(5*(a+b*arcsin(c*x))/b)/b/c+5/8
*d^2*sin(a/b)*Si((a+b*arcsin(c*x))/b)/b/c+5/16*d^2*sin(3*a/b)*Si(3*(a+b*ar
csin(c*x))/b)/b/c+1/16*d^2*sin(5*a/b)*Si(5*(a+b*arcsin(c*x))/b)/b/c
```

Mathematica [A] (verified)

Time = 0.48 (sec) , antiderivative size = 138, normalized size of antiderivative = 0.69

$$\int \frac{(d-c^2dx^2)^2}{a+b\arcsin(cx)}\,dx$$
$$= \frac{d^2\left(10\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a}{b}+\arcsin(cx)\right)+5\cos\left(\frac{3a}{b}\right)\text{CosIntegral}\left(3\left(\frac{a}{b}+\arcsin(cx)\right)\right)+\cos\left(\frac{5a}{b}\right)\text{CosI}}{}$$

input
```
Integrate[(d - c^2*d*x^2)^2/(a + b*ArcSin[c*x]),x]
```

output
```
(d^2*(10*Cos[a/b]*CosIntegral[a/b + ArcSin[c*x]] + 5*Cos[(3*a)/b]*CosInteg
ral[3*(a/b + ArcSin[c*x])] + Cos[(5*a)/b]*CosIntegral[5*(a/b + ArcSin[c*x]
)] + 10*Sin[a/b]*SinIntegral[a/b + ArcSin[c*x]] + 5*Sin[(3*a)/b]*SinIntegr
al[3*(a/b + ArcSin[c*x])] + Sin[(5*a)/b]*SinIntegral[5*(a/b + ArcSin[c*x])
]))/(16*b*c)
```

Rubi [A] (verified)

Time = 0.52 (sec) , antiderivative size = 157, normalized size of antiderivative = 0.78, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d-c^2dx^2)^2}{a+b\arcsin(cx)}\,dx$$
$$\downarrow 5168$$
$$\frac{d^2\int \frac{\cos^5\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{bc}$$
$$\downarrow 3042$$
$$\frac{d^2\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)^5}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 3793$$

$$\frac{d^2 \int \left(\frac{\cos\left(\frac{5a}{b} - \frac{5(a+b\arcsin(cx))}{b}\right)}{16(a+b\arcsin(cx))} + \frac{5\cos\left(\frac{3a}{b} - \frac{3(a+b\arcsin(cx))}{b}\right)}{16(a+b\arcsin(cx))} + \frac{5\cos\left(\frac{a}{b} - \frac{a+b\arcsin(cx)}{b}\right)}{8(a+b\arcsin(cx))} \right) d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 2009$$

$$\frac{d^2\left(\frac{5}{8}\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right) + \frac{5}{16}\cos\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right) + \frac{1}{16}\cos\left(\frac{5a}{b}\right)\text{CosIntegral}\left(\frac{5}{bc}\right.\right.$$

input
```
Int[(d - c^2*d*x^2)^2/(a + b*ArcSin[c*x]),x]
```

output
```
(d^2*((5*Cos[a/b]*CosIntegral[(a + b*ArcSin[c*x])/b])/8 + (5*Cos[(3*a)/b]*
CosIntegral[(3*(a + b*ArcSin[c*x]))/b])/16 + (Cos[(5*a)/b]*CosIntegral[(5*
(a + b*ArcSin[c*x]))/b])/16 + (5*Sin[a/b]*SinIntegral[(a + b*ArcSin[c*x])/
b])/8 + (5*Sin[(3*a)/b]*SinIntegral[(3*(a + b*ArcSin[c*x]))/b])/16 + (Sin[
(5*a)/b]*SinIntegral[(5*(a + b*ArcSin[c*x]))/b])/16))/(b*c)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168

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

Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 141, normalized size of antiderivative = 0.70

method	result
derivativedivides	$\frac{d^2\left(\operatorname{Si}\left(5\arcsin(cx)+\frac{5a}{b}\right)\sin\left(\frac{5a}{b}\right)+\operatorname{Ci}\left(5\arcsin(cx)+\frac{5a}{b}\right)\cos\left(\frac{5a}{b}\right)+5\ \operatorname{Si}\left(3\arcsin(cx)+\frac{3a}{b}\right)\sin\left(\frac{3a}{b}\right)+5\ \operatorname{Ci}\left(3\arcsin(cx)+\right.\right.}{16cb}$
default	$\frac{d^2\left(\operatorname{Si}\left(5\arcsin(cx)+\frac{5a}{b}\right)\sin\left(\frac{5a}{b}\right)+\operatorname{Ci}\left(5\arcsin(cx)+\frac{5a}{b}\right)\cos\left(\frac{5a}{b}\right)+5\ \operatorname{Si}\left(3\arcsin(cx)+\frac{3a}{b}\right)\sin\left(\frac{3a}{b}\right)+5\ \operatorname{Ci}\left(3\arcsin(cx)+\right.\right.}{16cb}$

input

```
int((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output

```
1/16/c*d^2*(Si(5*arcsin(c*x)+5*a/b)*sin(5*a/b)+Ci(5*arcsin(c*x)+5*a/b)*cos
(5*a/b)+5*Si(3*arcsin(c*x)+3*a/b)*sin(3*a/b)+5*Ci(3*arcsin(c*x)+3*a/b)*cos
(3*a/b)+10*Si(arcsin(c*x)+a/b)*sin(a/b)+10*Ci(arcsin(c*x)+a/b)*cos(a/b))/b
```

Fricas [F]

$$\int \frac{\left(d-c^2dx^2\right)^2}{a+b\arcsin(cx)}\,dx = \int \frac{\left(c^2dx^2-d\right)^2}{b\arcsin\left(cx\right)+a}\,dx$$

input

```
integrate((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output

```
integral((c^4*d^2*x^4 - 2*c^2*d^2*x^2 + d^2)/(b*arcsin(c*x) + a), x)
```

Sympy [F]

$$\int \frac{(d-c^2dx^2)^2}{a+b\arcsin(cx)}\,dx = d^2\left(\int\left(-\frac{2c^2x^2}{a+b\operatorname{asin}(cx)}\right)\,dx + \int \frac{c^4x^4}{a+b\operatorname{asin}(cx)}\,dx + \int \frac{1}{a+b\operatorname{asin}(cx)}\,dx\right)$$

input
```
integrate((-c**2*d*x**2+d)**2/(a+b*asin(c*x)),x)
```

output
```
d**2*(Integral(-2*c**2*x**2/(a + b*asin(c*x)), x) + Integral(c**4*x**4/(a
+ b*asin(c*x)), x) + Integral(1/(a + b*asin(c*x)), x))
```

Maxima [F]

$$\int \frac{(d-c^2dx^2)^2}{a+b\arcsin(cx)}\,dx = \int \frac{(c^2dx^2-d)^2}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate((c^2*d*x^2 - d)^2/(b*arcsin(c*x) + a), x)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 395 vs. $2(189) = 378$.

Time = 0.15 (sec) , antiderivative size = 395, normalized size of antiderivative = 1.97

$$\begin{aligned}\int \frac{(d-c^2dx^2)^2}{a+b\arcsin(cx)}\,dx = &\frac{d^2\cos\left(\frac{a}{b}\right)^5 \operatorname{Ci}\left(\frac{5a}{b}+5\arcsin(cx)\right)}{bc}\\ &+\frac{d^2\cos\left(\frac{a}{b}\right)^4\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{5a}{b}+5\arcsin(cx)\right)}{bc}\\ &-\frac{5\,d^2\cos\left(\frac{a}{b}\right)^3\operatorname{Ci}\left(\frac{5a}{b}+5\arcsin(cx)\right)}{4\,bc}\\ &+\frac{5\,d^2\cos\left(\frac{a}{b}\right)^3\operatorname{Ci}\left(\frac{3a}{b}+3\arcsin(cx)\right)}{4\,bc}\\ &-\frac{3\,d^2\cos\left(\frac{a}{b}\right)^2\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{5a}{b}+5\arcsin(cx)\right)}{4\,bc}\\ &+\frac{5\,d^2\cos\left(\frac{a}{b}\right)^2\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{3a}{b}+3\arcsin(cx)\right)}{4\,bc}\\ &+\frac{5\,d^2\cos\left(\frac{a}{b}\right)\operatorname{Ci}\left(\frac{5a}{b}+5\arcsin(cx)\right)}{16\,bc}\\ &-\frac{15\,d^2\cos\left(\frac{a}{b}\right)\operatorname{Ci}\left(\frac{3a}{b}+3\arcsin(cx)\right)}{16\,bc}\\ &+\frac{5\,d^2\cos\left(\frac{a}{b}\right)\operatorname{Ci}\left(\frac{a}{b}+\arcsin(cx)\right)}{8\,bc}\\ &+\frac{d^2\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{5a}{b}+5\arcsin(cx)\right)}{16\,bc}\\ &-\frac{5\,d^2\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{3a}{b}+3\arcsin(cx)\right)}{16\,bc}\\ &+\frac{5\,d^2\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a}{b}+\arcsin(cx)\right)}{8\,bc}\end{aligned}$$

input
```
integrate((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
d^2*cos(a/b)^5*cos_integral(5*a/b + 5*arcsin(c*x))/(b*c) + d^2*cos(a/b)^4*
sin(a/b)*sin_integral(5*a/b + 5*arcsin(c*x))/(b*c) - 5/4*d^2*cos(a/b)^3*co
s_integral(5*a/b + 5*arcsin(c*x))/(b*c) + 5/4*d^2*cos(a/b)^3*cos_integral(
3*a/b + 3*arcsin(c*x))/(b*c) - 3/4*d^2*cos(a/b)^2*sin(a/b)*sin_integral(5*
a/b + 5*arcsin(c*x))/(b*c) + 5/4*d^2*cos(a/b)^2*sin(a/b)*sin_integral(3*a/
b + 3*arcsin(c*x))/(b*c) + 5/16*d^2*cos(a/b)*cos_integral(5*a/b + 5*arcsin
(c*x))/(b*c) - 15/16*d^2*cos(a/b)*cos_integral(3*a/b + 3*arcsin(c*x))/(b*c
) + 5/8*d^2*cos(a/b)*cos_integral(a/b + arcsin(c*x))/(b*c) + 1/16*d^2*sin(
a/b)*sin_integral(5*a/b + 5*arcsin(c*x))/(b*c) - 5/16*d^2*sin(a/b)*sin_int
egral(3*a/b + 3*arcsin(c*x))/(b*c) + 5/8*d^2*sin(a/b)*sin_integral(a/b + a
rcsin(c*x))/(b*c)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d-c^2dx^2)^2}{a+b\arcsin(cx)}\,dx = \int \frac{(d-c^2\,d\,x^2)^2}{a+b\,\mathrm{asin}\,(c\,x)}\,dx$$

input
```
int((d - c^2*d*x^2)^2/(a + b*asin(c*x)),x)
```

output
```
int((d - c^2*d*x^2)^2/(a + b*asin(c*x)), x)
```

Reduce [F]

$$\int \frac{(d-c^2dx^2)^2}{a+b\arcsin(cx)}\,dx = d^2\left(\left(\int \frac{x^4}{asin\,(cx)\,b+a}dx\right)c^4 - 2\left(\int \frac{x^2}{asin\,(cx)\,b+a}dx\right)c^2 + \int \frac{1}{asin\,(cx)\,b+a}dx\right)$$

input
```
int((-c^2*d*x^2+d)^2/(a+b*asin(c*x)),x)
```

output
```
d**2*(int(x**4/(asin(c*x)*b + a),x)*c**4 - 2*int(x**2/(asin(c*x)*b + a),x)
*c**2 + int(1/(asin(c*x)*b + a),x))
```

3.29 $\int \frac{d-c^2dx^2}{a+b\arcsin(cx)}\,dx$

Optimal result . . . 319
Mathematica [A] (verified) . . . 320
Rubi [A] (verified) . . . 320
Maple [A] (verified) . . . 322
Fricas [F] . . . 322
Sympy [F] . . . 322
Maxima [F] . . . 323
Giac [A] (verification not implemented) . . . 323
Mupad [F(-1)] . . . 324
Reduce [F] . . . 324

Optimal result

Integrand size = 22, antiderivative size = 125

$$\int \frac{d-c^2dx^2}{a+b\arcsin(cx)}\,dx = \frac{3d\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{4bc} + \frac{d\cos\left(\frac{3a}{b}\right)\operatorname{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{4bc} + \frac{3d\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{4bc} + \frac{d\sin\left(\frac{3a}{b}\right)\operatorname{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{4bc}$$

output

```
3/4*d*cos(a/b)*Ci((a+b*arcsin(c*x))/b)/b/c+1/4*d*cos(3*a/b)*Ci(3*(a+b*arcs
in(c*x))/b)/b/c+3/4*d*sin(a/b)*Si((a+b*arcsin(c*x))/b)/b/c+1/4*d*sin(3*a/b
)*Si(3*(a+b*arcsin(c*x))/b)/b/c
```

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 92, normalized size of antiderivative = 0.74

$$\int \frac{d - c^2 dx^2}{a + b \arcsin(cx)}\, dx$$
$$= \frac{d\left(3\cos\left(\frac{a}{b}\right) \text{CosIntegral}\left(\frac{a}{b} + \arcsin(cx)\right) + \cos\left(\frac{3a}{b}\right) \text{CosIntegral}\left(3\left(\frac{a}{b} + \arcsin(cx)\right)\right) + 3\sin\left(\frac{a}{b}\right) \text{Si}\left(\frac{a}{b} + \right.\right.}{4bc}$$

input
```
Integrate[(d - c^2*d*x^2)/(a + b*ArcSin[c*x]),x]
```

output
```
(d*(3*Cos[a/b]*CosIntegral[a/b + ArcSin[c*x]] + Cos[(3*a)/b]*CosIntegral[3
*(a/b + ArcSin[c*x])] + 3*Sin[a/b]*SinIntegral[a/b + ArcSin[c*x]] + Sin[(3
*a)/b]*SinIntegral[3*(a/b + ArcSin[c*x])]))/(4*b*c)
```

Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 105, normalized size of antiderivative = 0.84, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{d - c^2 dx^2}{a + b \arcsin(cx)}\, dx$$
$$\downarrow 5168$$
$$\frac{d \int \frac{\cos^3\left(\frac{a}{b} - \frac{a + b\arcsin(cx)}{b}\right)}{a + b\arcsin(cx)} d(a + b\arcsin(cx))}{bc}$$
$$\downarrow 3042$$
$$\frac{d \int \frac{\sin\left(\frac{a}{b} - \frac{a + b\arcsin(cx)}{b} + \frac{\pi}{2}\right)^3}{a + b\arcsin(cx)} d(a + b\arcsin(cx))}{bc}$$
$$\downarrow 3793$$

$$\frac{d\int\left(\frac{\cos\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{4(a+b\arcsin(cx))}+\frac{3\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{4(a+b\arcsin(cx))}\right)d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 2009$$

$$\frac{d\left(\frac{3}{4}\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)+\frac{1}{4}\cos\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)+\frac{3}{4}\sin\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)+\right.}{bc}$$

input
```
Int[(d - c^2*d*x^2)/(a + b*ArcSin[c*x]),x]
```

output
```
(d*((3*Cos[a/b]*CosIntegral[(a + b*ArcSin[c*x])/b])/4 + (Cos[(3*a)/b]*CosI
ntegral[(3*(a + b*ArcSin[c*x]))/b])/4 + (3*Sin[a/b]*SinIntegral[(a + b*Arc
Sin[c*x])/b])/4 + (Sin[(3*a)/b]*SinIntegral[(3*(a + b*ArcSin[c*x]))/b])/4)
)/(b*c)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 93, normalized size of antiderivative = 0.74

method	result
derivativedivides	$\frac{d\left(\mathrm{Si}\left(3\arcsin(cx)+\frac{3a}{b}\right)\sin\left(\frac{3a}{b}\right)+\mathrm{Ci}\left(3\arcsin(cx)+\frac{3a}{b}\right)\cos\left(\frac{3a}{b}\right)+3\ \mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)+3\ \mathrm{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\right.}{4cb}$
default	$\frac{d\left(\mathrm{Si}\left(3\arcsin(cx)+\frac{3a}{b}\right)\sin\left(\frac{3a}{b}\right)+\mathrm{Ci}\left(3\arcsin(cx)+\frac{3a}{b}\right)\cos\left(\frac{3a}{b}\right)+3\ \mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)+3\ \mathrm{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\right.}{4cb}$

input
```
int((-c^2*d*x^2+d)/(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
1/4/c*d*(Si(3*arcsin(c*x)+3*a/b)*sin(3*a/b)+Ci(3*arcsin(c*x)+3*a/b)*cos(3*
a/b)+3*Si(arcsin(c*x)+a/b)*sin(a/b)+3*Ci(arcsin(c*x)+a/b)*cos(a/b))/b
```

Fricas [F]

$$\int \frac{d - c^2 dx^2}{a + b\arcsin(cx)}\,dx = \int -\frac{c^2 dx^2 - d}{b\arcsin\left(cx\right) + a}\,dx$$

input
```
integrate((-c^2*d*x^2+d)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(-(c^2*d*x^2 - d)/(b*arcsin(c*x) + a), x)
```

Sympy [F]

$$\int \frac{d - c^2 dx^2}{a + b\arcsin(cx)}\,dx = -d\left(\int \frac{c^2 x^2}{a + b\operatorname{asin}\left(cx\right)}\,dx + \int \left(-\frac{1}{a + b\operatorname{asin}\left(cx\right)}\right)\,dx\right)$$

input
```
integrate((-c**2*d*x**2+d)/(a+b*asin(c*x)),x)
```

output
```
-d*(Integral(c**2*x**2/(a + b*asin(c*x)), x) + Integral(-1/(a + b*asin(c*x
)), x))
```

Maxima [F]

$$\int \frac{d - c^2 dx^2}{a + b \arcsin(cx)}\, dx = \int -\frac{c^2 dx^2 - d}{b \arcsin(cx) + a}\, dx$$

input
```
integrate((-c^2*d*x^2+d)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
-integrate((c^2*d*x^2 - d)/(b*arcsin(c*x) + a), x)
```

Giac [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.42

$$\begin{aligned}\int \frac{d - c^2 dx^2}{a + b \arcsin(cx)}\, dx = {} & \frac{d \cos\left(\frac{a}{b}\right)^3 \operatorname{Ci}\left(\frac{3a}{b} + 3 \arcsin(cx)\right)}{bc} \\ & + \frac{d \cos\left(\frac{a}{b}\right)^2 \sin\left(\frac{a}{b}\right) \operatorname{Si}\left(\frac{3a}{b} + 3 \arcsin(cx)\right)}{bc} \\ & - \frac{3\, d \cos\left(\frac{a}{b}\right) \operatorname{Ci}\left(\frac{3a}{b} + 3 \arcsin(cx)\right)}{4\, bc} \\ & + \frac{3\, d \cos\left(\frac{a}{b}\right) \operatorname{Ci}\left(\frac{a}{b} + \arcsin(cx)\right)}{4\, bc} \\ & - \frac{d \sin\left(\frac{a}{b}\right) \operatorname{Si}\left(\frac{3a}{b} + 3 \arcsin(cx)\right)}{4\, bc} \\ & + \frac{3\, d \sin\left(\frac{a}{b}\right) \operatorname{Si}\left(\frac{a}{b} + \arcsin(cx)\right)}{4\, bc}\end{aligned}$$

input
```
integrate((-c^2*d*x^2+d)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
d*cos(a/b)^3*cos_integral(3*a/b + 3*arcsin(c*x))/(b*c) + d*cos(a/b)^2*sin(
a/b)*sin_integral(3*a/b + 3*arcsin(c*x))/(b*c) - 3/4*d*cos(a/b)*cos_integr
al(3*a/b + 3*arcsin(c*x))/(b*c) + 3/4*d*cos(a/b)*cos_integral(a/b + arcsin
(c*x))/(b*c) - 1/4*d*sin(a/b)*sin_integral(3*a/b + 3*arcsin(c*x))/(b*c) +
3/4*d*sin(a/b)*sin_integral(a/b + arcsin(c*x))/(b*c)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{d - c^2 dx^2}{a + b \arcsin(cx)}\, dx = \int \frac{d - c^2\, d\, x^2}{a + b \operatorname{asin}(c\, x)}\, dx$$

input
```
int((d - c^2*d*x^2)/(a + b*asin(c*x)),x)
```

output
```
int((d - c^2*d*x^2)/(a + b*asin(c*x)), x)
```

Reduce [F]

$$\int \frac{d - c^2 dx^2}{a + b \arcsin(cx)}\, dx = d\left(-\left(\int \frac{x^2}{asin\,(cx)\, b + a} dx\right) c^2 + \int \frac{1}{asin\,(cx)\, b + a} dx\right)$$

input
```
int((-c^2*d*x^2+d)/(a+b*asin(c*x)),x)
```

output
```
d*( - int(x**2/(asin(c*x)*b + a),x)*c**2 + int(1/(asin(c*x)*b + a),x))
```

3.30 $\int \frac{1}{(d-c^2dx^2)(a+b\arcsin(cx))}\,dx$

Optimal result . . . 325
Mathematica [N/A] . . . 325
Rubi [N/A] . . . 326
Maple [N/A] . . . 326
Fricas [N/A] . . . 327
Sympy [N/A] . . . 327
Maxima [N/A] . . . 327
Giac [N/A] . . . 328
Mupad [N/A] . . . 328
Reduce [N/A] . . . 329

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))}\,dx = \text{Int}\left(\frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))},x\right)$$

output
```
Defer(Int)(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x)),x)
```

Mathematica [N/A]

Not integrable

Time = 2.95 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))}\,dx$$

input
```
Integrate[1/((d - c^2*d*x^2)*(a + b*ArcSin[c*x])),x]
```

output
```
Integrate[1/((d - c^2*d*x^2)*(a + b*ArcSin[c*x])), x]
```

Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d - c^2 d x^2)\,(a + b \arcsin(cx))}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d - c^2 d x^2)\,(a + b \arcsin(cx))}dx$$

input
```
Int[1/((d - c^2*d*x^2)*(a + b*ArcSin[c*x])),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{1}{(-c^2 d\, x^2 + d)\,(a + b \arcsin\,(cx))}dx$$

input
```
int(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x)),x)
```

output
```
int(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x)),x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.62

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))}\,dx = \int -\frac{1}{(c^2dx^2-d)(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(-1/(a*c^2*d*x^2 - a*d + (b*c^2*d*x^2 - b*d)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 2.03 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.50

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))}\,dx = -\frac{\int \frac{1}{ac^2x^2-a+bc^2x^2\operatorname{asin}(cx)-b\operatorname{asin}(cx)}\,dx}{d}$$

input
```
integrate(1/(-c**2*d*x**2+d)/(a+b*asin(c*x)),x)
```

output
```
-Integral(1/(a*c**2*x**2 - a + b*c**2*x**2*asin(c*x) - b*asin(c*x)), x)/d
```

Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.21

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))}\,dx = \int -\frac{1}{(c^2dx^2-d)(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
-integrate(1/((c^2*d*x^2 - d)*(b*arcsin(c*x) + a)), x)
```

Giac [N/A]

Not integrable

Time = 2.85 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int \frac{1}{(d - c^2 dx^2)\,(a + b\arcsin(cx))}\,dx = \int -\frac{1}{(c^2 dx^2 - d)(b\arcsin(cx) + a)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
integrate(-1/((c^2*d*x^2 - d)*(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{(d - c^2 dx^2)\,(a + b\arcsin(cx))}\,dx = \int \frac{1}{(a + b\,\mathrm{asin}\,(c\,x))\;(d - c^2\,d\,x^2)}\,dx$$

input
```
int(1/((a + b*asin(c*x))*(d - c^2*d*x^2)),x)
```

output
```
int(1/((a + b*asin(c*x))*(d - c^2*d*x^2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 40, normalized size of antiderivative = 1.67

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))}\,dx = -\frac{\int \frac{1}{asin(cx)b\,c^2x^2-asin(cx)b+a\,c^2x^2-a}dx}{d}$$

input
```
int(1/(-c^2*d*x^2+d)/(a+b*asin(c*x)),x)
```

output
```
( - int(1/(asin(c*x)*b*c**2*x**2 - asin(c*x)*b + a*c**2*x**2 - a),x))/d
```

3.31 $\int \frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))}\,dx$

Optimal result 330
Mathematica [N/A] 330
Rubi [N/A] 331
Maple [N/A] 331
Fricas [N/A] 332
Sympy [N/A] 332
Maxima [N/A] 333
Giac [N/A] 333
Mupad [N/A] 333
Reduce [N/A] 334

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))}\,dx = \text{Int}\left(\frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))},x\right)$$

output
```
Defer(Int)(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x)),x)
```

Mathematica [N/A]

Not integrable

Time = 22.43 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))}\,dx = \int \frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))}\,dx$$

input
```
Integrate[1/((d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])),x]
```

output
```
Integrate[1/((d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])), x]
```

Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\left(d - c^2 d x^2\right)^2 \left(a + b \arcsin(cx)\right)} dx$$
$$\downarrow 5174$$
$$\int \frac{1}{\left(d - c^2 d x^2\right)^2 \left(a + b \arcsin(cx)\right)} dx$$

input
```
Int[1/((d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.53 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(-c^2 d\, x^2 + d\right)^2 \left(a + b \arcsin\left(cx\right)\right)} dx$$

input
```
int(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x)),x)
```

output
```
int(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x)),x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 67, normalized size of antiderivative = 2.79

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(c^2dx^2-d\right)^2\left(b\arcsin\left(cx\right)+a\right)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(1/(a*c^4*d^2*x^4 - 2*a*c^2*d^2*x^2 + a*d^2 + (b*c^4*d^2*x^4 - 2*b
*c^2*d^2*x^2 + b*d^2)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 3.53 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.54

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)}\,dx = \frac{\int \frac{1}{ac^4x^4-2ac^2x^2+a+bc^4x^4\operatorname{asin}\left(cx\right)-2bc^2x^2\operatorname{asin}\left(cx\right)+b\operatorname{asin}\left(cx\right)}\,dx}{d^2}$$

input
```
integrate(1/(-c**2*d*x**2+d)**2/(a+b*asin(c*x)),x)
```

output
```
Integral(1/(a*c**4*x**4 - 2*a*c**2*x**2 + a + b*c**4*x**4*asin(c*x) - 2*b*
c**2*x**2*asin(c*x) + b*asin(c*x)), x)/d**2
```

Maxima [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(c^2dx^2-d\right)^2(b\arcsin\left(cx\right)+a)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate(1/((c^2*d*x^2 - d)^2*(b*arcsin(c*x) + a)), x)
```

Giac [N/A]

Not integrable

Time = 175.92 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(c^2dx^2-d\right)^2(b\arcsin\left(cx\right)+a)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
integrate(1/((c^2*d*x^2 - d)^2*(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(a+b\,\mathrm{asin}\left(c\,x\right)\right)\,\left(d-c^2\,d\,x^2\right)^2}\,dx$$

input
```
int(1/((a + b*asin(c*x))*(d - c^2*d*x^2)^2),x)
```

output
```
int(1/((a + b*asin(c*x))*(d - c^2*d*x^2)^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 58, normalized size of antiderivative = 2.42

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)}\,dx = \frac{\int \frac{1}{asin(cx)b\,c^4x^4-2asin(cx)b\,c^2x^2+asin(cx)b+a\,c^4x^4-2a\,c^2x^2+a}dx}{d^2}$$

input
```
int(1/(-c^2*d*x^2+d)^2/(a+b*asin(c*x)),x)
```

output
```
int(1/(asin(c*x)*b*c**4*x**4 - 2*asin(c*x)*b*c**2*x**2 + asin(c*x)*b + a*c
**4*x**4 - 2*a*c**2*x**2 + a),x)/d**2
```

3.32 $\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 335
Mathematica [A] (verified) . . . 336
Rubi [A] (verified) . . . 337
Maple [A] (verified) . . . 339
Fricas [F] . . . 339
Sympy [F] . . . 340
Maxima [F] . . . 340
Giac [B] (verification not implemented) . . . 341
Mupad [F(-1)] . . . 342
Reduce [F] . . . 342

Optimal result

Integrand size = 24, antiderivative size = 304

$$\begin{aligned}\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^2}\,dx = &-\frac{d^3(1-c^2x^2)^{7/2}}{bc(a+b\arcsin(cx))}\\ &+\frac{35d^3\,\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}\right)}{64b^2c}\\ &+\frac{63d^3\,\text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{3a}{b}\right)}{64b^2c}\\ &+\frac{35d^3\,\text{CosIntegral}\left(\frac{5(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{5a}{b}\right)}{64b^2c}\\ &+\frac{7d^3\,\text{CosIntegral}\left(\frac{7(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{7a}{b}\right)}{64b^2c}\\ &-\frac{35d^3\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{64b^2c}\\ &-\frac{63d^3\cos\left(\frac{3a}{b}\right)\text{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{64b^2c}\\ &-\frac{35d^3\cos\left(\frac{5a}{b}\right)\text{Si}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{64b^2c}\\ &-\frac{7d^3\cos\left(\frac{7a}{b}\right)\text{Si}\left(\frac{7(a+b\arcsin(cx))}{b}\right)}{64b^2c}\end{aligned}$$

output

```
-d^3*(-c^2*x^2+1)^(7/2)/b/c/(a+b*arcsin(c*x))+35/64*d^3*Ci((a+b*arcsin(c*x
))/b)*sin(a/b)/b^2/c+63/64*d^3*Ci(3*(a+b*arcsin(c*x))/b)*sin(3*a/b)/b^2/c+
35/64*d^3*Ci(5*(a+b*arcsin(c*x))/b)*sin(5*a/b)/b^2/c+7/64*d^3*Ci(7*(a+b*ar
csin(c*x))/b)*sin(7*a/b)/b^2/c-35/64*d^3*cos(a/b)*Si((a+b*arcsin(c*x))/b)/
b^2/c-63/64*d^3*cos(3*a/b)*Si(3*(a+b*arcsin(c*x))/b)/b^2/c-35/64*d^3*cos(5
*a/b)*Si(5*(a+b*arcsin(c*x))/b)/b^2/c-7/64*d^3*cos(7*a/b)*Si(7*(a+b*arcsin
(c*x))/b)/b^2/c
```

Mathematica [A] (verified)

Time = 1.84 (sec) , antiderivative size = 310, normalized size of antiderivative = 1.02

$$\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^2}\,dx$$
$$= \frac{d^3\left(-\frac{64b\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}+\frac{192bc^2x^2\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}-\frac{192bc^4x^4\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}+\frac{64bc^6x^6\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}+35\,\text{CosIntegral}\left(\frac{a}{b}+\arcsin(cx)\right)\text{si}\right.}{}$$

input

```
Integrate[(d - c^2*d*x^2)^3/(a + b*ArcSin[c*x])^2,x]
```

output

```
(d^3*((-64*b*Sqrt[1 - c^2*x^2])/(a + b*ArcSin[c*x]) + (192*b*c^2*x^2*Sqrt[
1 - c^2*x^2])/(a + b*ArcSin[c*x]) - (192*b*c^4*x^4*Sqrt[1 - c^2*x^2])/(a +
 b*ArcSin[c*x]) + (64*b*c^6*x^6*Sqrt[1 - c^2*x^2])/(a + b*ArcSin[c*x]) + 3
5*CosIntegral[a/b + ArcSin[c*x]]*Sin[a/b] + 63*CosIntegral[3*(a/b + ArcSin
[c*x])]*Sin[(3*a)/b] + 35*CosIntegral[5*(a/b + ArcSin[c*x])]*Sin[(5*a)/b]
+ 7*CosIntegral[7*(a/b + ArcSin[c*x])]*Sin[(7*a)/b] - 35*Cos[a/b]*SinInteg
ral[a/b + ArcSin[c*x]] - 63*Cos[(3*a)/b]*SinIntegral[3*(a/b + ArcSin[c*x])
] - 35*Cos[(5*a)/b]*SinIntegral[5*(a/b + ArcSin[c*x])] - 7*Cos[(7*a)/b]*Si
nIntegral[7*(a/b + ArcSin[c*x])]))/(64*b^2*c)
```

Rubi [A] (verified)

Time = 0.72 (sec) , antiderivative size = 244, normalized size of antiderivative = 0.80, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.208$, Rules used = {5166, 5224, 25, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d-c^2dx^2\right)^3}{(a+b\arcsin(cx))^2}\,dx$$

$$\downarrow 5166$$

$$-\frac{7cd^3\int \frac{x\left(1-c^2x^2\right)^{5/2}}{a+b\arcsin(cx)}dx}{b}-\frac{d^3\left(1-c^2x^2\right)^{7/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 5224$$

$$-\frac{7d^3\int -\frac{\cos^6\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c}-\frac{d^3\left(1-c^2x^2\right)^{7/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 25$$

$$\frac{7d^3\int \frac{\cos^6\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c}-\frac{d^3\left(1-c^2x^2\right)^{7/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 4906$$

$$\frac{7d^3\int\left(\frac{\sin\left(\frac{7a}{b}-\frac{7(a+b\arcsin(cx))}{b}\right)}{64(a+b\arcsin(cx))}+\frac{5\sin\left(\frac{5a}{b}-\frac{5(a+b\arcsin(cx))}{b}\right)}{64(a+b\arcsin(cx))}+\frac{9\sin\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{64(a+b\arcsin(cx))}+\frac{5\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{64(a+b\arcsin(cx))}\right)d(a+b\arcsin(cx))}{b^2c}-\frac{d^3\left(1-c^2x^2\right)^{7/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 2009$$

$$-\frac{7d^3\left(-\frac{5}{64}\sin\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)-\frac{9}{64}\sin\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)-\frac{5}{64}\sin\left(\frac{5a}{b}\right)\text{CosIntegr}\right.}{\frac{d^3\left(1-c^2x^2\right)^{7/2}}{bc(a+b\arcsin(cx))}}$$

input
```
Int[(d - c^2*d*x^2)^3/(a + b*ArcSin[c*x])^2,x]
```

output
```
-((d^3*(1 - c^2*x^2)^(7/2))/(b*c*(a + b*ArcSin[c*x]))) - (7*d^3*((-5*CosIn
tegral[(a + b*ArcSin[c*x])/b]*Sin[a/b])/64 - (9*CosIntegral[(3*(a + b*ArcS
in[c*x]))/b]*Sin[(3*a)/b])/64 - (5*CosIntegral[(5*(a + b*ArcSin[c*x]))/b]*
Sin[(5*a)/b])/64 - (CosIntegral[(7*(a + b*ArcSin[c*x]))/b]*Sin[(7*a)/b])/6
4 + (5*Cos[a/b]*SinIntegral[(a + b*ArcSin[c*x])/b])/64 + (9*Cos[(3*a)/b]*S
inIntegral[(3*(a + b*ArcSin[c*x]))/b])/64 + (5*Cos[(5*a)/b]*SinIntegral[(5
*(a + b*ArcSin[c*x]))/b])/64 + (Cos[(7*a)/b]*SinIntegral[(7*(a + b*ArcSin[
c*x]))/b])/64))/(b^2*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 467, normalized size of antiderivative = 1.54

method	result
derivativedivides	$-\frac{d^3\left(7\arcsin(cx)\,\mathrm{Si}\left(7\arcsin(cx)+\frac{7a}{b}\right)\cos\left(\frac{7a}{b}\right)b-7\arcsin(cx)\,\mathrm{Ci}\left(7\arcsin(cx)+\frac{7a}{b}\right)\sin\left(\frac{7a}{b}\right)b+35\arcsin(cx)\,\mathrm{Si}\left(5\arcsi\right.\right.}{}$
default	$-\frac{d^3\left(7\arcsin(cx)\,\mathrm{Si}\left(7\arcsin(cx)+\frac{7a}{b}\right)\cos\left(\frac{7a}{b}\right)b-7\arcsin(cx)\,\mathrm{Ci}\left(7\arcsin(cx)+\frac{7a}{b}\right)\sin\left(\frac{7a}{b}\right)b+35\arcsin(cx)\,\mathrm{Si}\left(5\arcsi\right.\right.}{}$

input
```
int((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
-1/64/c*d^3*(7*arcsin(c*x)*Si(7*arcsin(c*x)+7*a/b)*cos(7*a/b)*b-7*arcsin(c
*x)*Ci(7*arcsin(c*x)+7*a/b)*sin(7*a/b)*b+35*arcsin(c*x)*Si(5*arcsin(c*x)+5
*a/b)*cos(5*a/b)*b-35*arcsin(c*x)*Ci(5*arcsin(c*x)+5*a/b)*sin(5*a/b)*b+63*
arcsin(c*x)*Si(3*arcsin(c*x)+3*a/b)*cos(3*a/b)*b-63*arcsin(c*x)*Ci(3*arcsi
n(c*x)+3*a/b)*sin(3*a/b)*b+35*arcsin(c*x)*Si(arcsin(c*x)+a/b)*cos(a/b)*b-3
5*arcsin(c*x)*Ci(arcsin(c*x)+a/b)*sin(a/b)*b+7*Si(7*arcsin(c*x)+7*a/b)*cos
(7*a/b)*a-7*Ci(7*arcsin(c*x)+7*a/b)*sin(7*a/b)*a+35*Si(5*arcsin(c*x)+5*a/b
)*cos(5*a/b)*a-35*Ci(5*arcsin(c*x)+5*a/b)*sin(5*a/b)*a+63*Si(3*arcsin(c*x)
+3*a/b)*cos(3*a/b)*a-63*Ci(3*arcsin(c*x)+3*a/b)*sin(3*a/b)*a+35*Si(arcsin(
c*x)+a/b)*cos(a/b)*a-35*Ci(arcsin(c*x)+a/b)*sin(a/b)*a+35*(-c^2*x^2+1)^(1/
2)*b+cos(7*arcsin(c*x))*b+7*cos(5*arcsin(c*x))*b+21*cos(3*arcsin(c*x))*b)/
(a+b*arcsin(c*x))/b^2
```

Fricas [F]

$$\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^2}\,dx = \int -\frac{(c^2dx^2-d)^3}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(-(c^6*d^3*x^6 - 3*c^4*d^3*x^4 + 3*c^2*d^3*x^2 - d^3)/(b^2*arcsin(
c*x)^2 + 2*a*b*arcsin(c*x) + a^2), x)
```

Sympy [F]

$$\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^2}\,dx = -d^3\left(\int \frac{3c^2x^2}{a^2+2ab\operatorname{asin}(cx)+b^2\operatorname{asin}^2(cx)}\,dx + \int\left(-\frac{3c^4x^4}{a^2+2ab\operatorname{asin}(cx)+b^2\operatorname{asin}^2(cx)}\right)dx + \int \frac{c^6x^6}{a^2+2ab\operatorname{asin}(cx)+b^2\operatorname{asin}^2(cx)}\,dx + \int\left(-\frac{1}{a^2+2ab\operatorname{asin}(cx)+b^2\operatorname{asin}^2(cx)}\right)dx\right)$$

input
```
integrate((-c**2*d*x**2+d)**3/(a+b*asin(c*x))**2,x)
```

output
```
-d**3*(Integral(3*c**2*x**2/(a**2 + 2*a*b*asin(c*x) + b**2*asin(c*x)**2),
x) + Integral(-3*c**4*x**4/(a**2 + 2*a*b*asin(c*x) + b**2*asin(c*x)**2), x
) + Integral(c**6*x**6/(a**2 + 2*a*b*asin(c*x) + b**2*asin(c*x)**2), x) +
Integral(-1/(a**2 + 2*a*b*asin(c*x) + b**2*asin(c*x)**2), x))
```

Maxima [F]

$$\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^2}\,dx = \int -\frac{(c^2dx^2-d)^3}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
((c^6*d^3*x^6 - 3*c^4*d^3*x^4 + 3*c^2*d^3*x^2 - d^3)*sqrt(c*x + 1)*sqrt(-c
*x + 1) - (b^2*c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)*integ
rate(7*(c^5*d^3*x^5 - 2*c^3*d^3*x^3 + c*d^3*x)*sqrt(c*x + 1)*sqrt(-c*x + 1
)/(b^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b), x))/(b^2*c*arcta
n2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1995 vs. $2(286) = 572$.

Time = 0.25 (sec) , antiderivative size = 1995, normalized size of antiderivative = 6.56

$$\int \frac{(d - c^2 dx^2)^3}{(a + b \arcsin(cx))^2}\, dx = \text{Too large to display}$$

input
```
integrate((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
7*b*d^3*arcsin(c*x)*cos(a/b)^6*cos_integral(7*a/b + 7*arcsin(c*x))*sin(a/b
)/(b^3*c*arcsin(c*x) + a*b^2*c) - 7*b*d^3*arcsin(c*x)*cos(a/b)^7*sin_integ
ral(7*a/b + 7*arcsin(c*x))/(b^3*c*arcsin(c*x) + a*b^2*c) + 7*a*d^3*cos(a/b
)^6*cos_integral(7*a/b + 7*arcsin(c*x))*sin(a/b)/(b^3*c*arcsin(c*x) + a*b^
2*c) - 7*a*d^3*cos(a/b)^7*sin_integral(7*a/b + 7*arcsin(c*x))/(b^3*c*arcsi
n(c*x) + a*b^2*c) - 35/4*b*d^3*arcsin(c*x)*cos(a/b)^4*cos_integral(7*a/b +
 7*arcsin(c*x))*sin(a/b)/(b^3*c*arcsin(c*x) + a*b^2*c) + 35/4*b*d^3*arcsin
(c*x)*cos(a/b)^4*cos_integral(5*a/b + 5*arcsin(c*x))*sin(a/b)/(b^3*c*arcsi
n(c*x) + a*b^2*c) + 49/4*b*d^3*arcsin(c*x)*cos(a/b)^5*sin_integral(7*a/b +
 7*arcsin(c*x))/(b^3*c*arcsin(c*x) + a*b^2*c) - 35/4*b*d^3*arcsin(c*x)*cos
(a/b)^5*sin_integral(5*a/b + 5*arcsin(c*x))/(b^3*c*arcsin(c*x) + a*b^2*c)
- 35/4*a*d^3*cos(a/b)^4*cos_integral(7*a/b + 7*arcsin(c*x))*sin(a/b)/(b^3*
c*arcsin(c*x) + a*b^2*c) + 35/4*a*d^3*cos(a/b)^4*cos_integral(5*a/b + 5*ar
csin(c*x))*sin(a/b)/(b^3*c*arcsin(c*x) + a*b^2*c) + 49/4*a*d^3*cos(a/b)^5*
sin_integral(7*a/b + 7*arcsin(c*x))/(b^3*c*arcsin(c*x) + a*b^2*c) - 35/4*a
*d^3*cos(a/b)^5*sin_integral(5*a/b + 5*arcsin(c*x))/(b^3*c*arcsin(c*x) + a
*b^2*c) + 21/8*b*d^3*arcsin(c*x)*cos(a/b)^2*cos_integral(7*a/b + 7*arcsin(
c*x))*sin(a/b)/(b^3*c*arcsin(c*x) + a*b^2*c) - 105/16*b*d^3*arcsin(c*x)*co
s(a/b)^2*cos_integral(5*a/b + 5*arcsin(c*x))*sin(a/b)/(b^3*c*arcsin(c*x) +
 a*b^2*c) + 63/16*b*d^3*arcsin(c*x)*cos(a/b)^2*cos_integral(3*a/b + 3*a...
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(d-c^2\,d\,x^2)^3}{(a+b\,\mathrm{asin}\,(c\,x))^2}\,dx$$

input
```
int((d - c^2*d*x^2)^3/(a + b*asin(c*x))^2,x)
```

output
```
int((d - c^2*d*x^2)^3/(a + b*asin(c*x))^2, x)
```

Reduce [F]

$$\begin{aligned}\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^2}\,dx = d^3\Bigg(&-\left(\int \frac{x^6}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx\right)c^6\\ &+3\left(\int \frac{x^4}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx\right)c^4\\ &-3\left(\int \frac{x^2}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx\right)c^2\\ &+\int \frac{1}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx\Bigg)\end{aligned}$$

input
```
int((-c^2*d*x^2+d)^3/(a+b*asin(c*x))^2,x)
```

output
```
d**3*( - int(x**6/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x)*c**6 + 3
*int(x**4/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x)*c**4 - 3*int(x**
2/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x)*c**2 + int(1/(asin(c*x)*
*2*b**2 + 2*asin(c*x)*a*b + a**2),x))
```

3.33 $\int \frac{\left(d-c^2dx^2\right)^2}{(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 343
Mathematica [A] (verified) . . . 344
Rubi [A] (verified) . . . 344
Maple [A] (verified) . . . 347
Fricas [F] . . . 347
Sympy [F] . . . 348
Maxima [F] . . . 348
Giac [B] (verification not implemented) . . . 349
Mupad [F(-1)] . . . 350
Reduce [F] . . . 350

Optimal result

Integrand size = 24, antiderivative size = 236

$$\begin{aligned}\int \frac{\left(d-c^2dx^2\right)^2}{(a+b\arcsin(cx))^2}\,dx = &-\frac{d^2(1-c^2x^2)^{5/2}}{bc(a+b\arcsin(cx))}\\ &+\frac{5d^2\,\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}\right)}{8b^2c}\\ &+\frac{15d^2\,\text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{3a}{b}\right)}{16b^2c}\\ &+\frac{5d^2\,\text{CosIntegral}\left(\frac{5(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{5a}{b}\right)}{16b^2c}\\ &-\frac{5d^2\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{8b^2c}\\ &-\frac{15d^2\cos\left(\frac{3a}{b}\right)\text{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{16b^2c}\\ &-\frac{5d^2\cos\left(\frac{5a}{b}\right)\text{Si}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{16b^2c}\end{aligned}$$

output
```
-d^2*(-c^2*x^2+1)^(5/2)/b/c/(a+b*arcsin(c*x))+5/8*d^2*Ci((a+b*arcsin(c*x))
/b)*sin(a/b)/b^2/c+15/16*d^2*Ci(3*(a+b*arcsin(c*x))/b)*sin(3*a/b)/b^2/c+5/
16*d^2*Ci(5*(a+b*arcsin(c*x))/b)*sin(5*a/b)/b^2/c-5/8*d^2*cos(a/b)*Si((a+b
*arcsin(c*x))/b)/b^2/c-15/16*d^2*cos(3*a/b)*Si(3*(a+b*arcsin(c*x))/b)/b^2/
c-5/16*d^2*cos(5*a/b)*Si(5*(a+b*arcsin(c*x))/b)/b^2/c
```

Mathematica [A] (verified)

Time = 0.86 (sec) , antiderivative size = 233, normalized size of antiderivative = 0.99

$$\int \frac{(d-c^2dx^2)^2}{(a+b\arcsin(cx))^2}\,dx$$
$$= \frac{d^2\left(-\frac{16b\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}+\frac{32bc^2x^2\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}-\frac{16bc^4x^4\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}+10\,\text{CosIntegral}\left(\frac{a}{b}+\arcsin(cx)\right)\sin\left(\frac{a}{b}\right)+15\,\text{CosInt}\right.}{}$$

input
```
Integrate[(d - c^2*d*x^2)^2/(a + b*ArcSin[c*x])^2,x]
```

output
```
(d^2*((-16*b*Sqrt[1 - c^2*x^2])/(a + b*ArcSin[c*x]) + (32*b*c^2*x^2*Sqrt[1
 - c^2*x^2])/(a + b*ArcSin[c*x]) - (16*b*c^4*x^4*Sqrt[1 - c^2*x^2])/(a + b
*ArcSin[c*x]) + 10*CosIntegral[a/b + ArcSin[c*x]]*Sin[a/b] + 15*CosIntegra
l[3*(a/b + ArcSin[c*x])]*Sin[(3*a)/b] + 5*CosIntegral[5*(a/b + ArcSin[c*x]
)]*Sin[(5*a)/b] - 10*Cos[a/b]*SinIntegral[a/b + ArcSin[c*x]] - 15*Cos[(3*a
)/b]*SinIntegral[3*(a/b + ArcSin[c*x])] - 5*Cos[(5*a)/b]*SinIntegral[5*(a/
b + ArcSin[c*x])]))/(16*b^2*c)
```

Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 194, normalized size of antiderivative = 0.82, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.208$, Rules used = {5166, 5224, 25, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d-c^2dx^2\right)^2}{(a+b\arcsin(cx))^2}\,dx$$

$$\downarrow 5166$$

$$-\frac{5cd^2\int \frac{x\left(1-c^2x^2\right)^{3/2}}{a+b\arcsin(cx)}dx}{b}-\frac{d^2\left(1-c^2x^2\right)^{5/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 5224$$

$$-\frac{5d^2\int -\frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c}-\frac{d^2\left(1-c^2x^2\right)^{5/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 25$$

$$\frac{5d^2\int \frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c}-\frac{d^2\left(1-c^2x^2\right)^{5/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 4906$$

$$\frac{5d^2\int \left(\frac{\sin\left(\frac{5a}{b}-\frac{5(a+b\arcsin(cx))}{b}\right)}{16(a+b\arcsin(cx))}+\frac{3\sin\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{16(a+b\arcsin(cx))}+\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{8(a+b\arcsin(cx))}\right)d(a+b\arcsin(cx))}{b^2c}-$$
$$\frac{d^2\left(1-c^2x^2\right)^{5/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 2009$$

$$-\frac{5d^2\left(-\frac{1}{8}\sin\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)-\frac{3}{16}\sin\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)-\frac{1}{16}\sin\left(\frac{5a}{b}\right)\text{CosIntegra}\right.$$
$$\frac{d^2\left(1-c^2x^2\right)^{5/2}}{bc(a+b\arcsin(cx))}$$

input
```
Int[(d - c^2*d*x^2)^2/(a + b*ArcSin[c*x])^2,x]
```

output
```
-((d^2*(1 - c^2*x^2)^(5/2))/(b*c*(a + b*ArcSin[c*x]))) - (5*d^2*(-1/8*(Cos
Integral[(a + b*ArcSin[c*x])/b]*Sin[a/b]) - (3*CosIntegral[(3*(a + b*ArcSi
n[c*x]))/b]*Sin[(3*a)/b])/16 - (CosIntegral[(5*(a + b*ArcSin[c*x]))/b]*Sin
[(5*a)/b])/16 + (Cos[a/b]*SinIntegral[(a + b*ArcSin[c*x])/b])/8 + (3*Cos[(
3*a)/b]*SinIntegral[(3*(a + b*ArcSin[c*x]))/b])/16 + (Cos[(5*a)/b]*SinInte
gral[(5*(a + b*ArcSin[c*x]))/b])/16))/(b^2*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 353, normalized size of antiderivative = 1.50

method	result
derivativedivides	$-\frac{d^2\left(5\arcsin(cx)\,\mathrm{Si}\left(5\arcsin(cx)+\frac{5a}{b}\right)\cos\left(\frac{5a}{b}\right)b-5\arcsin(cx)\,\mathrm{Ci}\left(5\arcsin(cx)+\frac{5a}{b}\right)\sin\left(\frac{5a}{b}\right)b+15\arcsin(cx)\,\mathrm{Si}(3\arcsi\right.}{}$
default	$-\frac{d^2\left(5\arcsin(cx)\,\mathrm{Si}\left(5\arcsin(cx)+\frac{5a}{b}\right)\cos\left(\frac{5a}{b}\right)b-5\arcsin(cx)\,\mathrm{Ci}\left(5\arcsin(cx)+\frac{5a}{b}\right)\sin\left(\frac{5a}{b}\right)b+15\arcsin(cx)\,\mathrm{Si}(3\arcsi\right.}{}$

input
```
int((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
-1/16/c*d^2*(5*arcsin(c*x)*Si(5*arcsin(c*x)+5*a/b)*cos(5*a/b)*b-5*arcsin(c
*x)*Ci(5*arcsin(c*x)+5*a/b)*sin(5*a/b)*b+15*arcsin(c*x)*Si(3*arcsin(c*x)+3
*a/b)*cos(3*a/b)*b-15*arcsin(c*x)*Ci(3*arcsin(c*x)+3*a/b)*sin(3*a/b)*b+10*
arcsin(c*x)*Si(arcsin(c*x)+a/b)*cos(a/b)*b-10*arcsin(c*x)*Ci(arcsin(c*x)+a
/b)*sin(a/b)*b+5*Si(5*arcsin(c*x)+5*a/b)*cos(5*a/b)*a-5*Ci(5*arcsin(c*x)+5
*a/b)*sin(5*a/b)*a+15*Si(3*arcsin(c*x)+3*a/b)*cos(3*a/b)*a-15*Ci(3*arcsin(
c*x)+3*a/b)*sin(3*a/b)*a+10*Si(arcsin(c*x)+a/b)*cos(a/b)*a-10*Ci(arcsin(c*
x)+a/b)*sin(a/b)*a+10*(-c^2*x^2+1)^(1/2)*b+cos(5*arcsin(c*x))*b+5*cos(3*ar
csin(c*x))*b)/(a+b*arcsin(c*x))/b^2
```

Fricas [F]

$$\int \frac{\left(d-c^2dx^2\right)^2}{\left(a+b\arcsin(cx)\right)^2}\,dx = \int \frac{\left(c^2dx^2-d\right)^2}{\left(b\arcsin\left(cx\right)+a\right)^2}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral((c^4*d^2*x^4 - 2*c^2*d^2*x^2 + d^2)/(b^2*arcsin(c*x)^2 + 2*a*b*ar
csin(c*x) + a^2), x)
```

Sympy [F]

$$\int \frac{\left(d - c^2 dx^2\right)^2}{\left(a + b \arcsin(cx)\right)^2}\, dx = d^2 \left(\int \left(-\frac{2c^2x^2}{a^2 + 2ab \operatorname{asin}(cx) + b^2 \operatorname{asin}^2(cx)} \right) dx + \int \frac{c^4x^4}{a^2 + 2ab \operatorname{asin}(cx) + b^2 \operatorname{asin}^2(cx)}\, dx + \int \frac{1}{a^2 + 2ab \operatorname{asin}(cx) + b^2 \operatorname{asin}^2(cx)}\, dx \right)$$

input
```
integrate((-c**2*d*x**2+d)**2/(a+b*asin(c*x))**2,x)
```

output
```
d**2*(Integral(-2*c**2*x**2/(a**2 + 2*a*b*asin(c*x) + b**2*asin(c*x)**2),
x) + Integral(c**4*x**4/(a**2 + 2*a*b*asin(c*x) + b**2*asin(c*x)**2), x) +
 Integral(1/(a**2 + 2*a*b*asin(c*x) + b**2*asin(c*x)**2), x))
```

Maxima [F]

$$\int \frac{\left(d - c^2 dx^2\right)^2}{\left(a + b \arcsin(cx)\right)^2}\, dx = \int \frac{\left(c^2 dx^2 - d\right)^2}{\left(b \arcsin(cx) + a\right)^2}\, dx$$

input
```
integrate((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
-((c^4*d^2*x^4 - 2*c^2*d^2*x^2 + d^2)*sqrt(c*x + 1)*sqrt(-c*x + 1) - (b^2*
c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)*integrate(5*(c^3*d^2
*x^3 - c*d^2*x)*sqrt(c*x + 1)*sqrt(-c*x + 1)/(b^2*arctan2(c*x, sqrt(c*x +
1)*sqrt(-c*x + 1)) + a*b), x))/(b^2*c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x
 + 1)) + a*b*c)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1200 vs. $2(222) = 444$.

Time = 0.23 (sec) , antiderivative size = 1200, normalized size of antiderivative = 5.08

$$\int \frac{(d - c^2 dx^2)^2}{(a + b \arcsin(cx))^2}\, dx = \text{Too large to display}$$

input
```
integrate((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
5*b*d^2*arcsin(c*x)*cos(a/b)^4*cos_integral(5*a/b + 5*arcsin(c*x))*sin(a/b
)/(b^3*c*arcsin(c*x) + a*b^2*c) - 5*b*d^2*arcsin(c*x)*cos(a/b)^5*sin_integ
ral(5*a/b + 5*arcsin(c*x))/(b^3*c*arcsin(c*x) + a*b^2*c) + 5*a*d^2*cos(a/b
)^4*cos_integral(5*a/b + 5*arcsin(c*x))*sin(a/b)/(b^3*c*arcsin(c*x) + a*b^
2*c) - 5*a*d^2*cos(a/b)^5*sin_integral(5*a/b + 5*arcsin(c*x))/(b^3*c*arcsi
n(c*x) + a*b^2*c) - 15/4*b*d^2*arcsin(c*x)*cos(a/b)^2*cos_integral(5*a/b +
 5*arcsin(c*x))*sin(a/b)/(b^3*c*arcsin(c*x) + a*b^2*c) + 15/4*b*d^2*arcsin
(c*x)*cos(a/b)^2*cos_integral(3*a/b + 3*arcsin(c*x))*sin(a/b)/(b^3*c*arcsi
n(c*x) + a*b^2*c) + 25/4*b*d^2*arcsin(c*x)*cos(a/b)^3*sin_integral(5*a/b +
 5*arcsin(c*x))/(b^3*c*arcsin(c*x) + a*b^2*c) - 15/4*b*d^2*arcsin(c*x)*cos
(a/b)^3*sin_integral(3*a/b + 3*arcsin(c*x))/(b^3*c*arcsin(c*x) + a*b^2*c)
- 15/4*a*d^2*cos(a/b)^2*cos_integral(5*a/b + 5*arcsin(c*x))*sin(a/b)/(b^3*
c*arcsin(c*x) + a*b^2*c) + 15/4*a*d^2*cos(a/b)^2*cos_integral(3*a/b + 3*ar
csin(c*x))*sin(a/b)/(b^3*c*arcsin(c*x) + a*b^2*c) + 25/4*a*d^2*cos(a/b)^3*
sin_integral(5*a/b + 5*arcsin(c*x))/(b^3*c*arcsin(c*x) + a*b^2*c) - 15/4*a
*d^2*cos(a/b)^3*sin_integral(3*a/b + 3*arcsin(c*x))/(b^3*c*arcsin(c*x) + a
*b^2*c) + 5/16*b*d^2*arcsin(c*x)*cos_integral(5*a/b + 5*arcsin(c*x))*sin(a
/b)/(b^3*c*arcsin(c*x) + a*b^2*c) - 15/16*b*d^2*arcsin(c*x)*cos_integral(3
*a/b + 3*arcsin(c*x))*sin(a/b)/(b^3*c*arcsin(c*x) + a*b^2*c) + 5/8*b*d^2*a
rcsin(c*x)*cos_integral(a/b + arcsin(c*x))*sin(a/b)/(b^3*c*arcsin(c*x) ...
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d-c^2dx^2)^2}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(d-c^2\,d\,x^2)^2}{(a+b\,\mathrm{asin}\,(c\,x))^2}\,dx$$

input
```
int((d - c^2*d*x^2)^2/(a + b*asin(c*x))^2,x)
```

output
```
int((d - c^2*d*x^2)^2/(a + b*asin(c*x))^2, x)
```

Reduce [F]

$$\int \frac{(d-c^2dx^2)^2}{(a+b\arcsin(cx))^2}\,dx = d^2\left(\left(\int \frac{x^4}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx\right)c^4 - 2\left(\int \frac{x^2}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx\right)c^2 + \int \frac{1}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx\right)$$

input
```
int((-c^2*d*x^2+d)^2/(a+b*asin(c*x))^2,x)
```

output
```
d**2*(int(x**4/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x)*c**4 - 2*in
t(x**2/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x)*c**2 + int(1/(asin(
c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x))
```

3.34 $\int \frac{d-c^2dx^2}{(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 351
Mathematica [A] (verified) . . . 352
Rubi [A] (verified) . . . 352
Maple [A] (verified) . . . 354
Fricas [F] . . . 355
Sympy [F] . . . 355
Maxima [F] . . . 355
Giac [B] (verification not implemented) . . . 356
Mupad [F(-1)] . . . 357
Reduce [F] . . . 357

Optimal result

Integrand size = 22, antiderivative size = 158

$$\int \frac{d-c^2dx^2}{(a+b\arcsin(cx))^2}\,dx = -\frac{d(1-c^2x^2)^{3/2}}{bc(a+b\arcsin(cx))} + \frac{3d\,\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}\right)}{4b^2c} + \frac{3d\,\text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{3a}{b}\right)}{4b^2c} - \frac{3d\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{4b^2c} - \frac{3d\cos\left(\frac{3a}{b}\right)\text{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{4b^2c}$$

output

```
-d*(-c^2*x^2+1)^(3/2)/b/c/(a+b*arcsin(c*x))+3/4*d*Ci((a+b*arcsin(c*x))/b)*
sin(a/b)/b^2/c+3/4*d*Ci(3*(a+b*arcsin(c*x))/b)*sin(3*a/b)/b^2/c-3/4*d*cos(
a/b)*Si((a+b*arcsin(c*x))/b)/b^2/c-3/4*d*cos(3*a/b)*Si(3*(a+b*arcsin(c*x))
/b)/b^2/c
```

Mathematica [A] (verified)

Time = 0.31 (sec) , antiderivative size = 122, normalized size of antiderivative = 0.77

$$\int \frac{d - c^2 d x^2}{(a + b \arcsin(cx))^2}\, dx$$

$$= \frac{d\left(-\frac{4b(1-c^2x^2)^{3/2}}{a+b\arcsin(cx)} + 3\left(\text{CosIntegral}\left(\frac{a}{b} + \arcsin(cx)\right)\sin\left(\frac{a}{b}\right) + \text{CosIntegral}\left(3\left(\frac{a}{b} + \arcsin(cx)\right)\right)\sin\left(\frac{3a}{b}\right) -\right.\right.}{4b^2c}$$

input
```
Integrate[(d - c^2*d*x^2)/(a + b*ArcSin[c*x])^2,x]
```

output
```
(d*((-4*b*(1 - c^2*x^2)^(3/2))/(a + b*ArcSin[c*x]) + 3*(CosIntegral[a/b +
ArcSin[c*x]]*Sin[a/b] + CosIntegral[3*(a/b + ArcSin[c*x])]*Sin[(3*a)/b] -
Cos[a/b]*SinIntegral[a/b + ArcSin[c*x]] - Cos[(3*a)/b]*SinIntegral[3*(a/b
+ ArcSin[c*x])])))/(4*b^2*c)
```

Rubi [A] (verified)

Time = 0.61 (sec) , antiderivative size = 140, normalized size of antiderivative = 0.89, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$, Rules used = {5166, 5224, 25, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{d - c^2 d x^2}{(a + b \arcsin(cx))^2}\, dx$$

$$\downarrow 5166$$

$$-\frac{3cd\int \frac{x\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}dx}{b} - \frac{d\left(1-c^2x^2\right)^{3/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 5224$$

$$-\frac{3d\int -\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c} - \frac{d\left(1-c^2x^2\right)^{3/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 25$$

$$\frac{3d\int \frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c}-\frac{d\left(1-c^2x^2\right)^{3/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 4906$$

$$\frac{3d\int\left(\frac{\sin\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{4(a+b\arcsin(cx))}+\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{4(a+b\arcsin(cx))}\right)d(a+b\arcsin(cx))}{b^2c}-\frac{d\left(1-c^2x^2\right)^{3/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 2009$$

$$-\frac{3d\left(-\frac{1}{4}\sin\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)-\frac{1}{4}\sin\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)+\frac{1}{4}\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right.\right.}{b^2c}$$

$$\frac{d\left(1-c^2x^2\right)^{3/2}}{bc(a+b\arcsin(cx))}$$

input
```
Int[(d - c^2*d*x^2)/(a + b*ArcSin[c*x])^2,x]
```

output
```
-((d*(1 - c^2*x^2)^(3/2))/(b*c*(a + b*ArcSin[c*x]))) - (3*d*(-1/4*(CosInte
gral[(a + b*ArcSin[c*x])/b]*Sin[a/b]) - (CosIntegral[(3*(a + b*ArcSin[c*x]
))/b]*Sin[(3*a)/b])/4 + (Cos[a/b]*SinIntegral[(a + b*ArcSin[c*x])/b])/4 +
(Cos[(3*a)/b]*SinIntegral[(3*(a + b*ArcSin[c*x]))/b])/4))/(b^2*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 237, normalized size of antiderivative = 1.50

method	result
derivativedivides	$-\frac{d\left(3\arcsin(cx)\,\mathrm{Si}\left(3\arcsin(cx)+\frac{3a}{b}\right)\cos\left(\frac{3a}{b}\right)b-3\arcsin(cx)\,\mathrm{Ci}\left(3\arcsin(cx)+\frac{3a}{b}\right)\sin\left(\frac{3a}{b}\right)b+3\arcsin(cx)\,\mathrm{Si}(\arcsin(c$
default	$-\frac{d\left(3\arcsin(cx)\,\mathrm{Si}\left(3\arcsin(cx)+\frac{3a}{b}\right)\cos\left(\frac{3a}{b}\right)b-3\arcsin(cx)\,\mathrm{Ci}\left(3\arcsin(cx)+\frac{3a}{b}\right)\sin\left(\frac{3a}{b}\right)b+3\arcsin(cx)\,\mathrm{Si}(\arcsin(c$

input

```
int((-c^2*d*x^2+d)/(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output

```
-1/4/c*d*(3*arcsin(c*x)*Si(3*arcsin(c*x)+3*a/b)*cos(3*a/b)*b-3*arcsin(c*x)
*Ci(3*arcsin(c*x)+3*a/b)*sin(3*a/b)*b+3*arcsin(c*x)*Si(arcsin(c*x)+a/b)*co
s(a/b)*b-3*arcsin(c*x)*Ci(arcsin(c*x)+a/b)*sin(a/b)*b+3*Si(3*arcsin(c*x)+3
*a/b)*cos(3*a/b)*a-3*Ci(3*arcsin(c*x)+3*a/b)*sin(3*a/b)*a+3*Si(arcsin(c*x)
+a/b)*cos(a/b)*a-3*Ci(arcsin(c*x)+a/b)*sin(a/b)*a+3*(-c^2*x^2+1)^(1/2)*b+c
os(3*arcsin(c*x))*b)/(a+b*arcsin(c*x))/b^2
```

Fricas [F]

$$\int \frac{d - c^2 dx^2}{(a + b \arcsin(cx))^2}\, dx = \int -\frac{c^2 dx^2 - d}{(b \arcsin(cx) + a)^2}\, dx$$

input
```
integrate((-c^2*d*x^2+d)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(-(c^2*d*x^2 - d)/(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2), x
)
```

Sympy [F]

$$\int \frac{d - c^2 dx^2}{(a + b \arcsin(cx))^2}\, dx = -d\left(\int \frac{c^2 x^2}{a^2 + 2ab \operatorname{asin}(cx) + b^2 \operatorname{asin}^2(cx)}\, dx + \int \left(-\frac{1}{a^2 + 2ab \operatorname{asin}(cx) + b^2 \operatorname{asin}^2(cx)}\right) dx\right)$$

input
```
integrate((-c**2*d*x**2+d)/(a+b*asin(c*x))**2,x)
```

output
```
-d*(Integral(c**2*x**2/(a**2 + 2*a*b*asin(c*x) + b**2*asin(c*x)**2), x) +
Integral(-1/(a**2 + 2*a*b*asin(c*x) + b**2*asin(c*x)**2), x))
```

Maxima [F]

$$\int \frac{d - c^2 dx^2}{(a + b \arcsin(cx))^2}\, dx = \int -\frac{c^2 dx^2 - d}{(b \arcsin(cx) + a)^2}\, dx$$

input
```
integrate((-c^2*d*x^2+d)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
((c^2*d*x^2 - d)*sqrt(c*x + 1)*sqrt(-c*x + 1) - 3*(b^2*c^2*d*arctan2(c*x,
sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c^2*d)*integrate(sqrt(c*x + 1)*sqrt(-c
*x + 1)*x/(b^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b), x))/(b^2
*c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 571 vs. $2(148) = 296$.

Time $= 0.21$ (sec) , antiderivative size $= 571$, normalized size of antiderivative $= 3.61$

$$\int \frac{d - c^2 dx^2}{(a + b\arcsin(cx))^2}\, dx = \text{Too large to display}$$

input
```
integrate((-c^2*d*x^2+d)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
3*b*d*arcsin(c*x)*cos(a/b)^2*cos_integral(3*a/b + 3*arcsin(c*x))*sin(a/b)/
(b^3*c*arcsin(c*x) + a*b^2*c) - 3*b*d*arcsin(c*x)*cos(a/b)^3*sin_integral(
3*a/b + 3*arcsin(c*x))/(b^3*c*arcsin(c*x) + a*b^2*c) + 3*a*d*cos(a/b)^2*co
s_integral(3*a/b + 3*arcsin(c*x))*sin(a/b)/(b^3*c*arcsin(c*x) + a*b^2*c) -
 3*a*d*cos(a/b)^3*sin_integral(3*a/b + 3*arcsin(c*x))/(b^3*c*arcsin(c*x) +
 a*b^2*c) - 3/4*b*d*arcsin(c*x)*cos_integral(3*a/b + 3*arcsin(c*x))*sin(a/
b)/(b^3*c*arcsin(c*x) + a*b^2*c) + 3/4*b*d*arcsin(c*x)*cos_integral(a/b +
arcsin(c*x))*sin(a/b)/(b^3*c*arcsin(c*x) + a*b^2*c) + 9/4*b*d*arcsin(c*x)*
cos(a/b)*sin_integral(3*a/b + 3*arcsin(c*x))/(b^3*c*arcsin(c*x) + a*b^2*c)
 - 3/4*b*d*arcsin(c*x)*cos(a/b)*sin_integral(a/b + arcsin(c*x))/(b^3*c*arc
sin(c*x) + a*b^2*c) - 3/4*a*d*cos_integral(3*a/b + 3*arcsin(c*x))*sin(a/b)
/(b^3*c*arcsin(c*x) + a*b^2*c) + 3/4*a*d*cos_integral(a/b + arcsin(c*x))*s
in(a/b)/(b^3*c*arcsin(c*x) + a*b^2*c) + 9/4*a*d*cos(a/b)*sin_integral(3*a/
b + 3*arcsin(c*x))/(b^3*c*arcsin(c*x) + a*b^2*c) - 3/4*a*d*cos(a/b)*sin_in
tegral(a/b + arcsin(c*x))/(b^3*c*arcsin(c*x) + a*b^2*c) - (-c^2*x^2 + 1)^(
3/2)*b*d/(b^3*c*arcsin(c*x) + a*b^2*c)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{d - c^2 dx^2}{(a + b \arcsin(cx))^2}\, dx = \int \frac{d - c^2\, d\, x^2}{(a + b \operatorname{asin}(c\, x))^2}\, dx$$

input
```
int((d - c^2*d*x^2)/(a + b*asin(c*x))^2,x)
```

output
```
int((d - c^2*d*x^2)/(a + b*asin(c*x))^2, x)
```

Reduce [F]

$$\int \frac{d - c^2 dx^2}{(a + b \arcsin(cx))^2}\, dx = d\left(-\left(\int \frac{x^2}{asin\,(cx)^2\, b^2 + 2 asin\,(cx)\, ab + a^2} dx\right) c^2 + \int \frac{1}{asin\,(cx)^2\, b^2 + 2 asin\,(cx)\, ab + a^2} dx\right)$$

input
```
int((-c^2*d*x^2+d)/(a+b*asin(c*x))^2,x)
```

output
```
d*( - int(x**2/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x)*c**2 + int(
1/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x))
```

3.35 $\int \frac{1}{(d-c^2dx^2)(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 358
Mathematica [N/A] . . . 358
Rubi [N/A] . . . 359
Maple [N/A] . . . 359
Fricas [N/A] . . . 360
Sympy [N/A] . . . 360
Maxima [N/A] . . . 361
Giac [N/A] . . . 361
Mupad [N/A] . . . 362
Reduce [N/A] . . . 362

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^2}\,dx = \text{Int}\left(\frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^2},x\right)$$

output
```
Defer(Int)(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 21.79 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^2}\,dx$$

input
```
Integrate[1/((d - c^2*d*x^2)*(a + b*ArcSin[c*x])^2),x]
```

output
```
Integrate[1/((d - c^2*d*x^2)*(a + b*ArcSin[c*x])^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.40 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d - c^2 d x^2)\,(a + b \arcsin(cx))^2}\,dx$$

$$\downarrow 5166$$

$$\frac{c \int \frac{x}{(1-c^2x^2)^{3/2}(a+b\arcsin(cx))}\,dx}{bd} - \frac{1}{bcd\sqrt{1-c^2x^2}(a+b\arcsin(cx))}$$

$$\downarrow 5234$$

$$\frac{c \int \frac{x}{(1-c^2x^2)^{3/2}(a+b\arcsin(cx))}\,dx}{bd} - \frac{1}{bcd\sqrt{1-c^2x^2}(a+b\arcsin(cx))}$$

input
```
Int[1/((d - c^2*d*x^2)*(a + b*ArcSin[c*x])^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{1}{(-c^2 d\, x^2 + d)\,(a + b \arcsin(cx))^2}\,dx$$

input
```
int(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^2,x)
```

output
```
int(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.96

$$\int \frac{1}{\left(d-c^2dx^2\right)\left(a+b\arcsin(cx)\right)^2}\,dx = \int -\frac{1}{(c^2dx^2-d)(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(-1/(a^2*c^2*d*x^2 - a^2*d + (b^2*c^2*d*x^2 - b^2*d)*arcsin(c*x)^2
 + 2*(a*b*c^2*d*x^2 - a*b*d)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 4.85 (sec) , antiderivative size = 73, normalized size of antiderivative = 3.04

$$\int \frac{1}{\left(d-c^2dx^2\right)\left(a+b\arcsin(cx)\right)^2}\,dx = -\frac{\int \frac{1}{a^2c^2x^2-a^2+2abc^2x^2\operatorname{asin}(cx)-2ab\operatorname{asin}(cx)+b^2c^2x^2\operatorname{asin}^2(cx)-b^2\operatorname{asin}^2(cx)}\,dx}{d}$$

input
```
integrate(1/(-c**2*d*x**2+d)/(a+b*asin(c*x))**2,x)
```

output
```
-Integral(1/(a**2*c**2*x**2 - a**2 + 2*a*b*c**2*x**2*asin(c*x) - 2*a*b*asi
n(c*x) + b**2*c**2*x**2*asin(c*x)**2 - b**2*asin(c*x)**2), x)/d
```

Maxima [N/A]

Not integrable

Time = 0.54 (sec) , antiderivative size = 236, normalized size of antiderivative = 9.83

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^2}\,dx = \int -\frac{1}{(c^2dx^2-d)(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
((a*b*c^4*d*x^2 - a*b*c^2*d + (b^2*c^4*d*x^2 - b^2*c^2*d)*arctan2(c*x, sqr
t(c*x + 1)*sqrt(-c*x + 1)))*integrate(sqrt(c*x + 1)*sqrt(-c*x + 1)*x/(a*b*
c^4*d*x^4 - 2*a*b*c^2*d*x^2 + a*b*d + (b^2*c^4*d*x^4 - 2*b^2*c^2*d*x^2 + b
^2*d)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))), x) + sqrt(c*x + 1)*sqrt
(-c*x + 1))/(a*b*c^3*d*x^2 - a*b*c*d + (b^2*c^3*d*x^2 - b^2*c*d)*arctan2(c
*x, sqrt(c*x + 1)*sqrt(-c*x + 1)))
```

Giac [N/A]

Not integrable

Time = 8.05 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.17

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^2}\,dx = \int -\frac{1}{(c^2dx^2-d)(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
integrate(-1/((c^2*d*x^2 - d)*(b*arcsin(c*x) + a)^2), x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}\,(c\,x))^2\,\left(d-c^2\,d\,x^2\right)}\,dx$$

input
```
int(1/((a + b*asin(c*x))^2*(d - c^2*d*x^2)),x)
```

output
```
int(1/((a + b*asin(c*x))^2*(d - c^2*d*x^2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 74, normalized size of antiderivative = 3.08

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^2}\,dx = -\frac{\int \frac{1}{asin(cx)^2b^2c^2x^2-asin(cx)^2b^2+2asin(cx)ab\,c^2x^2-2asin(cx)ab+a^2c^2x^2-a^2}\,dx}{d}$$

input
```
int(1/(-c^2*d*x^2+d)/(a+b*asin(c*x))^2,x)
```

output
```
( - int(1/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a
*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a**2),x))/d
```

3.36 $\int \frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 363
Mathematica [N/A] . . . 363
Rubi [N/A] . . . 364
Maple [N/A] . . . 364
Fricas [N/A] . . . 365
Sympy [N/A] . . . 365
Maxima [N/A] . . . 366
Giac [F(-1)] . . . 366
Mupad [N/A] . . . 367
Reduce [N/A] . . . 367

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))^2}\,dx = \text{Int}\left(\frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))^2},x\right)$$

output
```
Defer(Int)(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 42.09 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))^2}\,dx$$

input
```
Integrate[1/((d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])^2),x]
```

output
```
Integrate[1/((d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.40 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^2}\,dx$$

$$\downarrow 5166$$

$$\frac{3c\int \frac{x}{\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))}dx}{bd^2} - \frac{1}{bcd^2\left(1-c^2x^2\right)^{3/2}\left(a+b\arcsin(cx)\right)}$$

$$\downarrow 5234$$

$$\frac{3c\int \frac{x}{\left(1-c^2x^2\right)^{5/2}(a+b\arcsin(cx))}dx}{bd^2} - \frac{1}{bcd^2\left(1-c^2x^2\right)^{3/2}\left(a+b\arcsin(cx)\right)}$$

input
```
Int[1/((d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.60 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(-c^2d\,x^2+d\right)^2\left(a+b\arcsin\left(cx\right)\right)^2}dx$$

input
```
int(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^2,x)
```

output
```
int(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 119, normalized size of antiderivative = 4.96

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^2}\,dx = \int \frac{1}{\left(c^2dx^2-d\right)^2\left(b\arcsin\left(cx\right)+a\right)^2}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(1/(a^2*c^4*d^2*x^4 - 2*a^2*c^2*d^2*x^2 + a^2*d^2 + (b^2*c^4*d^2*x
^4 - 2*b^2*c^2*d^2*x^2 + b^2*d^2)*arcsin(c*x)^2 + 2*(a*b*c^4*d^2*x^4 - 2*a
*b*c^2*d^2*x^2 + a*b*d^2)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 19.05 (sec) , antiderivative size = 121, normalized size of antiderivative = 5.04

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^2}\,dx = \frac{\int \frac{1}{a^2c^4x^4-2a^2c^2x^2+a^2+2abc^4x^4\operatorname{asin}\left(cx\right)-4abc^2x^2\operatorname{asin}\left(cx\right)+2ab\operatorname{asin}\left(cx\right)+b^2c^4x^4\operatorname{asin}^2\left(cx\right)-2b^2c^2x^2\operatorname{asin}^2\left(cx\right)+b^2\operatorname{asin}^2\left(cx\right)}\,dx}{d^2}$$

input
```
integrate(1/(-c**2*d*x**2+d)**2/(a+b*asin(c*x))**2,x)
```

output
```
Integral(1/(a**2*c**4*x**4 - 2*a**2*c**2*x**2 + a**2 + 2*a*b*c**4*x**4*asi
n(c*x) - 4*a*b*c**2*x**2*asin(c*x) + 2*a*b*asin(c*x) + b**2*c**4*x**4*asin
(c*x)**2 - 2*b**2*c**2*x**2*asin(c*x)**2 + b**2*asin(c*x)**2), x)/d**2
```

Maxima [N/A]

Not integrable

Time = 0.60 (sec) , antiderivative size = 345, normalized size of antiderivative = 14.38

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^2}\,dx = \int \frac{1}{\left(c^2dx^2-d\right)^2\left(b\arcsin\left(cx\right)+a\right)^2}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
-(3*(a*b*c^6*d^2*x^4 - 2*a*b*c^4*d^2*x^2 + a*b*c^2*d^2 + (b^2*c^6*d^2*x^4
- 2*b^2*c^4*d^2*x^2 + b^2*c^2*d^2)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x +
1)))*integrate(sqrt(c*x + 1)*sqrt(-c*x + 1)*x/(a*b*c^6*d^2*x^6 - 3*a*b*c^4
*d^2*x^4 + 3*a*b*c^2*d^2*x^2 - a*b*d^2 + (b^2*c^6*d^2*x^6 - 3*b^2*c^4*d^2*
x^4 + 3*b^2*c^2*d^2*x^2 - b^2*d^2)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x +
1))), x) + sqrt(c*x + 1)*sqrt(-c*x + 1))/(a*b*c^5*d^2*x^4 - 2*a*b*c^3*d^2*
x^2 + a*b*c*d^2 + (b^2*c^5*d^2*x^4 - 2*b^2*c^3*d^2*x^2 + b^2*c*d^2)*arctan
2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)))
```

Giac [F(-1)]

Timed out.

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^2}\,dx = \text{Timed out}$$

input
```
integrate(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
Timed out
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^2}\,dx = \int \frac{1}{\left(a+b\,\mathrm{asin}\left(c\,x\right)\right)^2\left(d-c^2\,d\,x^2\right)^2}\,dx$$

input
```
int(1/((a + b*asin(c*x))^2*(d - c^2*d*x^2)^2),x)
```

output
```
int(1/((a + b*asin(c*x))^2*(d - c^2*d*x^2)^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 112, normalized size of antiderivative = 4.67

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^2}\,dx = \frac{\int \frac{1}{asin(cx)^2b^2c^4x^4-2asin(cx)^2b^2c^2x^2+asin(cx)^2b^2+2asin(cx)ab\,c^4x^4-4asin(cx)ab\,c^2x^2+2asin(cx)ab+a^2c^4x^4-2a^2c^2x^2+a^2}dx}{d^2}$$

input
```
int(1/(-c^2*d*x^2+d)^2/(a+b*asin(c*x))^2,x)
```

output
```
int(1/(asin(c*x)**2*b**2*c**4*x**4 - 2*asin(c*x)**2*b**2*c**2*x**2 + asin(
c*x)**2*b**2 + 2*asin(c*x)*a*b*c**4*x**4 - 4*asin(c*x)*a*b*c**2*x**2 + 2*a
sin(c*x)*a*b + a**2*c**4*x**4 - 2*a**2*c**2*x**2 + a**2),x)/d**2
```

3.37 $\int (\pi - c^2\pi x^2)^{5/2} (a + b \arcsin(cx))\, dx$

Optimal result . . . 368
Mathematica [A] (verified) . . . 368
Rubi [A] (verified) . . . 369
Maple [A] (verified) . . . 372
Fricas [F] . . . 372
Sympy [A] (verification not implemented) . . . 373
Maxima [F] . . . 373
Giac [F(-2)] . . . 374
Mupad [F(-1)] . . . 374
Reduce [F] . . . 374

Optimal result

Integrand size = 24, antiderivative size = 178

$$\int (\pi - c^2\pi x^2)^{5/2} (a + b \arcsin(cx))\, dx =$$
$$-\frac{5}{32} bc\pi^{5/2} x^2 + \frac{5b\pi^{5/2}(1 - c^2x^2)^2}{96c} + \frac{b\pi^{5/2}(1 - c^2x^2)^3}{36c}$$
$$+\frac{5}{16}\pi^2 x\sqrt{\pi - c^2\pi x^2}(a + b \arcsin(cx)) + \frac{5}{24}\pi x\left(\pi - c^2\pi x^2\right)^{3/2} (a + b \arcsin(cx)) + \frac{1}{6} x\left(\pi - c^2\pi x^2\right)^{5/2} (a + b \arcsi$$

output

```
-5/32*b*c*Pi^(5/2)*x^2+5/96*b*Pi^(5/2)*(-c^2*x^2+1)^2/c+1/36*b*Pi^(5/2)*(-
c^2*x^2+1)^3/c+5/16*Pi^2*x*(-Pi*c^2*x^2+Pi)^(1/2)*(a+b*arcsin(c*x))+5/24*P
i*x*(-Pi*c^2*x^2+Pi)^(3/2)*(a+b*arcsin(c*x))+1/6*x*(-Pi*c^2*x^2+Pi)^(5/2)*
(a+b*arcsin(c*x))+5/32*Pi^(5/2)*(a+b*arcsin(c*x))^2/b/c
```

Mathematica [A] (verified)

Time = 0.43 (sec) , antiderivative size = 156, normalized size of antiderivative = 0.88

$$\int (\pi - c^2\pi x^2)^{5/2} (a$$
$$+ b \arcsin(cx))\, dx = \frac{\pi^{5/2}\left(1584acx\sqrt{1 - c^2x^2} - 1248ac^3x^3\sqrt{1 - c^2x^2} + 384ac^5x^5\sqrt{1 - c^2x^2} + 360b \arcsin(c$$

input
```
Integrate[(Pi - c^2*Pi*x^2)^(5/2)*(a + b*ArcSin[c*x]),x]
```

output
```
(Pi^(5/2)*(1584*a*c*x*Sqrt[1 - c^2*x^2] - 1248*a*c^3*x^3*Sqrt[1 - c^2*x^2]
 + 384*a*c^5*x^5*Sqrt[1 - c^2*x^2] + 360*b*ArcSin[c*x]^2 + 270*b*Cos[2*Arc
Sin[c*x]] + 27*b*Cos[4*ArcSin[c*x]] + 2*b*Cos[6*ArcSin[c*x]] + 12*ArcSin[c
*x]*(60*a + 45*b*Sin[2*ArcSin[c*x]] + 9*b*Sin[4*ArcSin[c*x]] + b*Sin[6*Arc
Sin[c*x]])))/(2304*c)
```

Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 190, normalized size of antiderivative = 1.07, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {5158, 241, 5158, 244, 2009, 5156, 15, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(\pi - \pi c^2 x^2\right)^{5/2} (a + b \arcsin(cx))\, dx$$

$$\downarrow 5158$$

$$\frac{5}{6}\pi \int \left(\pi - c^2 \pi x^2\right)^{3/2} (a + b \arcsin(cx))dx - \frac{1}{6}\pi^{5/2} bc \int x\left(1 - c^2 x^2\right)^2 dx + \frac{1}{6} x \left(\pi - \pi c^2 x^2\right)^{5/2} (a + b \arcsin(cx))$$

$$\downarrow 241$$

$$\frac{5}{6}\pi \int \left(\pi - c^2 \pi x^2\right)^{3/2} (a + b \arcsin(cx))dx + \frac{1}{6} x \left(\pi - \pi c^2 x^2\right)^{5/2} (a + b \arcsin(cx)) + \frac{\pi^{5/2} b \left(1 - c^2 x^2\right)^3}{36c}$$

$$\downarrow 5158$$

$$\frac{5}{6}\pi \left(\frac{3}{4}\pi \int \sqrt{\pi - c^2 \pi x^2}(a + b \arcsin(cx))dx - \frac{1}{4}\pi^{3/2} bc \int x\left(1 - c^2 x^2\right) dx + \frac{1}{4} x \left(\pi - \pi c^2 x^2\right)^{3/2} (a + b \arcsin(cx)) + \frac{1}{6} x \left(\pi - \pi c^2 x^2\right)^{5/2} (a + b \arcsin(cx)) + \frac{\pi^{5/2} b \left(1 - c^2 x^2\right)^3}{36c}$$

$$\downarrow 244$$

$$\frac{5}{6}\pi\left(\frac{3}{4}\pi\int\sqrt{\pi-c^2\pi x^2}(a+b\arcsin(cx))dx-\frac{1}{4}\pi^{3/2}bc\int\left(x-c^2x^3\right)dx+\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+b\arcsin(cx))\right)$$
$$\frac{1}{6}x\left(\pi-\pi c^2x^2\right)^{5/2}(a+b\arcsin(cx))+\frac{\pi^{5/2}b\left(1-c^2x^2\right)^3}{36c}$$
$$\downarrow 2009$$
$$\frac{5}{6}\pi\left(\frac{3}{4}\pi\int\sqrt{\pi-c^2\pi x^2}(a+b\arcsin(cx))dx+\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+b\arcsin(cx))-\frac{1}{4}\pi^{3/2}bc\left(\frac{x^2}{2}-\frac{c^2x^4}{4}\right)\right)+$$
$$\frac{1}{6}x\left(\pi-\pi c^2x^2\right)^{5/2}(a+b\arcsin(cx))+\frac{\pi^{5/2}b\left(1-c^2x^2\right)^3}{36c}$$
$$\downarrow 5156$$
$$\frac{5}{6}\pi\left(\frac{3}{4}\pi\left(\frac{1}{2}\sqrt{\pi}\int\frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}dx-\frac{1}{2}\sqrt{\pi}bc\int xdx+\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))\right)+\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}$$
$$\frac{1}{6}x\left(\pi-\pi c^2x^2\right)^{5/2}(a+b\arcsin(cx))+\frac{\pi^{5/2}b\left(1-c^2x^2\right)^3}{36c}$$
$$\downarrow 15$$
$$\frac{5}{6}\pi\left(\frac{3}{4}\pi\left(\frac{1}{2}\sqrt{\pi}\int\frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}dx+\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))-\frac{1}{4}\sqrt{\pi}bcx^2\right)+\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+$$
$$\frac{1}{6}x\left(\pi-\pi c^2x^2\right)^{5/2}(a+b\arcsin(cx))+\frac{\pi^{5/2}b\left(1-c^2x^2\right)^3}{36c}$$
$$\downarrow 5152$$
$$\frac{1}{6}x\left(\pi-\pi c^2x^2\right)^{5/2}(a+b\arcsin(cx))+$$
$$\frac{5}{6}\pi\left(\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+b\arcsin(cx))+\frac{3}{4}\pi\left(\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))+\frac{\sqrt{\pi}(a+b\arcsin(cx))^2}{4bc}-\frac{1}{4}\right.\right.$$
$$\frac{\pi^{5/2}b\left(1-c^2x^2\right)^3}{36c}$$

input
```
Int[(Pi - c^2*Pi*x^2)^(5/2)*(a + b*ArcSin[c*x]),x]
```

output
```
(b*Pi^(5/2)*(1 - c^2*x^2)^3)/(36*c) + (x*(Pi - c^2*Pi*x^2)^(5/2)*(a + b*Ar
cSin[c*x]))/6 + (5*Pi*(-1/4*(b*c*Pi^(3/2)*(x^2/2 - (c^2*x^4)/4)) + (x*(Pi
- c^2*Pi*x^2)^(3/2)*(a + b*ArcSin[c*x]))/4 + (3*Pi*(-1/4*(b*c*Sqrt[Pi]*x^2
) + (x*Sqrt[Pi - c^2*Pi*x^2]*(a + b*ArcSin[c*x]))/2 + (Sqrt[Pi]*(a + b*Arc
Sin[c*x])^2)/(4*b*c)))/4))/6
```

Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 241
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(a + b*x^2)^(p + 1)/
(2*b*(p + 1)), x] /; FreeQ[{a, b, p}, x] && NeQ[p, -1]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

rule 5158

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

Maple [A] (verified)

Time = 0.33 (sec) , antiderivative size = 204, normalized size of antiderivative = 1.15

method	result
default	$\frac{ax\left(-\pi c^2x^2+\pi\right)^{\frac{5}{2}}}{6}+\frac{5a\pi x\left(-\pi c^2x^2+\pi\right)^{\frac{3}{2}}}{24}+\frac{5a\pi^2x\sqrt{-\pi c^2x^2+\pi}}{16}+\frac{5a\pi^3\arctan\left(\frac{\sqrt{\pi c^2}x}{\sqrt{-\pi c^2x^2+\pi}}\right)}{16\sqrt{\pi c^2}}+\frac{b\pi^{\frac{5}{2}}\left(48\sqrt{-c^2x^2+1}\,\mathrm{arc}\right.}$
parts	$\frac{ax\left(-\pi c^2x^2+\pi\right)^{\frac{5}{2}}}{6}+\frac{5a\pi x\left(-\pi c^2x^2+\pi\right)^{\frac{3}{2}}}{24}+\frac{5a\pi^2x\sqrt{-\pi c^2x^2+\pi}}{16}+\frac{5a\pi^3\arctan\left(\frac{\sqrt{\pi c^2}x}{\sqrt{-\pi c^2x^2+\pi}}\right)}{16\sqrt{\pi c^2}}+\frac{b\pi^{\frac{5}{2}}\left(48\sqrt{-c^2x^2+1}\,\mathrm{arc}\right.}$

input

```
int((-Pi*c^2*x^2+Pi)^(5/2)*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output

```
1/6*a*x*(-Pi*c^2*x^2+Pi)^(5/2)+5/24*a*Pi*x*(-Pi*c^2*x^2+Pi)^(3/2)+5/16*a*P
i^2*x*(-Pi*c^2*x^2+Pi)^(1/2)+5/16*a*Pi^3/(Pi*c^2)^(1/2)*arctan((Pi*c^2)^(1
/2)*x/(-Pi*c^2*x^2+Pi)^(1/2))+1/288*b*Pi^(5/2)*(48*(-c^2*x^2+1)^(1/2)*arcs
in(c*x)*x^5*c^5-8*c^6*x^6-156*(-c^2*x^2+1)^(1/2)*arcsin(c*x)*x^3*c^3+39*c^
4*x^4+198*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c*x-99*c^2*x^2+45*arcsin(c*x)^2+6
8)/c
```

Fricas [F]

$$\int \left(\pi - c^2\pi x^2\right)^{5/2}\left(a + b\arcsin(cx)\right)dx = \int \left(\pi - \pi c^2x^2\right)^{\frac{5}{2}}\left(b\arcsin\left(cx\right) + a\right)dx$$

input

```
integrate((-pi*c^2*x^2+pi)^(5/2)*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(sqrt(pi - pi*c^2*x^2)*(pi^2*a*c^4*x^4 - 2*pi^2*a*c^2*x^2 + pi^2*a
 + (pi^2*b*c^4*x^4 - 2*pi^2*b*c^2*x^2 + pi^2*b)*arcsin(c*x)), x)
```

Sympy [A] (verification not implemented)

Time = 17.82 (sec) , antiderivative size = 265, normalized size of antiderivative = 1.49

$$\int \left(\pi - c^2\pi x^2\right)^{5/2} (a + b\arcsin(cx))\, dx = \begin{cases} \frac{\pi^{\frac{5}{2}} a c^4 x^5 \sqrt{-c^2x^2+1}}{6} - \frac{13\pi^{\frac{5}{2}} a c^2 x^3 \sqrt{-c^2x^2+1}}{24} + \frac{11\pi^{\frac{5}{2}} a x \sqrt{-c^2x^2+1}}{16} + \frac{5\pi^{\frac{5}{2}} a \operatorname{asin}(cx)}{16c} - \frac{\pi^{\frac{5}{2}} b c^5 x^6}{36} + \frac{\pi^{\frac{5}{2}} bc^{} \\ \pi^{\frac{5}{2}} a x \end{cases}$$

input
```
integrate((-pi*c**2*x**2+pi)**(5/2)*(a+b*asin(c*x)),x)
```

output
```
Piecewise((pi**(5/2)*a*c**4*x**5*sqrt(-c**2*x**2 + 1)/6 - 13*pi**(5/2)*a*c
**2*x**3*sqrt(-c**2*x**2 + 1)/24 + 11*pi**(5/2)*a*x*sqrt(-c**2*x**2 + 1)/1
6 + 5*pi**(5/2)*a*asin(c*x)/(16*c) - pi**(5/2)*b*c**5*x**6/36 + pi**(5/2)*
b*c**4*x**5*sqrt(-c**2*x**2 + 1)*asin(c*x)/6 + 13*pi**(5/2)*b*c**3*x**4/96
 - 13*pi**(5/2)*b*c**2*x**3*sqrt(-c**2*x**2 + 1)*asin(c*x)/24 - 11*pi**(5/
2)*b*c*x**2/32 + 11*pi**(5/2)*b*x*sqrt(-c**2*x**2 + 1)*asin(c*x)/16 + 5*pi
**(5/2)*b*asin(c*x)**2/(32*c), Ne(c, 0)), (pi**(5/2)*a*x, True))
```

Maxima [F]

$$\int \left(\pi - c^2\pi x^2\right)^{5/2} (a + b\arcsin(cx))\, dx = \int \left(\pi - \pi c^2 x^2\right)^{\frac{5}{2}} (b\arcsin(cx) + a)\, dx$$

input
```
integrate((-pi*c^2*x^2+pi)^(5/2)*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
sqrt(pi)*b*integrate((pi^2*c^4*x^4 - 2*pi^2*c^2*x^2 + pi^2)*sqrt(c*x + 1)*
sqrt(-c*x + 1)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)), x) + 1/48*(15*p
i^2*sqrt(pi - pi*c^2*x^2)*x + 10*pi*(pi - pi*c^2*x^2)^(3/2)*x + 8*(pi - pi
*c^2*x^2)^(5/2)*x + 15*pi^(5/2)*arcsin(c*x)/c)*a
```

Giac [F(-2)]

Exception generated.

$$\int \left(\pi - c^2\pi x^2\right)^{5/2} \left(a + b\arcsin(cx)\right) dx = \text{Exception raised: TypeError}$$

input
```
integrate((-pi*c^2*x^2+pi)^(5/2)*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \left(\pi - c^2\pi x^2\right)^{5/2} \left(a + b\arcsin(cx)\right) dx = \int \left(a + b\,\text{asin}(c\,x)\right) \left(\Pi - \Pi\, c^2\, x^2\right)^{5/2} dx$$

input
```
int((a + b*asin(c*x))*(Pi - Pi*c^2*x^2)^(5/2),x)
```

output
```
int((a + b*asin(c*x))*(Pi - Pi*c^2*x^2)^(5/2), x)
```

Reduce [F]

$$\int \left(\pi - c^2\pi x^2\right)^{5/2} (a + b\arcsin(cx))\, dx = \frac{\sqrt{\pi}\,\pi^2\left(15 asin(cx)\, a + 8\sqrt{-c^2x^2+1}\, a\, c^5x^5 - 26\sqrt{-c^2x^2+1}\, a\, c^3x^3 + 33\sqrt{-c^2x^2+1}\, ac\right.$$

input
```
int((-Pi*c^2*x^2+Pi)^(5/2)*(a+b*asin(c*x)),x)
```

output

```
(sqrt(pi)*pi**2*(15*asin(c*x)*a + 8*sqrt( - c**2*x**2 + 1)*a*c**5*x**5 - 2
6*sqrt( - c**2*x**2 + 1)*a*c**3*x**3 + 33*sqrt( - c**2*x**2 + 1)*a*c*x + 4
8*int(sqrt( - c**2*x**2 + 1)*asin(c*x)*x**4,x)*b*c**5 - 96*int(sqrt( - c**
2*x**2 + 1)*asin(c*x)*x**2,x)*b*c**3 + 48*int(sqrt( - c**2*x**2 + 1)*asin(
c*x),x)*b*c))/(48*c)
```

3.38 $\int (\pi - c^2\pi x^2)^{3/2} (a + b \arcsin(cx))\, dx$

Optimal result . . . 376
Mathematica [A] (verified) . . . 376
Rubi [A] (verified) . . . 377
Maple [A] (verified) . . . 379
Fricas [F] . . . 380
Sympy [A] (verification not implemented) . . . 380
Maxima [F] . . . 381
Giac [F(-2)] . . . 381
Mupad [F(-1)] . . . 381
Reduce [F] . . . 382

Optimal result

Integrand size = 24, antiderivative size = 122

$$\int (\pi - c^2\pi x^2)^{3/2} (a + b \arcsin(cx))\, dx = -\frac{3}{16} bc\pi^{3/2} x^2 + \frac{b\pi^{3/2}(1 - c^2x^2)^2}{16c}$$
$$+\frac{3}{8}\pi x\sqrt{\pi - c^2\pi x^2}(a+b\arcsin(cx))+\frac{1}{4}x\left(\pi-c^2\pi x^2\right)^{3/2}(a+b\arcsin(cx))+\frac{3\pi^{3/2}(a + b\arcsin(cx))^2}{16bc}$$

output

```
-3/16*b*c*Pi^(3/2)*x^2+1/16*b*Pi^(3/2)*(-c^2*x^2+1)^2/c+3/8*Pi*x*(-Pi*c^2*
x^2+Pi)^(1/2)*(a+b*arcsin(c*x))+1/4*x*(-Pi*c^2*x^2+Pi)^(3/2)*(a+b*arcsin(c
*x))+3/16*Pi^(3/2)*(a+b*arcsin(c*x))^2/b/c
```

Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 112, normalized size of antiderivative = 0.92

$$\int (\pi - c^2\pi x^2)^{3/2} (a$$
$$+b \arcsin(cx))\, dx = \frac{\pi^{3/2}\left(80acx\sqrt{1 - c^2x^2} - 32ac^3x^3\sqrt{1 - c^2x^2} + 24b \arcsin(cx)^2 + 16b \cos(2 \arcsin(cx)) +\right.}{128}$$

input

```
Integrate[(Pi - c^2*Pi*x^2)^(3/2)*(a + b*ArcSin[c*x]),x]
```

output

```
(Pi^(3/2)*(80*a*c*x*Sqrt[1 - c^2*x^2] - 32*a*c^3*x^3*Sqrt[1 - c^2*x^2] + 2
4*b*ArcSin[c*x]^2 + 16*b*Cos[2*ArcSin[c*x]] + b*Cos[4*ArcSin[c*x]] + 4*Arc
Sin[c*x]*(12*a + 8*b*Sin[2*ArcSin[c*x]] + b*Sin[4*ArcSin[c*x]])))/(128*c)
```

Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.07, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {5158, 244, 2009, 5156, 15, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(\pi - \pi c^2 x^2\right)^{3/2} (a + b \arcsin(cx))\, dx$$

$$\downarrow 5158$$

$$\frac{3}{4}\pi \int \sqrt{\pi - c^2 \pi x^2}(a + b \arcsin(cx))dx - \frac{1}{4}\pi^{3/2} bc \int x\left(1 - c^2 x^2\right) dx + \frac{1}{4}x\left(\pi - \pi c^2 x^2\right)^{3/2} (a + b \arcsin(cx))$$

$$\downarrow 244$$

$$\frac{3}{4}\pi \int \sqrt{\pi - c^2 \pi x^2}(a + b \arcsin(cx))dx - \frac{1}{4}\pi^{3/2} bc \int \left(x - c^2 x^3\right) dx + \frac{1}{4}x\left(\pi - \pi c^2 x^2\right)^{3/2} (a + b \arcsin(cx))$$

$$\downarrow 2009$$

$$\frac{3}{4}\pi \int \sqrt{\pi - c^2 \pi x^2}(a + b \arcsin(cx))dx + \frac{1}{4}x\left(\pi - \pi c^2 x^2\right)^{3/2} (a + b \arcsin(cx)) - \frac{1}{4}\pi^{3/2} bc\left(\frac{x^2}{2} - \frac{c^2 x^4}{4}\right)$$

$$\downarrow 5156$$

$$\frac{3}{4}\pi\left(\frac{1}{2}\sqrt{\pi} \int \frac{a + b \arcsin(cx)}{\sqrt{1 - c^2 x^2}} dx - \frac{1}{2}\sqrt{\pi} bc \int x dx + \frac{1}{2}x\sqrt{\pi - \pi c^2 x^2}(a + b \arcsin(cx))\right) + \frac{1}{4}x\left(\pi - \pi c^2 x^2\right)^{3/2} (a + b \arcsin(cx)) - \frac{1}{4}\pi^{3/2} bc\left(\frac{x^2}{2} - \frac{c^2 x^4}{4}\right)$$

$$\downarrow 15$$

$$\frac{3}{4}\pi\left(\frac{1}{2}\sqrt{\pi}\int\frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}dx+\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))-\frac{1}{4}\sqrt{\pi}bcx^2\right)+\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+b\arcsin(cx))-\frac{1}{4}\pi^{3/2}bc\left(\frac{x^2}{2}-\frac{c^2x^4}{4}\right)$$

$$\downarrow 5152$$

$$\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+b\arcsin(cx))+\frac{3}{4}\pi\left(\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))+\frac{\sqrt{\pi}(a+b\arcsin(cx))^2}{4bc}-\frac{1}{4}\sqrt{\pi}bcx^2\right)-\frac{1}{4}\pi^{3/2}bc\left(\frac{x^2}{2}-\frac{c^2x^4}{4}\right)$$

input
```
Int[(Pi - c^2*Pi*x^2)^(3/2)*(a + b*ArcSin[c*x]),x]
```

output
```
-1/4*(b*c*Pi^(3/2)*(x^2/2 - (c^2*x^4)/4)) + (x*(Pi - c^2*Pi*x^2)^(3/2)*(a
+ b*ArcSin[c*x]))/4 + (3*Pi*(-1/4*(b*c*Sqrt[Pi]*x^2) + (x*Sqrt[Pi - c^2*Pi
*x^2]*(a + b*ArcSin[c*x]))/2 + (Sqrt[Pi]*(a + b*ArcSin[c*x])^2)/(4*b*c)))/
4
```

Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156

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

rule 5158

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

Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.25

method	result
default	$\frac{ax\left(-\pi c^2x^2+\pi\right)^{\frac{3}{2}}}{4}+\frac{3a\pi x\sqrt{-\pi c^2x^2+\pi}}{8}+\frac{3a\pi^2\arctan\left(\frac{\sqrt{\pi c^2}\,x}{\sqrt{-\pi c^2x^2+\pi}}\right)}{8\sqrt{\pi c^2}}+\frac{b\pi^{\frac{3}{2}}\left(-16\sqrt{-c^2x^2+1}\arcsin(cx)x^3c^3+4c^4x^4+40a\right.}$
parts	$\frac{ax\left(-\pi c^2x^2+\pi\right)^{\frac{3}{2}}}{4}+\frac{3a\pi x\sqrt{-\pi c^2x^2+\pi}}{8}+\frac{3a\pi^2\arctan\left(\frac{\sqrt{\pi c^2}\,x}{\sqrt{-\pi c^2x^2+\pi}}\right)}{8\sqrt{\pi c^2}}+\frac{b\pi^{\frac{3}{2}}\left(-16\sqrt{-c^2x^2+1}\arcsin(cx)x^3c^3+4c^4x^4+40a\right.}$

input

```
int((-Pi*c^2*x^2+Pi)^(3/2)*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output

```
1/4*a*x*(-Pi*c^2*x^2+Pi)^(3/2)+3/8*a*Pi*x*(-Pi*c^2*x^2+Pi)^(1/2)+3/8*a*Pi^
2/(Pi*c^2)^(1/2)*arctan((Pi*c^2)^(1/2)*x/(-Pi*c^2*x^2+Pi)^(1/2))+1/64*b*Pi
^(3/2)*(-16*(-c^2*x^2+1)^(1/2)*arcsin(c*x)*x^3*c^3+4*c^4*x^4+40*arcsin(c*x
)*(-c^2*x^2+1)^(1/2)*c*x-20*c^2*x^2+12*arcsin(c*x)^2+25)/c
```

Fricas [F]

$$\int \left(\pi - c^2\pi x^2\right)^{3/2} \left(a + b\arcsin(cx)\right) dx = \int \left(\pi - \pi c^2 x^2\right)^{\frac{3}{2}} \left(b\arcsin\left(cx\right) + a\right) dx$$

input
```
integrate((-pi*c^2*x^2+pi)^(3/2)*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(-sqrt(pi - pi*c^2*x^2)*(pi*a*c^2*x^2 - pi*a + (pi*b*c^2*x^2 - pi*
b)*arcsin(c*x)), x)
```

Sympy [A] (verification not implemented)

Time = 1.70 (sec) , antiderivative size = 185, normalized size of antiderivative = 1.52

$$\int \left(\pi - c^2\pi x^2\right)^{3/2} \left(a + b\arcsin(cx)\right) dx = \begin{cases} -\frac{\pi^{\frac{3}{2}} a c^2 x^3 \sqrt{-c^2x^2+1}}{4} + \frac{5\pi^{\frac{3}{2}} a x \sqrt{-c^2x^2+1}}{8} + \frac{3\pi^{\frac{3}{2}} a \operatorname{asin}\left(cx\right)}{8c} + \frac{\pi^{\frac{3}{2}} b c^3 x^4}{16} - \frac{\pi^{\frac{3}{2}} b c^2 x^3 \sqrt{-c^2x^2+1} \operatorname{asin}\left(cx\right)}{4} - \\ \pi^{\frac{3}{2}} a x \end{cases}$$

input
```
integrate((-pi*c**2*x**2+pi)**(3/2)*(a+b*asin(c*x)),x)
```

output
```
Piecewise((-pi**(3/2)*a*c**2*x**3*sqrt(-c**2*x**2 + 1)/4 + 5*pi**(3/2)*a*x
*sqrt(-c**2*x**2 + 1)/8 + 3*pi**(3/2)*a*asin(c*x)/(8*c) + pi**(3/2)*b*c**3
*x**4/16 - pi**(3/2)*b*c**2*x**3*sqrt(-c**2*x**2 + 1)*asin(c*x)/4 - 5*pi**
(3/2)*b*c*x**2/16 + 5*pi**(3/2)*b*x*sqrt(-c**2*x**2 + 1)*asin(c*x)/8 + 3*p
i**(3/2)*b*asin(c*x)**2/(16*c), Ne(c, 0)), (pi**(3/2)*a*x, True))
```

Maxima [F]

$$\int \left(\pi - c^2\pi x^2\right)^{3/2} \left(a + b\arcsin(cx)\right) dx = \int \left(\pi - \pi c^2 x^2\right)^{\frac{3}{2}} \left(b\arcsin\left(cx\right) + a\right) dx$$

input
```
integrate((-pi*c^2*x^2+pi)^(3/2)*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
sqrt(pi)*b*integrate((pi - pi*c^2*x^2)*sqrt(c*x + 1)*sqrt(-c*x + 1)*arctan
2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)), x) + 1/8*(3*pi*sqrt(pi - pi*c^2*x^2)
*x + 2*(pi - pi*c^2*x^2)^(3/2)*x + 3*pi^(3/2)*arcsin(c*x)/c)*a
```

Giac [F(-2)]

Exception generated.

$$\int \left(\pi - c^2\pi x^2\right)^{3/2} \left(a + b\arcsin(cx)\right) dx = \text{Exception raised: TypeError}$$

input
```
integrate((-pi*c^2*x^2+pi)^(3/2)*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \left(\pi - c^2\pi x^2\right)^{3/2} \left(a + b\arcsin(cx)\right) dx = \int \left(a + b\,\mathrm{asin}(c\,x)\right) \left(\Pi - \Pi\,c^2\,x^2\right)^{3/2} dx$$

input
```
int((a + b*asin(c*x))*(Pi - Pi*c^2*x^2)^(3/2),x)
```

output
```
int((a + b*asin(c*x))*(Pi - Pi*c^2*x^2)^(3/2), x)
```

Reduce [F]

$$\int \left(\pi - c^2\pi x^2\right)^{3/2} (a + b\arcsin(cx))\, dx = \frac{\sqrt{\pi}\,\pi\left(3asin(cx)\,a - 2\sqrt{-c^2x^2+1}\,a\,c^3x^3 + 5\sqrt{-c^2x^2+1}\,acx - 8\left(\int \sqrt{-c^2x^2+1}\,asin(c\right.\right.}{8c}$$

input
```
int((-Pi*c^2*x^2+Pi)^(3/2)*(a+b*asin(c*x)),x)
```

output
```
(sqrt(pi)*pi*(3*asin(c*x)*a - 2*sqrt( - c**2*x**2 + 1)*a*c**3*x**3 + 5*sqr
t( - c**2*x**2 + 1)*a*c*x - 8*int(sqrt( - c**2*x**2 + 1)*asin(c*x)*x**2,x)
*b*c**3 + 8*int(sqrt( - c**2*x**2 + 1)*asin(c*x),x)*b*c))/(8*c)
```

3.39 $\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))\,dx$

Optimal result . . . 383
Mathematica [A] (verified) . . . 383
Rubi [A] (verified) . . . 384
Maple [A] (verified) . . . 385
Fricas [F] . . . 386
Sympy [A] (verification not implemented) . . . 386
Maxima [F] . . . 386
Giac [F(-2)] . . . 387
Mupad [F(-1)] . . . 387
Reduce [F] . . . 388

Optimal result

Integrand size = 24, antiderivative size = 68

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))\,dx = -\frac{1}{4}bc\sqrt{\pi}x^2 + \frac{1}{2}x\sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx)) + \frac{\sqrt{\pi}(a + b\arcsin(cx))^2}{4bc}$$

output

```
-1/4*b*c*Pi^(1/2)*x^2+1/2*x*(-Pi*c^2*x^2+Pi)^(1/2)*(a+b*arcsin(c*x))+1/4*P
i^(1/2)*(a+b*arcsin(c*x))^2/b/c
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 87, normalized size of antiderivative = 1.28

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))\,dx = \frac{\sqrt{\pi}\left(a^2 - b^2c^2x^2 + 2abcx\sqrt{1 - c^2x^2} + 2b\left(a + bcx\sqrt{1 - c^2x^2}\right)\arcsin(cx) + b^2\arcsin(cx)^2\right)}{4bc}$$

input

```
Integrate[Sqrt[Pi - c^2*Pi*x^2]*(a + b*ArcSin[c*x]),x]
```

output
```
(Sqrt[Pi]*(a^2 - b^2*c^2*x^2 + 2*a*b*c*x*Sqrt[1 - c^2*x^2] + 2*b*(a + b*c*
x*Sqrt[1 - c^2*x^2])*ArcSin[c*x] + b^2*ArcSin[c*x]^2))/(4*b*c)
```

Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {5156, 15, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{\pi - \pi c^2 x^2}(a + b\arcsin(cx))\,dx$$

$$\downarrow 5156$$

$$\frac{1}{2}\sqrt{\pi}\int \frac{a + b\arcsin(cx)}{\sqrt{1 - c^2x^2}}dx - \frac{1}{2}\sqrt{\pi}bc\int x dx + \frac{1}{2}x\sqrt{\pi - \pi c^2x^2}(a + b\arcsin(cx))$$

$$\downarrow 15$$

$$\frac{1}{2}\sqrt{\pi}\int \frac{a + b\arcsin(cx)}{\sqrt{1 - c^2x^2}}dx + \frac{1}{2}x\sqrt{\pi - \pi c^2x^2}(a + b\arcsin(cx)) - \frac{1}{4}\sqrt{\pi}bcx^2$$

$$\downarrow 5152$$

$$\frac{1}{2}x\sqrt{\pi - \pi c^2x^2}(a + b\arcsin(cx)) + \frac{\sqrt{\pi}(a + b\arcsin(cx))^2}{4bc} - \frac{1}{4}\sqrt{\pi}bcx^2$$

input
```
Int[Sqrt[Pi - c^2*Pi*x^2]*(a + b*ArcSin[c*x]),x]
```

output
```
-1/4*(b*c*Sqrt[Pi]*x^2) + (x*Sqrt[Pi - c^2*Pi*x^2]*(a + b*ArcSin[c*x]))/2
+ (Sqrt[Pi]*(a + b*ArcSin[c*x])^2)/(4*b*c)
```

Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.43

method	result	size
default	$\frac{ax\sqrt{-\pi c^2x^2+\pi}}{2}+\frac{a\pi\arctan\left(\frac{\sqrt{\pi c^2}x}{\sqrt{-\pi c^2x^2+\pi}}\right)}{2\sqrt{\pi c^2}}+\frac{b\sqrt{\pi}\left(2\arcsin(cx)\sqrt{-c^2x^2+1}\,cx-c^2x^2+\arcsin(cx)^2\right)}{4c}$	97
parts	$\frac{ax\sqrt{-\pi c^2x^2+\pi}}{2}+\frac{a\pi\arctan\left(\frac{\sqrt{\pi c^2}x}{\sqrt{-\pi c^2x^2+\pi}}\right)}{2\sqrt{\pi c^2}}+\frac{b\sqrt{\pi}\left(2\arcsin(cx)\sqrt{-c^2x^2+1}\,cx-c^2x^2+\arcsin(cx)^2\right)}{4c}$	97

input
```
int((-Pi*c^2*x^2+Pi)^(1/2)*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
1/2*a*x*(-Pi*c^2*x^2+Pi)^(1/2)+1/2*a*Pi/(Pi*c^2)^(1/2)*arctan((Pi*c^2)^(1/
2)*x/(-Pi*c^2*x^2+Pi)^(1/2))+1/4*b*Pi^(1/2)*(2*arcsin(c*x)*(-c^2*x^2+1)^(1
/2)*c*x-c^2*x^2+arcsin(c*x)^2)/c
```

Fricas [F]

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))\,dx = \int \sqrt{\pi - \pi c^2 x^2}(b\arcsin(cx) + a)\,dx$$

input
```
integrate((-pi*c^2*x^2+pi)^(1/2)*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(sqrt(pi - pi*c^2*x^2)*(b*arcsin(c*x) + a), x)
```

Sympy [A] (verification not implemented)

Time = 5.11 (sec) , antiderivative size = 92, normalized size of antiderivative = 1.35

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))\,dx$$
$$= \begin{cases} \frac{\sqrt{\pi}a\left(\frac{cx\sqrt{-c^2x^2+1}}{2} + \frac{\operatorname{asin}(cx)}{2}\right) + \sqrt{\pi}b\left(-\frac{c^2x^2}{4} + \left(\frac{cx\sqrt{-c^2x^2+1}}{2} + \frac{\operatorname{asin}(cx)}{2}\right)\operatorname{asin}(cx) - \frac{\operatorname{asin}^2(cx)}{4}\right)}{c} & \text{for } c \neq 0 \\ \sqrt{\pi}ax & \text{otherwise} \end{cases}$$

input
```
integrate((-pi*c**2*x**2+pi)**(1/2)*(a+b*asin(c*x)),x)
```

output
```
Piecewise(((sqrt(pi)*a*(c*x*sqrt(-c**2*x**2 + 1)/2 + asin(c*x)/2) + sqrt(p
i)*b*(-c**2*x**2/4 + (c*x*sqrt(-c**2*x**2 + 1)/2 + asin(c*x)/2)*asin(c*x)
- asin(c*x)**2/4))/c, Ne(c, 0)), (sqrt(pi)*a*x, True))
```

Maxima [F]

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))\,dx = \int \sqrt{\pi - \pi c^2 x^2}(b\arcsin(cx) + a)\,dx$$

input
```
integrate((-pi*c^2*x^2+pi)^(1/2)*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
sqrt(pi)*b*integrate(sqrt(c*x + 1)*sqrt(-c*x + 1)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)), x) + 1/2*(sqrt(pi - pi*c^2*x^2)*x + sqrt(pi)*arcsin(c*x)/c)*a
```

Giac [F(-2)]

Exception generated.

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((-pi*c^2*x^2+pi)^(1/2)*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:INPUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))\,dx = \int (a + b\,\mathrm{asin}(c\,x))\,\sqrt{\Pi - \Pi\,c^2\,x^2}\,dx$$

input
```
int((a + b*asin(c*x))*(Pi - Pi*c^2*x^2)^(1/2),x)
```

output
```
int((a + b*asin(c*x))*(Pi - Pi*c^2*x^2)^(1/2), x)
```

Reduce [F]

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))\,dx$$
$$= \frac{\sqrt{\pi}\left(asin(cx)\,a + \sqrt{-c^2x^2+1}\,acx + 2\left(\int \sqrt{-c^2x^2+1}\,asin(cx)\,dx\right)bc\right)}{2c}$$

input
```
int((-Pi*c^2*x^2+Pi)^(1/2)*(a+b*asin(c*x)),x)
```

output
```
(sqrt(pi)*(asin(c*x)*a + sqrt( - c**2*x**2 + 1)*a*c*x + 2*int(sqrt( - c**2
*x**2 + 1)*asin(c*x),x)*b*c))/(2*c)
```

3.40 $\int \frac{a+b\arcsin(cx)}{\sqrt{\pi-c^2\pi x^2}}\,dx$

Optimal result . . . 389
Mathematica [A] (verified) . . . 389
Rubi [A] (verified) . . . 390
Maple [B] (verified) . . . 390
Fricas [F] . . . 391
Sympy [B] (verification not implemented) . . . 391
Maxima [A] (verification not implemented) . . . 392
Giac [F(-2)] . . . 392
Mupad [F(-1)] . . . 393
Reduce [B] (verification not implemented) . . . 393

Optimal result

Integrand size = 24, antiderivative size = 25

$$\int \frac{a+b\arcsin(cx)}{\sqrt{\pi-c^2\pi x^2}}\,dx = \frac{(a+b\arcsin(cx))^2}{2bc\sqrt{\pi}}$$

output
```
1/2*(a+b*arcsin(c*x))^2/b/c/Pi^(1/2)
```

Mathematica [A] (verified)

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

$$\int \frac{a+b\arcsin(cx)}{\sqrt{\pi-c^2\pi x^2}}\,dx = \frac{(a+b\arcsin(cx))^2}{2bc\sqrt{\pi}}$$

input
```
Integrate[(a + b*ArcSin[c*x])/Sqrt[Pi - c^2*Pi*x^2],x]
```

output
```
(a + b*ArcSin[c*x])^2/(2*b*c*Sqrt[Pi])
```

Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a + b \arcsin(cx)}{\sqrt{\pi - \pi c^2 x^2}}\, dx$$

$$\downarrow 5152$$

$$\frac{(a + b \arcsin(cx))^2}{2\sqrt{\pi} bc}$$

input
```
Int[(a + b*ArcSin[c*x])/Sqrt[Pi - c^2*Pi*x^2],x]
```

output
```
(a + b*ArcSin[c*x])^2/(2*b*c*Sqrt[Pi])
```

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. 2(21) = 42.

Time = 0.17 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.96

method	result	size
default	$\frac{a\arctan\left(\frac{\sqrt{\pi c^2}\,x}{\sqrt{-\pi c^2x^2+\pi}}\right)}{\sqrt{\pi c^2}}+\frac{b\arcsin(cx)^2}{2c\sqrt{\pi}}$	49
parts	$\frac{a\arctan\left(\frac{\sqrt{\pi c^2}\,x}{\sqrt{-\pi c^2x^2+\pi}}\right)}{\sqrt{\pi c^2}}+\frac{b\arcsin(cx)^2}{2c\sqrt{\pi}}$	49

input
```
int((a+b*arcsin(c*x))/(-Pi*c^2*x^2+Pi)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
a/(Pi*c^2)^(1/2)*arctan((Pi*c^2)^(1/2)*x/(-Pi*c^2*x^2+Pi)^(1/2))+1/2*b/c/P
i^(1/2)*arcsin(c*x)^2
```

Fricas [F]

$$\int \frac{a+b\arcsin(cx)}{\sqrt{\pi-c^2\pi x^2}}\,dx=\int \frac{b\arcsin\left(cx\right)+a}{\sqrt{\pi-\pi c^2x^2}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-pi*c^2*x^2+pi)^(1/2),x, algorithm="fricas")
```

output
```
integral((b*arcsin(c*x) + a)/sqrt(pi - pi*c^2*x^2), x)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 90 vs. $2(19)=38$.

Time $=3.20$ (sec) , antiderivative size $=90$, normalized size of antiderivative $=3.60$

$$\int \frac{a+b\arcsin(cx)}{\sqrt{\pi-c^2\pi x^2}}\,dx$$
$$=\begin{cases} a\left(\begin{cases}\frac{\log\left(-2\pi c^2x+2\sqrt{\pi}\sqrt{-c^2}\sqrt{-\pi c^2x^2+\pi}\right)}{\sqrt{\pi}\sqrt{-c^2}} & \text{for } \pi c^2\neq 0\\ \frac{x}{\sqrt{\pi}} & \text{otherwise}\end{cases}\right) & \text{for } b=0\\ \frac{ax}{\sqrt{\pi}} & \text{for } c=0\\ \frac{\left(a+b\operatorname{asin}\left(cx\right)\right)^2}{2\sqrt{\pi}bc} & \text{otherwise}\end{cases}$$

input
```
integrate((a+b*asin(c*x))/(-pi*c**2*x**2+pi)**(1/2),x)
```

output
```
Piecewise((a*Piecewise((log(-2*pi*c**2*x + 2*sqrt(pi)*sqrt(-c**2)*sqrt(-pi
*c**2*x**2 + pi))/(sqrt(pi)*sqrt(-c**2)), Ne(pi*c**2, 0)), (x/sqrt(pi), Tr
ue)), Eq(b, 0)), (a*x/sqrt(pi), Eq(c, 0)), ((a + b*asin(c*x))**2/(2*sqrt(p
i)*b*c), True))
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.12

$$\int \frac{a + b \arcsin(cx)}{\sqrt{\pi - c^2 \pi x^2}}\, dx = \frac{b \arcsin(cx)^2}{2\sqrt{\pi} c} + \frac{a \arcsin(cx)}{\sqrt{\pi} c}$$

input
```
integrate((a+b*arcsin(c*x))/(-pi*c^2*x^2+pi)^(1/2),x, algorithm="maxima")
```

output
```
1/2*b*arcsin(c*x)^2/(sqrt(pi)*c) + a*arcsin(c*x)/(sqrt(pi)*c)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a + b \arcsin(cx)}{\sqrt{\pi - c^2 \pi x^2}}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))/(-pi*c^2*x^2+pi)^(1/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b \arcsin(cx)}{\sqrt{\pi - c^2 \pi x^2}}\, dx = \int \frac{a + b \operatorname{asin}(c\,x)}{\sqrt{\Pi - \Pi\, c^2\, x^2}}\, dx$$

input
```
int((a + b*asin(c*x))/(Pi - Pi*c^2*x^2)^(1/2),x)
```

output
```
int((a + b*asin(c*x))/(Pi - Pi*c^2*x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{a + b \arcsin(cx)}{\sqrt{\pi - c^2 \pi x^2}}\, dx = \frac{\sqrt{\pi}\, asin(cx)\, (asin(cx)\, b + 2a)}{2c\pi}$$

input
```
int((a+b*asin(c*x))/(-Pi*c^2*x^2+Pi)^(1/2),x)
```

output
```
(sqrt(pi)*asin(c*x)*(asin(c*x)*b + 2*a))/(2*c*pi)
```

3.41 $\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{3/2}}\,dx$

Optimal result . . . 394
Mathematica [A] (verified) . . . 394
Rubi [A] (verified) . . . 395
Maple [A] (verified) . . . 396
Fricas [F] . . . 396
Sympy [F] . . . 396
Maxima [A] (verification not implemented) . . . 397
Giac [F(-2)] . . . 397
Mupad [F(-1)] . . . 398
Reduce [F] . . . 398

Optimal result

Integrand size = 24, antiderivative size = 53

$$\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{3/2}}\,dx = \frac{x(a+b\arcsin(cx))}{\pi\sqrt{\pi-c^2\pi x^2}} + \frac{b\log\left(1-c^2x^2\right)}{2c\pi^{3/2}}$$

output

```
x*(a+b*arcsin(c*x))/Pi/(-Pi*c^2*x^2+Pi)^(1/2)+1/2*b*ln(-c^2*x^2+1)/c/Pi^(3
/2)
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00

$$\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{3/2}}\,dx = \frac{x(a+b\arcsin(cx))}{\pi\sqrt{\pi-c^2\pi x^2}} + \frac{b\log\left(1-c^2x^2\right)}{2c\pi^{3/2}}$$

input

```
Integrate[(a + b*ArcSin[c*x])/(Pi - c^2*Pi*x^2)^(3/2),x]
```

output

```
(x*(a + b*ArcSin[c*x]))/(Pi*Sqrt[Pi - c^2*Pi*x^2]) + (b*Log[1 - c^2*x^2])/
(2*c*Pi^(3/2))
```

Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$, Rules used = {5160, 240}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a + b\arcsin(cx)}{(\pi - \pi c^2 x^2)^{3/2}}\,dx$$

$$\downarrow 5160$$

$$\frac{x(a + b\arcsin(cx))}{\pi\sqrt{\pi - \pi c^2 x^2}} - \frac{bc\int \frac{x}{1-c^2x^2}dx}{\pi^{3/2}}$$

$$\downarrow 240$$

$$\frac{x(a + b\arcsin(cx))}{\pi\sqrt{\pi - \pi c^2 x^2}} + \frac{b\log\left(1 - c^2x^2\right)}{2\pi^{3/2}c}$$

input
```
Int[(a + b*ArcSin[c*x])/(Pi - c^2*Pi*x^2)^(3/2),x]
```

output
```
(x*(a + b*ArcSin[c*x]))/(Pi*Sqrt[Pi - c^2*Pi*x^2]) + (b*Log[1 - c^2*x^2])/
(2*c*Pi^(3/2))
```

Defintions of rubi rules used

rule 240
```
Int[(x_)/((a_) + (b_.)*(x_)^2), x_Symbol] :> Simp[Log[RemoveContent[a + b*x
^2, x]]/(2*b), x] /; FreeQ[{a, b}, x]
```

rule 5160
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2)^(3/2), x
_Symbol] :> Simp[x*((a + b*ArcSin[c*x])^n/(d*Sqrt[d + e*x^2])), x] - Simp[b
*c*(n/d)*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]   Int[x*((a + b*ArcSin[c*x
])^(n - 1)/(1 - c^2*x^2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d
 + e, 0] && GtQ[n, 0]
```

Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 92, normalized size of antiderivative = 1.74

method	result	size
default	$\frac{ax}{\pi\sqrt{-\pi c^2x^2+\pi}} - \frac{b\left(-\ln(-c^2x^2+1)x^2c^2+2\arcsin(cx)\sqrt{-c^2x^2+1}\,cx+\ln(-c^2x^2+1)\right)}{2c\pi^{\frac{3}{2}}(c^2x^2-1)}$	92
parts	$\frac{ax}{\pi\sqrt{-\pi c^2x^2+\pi}} - \frac{b\left(-\ln(-c^2x^2+1)x^2c^2+2\arcsin(cx)\sqrt{-c^2x^2+1}\,cx+\ln(-c^2x^2+1)\right)}{2c\pi^{\frac{3}{2}}(c^2x^2-1)}$	92

input
```
int((a+b*arcsin(c*x))/(-Pi*c^2*x^2+Pi)^(3/2),x,method=_RETURNVERBOSE)
```

output
```
a/Pi*x/(-Pi*c^2*x^2+Pi)^(1/2)-1/2*b/c/Pi^(3/2)*(-ln(-c^2*x^2+1)*x^2*c^2+2*
arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c*x+ln(-c^2*x^2+1))/(c^2*x^2-1)
```

Fricas [F]

$$\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{3/2}}\,dx = \int \frac{b\arcsin(cx)+a}{(\pi-\pi c^2x^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-pi*c^2*x^2+pi)^(3/2),x, algorithm="fricas")
```

output
```
integral(sqrt(pi - pi*c^2*x^2)*(b*arcsin(c*x) + a)/(pi^2*c^4*x^4 - 2*pi^2*
c^2*x^2 + pi^2), x)
```

Sympy [F]

$$\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{3/2}}\,dx = \frac{\int \frac{a}{-c^2x^2\sqrt{-c^2x^2+1}+\sqrt{-c^2x^2+1}}\,dx + \int \frac{b\operatorname{asin}(cx)}{-c^2x^2\sqrt{-c^2x^2+1}+\sqrt{-c^2x^2+1}}\,dx}{\pi^{\frac{3}{2}}}$$

input
```
integrate((a+b*asin(c*x))/(-pi*c**2*x**2+pi)**(3/2),x)
```

output
```
(Integral(a/(-c**2*x**2*sqrt(-c**2*x**2 + 1) + sqrt(-c**2*x**2 + 1)), x) +
 Integral(b*asin(c*x)/(-c**2*x**2*sqrt(-c**2*x**2 + 1) + sqrt(-c**2*x**2 +
 1)), x))/pi**(3/2)
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.17

$$\int \frac{a + b\arcsin(cx)}{(\pi - c^2\pi x^2)^{3/2}}\,dx = \frac{bx\arcsin(cx)}{\pi\sqrt{\pi - \pi c^2x^2}} + \frac{ax}{\pi\sqrt{\pi - \pi c^2x^2}} - \frac{b\log\left(x^2 - \frac{1}{c^2}\right)}{2\,\pi^{\frac{3}{2}}c}$$

input
```
integrate((a+b*arcsin(c*x))/(-pi*c^2*x^2+pi)^(3/2),x, algorithm="maxima")
```

output
```
b*x*arcsin(c*x)/(pi*sqrt(pi - pi*c^2*x^2)) + a*x/(pi*sqrt(pi - pi*c^2*x^2)
) - 1/2*b*log(x^2 - 1/c^2)/(pi^(3/2)*c)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a + b\arcsin(cx)}{(\pi - c^2\pi x^2)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))/(-pi*c^2*x^2+pi)^(3/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{3/2}}\,dx=\int \frac{a+b\,\text{asin}(c\,x)}{(\Pi-\Pi\,c^2\,x^2)^{3/2}}\,dx$$

input
```
int((a + b*asin(c*x))/(Pi - Pi*c^2*x^2)^(3/2),x)
```

output
```
int((a + b*asin(c*x))/(Pi - Pi*c^2*x^2)^(3/2), x)
```

Reduce [F]

$$\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{3/2}}\,dx=\frac{-\sqrt{-c^2x^2+1}\left(\int \frac{asin(cx)}{\sqrt{-c^2x^2+1}\,c^2x^2-\sqrt{-c^2x^2+1}}dx\right)b+ax}{\sqrt{\pi}\,\sqrt{-c^2x^2+1}\,\pi}$$

input
```
int((a+b*asin(c*x))/(-Pi*c^2*x^2+Pi)^(3/2),x)
```

output
```
( - sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**2*x**2
 - sqrt( - c**2*x**2 + 1)),x)*b + a*x)/(sqrt(pi)*sqrt( - c**2*x**2 + 1)*pi
)
```

3.42 $\int \frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{5/2}}\,dx$

Optimal result . . . 399
Mathematica [A] (verified) . . . 399
Rubi [A] (verified) . . . 400
Maple [A] (verified) . . . 402
Fricas [F] . . . 402
Sympy [F] . . . 403
Maxima [A] (verification not implemented) . . . 403
Giac [F(-2)] . . . 404
Mupad [F(-1)] . . . 404
Reduce [F] . . . 404

Optimal result

Integrand size = 24, antiderivative size = 112

$$\int \frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{5/2}}\,dx = -\frac{b}{6c\pi^{5/2}\left(1-c^2x^2\right)} + \frac{x(a+b\arcsin(cx))}{3\pi\left(\pi-c^2\pi x^2\right)^{3/2}} + \frac{2x(a+b\arcsin(cx))}{3\pi^2\sqrt{\pi-c^2\pi x^2}} + \frac{b\log\left(1-c^2x^2\right)}{3c\pi^{5/2}}$$

output

```
-1/6*b/c/Pi^(5/2)/(-c^2*x^2+1)+1/3*x*(a+b*arcsin(c*x))/Pi/(-Pi*c^2*x^2+Pi)
^(3/2)+2/3*x*(a+b*arcsin(c*x))/Pi^2/(-Pi*c^2*x^2+Pi)^(1/2)+1/3*b*ln(-c^2*x
^2+1)/c/Pi^(5/2)
```

Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.21

$$\int \frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{5/2}}\,dx = \frac{-b+bc^2x^2+6acx\sqrt{1-c^2x^2}-4ac^3x^3\sqrt{1-c^2x^2}-2bcx\sqrt{1-c^2x^2}(-3+2c^2x^2)}{6c\pi^{5/2}\left(-1+c^2x^2\right)^2}$$

input

```
Integrate[(a + b*ArcSin[c*x])/(Pi - c^2*Pi*x^2)^(5/2),x]
```

output

```
(-b + b*c^2*x^2 + 6*a*c*x*Sqrt[1 - c^2*x^2] - 4*a*c^3*x^3*Sqrt[1 - c^2*x^2
] - 2*b*c*x*Sqrt[1 - c^2*x^2]*(-3 + 2*c^2*x^2)*ArcSin[c*x] + 2*b*(-1 + c^2
*x^2)^2*Log[1 - c^2*x^2])/(6*c*Pi^(5/2)*(-1 + c^2*x^2)^2)
```

Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 117, normalized size of antiderivative = 1.04, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {5162, 241, 5160, 240}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a + b \arcsin(cx)}{(\pi - \pi c^2 x^2)^{5/2}}\, dx$$

$$\downarrow 5162$$

$$\frac{2 \int \frac{a+b \arcsin(cx)}{(\pi - c^2 \pi x^2)^{3/2}}\, dx}{3\pi} - \frac{bc \int \frac{x}{(1-c^2x^2)^2}\, dx}{3\pi^{5/2}} + \frac{x(a + b \arcsin(cx))}{3\pi \left(\pi - \pi c^2 x^2\right)^{3/2}}$$

$$\downarrow 241$$

$$\frac{2 \int \frac{a+b \arcsin(cx)}{(\pi - c^2 \pi x^2)^{3/2}}\, dx}{3\pi} + \frac{x(a + b \arcsin(cx))}{3\pi \left(\pi - \pi c^2 x^2\right)^{3/2}} - \frac{b}{6\pi^{5/2} c \left(1 - c^2 x^2\right)}$$

$$\downarrow 5160$$

$$\frac{2\left(\frac{x(a+b \arcsin(cx))}{\pi \sqrt{\pi - \pi c^2 x^2}} - \frac{bc \int \frac{x}{1-c^2x^2}\, dx}{\pi^{3/2}}\right)}{3\pi} + \frac{x(a + b \arcsin(cx))}{3\pi \left(\pi - \pi c^2 x^2\right)^{3/2}} - \frac{b}{6\pi^{5/2} c \left(1 - c^2 x^2\right)}$$

$$\downarrow 240$$

$$\frac{x(a + b \arcsin(cx))}{3\pi \left(\pi - \pi c^2 x^2\right)^{3/2}} + \frac{2\left(\frac{x(a+b \arcsin(cx))}{\pi \sqrt{\pi - \pi c^2 x^2}} + \frac{b \log\left(1-c^2x^2\right)}{2\pi^{3/2} c}\right)}{3\pi} - \frac{b}{6\pi^{5/2} c \left(1 - c^2 x^2\right)}$$

input

```
Int[(a + b*ArcSin[c*x])/(Pi - c^2*Pi*x^2)^(5/2),x]
```

output
```
-1/6*b/(c*Pi^(5/2)*(1 - c^2*x^2)) + (x*(a + b*ArcSin[c*x]))/(3*Pi*(Pi - c^
2*Pi*x^2)^(3/2)) + (2*((x*(a + b*ArcSin[c*x]))/(Pi*Sqrt[Pi - c^2*Pi*x^2])
+ (b*Log[1 - c^2*x^2])/(2*c*Pi^(3/2))))/(3*Pi)
```

Defintions of rubi rules used

rule 240
```
Int[(x_)/((a_) + (b_.)*(x_)^2), x_Symbol] :> Simp[Log[RemoveContent[a + b*x
^2, x]]/(2*b), x] /; FreeQ[{a, b}, x]
```

rule 241
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(a + b*x^2)^(p + 1)/
(2*b*(p + 1)), x] /; FreeQ[{a, b, p}, x] && NeQ[p, -1]
```

rule 5160
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2)^(3/2), x
_Symbol] :> Simp[x*((a + b*ArcSin[c*x])^n/(d*Sqrt[d + e*x^2])), x] - Simp[b
*c*(n/d)*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]   Int[x*((a + b*ArcSin[c*x
])^(n - 1)/(1 - c^2*x^2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d
 + e, 0] && GtQ[n, 0]
```

rule 5162
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_), x_
Symbol] :> Simp[(-x)*(d + e*x^2)^(p + 1)*((a + b*ArcSin[c*x])^n/(2*d*(p + 1
))), x] + (Simp[(2*p + 3)/(2*d*(p + 1))   Int[(d + e*x^2)^(p + 1)*(a + b*Ar
cSin[c*x])^n, x], x] + Simp[b*c*(n/(2*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2
*x^2)^p]   Int[x*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x
]) /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && LtQ[p,
 -1] && NeQ[p, -3/2]
```

Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 168, normalized size of antiderivative = 1.50

method	result
default	$a\left(\frac{x}{3\pi(-\pi c^2x^2+\pi)^{\frac{3}{2}}}+\frac{2x}{3\pi^2\sqrt{-\pi c^2x^2+\pi}}\right)-\frac{b\left(-2\ln(-c^2x^2+1)x^4c^4+4\sqrt{-c^2x^2+1}\arcsin(cx)x^3c^3+4\ln(-c^2x^2+1)x^2c^2-6\right.}{6c\pi^{\frac{5}{2}}(c^2x^2-1)^2}$
parts	$a\left(\frac{x}{3\pi(-\pi c^2x^2+\pi)^{\frac{3}{2}}}+\frac{2x}{3\pi^2\sqrt{-\pi c^2x^2+\pi}}\right)-\frac{b\left(-2\ln(-c^2x^2+1)x^4c^4+4\sqrt{-c^2x^2+1}\arcsin(cx)x^3c^3+4\ln(-c^2x^2+1)x^2c^2-6\right.}{6c\pi^{\frac{5}{2}}(c^2x^2-1)^2}$

input
```
int((a+b*arcsin(c*x))/(-Pi*c^2*x^2+Pi)^(5/2),x,method=_RETURNVERBOSE)
```

output
```
a*(1/3/Pi*x/(-Pi*c^2*x^2+Pi)^(3/2)+2/3/Pi^2*x/(-Pi*c^2*x^2+Pi)^(1/2))-1/6*
b/c/Pi^(5/2)*(-2*ln(-c^2*x^2+1)*x^4*c^4+4*(-c^2*x^2+1)^(1/2)*arcsin(c*x)*x
^3*c^3+4*ln(-c^2*x^2+1)*x^2*c^2-6*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c*x-c^2*x
^2-2*ln(-c^2*x^2+1)+1)/(c^2*x^2-1)^2
```

Fricas [F]

$$\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{5/2}}\,dx=\int \frac{b\arcsin(cx)+a}{(\pi-\pi c^2x^2)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-pi*c^2*x^2+pi)^(5/2),x, algorithm="fricas")
```

output
```
integral(-sqrt(pi - pi*c^2*x^2)*(b*arcsin(c*x) + a)/(pi^3*c^6*x^6 - 3*pi^3
*c^4*x^4 + 3*pi^3*c^2*x^2 - pi^3), x)
```

Sympy [F]

$$\int \frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{5/2}}\,dx = \frac{\int \frac{a}{c^4x^4\sqrt{-c^2x^2+1}-2c^2x^2\sqrt{-c^2x^2+1}+\sqrt{-c^2x^2+1}}\,dx + \int \frac{b\operatorname{asin}(cx)}{c^4x^4\sqrt{-c^2x^2+1}-2c^2x^2\sqrt{-c^2x^2+1}+\sqrt{-c^2x^2+1}}}{\pi^{\frac{5}{2}}}$$

input
```
integrate((a+b*asin(c*x))/(-pi*c**2*x**2+pi)**(5/2),x)
```

output
```
(Integral(a/(c**4*x**4*sqrt(-c**2*x**2 + 1) - 2*c**2*x**2*sqrt(-c**2*x**2
+ 1) + sqrt(-c**2*x**2 + 1)), x) + Integral(b*asin(c*x)/(c**4*x**4*sqrt(-c
**2*x**2 + 1) - 2*c**2*x**2*sqrt(-c**2*x**2 + 1) + sqrt(-c**2*x**2 + 1)),
x))/pi**(5/2)
```

Maxima [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.26

$$\int \frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{5/2}}\,dx = \frac{1}{6}\,bc\left(\frac{1}{\pi^{\frac{5}{2}}c^4x^2-\pi^{\frac{5}{2}}c^2}+\frac{2\log(cx+1)}{\pi^{\frac{5}{2}}c^2}+\frac{2\log(cx-1)}{\pi^{\frac{5}{2}}c^2}\right)$$
$$+\frac{1}{3}\,b\left(\frac{x}{\pi(\pi-\pi c^2x^2)^{\frac{3}{2}}}+\frac{2\,x}{\pi^2\sqrt{\pi-\pi c^2x^2}}\right)\arcsin(cx)$$
$$+\frac{1}{3}\,a\left(\frac{x}{\pi(\pi-\pi c^2x^2)^{\frac{3}{2}}}+\frac{2\,x}{\pi^2\sqrt{\pi-\pi c^2x^2}}\right)$$

input
```
integrate((a+b*arcsin(c*x))/(-pi*c^2*x^2+pi)^(5/2),x, algorithm="maxima")
```

output
```
1/6*b*c*(1/(pi^(5/2)*c^4*x^2 - pi^(5/2)*c^2) + 2*log(c*x + 1)/(pi^(5/2)*c^
2) + 2*log(c*x - 1)/(pi^(5/2)*c^2)) + 1/3*b*(x/(pi*(pi - pi*c^2*x^2)^(3/2)
) + 2*x/(pi^2*sqrt(pi - pi*c^2*x^2)))*arcsin(c*x) + 1/3*a*(x/(pi*(pi - pi*
c^2*x^2)^(3/2)) + 2*x/(pi^2*sqrt(pi - pi*c^2*x^2)))
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a + b \arcsin(cx)}{(\pi - c^2 \pi x^2)^{5/2}}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))/(-pi*c^2*x^2+pi)^(5/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b \arcsin(cx)}{(\pi - c^2 \pi x^2)^{5/2}}\, dx = \int \frac{a + b \operatorname{asin}(c\, x)}{(\Pi - \Pi\, c^2\, x^2)^{5/2}}\, dx$$

input
```
int((a + b*asin(c*x))/(Pi - Pi*c^2*x^2)^(5/2),x)
```

output
```
int((a + b*asin(c*x))/(Pi - Pi*c^2*x^2)^(5/2), x)
```

Reduce [F]

$$\int \frac{a + b \arcsin(cx)}{(\pi - c^2 \pi x^2)^{5/2}}\, dx = \frac{3\sqrt{-c^2x^2+1}\left(\int \frac{asin(cx)}{\sqrt{-c^2x^2+1}\,c^4x^4-2\sqrt{-c^2x^2+1}\,c^2x^2+\sqrt{-c^2x^2+1}}dx\right) b\,c^2x^2 - 3\sqrt{-c^2x^2+1}\,(}{3\sqrt{\pi}\,\sqrt{-c^2x^2+1}\,\pi^2\,(c^2x^2}$$

input
```
int((a+b*asin(c*x))/(-Pi*c^2*x^2+Pi)^(5/2),x)
```

output

```
(3*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**4*x**4
- 2*sqrt( - c**2*x**2 + 1)*c**2*x**2 + sqrt( - c**2*x**2 + 1)),x)*b*c**2*x
**2 - 3*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**4*
x**4 - 2*sqrt( - c**2*x**2 + 1)*c**2*x**2 + sqrt( - c**2*x**2 + 1)),x)*b +
 2*a*c**2*x**3 - 3*a*x)/(3*sqrt(pi)*sqrt( - c**2*x**2 + 1)*pi**2*(c**2*x**
2 - 1))
```

3.43 $\int \frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{7/2}}\,dx$

Optimal result . . . 406
Mathematica [A] (verified) . . . 407
Rubi [A] (verified) . . . 407
Maple [A] (verified) . . . 409
Fricas [F] . . . 410
Sympy [F(-1)] . . . 410
Maxima [F] . . . 411
Giac [F(-2)] . . . 411
Mupad [F(-1)] . . . 411
Reduce [F] . . . 412

Optimal result

Integrand size = 24, antiderivative size = 168

$$\begin{aligned}\int \frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{7/2}}\,dx &= -\frac{b}{20c\pi^{7/2}\left(1-c^2x^2\right)^2}\\ &-\frac{2b}{15c\pi^{7/2}\left(1-c^2x^2\right)}+\frac{x(a+b\arcsin(cx))}{5\pi\left(\pi-c^2\pi x^2\right)^{5/2}}\\ &+\frac{4x(a+b\arcsin(cx))}{15\pi^2\left(\pi-c^2\pi x^2\right)^{3/2}}+\frac{8x(a+b\arcsin(cx))}{15\pi^3\sqrt{\pi-c^2\pi x^2}}+\frac{4b\log\left(1-c^2x^2\right)}{15c\pi^{7/2}}\end{aligned}$$

output

```
-1/20*b/c/Pi^(7/2)/(-c^2*x^2+1)^2-2/15*b/c/Pi^(7/2)/(-c^2*x^2+1)+1/5*x*(a+
b*arcsin(c*x))/Pi/(-Pi*c^2*x^2+Pi)^(5/2)+4/15*x*(a+b*arcsin(c*x))/Pi^2/(-P
i*c^2*x^2+Pi)^(3/2)+8/15*x*(a+b*arcsin(c*x))/Pi^3/(-Pi*c^2*x^2+Pi)^(1/2)+4
/15*b*ln(-c^2*x^2+1)/c/Pi^(7/2)
```

Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 176, normalized size of antiderivative = 1.05

$$\int \frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{7/2}}\,dx = \frac{11b-19bc^2x^2+8bc^4x^4-60acx\sqrt{1-c^2x^2}+80ac^3x^3\sqrt{1-c^2x^2}-32ac^5x^5\sqrt{1-c}}{60c\pi^{7/2}}$$

input
```
Integrate[(a + b*ArcSin[c*x])/(Pi - c^2*Pi*x^2)^(7/2),x]
```

output
```
(11*b - 19*b*c^2*x^2 + 8*b*c^4*x^4 - 60*a*c*x*Sqrt[1 - c^2*x^2] + 80*a*c^3
*x^3*Sqrt[1 - c^2*x^2] - 32*a*c^5*x^5*Sqrt[1 - c^2*x^2] - 4*b*c*x*Sqrt[1 -
 c^2*x^2]*(15 - 20*c^2*x^2 + 8*c^4*x^4)*ArcSin[c*x] + 16*b*(-1 + c^2*x^2)^
3*Log[1 - c^2*x^2])/(60*c*Pi^(7/2)*(-1 + c^2*x^2)^3)
```

Rubi [A] (verified)

Time = 0.53 (sec) , antiderivative size = 181, normalized size of antiderivative = 1.08, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {5162, 241, 5162, 241, 5160, 240}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\arcsin(cx)}{\left(\pi-\pi c^2x^2\right)^{7/2}}\,dx$$

$$\downarrow 5162$$

$$\frac{4\int \frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{5/2}}dx}{5\pi} - \frac{bc\int \frac{x}{\left(1-c^2x^2\right)^3}dx}{5\pi^{7/2}} + \frac{x(a+b\arcsin(cx))}{5\pi\left(\pi-\pi c^2x^2\right)^{5/2}}$$

$$\downarrow 241$$

$$\frac{4\int \frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{5/2}}dx}{5\pi} + \frac{x(a+b\arcsin(cx))}{5\pi\left(\pi-\pi c^2x^2\right)^{5/2}} - \frac{b}{20\pi^{7/2}c\left(1-c^2x^2\right)^2}$$

$$\downarrow 5162$$

$$\frac{4\left(\frac{2\int\frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{3/2}}dx}{3\pi}-\frac{bc\int\frac{x}{\left(1-c^2x^2\right)^2}dx}{3\pi^{5/2}}+\frac{x(a+b\arcsin(cx))}{3\pi(\pi-\pi c^2x^2)^{3/2}}\right)}{5\pi}+\frac{x(a+b\arcsin(cx))}{5\pi\left(\pi-\pi c^2x^2\right)^{5/2}}-\frac{b}{20\pi^{7/2}c\left(1-c^2x^2\right)^2}$$

$$\downarrow 241$$

$$\frac{4\left(\frac{2\int\frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{3/2}}dx}{3\pi}+\frac{x(a+b\arcsin(cx))}{3\pi(\pi-\pi c^2x^2)^{3/2}}-\frac{b}{6\pi^{5/2}c(1-c^2x^2)}\right)}{5\pi}+\frac{x(a+b\arcsin(cx))}{5\pi\left(\pi-\pi c^2x^2\right)^{5/2}}-\frac{b}{20\pi^{7/2}c\left(1-c^2x^2\right)^2}$$

$$\downarrow 5160$$

$$\frac{4\left(\frac{2\left(\frac{x(a+b\arcsin(cx))}{\pi\sqrt{\pi-\pi c^2x^2}}-\frac{bc\int\frac{x}{1-c^2x^2}dx}{\pi^{3/2}}\right)}{3\pi}+\frac{x(a+b\arcsin(cx))}{3\pi(\pi-\pi c^2x^2)^{3/2}}-\frac{b}{6\pi^{5/2}c(1-c^2x^2)}\right)}{5\pi}+\frac{x(a+b\arcsin(cx))}{5\pi\left(\pi-\pi c^2x^2\right)^{5/2}}-\frac{b}{20\pi^{7/2}c\left(1-c^2x^2\right)^2}$$

$$\downarrow 240$$

$$\frac{x(a+b\arcsin(cx))}{5\pi\left(\pi-\pi c^2x^2\right)^{5/2}}+\frac{4\left(\frac{x(a+b\arcsin(cx))}{3\pi(\pi-\pi c^2x^2)^{3/2}}+\frac{2\left(\frac{x(a+b\arcsin(cx))}{\pi\sqrt{\pi-\pi c^2x^2}}+\frac{b\log\left(1-c^2x^2\right)}{2\pi^{3/2}c}\right)}{3\pi}-\frac{b}{6\pi^{5/2}c(1-c^2x^2)}\right)}{5\pi}-\frac{b}{20\pi^{7/2}c\left(1-c^2x^2\right)^2}$$

input

```
Int[(a + b*ArcSin[c*x])/(Pi - c^2*Pi*x^2)^(7/2),x]
```

output

```
-1/20*b/(c*Pi^(7/2)*(1 - c^2*x^2)^2) + (x*(a + b*ArcSin[c*x]))/(5*Pi*(Pi -
 c^2*Pi*x^2)^(5/2)) + (4*(-1/6*b/(c*Pi^(5/2)*(1 - c^2*x^2)) + (x*(a + b*Ar
cSin[c*x]))/(3*Pi*(Pi - c^2*Pi*x^2)^(3/2)) + (2*((x*(a + b*ArcSin[c*x]))/(
Pi*Sqrt[Pi - c^2*Pi*x^2]) + (b*Log[1 - c^2*x^2])/(2*c*Pi^(3/2))))/(3*Pi)))
/(5*Pi)
```

Defintions of rubi rules used

rule 240
```
Int[(x_)/((a_) + (b_.)*(x_)^2), x_Symbol] :> Simp[Log[RemoveContent[a + b*x
^2, x]]/(2*b), x] /; FreeQ[{a, b}, x]
```

rule 241
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(a + b*x^2)^(p + 1)/
(2*b*(p + 1)), x] /; FreeQ[{a, b, p}, x] && NeQ[p, -1]
```

rule 5160
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2)^(3/2), x
_Symbol] :> Simp[x*((a + b*ArcSin[c*x])^n/(d*Sqrt[d + e*x^2])), x] - Simp[b
*c*(n/d)*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]   Int[x*((a + b*ArcSin[c*x
])^(n - 1)/(1 - c^2*x^2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d
 + e, 0] && GtQ[n, 0]
```

rule 5162
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_), x_
Symbol] :> Simp[(-x)*(d + e*x^2)^(p + 1)*((a + b*ArcSin[c*x])^n/(2*d*(p + 1
))), x] + (Simp[(2*p + 3)/(2*d*(p + 1))   Int[(d + e*x^2)^(p + 1)*(a + b*Ar
cSin[c*x])^n, x], x] + Simp[b*c*(n/(2*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2
*x^2)^p]   Int[x*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x
]) /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && LtQ[p,
 -1] && NeQ[p, -3/2]
```

Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 244, normalized size of antiderivative = 1.45

method	result
default	$a\left(\frac{x}{5\pi(-\pi c^2x^2+\pi)^{\frac{5}{2}}}+\frac{\frac{4x}{15\pi\left(-\pi c^2x^2+\pi\right)^{\frac{3}{2}}}+\frac{8x}{15\pi^2\sqrt{-\pi c^2x^2+\pi}}}{\pi}\right)+\frac{b\left(16\ln(-c^2x^2+1)x^6c^6-32\sqrt{-c^2x^2+1}\arcsin(cx)x^5c^5-4\right.}{}$
parts	$a\left(\frac{x}{5\pi(-\pi c^2x^2+\pi)^{\frac{5}{2}}}+\frac{\frac{4x}{15\pi\left(-\pi c^2x^2+\pi\right)^{\frac{3}{2}}}+\frac{8x}{15\pi^2\sqrt{-\pi c^2x^2+\pi}}}{\pi}\right)+\frac{b\left(16\ln(-c^2x^2+1)x^6c^6-32\sqrt{-c^2x^2+1}\arcsin(cx)x^5c^5-4\right.}{}$

input
```
int((a+b*arcsin(c*x))/(-Pi*c^2*x^2+Pi)^(7/2),x,method=_RETURNVERBOSE)
```

output
```
a*(1/5/Pi*x/(-Pi*c^2*x^2+Pi)^(5/2)+4/5/Pi*(1/3/Pi*x/(-Pi*c^2*x^2+Pi)^(3/2)
+2/3/Pi^2*x/(-Pi*c^2*x^2+Pi)^(1/2)))+1/60*b/c/Pi^(7/2)*(16*ln(-c^2*x^2+1)*
x^6*c^6-32*(-c^2*x^2+1)^(1/2)*arcsin(c*x)*x^5*c^5-48*ln(-c^2*x^2+1)*x^4*c^
4+80*(-c^2*x^2+1)^(1/2)*arcsin(c*x)*x^3*c^3+8*c^4*x^4+48*ln(-c^2*x^2+1)*x^
2*c^2-60*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c*x-19*c^2*x^2-16*ln(-c^2*x^2+1)+1
1)/(c^2*x^2-1)^3
```

Fricas [F]

$$\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{7/2}}\,dx = \int \frac{b\arcsin(cx)+a}{(\pi-\pi c^2x^2)^{\frac{7}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-pi*c^2*x^2+pi)^(7/2),x, algorithm="fricas")
```

output
```
integral(sqrt(pi - pi*c^2*x^2)*(b*arcsin(c*x) + a)/(pi^4*c^8*x^8 - 4*pi^4*
c^6*x^6 + 6*pi^4*c^4*x^4 - 4*pi^4*c^2*x^2 + pi^4), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\arcsin(cx)}{(\pi-c^2\pi x^2)^{7/2}}\,dx = \text{Timed out}$$

input
```
integrate((a+b*asin(c*x))/(-pi*c**2*x**2+pi)**(7/2),x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{a + b \arcsin(cx)}{\left(\pi - c^2\pi x^2\right)^{7/2}}\, dx = \int \frac{b \arcsin(cx) + a}{\left(\pi - \pi c^2 x^2\right)^{\frac{7}{2}}}\, dx$$

input
```
integrate((a+b*arcsin(c*x))/(-pi*c^2*x^2+pi)^(7/2),x, algorithm="maxima")
```

output
```
1/15*a*(3*x/(pi*(pi - pi*c^2*x^2)^(5/2)) + 4*x/(pi^2*(pi - pi*c^2*x^2)^(3/
2)) + 8*x/(pi^3*sqrt(pi - pi*c^2*x^2))) - b*integrate(arctan2(c*x, sqrt(c*
x + 1)*sqrt(-c*x + 1))/((pi^3*c^6*x^6 - 3*pi^3*c^4*x^4 + 3*pi^3*c^2*x^2 -
pi^3)*sqrt(c*x + 1)*sqrt(-c*x + 1)), x)/sqrt(pi)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a + b \arcsin(cx)}{\left(\pi - c^2\pi x^2\right)^{7/2}}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))/(-pi*c^2*x^2+pi)^(7/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b \arcsin(cx)}{\left(\pi - c^2\pi x^2\right)^{7/2}}\, dx = \int \frac{a + b \operatorname{asin}(c\,x)}{\left(\Pi - \Pi\, c^2\, x^2\right)^{7/2}}\, dx$$

input
```
int((a + b*asin(c*x))/(Pi - Pi*c^2*x^2)^(7/2),x)
```

output
```
int((a + b*asin(c*x))/(Pi - Pi*c^2*x^2)^(7/2), x)
```

Reduce [F]

$$\int \frac{a+b\arcsin(cx)}{\left(\pi-c^2\pi x^2\right)^{7/2}}\,dx = \frac{-15\sqrt{-c^2x^2+1}\left(\int \frac{asin(cx)}{\sqrt{-c^2x^2+1}\,c^6x^6-3\sqrt{-c^2x^2+1}\,c^4x^4+3\sqrt{-c^2x^2+1}\,c^2x^2-\sqrt{-c^2x^2+1}}dx\right) b\,c^4x^4$$

input
```
int((a+b*asin(c*x))/(-Pi*c^2*x^2+Pi)^(7/2),x)
```

output
```
( - 15*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**6*x
**6 - 3*sqrt( - c**2*x**2 + 1)*c**4*x**4 + 3*sqrt( - c**2*x**2 + 1)*c**2*x
**2 - sqrt( - c**2*x**2 + 1)),x)*b*c**4*x**4 + 30*sqrt( - c**2*x**2 + 1)*i
nt(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**6*x**6 - 3*sqrt( - c**2*x**2 + 1)*
c**4*x**4 + 3*sqrt( - c**2*x**2 + 1)*c**2*x**2 - sqrt( - c**2*x**2 + 1)),x
)*b*c**2*x**2 - 15*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2
 + 1)*c**6*x**6 - 3*sqrt( - c**2*x**2 + 1)*c**4*x**4 + 3*sqrt( - c**2*x**2
 + 1)*c**2*x**2 - sqrt( - c**2*x**2 + 1)),x)*b + 8*a*c**4*x**5 - 20*a*c**2
*x**3 + 15*a*x)/(15*sqrt(pi)*sqrt( - c**2*x**2 + 1)*pi**3*(c**4*x**4 - 2*c
**2*x**2 + 1))
```

3.44 $\int (\pi - c^2\pi x^2)^{3/2} (a + b \arcsin(cx))^2 \, dx$

Optimal result . . . 413
Mathematica [A] (verified) . . . 413
Rubi [A] (verified) . . . 414
Maple [A] (verified) . . . 418
Fricas [F] . . . 418
Sympy [B] (verification not implemented) . . . 419
Maxima [F] . . . 419
Giac [F(-2)] . . . 420
Mupad [F(-1)] . . . 420
Reduce [F] . . . 421

Optimal result

Integrand size = 26, antiderivative size = 215

$$\int (\pi - c^2\pi x^2)^{3/2} (a + b \arcsin(cx))^2 \, dx = -\frac{15}{64} b^2 \pi^{3/2} x \sqrt{1 - c^2 x^2}$$
$$- \frac{1}{32} b^2 \pi^{3/2} x \left(1 - c^2 x^2\right)^{3/2} + \frac{9 b^2 \pi^{3/2} \arcsin(cx)}{64c} - \frac{3}{8} bc\pi^{3/2} x^2 (a + b \arcsin(cx)) + \frac{b\pi^{3/2}(1 - c^2x^2)^2 (a + b \arcsin($$

output

```
-15/64*b^2*Pi^(3/2)*x*(-c^2*x^2+1)^(1/2)-1/32*b^2*Pi^(3/2)*x*(-c^2*x^2+1)^
(3/2)+9/64*b^2*Pi^(3/2)*arcsin(c*x)/c-3/8*b*c*Pi^(3/2)*x^2*(a+b*arcsin(c*x
))+1/8*b*Pi^(3/2)*(-c^2*x^2+1)^2*(a+b*arcsin(c*x))/c+3/8*Pi*x*(-Pi*c^2*x^2
+Pi)^(1/2)*(a+b*arcsin(c*x))^2+1/4*x*(-Pi*c^2*x^2+Pi)^(3/2)*(a+b*arcsin(c*
x))^2+1/8*Pi^(3/2)*(a+b*arcsin(c*x))^3/b/c
```

Mathematica [A] (verified)

Time = 0.48 (sec) , antiderivative size = 204, normalized size of antiderivative = 0.95

$$\int (\pi - c^2\pi x^2)^{3/2} (a$$
$$+ b \arcsin(cx))^2 \, dx = \frac{\pi^{3/2}\left(cx\left(8abcx(-5 + c^2x^2) + b^2\sqrt{1 - c^2x^2}(-17 + 2c^2x^2) - 8a^2\sqrt{1 - c^2x^2}(-5 + 2c^2x^2\right.\right.}{}$$

input
```
Integrate[(Pi - c^2*Pi*x^2)^(3/2)*(a + b*ArcSin[c*x])^2,x]
```

output
```
(Pi^(3/2)*(c*x*(8*a*b*c*x*(-5 + c^2*x^2) + b^2*Sqrt[1 - c^2*x^2]*(-17 + 2*
c^2*x^2) - 8*a^2*Sqrt[1 - c^2*x^2]*(-5 + 2*c^2*x^2)) + (24*a^2 + 16*a*b*c*
x*(5 - 2*c^2*x^2)*Sqrt[1 - c^2*x^2] + b^2*(17 - 40*c^2*x^2 + 8*c^4*x^4))*A
rcSin[c*x] + 8*b*(3*a + b*c*x*(5 - 2*c^2*x^2)*Sqrt[1 - c^2*x^2])*ArcSin[c*
x]^2 + 8*b^2*ArcSin[c*x]^3))/(64*c)
```

Rubi [A] (verified)

Time = 0.88 (sec) , antiderivative size = 259, normalized size of antiderivative = 1.20, number of steps used = 10, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.385$, Rules used = {5158, 5156, 5138, 262, 223, 5152, 5182, 211, 211, 223}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(\pi - \pi c^2 x^2\right)^{3/2} (a + b \arcsin(cx))^2 \, dx$$

$$\downarrow 5158$$

$$-\frac{1}{2}\pi^{3/2} bc \int x\left(1 - c^2 x^2\right) (a + b \arcsin(cx)) dx + \frac{3}{4}\pi \int \sqrt{\pi - c^2 \pi x^2} (a + b \arcsin(cx))^2 dx + \frac{1}{4} x \left(\pi - \pi c^2 x^2\right)^{3/2} (a + b \arcsin(cx))^2$$

$$\downarrow 5156$$

$$-\frac{1}{2}\pi^{3/2} bc \int x\left(1 - c^2 x^2\right) (a + b \arcsin(cx)) dx + \frac{3}{4}\pi \left(\frac{1}{2}\sqrt{\pi} \int \frac{(a + b \arcsin(cx))^2}{\sqrt{1 - c^2 x^2}} dx - \sqrt{\pi} bc \int x (a + b \arcsin(cx)) dx + \frac{1}{2} x \sqrt{\pi - \pi c^2 x^2} (a + b \arcsin(cx))^2\right) + \frac{1}{4} x \left(\pi - \pi c^2 x^2\right)^{3/2} (a + b \arcsin(cx))^2$$

$$\downarrow 5138$$

$$-\frac{1}{2}\pi^{3/2} bc \int x\left(1 - c^2 x^2\right) (a + b \arcsin(cx)) dx + \frac{3}{4}\pi \left(-\sqrt{\pi} bc \left(\frac{1}{2} x^2 (a + b \arcsin(cx)) - \frac{1}{2} bc \int \frac{x^2}{\sqrt{1 - c^2 x^2}} dx\right) + \frac{1}{2}\sqrt{\pi} \int \frac{(a + b \arcsin(cx))^2}{\sqrt{1 - c^2 x^2}} dx + \frac{1}{2} x \sqrt{\pi - \pi c^2 x^2}\right) + \frac{1}{4} x \left(\pi - \pi c^2 x^2\right)^{3/2} (a + b \arcsin(cx))^2$$

$$\downarrow 262$$

$$-\frac{1}{2}\pi^{3/2}bc\int x\left(1-c^2x^2\right)(a+b\arcsin(cx))dx+$$

$$\frac{3}{4}\pi\left(-\sqrt{\pi}bc\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\int\frac{1}{\sqrt{1-c^2x^2}}dx}{2c^2}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)+\frac{1}{2}\sqrt{\pi}\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx+\right.$$

$$\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+b\arcsin(cx))^2$$

$$\downarrow 223$$

$$-\frac{1}{2}\pi^{3/2}bc\int x\left(1-c^2x^2\right)(a+b\arcsin(cx))dx+$$

$$\frac{3}{4}\pi\left(\frac{1}{2}\sqrt{\pi}\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx+\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))^2-\sqrt{\pi}bc\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\right.\right.$$

$$\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+b\arcsin(cx))^2$$

$$\downarrow 5152$$

$$-\frac{1}{2}\pi^{3/2}bc\int x\left(1-c^2x^2\right)(a+b\arcsin(cx))dx+\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+b\arcsin(cx))^2+$$

$$\frac{3}{4}\pi\left(\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))^2-\sqrt{\pi}bc\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\arcsin(cx)}{2c^3}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)+\right.$$

$$\downarrow 5182$$

$$-\frac{1}{2}\pi^{3/2}bc\left(\frac{b\int\left(1-c^2x^2\right)^{3/2}dx}{4c}-\frac{\left(1-c^2x^2\right)^2(a+b\arcsin(cx))}{4c^2}\right)+\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+$$

$$b\arcsin(cx))^2+$$

$$\frac{3}{4}\pi\left(\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))^2-\sqrt{\pi}bc\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\arcsin(cx)}{2c^3}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)+\right.$$

$$\downarrow 211$$

$$-\frac{1}{2}\pi^{3/2}bc\left(\frac{b\left(\frac{3}{4}\int\sqrt{1-c^2x^2}dx+\frac{1}{4}x\left(1-c^2x^2\right)^{3/2}\right)}{4c}-\frac{\left(1-c^2x^2\right)^2(a+b\arcsin(cx))}{4c^2}\right)+$$

$$\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+b\arcsin(cx))^2+$$

$$\frac{3}{4}\pi\left(\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))^2-\sqrt{\pi}bc\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\arcsin(cx)}{2c^3}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)+\right.$$

$$\downarrow 211$$

$$-\frac{1}{2}\pi^{3/2}bc\left(\frac{b\left(\frac{3}{4}\left(\frac{1}{2}\int\frac{1}{\sqrt{1-c^2x^2}}dx+\frac{1}{2}x\sqrt{1-c^2x^2}\right)+\frac{1}{4}x\left(1-c^2x^2\right)^{3/2}\right)}{4c}-\frac{\left(1-c^2x^2\right)^2(a+b\arcsin(cx))}{4c^2}\right)+$$

$$\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+b\arcsin(cx))^2+$$

$$\frac{3}{4}\pi\left(\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))^2-\sqrt{\pi}bc\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\arcsin(cx)}{2c^3}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)+$$

$$\downarrow 223$$

$$\frac{1}{4}x\left(\pi-\pi c^2x^2\right)^{3/2}(a+b\arcsin(cx))^2-$$

$$\frac{1}{2}\pi^{3/2}bc\left(\frac{b\left(\frac{3}{4}\left(\frac{\arcsin(cx)}{2c}+\frac{1}{2}x\sqrt{1-c^2x^2}\right)+\frac{1}{4}x\left(1-c^2x^2\right)^{3/2}\right)}{4c}-\frac{\left(1-c^2x^2\right)^2(a+b\arcsin(cx))}{4c^2}\right)+$$

$$\frac{3}{4}\pi\left(\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))^2-\sqrt{\pi}bc\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\arcsin(cx)}{2c^3}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)+$$

input
```
Int[(Pi - c^2*Pi*x^2)^(3/2)*(a + b*ArcSin[c*x])^2,x]
```

output
```
(x*(Pi - c^2*Pi*x^2)^(3/2)*(a + b*ArcSin[c*x])^2)/4 + (3*Pi*((x*Sqrt[Pi -
c^2*Pi*x^2]*(a + b*ArcSin[c*x])^2)/2 + (Sqrt[Pi]*(a + b*ArcSin[c*x])^3)/(6
*b*c) - b*c*Sqrt[Pi]*((x^2*(a + b*ArcSin[c*x]))/2 - (b*c*(-1/2*(x*Sqrt[1 -
 c^2*x^2])/c^2 + ArcSin[c*x]/(2*c^3)))/2)))/4 - (b*c*Pi^(3/2)*(-1/4*((1 -
c^2*x^2)^2*(a + b*ArcSin[c*x]))/c^2 + (b*((x*(1 - c^2*x^2)^(3/2))/4 + (3*(
(x*Sqrt[1 - c^2*x^2])/2 + ArcSin[c*x]/(2*c)))/4))/(4*c)))/2
```

Defintions of rubi rules used

rule 211
```
Int[((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[x*((a + b*x^2)^p/(2*p + 1
)), x] + Simp[2*a*(p/(2*p + 1))   Int[(a + b*x^2)^(p - 1), x], x] /; FreeQ[
{a, b}, x] && GtQ[p, 0] && (IntegerQ[4*p] || IntegerQ[6*p])
```

rule 223
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSin[Rt[-b, 2]*(x/Sqrt
[a])]/Rt[-b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && NegQ[b]
```

rule 262

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[c*(c*x)
^(m - 1)*((a + b*x^2)^(p + 1)/(b*(m + 2*p + 1))), x] - Simp[a*c^2*((m - 1)/
(b*(m + 2*p + 1)))  Int[(c*x)^(m - 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b
, c, p}, x] && GtQ[m, 2 - 1] && NeQ[m + 2*p + 1, 0] && IntBinomialQ[a, b, c
, 2, m, p, x]
```

rule 5138

```
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] - Simp[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 5152

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

rule 5156

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

rule 5158

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

rule 5182

```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]  I
nt[(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]
```

Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 293, normalized size of antiderivative = 1.36

method	result
default	$\frac{a^2x(-\pi c^2x^2+\pi)^{\frac{3}{2}}}{4}+\frac{3a^2\pi x\sqrt{-\pi c^2x^2+\pi}}{8}+\frac{3a^2\pi^2\arctan\left(\frac{\sqrt{\pi c^2}x}{\sqrt{-\pi c^2x^2+\pi}}\right)}{8\sqrt{\pi c^2}}+\frac{b^2\pi^{\frac{3}{2}}\left(-16\arcsin(cx)^2\sqrt{-c^2x^2+1}\,c^3x^3+8c^4x^4\right.}$
parts	$\frac{a^2x(-\pi c^2x^2+\pi)^{\frac{3}{2}}}{4}+\frac{3a^2\pi x\sqrt{-\pi c^2x^2+\pi}}{8}+\frac{3a^2\pi^2\arctan\left(\frac{\sqrt{\pi c^2}x}{\sqrt{-\pi c^2x^2+\pi}}\right)}{8\sqrt{\pi c^2}}+\frac{b^2\pi^{\frac{3}{2}}\left(-16\arcsin(cx)^2\sqrt{-c^2x^2+1}\,c^3x^3+8c^4x^4\right.}$

input
```
int((-Pi*c^2*x^2+Pi)^(3/2)*(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
1/4*a^2*x*(-Pi*c^2*x^2+Pi)^(3/2)+3/8*a^2*Pi*x*(-Pi*c^2*x^2+Pi)^(1/2)+3/8*a
^2*Pi^2/(Pi*c^2)^(1/2)*arctan((Pi*c^2)^(1/2)*x/(-Pi*c^2*x^2+Pi)^(1/2))+1/6
4*b^2*Pi^(3/2)*(-16*arcsin(c*x)^2*(-c^2*x^2+1)^(1/2)*c^3*x^3+8*c^4*x^4*arc
sin(c*x)+2*c^3*x^3*(-c^2*x^2+1)^(1/2)+40*arcsin(c*x)^2*(-c^2*x^2+1)^(1/2)*
c*x-40*c^2*x^2*arcsin(c*x)+8*arcsin(c*x)^3-17*c*x*(-c^2*x^2+1)^(1/2)+17*ar
csin(c*x))/c+1/32*a*b*Pi^(3/2)*(-16*(-c^2*x^2+1)^(1/2)*arcsin(c*x)*x^3*c^3
+4*c^4*x^4+40*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c*x-20*c^2*x^2+12*arcsin(c*x)
^2+25)/c
```

Fricas [F]

$$\int \left(\pi - c^2\pi x^2\right)^{3/2}\left(a + b\arcsin(cx)\right)^2\,dx = \int \left(\pi - \pi c^2x^2\right)^{\frac{3}{2}}\left(b\arcsin\left(cx\right) + a\right)^2\,dx$$

input
```
integrate((-pi*c^2*x^2+pi)^(3/2)*(a+b*arcsin(c*x))^2,x, algorithm="fricas"
)
```

output
```
integral(-sqrt(pi - pi*c^2*x^2)*(pi*a^2*c^2*x^2 - pi*a^2 + (pi*b^2*c^2*x^2
 - pi*b^2)*arcsin(c*x)^2 + 2*(pi*a*b*c^2*x^2 - pi*a*b)*arcsin(c*x)), x)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 405 vs. $2(197) = 394$.

Time = 3.49 (sec) , antiderivative size = 405, normalized size of antiderivative = 1.88

$$\int \left(\pi - c^2\pi x^2\right)^{3/2} (a + b\arcsin(cx))^2\, dx = \begin{cases} -\frac{\pi^{\frac{3}{2}} a^2 c^2 x^3 \sqrt{-c^2x^2+1}}{4} + \frac{5\pi^{\frac{3}{2}} a^2 x\sqrt{-c^2x^2+1}}{8} + \frac{3\pi^{\frac{3}{2}} a^2 \operatorname{asin}(cx)}{8c} + \frac{\pi^{\frac{3}{2}} abc^3x^4}{8} - \frac{\pi^{\frac{3}{2}} abc^2x^3\sqrt{-c^2x^2+1}\,\operatorname{asin}}{2} \\ \pi^{\frac{3}{2}} a^2 x \end{cases}$$

input
```
integrate((-pi*c**2*x**2+pi)**(3/2)*(a+b*asin(c*x))**2,x)
```

output
```
Piecewise((-pi**(3/2)*a**2*c**2*x**3*sqrt(-c**2*x**2 + 1)/4 + 5*pi**(3/2)*
a**2*x*sqrt(-c**2*x**2 + 1)/8 + 3*pi**(3/2)*a**2*asin(c*x)/(8*c) + pi**(3/
2)*a*b*c**3*x**4/8 - pi**(3/2)*a*b*c**2*x**3*sqrt(-c**2*x**2 + 1)*asin(c*x
)/2 - 5*pi**(3/2)*a*b*c*x**2/8 + 5*pi**(3/2)*a*b*x*sqrt(-c**2*x**2 + 1)*as
in(c*x)/4 + 3*pi**(3/2)*a*b*asin(c*x)**2/(8*c) + pi**(3/2)*b**2*c**3*x**4*
asin(c*x)/8 - pi**(3/2)*b**2*c**2*x**3*sqrt(-c**2*x**2 + 1)*asin(c*x)**2/4
 + pi**(3/2)*b**2*c**2*x**3*sqrt(-c**2*x**2 + 1)/32 - 5*pi**(3/2)*b**2*c*x
**2*asin(c*x)/8 + 5*pi**(3/2)*b**2*x*sqrt(-c**2*x**2 + 1)*asin(c*x)**2/8 -
 17*pi**(3/2)*b**2*x*sqrt(-c**2*x**2 + 1)/64 + pi**(3/2)*b**2*asin(c*x)**3
/(8*c) + 17*pi**(3/2)*b**2*asin(c*x)/(64*c), Ne(c, 0)), (pi**(3/2)*a**2*x,
 True))
```

Maxima [F]

$$\int \left(\pi - c^2\pi x^2\right)^{3/2} (a + b\arcsin(cx))^2\, dx = \int \left(\pi - \pi c^2 x^2\right)^{\frac{3}{2}} (b\arcsin(cx) + a)^2\, dx$$

input
```
integrate((-pi*c^2*x^2+pi)^(3/2)*(a+b*arcsin(c*x))^2,x, algorithm="maxima"
)
```

output
```
1/8*(3*pi*sqrt(pi - pi*c^2*x^2)*x + 2*(pi - pi*c^2*x^2)^(3/2)*x + 3*pi^(3/
2)*arcsin(c*x)/c)*a^2 + sqrt(pi)*integrate(-((pi*b^2*c^2*x^2 - pi*b^2)*arc
tan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 + 2*(pi*a*b*c^2*x^2 - pi*a*b)*ar
ctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)))*sqrt(c*x + 1)*sqrt(-c*x + 1), x)
```

Giac [F(-2)]

Exception generated.

$$\int \left(\pi - c^2\pi x^2\right)^{3/2} \left(a + b\arcsin(cx)\right)^2 dx = \text{Exception raised: TypeError}$$

input
```
integrate((-pi*c^2*x^2+pi)^(3/2)*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \left(\pi - c^2\pi x^2\right)^{3/2} \left(a + b\arcsin(cx)\right)^2 dx = \int \left(a + b\,\mathrm{asin}(c\,x)\right)^2 \left(\Pi - \Pi\,c^2\,x^2\right)^{3/2} dx$$

input
```
int((a + b*asin(c*x))^2*(Pi - Pi*c^2*x^2)^(3/2),x)
```

output
```
int((a + b*asin(c*x))^2*(Pi - Pi*c^2*x^2)^(3/2), x)
```

Reduce [F]

$$\int \left(\pi - c^2\pi x^2\right)^{3/2} (a + b\arcsin(cx))^2\, dx = \frac{\sqrt{\pi}\,\pi\left(3asin(cx)\,a^2 - 2\sqrt{-c^2x^2+1}\,a^2c^3x^3 + 5\sqrt{-c^2x^2+1}\,a^2cx - 16\left(\int \sqrt{-c^2x^2+1}\,a\right.\right.$$

input
```
int((-Pi*c^2*x^2+Pi)^(3/2)*(a+b*asin(c*x))^2,x)
```

output
```
(sqrt(pi)*pi*(3*asin(c*x)*a**2 - 2*sqrt( - c**2*x**2 + 1)*a**2*c**3*x**3 +
 5*sqrt( - c**2*x**2 + 1)*a**2*c*x - 16*int(sqrt( - c**2*x**2 + 1)*asin(c*
x)*x**2,x)*a*b*c**3 + 16*int(sqrt( - c**2*x**2 + 1)*asin(c*x),x)*a*b*c - 8
*int(sqrt( - c**2*x**2 + 1)*asin(c*x)**2*x**2,x)*b**2*c**3 + 8*int(sqrt( -
 c**2*x**2 + 1)*asin(c*x)**2,x)*b**2*c))/(8*c)
```

3.45 $\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))^2\,dx$

Optimal result . . . 422
Mathematica [A] (verified) . . . 423
Rubi [A] (verified) . . . 423
Maple [A] (verified) . . . 425
Fricas [F] . . . 426
Sympy [F] . . . 426
Maxima [F] . . . 427
Giac [F(-2)] . . . 427
Mupad [F(-1)] . . . 427
Reduce [F] . . . 428

Optimal result

Integrand size = 26, antiderivative size = 124

$$\begin{aligned}\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))^2\,dx = &-\frac{1}{4}b^2\sqrt{\pi}x\sqrt{1 - c^2x^2} + \frac{b^2\sqrt{\pi}\arcsin(cx)}{4c} \\ &- \frac{1}{2}bc\sqrt{\pi}x^2(a + b\arcsin(cx)) \\ &+ \frac{1}{2}x\sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))^2 \\ &+ \frac{\sqrt{\pi}(a + b\arcsin(cx))^3}{6bc}\end{aligned}$$

output

```
-1/4*b^2*Pi^(1/2)*x*(-c^2*x^2+1)^(1/2)+1/4*b^2*Pi^(1/2)*arcsin(c*x)/c-1/2*
b*c*Pi^(1/2)*x^2*(a+b*arcsin(c*x))+1/2*x*(-Pi*c^2*x^2+Pi)^(1/2)*(a+b*arcsi
n(c*x))^2+1/6*Pi^(1/2)*(a+b*arcsin(c*x))^3/b/c
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 165, normalized size of antiderivative = 1.33

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))^2\,dx$$
$$= \frac{\sqrt{\pi}\left(2a^3 - 6ab^2c^2x^2 + 6a^2bcx\sqrt{1-c^2x^2} - 3b^3cx\sqrt{1-c^2x^2} + 3b\left(2a^2 + b^2(1-2c^2x^2) + 4abcx\sqrt{1-c^2x^2}\right.\right.}{12bc}$$

input
```
Integrate[Sqrt[Pi - c^2*Pi*x^2]*(a + b*ArcSin[c*x])^2,x]
```

output
```
(Sqrt[Pi]*(2*a^3 - 6*a*b^2*c^2*x^2 + 6*a^2*b*c*x*Sqrt[1 - c^2*x^2] - 3*b^3
*c*x*Sqrt[1 - c^2*x^2] + 3*b*(2*a^2 + b^2*(1 - 2*c^2*x^2) + 4*a*b*c*x*Sqrt
[1 - c^2*x^2])*ArcSin[c*x] + 6*b^2*(a + b*c*x*Sqrt[1 - c^2*x^2])*ArcSin[c*
x]^2 + 2*b^3*ArcSin[c*x]^3))/(12*b*c)
```

Rubi [A] (verified)

Time = 0.54 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.98, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$, Rules used = {5156, 5138, 262, 223, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{\pi - \pi c^2 x^2}(a + b\arcsin(cx))^2\,dx$$
$$\downarrow 5156$$
$$\frac{1}{2}\sqrt{\pi}\int \frac{(a + b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx - \sqrt{\pi}bc\int x(a + b\arcsin(cx))dx + \frac{1}{2}x\sqrt{\pi - \pi c^2x^2}(a + b\arcsin(cx))^2$$
$$\downarrow 5138$$
$$-\sqrt{\pi}bc\left(\frac{1}{2}x^2(a + b\arcsin(cx)) - \frac{1}{2}bc\int \frac{x^2}{\sqrt{1-c^2x^2}}dx\right) + \frac{1}{2}\sqrt{\pi}\int \frac{(a + b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx + \frac{1}{2}x\sqrt{\pi - \pi c^2x^2}(a + b\arcsin(cx))^2$$

$$\downarrow 262$$

$$-\sqrt{\pi}bc\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\int\frac{1}{\sqrt{1-c^2x^2}}dx}{2c^2}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)+$$
$$\frac{1}{2}\sqrt{\pi}\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx+\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))^2$$

$$\downarrow 223$$

$$\frac{1}{2}\sqrt{\pi}\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx+\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))^2-$$
$$\sqrt{\pi}bc\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\arcsin(cx)}{2c^3}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)$$

$$\downarrow 5152$$

$$\frac{1}{2}x\sqrt{\pi-\pi c^2x^2}(a+b\arcsin(cx))^2-$$
$$\sqrt{\pi}bc\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\arcsin(cx)}{2c^3}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)+\frac{\sqrt{\pi}(a+b\arcsin(cx))^3}{6bc}$$

input
```
Int[Sqrt[Pi - c^2*Pi*x^2]*(a + b*ArcSin[c*x])^2,x]
```

output
```
(x*Sqrt[Pi - c^2*Pi*x^2]*(a + b*ArcSin[c*x])^2)/2 + (Sqrt[Pi]*(a + b*ArcSi
n[c*x])^3)/(6*b*c) - b*c*Sqrt[Pi]*((x^2*(a + b*ArcSin[c*x]))/2 - (b*c*(-1/
2*(x*Sqrt[1 - c^2*x^2])/c^2 + ArcSin[c*x]/(2*c^3)))/2)
```

Defintions of rubi rules used

rule 223
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSin[Rt[-b, 2]*(x/Sqrt
[a])]/Rt[-b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && NegQ[b]
```

rule 262
```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[c*(c*x)
^(m - 1)*((a + b*x^2)^(p + 1)/(b*(m + 2*p + 1))), x] - Simp[a*c^2*((m - 1)/
(b*(m + 2*p + 1)))  Int[(c*x)^(m - 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b
, c, p}, x] && GtQ[m, 2 - 1] && NeQ[m + 2*p + 1, 0] && IntBinomialQ[a, b, c
, 2, m, p, x]
```

rule 5138
```
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] - Simp[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 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

Maple [A] (verified)

Time = 0.25 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.44

method	result
default	$\frac{a^2 x\sqrt{-\pi c^2x^2+\pi}}{2}+\frac{a^2\pi\arctan\left(\frac{\sqrt{\pi c^2}\,x}{\sqrt{-\pi c^2x^2+\pi}}\right)}{2\sqrt{\pi c^2}}+\frac{b^2\sqrt{\pi}\left(6\arcsin(cx)^2\sqrt{-c^2x^2+1}\,cx-6c^2x^2\arcsin(cx)-3cx\sqrt{-c^2x^2+1}+2\arc\right.}{12c}$
parts	$\frac{a^2 x\sqrt{-\pi c^2x^2+\pi}}{2}+\frac{a^2\pi\arctan\left(\frac{\sqrt{\pi c^2}\,x}{\sqrt{-\pi c^2x^2+\pi}}\right)}{2\sqrt{\pi c^2}}+\frac{b^2\sqrt{\pi}\left(6\arcsin(cx)^2\sqrt{-c^2x^2+1}\,cx-6c^2x^2\arcsin(cx)-3cx\sqrt{-c^2x^2+1}+2\arc\right.}{12c}$

input
```
int((-Pi*c^2*x^2+Pi)^(1/2)*(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*a^2*x*(-Pi*c^2*x^2+Pi)^(1/2)+1/2*a^2*Pi/(Pi*c^2)^(1/2)*arctan((Pi*c^2)
^(1/2)*x/(-Pi*c^2*x^2+Pi)^(1/2))+1/12*b^2*Pi^(1/2)*(6*arcsin(c*x)^2*(-c^2*
x^2+1)^(1/2)*c*x-6*c^2*x^2*arcsin(c*x)-3*c*x*(-c^2*x^2+1)^(1/2)+2*arcsin(c
*x)^3+3*arcsin(c*x))/c+1/2*a*b*Pi^(1/2)*(2*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*
c*x-c^2*x^2+arcsin(c*x)^2)/c
```

Fricas [F]

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))^2\,dx = \int \sqrt{\pi - \pi c^2 x^2}(b\arcsin(cx) + a)^2\,dx$$

input
```
integrate((-pi*c^2*x^2+pi)^(1/2)*(a+b*arcsin(c*x))^2,x, algorithm="fricas"
)
```

output
```
integral(sqrt(pi - pi*c^2*x^2)*(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^
2), x)
```

Sympy [F]

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))^2\,dx = \sqrt{\pi}\left(\int a^2\sqrt{-c^2x^2+1}\,dx + \int b^2\sqrt{-c^2x^2+1}\operatorname{asin}^2(cx)\,dx + \int 2ab\sqrt{-c^2x^2+1}\operatorname{asin}(cx)\,dx\right)$$

input
```
integrate((-pi*c**2*x**2+pi)**(1/2)*(a+b*asin(c*x))**2,x)
```

output
```
sqrt(pi)*(Integral(a**2*sqrt(-c**2*x**2 + 1), x) + Integral(b**2*sqrt(-c**
2*x**2 + 1)*asin(c*x)**2, x) + Integral(2*a*b*sqrt(-c**2*x**2 + 1)*asin(c*
x), x))
```

Maxima [F]

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))^2\,dx = \int \sqrt{\pi - \pi c^2 x^2}(b\arcsin(cx) + a)^2\,dx$$

input
```
integrate((-pi*c^2*x^2+pi)^(1/2)*(a+b*arcsin(c*x))^2,x, algorithm="maxima"
)
```

output
```
1/2*(sqrt(pi - pi*c^2*x^2)*x + sqrt(pi)*arcsin(c*x)/c)*a^2 + sqrt(pi)*inte
grate((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)))*sqrt(c*x + 1)*sqrt(-c*x + 1), x)
```

Giac [F(-2)]

Exception generated.

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))^2\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((-pi*c^2*x^2+pi)^(1/2)*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))^2\,dx = \int (a + b\,\mathrm{asin}(c\,x))^2\,\sqrt{\Pi - \Pi\,c^2\,x^2}\,dx$$

input
```
int((a + b*asin(c*x))^2*(Pi - Pi*c^2*x^2)^(1/2),x)
```

output
```
int((a + b*asin(c*x))^2*(Pi - Pi*c^2*x^2)^(1/2), x)
```

Reduce [F]

$$\int \sqrt{\pi - c^2\pi x^2}(a + b\arcsin(cx))^2\,dx$$

$$= \frac{\sqrt{\pi}\left(asin(cx)\,a^2 + \sqrt{-c^2x^2+1}\,a^2cx + 4\left(\int \sqrt{-c^2x^2+1}\,asin(cx)\,dx\right)abc + 2\left(\int \sqrt{-c^2x^2+1}\,asin(cx)^2\,dx\right.\right.}{2c}$$

input

```
int((-Pi*c^2*x^2+Pi)^(1/2)*(a+b*asin(c*x))^2,x)
```

output

```
(sqrt(pi)*(asin(c*x)*a**2 + sqrt( - c**2*x**2 + 1)*a**2*c*x + 4*int(sqrt(
- c**2*x**2 + 1)*asin(c*x),x)*a*b*c + 2*int(sqrt( - c**2*x**2 + 1)*asin(c*
x)**2,x)*b**2*c))/(2*c)
```

3.46 $\int \frac{(a+b\arcsin(cx))^2}{\sqrt{\pi-c^2\pi x^2}}\,dx$

Optimal result . . . 429
Mathematica [A] (verified) . . . 429
Rubi [A] (verified) . . . 430
Maple [B] (verified) . . . 430
Fricas [F] . . . 431
Sympy [B] (verification not implemented) . . . 432
Maxima [B] (verification not implemented) . . . 432
Giac [F(-2)] . . . 433
Mupad [F(-1)] . . . 433
Reduce [B] (verification not implemented) . . . 433

Optimal result

Integrand size = 26, antiderivative size = 25

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{\pi-c^2\pi x^2}}\,dx = \frac{(a+b\arcsin(cx))^3}{3bc\sqrt{\pi}}$$

output
```
1/3*(a+b*arcsin(c*x))^3/b/c/Pi^(1/2)
```

Mathematica [A] (verified)

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

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{\pi-c^2\pi x^2}}\,dx = \frac{(a+b\arcsin(cx))^3}{3bc\sqrt{\pi}}$$

input
```
Integrate[(a + b*ArcSin[c*x])^2/Sqrt[Pi - c^2*Pi*x^2],x]
```

output
```
(a + b*ArcSin[c*x])^3/(3*b*c*Sqrt[Pi])
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.038$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a + b \arcsin(cx))^2}{\sqrt{\pi - \pi c^2 x^2}}\, dx$$
$$\downarrow 5152$$
$$\frac{(a + b \arcsin(cx))^3}{3\sqrt{\pi} bc}$$

input
```
Int[(a + b*ArcSin[c*x])^2/Sqrt[Pi - c^2*Pi*x^2],x]
```

output
```
(a + b*ArcSin[c*x])^3/(3*b*c*Sqrt[Pi])
```

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 67 vs. 2(21) = 42.

Time = 0.25 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.72

method	result	size
default	$\frac{a^2 \arctan\left(\frac{\sqrt{\pi c^2}\, x}{\sqrt{-\pi c^2 x^2+\pi}}\right)}{\sqrt{\pi c^2}} + \frac{b^2 \arcsin(cx)^3}{3c\sqrt{\pi}} + \frac{ab \arcsin(cx)^2}{c\sqrt{\pi}}$	68
parts	$\frac{a^2 \arctan\left(\frac{\sqrt{\pi c^2}\, x}{\sqrt{-\pi c^2 x^2+\pi}}\right)}{\sqrt{\pi c^2}} + \frac{b^2 \arcsin(cx)^3}{3c\sqrt{\pi}} + \frac{ab \arcsin(cx)^2}{c\sqrt{\pi}}$	68

input
```
int((a+b*arcsin(c*x))^2/(-Pi*c^2*x^2+Pi)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
a^2/(Pi*c^2)^(1/2)*arctan((Pi*c^2)^(1/2)*x/(-Pi*c^2*x^2+Pi)^(1/2))+1/3*b^2
/c/Pi^(1/2)*arcsin(c*x)^3+a*b/c/Pi^(1/2)*arcsin(c*x)^2
```

Fricas [F]

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{\pi - c^2\pi x^2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{\sqrt{\pi - \pi c^2 x^2}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-pi*c^2*x^2+pi)^(1/2),x, algorithm="fricas"
)
```

output
```
integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)/sqrt(pi - pi*c^2*x^
2), x)
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 94 vs. $2(19) = 38$.

Time $= 3.63$ (sec) , antiderivative size $= 94$, normalized size of antiderivative $= 3.76$

$$\int \frac{(a + b\arcsin(cx))^2}{\sqrt{\pi - c^2\pi x^2}}\,dx$$

$$= \begin{cases} a^2\left(\begin{cases} \frac{\log\left(-2\pi c^2 x + 2\sqrt{\pi}\sqrt{-c^2}\sqrt{-\pi c^2x^2+\pi}\right)}{\sqrt{\pi}\sqrt{-c^2}} & \text{for } \pi c^2 \neq 0 \\ \frac{x}{\sqrt{\pi}} & \text{otherwise} \end{cases}\right) & \text{for } b = 0 \\ \frac{a^2 x}{\sqrt{\pi}} & \text{for } c = 0 \\ \frac{(a+b\operatorname{asin}(cx))^3}{3\sqrt{\pi}bc} & \text{otherwise} \end{cases}$$

input
```
integrate((a+b*asin(c*x))**2/(-pi*c**2*x**2+pi)**(1/2),x)
```

output
```
Piecewise((a**2*Piecewise((log(-2*pi*c**2*x + 2*sqrt(pi)*sqrt(-c**2)*sqrt(
-pi*c**2*x**2 + pi))/(sqrt(pi)*sqrt(-c**2)), Ne(pi*c**2, 0)), (x/sqrt(pi),
 True)), Eq(b, 0)), (a**2*x/sqrt(pi), Eq(c, 0)), ((a + b*asin(c*x))**3/(3*
sqrt(pi)*b*c), True))
```

Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 47 vs. $2(21) = 42$.

Time $= 0.13$ (sec) , antiderivative size $= 47$, normalized size of antiderivative $= 1.88$

$$\int \frac{(a + b\arcsin(cx))^2}{\sqrt{\pi - c^2\pi x^2}}\,dx = \frac{b^2\arcsin(cx)^3}{3\sqrt{\pi}c} + \frac{ab\arcsin(cx)^2}{\sqrt{\pi}c} + \frac{a^2\arcsin(cx)}{\sqrt{\pi}c}$$

input
```
integrate((a+b*arcsin(c*x))^2/(-pi*c^2*x^2+pi)^(1/2),x, algorithm="maxima"
)
```

output
```
1/3*b^2*arcsin(c*x)^3/(sqrt(pi)*c) + a*b*arcsin(c*x)^2/(sqrt(pi)*c) + a^2*
arcsin(c*x)/(sqrt(pi)*c)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{\pi-c^2\pi x^2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(-pi*c^2*x^2+pi)^(1/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{\pi-c^2\pi x^2}}\,dx = \int \frac{(a+b\,\mathrm{asin}(c\,x))^2}{\sqrt{\Pi-\Pi\,c^2\,x^2}}\,dx$$

input
```
int((a + b*asin(c*x))^2/(Pi - Pi*c^2*x^2)^(1/2),x)
```

output
```
int((a + b*asin(c*x))^2/(Pi - Pi*c^2*x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.52

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{\pi-c^2\pi x^2}}\,dx = \frac{\sqrt{\pi}\;asin(cx)\left(asin(cx)^2\,b^2+3asin(cx)\,ab+3a^2\right)}{3c\pi}$$

input
```
int((a+b*asin(c*x))^2/(-Pi*c^2*x^2+Pi)^(1/2),x)
```

output
```
(sqrt(pi)*asin(c*x)*(asin(c*x)**2*b**2 + 3*asin(c*x)*a*b + 3*a**2))/(3*c*p
i)
```

3.47 $\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{3/2}}\,dx$

Optimal result . . . 434
Mathematica [A] (verified) . . . 434
Rubi [A] (verified) . . . 435
Maple [A] (verified) . . . 437
Fricas [F] . . . 438
Sympy [F] . . . 438
Maxima [F] . . . 439
Giac [F(-2)] . . . 439
Mupad [F(-1)] . . . 439
Reduce [F] . . . 440

Optimal result

Integrand size = 26, antiderivative size = 114

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{3/2}}\,dx = -\frac{i(a+b\arcsin(cx))^2}{c\pi^{3/2}} + \frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-c^2\pi x^2}} + \frac{2b(a+b\arcsin(cx))\log\left(1+e^{2i\arcsin(cx)}\right)}{c\pi^{3/2}} - \frac{ib^2\,\mathrm{PolyLog}\left(2,-e^{2i\arcsin(cx)}\right)}{c\pi^{3/2}}$$

output

```
-I*(a+b*arcsin(c*x))^2/c/Pi^(3/2)+x*(a+b*arcsin(c*x))^2/Pi/(-Pi*c^2*x^2+Pi
)^(1/2)+2*b*(a+b*arcsin(c*x))*ln(1+(I*c*x+(-c^2*x^2+1)^(1/2))^2)/c/Pi^(3/2
)-I*b^2*polylog(2,-(I*c*x+(-c^2*x^2+1)^(1/2))^2)/c/Pi^(3/2)
```

Mathematica [A] (verified)

Time = 1.18 (sec) , antiderivative size = 166, normalized size of antiderivative = 1.46

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{3/2}}\,dx = \frac{b^2\left(cx-i\sqrt{1-c^2x^2}\right)\arcsin(cx)^2 + 2b\arcsin(cx)\left(acx+b\sqrt{1-c^2x^2}\log\left(1+e^{2}\right.\right.}{c}$$

input

```
Integrate[(a + b*ArcSin[c*x])^2/(Pi - c^2*Pi*x^2)^(3/2),x]
```

output

```
(b^2*(c*x - I*Sqrt[1 - c^2*x^2])*ArcSin[c*x]^2 + 2*b*ArcSin[c*x]*(a*c*x +
b*Sqrt[1 - c^2*x^2]*Log[1 + E^((2*I)*ArcSin[c*x])]) + a*(a*c*x + b*Sqrt[1
- c^2*x^2]*Log[1 - c^2*x^2]) - I*b^2*Sqrt[1 - c^2*x^2]*PolyLog[2, -E^((2*I
)*ArcSin[c*x])])/(c*Pi^(3/2)*Sqrt[1 - c^2*x^2])
```

Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.99, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.269$, Rules used = {5160, 5180, 3042, 4202, 2620, 2715, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-\pi c^2x^2)^{3/2}}\,dx$$

$$\downarrow 5160$$

$$\frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-\pi c^2x^2}} - \frac{2bc\int \frac{x(a+b\arcsin(cx))}{1-c^2x^2}dx}{\pi^{3/2}}$$

$$\downarrow 5180$$

$$\frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-\pi c^2x^2}} - \frac{2b\int \frac{cx(a+b\arcsin(cx))}{\sqrt{1-c^2x^2}}d\arcsin(cx)}{\pi^{3/2}c}$$

$$\downarrow 3042$$

$$\frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-\pi c^2x^2}} - \frac{2b\int (a+b\arcsin(cx))\tan(\arcsin(cx))d\arcsin(cx)}{\pi^{3/2}c}$$

$$\downarrow 4202$$

$$\frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-\pi c^2x^2}} - \frac{2b\left(\frac{i(a+b\arcsin(cx))^2}{2b} - 2i\int \frac{e^{2i\arcsin(cx)}(a+b\arcsin(cx))}{1+e^{2i\arcsin(cx)}}d\arcsin(cx)\right)}{\pi^{3/2}c}$$

$$\downarrow 2620$$

$$\frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-\pi c^2x^2}} - \frac{2b\left(\frac{i(a+b\arcsin(cx))^2}{2b} - 2i\left(\frac{1}{2}ib\int \log\left(1+e^{2i\arcsin(cx)}\right)d\arcsin(cx) - \frac{1}{2}i\log\left(1+e^{2i\arcsin(cx)}\right)(a+b\arcsin(cx))\right)\right)}{\pi^{3/2}c}$$

$$\downarrow 2715$$

$$\frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-\pi c^2x^2}} - \frac{2b\left(\frac{i(a+b\arcsin(cx))^2}{2b} - 2i\left(\frac{1}{4}b\int e^{-2i\arcsin(cx)}\log\left(1+e^{2i\arcsin(cx)}\right)de^{2i\arcsin(cx)} - \frac{1}{2}i\log\left(1+e^{2i\arcsin(cx)}\right)(a+b\arcs\right.}{\pi^{3/2}c}$$

$$\downarrow 2838$$

$$\frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-\pi c^2x^2}} - \frac{2b\left(\frac{i(a+b\arcsin(cx))^2}{2b} - 2i\left(-\frac{1}{2}i\log\left(1+e^{2i\arcsin(cx)}\right)(a+b\arcsin(cx)) - \frac{1}{4}b\,\mathrm{PolyLog}\left(2,-e^{2i\arcsin(cx)}\right)\right)\right)}{\pi^{3/2}c}$$

input
```
Int[(a + b*ArcSin[c*x])^2/(Pi - c^2*Pi*x^2)^(3/2),x]
```

output
```
(x*(a + b*ArcSin[c*x])^2)/(Pi*Sqrt[Pi - c^2*Pi*x^2]) - (2*b*(((I/2)*(a + b
*ArcSin[c*x])^2)/b - (2*I)*((-1/2*I)*(a + b*ArcSin[c*x])*Log[1 + E^((2*I)*
ArcSin[c*x])] - (b*PolyLog[2, -E^((2*I)*ArcSin[c*x])])/4)))/(c*Pi^(3/2))
```

Defintions of rubi rules used

rule 2620
```
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/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[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 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[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 2838
```
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 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4202
```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[I
*((c + d*x)^(m + 1)/(d*(m + 1))), x] - Simp[2*I   Int[(c + d*x)^m*(E^(2*I*(
e + f*x))/(1 + E^(2*I*(e + f*x)))), x], x] /; FreeQ[{c, d, e, f}, x] && IGt
Q[m, 0]
```

rule 5160
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2)^(3/2), x
_Symbol] :> Simp[x*((a + b*ArcSin[c*x])^n/(d*Sqrt[d + e*x^2])), x] - Simp[b
*c*(n/d)*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]   Int[x*((a + b*ArcSin[c*x
])^(n - 1)/(1 - c^2*x^2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d
 + e, 0] && GtQ[n, 0]
```

rule 5180
```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_))/((d_) + (e_.)*(x_)^2),
x_Symbol] :> Simp[-e^(-1)   Subst[Int[(a + b*x)^n*Tan[x], x], x, ArcSin[c*x
]], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[n, 0]
```

Maple [A] (verified)

Time = 0.29 (sec) , antiderivative size = 224, normalized size of antiderivative = 1.96

method	result
default	$\frac{a^2 x}{\pi\sqrt{-\pi c^2x^2+\pi}} + b^2\left(\frac{\left(ic^2x^2-cx\sqrt{-c^2x^2+1}-i\right)\arcsin(cx)^2}{\pi^{\frac{3}{2}}c(c^2x^2-1)} - \frac{i\left(2i\arcsin(cx)\ln\left(1+\left(icx+\sqrt{-c^2x^2+1}\right)^2\right)+2\arcsin(cx)^2+\text{p}\right.}{c\,\pi^{\frac{3}{2}}}\right.$
parts	$\frac{a^2 x}{\pi\sqrt{-\pi c^2x^2+\pi}} + b^2\left(\frac{\left(ic^2x^2-cx\sqrt{-c^2x^2+1}-i\right)\arcsin(cx)^2}{\pi^{\frac{3}{2}}c(c^2x^2-1)} - \frac{i\left(2i\arcsin(cx)\ln\left(1+\left(icx+\sqrt{-c^2x^2+1}\right)^2\right)+2\arcsin(cx)^2+\text{p}\right.}{c\,\pi^{\frac{3}{2}}}\right.$

input
```
int((a+b*arcsin(c*x))^2/(-Pi*c^2*x^2+Pi)^(3/2),x,method=_RETURNVERBOSE)
```

output
```
a^2/Pi*x/(-Pi*c^2*x^2+Pi)^(1/2)+b^2*(1/Pi^(3/2)*(I*c^2*x^2-c*x*(-c^2*x^2+1
)^(1/2)-I)*arcsin(c*x)^2/c/(c^2*x^2-1)-I*(2*I*arcsin(c*x)*ln(1+(I*c*x+(-c^
2*x^2+1)^(1/2))^2)+2*arcsin(c*x)^2+polylog(2,-(I*c*x+(-c^2*x^2+1)^(1/2))^2
))/c/Pi^(3/2))-a*b/c/Pi^(3/2)*(-ln(-c^2*x^2+1)*x^2*c^2+2*arcsin(c*x)*(-c^2
*x^2+1)^(1/2)*c*x+ln(-c^2*x^2+1))/(c^2*x^2-1)
```

Fricas [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{3/2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(\pi-\pi c^2x^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-pi*c^2*x^2+pi)^(3/2),x, algorithm="fricas"
)
```

output
```
integral(sqrt(pi - pi*c^2*x^2)*(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^
2)/(pi^2*c^4*x^4 - 2*pi^2*c^2*x^2 + pi^2), x)
```

Sympy [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{3/2}}\,dx = \frac{\int \frac{a^2}{-c^2x^2\sqrt{-c^2x^2+1}+\sqrt{-c^2x^2+1}}\,dx + \int \frac{b^2\operatorname{asin}^2(cx)}{-c^2x^2\sqrt{-c^2x^2+1}+\sqrt{-c^2x^2+1}}\,dx + \int \frac{2ab\operatorname{asin}(c}{-c^2x^2\sqrt{-c^2x^2+1}+}}{\pi^{\frac{3}{2}}}$$

input
```
integrate((a+b*asin(c*x))**2/(-pi*c**2*x**2+pi)**(3/2),x)
```

output
```
(Integral(a**2/(-c**2*x**2*sqrt(-c**2*x**2 + 1) + sqrt(-c**2*x**2 + 1)), x
) + Integral(b**2*asin(c*x)**2/(-c**2*x**2*sqrt(-c**2*x**2 + 1) + sqrt(-c*
*2*x**2 + 1)), x) + Integral(2*a*b*asin(c*x)/(-c**2*x**2*sqrt(-c**2*x**2 +
 1) + sqrt(-c**2*x**2 + 1)), x))/pi**(3/2)
```

Maxima [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{3/2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(\pi-\pi c^2x^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-pi*c^2*x^2+pi)^(3/2),x, algorithm="maxima"
)
```

output
```
2*a*b*x*arcsin(c*x)/(pi*sqrt(pi - pi*c^2*x^2)) - b^2*integrate(-arctan2(c*
x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2/((pi - pi*c^2*x^2)*sqrt(c*x + 1)*sqrt(-
c*x + 1)), x)/sqrt(pi) + a^2*x/(pi*sqrt(pi - pi*c^2*x^2)) - a*b*log(x^2 -
1/c^2)/(pi^(3/2)*c)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(-pi*c^2*x^2+pi)^(3/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{3/2}}\,dx = \int \frac{(a+b\,\mathrm{asin}(c\,x))^2}{(\Pi-\Pi\,c^2\,x^2)^{3/2}}\,dx$$

input
```
int((a + b*asin(c*x))^2/(Pi - Pi*c^2*x^2)^(3/2),x)
```

output
```
int((a + b*asin(c*x))^2/(Pi - Pi*c^2*x^2)^(3/2), x)
```

Reduce [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{3/2}}\,dx = \frac{-2\sqrt{-c^2x^2+1}\left(\int \frac{asin(cx)}{\sqrt{-c^2x^2+1}\,c^2x^2-\sqrt{-c^2x^2+1}}dx\right)ab-\sqrt{-c^2x^2+1}\left(\int \frac{asin(}{\sqrt{-c^2x^2+1}\,c^2x}\right.}{\sqrt{\pi}\sqrt{-c^2x^2+1}\,\pi}$$

input
```
int((a+b*asin(c*x))^2/(-Pi*c^2*x^2+Pi)^(3/2),x)
```

output
```
( - 2*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**2*x*
*2 - sqrt( - c**2*x**2 + 1)),x)*a*b - sqrt( - c**2*x**2 + 1)*int(asin(c*x)
**2/(sqrt( - c**2*x**2 + 1)*c**2*x**2 - sqrt( - c**2*x**2 + 1)),x)*b**2 +
a**2*x)/(sqrt(pi)*sqrt( - c**2*x**2 + 1)*pi)
```

3.48 $\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{5/2}}\,dx$

Optimal result . . . 441
Mathematica [A] (verified) . . . 442
Rubi [A] (verified) . . . 442
Maple [B] (verified) . . . 446
Fricas [F] . . . 447
Sympy [F] . . . 448
Maxima [F] . . . 448
Giac [F(-2)] . . . 449
Mupad [F(-1)] . . . 449
Reduce [F] . . . 449

Optimal result

Integrand size = 26, antiderivative size = 216

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{5/2}}\,dx = \frac{b^2x}{3\pi^{5/2}\sqrt{1-c^2x^2}} - \frac{b(a+b\arcsin(cx))}{3c\pi^{5/2}(1-c^2x^2)} - \frac{2i(a+b\arcsin(cx))^2}{3c\pi^{5/2}} + \frac{x(a+b\arcsin(cx))^2}{3\pi(\pi-c^2\pi x^2)^{3/2}} + \frac{2x(a+b\arcsin(cx))^2}{3\pi^2\sqrt{\pi-c^2\pi x^2}} + \frac{4b(a+b\arcsin(cx))\log\left(1+e^{2i\arcsin(cx)}\right)}{3c\pi^{5/2}} - \frac{2ib^2\,\mathrm{PolyLog}\left(2,-e^{2i\arcsin(cx)}\right)}{3c\pi^{5/2}}$$

output

```
1/3*b^2*x/Pi^(5/2)/(-c^2*x^2+1)^(1/2)-1/3*b*(a+b*arcsin(c*x))/c/Pi^(5/2)/(
-c^2*x^2+1)-2/3*I*(a+b*arcsin(c*x))^2/c/Pi^(5/2)+1/3*x*(a+b*arcsin(c*x))^2
/Pi/(-Pi*c^2*x^2+Pi)^(3/2)+2/3*x*(a+b*arcsin(c*x))^2/Pi^2/(-Pi*c^2*x^2+Pi)
^(1/2)+4/3*b*(a+b*arcsin(c*x))*ln(1+(I*c*x+(-c^2*x^2+1)^(1/2))^2)/c/Pi^(5/
2)-2/3*I*b^2*polylog(2,-(I*c*x+(-c^2*x^2+1)^(1/2))^2)/c/Pi^(5/2)
```

Mathematica [A] (verified)

Time = 0.74 (sec) , antiderivative size = 308, normalized size of antiderivative = 1.43

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{5/2}}\,dx =$$

$$-\frac{-3a^2cx-b^2cx+2a^2c^3x^3+b^2c^3x^3+ab\sqrt{1-c^2x^2}+b^2\left(-3cx+2c^3x^3+2i\sqrt{1-c^2x^2}-2ic^2x^2\sqrt{1-c^2x}\right.}{}$$

input
```
Integrate[(a + b*ArcSin[c*x])^2/(Pi - c^2*Pi*x^2)^(5/2),x]
```

output
```
-1/3*(-3*a^2*c*x - b^2*c*x + 2*a^2*c^3*x^3 + b^2*c^3*x^3 + a*b*Sqrt[1 - c^
2*x^2] + b^2*(-3*c*x + 2*c^3*x^3 + (2*I)*Sqrt[1 - c^2*x^2] - (2*I)*c^2*x^2
*Sqrt[1 - c^2*x^2])*ArcSin[c*x]^2 + b*ArcSin[c*x]*(-6*a*c*x + 4*a*c^3*x^3
+ b*Sqrt[1 - c^2*x^2] - 4*b*(1 - c^2*x^2)^(3/2)*Log[1 + E^((2*I)*ArcSin[c*
x])]) - 2*a*b*Sqrt[1 - c^2*x^2]*Log[-1 + c^2*x^2] + 2*a*b*c^2*x^2*Sqrt[1 -
 c^2*x^2]*Log[-1 + c^2*x^2] + (2*I)*b^2*(1 - c^2*x^2)^(3/2)*PolyLog[2, -E^
((2*I)*ArcSin[c*x])])/(c*Pi^(5/2)*(1 - c^2*x^2)^(3/2))
```

Rubi [A] (verified)

Time = 1.36 (sec) , antiderivative size = 216, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.385$, Rules used = {5162, 5160, 5180, 3042, 4202, 2620, 2715, 2838, 5182, 208}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-\pi c^2x^2)^{5/2}}\,dx$$

$$\downarrow 5162$$

$$-\frac{2bc\int \frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^2}dx}{3\pi^{5/2}}+\frac{2\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{3/2}}dx}{3\pi}+\frac{x(a+b\arcsin(cx))^2}{3\pi\left(\pi-\pi c^2x^2\right)^{3/2}}$$

$$\downarrow 5160$$

$$-\frac{2bc\int\frac{x(a+b\arcsin(cx))}{\left(1-c^2x^2\right)^2}dx}{3\pi^{5/2}}+\frac{2\left(\frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-\pi c^2x^2}}-\frac{2bc\int\frac{x(a+b\arcsin(cx))}{1-c^2x^2}dx}{\pi^{3/2}}\right)}{3\pi}+\frac{x(a+b\arcsin(cx))^2}{3\pi\left(\pi-\pi c^2x^2\right)^{3/2}}$$

$$\downarrow 5180$$

$$-\frac{2bc\int\frac{x(a+b\arcsin(cx))}{\left(1-c^2x^2\right)^2}dx}{3\pi^{5/2}}+\frac{2\left(\frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-\pi c^2x^2}}-\frac{2b\int\frac{cx(a+b\arcsin(cx))}{\sqrt{1-c^2x^2}}d\arcsin(cx)}{\pi^{3/2}c}\right)}{3\pi}+\frac{x(a+b\arcsin(cx))^2}{3\pi\left(\pi-\pi c^2x^2\right)^{3/2}}$$

$$\downarrow 3042$$

$$-\frac{2bc\int\frac{x(a+b\arcsin(cx))}{\left(1-c^2x^2\right)^2}dx}{3\pi^{5/2}}+\frac{2\left(\frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-\pi c^2x^2}}-\frac{2b\int(a+b\arcsin(cx))\tan(\arcsin(cx))d\arcsin(cx)}{\pi^{3/2}c}\right)}{3\pi}+\frac{x(a+b\arcsin(cx))^2}{3\pi\left(\pi-\pi c^2x^2\right)^{3/2}}$$

$$\downarrow 4202$$

$$\frac{2\left(\frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-\pi c^2x^2}}-\frac{2b\left(\frac{i(a+b\arcsin(cx))^2}{2b}-2i\int\frac{e^{2i\arcsin(cx)}(a+b\arcsin(cx))}{1+e^{2i\arcsin(cx)}}d\arcsin(cx)\right)}{\pi^{3/2}c}\right)}{3\pi}-\frac{2bc\int\frac{x(a+b\arcsin(cx))}{\left(1-c^2x^2\right)^2}dx}{3\pi^{5/2}}+\frac{x(a+b\arcsin(cx))^2}{3\pi\left(\pi-\pi c^2x^2\right)^{3/2}}$$

$$\downarrow 2620$$

$$-\frac{2bc\int\frac{x(a+b\arcsin(cx))}{\left(1-c^2x^2\right)^2}dx}{3\pi^{5/2}}+\frac{2\left(\frac{x(a+b\arcsin(cx))^2}{\pi\sqrt{\pi-\pi c^2x^2}}-\frac{2b\left(\frac{i(a+b\arcsin(cx))^2}{2b}-2i\left(\frac{1}{2}ib\int\log\left(1+e^{2i\arcsin(cx)}\right)d\arcsin(cx)-\frac{1}{2}i\log\left(1+e^{2i\arcsin(cx)}\right)(a+b\arcsin(cx))\right)\right)}{\pi^{3/2}c}\right)}{3\pi}+\frac{x(a+b\arcsin(cx))^2}{3\pi\left(\pi-\pi c^2x^2\right)^{3/2}}$$

$$\downarrow 2715$$

$$\frac{x(a+b\arcsin(cx))^2}{3\pi\left(\pi-\pi c^2x^2\right)^{3/2}}$$

$$\downarrow 2838$$

$$\frac{x(a+b\arcsin(cx))^2}{3\pi\left(\pi-\pi c^2x^2\right)^{3/2}}$$

$$\downarrow 5182$$

$$\frac{x(a+b\arcsin(cx))^2}{3\pi\left(\pi-\pi c^2x^2\right)^{3/2}}$$

$$\downarrow 208$$

$$\frac{x(a+b\arcsin(cx))^2}{3\pi\left(\pi-\pi c^2x^2\right)^{3/2}}-\frac{2bc\left(\frac{a+b\arcsin(cx)}{2c^2(1-c^2x^2)}-\frac{bx}{2c\sqrt{1-c^2x^2}}\right)}{3\pi^{5/2}}$$

input
```
Int[(a + b*ArcSin[c*x])^2/(Pi - c^2*Pi*x^2)^(5/2),x]
```

output
```
(x*(a + b*ArcSin[c*x])^2)/(3*Pi*(Pi - c^2*Pi*x^2)^(3/2)) - (2*b*c*(-1/2*(b
*x)/(c*Sqrt[1 - c^2*x^2]) + (a + b*ArcSin[c*x])/(2*c^2*(1 - c^2*x^2))))/(3
*Pi^(5/2)) + (2*((x*(a + b*ArcSin[c*x])^2)/(Pi*Sqrt[Pi - c^2*Pi*x^2]) - (2
*b*(((I/2)*(a + b*ArcSin[c*x])^2)/b - (2*I)*((-1/2*I)*(a + b*ArcSin[c*x])*
Log[1 + E^((2*I)*ArcSin[c*x])] - (b*PolyLog[2, -E^((2*I)*ArcSin[c*x])])/4)
))/(c*Pi^(3/2))))/(3*Pi)
```

Defintions of rubi rules used

rule 208
```
Int[((a_) + (b_.)*(x_)^2)^(-3/2), x_Symbol] :> Simp[x/(a*Sqrt[a + b*x^2]),
x] /; FreeQ[{a, b}, x]
```

rule 2620
```
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/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[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 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[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 2838
```
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 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4202
```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[I
*((c + d*x)^(m + 1)/(d*(m + 1))), x] - Simp[2*I  Int[(c + d*x)^m*(E^(2*I*(
e + f*x))/(1 + E^(2*I*(e + f*x)))), x], x] /; FreeQ[{c, d, e, f}, x] && IGt
Q[m, 0]
```

rule 5160
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2)^(3/2), x
_Symbol] :> Simp[x*((a + b*ArcSin[c*x])^n/(d*Sqrt[d + e*x^2])), x] - Simp[b
*c*(n/d)*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]   Int[x*((a + b*ArcSin[c*x
])^(n - 1)/(1 - c^2*x^2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d
 + e, 0] && GtQ[n, 0]
```

rule 5162
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_), x_
Symbol] :> Simp[(-x)*(d + e*x^2)^(p + 1)*((a + b*ArcSin[c*x])^n/(2*d*(p + 1
))), x] + (Simp[(2*p + 3)/(2*d*(p + 1))   Int[(d + e*x^2)^(p + 1)*(a + b*Ar
cSin[c*x])^n, x], x] + Simp[b*c*(n/(2*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2
*x^2)^p]   Int[x*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x
]) /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && LtQ[p,
 -1] && NeQ[p, -3/2]
```

rule 5180
```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_))/((d_) + (e_.)*(x_)^2),
x_Symbol] :> Simp[-e^(-1)   Subst[Int[(a + b*x)^n*Tan[x], x], x, ArcSin[c*x
]], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[n, 0]
```

rule 5182
```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [B] (verified)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 1621 vs. $2(204) = 408$.

Time = 0.30 (sec) , antiderivative size = 1622, normalized size of antiderivative = 7.51

method	result	size
default	Expression too large to display	1622
parts	Expression too large to display	1622

input
```
int((a+b*arcsin(c*x))^2/(-Pi*c^2*x^2+Pi)^(5/2),x,method=_RETURNVERBOSE)
```

output
```
a^2*(1/3/Pi*x/(-Pi*c^2*x^2+Pi)^(3/2)+2/3/Pi^2*x/(-Pi*c^2*x^2+Pi)^(1/2))-4/
3*b^2/Pi^(5/2)/(3*c^4*x^4-7*c^2*x^2+4)/(c^2*x^2-1)*(-c^2*x^2+1)^(1/2)*x+4/
3*b^2/Pi^(5/2)/(3*c^4*x^4-7*c^2*x^2+4)/(c^2*x^2-1)/c*arcsin(c*x)-4/3*I*b^2
/Pi^(5/2)/(3*c^4*x^4-7*c^2*x^2+4)/(c^2*x^2-1)/c+4/3*b^2/c/Pi^(5/2)*arcsin(
c*x)*ln(1+(I*c*x+(-c^2*x^2+1)^(1/2))^2)-4/3*I*b^2/c/Pi^(5/2)*arcsin(c*x)^2
-1/3*a*b/c/Pi^(5/2)*(-2*ln(-c^2*x^2+1)*x^4*c^4+4*(-c^2*x^2+1)^(1/2)*arcsin
(c*x)*x^3*c^3+4*ln(-c^2*x^2+1)*x^2*c^2-6*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c*
x-c^2*x^2-2*ln(-c^2*x^2+1)+1)/(c^2*x^2-1)^2+3*b^2/Pi^(5/2)/(3*c^4*x^4-7*c^
2*x^2+4)/(c^2*x^2-1)*c*(-c^2*x^2+1)*arcsin(c*x)*x^2+17/3*b^2/Pi^(5/2)/(3*c
^4*x^4-7*c^2*x^2+4)/(c^2*x^2-1)*c^2*(-c^2*x^2+1)^(1/2)*arcsin(c*x)^2*x^3-2
*b^2/Pi^(5/2)/(3*c^4*x^4-7*c^2*x^2+4)/(c^2*x^2-1)*c^4*(-c^2*x^2+1)^(1/2)*a
rcsin(c*x)^2*x^5+4/3*b^2/Pi^(5/2)/(3*c^4*x^4-7*c^2*x^2+4)/(c^2*x^2-1)*c^5*
(-c^2*x^2+1)*arcsin(c*x)*x^6-4*b^2/Pi^(5/2)/(3*c^4*x^4-7*c^2*x^2+4)/(c^2*x
^2-1)*c^3*(-c^2*x^2+1)*arcsin(c*x)*x^4-I*b^2/Pi^(5/2)/(3*c^4*x^4-7*c^2*x^2
+4)/(c^2*x^2-1)*c*(-c^2*x^2+1)*x^2+22/3*I*b^2/Pi^(5/2)/(3*c^4*x^4-7*c^2*x^
2+4)/(c^2*x^2-1)*c*arcsin(c*x)^2*x^2+5/3*I*b^2/Pi^(5/2)/(3*c^4*x^4-7*c^2*x
^2+4)/(c^2*x^2-1)*c^3*(-c^2*x^2+1)*x^4-20/3*I*b^2/Pi^(5/2)/(3*c^4*x^4-7*c^
2*x^2+4)/(c^2*x^2-1)*c^3*arcsin(c*x)^2*x^4-2/3*I*b^2/Pi^(5/2)/(3*c^4*x^4-7
*c^2*x^2+4)/(c^2*x^2-1)*c^5*(-c^2*x^2+1)*x^6+2*I*b^2/Pi^(5/2)/(3*c^4*x^4-7
*c^2*x^2+4)/(c^2*x^2-1)*c^5*arcsin(c*x)^2*x^6-2/3*I*b^2*polylog(2,-(I*c...
```

Fricas [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{5/2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(\pi-\pi c^2x^2)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-pi*c^2*x^2+pi)^(5/2),x, algorithm="fricas"
)
```

output
```
integral(-sqrt(pi - pi*c^2*x^2)*(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a
^2)/(pi^3*c^6*x^6 - 3*pi^3*c^4*x^4 + 3*pi^3*c^2*x^2 - pi^3), x)
```

Sympy [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{5/2}}\,dx = \frac{\int \frac{a^2}{c^4x^4\sqrt{-c^2x^2+1}-2c^2x^2\sqrt{-c^2x^2+1}+\sqrt{-c^2x^2+1}}\,dx + \int \frac{b^2\operatorname{asin}^2(cx)}{c^4x^4\sqrt{-c^2x^2+1}-2c^2x^2\sqrt{-c^2x^2+1}+\sqrt{-c^2x^2+1}}}{\pi^{\frac{5}{2}}}$$

input
```
integrate((a+b*asin(c*x))**2/(-pi*c**2*x**2+pi)**(5/2),x)
```

output
```
(Integral(a**2/(c**4*x**4*sqrt(-c**2*x**2 + 1) - 2*c**2*x**2*sqrt(-c**2*x**
*2 + 1) + sqrt(-c**2*x**2 + 1)), x) + Integral(b**2*asin(c*x)**2/(c**4*x**
4*sqrt(-c**2*x**2 + 1) - 2*c**2*x**2*sqrt(-c**2*x**2 + 1) + sqrt(-c**2*x**
2 + 1)), x) + Integral(2*a*b*asin(c*x)/(c**4*x**4*sqrt(-c**2*x**2 + 1) - 2
*c**2*x**2*sqrt(-c**2*x**2 + 1) + sqrt(-c**2*x**2 + 1)), x))/pi**(5/2)
```

Maxima [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{5/2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(\pi-\pi c^2x^2)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-pi*c^2*x^2+pi)^(5/2),x, algorithm="maxima"
)
```

output
```
1/3*a*b*c*(1/(pi^(5/2)*c^4*x^2 - pi^(5/2)*c^2) + 2*log(c*x + 1)/(pi^(5/2)*
c^2) + 2*log(c*x - 1)/(pi^(5/2)*c^2)) + 2/3*a*b*(x/(pi*(pi - pi*c^2*x^2)^(
3/2)) + 2*x/(pi^2*sqrt(pi - pi*c^2*x^2)))*arcsin(c*x) + 1/3*a^2*(x/(pi*(pi
 - pi*c^2*x^2)^(3/2)) + 2*x/(pi^2*sqrt(pi - pi*c^2*x^2))) + b^2*integrate(
arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2/((pi^2*c^4*x^4 - 2*pi^2*c^2*x
^2 + pi^2)*sqrt(c*x + 1)*sqrt(-c*x + 1)), x)/sqrt(pi)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{5/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(-pi*c^2*x^2+pi)^(5/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{5/2}}\,dx = \int \frac{(a+b\,\mathrm{asin}(c\,x))^2}{(\Pi-\Pi\,c^2\,x^2)^{5/2}}\,dx$$

input
```
int((a + b*asin(c*x))^2/(Pi - Pi*c^2*x^2)^(5/2),x)
```

output
```
int((a + b*asin(c*x))^2/(Pi - Pi*c^2*x^2)^(5/2), x)
```

Reduce [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(\pi-c^2\pi x^2)^{5/2}}\,dx = \frac{6\sqrt{-c^2x^2+1}\left(\int \frac{asin(cx)}{\sqrt{-c^2x^2+1}\,c^4x^4-2\sqrt{-c^2x^2+1}\,c^2x^2+\sqrt{-c^2x^2+1}}dx\right)ab\,c^2x^2-6\sqrt{-c^2x^2}$$

input
```
int((a+b*asin(c*x))^2/(-Pi*c^2*x^2+Pi)^(5/2),x)
```

output

```
(6*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**4*x**4
- 2*sqrt( - c**2*x**2 + 1)*c**2*x**2 + sqrt( - c**2*x**2 + 1)),x)*a*b*c**2
*x**2 - 6*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**
4*x**4 - 2*sqrt( - c**2*x**2 + 1)*c**2*x**2 + sqrt( - c**2*x**2 + 1)),x)*a
*b + 3*sqrt( - c**2*x**2 + 1)*int(asin(c*x)**2/(sqrt( - c**2*x**2 + 1)*c**
4*x**4 - 2*sqrt( - c**2*x**2 + 1)*c**2*x**2 + sqrt( - c**2*x**2 + 1)),x)*b
**2*c**2*x**2 - 3*sqrt( - c**2*x**2 + 1)*int(asin(c*x)**2/(sqrt( - c**2*x*
*2 + 1)*c**4*x**4 - 2*sqrt( - c**2*x**2 + 1)*c**2*x**2 + sqrt( - c**2*x**2
 + 1)),x)*b**2 + 2*a**2*c**2*x**3 - 3*a**2*x)/(3*sqrt(pi)*sqrt( - c**2*x**
2 + 1)*pi**2*(c**2*x**2 - 1))
```

3.49 $\int \sqrt{1-x^2}\arcsin(x)\,dx$

Optimal result . . . 451
Mathematica [A] (verified) . . . 451
Rubi [A] (verified) . . . 452
Maple [A] (verified) . . . 453
Fricas [A] (verification not implemented) . . . 453
Sympy [A] (verification not implemented) . . . 454
Maxima [A] (verification not implemented) . . . 454
Giac [A] (verification not implemented) . . . 454
Mupad [F(-1)] . . . 455
Reduce [F] . . . 455

Optimal result

Integrand size = 14, antiderivative size = 34

$$\int \sqrt{1-x^2}\arcsin(x)\,dx = -\frac{x^2}{4} + \frac{1}{2}x\sqrt{1-x^2}\arcsin(x) + \frac{\arcsin(x)^2}{4}$$

output
```
-1/4*x^2+1/2*x*(-x^2+1)^(1/2)*arcsin(x)+1/4*arcsin(x)^2
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.88

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

input
```
Integrate[Sqrt[1 - x^2]*ArcSin[x],x]
```

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

Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.214$, Rules used = {5156, 15, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{1-x^2}\arcsin(x)\,dx$$

$$\downarrow 5156$$

$$\frac{1}{2}\int \frac{\arcsin(x)}{\sqrt{1-x^2}}dx - \frac{\int x dx}{2} + \frac{1}{2}x\sqrt{1-x^2}\arcsin(x)$$

$$\downarrow 15$$

$$\frac{1}{2}\int \frac{\arcsin(x)}{\sqrt{1-x^2}}dx + \frac{1}{2}\sqrt{1-x^2}x\arcsin(x) - \frac{x^2}{4}$$

$$\downarrow 5152$$

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

input
```
Int[Sqrt[1 - x^2]*ArcSin[x],x]
```

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

Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156

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

Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

method	result	size
default	$\frac{\arcsin(x)\left(\sqrt{-x^2+1}\,x+\arcsin(x)\right)}{2}-\frac{\arcsin(x)^2}{4}-\frac{x^2}{4}$	31

input

```
int((-x^2+1)^(1/2)*arcsin(x),x,method=_RETURNVERBOSE)
```

output

```
1/2*arcsin(x)*((-x^2+1)^(1/2)*x+arcsin(x))-1/4*arcsin(x)^2-1/4*x^2
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.76

$$\int \sqrt{1-x^2}\arcsin(x)\,dx = \frac{1}{2}\sqrt{-x^2+1}x\arcsin(x) - \frac{1}{4}x^2 + \frac{1}{4}\arcsin(x)^2$$

input

```
integrate((-x^2+1)^(1/2)*arcsin(x),x, algorithm="fricas")
```

output

```
1/2*sqrt(-x^2 + 1)*x*arcsin(x) - 1/4*x^2 + 1/4*arcsin(x)^2
```

Sympy [A] (verification not implemented)

Time = 0.70 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

$$\int \sqrt{1-x^2}\arcsin(x)\,dx = -\frac{x^2}{4} + \left(\frac{x\sqrt{1-x^2}}{2} + \frac{\operatorname{asin}(x)}{2}\right)\operatorname{asin}(x) - \frac{\operatorname{asin}^2(x)}{4}$$

input
```
integrate((-x**2+1)**(1/2)*asin(x),x)
```

output
```
-x**2/4 + (x*sqrt(1 - x**2)/2 + asin(x)/2)*asin(x) - asin(x)**2/4
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.88

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

input
```
integrate((-x^2+1)^(1/2)*arcsin(x),x, algorithm="maxima")
```

output
```
-1/4*x^2 + 1/2*(sqrt(-x^2 + 1)*x + arcsin(x))*arcsin(x) - 1/4*arcsin(x)^2
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int \sqrt{1-x^2}\arcsin(x)\,dx = \frac{1}{2}\sqrt{-x^2+1}x\arcsin(x) - \frac{1}{4}x^2 + \frac{1}{4}\arcsin(x)^2 + \frac{1}{8}$$

input
```
integrate((-x^2+1)^(1/2)*arcsin(x),x, algorithm="giac")
```

output
```
1/2*sqrt(-x^2 + 1)*x*arcsin(x) - 1/4*x^2 + 1/4*arcsin(x)^2 + 1/8
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{1-x^2}\,\arcsin(x)\,dx = \int \operatorname{asin}(x)\,\sqrt{1-x^2}\,dx$$

input
```
int(asin(x)*(1 - x^2)^(1/2),x)
```

output
```
int(asin(x)*(1 - x^2)^(1/2), x)
```

Reduce [F]

$$\int \sqrt{1-x^2}\,\arcsin(x)\,dx = \int \sqrt{-x^2+1}\,asin(x)\,dx$$

input
```
int((-x^2+1)^(1/2)*asin(x),x)
```

output
```
int(sqrt( - x**2 + 1)*asin(x),x)
```

3.50 $\int \frac{1}{\sqrt{1-a^2x^2}\arcsin(ax)^3}\,dx$

Optimal result 456
Mathematica [A] (verified) 456
Rubi [A] (verified) 457
Maple [A] (verified) 457
Fricas [A] (verification not implemented) 458
Sympy [A] (verification not implemented) 458
Maxima [A] (verification not implemented) 459
Giac [A] (verification not implemented) 459
Mupad [B] (verification not implemented) 459
Reduce [B] (verification not implemented) 460

Optimal result

Integrand size = 21, antiderivative size = 13

$$\int \frac{1}{\sqrt{1-a^2x^2}\arcsin(ax)^3}\,dx = -\frac{1}{2a\arcsin(ax)^2}$$

output

```
-1/2/a/arcsin(a*x)^2
```

Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{1-a^2x^2}\arcsin(ax)^3}\,dx = -\frac{1}{2a\arcsin(ax)^2}$$

input

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

output

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

Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.048$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\sqrt{1-a^2x^2}\arcsin(ax)^3}\,dx$$
$$\downarrow 5152$$
$$-\frac{1}{2a\arcsin(ax)^2}$$

input
```
Int[1/(Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3),x]
```

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

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

method	result	size
derivativedivides	$-\frac{1}{2a\arcsin(ax)^2}$	12
default	$-\frac{1}{2a\arcsin(ax)^2}$	12

input
```
int(1/(-a^2*x^2+1)^(1/2)/arcsin(a*x)^3,x,method=_RETURNVERBOSE)
```

output
```
-1/2/a/arcsin(a*x)^2
```

Fricas [A] (verification not implemented)

Time = 0.08 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

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

input
```
integrate(1/(-a^2*x^2+1)^(1/2)/arcsin(a*x)^3,x, algorithm="fricas")
```

output
```
-1/2/(a*arcsin(a*x)^2)
```

Sympy [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.92

$$\int \frac{1}{\sqrt{1-a^2x^2}\arcsin(ax)^3}\,dx = -\frac{1}{2a\,\mathrm{asin}^2\left(ax\right)}$$

input
```
integrate(1/(-a**2*x**2+1)**(1/2)/asin(a*x)**3,x)
```

output
```
-1/(2*a*asin(a*x)**2)
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{1}{\sqrt{1-a^2x^2}\arcsin(ax)^3}\,dx = -\frac{1}{2\,a\arcsin(ax)^2}$$

input
```
integrate(1/(-a^2*x^2+1)^(1/2)/arcsin(a*x)^3,x, algorithm="maxima")
```

output
```
-1/2/(a*arcsin(a*x)^2)
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{1}{\sqrt{1-a^2x^2}\arcsin(ax)^3}\,dx = -\frac{1}{2\,a\arcsin(ax)^2}$$

input
```
integrate(1/(-a^2*x^2+1)^(1/2)/arcsin(a*x)^3,x, algorithm="giac")
```

output
```
-1/2/(a*arcsin(a*x)^2)
```

Mupad [B] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{1}{\sqrt{1-a^2x^2}\arcsin(ax)^3}\,dx = -\frac{1}{2\,a\,\mathrm{asin}(a\,x)^2}$$

input
```
int(1/(asin(a*x)^3*(1 - a^2*x^2)^(1/2)),x)
```

output
```
-1/(2*a*asin(a*x)^2)
```

Reduce [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.85

$$\int \frac{1}{\sqrt{1-a^2x^2}\arcsin(ax)^3}\,dx = -\frac{1}{2asin\left(ax\right)^2 a}$$

input
```
int(1/(-a^2*x^2+1)^(1/2)/asin(a*x)^3,x)
```

output
```
( - 1)/(2*asin(a*x)**2*a)
```

3.51 $\int (d-c^2dx^2)^{5/2}(a+b\arcsin(cx))\,dx$

Optimal result . . . 461
Mathematica [A] (verified) . . . 462
Rubi [A] (verified) . . . 462
Maple [C] (verified) . . . 465
Fricas [F] . . . 466
Sympy [F(-1)] . . . 466
Maxima [F] . . . 467
Giac [F(-2)] . . . 467
Mupad [F(-1)] . . . 467
Reduce [F] . . . 468

Optimal result

Integrand size = 24, antiderivative size = 262

$$\int (d-c^2dx^2)^{5/2}(a+b\arcsin(cx))\,dx = -\frac{5bcd^2x^2\sqrt{d-c^2dx^2}}{32\sqrt{1-c^2x^2}}$$
$$+\frac{5bd^2(1-c^2x^2)^{3/2}\sqrt{d-c^2dx^2}}{96c}+\frac{bd^2(1-c^2x^2)^{5/2}\sqrt{d-c^2dx^2}}{36c}$$
$$+\frac{5}{16}d^2x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))+\frac{5}{24}dx\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))+\frac{1}{6}x\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin($$

output

```
-5/32*b*c*d^2*x^2*(-c^2*d*x^2+d)^(1/2)/(-c^2*x^2+1)^(1/2)+5/96*b*d^2*(-c^2
*x^2+1)^(3/2)*(-c^2*d*x^2+d)^(1/2)/c+1/36*b*d^2*(-c^2*x^2+1)^(5/2)*(-c^2*d
*x^2+d)^(1/2)/c+5/16*d^2*x*(-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x))+5/24*d*x
*(-c^2*d*x^2+d)^(3/2)*(a+b*arcsin(c*x))+1/6*x*(-c^2*d*x^2+d)^(5/2)*(a+b*ar
csin(c*x))+5/32*d^2*(-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2/b/c/(-c^2*x^2
+1)^(1/2)
```

Mathematica [A] (verified)

Time = 0.71 (sec) , antiderivative size = 266, normalized size of antiderivative = 1.02

$$\int \left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))\,dx = \frac{d^2\left(360b\sqrt{d-c^2dx^2}\arcsin(cx)^2-720a\sqrt{d}\sqrt{1-c^2x^2}\arctan\left(\frac{cx\sqrt{d-c^2dx^2}}{\sqrt{d}(-1+c^2x^2)}\right)+\sqrt{d-c^2d}\right.$$

input
```
Integrate[(d - c^2*d*x^2)^(5/2)*(a + b*ArcSin[c*x]),x]
```

output
```
(d^2*(360*b*Sqrt[d - c^2*d*x^2]*ArcSin[c*x]^2 - 720*a*Sqrt[d]*Sqrt[1 - c^2
*x^2]*ArcTan[(c*x*Sqrt[d - c^2*d*x^2])/(Sqrt[d]*(-1 + c^2*x^2))] + Sqrt[d
- c^2*d*x^2]*(1584*a*c*x*Sqrt[1 - c^2*x^2] - 1248*a*c^3*x^3*Sqrt[1 - c^2*x
^2] + 384*a*c^5*x^5*Sqrt[1 - c^2*x^2] + 270*b*Cos[2*ArcSin[c*x]] + 27*b*Co
s[4*ArcSin[c*x]] + 2*b*Cos[6*ArcSin[c*x]]) + 12*b*Sqrt[d - c^2*d*x^2]*ArcS
in[c*x]*(45*Sin[2*ArcSin[c*x]] + 9*Sin[4*ArcSin[c*x]] + Sin[6*ArcSin[c*x]]
)))/(2304*c*Sqrt[1 - c^2*x^2])
```

Rubi [A] (verified)

Time = 0.83 (sec) , antiderivative size = 278, normalized size of antiderivative = 1.06, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {5158, 241, 5158, 244, 2009, 5156, 15, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))\,dx$$

$$\downarrow \text{5158}$$

$$\frac{5}{6}d\int \left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))dx-\frac{bcd^2\sqrt{d-c^2dx^2}\int x\left(1-c^2x^2\right)^2dx}{6\sqrt{1-c^2x^2}}+\frac{1}{6}x\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))$$

$$\downarrow \text{241}$$

$$\frac{5}{6}d\int \left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))dx+\frac{1}{6}x\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))+\frac{bd^2\left(1-c^2x^2\right)^{5/2}\sqrt{d-c^2dx^2}}{36c}$$

$$\downarrow 5158$$

$$\frac{5}{6}d\left(\frac{3}{4}d\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))dx-\frac{bcd\sqrt{d-c^2dx^2}\int x\left(1-c^2x^2\right)dx}{4\sqrt{1-c^2x^2}}+\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin\right.$$
$$\left.\frac{1}{6}x\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))+\frac{bd^2\left(1-c^2x^2\right)^{5/2}\sqrt{d-c^2dx^2}}{36c}\right)$$

$$\downarrow 244$$

$$\frac{5}{6}d\left(\frac{3}{4}d\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))dx-\frac{bcd\sqrt{d-c^2dx^2}\int \left(x-c^2x^3\right)dx}{4\sqrt{1-c^2x^2}}+\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(\right.$$
$$\left.\frac{1}{6}x\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))+\frac{bd^2\left(1-c^2x^2\right)^{5/2}\sqrt{d-c^2dx^2}}{36c}\right)$$

$$\downarrow 2009$$

$$\frac{5}{6}d\left(\frac{3}{4}d\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))dx+\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))-\frac{bcd\left(\frac{x^2}{2}-\frac{c^2x^4}{4}\right)\sqrt{d-c^2dx^2}}{4\sqrt{1-c^2x^2}}\right.$$
$$\left.\frac{1}{6}x\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))+\frac{bd^2\left(1-c^2x^2\right)^{5/2}\sqrt{d-c^2dx^2}}{36c}\right)$$

$$\downarrow 5156$$

$$\frac{5}{6}d\left(\frac{3}{4}d\left(\frac{\sqrt{d-c^2dx^2}\int \frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}}-\frac{bc\sqrt{d-c^2dx^2}\int xdx}{2\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))\right)+\frac{1}{4}x\left(d-c\right.\right.$$
$$\left.\left.\frac{1}{6}x\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))+\frac{bd^2\left(1-c^2x^2\right)^{5/2}\sqrt{d-c^2dx^2}}{36c}\right)\right.$$

$$\downarrow 15$$

$$\frac{5}{6}d\left(\frac{3}{4}d\left(\frac{\sqrt{d-c^2dx^2}\int \frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))-\frac{bcx^2\sqrt{d-c^2dx^2}}{4\sqrt{1-c^2x^2}}\right)+\frac{1}{4}x\left(d-c^2dx^2\right.\right.$$
$$\left.\left.\frac{1}{6}x\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))+\frac{bd^2\left(1-c^2x^2\right)^{5/2}\sqrt{d-c^2dx^2}}{36c}\right)\right.$$

$$\downarrow 5152$$

$$\frac{1}{6}x\left(d-c^2dx^2\right)^{5/2}\left(a+b\arcsin(cx)\right)+$$

$$\frac{5}{6}d\left(\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)+\frac{3}{4}d\left(\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))+\frac{\sqrt{d-c^2dx^2}(a+b\arcsin(cx)}{4bc\sqrt{1-c^2x^2}}\right.\right.$$

$$\left.\left.\frac{bd^2\left(1-c^2x^2\right)^{5/2}\sqrt{d-c^2dx^2}}{36c}\right.\right.$$

input
```
Int[(d - c^2*d*x^2)^(5/2)*(a + b*ArcSin[c*x]),x]
```

output
```
(b*d^2*(1 - c^2*x^2)^(5/2)*Sqrt[d - c^2*d*x^2])/(36*c) + (x*(d - c^2*d*x^2
)^(5/2)*(a + b*ArcSin[c*x]))/6 + (5*d*(-1/4*(b*c*d*Sqrt[d - c^2*d*x^2]*(x^
2/2 - (c^2*x^4)/4))/Sqrt[1 - c^2*x^2] + (x*(d - c^2*d*x^2)^(3/2)*(a + b*Ar
cSin[c*x]))/4 + (3*d*(-1/4*(b*c*x^2*Sqrt[d - c^2*d*x^2])/Sqrt[1 - c^2*x^2]
 + (x*Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x]))/2 + (Sqrt[d - c^2*d*x^2]*(a
 + b*ArcSin[c*x])^2)/(4*b*c*Sqrt[1 - c^2*x^2])))/4))/6
```

Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 241
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(a + b*x^2)^(p + 1)/
(2*b*(p + 1)), x] /; FreeQ[{a, b, p}, x] && NeQ[p, -1]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

rule 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.35 (sec) , antiderivative size = 691, normalized size of antiderivative = 2.64

method	result
default	$\frac{ax\left(-c^2dx^2+d\right)^{\frac{5}{2}}}{6}+\frac{5adx\left(-c^2dx^2+d\right)^{\frac{3}{2}}}{24}+\frac{5ad^2x\sqrt{-c^2dx^2+d}}{16}+\frac{5ad^3\arctan\left(\frac{\sqrt{c^2d}x}{\sqrt{-c^2dx^2+d}}\right)}{16\sqrt{c^2d}}+b\left(-\frac{5\sqrt{-d(c^2x^2-1)}\sqrt{-}\right.$
parts	$\frac{ax\left(-c^2dx^2+d\right)^{\frac{5}{2}}}{6}+\frac{5adx\left(-c^2dx^2+d\right)^{\frac{3}{2}}}{24}+\frac{5ad^2x\sqrt{-c^2dx^2+d}}{16}+\frac{5ad^3\arctan\left(\frac{\sqrt{c^2d}x}{\sqrt{-c^2dx^2+d}}\right)}{16\sqrt{c^2d}}+b\left(-\frac{5\sqrt{-d(c^2x^2-1)}\sqrt{-}\right.$

input
```
int((-c^2*d*x^2+d)^(5/2)*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
1/6*a*x*(-c^2*d*x^2+d)^(5/2)+5/24*a*d*x*(-c^2*d*x^2+d)^(3/2)+5/16*a*d^2*x*
(-c^2*d*x^2+d)^(1/2)+5/16*a*d^3/(c^2*d)^(1/2)*arctan((c^2*d)^(1/2)*x/(-c^2
*d*x^2+d)^(1/2))+b*(-5/32*(-d*(c^2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/c/(c^2
*x^2-1)*arcsin(c*x)^2*d^2+1/2304*(-d*(c^2*x^2-1))^(1/2)*(-32*I*(-c^2*x^2+1
)^(1/2)*x^6*c^6+32*c^7*x^7+48*I*(-c^2*x^2+1)^(1/2)*x^4*c^4-64*c^5*x^5-18*I
*(-c^2*x^2+1)^(1/2)*x^2*c^2+38*c^3*x^3+I*(-c^2*x^2+1)^(1/2)-6*c*x)*(I+6*ar
csin(c*x))*d^2/c/(c^2*x^2-1)+15/256*(-d*(c^2*x^2-1))^(1/2)*(2*I*(-c^2*x^2+
1)^(1/2)*x^2*c^2+2*c^3*x^3-I*(-c^2*x^2+1)^(1/2)-2*c*x)*(-I+2*arcsin(c*x))*
d^2/c/(c^2*x^2-1)-1/4608*(-d*(c^2*x^2-1))^(1/2)*(I*c^2*x^2-c*x*(-c^2*x^2+1
)^(1/2)-I)*(29*I+96*arcsin(c*x))*cos(5*arcsin(c*x))*d^2/c/(c^2*x^2-1)+5/46
08*(-d*(c^2*x^2-1))^(1/2)*(I*(-c^2*x^2+1)^(1/2)*c*x+c^2*x^2-1)*(5*I+24*arc
sin(c*x))*sin(5*arcsin(c*x))*d^2/c/(c^2*x^2-1)-3/512*(-d*(c^2*x^2-1))^(1/2
)*(I*c^2*x^2-c*x*(-c^2*x^2+1)^(1/2)-I)*(11*I+16*arcsin(c*x))*cos(3*arcsin(
c*x))*d^2/c/(c^2*x^2-1)+9/512*(-d*(c^2*x^2-1))^(1/2)*(I*(-c^2*x^2+1)^(1/2)
*c*x+c^2*x^2-1)*(3*I+8*arcsin(c*x))*sin(3*arcsin(c*x))*d^2/c/(c^2*x^2-1))
```

Fricas [F]

$$\int \left(d - c^2 dx^2\right)^{5/2} \left(a + b \arcsin(cx)\right) dx = \int \left(-c^2 dx^2 + d\right)^{\frac{5}{2}} \left(b \arcsin\left(cx\right) + a\right) dx$$

input
```
integrate((-c^2*d*x^2+d)^(5/2)*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral((a*c^4*d^2*x^4 - 2*a*c^2*d^2*x^2 + a*d^2 + (b*c^4*d^2*x^4 - 2*b*c
^2*d^2*x^2 + b*d^2)*arcsin(c*x))*sqrt(-c^2*d*x^2 + d), x)
```

Sympy [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right)^{5/2} \left(a + b \arcsin(cx)\right) dx = \text{Timed out}$$

input
```
integrate((-c**2*d*x**2+d)**(5/2)*(a+b*asin(c*x)),x)
```

output
```
Timed out
```

Maxima [F]

$$\int \left(d - c^2 dx^2\right)^{5/2} \left(a + b \arcsin(cx)\right) dx = \int \left(-c^2 dx^2 + d\right)^{\frac{5}{2}} \left(b \arcsin\left(cx\right) + a\right) dx$$

input
```
integrate((-c^2*d*x^2+d)^(5/2)*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
b*sqrt(d)*integrate((c^4*d^2*x^4 - 2*c^2*d^2*x^2 + d^2)*sqrt(c*x + 1)*sqrt
(-c*x + 1)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)), x) + 1/48*(8*(-c^2*
d*x^2 + d)^(5/2)*x + 10*(-c^2*d*x^2 + d)^(3/2)*d*x + 15*sqrt(-c^2*d*x^2 +
d)*d^2*x + 15*d^(5/2)*arcsin(c*x)/c)*a
```

Giac [F(-2)]

Exception generated.

$$\int \left(d - c^2 dx^2\right)^{5/2} \left(a + b \arcsin(cx)\right) dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)^(5/2)*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right)^{5/2} \left(a + b \arcsin(cx)\right) dx = \int \left(a + b \operatorname{asin}(c\,x)\right) \left(d - c^2\,d\,x^2\right)^{5/2} dx$$

input
```
int((a + b*asin(c*x))*(d - c^2*d*x^2)^(5/2),x)
```

output
```
int((a + b*asin(c*x))*(d - c^2*d*x^2)^(5/2), x)
```

Reduce [F]

$$\int \left(d - c^2 d x^2\right)^{5/2} (a + b \arcsin(cx))\, dx = \frac{\sqrt{d}\, d^2 \left(15 asin(cx)\, a + 8\sqrt{-c^2x^2+1}\, a\, c^5 x^5 - 26\sqrt{-c^2x^2+1}\, a\, c^3 x^3 + 33\sqrt{-c^2x^2+1}\, ac\right.$$

input
```
int((-c^2*d*x^2+d)^(5/2)*(a+b*asin(c*x)),x)
```

output
```
(sqrt(d)*d**2*(15*asin(c*x)*a + 8*sqrt( - c**2*x**2 + 1)*a*c**5*x**5 - 26*
sqrt( - c**2*x**2 + 1)*a*c**3*x**3 + 33*sqrt( - c**2*x**2 + 1)*a*c*x + 48*
int(sqrt( - c**2*x**2 + 1)*asin(c*x)*x**4,x)*b*c**5 - 96*int(sqrt( - c**2*
x**2 + 1)*asin(c*x)*x**2,x)*b*c**3 + 48*int(sqrt( - c**2*x**2 + 1)*asin(c*
x),x)*b*c))/(48*c)
```

3.52 $\int (d - c^2 dx^2)^{3/2} (a + b \arcsin(cx))\, dx$

Optimal result . . . 469
Mathematica [A] (verified) . . . 470
Rubi [A] (verified) . . . 470
Maple [C] (verified) . . . 473
Fricas [F] . . . 474
Sympy [F] . . . 474
Maxima [F] . . . 474
Giac [F(-2)] . . . 475
Mupad [F(-1)] . . . 475
Reduce [F] . . . 475

Optimal result

Integrand size = 24, antiderivative size = 185

$$\int (d - c^2 dx^2)^{3/2} (a + b \arcsin(cx))\, dx = -\frac{3bcdx^2\sqrt{d - c^2dx^2}}{16\sqrt{1 - c^2x^2}} + \frac{bd(1 - c^2x^2)^{3/2}\sqrt{d - c^2dx^2}}{16c} + \frac{3}{8}dx\sqrt{d - c^2dx^2}(a + b \arcsin(cx)) + \frac{1}{4}x(d - c^2dx^2)^{3/2}(a + b \arcsin(cx)) + \frac{3d\sqrt{d - c^2dx^2}(a + b \arcsin(cx))^2}{16bc\sqrt{1 - c^2x^2}}$$

output

```
-3/16*b*c*d*x^2*(-c^2*d*x^2+d)^(1/2)/(-c^2*x^2+1)^(1/2)+1/16*b*d*(-c^2*x^2
+1)^(3/2)*(-c^2*d*x^2+d)^(1/2)/c+3/8*d*x*(-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(
c*x))+1/4*x*(-c^2*d*x^2+d)^(3/2)*(a+b*arcsin(c*x))+3/16*d*(-c^2*d*x^2+d)^(
1/2)*(a+b*arcsin(c*x))^2/b/c/(-c^2*x^2+1)^(1/2)
```

Mathematica [A] (verified)

Time = 0.42 (sec) , antiderivative size = 210, normalized size of antiderivative = 1.14

$$\int \left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))\,dx = \frac{24bd\sqrt{d-c^2dx^2}\arcsin(cx)^2-48ad^{3/2}\sqrt{1-c^2x^2}\arctan\left(\frac{cx\sqrt{d-c^2dx^2}}{\sqrt{d}(-1+c^2x^2)}\right)+d\sqrt{d-c^2dx^2}$$

input
```
Integrate[(d - c^2*d*x^2)^(3/2)*(a + b*ArcSin[c*x]),x]
```

output
```
(24*b*d*Sqrt[d - c^2*d*x^2]*ArcSin[c*x]^2 - 48*a*d^(3/2)*Sqrt[1 - c^2*x^2]
*ArcTan[(c*x*Sqrt[d - c^2*d*x^2])/(Sqrt[d]*(-1 + c^2*x^2))] + d*Sqrt[d - c
^2*d*x^2]*(16*a*c*x*(5 - 2*c^2*x^2)*Sqrt[1 - c^2*x^2] + 16*b*Cos[2*ArcSin[
c*x]] + b*Cos[4*ArcSin[c*x]]) + 4*b*d*Sqrt[d - c^2*d*x^2]*ArcSin[c*x]*(8*S
in[2*ArcSin[c*x]] + Sin[4*ArcSin[c*x]]))/(128*c*Sqrt[1 - c^2*x^2])
```

Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 204, normalized size of antiderivative = 1.10, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {5158, 244, 2009, 5156, 15, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))\,dx$$

$$\downarrow 5158$$

$$\frac{3}{4}d\int\sqrt{d-c^2dx^2}(a+b\arcsin(cx))dx-\frac{bcd\sqrt{d-c^2dx^2}\int x\left(1-c^2x^2\right)dx}{4\sqrt{1-c^2x^2}}+\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))$$

$$\downarrow 244$$

$$\frac{3}{4}d\int\sqrt{d-c^2dx^2}(a+b\arcsin(cx))dx-\frac{bcd\sqrt{d-c^2dx^2}\int\left(x-c^2x^3\right)dx}{4\sqrt{1-c^2x^2}}+\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))$$

$$\downarrow 2009$$

$$\frac{3}{4}d\int\sqrt{d-c^2dx^2}(a+b\arcsin(cx))dx+\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))-\frac{bcd\left(\frac{x^2}{2}-\frac{c^2x^4}{4}\right)\sqrt{d-c^2dx^2}}{4\sqrt{1-c^2x^2}}$$

$$\downarrow 5156$$

$$\frac{3}{4}d\left(\frac{\sqrt{d-c^2dx^2}\int\frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}}-\frac{bc\sqrt{d-c^2dx^2}\int xdx}{2\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))\right)+\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))-\frac{bcd\left(\frac{x^2}{2}-\frac{c^2x^4}{4}\right)\sqrt{d-c^2dx^2}}{4\sqrt{1-c^2x^2}}$$

$$\downarrow 15$$

$$\frac{3}{4}d\left(\frac{\sqrt{d-c^2dx^2}\int\frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))-\frac{bcx^2\sqrt{d-c^2dx^2}}{4\sqrt{1-c^2x^2}}\right)+\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))-\frac{bcd\left(\frac{x^2}{2}-\frac{c^2x^4}{4}\right)\sqrt{d-c^2dx^2}}{4\sqrt{1-c^2x^2}}$$

$$\downarrow 5152$$

$$\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))+\frac{3}{4}d\left(\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))+\frac{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}{4bc\sqrt{1-c^2x^2}}-\frac{bcx^2\sqrt{d-c^2dx^2}}{4\sqrt{1-c^2x^2}}\right)-\frac{bcd\left(\frac{x^2}{2}-\frac{c^2x^4}{4}\right)\sqrt{d-c^2dx^2}}{4\sqrt{1-c^2x^2}}$$

input
```
Int[(d - c^2*d*x^2)^(3/2)*(a + b*ArcSin[c*x]),x]
```

output
```
-1/4*(b*c*d*Sqrt[d - c^2*d*x^2]*(x^2/2 - (c^2*x^4)/4))/Sqrt[1 - c^2*x^2] +
 (x*(d - c^2*d*x^2)^(3/2)*(a + b*ArcSin[c*x]))/4 + (3*d*(-1/4*(b*c*x^2*Sqr
t[d - c^2*d*x^2])/Sqrt[1 - c^2*x^2] + (x*Sqrt[d - c^2*d*x^2]*(a + b*ArcSin
[c*x]))/2 + (Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x])^2)/(4*b*c*Sqrt[1 - c^
2*x^2])))/4
```

Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

rule 5158

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

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.22 (sec) , antiderivative size = 480, normalized size of antiderivative = 2.59

method	result
default	$\frac{ax\left(-c^2dx^2+d\right)^{\frac{3}{2}}}{4}+\frac{3adx\sqrt{-c^2dx^2+d}}{8}+\frac{3ad^2\arctan\left(\frac{\sqrt{c^2d}x}{\sqrt{-c^2dx^2+d}}\right)}{8\sqrt{c^2d}}+b\left(-\frac{3\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\arcsin(cx)^2d}{16(c^2x^2-1)c}-\right.$
parts	$\frac{ax\left(-c^2dx^2+d\right)^{\frac{3}{2}}}{4}+\frac{3adx\sqrt{-c^2dx^2+d}}{8}+\frac{3ad^2\arctan\left(\frac{\sqrt{c^2d}x}{\sqrt{-c^2dx^2+d}}\right)}{8\sqrt{c^2d}}+b\left(-\frac{3\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\arcsin(cx)^2d}{16(c^2x^2-1)c}-\right.$

input

```
int((-c^2*d*x^2+d)^(3/2)*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output

```
1/4*a*x*(-c^2*d*x^2+d)^(3/2)+3/8*a*d*x*(-c^2*d*x^2+d)^(1/2)+3/8*a*d^2/(c^2
*d)^(1/2)*arctan((c^2*d)^(1/2)*x/(-c^2*d*x^2+d)^(1/2))+b*(-3/16*(-d*(c^2*x
^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/(c^2*x^2-1)/c*arcsin(c*x)^2*d-1/256*(-d*(c
^2*x^2-1))^(1/2)*(-8*I*(-c^2*x^2+1)^(1/2)*x^4*c^4+8*c^5*x^5+8*I*(-c^2*x^2+
1)^(1/2)*x^2*c^2-12*c^3*x^3-I*(-c^2*x^2+1)^(1/2)+4*c*x)*(I+4*arcsin(c*x))*
d/(c^2*x^2-1)/c+1/16*(-d*(c^2*x^2-1))^(1/2)*(2*I*(-c^2*x^2+1)^(1/2)*x^2*c^
2+2*c^3*x^3-I*(-c^2*x^2+1)^(1/2)-2*c*x)*(-I+2*arcsin(c*x))*d/(c^2*x^2-1)/c
-1/256*(-d*(c^2*x^2-1))^(1/2)*(I*c^2*x^2-c*x*(-c^2*x^2+1)^(1/2)-I)*(17*I+2
8*arcsin(c*x))*cos(3*arcsin(c*x))*d/(c^2*x^2-1)/c+3/256*(-d*(c^2*x^2-1))^(
1/2)*(I*(-c^2*x^2+1)^(1/2)*c*x+c^2*x^2-1)*(5*I+12*arcsin(c*x))*sin(3*arcsi
n(c*x))*d/(c^2*x^2-1)/c)
```

Fricas [F]

$$\int \left(d - c^2 dx^2\right)^{3/2} (a + b \arcsin(cx))\, dx = \int \left(-c^2 dx^2 + d\right)^{\frac{3}{2}} (b \arcsin(cx) + a)\, dx$$

input
```
integrate((-c^2*d*x^2+d)^(3/2)*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(-(a*c^2*d*x^2 - a*d + (b*c^2*d*x^2 - b*d)*arcsin(c*x))*sqrt(-c^2*
d*x^2 + d), x)
```

Sympy [F]

$$\int \left(d - c^2 dx^2\right)^{3/2} (a + b \arcsin(cx))\, dx = \int \left(-d(cx - 1)(cx + 1)\right)^{\frac{3}{2}} (a + b \operatorname{asin}(cx))\, dx$$

input
```
integrate((-c**2*d*x**2+d)**(3/2)*(a+b*asin(c*x)),x)
```

output
```
Integral((-d*(c*x - 1)*(c*x + 1))**(3/2)*(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \left(d - c^2 dx^2\right)^{3/2} (a + b \arcsin(cx))\, dx = \int \left(-c^2 dx^2 + d\right)^{\frac{3}{2}} (b \arcsin(cx) + a)\, dx$$

input
```
integrate((-c^2*d*x^2+d)^(3/2)*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
b*sqrt(d)*integrate(-(c^2*d*x^2 - d)*sqrt(c*x + 1)*sqrt(-c*x + 1)*arctan2(
c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)), x) + 1/8*(2*(-c^2*d*x^2 + d)^(3/2)*x +
 3*sqrt(-c^2*d*x^2 + d)*d*x + 3*d^(3/2)*arcsin(c*x)/c)*a
```

Giac [F(-2)]

Exception generated.

$$\int \left(d - c^2 dx^2\right)^{3/2} \left(a + b \arcsin(cx)\right) dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)^(3/2)*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right)^{3/2} \left(a + b \arcsin(cx)\right) dx = \int \left(a + b \operatorname{asin}(c\,x)\right) \left(d - c^2\, d\, x^2\right)^{3/2} dx$$

input
```
int((a + b*asin(c*x))*(d - c^2*d*x^2)^(3/2),x)
```

output
```
int((a + b*asin(c*x))*(d - c^2*d*x^2)^(3/2), x)
```

Reduce [F]

$$\int \left(d - c^2 dx^2\right)^{3/2} (a + b \arcsin(cx))\, dx = \frac{\sqrt{d}\, d\left(3 asin(cx)\, a - 2\sqrt{-c^2x^2+1}\, a\, c^3x^3 + 5\sqrt{-c^2x^2+1}\, acx - 8\left(\int \sqrt{-c^2x^2+1}\, asin(c\right.\right.}{8c}$$

input
```
int((-c^2*d*x^2+d)^(3/2)*(a+b*asin(c*x)),x)
```

output

```
(sqrt(d)*d*(3*asin(c*x)*a - 2*sqrt( - c**2*x**2 + 1)*a*c**3*x**3 + 5*sqrt(
 - c**2*x**2 + 1)*a*c*x - 8*int(sqrt( - c**2*x**2 + 1)*asin(c*x)*x**2,x)*b
*c**3 + 8*int(sqrt( - c**2*x**2 + 1)*asin(c*x),x)*b*c))/(8*c)
```

3.53 $\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))\,dx$

Optimal result . . . 477
Mathematica [A] (verified) . . . 477
Rubi [A] (verified) . . . 478
Maple [C] (verified) . . . 479
Fricas [F] . . . 480
Sympy [F] . . . 480
Maxima [F] . . . 481
Giac [F(-2)] . . . 481
Mupad [F(-1)] . . . 481
Reduce [F] . . . 482

Optimal result

Integrand size = 24, antiderivative size = 116

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))\,dx$$
$$= -\frac{bcx^2\sqrt{d-c^2dx^2}}{4\sqrt{1-c^2x^2}} + \frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx)) + \frac{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}{4bc\sqrt{1-c^2x^2}}$$

output

```
-1/4*b*c*x^2*(-c^2*d*x^2+d)^(1/2)/(-c^2*x^2+1)^(1/2)+1/2*x*(-c^2*d*x^2+d)^
(1/2)*(a+b*arcsin(c*x))+1/4*(-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2/b/c/(
-c^2*x^2+1)^(1/2)
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 111, normalized size of antiderivative = 0.96

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))\,dx$$
$$= \frac{\sqrt{d-c^2dx^2}\left(a^2-b^2c^2x^2+2abcx\sqrt{1-c^2x^2}+2b\left(a+bcx\sqrt{1-c^2x^2}\right)\arcsin(cx)+b^2\arcsin(cx)^2\right)}{4bc\sqrt{1-c^2x^2}}$$

input
```
Integrate[Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x]),x]
```

output
```
(Sqrt[d - c^2*d*x^2]*(a^2 - b^2*c^2*x^2 + 2*a*b*c*x*Sqrt[1 - c^2*x^2] + 2*
b*(a + b*c*x*Sqrt[1 - c^2*x^2])*ArcSin[c*x] + b^2*ArcSin[c*x]^2))/(4*b*c*S
qrt[1 - c^2*x^2])
```

Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {5156, 15, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))\,dx$$

$$\downarrow 5156$$

$$\frac{\sqrt{d-c^2dx^2}\int \frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}} - \frac{bc\sqrt{d-c^2dx^2}\int x dx}{2\sqrt{1-c^2x^2}} + \frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))$$

$$\downarrow 15$$

$$\frac{\sqrt{d-c^2dx^2}\int \frac{a+b\arcsin(cx)}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}} + \frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx)) - \frac{bcx^2\sqrt{d-c^2dx^2}}{4\sqrt{1-c^2x^2}}$$

$$\downarrow 5152$$

$$\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx)) + \frac{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}{4bc\sqrt{1-c^2x^2}} - \frac{bcx^2\sqrt{d-c^2dx^2}}{4\sqrt{1-c^2x^2}}$$

input
```
Int[Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x]),x]
```

output
```
-1/4*(b*c*x^2*Sqrt[d - c^2*d*x^2])/Sqrt[1 - c^2*x^2] + (x*Sqrt[d - c^2*d*x
^2]*(a + b*ArcSin[c*x]))/2 + (Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x])^2)/(
4*b*c*Sqrt[1 - c^2*x^2])
```

Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.17 (sec) , antiderivative size = 280, normalized size of antiderivative = 2.41

method	result
default	$\frac{ax\sqrt{-c^2dx^2+d}}{2}+\frac{ad\arctan\left(\frac{\sqrt{c^2d}\,x}{\sqrt{-c^2dx^2+d}}\right)}{2\sqrt{c^2d}}+b\left(-\frac{\sqrt{-d(c^2x^2-1)}\,\sqrt{-c^2x^2+1}\,\arcsin(cx)^2}{4(c^2x^2-1)c}+\frac{\sqrt{-d(c^2x^2-1)}\left(-2i\sqrt{-c^2x^2}\right.\right.$
parts	$\frac{ax\sqrt{-c^2dx^2+d}}{2}+\frac{ad\arctan\left(\frac{\sqrt{c^2d}\,x}{\sqrt{-c^2dx^2+d}}\right)}{2\sqrt{c^2d}}+b\left(-\frac{\sqrt{-d(c^2x^2-1)}\,\sqrt{-c^2x^2+1}\,\arcsin(cx)^2}{4(c^2x^2-1)c}+\frac{\sqrt{-d(c^2x^2-1)}\left(-2i\sqrt{-c^2x^2}\right.\right.$

input
```
int((-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
1/2*a*x*(-c^2*d*x^2+d)^(1/2)+1/2*a*d/(c^2*d)^(1/2)*arctan((c^2*d)^(1/2)*x/
(-c^2*d*x^2+d)^(1/2))+b*(-1/4*(-d*(c^2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/(c
^2*x^2-1)/c*arcsin(c*x)^2+1/16*(-d*(c^2*x^2-1))^(1/2)*(-2*I*(-c^2*x^2+1)^(
1/2)*x^2*c^2+2*c^3*x^3+I*(-c^2*x^2+1)^(1/2)-2*c*x)*(I+2*arcsin(c*x))/(c^2*
x^2-1)/c+1/16*(-d*(c^2*x^2-1))^(1/2)*(2*I*(-c^2*x^2+1)^(1/2)*x^2*c^2+2*c^3
*x^3-I*(-c^2*x^2+1)^(1/2)-2*c*x)*(-I+2*arcsin(c*x))/(c^2*x^2-1)/c)
```

Fricas [F]

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))\,dx = \int \sqrt{-c^2dx^2+d}(b\arcsin(cx)+a)\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(sqrt(-c^2*d*x^2 + d)*(b*arcsin(c*x) + a), x)
```

Sympy [F]

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))\,dx = \int \sqrt{-d\,(cx-1)\,(cx+1)}(a+b\,\mathrm{asin}\,(cx))\,\,dx$$

input
```
integrate((-c**2*d*x**2+d)**(1/2)*(a+b*asin(c*x)),x)
```

output
```
Integral(sqrt(-d*(c*x - 1)*(c*x + 1))*(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))\,dx = \int \sqrt{-c^2dx^2+d}(b\arcsin(cx)+a)\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
b*sqrt(d)*integrate(sqrt(c*x + 1)*sqrt(-c*x + 1)*arctan2(c*x, sqrt(c*x + 1
)*sqrt(-c*x + 1)), x) + 1/2*(sqrt(-c^2*d*x^2 + d)*x + sqrt(d)*arcsin(c*x)/
c)*a
```

Giac [F(-2)]

Exception generated.

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))\,dx = \int (a+b\,\mathrm{asin}(c\,x))\,\sqrt{d-c^2\,d\,x^2}\,dx$$

input
```
int((a + b*asin(c*x))*(d - c^2*d*x^2)^(1/2),x)
```

output
```
int((a + b*asin(c*x))*(d - c^2*d*x^2)^(1/2), x)
```

Reduce [F]

$$\int \sqrt{d - c^2 dx^2}(a + b \arcsin(cx))\, dx$$
$$= \frac{\sqrt{d}\left(asin(cx)\, a + \sqrt{-c^2x^2 + 1}\, acx + 2\left(\int \sqrt{-c^2x^2 + 1}\, asin(cx)\, dx\right) bc\right)}{2c}$$

input
```
int((-c^2*d*x^2+d)^(1/2)*(a+b*asin(c*x)),x)
```

output
```
(sqrt(d)*(asin(c*x)*a + sqrt( - c**2*x**2 + 1)*a*c*x + 2*int(sqrt( - c**2*
x**2 + 1)*asin(c*x),x)*b*c))/(2*c)
```

3.54 $\int \frac{a+b\arcsin(cx)}{\sqrt{d-c^2dx^2}}\,dx$

Optimal result . . . 483
Mathematica [A] (verified) . . . 483
Rubi [A] (verified) . . . 484
Maple [A] (verified) . . . 484
Fricas [F] . . . 485
Sympy [F] . . . 485
Maxima [A] (verification not implemented) . . . 486
Giac [A] (verification not implemented) . . . 486
Mupad [F(-1)] . . . 486
Reduce [B] (verification not implemented) . . . 487

Optimal result

Integrand size = 24, antiderivative size = 49

$$\int \frac{a+b\arcsin(cx)}{\sqrt{d-c^2dx^2}}\,dx = \frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2}{2bc\sqrt{d-c^2dx^2}}$$

output
```
1/2*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))^2/b/c/(-c^2*d*x^2+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.02

$$\int \frac{a+b\arcsin(cx)}{\sqrt{d-c^2dx^2}}\,dx = \frac{\sqrt{1-c^2x^2}\arcsin(cx)(2a+b\arcsin(cx))}{2c\sqrt{d-c^2dx^2}}$$

input
```
Integrate[(a + b*ArcSin[c*x])/Sqrt[d - c^2*d*x^2],x]
```

output
```
(Sqrt[1 - c^2*x^2]*ArcSin[c*x]*(2*a + b*ArcSin[c*x]))/(2*c*Sqrt[d - c^2*d*
x^2])
```

Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a + b\arcsin(cx)}{\sqrt{d - c^2dx^2}}\,dx$$
$$\downarrow 5152$$
$$\frac{\sqrt{1 - c^2x^2}(a + b\arcsin(cx))^2}{2bc\sqrt{d - c^2dx^2}}$$

input
```
Int[(a + b*ArcSin[c*x])/Sqrt[d - c^2*d*x^2],x]
```

output
```
(Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^2)/(2*b*c*Sqrt[d - c^2*d*x^2])
```

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 86, normalized size of antiderivative = 1.76

method	result	size
default	$\frac{a\arctan\left(\frac{\sqrt{c^2d}\,x}{\sqrt{-c^2dx^2+d}}\right)}{\sqrt{c^2d}} - \frac{b\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\,\arcsin(cx)^2}{2cd(c^2x^2-1)}$	86
parts	$\frac{a\arctan\left(\frac{\sqrt{c^2d}\,x}{\sqrt{-c^2dx^2+d}}\right)}{\sqrt{c^2d}} - \frac{b\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\,\arcsin(cx)^2}{2cd(c^2x^2-1)}$	86

input
```
int((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
a/(c^2*d)^(1/2)*arctan((c^2*d)^(1/2)*x/(-c^2*d*x^2+d)^(1/2))-1/2*b*(-d*(c^
2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/c/d/(c^2*x^2-1)*arcsin(c*x)^2
```

Fricas [F]

$$\int \frac{a+b\arcsin(cx)}{\sqrt{d-c^2dx^2}}\,dx = \int \frac{b\arcsin(cx)+a}{\sqrt{-c^2dx^2+d}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral(-sqrt(-c^2*d*x^2 + d)*(b*arcsin(c*x) + a)/(c^2*d*x^2 - d), x)
```

Sympy [F]

$$\int \frac{a+b\arcsin(cx)}{\sqrt{d-c^2dx^2}}\,dx = \int \frac{a+b\operatorname{asin}(cx)}{\sqrt{-d\,(cx-1)\,(cx+1)}}\,dx$$

input
```
integrate((a+b*asin(c*x))/(-c**2*d*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*asin(c*x))/sqrt(-d*(c*x - 1)*(c*x + 1)), x)
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.57

$$\int \frac{a + b \arcsin(cx)}{\sqrt{d - c^2 d x^2}}\, dx = \frac{b \arcsin(cx)^2}{2\, c\sqrt{d}} + \frac{a \arcsin(cx)}{c\sqrt{d}}$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
1/2*b*arcsin(c*x)^2/(c*sqrt(d)) + a*arcsin(c*x)/(c*sqrt(d))
```

Giac [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.49

$$\int \frac{a + b \arcsin(cx)}{\sqrt{d - c^2 d x^2}}\, dx = \frac{b \arcsin(cx)^2 + 2\, a \arcsin(cx)}{2\, c\sqrt{d}}$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
1/2*(b*arcsin(c*x)^2 + 2*a*arcsin(c*x))/(c*sqrt(d))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b \arcsin(cx)}{\sqrt{d - c^2 d x^2}}\, dx = \int \frac{a + b \operatorname{asin}(c\, x)}{\sqrt{d - c^2\, d\, x^2}}\, dx$$

input
```
int((a + b*asin(c*x))/(d - c^2*d*x^2)^(1/2),x)
```

output
```
int((a + b*asin(c*x))/(d - c^2*d*x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.49

$$\int \frac{a + b \arcsin(cx)}{\sqrt{d - c^2 dx^2}}\, dx = \frac{\sqrt{d}\, asin(cx)\, (asin(cx)\, b + 2a)}{2cd}$$

input
```
int((a+b*asin(c*x))/(-c^2*d*x^2+d)^(1/2),x)
```

output
```
(sqrt(d)*asin(c*x)*(asin(c*x)*b + 2*a))/(2*c*d)
```

3.55 $\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^{3/2}}\,dx$

Optimal result . . . 488
Mathematica [A] (verified) . . . 488
Rubi [A] (verified) . . . 489
Maple [C] (verified) . . . 490
Fricas [F] . . . 491
Sympy [F] . . . 491
Maxima [A] (verification not implemented) . . . 491
Giac [F(-2)] . . . 492
Mupad [F(-1)] . . . 492
Reduce [F] . . . 492

Optimal result

Integrand size = 24, antiderivative size = 80

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{3/2}}\,dx = \frac{x(a+b\arcsin(cx))}{d\sqrt{d-c^2dx^2}} + \frac{b\sqrt{1-c^2x^2}\log\left(1-c^2x^2\right)}{2cd\sqrt{d-c^2dx^2}}$$

output
```
x*(a+b*arcsin(c*x))/d/(-c^2*d*x^2+d)^(1/2)+1/2*b*(-c^2*x^2+1)^(1/2)*ln(-c^
2*x^2+1)/c/d/(-c^2*d*x^2+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 77, normalized size of antiderivative = 0.96

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{3/2}}\,dx = -\frac{\sqrt{d-c^2dx^2}\left(2acx+2bcx\arcsin(cx)+b\sqrt{1-c^2x^2}\log\left(-1+c^2x^2\right)\right)}{2cd^2\left(-1+c^2x^2\right)}$$

input
```
Integrate[(a + b*ArcSin[c*x])/(d - c^2*d*x^2)^(3/2),x]
```

output
```
-1/2*(Sqrt[d - c^2*d*x^2]*(2*a*c*x + 2*b*c*x*ArcSin[c*x] + b*Sqrt[1 - c^2*
x^2]*Log[-1 + c^2*x^2]))/(c*d^2*(-1 + c^2*x^2))
```

Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 80, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$, Rules used = {5160, 240}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a + b \arcsin(cx)}{(d - c^2 dx^2)^{3/2}}\, dx$$

$$\downarrow 5160$$

$$\frac{x(a + b \arcsin(cx))}{d\sqrt{d - c^2 dx^2}} - \frac{bc\sqrt{1 - c^2x^2} \int \frac{x}{1 - c^2x^2}\, dx}{d\sqrt{d - c^2 dx^2}}$$

$$\downarrow 240$$

$$\frac{x(a + b \arcsin(cx))}{d\sqrt{d - c^2 dx^2}} + \frac{b\sqrt{1 - c^2x^2} \log\left(1 - c^2x^2\right)}{2cd\sqrt{d - c^2 dx^2}}$$

input
```
Int[(a + b*ArcSin[c*x])/(d - c^2*d*x^2)^(3/2),x]
```

output
```
(x*(a + b*ArcSin[c*x]))/(d*Sqrt[d - c^2*d*x^2]) + (b*Sqrt[1 - c^2*x^2]*Log
[1 - c^2*x^2])/(2*c*d*Sqrt[d - c^2*d*x^2])
```

Defintions of rubi rules used

rule 240

```
Int[(x_)/((a_) + (b_.)*(x_)^2), x_Symbol] :> Simp[Log[RemoveContent[a + b*x
^2, x]]/(2*b), x] /; FreeQ[{a, b}, x]
```

rule 5160

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2)^(3/2), x
_Symbol] :> Simp[x*((a + b*ArcSin[c*x])^n/(d*Sqrt[d + e*x^2])), x] - Simp[b
*c*(n/d)*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]   Int[x*((a + b*ArcSin[c*x
])^(n - 1)/(1 - c^2*x^2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d
 + e, 0] && GtQ[n, 0]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.19 (sec) , antiderivative size = 177, normalized size of antiderivative = 2.21

method	result
default	$\frac{ax}{d\sqrt{-c^2dx^2+d}}+\frac{ib\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\arcsin(cx)}{cd^2(c^2x^2-1)}-\frac{b\sqrt{-d(c^2x^2-1)}\arcsin(cx)x}{d^2(c^2x^2-1)}-\frac{b\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\ln\left(1-$
parts	$\frac{ax}{d\sqrt{-c^2dx^2+d}}+\frac{ib\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\arcsin(cx)}{cd^2(c^2x^2-1)}-\frac{b\sqrt{-d(c^2x^2-1)}\arcsin(cx)x}{d^2(c^2x^2-1)}-\frac{b\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\ln\left(1-$

input

```
int((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(3/2),x,method=_RETURNVERBOSE)
```

output

```
a*x/d/(-c^2*d*x^2+d)^(1/2)+I*b*(-d*(c^2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/c
/d^2/(c^2*x^2-1)*arcsin(c*x)-b*(-d*(c^2*x^2-1))^(1/2)*arcsin(c*x)/d^2/(c^2
*x^2-1)*x-b*(-d*(c^2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/c/d^2/(c^2*x^2-1)*ln
(1+(I*c*x+(-c^2*x^2+1)^(1/2))^2)
```

Fricas [F]

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{3/2}}\,dx = \int \frac{b\arcsin(cx)+a}{(-c^2dx^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
integral(sqrt(-c^2*d*x^2 + d)*(b*arcsin(c*x) + a)/(c^4*d^2*x^4 - 2*c^2*d^2
*x^2 + d^2), x)
```

Sympy [F]

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{3/2}}\,dx = \int \frac{a+b\operatorname{asin}(cx)}{(-d(cx-1)(cx+1))^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*asin(c*x))/(-c**2*d*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*asin(c*x))/(-d*(c*x - 1)*(c*x + 1))**(3/2), x)
```

Maxima [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 62, normalized size of antiderivative = 0.78

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{3/2}}\,dx = \frac{bx\arcsin(cx)}{\sqrt{-c^2dx^2+dd}} + \frac{ax}{\sqrt{-c^2dx^2+dd}} - \frac{b\log\left(x^2-\frac{1}{c^2}\right)}{2\,cd^{\frac{3}{2}}}$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
b*x*arcsin(c*x)/(sqrt(-c^2*d*x^2 + d)*d) + a*x/(sqrt(-c^2*d*x^2 + d)*d) -
1/2*b*log(x^2 - 1/c^2)/(c*d^(3/2))
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:index.cc index_m i_lex_is_greater E
rror: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{3/2}}\,dx = \int \frac{a+b\operatorname{asin}(c\,x)}{(d-c^2\,d\,x^2)^{3/2}}\,dx$$

input
```
int((a + b*asin(c*x))/(d - c^2*d*x^2)^(3/2),x)
```

output
```
int((a + b*asin(c*x))/(d - c^2*d*x^2)^(3/2), x)
```

Reduce [F]

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{3/2}}\,dx = \frac{-\sqrt{-c^2x^2+1}\left(\int \frac{asin(cx)}{\sqrt{-c^2x^2+1}\,c^2x^2-\sqrt{-c^2x^2+1}}dx\right)b+ax}{\sqrt{d}\,\sqrt{-c^2x^2+1}\,d}$$

input
```
int((a+b*asin(c*x))/(-c^2*d*x^2+d)^(3/2),x)
```

output
```
( - sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**2*x**2
 - sqrt( - c**2*x**2 + 1)),x)*b + a*x)/(sqrt(d)*sqrt( - c**2*x**2 + 1)*d)
```

3.56 $\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^{5/2}}\,dx$

Optimal result . . . 493
Mathematica [A] (verified) . . . 493
Rubi [A] (verified) . . . 494
Maple [C] (verified) . . . 496
Fricas [F] . . . 497
Sympy [F] . . . 497
Maxima [A] (verification not implemented) . . . 497
Giac [F(-2)] . . . 498
Mupad [F(-1)] . . . 498
Reduce [F] . . . 499

Optimal result

Integrand size = 24, antiderivative size = 154

$$\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^{5/2}}\,dx = -\frac{b}{6cd^2\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}} + \frac{x(a+b\arcsin(cx))}{3d\left(d-c^2dx^2\right)^{3/2}} + \frac{2x(a+b\arcsin(cx))}{3d^2\sqrt{d-c^2dx^2}} + \frac{b\sqrt{1-c^2x^2}\log\left(1-c^2x^2\right)}{3cd^2\sqrt{d-c^2dx^2}}$$

output

```
-1/6*b/c/d^2/(-c^2*x^2+1)^(1/2)/(-c^2*d*x^2+d)^(1/2)+1/3*x*(a+b*arcsin(c*x
))/d/(-c^2*d*x^2+d)^(3/2)+2/3*x*(a+b*arcsin(c*x))/d^2/(-c^2*d*x^2+d)^(1/2)
+1/3*b*(-c^2*x^2+1)^(1/2)*ln(-c^2*x^2+1)/c/d^2/(-c^2*d*x^2+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.73

$$\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^{5/2}}\,dx = -\frac{\sqrt{d-c^2dx^2}\left(-6acx+4ac^3x^3+b\sqrt{1-c^2x^2}+2bcx(-3+2c^2x^2)\arcsin(cx)-2b(1-c^2x^2)^{3/2}\log\left(-1+\right.\right.}{6cd^3\left(-1+c^2x^2\right)^2}$$

input
```
Integrate[(a + b*ArcSin[c*x])/(d - c^2*d*x^2)^(5/2),x]
```

output
```
-1/6*(Sqrt[d - c^2*d*x^2]*(-6*a*c*x + 4*a*c^3*x^3 + b*Sqrt[1 - c^2*x^2] +
2*b*c*x*(-3 + 2*c^2*x^2)*ArcSin[c*x] - 2*b*(1 - c^2*x^2)^(3/2)*Log[-1 + c^
2*x^2]))/(c*d^3*(-1 + c^2*x^2)^2)
```

Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 159, normalized size of antiderivative = 1.03, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {5162, 241, 5160, 240}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a + b\arcsin(cx)}{(d - c^2dx^2)^{5/2}}\,dx$$

$$\downarrow 5162$$

$$\frac{2\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{3/2}}dx}{3d} - \frac{bc\sqrt{1-c^2x^2}\int \frac{x}{(1-c^2x^2)^2}dx}{3d^2\sqrt{d-c^2dx^2}} + \frac{x(a + b\arcsin(cx))}{3d\,(d - c^2dx^2)^{3/2}}$$

$$\downarrow 241$$

$$\frac{2\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{3/2}}dx}{3d} + \frac{x(a + b\arcsin(cx))}{3d\,(d - c^2dx^2)^{3/2}} - \frac{b}{6cd^2\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}$$

$$\downarrow 5160$$

$$\frac{2\left(\frac{x(a+b\arcsin(cx))}{d\sqrt{d-c^2dx^2}} - \frac{bc\sqrt{1-c^2x^2}\int \frac{x}{1-c^2x^2}dx}{d\sqrt{d-c^2dx^2}}\right)}{3d} + \frac{x(a + b\arcsin(cx))}{3d\,(d - c^2dx^2)^{3/2}} - \frac{b}{6cd^2\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}$$

$$\downarrow 240$$

$$\frac{x(a + b\arcsin(cx))}{3d\,(d - c^2dx^2)^{3/2}} + \frac{2\left(\frac{x(a+b\arcsin(cx))}{d\sqrt{d-c^2dx^2}} + \frac{b\sqrt{1-c^2x^2}\log(1-c^2x^2)}{2cd\sqrt{d-c^2dx^2}}\right)}{3d} - \frac{b}{6cd^2\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}$$

input
```
Int[(a + b*ArcSin[c*x])/(d - c^2*d*x^2)^(5/2),x]
```

output
```
-1/6*b/(c*d^2*Sqrt[1 - c^2*x^2]*Sqrt[d - c^2*d*x^2]) + (x*(a + b*ArcSin[c*
x]))/(3*d*(d - c^2*d*x^2)^(3/2)) + (2*((x*(a + b*ArcSin[c*x]))/(d*Sqrt[d -
 c^2*d*x^2]) + (b*Sqrt[1 - c^2*x^2]*Log[1 - c^2*x^2])/(2*c*d*Sqrt[d - c^2*
d*x^2])))/(3*d)
```

Defintions of rubi rules used

rule 240
```
Int[(x_)/((a_) + (b_.)*(x_)^2), x_Symbol] :> Simp[Log[RemoveContent[a + b*x
^2, x]]/(2*b), x] /; FreeQ[{a, b}, x]
```

rule 241
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(a + b*x^2)^(p + 1)/
(2*b*(p + 1)), x] /; FreeQ[{a, b, p}, x] && NeQ[p, -1]
```

rule 5160
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2)^(3/2), x
_Symbol] :> Simp[x*((a + b*ArcSin[c*x])^n/(d*Sqrt[d + e*x^2])), x] - Simp[b
*c*(n/d)*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]   Int[x*((a + b*ArcSin[c*x
])^(n - 1)/(1 - c^2*x^2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d
 + e, 0] && GtQ[n, 0]
```

rule 5162
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_), x_
Symbol] :> Simp[(-x)*(d + e*x^2)^(p + 1)*((a + b*ArcSin[c*x])^n/(2*d*(p + 1
))), x] + (Simp[(2*p + 3)/(2*d*(p + 1))   Int[(d + e*x^2)^(p + 1)*(a + b*Ar
cSin[c*x])^n, x], x] + Simp[b*c*(n/(2*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2
*x^2)^p]   Int[x*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x
]) /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && LtQ[p,
 -1] && NeQ[p, -3/2]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.24 (sec) , antiderivative size = 1072, normalized size of antiderivative = 6.96

method	result	size
default	Expression too large to display	1072
parts	Expression too large to display	1072

input
```
int((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(5/2),x,method=_RETURNVERBOSE)
```

output
```
a*(1/3*x/d/(-c^2*d*x^2+d)^(3/2)+2/3/d^2*x/(-c^2*d*x^2+d)^(1/2))-8/3*I*b*(-
d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)/c*arcsin(c*x)
*(-c^2*x^2+1)^(1/2)+4/3*I*b*(-d*(c^2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/c/d^
3/(c^2*x^2-1)*arcsin(c*x)+2/3*I*b*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10
*c^4*x^4+11*c^2*x^2-4)*c^4*(-c^2*x^2+1)*x^5-5/3*I*b*(-d*(c^2*x^2-1))^(1/2)
/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c^2*(-c^2*x^2+1)*x^3-2*b*(-d*(c^2
*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c^4*arcsin(c*x)*x^5
+8/3*I*b*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c^
2*x^3-7/3*I*b*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-
4)*c^4*x^5+14/3*I*b*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^
2*x^2-4)*c*(-c^2*x^2+1)^(1/2)*arcsin(c*x)*x^2-1/2*b*(-d*(c^2*x^2-1))^(1/2)
/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c*(-c^2*x^2+1)^(1/2)*x^2+17/3*b*(
-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c^2*arcsin(c
*x)*x^3-2*I*b*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-
4)*c^3*(-c^2*x^2+1)^(1/2)*arcsin(c*x)*x^4+2/3*I*b*(-d*(c^2*x^2-1))^(1/2)/d
^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c^6*x^7+I*b*(-d*(c^2*x^2-1))^(1/2)/
d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*(-c^2*x^2+1)*x+2/3*b*(-d*(c^2*x^2-
1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)/c*(-c^2*x^2+1)^(1/2)-4*b
*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*arcsin(c*x
)*x-I*b*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*...
```

Fricas [F]

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{5/2}}\,dx = \int \frac{b\arcsin(cx)+a}{(-c^2dx^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
integral(-sqrt(-c^2*d*x^2 + d)*(b*arcsin(c*x) + a)/(c^6*d^3*x^6 - 3*c^4*d^
3*x^4 + 3*c^2*d^3*x^2 - d^3), x)
```

Sympy [F]

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{5/2}}\,dx = \int \frac{a+b\operatorname{asin}(cx)}{(-d(cx-1)(cx+1))^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*asin(c*x))/(-c**2*d*x**2+d)**(5/2),x)
```

output
```
Integral((a + b*asin(c*x))/(-d*(c*x - 1)*(c*x + 1))**(5/2), x)
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 141, normalized size of antiderivative = 0.92

$$\begin{aligned}\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{5/2}}\,dx &= \frac{1}{6}\,bc\left(\frac{1}{c^4d^{\frac{5}{2}}x^2-c^2d^{\frac{5}{2}}}+\frac{2\log(cx+1)}{c^2d^{\frac{5}{2}}}+\frac{2\log(cx-1)}{c^2d^{\frac{5}{2}}}\right)\\ &+\frac{1}{3}\,b\left(\frac{2x}{\sqrt{-c^2dx^2+dd^2}}+\frac{x}{(-c^2dx^2+d)^{\frac{3}{2}}d}\right)\arcsin(cx)\\ &+\frac{1}{3}\,a\left(\frac{2x}{\sqrt{-c^2dx^2+dd^2}}+\frac{x}{(-c^2dx^2+d)^{\frac{3}{2}}d}\right)\end{aligned}$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
1/6*b*c*(1/(c^4*d^(5/2)*x^2 - c^2*d^(5/2)) + 2*log(c*x + 1)/(c^2*d^(5/2))
+ 2*log(c*x - 1)/(c^2*d^(5/2))) + 1/3*b*(2*x/(sqrt(-c^2*d*x^2 + d)*d^2) +
x/((-c^2*d*x^2 + d)^(3/2)*d))*arcsin(c*x) + 1/3*a*(2*x/(sqrt(-c^2*d*x^2 +
d)*d^2) + x/((-c^2*d*x^2 + d)^(3/2)*d))
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a + b \arcsin(cx)}{(d - c^2 dx^2)^{5/2}}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:index.cc index_m i_lex_is_greater E
rror: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a + b \arcsin(cx)}{(d - c^2 dx^2)^{5/2}}\, dx = \int \frac{a + b \operatorname{asin}(c\,x)}{(d - c^2\, d\, x^2)^{5/2}}\, dx$$

input
```
int((a + b*asin(c*x))/(d - c^2*d*x^2)^(5/2),x)
```

output
```
int((a + b*asin(c*x))/(d - c^2*d*x^2)^(5/2), x)
```

Reduce [F]

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{5/2}}\,dx = \frac{3\sqrt{-c^2x^2+1}\left(\int \frac{asin(cx)}{\sqrt{-c^2x^2+1}\,c^4x^4-2\sqrt{-c^2x^2+1}\,c^2x^2+\sqrt{-c^2x^2+1}}dx\right)b\,c^2x^2-3\sqrt{-c^2x^2+1}\,(}{3\sqrt{d}\,\sqrt{-c^2x^2+1}\,d^2\,(c^2x^2}$$

input
```
int((a+b*asin(c*x))/(-c^2*d*x^2+d)^(5/2),x)
```

output
```
(3*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**4*x**4
- 2*sqrt( - c**2*x**2 + 1)*c**2*x**2 + sqrt( - c**2*x**2 + 1)),x)*b*c**2*x
**2 - 3*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**4*
x**4 - 2*sqrt( - c**2*x**2 + 1)*c**2*x**2 + sqrt( - c**2*x**2 + 1)),x)*b +
 2*a*c**2*x**3 - 3*a*x)/(3*sqrt(d)*sqrt( - c**2*x**2 + 1)*d**2*(c**2*x**2
- 1))
```

3.57 $\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^{7/2}}\,dx$

Optimal result . . . 500
Mathematica [A] (verified) . . . 501
Rubi [A] (verified) . . . 501
Maple [C] (verified) . . . 504
Fricas [F] . . . 505
Sympy [F(-1)] . . . 505
Maxima [F] . . . 505
Giac [F(-2)] . . . 506
Mupad [F(-1)] . . . 506
Reduce [F] . . . 506

Optimal result

Integrand size = 24, antiderivative size = 225

$$\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^{7/2}}\,dx = -\frac{b}{20cd^3\left(1-c^2x^2\right)^{3/2}\sqrt{d-c^2dx^2}} - \frac{2b}{15cd^3\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}} + \frac{x(a+b\arcsin(cx))}{5d\left(d-c^2dx^2\right)^{5/2}} + \frac{4x(a+b\arcsin(cx))}{15d^2\left(d-c^2dx^2\right)^{3/2}} + \frac{8x(a+b\arcsin(cx))}{15d^3\sqrt{d-c^2dx^2}} + \frac{4b\sqrt{1-c^2x^2}\log\left(1-c^2x^2\right)}{15cd^3\sqrt{d-c^2dx^2}}$$

output

```
-1/20*b/c/d^3/(-c^2*x^2+1)^(3/2)/(-c^2*d*x^2+d)^(1/2)-2/15*b/c/d^3/(-c^2*x
^2+1)^(1/2)/(-c^2*d*x^2+d)^(1/2)+1/5*x*(a+b*arcsin(c*x))/d/(-c^2*d*x^2+d)^
(5/2)+4/15*x*(a+b*arcsin(c*x))/d^2/(-c^2*d*x^2+d)^(3/2)+8/15*x*(a+b*arcsin
(c*x))/d^3/(-c^2*d*x^2+d)^(1/2)+4/15*b*(-c^2*x^2+1)^(1/2)*ln(-c^2*x^2+1)/c
/d^3/(-c^2*d*x^2+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 154, normalized size of antiderivative = 0.68

$$\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^{7/2}}\,dx =$$
$$-\frac{\sqrt{d-c^2dx^2}\left(60acx-80ac^3x^3+32ac^5x^5-11b\sqrt{1-c^2x^2}+8bc^2x^2\sqrt{1-c^2x^2}+4bcx(15-20c^2x^2+8c^4$$
$$60cd^4\left(-1+c^2x^2\right)^3$$

input
```
Integrate[(a + b*ArcSin[c*x])/(d - c^2*d*x^2)^(7/2),x]
```

output
```
-1/60*(Sqrt[d - c^2*d*x^2]*(60*a*c*x - 80*a*c^3*x^3 + 32*a*c^5*x^5 - 11*b*
Sqrt[1 - c^2*x^2] + 8*b*c^2*x^2*Sqrt[1 - c^2*x^2] + 4*b*c*x*(15 - 20*c^2*x
^2 + 8*c^4*x^4)*ArcSin[c*x] + 16*b*(1 - c^2*x^2)^(5/2)*Log[-1 + c^2*x^2]))
/(c*d^4*(-1 + c^2*x^2)^3)
```

Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 238, normalized size of antiderivative = 1.06, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {5162, 241, 5162, 241, 5160, 240}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^{7/2}}\,dx$$
$$\downarrow 5162$$
$$\frac{4\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^{5/2}}dx}{5d}-\frac{bc\sqrt{1-c^2x^2}\int \frac{x}{\left(1-c^2x^2\right)^3}dx}{5d^3\sqrt{d-c^2dx^2}}+\frac{x(a+b\arcsin(cx))}{5d\left(d-c^2dx^2\right)^{5/2}}$$
$$\downarrow 241$$
$$\frac{4\int \frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^{5/2}}dx}{5d}+\frac{x(a+b\arcsin(cx))}{5d\left(d-c^2dx^2\right)^{5/2}}-\frac{b}{20cd^3\left(1-c^2x^2\right)^{3/2}\sqrt{d-c^2dx^2}}$$

$$\downarrow 5162$$

$$\frac{4\left(\frac{2\int\frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^{3/2}}dx}{3d}-\frac{bc\sqrt{1-c^2x^2}\int\frac{x}{\left(1-c^2x^2\right)^2}dx}{3d^2\sqrt{d-c^2dx^2}}+\frac{x(a+b\arcsin(cx))}{3d(d-c^2dx^2)^{3/2}}\right)}{5d}+\frac{x(a+b\arcsin(cx))}{5d\left(d-c^2dx^2\right)^{5/2}}-\frac{b}{20cd^3\left(1-c^2x^2\right)^{3/2}\sqrt{d-c^2dx^2}}$$

$$\downarrow 241$$

$$\frac{4\left(\frac{2\int\frac{a+b\arcsin(cx)}{\left(d-c^2dx^2\right)^{3/2}}dx}{3d}+\frac{x(a+b\arcsin(cx))}{3d(d-c^2dx^2)^{3/2}}-\frac{b}{6cd^2\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}\right)}{5d}+\frac{x(a+b\arcsin(cx))}{5d\left(d-c^2dx^2\right)^{5/2}}-\frac{b}{20cd^3\left(1-c^2x^2\right)^{3/2}\sqrt{d-c^2dx^2}}$$

$$\downarrow 5160$$

$$\frac{4\left(\frac{2\left(\frac{x(a+b\arcsin(cx))}{d\sqrt{d-c^2dx^2}}-\frac{bc\sqrt{1-c^2x^2}\int\frac{x}{1-c^2x^2}dx}{d\sqrt{d-c^2dx^2}}\right)}{3d}+\frac{x(a+b\arcsin(cx))}{3d(d-c^2dx^2)^{3/2}}-\frac{b}{6cd^2\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}\right)}{5d}+\frac{x(a+b\arcsin(cx))}{5d\left(d-c^2dx^2\right)^{5/2}}-\frac{b}{20cd^3\left(1-c^2x^2\right)^{3/2}\sqrt{d-c^2dx^2}}$$

$$\downarrow 240$$

$$\frac{4\left(\frac{x(a+b\arcsin(cx))}{3d(d-c^2dx^2)^{3/2}}+\frac{2\left(\frac{x(a+b\arcsin(cx))}{d\sqrt{d-c^2dx^2}}+\frac{b\sqrt{1-c^2x^2}\log\left(1-c^2x^2\right)}{2cd\sqrt{d-c^2dx^2}}\right)}{3d}-\frac{b}{6cd^2\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}\right)}{5d}+\frac{x(a+b\arcsin(cx))}{5d\left(d-c^2dx^2\right)^{5/2}}-\frac{b}{20cd^3\left(1-c^2x^2\right)^{3/2}\sqrt{d-c^2dx^2}}$$

input

```
Int[(a + b*ArcSin[c*x])/(d - c^2*d*x^2)^(7/2),x]
```

output
```
-1/20*b/(c*d^3*(1 - c^2*x^2)^(3/2)*Sqrt[d - c^2*d*x^2]) + (x*(a + b*ArcSin
[c*x]))/(5*d*(d - c^2*d*x^2)^(5/2)) + (4*(-1/6*b/(c*d^2*Sqrt[1 - c^2*x^2]*
Sqrt[d - c^2*d*x^2]) + (x*(a + b*ArcSin[c*x]))/(3*d*(d - c^2*d*x^2)^(3/2))
 + (2*((x*(a + b*ArcSin[c*x]))/(d*Sqrt[d - c^2*d*x^2]) + (b*Sqrt[1 - c^2*x
^2]*Log[1 - c^2*x^2])/(2*c*d*Sqrt[d - c^2*d*x^2])))/(3*d)))/(5*d)
```

Defintions of rubi rules used

rule 240
```
Int[(x_)/((a_) + (b_.)*(x_)^2), x_Symbol] :> Simp[Log[RemoveContent[a + b*x
^2, x]]/(2*b), x] /; FreeQ[{a, b}, x]
```

rule 241
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(a + b*x^2)^(p + 1)/
(2*b*(p + 1)), x] /; FreeQ[{a, b, p}, x] && NeQ[p, -1]
```

rule 5160
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2)^(3/2), x
_Symbol] :> Simp[x*((a + b*ArcSin[c*x])^n/(d*Sqrt[d + e*x^2])), x] - Simp[b
*c*(n/d)*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]   Int[x*((a + b*ArcSin[c*x
])^(n - 1)/(1 - c^2*x^2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d
 + e, 0] && GtQ[n, 0]
```

rule 5162
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_), x_
Symbol] :> Simp[(-x)*(d + e*x^2)^(p + 1)*((a + b*ArcSin[c*x])^n/(2*d*(p + 1
))), x] + (Simp[(2*p + 3)/(2*d*(p + 1))   Int[(d + e*x^2)^(p + 1)*(a + b*Ar
cSin[c*x])^n, x], x] + Simp[b*c*(n/(2*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2
*x^2)^p]   Int[x*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x
]) /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && LtQ[p,
 -1] && NeQ[p, -3/2]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.28 (sec) , antiderivative size = 2279, normalized size of antiderivative = 10.13

method	result	size
default	Expression too large to display	2279
parts	Expression too large to display	2279

input
```
int((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(7/2),x,method=_RETURNVERBOSE)
```

output
```
176/15*b*(-d*(c^2*x^2-1))^(1/2)/d^4/(40*c^10*x^10-215*c^8*x^8+469*c^6*x^6-
517*c^4*x^4+287*c^2*x^2-64)/c*(-c^2*x^2+1)^(1/2)-64*b*(-d*(c^2*x^2-1))^(1/
2)/d^4/(40*c^10*x^10-215*c^8*x^8+469*c^6*x^6-517*c^4*x^4+287*c^2*x^2-64)*a
rcsin(c*x)*x-22*I*b*(-d*(c^2*x^2-1))^(1/2)/d^4/(40*c^10*x^10-215*c^8*x^8+4
69*c^6*x^6-517*c^4*x^4+287*c^2*x^2-64)*x-64/3*I*b*(-d*(c^2*x^2-1))^(1/2)/d
^4/(40*c^10*x^10-215*c^8*x^8+469*c^6*x^6-517*c^4*x^4+287*c^2*x^2-64)*c^7*(
-c^2*x^2+1)^(1/2)*arcsin(c*x)*x^8+280/3*I*b*(-d*(c^2*x^2-1))^(1/2)/d^4/(40
*c^10*x^10-215*c^8*x^8+469*c^6*x^6-517*c^4*x^4+287*c^2*x^2-64)*c^5*(-c^2*x
^2+1)^(1/2)*arcsin(c*x)*x^6-784/5*I*b*(-d*(c^2*x^2-1))^(1/2)/d^4/(40*c^10*
x^10-215*c^8*x^8+469*c^6*x^6-517*c^4*x^4+287*c^2*x^2-64)*c^3*(-c^2*x^2+1)^
(1/2)*arcsin(c*x)*x^4+1784/15*I*b*(-d*(c^2*x^2-1))^(1/2)/d^4/(40*c^10*x^10
-215*c^8*x^8+469*c^6*x^6-517*c^4*x^4+287*c^2*x^2-64)*c*(-c^2*x^2+1)^(1/2)*
arcsin(c*x)*x^2+104*b*(-d*(c^2*x^2-1))^(1/2)/d^4/(40*c^10*x^10-215*c^8*x^8
+469*c^6*x^6-517*c^4*x^4+287*c^2*x^2-64)*c^6*arcsin(c*x)*x^7-16/3*b*(-d*(c
^2*x^2-1))^(1/2)/d^4/(40*c^10*x^10-215*c^8*x^8+469*c^6*x^6-517*c^4*x^4+287
*c^2*x^2-64)*c^5*x^6*(-c^2*x^2+1)^(1/2)-1004/5*b*(-d*(c^2*x^2-1))^(1/2)/d^
4/(40*c^10*x^10-215*c^8*x^8+469*c^6*x^6-517*c^4*x^4+287*c^2*x^2-64)*c^4*ar
csin(c*x)*x^5+a*(1/5*x/d/(-c^2*d*x^2+d)^(5/2)+4/5/d*(1/3*x/d/(-c^2*d*x^2+d
)^(3/2)+2/3/d^2*x/(-c^2*d*x^2+d)^(1/2)))+20*b*(-d*(c^2*x^2-1))^(1/2)/d^4/(
40*c^10*x^10-215*c^8*x^8+469*c^6*x^6-517*c^4*x^4+287*c^2*x^2-64)*c^3*x^...
```

Fricas [F]

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{7/2}}\,dx = \int \frac{b\arcsin(cx)+a}{(-c^2dx^2+d)^{\frac{7}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(7/2),x, algorithm="fricas")
```

output
```
integral(sqrt(-c^2*d*x^2 + d)*(b*arcsin(c*x) + a)/(c^8*d^4*x^8 - 4*c^6*d^4
*x^6 + 6*c^4*d^4*x^4 - 4*c^2*d^4*x^2 + d^4), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{7/2}}\,dx = \text{Timed out}$$

input
```
integrate((a+b*asin(c*x))/(-c**2*d*x**2+d)**(7/2),x)
```

output
```
Timed out
```

Maxima [F]

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{7/2}}\,dx = \int \frac{b\arcsin(cx)+a}{(-c^2dx^2+d)^{\frac{7}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(7/2),x, algorithm="maxima")
```

output
```
1/15*a*(8*x/(sqrt(-c^2*d*x^2 + d)*d^3) + 4*x/((-c^2*d*x^2 + d)^(3/2)*d^2)
+ 3*x/((-c^2*d*x^2 + d)^(5/2)*d)) - b*integrate(arctan2(c*x, sqrt(c*x + 1)
*sqrt(-c*x + 1))/((c^6*d^3*x^6 - 3*c^4*d^3*x^4 + 3*c^2*d^3*x^2 - d^3)*sqrt
(c*x + 1)*sqrt(-c*x + 1)), x)/sqrt(d)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{7/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))/(-c^2*d*x^2+d)^(7/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:index.cc index_m i_lex_is_greater E
rror: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{7/2}}\,dx = \int \frac{a+b\,\mathrm{asin}(c\,x)}{(d-c^2\,d\,x^2)^{7/2}}\,dx$$

input
```
int((a + b*asin(c*x))/(d - c^2*d*x^2)^(7/2),x)
```

output
```
int((a + b*asin(c*x))/(d - c^2*d*x^2)^(7/2), x)
```

Reduce [F]

$$\int \frac{a+b\arcsin(cx)}{(d-c^2dx^2)^{7/2}}\,dx = \frac{-15\sqrt{-c^2x^2+1}\left(\int \frac{asin(cx)}{\sqrt{-c^2x^2+1}\,c^6x^6-3\sqrt{-c^2x^2+1}\,c^4x^4+3\sqrt{-c^2x^2+1}\,c^2x^2-\sqrt{-c^2x^2+1}}dx\right)b\,c^4x^4}$$

input
```
int((a+b*asin(c*x))/(-c^2*d*x^2+d)^(7/2),x)
```

output

```
( - 15*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**6*x
**6 - 3*sqrt( - c**2*x**2 + 1)*c**4*x**4 + 3*sqrt( - c**2*x**2 + 1)*c**2*x
**2 - sqrt( - c**2*x**2 + 1)),x)*b*c**4*x**4 + 30*sqrt( - c**2*x**2 + 1)*i
nt(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**6*x**6 - 3*sqrt( - c**2*x**2 + 1)*
c**4*x**4 + 3*sqrt( - c**2*x**2 + 1)*c**2*x**2 - sqrt( - c**2*x**2 + 1)),x
)*b*c**2*x**2 - 15*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2
 + 1)*c**6*x**6 - 3*sqrt( - c**2*x**2 + 1)*c**4*x**4 + 3*sqrt( - c**2*x**2
 + 1)*c**2*x**2 - sqrt( - c**2*x**2 + 1)),x)*b + 8*a*c**4*x**5 - 20*a*c**2
*x**3 + 15*a*x)/(15*sqrt(d)*sqrt( - c**2*x**2 + 1)*d**3*(c**4*x**4 - 2*c**
2*x**2 + 1))
```

3.58 $\int (d - c^2 dx^2)^{3/2} (a + b \arcsin(cx))^2 \, dx$

Optimal result . . . 508
Mathematica [A] (verified) . . . 509
Rubi [A] (verified) . . . 509
Maple [C] (verified) . . . 513
Fricas [F] . . . 514
Sympy [F] . . . 515
Maxima [F] . . . 515
Giac [F(-2)] . . . 515
Mupad [F(-1)] . . . 516
Reduce [F] . . . 516

Optimal result

Integrand size = 26, antiderivative size = 296

$$\int (d - c^2 dx^2)^{3/2} (a + b \arcsin(cx))^2 \, dx = -\frac{15}{64} b^2 dx \sqrt{d - c^2 dx^2}$$
$$- \frac{1}{32} b^2 x (d - c^2 dx^2)^{3/2} + \frac{9 b^2 d \sqrt{d - c^2 dx^2} \arcsin(cx)}{64 c \sqrt{1 - c^2 x^2}}$$
$$- \frac{3 bcdx^2 \sqrt{d - c^2 dx^2} (a + b \arcsin(cx))}{8 \sqrt{1 - c^2 x^2}} + \frac{bd (1 - c^2 x^2)^{3/2} \sqrt{d - c^2 dx^2} (a + b \arcsin(cx))}{8c}$$
$$+ \frac{3}{8} dx \sqrt{d - c^2 dx^2} (a + b \arcsin(cx))^2 + \frac{1}{4} x (d - c^2 dx^2)^{3/2} (a + b \arcsin(cx))^2 + \frac{d \sqrt{d - c^2 dx^2} (a + b \arcsin(cx))^3}{8 bc \sqrt{1 - c^2 x^2}}$$

output

```
-15/64*b^2*d*x*(-c^2*d*x^2+d)^(1/2)-1/32*b^2*x*(-c^2*d*x^2+d)^(3/2)+9/64*b
^2*d*(-c^2*d*x^2+d)^(1/2)*arcsin(c*x)/c/(-c^2*x^2+1)^(1/2)-3/8*b*c*d*x^2*(
-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x))/(-c^2*x^2+1)^(1/2)+1/8*b*d*(-c^2*x^2
+1)^(3/2)*(-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x))/c+3/8*d*x*(-c^2*d*x^2+d)^
(1/2)*(a+b*arcsin(c*x))^2+1/4*x*(-c^2*d*x^2+d)^(3/2)*(a+b*arcsin(c*x))^2+1
/8*d*(-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x))^3/b/c/(-c^2*x^2+1)^(1/2)
```

Mathematica [A] (verified)

Time = 0.44 (sec) , antiderivative size = 247, normalized size of antiderivative = 0.83

$$\int \left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2\,dx = \frac{d\sqrt{d-c^2dx^2}\left(8a^3+8ab^2c^2x^2(-5+c^2x^2)+b^3cx\sqrt{1-c^2x^2}(-17+2c^2x^2)-8a^2bcx\sqrt{1}\right.$$

input
```
Integrate[(d - c^2*d*x^2)^(3/2)*(a + b*ArcSin[c*x])^2,x]
```

output
```
(d*Sqrt[d - c^2*d*x^2]*(8*a^3 + 8*a*b^2*c^2*x^2*(-5 + c^2*x^2) + b^3*c*x*S
qrt[1 - c^2*x^2]*(-17 + 2*c^2*x^2) - 8*a^2*b*c*x*Sqrt[1 - c^2*x^2]*(-5 + 2
*c^2*x^2) + b*(24*a^2 + 16*a*b*c*x*(5 - 2*c^2*x^2)*Sqrt[1 - c^2*x^2] + b^2
*(17 - 40*c^2*x^2 + 8*c^4*x^4))*ArcSin[c*x] + 8*b^2*(3*a + b*c*x*(5 - 2*c^
2*x^2)*Sqrt[1 - c^2*x^2])*ArcSin[c*x]^2 + 8*b^3*ArcSin[c*x]^3))/(64*b*c*Sq
rt[1 - c^2*x^2])
```

Rubi [A] (verified)

Time = 1.08 (sec) , antiderivative size = 332, normalized size of antiderivative = 1.12, number of steps used = 10, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.385$, Rules used = {5158, 5156, 5138, 262, 223, 5152, 5182, 211, 211, 223}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2\,dx$$

$$\downarrow 5158$$

$$-\frac{bcd\sqrt{d-c^2dx^2}\int x\left(1-c^2x^2\right)(a+b\arcsin(cx))dx}{2\sqrt{1-c^2x^2}}+\frac{3}{4}d\int\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2dx+\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2$$

$$\downarrow 5156$$

$$-\frac{bcd\sqrt{d-c^2dx^2}\int x\left(1-c^2x^2\right)(a+b\arcsin(cx))dx}{2\sqrt{1-c^2x^2}}+$$
$$\frac{3}{4}d\left(-\frac{bc\sqrt{d-c^2dx^2}\int x(a+b\arcsin(cx))dx}{\sqrt{1-c^2x^2}}+\frac{\sqrt{d-c^2dx^2}\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(c\right.$$
$$\left.\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2\right.$$

$$\downarrow 5138$$

$$-\frac{bcd\sqrt{d-c^2dx^2}\int x\left(1-c^2x^2\right)(a+b\arcsin(cx))dx}{2\sqrt{1-c^2x^2}}+$$
$$\frac{3}{4}d\left(-\frac{bc\sqrt{d-c^2dx^2}\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\int\frac{x^2}{\sqrt{1-c^2x^2}}dx\right)}{\sqrt{1-c^2x^2}}+\frac{\sqrt{d-c^2dx^2}\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c\right.$$
$$\left.\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2\right.$$

$$\downarrow 262$$

$$-\frac{bcd\sqrt{d-c^2dx^2}\int x\left(1-c^2x^2\right)(a+b\arcsin(cx))dx}{2\sqrt{1-c^2x^2}}+$$
$$\frac{3}{4}d\left(-\frac{bc\sqrt{d-c^2dx^2}\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\int\frac{1}{\sqrt{1-c^2x^2}}dx}{2c^2}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)}{\sqrt{1-c^2x^2}}+\frac{\sqrt{d-c^2dx^2}\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}}\right.$$
$$\left.\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2\right.$$

$$\downarrow 223$$

$$-\frac{bcd\sqrt{d-c^2dx^2}\int x\left(1-c^2x^2\right)(a+b\arcsin(cx))dx}{2\sqrt{1-c^2x^2}}+$$
$$\frac{3}{4}d\left(\frac{\sqrt{d-c^2dx^2}\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2-\frac{bc\sqrt{d-c^2dx^2}\left(\frac{1}{2}x^2(a+b\arcsin(cx))\right.}{\sqrt{1-c^2}}\right.$$
$$\left.\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2\right.$$

$$\downarrow 5152$$

$$-\frac{bcd\sqrt{d-c^2dx^2}\int x\left(1-c^2x^2\right)(a+b\arcsin(cx))dx}{2\sqrt{1-c^2x^2}}+\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2+$$
$$\frac{3}{4}d\left(\frac{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^3}{6bc\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2-\frac{bc\sqrt{d-c^2dx^2}\left(\frac{1}{2}x^2(a+b\arcsin(cx))\right.}{\sqrt{1-c^2}}\right.$$

$$\downarrow 5182$$

$$-\frac{bcd\sqrt{d-c^2dx^2}\left(\frac{b\int(1-c^2x^2)^{3/2}dx}{4c}-\frac{(1-c^2x^2)^2(a+b\arcsin(cx))}{4c^2}\right)}{2\sqrt{1-c^2x^2}}+\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2+$$

$$\frac{3}{4}d\left(\frac{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^3}{6bc\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2-\frac{bc\sqrt{d-c^2dx^2}\left(\frac{1}{2}x^2(a+b\arcsin(cx))\right.}{\sqrt{1-c^2}}\right.$$

$$\downarrow 211$$

$$-\frac{bcd\sqrt{d-c^2dx^2}\left(\frac{b\left(\frac{3}{4}\int\sqrt{1-c^2x^2}dx+\frac{1}{4}x\left(1-c^2x^2\right)^{3/2}\right)}{4c}-\frac{(1-c^2x^2)^2(a+b\arcsin(cx))}{4c^2}\right)}{2\sqrt{1-c^2x^2}}+$$

$$\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2+$$

$$\frac{3}{4}d\left(\frac{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^3}{6bc\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2-\frac{bc\sqrt{d-c^2dx^2}\left(\frac{1}{2}x^2(a+b\arcsin(cx))\right.}{\sqrt{1-c^2}}\right.$$

$$\downarrow 211$$

$$-\frac{bcd\sqrt{d-c^2dx^2}\left(\frac{b\left(\frac{3}{4}\left(\frac{1}{2}\int\frac{1}{\sqrt{1-c^2x^2}}dx+\frac{1}{2}x\sqrt{1-c^2x^2}\right)+\frac{1}{4}x\left(1-c^2x^2\right)^{3/2}\right)}{4c}-\frac{(1-c^2x^2)^2(a+b\arcsin(cx))}{4c^2}\right)}{2\sqrt{1-c^2x^2}}+$$

$$\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2+$$

$$\frac{3}{4}d\left(\frac{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^3}{6bc\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2-\frac{bc\sqrt{d-c^2dx^2}\left(\frac{1}{2}x^2(a+b\arcsin(cx))\right.}{\sqrt{1-c^2}}\right.$$

$$\downarrow 223$$

$$\frac{1}{4}x\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2-$$

$$\frac{bcd\sqrt{d-c^2dx^2}\left(\frac{b\left(\frac{3}{4}\left(\frac{\arcsin(cx)}{2c}+\frac{1}{2}x\sqrt{1-c^2x^2}\right)+\frac{1}{4}x\left(1-c^2x^2\right)^{3/2}\right)}{4c}-\frac{(1-c^2x^2)^2(a+b\arcsin(cx))}{4c^2}\right)}{2\sqrt{1-c^2x^2}}+$$

$$\frac{3}{4}d\left(\frac{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^3}{6bc\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2-\frac{bc\sqrt{d-c^2dx^2}\left(\frac{1}{2}x^2(a+b\arcsin(cx))\right.}{\sqrt{1-c^2}}\right.$$

input
```
Int[(d - c^2*d*x^2)^(3/2)*(a + b*ArcSin[c*x])^2,x]
```

output
```
(x*(d - c^2*d*x^2)^(3/2)*(a + b*ArcSin[c*x])^2)/4 + (3*d*((x*Sqrt[d - c^2*
d*x^2]*(a + b*ArcSin[c*x])^2)/2 + (Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x])
^3)/(6*b*c*Sqrt[1 - c^2*x^2]) - (b*c*Sqrt[d - c^2*d*x^2]*((x^2*(a + b*ArcS
in[c*x]))/2 - (b*c*(-1/2*(x*Sqrt[1 - c^2*x^2])/c^2 + ArcSin[c*x]/(2*c^3)))
/2))/Sqrt[1 - c^2*x^2]))/4 - (b*c*d*Sqrt[d - c^2*d*x^2]*(-1/4*((1 - c^2*x^
2)^2*(a + b*ArcSin[c*x]))/c^2 + (b*((x*(1 - c^2*x^2)^(3/2))/4 + (3*((x*Sqr
t[1 - c^2*x^2])/2 + ArcSin[c*x]/(2*c)))/4))/(4*c)))/(2*Sqrt[1 - c^2*x^2])
```

Defintions of rubi rules used

rule 211
```
Int[((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[x*((a + b*x^2)^p/(2*p + 1
)), x] + Simp[2*a*(p/(2*p + 1))   Int[(a + b*x^2)^(p - 1), x], x] /; FreeQ[
{a, b}, x] && GtQ[p, 0] && (IntegerQ[4*p] || IntegerQ[6*p])
```

rule 223
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSin[Rt[-b, 2]*(x/Sqrt
[a])]/Rt[-b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && NegQ[b]
```

rule 262
```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[c*(c*x)
^(m - 1)*((a + b*x^2)^(p + 1)/(b*(m + 2*p + 1))), x] - Simp[a*c^2*((m - 1)/
(b*(m + 2*p + 1)))   Int[(c*x)^(m - 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b
, c, p}, x] && GtQ[m, 2 - 1] && NeQ[m + 2*p + 1, 0] && IntBinomialQ[a, b, c
, 2, m, p, x]
```

rule 5138
```
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] - Simp[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 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

rule 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5182
```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.26 (sec) , antiderivative size = 929, normalized size of antiderivative = 3.14

method	result
default	$\frac{a^2x(-c^2dx^2+d)^{\frac{3}{2}}}{4}+\frac{3a^2dx\sqrt{-c^2dx^2+d}}{8}+\frac{3a^2d^2\arctan\left(\frac{\sqrt{c^2}dx}{\sqrt{-c^2dx^2+d}}\right)}{8\sqrt{c^2}d}+b^2\left(-\frac{\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\arcsin(cx)^3d}{8(c^2x^2-1)c}\right.$
parts	$\frac{a^2x(-c^2dx^2+d)^{\frac{3}{2}}}{4}+\frac{3a^2dx\sqrt{-c^2dx^2+d}}{8}+\frac{3a^2d^2\arctan\left(\frac{\sqrt{c^2}dx}{\sqrt{-c^2dx^2+d}}\right)}{8\sqrt{c^2}d}+b^2\left(-\frac{\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\arcsin(cx)^3d}{8(c^2x^2-1)c}\right.$

input
```
int((-c^2*d*x^2+d)^(3/2)*(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output

```
1/4*a^2*x*(-c^2*d*x^2+d)^(3/2)+3/8*a^2*d*x*(-c^2*d*x^2+d)^(1/2)+3/8*a^2*d^
2/(c^2*d)^(1/2)*arctan((c^2*d)^(1/2)*x/(-c^2*d*x^2+d)^(1/2))+b^2*(-1/8*(-d
*(c^2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/(c^2*x^2-1)/c*arcsin(c*x)^3*d-1/512
*(-d*(c^2*x^2-1))^(1/2)*(-8*I*(-c^2*x^2+1)^(1/2)*x^4*c^4+8*c^5*x^5+8*I*(-c
^2*x^2+1)^(1/2)*x^2*c^2-12*c^3*x^3-I*(-c^2*x^2+1)^(1/2)+4*c*x)*(4*I*arcsin
(c*x)+8*arcsin(c*x)^2-1)*d/(c^2*x^2-1)/c+1/16*(-d*(c^2*x^2-1))^(1/2)*(2*I*
(-c^2*x^2+1)^(1/2)*x^2*c^2+2*c^3*x^3-I*(-c^2*x^2+1)^(1/2)-2*c*x)*(2*arcsin
(c*x)^2-1-2*I*arcsin(c*x))*d/(c^2*x^2-1)/c-1/512*(-d*(c^2*x^2-1))^(1/2)*(I
*c^2*x^2-c*x*(-c^2*x^2+1)^(1/2)-I)*(68*I*arcsin(c*x)+56*arcsin(c*x)^2-31)*
cos(3*arcsin(c*x))*d/(c^2*x^2-1)/c+3/512*(-d*(c^2*x^2-1))^(1/2)*(I*(-c^2*x
^2+1)^(1/2)*c*x+c^2*x^2-1)*(20*I*arcsin(c*x)+24*arcsin(c*x)^2-11)*sin(3*ar
csin(c*x))*d/(c^2*x^2-1)/c)+2*a*b*(-3/16*(-d*(c^2*x^2-1))^(1/2)*(-c^2*x^2+
1)^(1/2)/(c^2*x^2-1)/c*arcsin(c*x)^2*d-1/256*(-d*(c^2*x^2-1))^(1/2)*(-8*I*
(-c^2*x^2+1)^(1/2)*x^4*c^4+8*c^5*x^5+8*I*(-c^2*x^2+1)^(1/2)*x^2*c^2-12*c^3
*x^3-I*(-c^2*x^2+1)^(1/2)+4*c*x)*(I+4*arcsin(c*x))*d/(c^2*x^2-1)/c+1/16*(-
d*(c^2*x^2-1))^(1/2)*(2*I*(-c^2*x^2+1)^(1/2)*x^2*c^2+2*c^3*x^3-I*(-c^2*x^2
+1)^(1/2)-2*c*x)*(-I+2*arcsin(c*x))*d/(c^2*x^2-1)/c-1/256*(-d*(c^2*x^2-1))
^(1/2)*(I*c^2*x^2-c*x*(-c^2*x^2+1)^(1/2)-I)*(17*I+28*arcsin(c*x))*cos(3*ar
csin(c*x))*d/(c^2*x^2-1)/c+3/256*(-d*(c^2*x^2-1))^(1/2)*(I*(-c^2*x^2+1)^(1
/2)*c*x+c^2*x^2-1)*(5*I+12*arcsin(c*x))*sin(3*arcsin(c*x))*d/(c^2*x^2-1...
```

Fricas [F]

$$\int \left(d - c^2 dx^2\right)^{3/2} \left(a + b \arcsin(cx)\right)^2 dx = \int \left(-c^2 dx^2 + d\right)^{\frac{3}{2}} \left(b \arcsin\left(cx\right) + a\right)^2 dx$$

input

```
integrate((-c^2*d*x^2+d)^(3/2)*(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output

```
integral(-(a^2*c^2*d*x^2 - a^2*d + (b^2*c^2*d*x^2 - b^2*d)*arcsin(c*x)^2 +
 2*(a*b*c^2*d*x^2 - a*b*d)*arcsin(c*x))*sqrt(-c^2*d*x^2 + d), x)
```

Sympy [F]

$$\int \left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2\,dx = \int \left(-d(cx-1)\left(cx+1\right)\right)^{\frac{3}{2}}\left(a+b\,\mathrm{asin}\left(cx\right)\right)^2\,dx$$

input
```
integrate((-c**2*d*x**2+d)**(3/2)*(a+b*asin(c*x))**2,x)
```

output
```
Integral((-d*(c*x - 1)*(c*x + 1))**(3/2)*(a + b*asin(c*x))**2, x)
```

Maxima [F]

$$\int \left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2\,dx = \int \left(-c^2dx^2+d\right)^{\frac{3}{2}}\left(b\arcsin\left(cx\right)+a\right)^2\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(3/2)*(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
1/8*(2*(-c^2*d*x^2 + d)^(3/2)*x + 3*sqrt(-c^2*d*x^2 + d)*d*x + 3*d^(3/2)*a
rcsin(c*x)/c)*a^2 + sqrt(d)*integrate(-((b^2*c^2*d*x^2 - b^2*d)*arctan2(c*
x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 + 2*(a*b*c^2*d*x^2 - a*b*d)*arctan2(c*x
, sqrt(c*x + 1)*sqrt(-c*x + 1)))*sqrt(c*x + 1)*sqrt(-c*x + 1), x)
```

Giac [F(-2)]

Exception generated.

$$\int \left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)^(3/2)*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2\,dx=\int \left(a+b\,\text{asin}(c\,x)\right)^2\left(d-c^2\,d\,x^2\right)^{3/2}\,dx$$

input
```
int((a + b*asin(c*x))^2*(d - c^2*d*x^2)^(3/2),x)
```

output
```
int((a + b*asin(c*x))^2*(d - c^2*d*x^2)^(3/2), x)
```

Reduce [F]

$$\int \left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2\,dx=\frac{\sqrt{d}\,d\left(3asin(cx)\,a^2-2\sqrt{-c^2x^2+1}\,a^2c^3x^3+5\sqrt{-c^2x^2+1}\,a^2cx-16\left(\int \sqrt{-c^2x^2+1}\,a\right.\right.}{}$$

input
```
int((-c^2*d*x^2+d)^(3/2)*(a+b*asin(c*x))^2,x)
```

output
```
(sqrt(d)*d*(3*asin(c*x)*a**2 - 2*sqrt( - c**2*x**2 + 1)*a**2*c**3*x**3 + 5
*sqrt( - c**2*x**2 + 1)*a**2*c*x - 16*int(sqrt( - c**2*x**2 + 1)*asin(c*x)
*x**2,x)*a*b*c**3 + 16*int(sqrt( - c**2*x**2 + 1)*asin(c*x),x)*a*b*c - 8*i
nt(sqrt( - c**2*x**2 + 1)*asin(c*x)**2*x**2,x)*b**2*c**3 + 8*int(sqrt( - c
**2*x**2 + 1)*asin(c*x)**2,x)*b**2*c))/(8*c)
```

3.59 $\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2\,dx$

Optimal result . . . 517
Mathematica [A] (verified) . . . 518
Rubi [A] (verified) . . . 518
Maple [C] (verified) . . . 521
Fricas [F] . . . 521
Sympy [F] . . . 522
Maxima [F] . . . 522
Giac [F(-2)] . . . 522
Mupad [F(-1)] . . . 523
Reduce [F] . . . 523

Optimal result

Integrand size = 26, antiderivative size = 192

$$\begin{aligned}\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2\,dx = &-\frac{1}{4}b^2x\sqrt{d-c^2dx^2}+\frac{b^2\sqrt{d-c^2dx^2}\arcsin(cx)}{4c\sqrt{1-c^2x^2}}\\&-\frac{bcx^2\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}{2\sqrt{1-c^2x^2}}\\&+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2\\&+\frac{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^3}{6bc\sqrt{1-c^2x^2}}\end{aligned}$$

output

```
-1/4*b^2*x*(-c^2*d*x^2+d)^(1/2)+1/4*b^2*(-c^2*d*x^2+d)^(1/2)*arcsin(c*x)/c
/(-c^2*x^2+1)^(1/2)-1/2*b*c*x^2*(-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x))/(-c
^2*x^2+1)^(1/2)+1/2*x*(-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2+1/6*(-c^2*d
*x^2+d)^(1/2)*(a+b*arcsin(c*x))^3/b/c/(-c^2*x^2+1)^(1/2)
```

Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 128, normalized size of antiderivative = 0.67

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2\,dx$$
$$= \frac{1}{6}\sqrt{d-c^2dx^2}\left(3x(a+b\arcsin(cx))^2+\frac{(a+b\arcsin(cx))^3}{bc\sqrt{1-c^2x^2}}\right.$$
$$\left.-\frac{3b\left(cx\left(2acx+b\sqrt{1-c^2x^2}\right)+b(-1+2c^2x^2)\arcsin(cx)\right)}{2c\sqrt{1-c^2x^2}}\right)$$

input
```
Integrate[Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x])^2,x]
```

output
```
(Sqrt[d - c^2*d*x^2]*(3*x*(a + b*ArcSin[c*x])^2 + (a + b*ArcSin[c*x])^3/(b
*c*Sqrt[1 - c^2*x^2]) - (3*b*(c*x*(2*a*c*x + b*Sqrt[1 - c^2*x^2]) + b*(-1
+ 2*c^2*x^2)*ArcSin[c*x]))/(2*c*Sqrt[1 - c^2*x^2])))/6
```

Rubi [A] (verified)

Time = 0.55 (sec) , antiderivative size = 169, normalized size of antiderivative = 0.88, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$, Rules used = {5156, 5138, 262, 223, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2\,dx$$
$$\downarrow 5156$$
$$-\frac{bc\sqrt{d-c^2dx^2}\int x(a+b\arcsin(cx))dx}{\sqrt{1-c^2x^2}}+\frac{\sqrt{d-c^2dx^2}\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}}+$$
$$\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2$$
$$\downarrow 5138$$

$$-\frac{bc\sqrt{d-c^2dx^2}\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\int\frac{x^2}{\sqrt{1-c^2x^2}}dx\right)}{\sqrt{1-c^2x^2}}+$$
$$\frac{\sqrt{d-c^2dx^2}\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2$$

$$\downarrow 262$$

$$-\frac{bc\sqrt{d-c^2dx^2}\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\int\frac{1}{\sqrt{1-c^2x^2}}dx}{2c^2}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)}{\sqrt{1-c^2x^2}}+$$
$$\frac{\sqrt{d-c^2dx^2}\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2$$

$$\downarrow 223$$

$$\frac{\sqrt{d-c^2dx^2}\int\frac{(a+b\arcsin(cx))^2}{\sqrt{1-c^2x^2}}dx}{2\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2-$$
$$\frac{bc\sqrt{d-c^2dx^2}\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\arcsin(cx)}{2c^3}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)}{\sqrt{1-c^2x^2}}$$

$$\downarrow 5152$$

$$\frac{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^3}{6bc\sqrt{1-c^2x^2}}+\frac{1}{2}x\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2-$$
$$\frac{bc\sqrt{d-c^2dx^2}\left(\frac{1}{2}x^2(a+b\arcsin(cx))-\frac{1}{2}bc\left(\frac{\arcsin(cx)}{2c^3}-\frac{x\sqrt{1-c^2x^2}}{2c^2}\right)\right)}{\sqrt{1-c^2x^2}}$$

input

```
Int[Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x])^2,x]
```

output

```
(x*Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x])^2)/2 + (Sqrt[d - c^2*d*x^2]*(a
+ b*ArcSin[c*x])^3)/(6*b*c*Sqrt[1 - c^2*x^2]) - (b*c*Sqrt[d - c^2*d*x^2]*(
(x^2*(a + b*ArcSin[c*x]))/2 - (b*c*(-1/2*(x*Sqrt[1 - c^2*x^2])/c^2 + ArcSi
n[c*x]/(2*c^3)))/2))/Sqrt[1 - c^2*x^2]
```

Defintions of rubi rules used

rule 223
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSin[Rt[-b, 2]*(x/Sqrt
[a])]/Rt[-b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && NegQ[b]
```

rule 262
```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[c*(c*x)
^(m - 1)*((a + b*x^2)^(p + 1)/(b*(m + 2*p + 1))), x] - Simp[a*c^2*((m - 1)/
(b*(m + 2*p + 1)))   Int[(c*x)^(m - 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b
, c, p}, x] && GtQ[m, 2 - 1] && NeQ[m + 2*p + 1, 0] && IntBinomialQ[a, b, c
, 2, m, p, x]
```

rule 5138
```
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] - Simp[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 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.20 (sec) , antiderivative size = 531, normalized size of antiderivative = 2.77

method	result
default	$\frac{a^2 x\sqrt{-c^2dx^2+d}}{2}+\frac{a^2d\arctan\left(\frac{\sqrt{c^2d}\,x}{\sqrt{-c^2dx^2+d}}\right)}{2\sqrt{c^2d}}+b^2\left(-\frac{\sqrt{-d(c^2x^2-1)}\,\sqrt{-c^2x^2+1}\,\arcsin(cx)^3}{6(c^2x^2-1)c}+\frac{\sqrt{-d(c^2x^2-1)}\left(-2i\sqrt{-c^2}\right.\right.$
parts	$\frac{a^2 x\sqrt{-c^2dx^2+d}}{2}+\frac{a^2d\arctan\left(\frac{\sqrt{c^2d}\,x}{\sqrt{-c^2dx^2+d}}\right)}{2\sqrt{c^2d}}+b^2\left(-\frac{\sqrt{-d(c^2x^2-1)}\,\sqrt{-c^2x^2+1}\,\arcsin(cx)^3}{6(c^2x^2-1)c}+\frac{\sqrt{-d(c^2x^2-1)}\left(-2i\sqrt{-c^2}\right.\right.$

input
```
int((-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*a^2*x*(-c^2*d*x^2+d)^(1/2)+1/2*a^2*d/(c^2*d)^(1/2)*arctan((c^2*d)^(1/2
)*x/(-c^2*d*x^2+d)^(1/2))+b^2*(-1/6*(-d*(c^2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1
/2)/(c^2*x^2-1)/c*arcsin(c*x)^3+1/16*(-d*(c^2*x^2-1))^(1/2)*(-2*I*(-c^2*x^
2+1)^(1/2)*x^2*c^2+2*c^3*x^3+I*(-c^2*x^2+1)^(1/2)-2*c*x)*(2*arcsin(c*x)^2-
1+2*I*arcsin(c*x))/(c^2*x^2-1)/c+1/16*(-d*(c^2*x^2-1))^(1/2)*(2*I*(-c^2*x^
2+1)^(1/2)*x^2*c^2+2*c^3*x^3-I*(-c^2*x^2+1)^(1/2)-2*c*x)*(2*arcsin(c*x)^2-
1-2*I*arcsin(c*x))/(c^2*x^2-1)/c)+2*a*b*(-1/4*(-d*(c^2*x^2-1))^(1/2)*(-c^2
*x^2+1)^(1/2)/(c^2*x^2-1)/c*arcsin(c*x)^2+1/16*(-d*(c^2*x^2-1))^(1/2)*(-2*
I*(-c^2*x^2+1)^(1/2)*x^2*c^2+2*c^3*x^3+I*(-c^2*x^2+1)^(1/2)-2*c*x)*(I+2*ar
csin(c*x))/(c^2*x^2-1)/c+1/16*(-d*(c^2*x^2-1))^(1/2)*(2*I*(-c^2*x^2+1)^(1/
2)*x^2*c^2+2*c^3*x^3-I*(-c^2*x^2+1)^(1/2)-2*c*x)*(-I+2*arcsin(c*x))/(c^2*x
^2-1)/c)
```

Fricas [F]

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2\,dx=\int \sqrt{-c^2dx^2+d}(b\arcsin(cx)+a)^2\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(sqrt(-c^2*d*x^2 + d)*(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2
), x)
```

Sympy [F]

$$\int \sqrt{d - c^2 dx^2}(a + b \arcsin(cx))^2 \, dx = \int \sqrt{-d\,(cx - 1)\,(cx + 1)}(a + b\,\mathrm{asin}\,(cx))^2 \, dx$$

input
```
integrate((-c**2*d*x**2+d)**(1/2)*(a+b*asin(c*x))**2,x)
```

output
```
Integral(sqrt(-d*(c*x - 1)*(c*x + 1))*(a + b*asin(c*x))**2, x)
```

Maxima [F]

$$\int \sqrt{d - c^2 dx^2}(a + b \arcsin(cx))^2 \, dx = \int \sqrt{-c^2 dx^2 + d}(b \arcsin(cx) + a)^2 \, dx$$

input
```
integrate((-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
1/2*(sqrt(-c^2*d*x^2 + d)*x + sqrt(d)*arcsin(c*x)/c)*a^2 + sqrt(d)*integra
te((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)))*sqrt(c*x + 1)*sqrt(-c*x + 1), x)
```

Giac [F(-2)]

Exception generated.

$$\int \sqrt{d - c^2 dx^2}(a + b \arcsin(cx))^2 \, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2\,dx = \int (a+b\,\mathrm{asin}(c\,x))^2\,\sqrt{d-c^2\,d\,x^2}\,dx$$

input
```
int((a + b*asin(c*x))^2*(d - c^2*d*x^2)^(1/2),x)
```

output
```
int((a + b*asin(c*x))^2*(d - c^2*d*x^2)^(1/2), x)
```

Reduce [F]

$$\int \sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2\,dx$$
$$= \frac{\sqrt{d}\left(asin(cx)\,a^2+\sqrt{-c^2x^2+1}\,a^2cx+4\left(\int \sqrt{-c^2x^2+1}\,asin(cx)\,dx\right)abc+2\left(\int \sqrt{-c^2x^2+1}\,asin(cx)^2\,dx\right.\right.}{2c}$$

input
```
int((-c^2*d*x^2+d)^(1/2)*(a+b*asin(c*x))^2,x)
```

output
```
(sqrt(d)*(asin(c*x)*a**2 + sqrt( - c**2*x**2 + 1)*a**2*c*x + 4*int(sqrt( -
 c**2*x**2 + 1)*asin(c*x),x)*a*b*c + 2*int(sqrt( - c**2*x**2 + 1)*asin(c*x
)**2,x)*b**2*c))/(2*c)
```

3.60 $\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d-c^2dx^2}}\,dx$

Optimal result . . . 524
Mathematica [A] (verified) . . . 524
Rubi [A] (verified) . . . 525
Maple [B] (verified) . . . 525
Fricas [F] . . . 526
Sympy [F] . . . 526
Maxima [A] (verification not implemented) . . . 527
Giac [A] (verification not implemented) . . . 527
Mupad [F(-1)] . . . 527
Reduce [B] (verification not implemented) . . . 528

Optimal result

Integrand size = 26, antiderivative size = 49

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d-c^2dx^2}}\,dx = \frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))^3}{3bc\sqrt{d-c^2dx^2}}$$

output
```
1/3*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))^3/b/c/(-c^2*d*x^2+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.38 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.31

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d-c^2dx^2}}\,dx = \frac{\sqrt{1-c^2x^2}\arcsin(cx)\left(3a^2+3ab\arcsin(cx)+b^2\arcsin(cx)^2\right)}{3c\sqrt{d-c^2dx^2}}$$

input
```
Integrate[(a + b*ArcSin[c*x])^2/Sqrt[d - c^2*d*x^2],x]
```

output
```
(Sqrt[1 - c^2*x^2]*ArcSin[c*x]*(3*a^2 + 3*a*b*ArcSin[c*x] + b^2*ArcSin[c*x
]^2))/(3*c*Sqrt[d - c^2*d*x^2])
```

Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.038$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a + b \arcsin(cx))^2}{\sqrt{d - c^2 dx^2}}\, dx$$

$$\downarrow 5152$$

$$\frac{\sqrt{1 - c^2 x^2}(a + b \arcsin(cx))^3}{3bc\sqrt{d - c^2 dx^2}}$$

input
```
Int[(a + b*ArcSin[c*x])^2/Sqrt[d - c^2*d*x^2],x]
```

output
```
(Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^3)/(3*b*c*Sqrt[d - c^2*d*x^2])
```

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 142 vs. $2(43) = 86$.

Time = 0.16 (sec) , antiderivative size = 143, normalized size of antiderivative = 2.92

method	result	size
default	$\frac{a^2 \arctan\left(\frac{\sqrt{c^2 d}\, x}{\sqrt{-c^2 d x^2+d}}\right)}{\sqrt{c^2 d}} - \frac{b^2 \sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\,\arcsin(cx)^3}{3cd(c^2x^2-1)} - \frac{ab\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\,\arcsin(cx)^2}{cd(c^2x^2-1)}$	143
parts	$\frac{a^2 \arctan\left(\frac{\sqrt{c^2 d}\, x}{\sqrt{-c^2 d x^2+d}}\right)}{\sqrt{c^2 d}} - \frac{b^2 \sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\,\arcsin(cx)^3}{3cd(c^2x^2-1)} - \frac{ab\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\,\arcsin(cx)^2}{cd(c^2x^2-1)}$	143

input
```
int((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
a^2/(c^2*d)^(1/2)*arctan((c^2*d)^(1/2)*x/(-c^2*d*x^2+d)^(1/2))-1/3*b^2*(-d
*(c^2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/c/d/(c^2*x^2-1)*arcsin(c*x)^3-a*b*(
-d*(c^2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/c/d/(c^2*x^2-1)*arcsin(c*x)^2
```

Fricas [F]

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d-c^2dx^2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{\sqrt{-c^2dx^2+d}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral(-sqrt(-c^2*d*x^2 + d)*(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^
2)/(c^2*d*x^2 - d), x)
```

Sympy [F]

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d-c^2dx^2}}\,dx = \int \frac{(a+b\operatorname{asin}(cx))^2}{\sqrt{-d\,(cx-1)\,(cx+1)}}\,dx$$

input
```
integrate((a+b*asin(c*x))**2/(-c**2*d*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*asin(c*x))**2/sqrt(-d*(c*x - 1)*(c*x + 1)), x)
```

Maxima [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 47, normalized size of antiderivative = 0.96

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d-c^2dx^2}}\,dx = \frac{b^2\arcsin(cx)^3}{3\,c\sqrt{d}} + \frac{ab\arcsin(cx)^2}{c\sqrt{d}} + \frac{a^2\arcsin(cx)}{c\sqrt{d}}$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
1/3*b^2*arcsin(c*x)^3/(c*sqrt(d)) + a*b*arcsin(c*x)^2/(c*sqrt(d)) + a^2*ar
csin(c*x)/(c*sqrt(d))
```

Giac [A] (verification not implemented)

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

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d-c^2dx^2}}\,dx = \frac{b^2\arcsin(cx)^3 + 3\,ab\arcsin(cx)^2 + 3\,a^2\arcsin(cx)}{3\,c\sqrt{d}}$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
1/3*(b^2*arcsin(c*x)^3 + 3*a*b*arcsin(c*x)^2 + 3*a^2*arcsin(c*x))/(c*sqrt(
d))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d-c^2dx^2}}\,dx = \int \frac{(a+b\,\mathrm{asin}(c\,x))^2}{\sqrt{d-c^2\,d\,x^2}}\,dx$$

input
```
int((a + b*asin(c*x))^2/(d - c^2*d*x^2)^(1/2),x)
```

output
```
int((a + b*asin(c*x))^2/(d - c^2*d*x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 38, normalized size of antiderivative = 0.78

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d-c^2dx^2}}\,dx = \frac{\sqrt{d}\,asin(cx)\left(asin(cx)^2\,b^2+3asin(cx)\,ab+3a^2\right)}{3cd}$$

input
```
int((a+b*asin(c*x))^2/(-c^2*d*x^2+d)^(1/2),x)
```

output
```
(sqrt(d)*asin(c*x)*(asin(c*x)**2*b**2 + 3*asin(c*x)*a*b + 3*a**2))/(3*c*d)
```

3.61 $\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}\,dx$

Optimal result . . . 529
Mathematica [A] (verified) . . . 530
Rubi [A] (verified) . . . 530
Maple [A] (verified) . . . 533
Fricas [F] . . . 533
Sympy [F] . . . 534
Maxima [F] . . . 534
Giac [F(-2)] . . . 534
Mupad [F(-1)] . . . 535
Reduce [F] . . . 535

Optimal result

Integrand size = 26, antiderivative size = 195

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}\,dx = \frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}} - \frac{i\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2}{cd\sqrt{d-c^2dx^2}} + \frac{2b\sqrt{1-c^2x^2}(a+b\arcsin(cx))\log\left(1+e^{2i\arcsin(cx)}\right)}{cd\sqrt{d-c^2dx^2}} - \frac{ib^2\sqrt{1-c^2x^2}\,\mathrm{PolyLog}\left(2,-e^{2i\arcsin(cx)}\right)}{cd\sqrt{d-c^2dx^2}}$$

output

```
x*(a+b*arcsin(c*x))^2/d/(-c^2*d*x^2+d)^(1/2)-I*(-c^2*x^2+1)^(1/2)*(a+b*arc
sin(c*x))^2/c/d/(-c^2*d*x^2+d)^(1/2)+2*b*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*
x))*ln(1+(I*c*x+(-c^2*x^2+1)^(1/2))^2)/c/d/(-c^2*d*x^2+d)^(1/2)-I*b^2*(-c^
2*x^2+1)^(1/2)*polylog(2,-(I*c*x+(-c^2*x^2+1)^(1/2))^2)/c/d/(-c^2*d*x^2+d)
^(1/2)
```

Mathematica [A] (verified)

Time = 0.61 (sec) , antiderivative size = 165, normalized size of antiderivative = 0.85

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}\,dx = \frac{b^2\left(cx-i\sqrt{1-c^2x^2}\right)\arcsin(cx)^2+2b\arcsin(cx)\left(acx+b\sqrt{1-c^2x^2}\log\left(1+e^2\right.\right.}{c}$$

input
```
Integrate[(a + b*ArcSin[c*x])^2/(d - c^2*d*x^2)^(3/2),x]
```

output
```
(b^2*(c*x - I*Sqrt[1 - c^2*x^2])*ArcSin[c*x]^2 + 2*b*ArcSin[c*x]*(a*c*x +
b*Sqrt[1 - c^2*x^2]*Log[1 + E^((2*I)*ArcSin[c*x])]) + a*(a*c*x + b*Sqrt[1
- c^2*x^2]*Log[1 - c^2*x^2]) - I*b^2*Sqrt[1 - c^2*x^2]*PolyLog[2, -E^((2*I
)*ArcSin[c*x])])/(c*d*Sqrt[d - c^2*d*x^2])
```

Rubi [A] (verified)

Time = 0.61 (sec) , antiderivative size = 140, normalized size of antiderivative = 0.72, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.269$, Rules used = {5160, 5180, 3042, 4202, 2620, 2715, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}\,dx$$

$$\downarrow 5160$$

$$\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}} - \frac{2bc\sqrt{1-c^2x^2}\int \frac{x(a+b\arcsin(cx))}{1-c^2x^2}dx}{d\sqrt{d-c^2dx^2}}$$

$$\downarrow 5180$$

$$\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}} - \frac{2b\sqrt{1-c^2x^2}\int \frac{cx(a+b\arcsin(cx))}{\sqrt{1-c^2x^2}}d\arcsin(cx)}{cd\sqrt{d-c^2dx^2}}$$

$$\downarrow 3042$$

$$\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}} - \frac{2b\sqrt{1-c^2x^2}\int (a+b\arcsin(cx))\tan(\arcsin(cx))d\arcsin(cx)}{cd\sqrt{d-c^2dx^2}}$$

$$\downarrow 4202$$

$$\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}} - \frac{2b\sqrt{1-c^2x^2}\left(\frac{i(a+b\arcsin(cx))^2}{2b} - 2i\int \frac{e^{2i\arcsin(cx)}(a+b\arcsin(cx))}{1+e^{2i\arcsin(cx)}}d\arcsin(cx)\right)}{cd\sqrt{d-c^2dx^2}}$$

$$\downarrow 2620$$

$$\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}} - \frac{2b\sqrt{1-c^2x^2}\left(\frac{i(a+b\arcsin(cx))^2}{2b} - 2i\left(\frac{1}{2}ib\int \log\left(1+e^{2i\arcsin(cx)}\right)d\arcsin(cx) - \frac{1}{2}i\log\left(1+e^{2i\arcsin(cx)}\right)(a+b\arcsin\right.\right.}{cd\sqrt{d-c^2dx^2}}$$

$$\downarrow 2715$$

$$\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}} - \frac{2b\sqrt{1-c^2x^2}\left(\frac{i(a+b\arcsin(cx))^2}{2b} - 2i\left(\frac{1}{4}b\int e^{-2i\arcsin(cx)}\log\left(1+e^{2i\arcsin(cx)}\right)de^{2i\arcsin(cx)} - \frac{1}{2}i\log\left(1+e^{2i\arcsin(cx)}\right)\right.\right.}{cd\sqrt{d-c^2dx^2}}$$

$$\downarrow 2838$$

$$\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}} - \frac{2b\sqrt{1-c^2x^2}\left(\frac{i(a+b\arcsin(cx))^2}{2b} - 2i\left(-\frac{1}{2}i\log\left(1+e^{2i\arcsin(cx)}\right)(a+b\arcsin(cx)) - \frac{1}{4}b\,\mathrm{PolyLog}\left(2,-e^{2i\arcsin(cx)}\right)\right)\right)}{cd\sqrt{d-c^2dx^2}}$$

input

```
Int[(a + b*ArcSin[c*x])^2/(d - c^2*d*x^2)^(3/2),x]
```

output

```
(x*(a + b*ArcSin[c*x])^2)/(d*Sqrt[d - c^2*d*x^2]) - (2*b*Sqrt[1 - c^2*x^2]
*(((I/2)*(a + b*ArcSin[c*x])^2)/b - (2*I)*((-1/2*I)*(a + b*ArcSin[c*x])*Lo
g[1 + E^((2*I)*ArcSin[c*x])] - (b*PolyLog[2, -E^((2*I)*ArcSin[c*x])])/4)))
/(c*d*Sqrt[d - c^2*d*x^2])
```

Defintions of rubi rules used

rule 2620
```
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/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[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 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[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 2838
```
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 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4202
```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[I
*((c + d*x)^(m + 1)/(d*(m + 1))), x] - Simp[2*I  Int[(c + d*x)^m*(E^(2*I*(
e + f*x))/(1 + E^(2*I*(e + f*x)))), x], x] /; FreeQ[{c, d, e, f}, x] && IGt
Q[m, 0]
```

rule 5160
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2)^(3/2), x
_Symbol] :> Simp[x*((a + b*ArcSin[c*x])^n/(d*Sqrt[d + e*x^2])), x] - Simp[b
*c*(n/d)*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]  Int[x*((a + b*ArcSin[c*x
])^(n - 1)/(1 - c^2*x^2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d
 + e, 0] && GtQ[n, 0]
```

rule 5180
```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_))/((d_) + (e_.)*(x_)^2),
x_Symbol] :> Simp[-e^(-1)  Subst[Int[(a + b*x)^n*Tan[x], x], x, ArcSin[c*x
]], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && IGtQ[n, 0]
```

Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 354, normalized size of antiderivative = 1.82

method	result
default	$\frac{a^2 x}{d\sqrt{-c^2 d x^2+d}} + b^2\left(-\frac{\sqrt{-d(c^2x^2-1)}\left(i\sqrt{-c^2x^2+1}+cx\right)\arcsin(cx)^2}{c\,d^2(c^2x^2-1)} + \frac{i\sqrt{-c^2x^2+1}\,\sqrt{-d(c^2x^2-1)}\left(2i\arcsin(cx)\ln\left(1+\left(i\right.\right.\right.\right.$
parts	$\frac{a^2 x}{d\sqrt{-c^2 d x^2+d}} + b^2\left(-\frac{\sqrt{-d(c^2x^2-1)}\left(i\sqrt{-c^2x^2+1}+cx\right)\arcsin(cx)^2}{c\,d^2(c^2x^2-1)} + \frac{i\sqrt{-c^2x^2+1}\,\sqrt{-d(c^2x^2-1)}\left(2i\arcsin(cx)\ln\left(1+\left(i\right.\right.\right.\right.$

input
```
int((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^(3/2),x,method=_RETURNVERBOSE)
```

output
```
a^2*x/d/(-c^2*d*x^2+d)^(1/2)+b^2*(-(-d*(c^2*x^2-1))^(1/2)*(I*(-c^2*x^2+1)^
(1/2)+c*x)*arcsin(c*x)^2/c/d^2/(c^2*x^2-1)+I*(-c^2*x^2+1)^(1/2)*(-d*(c^2*x
^2-1))^(1/2)/c/d^2/(c^2*x^2-1)*(2*I*arcsin(c*x)*ln(1+(I*c*x+(-c^2*x^2+1)^(
1/2))^2)+2*arcsin(c*x)^2+polylog(2,-(I*c*x+(-c^2*x^2+1)^(1/2))^2)))+2*I*a*
b*(-d*(c^2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/c/d^2/(c^2*x^2-1)*arcsin(c*x)-
2*a*b*(-d*(c^2*x^2-1))^(1/2)*arcsin(c*x)/d^2/(c^2*x^2-1)*x-2*a*b*(-d*(c^2*
x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/c/d^2/(c^2*x^2-1)*ln(1+(I*c*x+(-c^2*x^2+1
)^(1/2))^2)
```

Fricas [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(-c^2dx^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
integral(sqrt(-c^2*d*x^2 + d)*(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2
)/(c^4*d^2*x^4 - 2*c^2*d^2*x^2 + d^2), x)
```

Sympy [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}\,dx = \int \frac{(a+b\operatorname{asin}(cx))^2}{(-d(cx-1)(cx+1))^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*asin(c*x))**2/(-c**2*d*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*asin(c*x))**2/(-d*(c*x - 1)*(c*x + 1))**(3/2), x)
```

Maxima [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(-c^2dx^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
2*a*b*x*arcsin(c*x)/(sqrt(-c^2*d*x^2 + d)*d) - b^2*integrate(arctan2(c*x,
sqrt(c*x + 1)*sqrt(-c*x + 1))^2/((c^2*d*x^2 - d)*sqrt(c*x + 1)*sqrt(-c*x +
 1)), x)/sqrt(d) + a^2*x/(sqrt(-c^2*d*x^2 + d)*d) - a*b*log(x^2 - 1/c^2)/(
c*d^(3/2))
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:index.cc index_m i_lex_is_greater E
rror: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}\,dx = \int \frac{(a+b\,\mathrm{asin}(c\,x))^2}{(d-c^2\,d\,x^2)^{3/2}}\,dx$$

input
```
int((a + b*asin(c*x))^2/(d - c^2*d*x^2)^(3/2),x)
```

output
```
int((a + b*asin(c*x))^2/(d - c^2*d*x^2)^(3/2), x)
```

Reduce [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}\,dx = \frac{-2\sqrt{-c^2x^2+1}\left(\int \frac{asin(cx)}{\sqrt{-c^2x^2+1}\,c^2x^2-\sqrt{-c^2x^2+1}}dx\right)ab-\sqrt{-c^2x^2+1}\left(\int \frac{asin(}{\sqrt{-c^2x^2+1}\,c^2x}\right.}{\sqrt{d}\sqrt{-c^2x^2+1}\,d}$$

input
```
int((a+b*asin(c*x))^2/(-c^2*d*x^2+d)^(3/2),x)
```

output
```
( - 2*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**2*x*
*2 - sqrt( - c**2*x**2 + 1)),x)*a*b - sqrt( - c**2*x**2 + 1)*int(asin(c*x)
**2/(sqrt( - c**2*x**2 + 1)*c**2*x**2 - sqrt( - c**2*x**2 + 1)),x)*b**2 +
a**2*x)/(sqrt(d)*sqrt( - c**2*x**2 + 1)*d)
```

3.62 $\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{5/2}}\,dx$

Optimal result . . . 536
Mathematica [A] (verified) . . . 537
Rubi [A] (verified) . . . 537
Maple [B] (verified) . . . 542
Fricas [F] . . . 543
Sympy [F] . . . 543
Maxima [F] . . . 543
Giac [F(-2)] . . . 544
Mupad [F(-1)] . . . 544
Reduce [F] . . . 545

Optimal result

Integrand size = 26, antiderivative size = 311

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{5/2}}\,dx = \frac{b^2x}{3d^2\sqrt{d-c^2dx^2}} - \frac{b(a+b\arcsin(cx))}{3cd^2\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}} + \frac{x(a+b\arcsin(cx))^2}{3d\left(d-c^2dx^2\right)^{3/2}} + \frac{2x(a+b\arcsin(cx))^2}{3d^2\sqrt{d-c^2dx^2}} - \frac{2i\sqrt{1-c^2x^2}(a+b\arcsin(cx))^2}{3cd^2\sqrt{d-c^2dx^2}} + \frac{4b\sqrt{1-c^2x^2}(a+b\arcsin(cx))\log\left(1+e^{2i\arcsin(cx)}\right)}{3cd^2\sqrt{d-c^2dx^2}} - \frac{2ib^2\sqrt{1-c^2x^2}\,\mathrm{PolyLog}\left(2,-e^{2i\arcsin(cx)}\right)}{3cd^2\sqrt{d-c^2dx^2}}$$

output

```
1/3*b^2*x/d^2/(-c^2*d*x^2+d)^(1/2)-1/3*b*(a+b*arcsin(c*x))/c/d^2/(-c^2*x^2
+1)^(1/2)/(-c^2*d*x^2+d)^(1/2)+1/3*x*(a+b*arcsin(c*x))^2/d/(-c^2*d*x^2+d)^
(3/2)+2/3*x*(a+b*arcsin(c*x))^2/d^2/(-c^2*d*x^2+d)^(1/2)-2/3*I*(-c^2*x^2+1
)^(1/2)*(a+b*arcsin(c*x))^2/c/d^2/(-c^2*d*x^2+d)^(1/2)+4/3*b*(-c^2*x^2+1)^
(1/2)*(a+b*arcsin(c*x))*ln(1+(I*c*x+(-c^2*x^2+1)^(1/2))^2)/c/d^2/(-c^2*d*x
^2+d)^(1/2)-2/3*I*b^2*(-c^2*x^2+1)^(1/2)*polylog(2,-(I*c*x+(-c^2*x^2+1)^(1
/2))^2)/c/d^2/(-c^2*d*x^2+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.95 (sec) , antiderivative size = 320, normalized size of antiderivative = 1.03

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{5/2}}\,dx = \frac{-3a^2cx - b^2cx + 2a^2c^3x^3 + b^2c^3x^3 + ab\sqrt{1-c^2x^2} + b^2\left(-3cx + 2c^3x^3 + 2i\sqrt{1}\right.}{}$$

input

```
Integrate[(a + b*ArcSin[c*x])^2/(d - c^2*d*x^2)^(5/2),x]
```

output

```
(-3*a^2*c*x - b^2*c*x + 2*a^2*c^3*x^3 + b^2*c^3*x^3 + a*b*Sqrt[1 - c^2*x^2
] + b^2*(-3*c*x + 2*c^3*x^3 + (2*I)*Sqrt[1 - c^2*x^2] - (2*I)*c^2*x^2*Sqrt
[1 - c^2*x^2])*ArcSin[c*x]^2 + b*ArcSin[c*x]*(-6*a*c*x + 4*a*c^3*x^3 + b*S
qrt[1 - c^2*x^2] - 4*b*(1 - c^2*x^2)^(3/2)*Log[1 + E^((2*I)*ArcSin[c*x])])
 - 2*a*b*Sqrt[1 - c^2*x^2]*Log[1 - c^2*x^2] + 2*a*b*c^2*x^2*Sqrt[1 - c^2*x
^2]*Log[1 - c^2*x^2] + (2*I)*b^2*(1 - c^2*x^2)^(3/2)*PolyLog[2, -E^((2*I)*
ArcSin[c*x])])/(3*c*d^2*(-1 + c^2*x^2)*Sqrt[d - c^2*d*x^2])
```

Rubi [A] (verified)

Time = 1.41 (sec) , antiderivative size = 270, normalized size of antiderivative = 0.87, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.385$, Rules used = {5162, 5160, 5180, 3042, 4202, 2620, 2715, 2838, 5182, 208}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{5/2}}\,dx$$

$$\downarrow 5162$$

$$-\frac{2bc\sqrt{1-c^2x^2}\int \frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^2}dx}{3d^2\sqrt{d-c^2dx^2}} + \frac{2\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{3/2}}dx}{3d} + \frac{x(a+b\arcsin(cx))^2}{3d\left(d-c^2dx^2\right)^{3/2}}$$

$$\downarrow 5160$$

$$-\frac{2bc\sqrt{1-c^2x^2}\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^2}dx}{3d^2\sqrt{d-c^2dx^2}}+\frac{2\left(\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}}-\frac{2bc\sqrt{1-c^2x^2}\int\frac{x(a+b\arcsin(cx))}{1-c^2x^2}dx}{d\sqrt{d-c^2dx^2}}\right)}{3d}+\frac{x(a+b\arcsin(cx))^2}{3d\left(d-c^2dx^2\right)^{3/2}}$$

$$\downarrow 5180$$

$$-\frac{2bc\sqrt{1-c^2x^2}\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^2}dx}{3d^2\sqrt{d-c^2dx^2}}+\frac{2\left(\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}}-\frac{2b\sqrt{1-c^2x^2}\int\frac{cx(a+b\arcsin(cx))}{\sqrt{1-c^2x^2}}d\arcsin(cx)}{cd\sqrt{d-c^2dx^2}}\right)}{3d}+\frac{x(a+b\arcsin(cx))^2}{3d\left(d-c^2dx^2\right)^{3/2}}$$

$$\downarrow 3042$$

$$-\frac{2bc\sqrt{1-c^2x^2}\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^2}dx}{3d^2\sqrt{d-c^2dx^2}}+\frac{2\left(\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}}-\frac{2b\sqrt{1-c^2x^2}\int(a+b\arcsin(cx))\tan(\arcsin(cx))d\arcsin(cx)}{cd\sqrt{d-c^2dx^2}}\right)}{3d}+\frac{x(a+b\arcsin(cx))^2}{3d\left(d-c^2dx^2\right)^{3/2}}$$

$$\downarrow 4202$$

$$-\frac{2bc\sqrt{1-c^2x^2}\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^2}dx}{3d^2\sqrt{d-c^2dx^2}}+\frac{2\left(\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}}-\frac{2b\sqrt{1-c^2x^2}\left(\frac{i(a+b\arcsin(cx))^2}{2b}-2i\int\frac{e^{2i\arcsin(cx)}(a+b\arcsin(cx))}{1+e^{2i\arcsin(cx)}}d\arcsin(cx)\right)}{cd\sqrt{d-c^2dx^2}}\right)}{3d}+\frac{x(a+b\arcsin(cx))^2}{3d\left(d-c^2dx^2\right)^{3/2}}$$

$$\downarrow 2620$$

$$-\frac{2bc\sqrt{1-c^2x^2}\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^2}dx}{3d^2\sqrt{d-c^2dx^2}}+\frac{2\left(\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}}-\frac{2b\sqrt{1-c^2x^2}\left(\frac{i(a+b\arcsin(cx))^2}{2b}-2i\left(\frac{1}{2}ib\int\log\left(1+e^{2i\arcsin(cx)}\right)d\arcsin(cx)-\frac{1}{2}i\log\left(1+e^{2i\arcsin(cx)}\right)(a+b\arcsin(cx))\right)\right)}{cd\sqrt{d-c^2dx^2}}\right)}{3d}+\frac{x(a+b\arcsin(cx))^2}{3d\left(d-c^2dx^2\right)^{3/2}}$$

$$\downarrow 2715$$

$$\frac{-\frac{2bc\sqrt{1-c^2x^2}\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^2}dx}{3d^2\sqrt{d-c^2dx^2}}+2\left(\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}}-\frac{2b\sqrt{1-c^2x^2}\left(\frac{i(a+b\arcsin(cx))^2}{2b}-2i\left(\frac{1}{4}b\int e^{-2i\arcsin(cx)}\log\left(1+e^{2i\arcsin(cx)}\right)de^{2i\arcsin(cx)}-\frac{1}{2}i\log\left(1+e^{2i\arcsin(cx)}\right)(a\right.\right.\right.}{cd\sqrt{d-c^2dx^2}}}{3d}$$

$$\frac{x(a+b\arcsin(cx))^2}{3d\left(d-c^2dx^2\right)^{3/2}}$$

$$\downarrow 2838$$

$$\frac{-\frac{2bc\sqrt{1-c^2x^2}\int\frac{x(a+b\arcsin(cx))}{(1-c^2x^2)^2}dx}{3d^2\sqrt{d-c^2dx^2}}+2\left(\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}}-\frac{2b\sqrt{1-c^2x^2}\left(\frac{i(a+b\arcsin(cx))^2}{2b}-2i\left(-\frac{1}{2}i\log\left(1+e^{2i\arcsin(cx)}\right)(a+b\arcsin(cx))-\frac{1}{4}b\,\mathrm{PolyLog}\left(2,-e^{2i\arcsin(cx)}\right)\right)\right)}{cd\sqrt{d-c^2dx^2}}\right)}{3d}+$$

$$\frac{x(a+b\arcsin(cx))^2}{3d\left(d-c^2dx^2\right)^{3/2}}$$

$$\downarrow 5182$$

$$\frac{-\frac{2bc\sqrt{1-c^2x^2}\left(\frac{a+b\arcsin(cx)}{2c^2(1-c^2x^2)}-\frac{b\int\frac{1}{\left(1-c^2x^2\right)^{3/2}}dx}{2c}\right)}{3d^2\sqrt{d-c^2dx^2}}+2\left(\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}}-\frac{2b\sqrt{1-c^2x^2}\left(\frac{i(a+b\arcsin(cx))^2}{2b}-2i\left(-\frac{1}{2}i\log\left(1+e^{2i\arcsin(cx)}\right)(a+b\arcsin(cx))-\frac{1}{4}b\,\mathrm{PolyLog}\left(2,-e^{2i\arcsin(cx)}\right)\right)\right)}{cd\sqrt{d-c^2dx^2}}\right)}{3d}+$$

$$\frac{x(a+b\arcsin(cx))^2}{3d\left(d-c^2dx^2\right)^{3/2}}$$

$$\downarrow 208$$

$$\frac{-\frac{2bc\sqrt{1-c^2x^2}\left(\frac{a+b\arcsin(cx)}{2c^2(1-c^2x^2)}-\frac{bx}{2c\sqrt{1-c^2x^2}}\right)}{3d^2\sqrt{d-c^2dx^2}}+2\left(\frac{x(a+b\arcsin(cx))^2}{d\sqrt{d-c^2dx^2}}-\frac{2b\sqrt{1-c^2x^2}\left(\frac{i(a+b\arcsin(cx))^2}{2b}-2i\left(-\frac{1}{2}i\log\left(1+e^{2i\arcsin(cx)}\right)(a+b\arcsin(cx))-\frac{1}{4}b\,\mathrm{PolyLog}\left(2,-e^{2i\arcsin(cx)}\right)\right)\right)}{cd\sqrt{d-c^2dx^2}}\right)}{3d}+$$

$$\frac{x(a+b\arcsin(cx))^2}{3d\left(d-c^2dx^2\right)^{3/2}}$$

input
```
Int[(a + b*ArcSin[c*x])^2/(d - c^2*d*x^2)^(5/2),x]
```

output
```
(x*(a + b*ArcSin[c*x])^2)/(3*d*(d - c^2*d*x^2)^(3/2)) - (2*b*c*Sqrt[1 - c^
2*x^2]*(-1/2*(b*x)/(c*Sqrt[1 - c^2*x^2]) + (a + b*ArcSin[c*x])/(2*c^2*(1 -
 c^2*x^2))))/(3*d^2*Sqrt[d - c^2*d*x^2]) + (2*((x*(a + b*ArcSin[c*x])^2)/(
d*Sqrt[d - c^2*d*x^2]) - (2*b*Sqrt[1 - c^2*x^2]*(((I/2)*(a + b*ArcSin[c*x]
)^2)/b - (2*I)*((-1/2*I)*(a + b*ArcSin[c*x])*Log[1 + E^((2*I)*ArcSin[c*x])
] - (b*PolyLog[2, -E^((2*I)*ArcSin[c*x])])/4)))/(c*d*Sqrt[d - c^2*d*x^2]))
)/(3*d)
```

Defintions of rubi rules used

rule 208
```
Int[((a_) + (b_.)*(x_)^2)^(-3/2), x_Symbol] :> Simp[x/(a*Sqrt[a + b*x^2]),
x] /; FreeQ[{a, b}, x]
```

rule 2620
```
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/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[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 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[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 2838
```
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 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4202

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

rule 5160

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2)^(3/2), x
_Symbol] :> Simp[x*((a + b*ArcSin[c*x])^n/(d*Sqrt[d + e*x^2])), x] - Simp[b
*c*(n/d)*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]   Int[x*((a + b*ArcSin[c*x
])^(n - 1)/(1 - c^2*x^2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d
 + e, 0] && GtQ[n, 0]
```

rule 5162

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_), x_
Symbol] :> Simp[(-x)*(d + e*x^2)^(p + 1)*((a + b*ArcSin[c*x])^n/(2*d*(p + 1
))), x] + (Simp[(2*p + 3)/(2*d*(p + 1))   Int[(d + e*x^2)^(p + 1)*(a + b*Ar
cSin[c*x])^n, x], x] + Simp[b*c*(n/(2*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2
*x^2)^p]   Int[x*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x
]) /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && LtQ[p,
 -1] && NeQ[p, -3/2]
```

rule 5180

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

rule 5182

```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [B] (verified)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 2894 vs. 2(293) = 586.

Time = 0.25 (sec) , antiderivative size = 2895, normalized size of antiderivative = 9.31

method	result	size
default	Expression too large to display	2895
parts	Expression too large to display	2895

input
```
int((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^(5/2),x,method=_RETURNVERBOSE)
```

output
```
14/3*I*b^2*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*
c*(-c^2*x^2+1)^(1/2)*arcsin(c*x)^2*x^2-10/3*I*b^2*(-d*(c^2*x^2-1))^(1/2)/d
^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c^2*(-c^2*x^2+1)*arcsin(c*x)*x^3+4/
3*I*b^2*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c^4
*(-c^2*x^2+1)*arcsin(c*x)*x^5-2*I*b^2*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^
6-10*c^4*x^4+11*c^2*x^2-4)*c^3*(-c^2*x^2+1)^(1/2)*arcsin(c*x)^2*x^4+a^2*(1
/3*x/d/(-c^2*d*x^2+d)^(3/2)+2/3/d^2*x/(-c^2*d*x^2+d)^(1/2))+2/3*b^2*(-d*(c
^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c^4*(-c^2*x^2+1)*
x^5-4/3*b^2*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)
*c^2*(-c^2*x^2+1)*x^3-2*b^2*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x
^4+11*c^2*x^2-4)*c^4*arcsin(c*x)^2*x^5+17/3*b^2*(-d*(c^2*x^2-1))^(1/2)/d^3
/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c^2*arcsin(c*x)^2*x^3+4/3*b^2*(-d*(c^
2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)/c*(-c^2*x^2+1)^(1/
2)*arcsin(c*x)-2*I*b^2*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11
*c^2*x^2-4)*arcsin(c*x)*x-4/3*I*b^2*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-
10*c^4*x^4+11*c^2*x^2-4)/c*(-c^2*x^2+1)^(1/2)-2*b^2*(-d*(c^2*x^2-1))^(1/2)
/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*x+16/3*I*a*b*(-d*(c^2*x^2-1))^(1/
2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c^2*x^3-a*b*(-d*(c^2*x^2-1))^(1
/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c*(-c^2*x^2+1)^(1/2)*x^2-4*a*b
*(-d*(c^2*x^2-1))^(1/2)/d^3/(3*c^6*x^6-10*c^4*x^4+11*c^2*x^2-4)*c^4*arc...
```

Fricas [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{5/2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(-c^2dx^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
integral(-sqrt(-c^2*d*x^2 + d)*(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^
2)/(c^6*d^3*x^6 - 3*c^4*d^3*x^4 + 3*c^2*d^3*x^2 - d^3), x)
```

Sympy [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{5/2}}\,dx = \int \frac{(a+b\operatorname{asin}(cx))^2}{(-d(cx-1)(cx+1))^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*asin(c*x))**2/(-c**2*d*x**2+d)**(5/2),x)
```

output
```
Integral((a + b*asin(c*x))**2/(-d*(c*x - 1)*(c*x + 1))**(5/2), x)
```

Maxima [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{5/2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(-c^2dx^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
1/3*a*b*c*(1/(c^4*d^(5/2)*x^2 - c^2*d^(5/2)) + 2*log(c*x + 1)/(c^2*d^(5/2)
) + 2*log(c*x - 1)/(c^2*d^(5/2))) + 2/3*a*b*(2*x/(sqrt(-c^2*d*x^2 + d)*d^2
) + x/((-c^2*d*x^2 + d)^(3/2)*d))*arcsin(c*x) + 1/3*a^2*(2*x/(sqrt(-c^2*d*
x^2 + d)*d^2) + x/((-c^2*d*x^2 + d)^(3/2)*d)) + b^2*integrate(arctan2(c*x,
 sqrt(c*x + 1)*sqrt(-c*x + 1))^2/((c^4*d^2*x^4 - 2*c^2*d^2*x^2 + d^2)*sqrt
(c*x + 1)*sqrt(-c*x + 1)), x)/sqrt(d)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a + b \arcsin(cx))^2}{(d - c^2 dx^2)^{5/2}}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(-c^2*d*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:index.cc index_m i_lex_is_greater E
rror: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a + b \arcsin(cx))^2}{(d - c^2 dx^2)^{5/2}}\, dx = \int \frac{(a + b \operatorname{asin}(c\, x))^2}{(d - c^2\, d\, x^2)^{5/2}}\, dx$$

input
```
int((a + b*asin(c*x))^2/(d - c^2*d*x^2)^(5/2),x)
```

output
```
int((a + b*asin(c*x))^2/(d - c^2*d*x^2)^(5/2), x)
```

Reduce [F]

$$\int \frac{(a+b\arcsin(cx))^2}{(d-c^2dx^2)^{5/2}}\,dx = \frac{6\sqrt{-c^2x^2+1}\left(\int \frac{asin(cx)}{\sqrt{-c^2x^2+1}\,c^4x^4-2\sqrt{-c^2x^2+1}\,c^2x^2+\sqrt{-c^2x^2+1}}dx\right)ab\,c^2x^2-6\sqrt{-c^2x^2}$$

input

```
int((a+b*asin(c*x))^2/(-c^2*d*x^2+d)^(5/2),x)
```

output

```
(6*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**4*x**4
- 2*sqrt( - c**2*x**2 + 1)*c**2*x**2 + sqrt( - c**2*x**2 + 1)),x)*a*b*c**2
*x**2 - 6*sqrt( - c**2*x**2 + 1)*int(asin(c*x)/(sqrt( - c**2*x**2 + 1)*c**
4*x**4 - 2*sqrt( - c**2*x**2 + 1)*c**2*x**2 + sqrt( - c**2*x**2 + 1)),x)*a
*b + 3*sqrt( - c**2*x**2 + 1)*int(asin(c*x)**2/(sqrt( - c**2*x**2 + 1)*c**
4*x**4 - 2*sqrt( - c**2*x**2 + 1)*c**2*x**2 + sqrt( - c**2*x**2 + 1)),x)*b
**2*c**2*x**2 - 3*sqrt( - c**2*x**2 + 1)*int(asin(c*x)**2/(sqrt( - c**2*x*
*2 + 1)*c**4*x**4 - 2*sqrt( - c**2*x**2 + 1)*c**2*x**2 + sqrt( - c**2*x**2
 + 1)),x)*b**2 + 2*a**2*c**2*x**3 - 3*a**2*x)/(3*sqrt(d)*sqrt( - c**2*x**2
 + 1)*d**2*(c**2*x**2 - 1))
```

3.63 $\int (c - a^2cx^2)^{3/2} \arcsin(ax)^3 \, dx$

Optimal result . . . 546
Mathematica [A] (verified) . . . 547
Rubi [A] (verified) . . . 547
Maple [C] (verified) . . . 553
Fricas [F] . . . 554
Sympy [F] . . . 554
Maxima [F] . . . 555
Giac [F(-2)] . . . 555
Mupad [F(-1)] . . . 555
Reduce [F] . . . 556

Optimal result

Integrand size = 22, antiderivative size = 351

$$\int (c - a^2cx^2)^{3/2} \arcsin(ax)^3 \, dx = \frac{45acx^2\sqrt{c - a^2cx^2}}{128\sqrt{1 - a^2x^2}}$$
$$- \frac{3c(1 - a^2x^2)^{3/2}\sqrt{c - a^2cx^2}}{128a} - \frac{45}{64}cx\sqrt{c - a^2cx^2}\arcsin(ax)$$
$$- \frac{3}{32}x\left(c - a^2cx^2\right)^{3/2}\arcsin(ax) + \frac{27c\sqrt{c - a^2cx^2}\arcsin(ax)^2}{128a\sqrt{1 - a^2x^2}} - \frac{9acx^2\sqrt{c - a^2cx^2}\arcsin(ax)^2}{16\sqrt{1 - a^2x^2}} + \frac{3c(1 - a^2x^2)}$$

output

```
45/128*a*c*x^2*(-a^2*c*x^2+c)^(1/2)/(-a^2*x^2+1)^(1/2)-3/128*c*(-a^2*x^2+1
)^(3/2)*(-a^2*c*x^2+c)^(1/2)/a-45/64*c*x*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)-
3/32*x*(-a^2*c*x^2+c)^(3/2)*arcsin(a*x)+27/128*c*(-a^2*c*x^2+c)^(1/2)*arcs
in(a*x)^2/a/(-a^2*x^2+1)^(1/2)-9/16*a*c*x^2*(-a^2*c*x^2+c)^(1/2)*arcsin(a*
x)^2/(-a^2*x^2+1)^(1/2)+3/16*c*(-a^2*x^2+1)^(3/2)*(-a^2*c*x^2+c)^(1/2)*arc
sin(a*x)^2/a+3/8*c*x*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^3+1/4*x*(-a^2*c*x^2+
c)^(3/2)*arcsin(a*x)^3+3/32*c*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^4/a/(-a^2*x
^2+1)^(1/2)
```

Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 138, normalized size of antiderivative = 0.39

$$\int (c - a^2 c x^2)^{3/2} \arcsin(ax)^3 \, dx = \frac{c\sqrt{c - a^2 c x^2}(96 \arcsin(ax)^4 + 24 \arcsin(ax)^2(16 \cos(2 \arcsin(ax)) + \cos(4 \arc$$

input
```
Integrate[(c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^3,x]
```

output
```
(c*Sqrt[c - a^2*c*x^2]*(96*ArcSin[a*x]^4 + 24*ArcSin[a*x]^2*(16*Cos[2*ArcS
in[a*x]] + Cos[4*ArcSin[a*x]]) - 3*(64*Cos[2*ArcSin[a*x]] + Cos[4*ArcSin[a
*x]]) + 32*ArcSin[a*x]^3*(8*Sin[2*ArcSin[a*x]] + Sin[4*ArcSin[a*x]]) - 12*
ArcSin[a*x]*(32*Sin[2*ArcSin[a*x]] + Sin[4*ArcSin[a*x]])))/(1024*a*Sqrt[1
- a^2*x^2])
```

Rubi [A] (verified)

Time = 2.36 (sec) , antiderivative size = 366, normalized size of antiderivative = 1.04, number of steps used = 14, number of rules used = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.636$, Rules used = {5158, 5156, 5138, 5152, 5182, 5158, 244, 2009, 5156, 15, 5152, 5210, 15, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \arcsin(ax)^3 \left(c - a^2 c x^2\right)^{3/2} \, dx$$

$$\downarrow 5158$$

$$-\frac{3ac\sqrt{c - a^2 c x^2} \int x\left(1 - a^2 x^2\right) \arcsin(ax)^2 dx}{4\sqrt{1 - a^2 x^2}} + \frac{3}{4} c \int \sqrt{c - a^2 c x^2} \arcsin(ax)^3 dx + \frac{1}{4} x \arcsin(ax)^3 \left(c - a^2 c x^2\right)^{3/2}$$

$$\downarrow 5156$$

$$-\frac{3ac\sqrt{c-a^2cx^2}\int x\left(1-a^2x^2\right)\arcsin(ax)^2dx}{4\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\int x\arcsin(ax)^2dx}{2\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\arcsin(ax)^3}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2cx^2}\right)+$$
$$\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5138$$

$$-\frac{3ac\sqrt{c-a^2cx^2}\int x\left(1-a^2x^2\right)\arcsin(ax)^2dx}{4\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\int\frac{x^2\arcsin(ax)}{\sqrt{1-a^2x^2}}dx\right)}{2\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\arcsin(ax)^3}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-\right.$$
$$\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5152$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\int\frac{x^2\arcsin(ax)}{\sqrt{1-a^2x^2}}dx\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2cx^2}}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2}\right.$$
$$\frac{3ac\sqrt{c-a^2cx^2}\int x\left(1-a^2x^2\right)\arcsin(ax)^2dx}{4\sqrt{1-a^2x^2}}+\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5182$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\int\frac{x^2\arcsin(ax)}{\sqrt{1-a^2x^2}}dx\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2cx^2}}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2}\right.$$
$$\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\int\left(1-a^2x^2\right)^{3/2}\arcsin(ax)dx}{2a}-\frac{\left(1-a^2x^2\right)^2\arcsin(ax)^2}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5158$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\int\frac{x^2\arcsin(ax)}{\sqrt{1-a^2x^2}}dx\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2cx^2}}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2}\right.$$
$$\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\frac{3}{4}\int\sqrt{1-a^2x^2}\arcsin(ax)dx-\frac{1}{4}a\int x\left(1-a^2x^2\right)dx+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}\arcsin(ax)}{2a}-\frac{\left(1-a^2x^2\right)^2\arcsin(ax)^2}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+$$
$$\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 244$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\int\frac{x^2\arcsin(ax)}{\sqrt{1-a^2x^2}}dx\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2cx^2}}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2}\right.$$
$$\left.\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\frac{3}{4}\int\sqrt{1-a^2x^2}\arcsin(ax)dx-\frac{1}{4}a\int(x-a^2x^3)dx+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}\arcsin(ax)}{2a}-\frac{\left(1-a^2x^2\right)^2\arcsin(ax)^2}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+\right.$$
$$\left.\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}\right.$$

$$\downarrow 2009$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\int\frac{x^2\arcsin(ax)}{\sqrt{1-a^2x^2}}dx\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2cx^2}}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2}\right.$$
$$\left.\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\frac{3}{4}\int\sqrt{1-a^2x^2}\arcsin(ax)dx+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}\arcsin(ax)-\frac{1}{4}a\left(\frac{x^2}{2}-\frac{a^2x^4}{4}\right)}{2a}-\frac{\left(1-a^2x^2\right)^2\arcsin(ax)^2}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+\right.$$
$$\left.\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}\right.$$

$$\downarrow 5156$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\int\frac{x^2\arcsin(ax)}{\sqrt{1-a^2x^2}}dx\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2cx^2}}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2}\right.$$
$$\left.\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\frac{3}{4}\left(\frac{1}{2}\int\frac{\arcsin(ax)}{\sqrt{1-a^2x^2}}dx-\frac{a\int xdx}{2}+\frac{1}{2}x\sqrt{1-a^2x^2}\arcsin(ax)\right)+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}\arcsin(ax)-\frac{1}{4}a\left(\frac{x^2}{2}-\frac{a^2x^4}{4}\right)}{2a}-\frac{\left(1-a^2x^2\right)^2\arcsin(ax)^2}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+\right.$$
$$\left.\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}\right.$$

$$\downarrow 15$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\int\frac{x^2\arcsin(ax)}{\sqrt{1-a^2x^2}}dx\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2cx^2}}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2}\right.$$

$$\left.\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\frac{3}{4}\left(\frac{1}{2}\int\frac{\arcsin(ax)}{\sqrt{1-a^2x^2}}dx+\frac{1}{2}x\sqrt{1-a^2x^2}\arcsin(ax)-\frac{ax^2}{4}\right)+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}\arcsin(ax)-\frac{1}{4}a\left(\frac{x^2}{2}-\frac{a^2x^4}{4}\right)}{2a}-\frac{\left(1-a^2x^2\right)^2\arcsin(}{4a^2}\right.}{4\sqrt{1-a^2x^2}}\right.$$

$$\left.\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}\right.$$

$$\downarrow 5152$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\int\frac{x^2\arcsin(ax)}{\sqrt{1-a^2x^2}}dx\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2cx^2}}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2}\right.$$

$$\left.\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}-\right.$$

$$\left.\frac{3ac\left(\frac{\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}\arcsin(ax)+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\arcsin(ax)+\frac{\arcsin(ax)^2}{4a}-\frac{ax^2}{4}\right)-\frac{1}{4}a\left(\frac{x^2}{2}-\frac{a^2x^4}{4}\right)}{2a}-\frac{\left(1-a^2x^2\right)^2\arcsin(ax)^2}{4a^2}\right)\sqrt{c-a^2c}}{4\sqrt{1-a^2x^2}}\right.$$

$$\downarrow 5210$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\left(\frac{\int\frac{\arcsin(ax)}{\sqrt{1-a^2x^2}}dx}{2a^2}+\frac{\int xdx}{2a}-\frac{x\sqrt{1-a^2x^2}\arcsin(ax)}{2a^2}\right)\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2c}}{8a\sqrt{1-a^2x^2}}\right.$$

$$\left.\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}-\right.$$

$$\left.\frac{3ac\left(\frac{\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}\arcsin(ax)+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\arcsin(ax)+\frac{\arcsin(ax)^2}{4a}-\frac{ax^2}{4}\right)-\frac{1}{4}a\left(\frac{x^2}{2}-\frac{a^2x^4}{4}\right)}{2a}-\frac{\left(1-a^2x^2\right)^2\arcsin(ax)^2}{4a^2}\right)\sqrt{c-a^2c}}{4\sqrt{1-a^2x^2}}\right.$$

$$\downarrow 15$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\left(\frac{\int\frac{\arcsin(ax)}{\sqrt{1-a^2x^2}}dx}{2a^2}-\frac{x\sqrt{1-a^2x^2}\arcsin(ax)}{2a^2}+\frac{x^2}{4a}\right)\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2cx^2}}{8a\sqrt{1-a^2x^2}}\right.$$

$$\left.\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}-\frac{3ac\left(\frac{\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}\arcsin(ax)+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\arcsin(ax)+\frac{\arcsin(ax)^2}{4a}-\frac{ax^2}{4}\right)-\frac{1}{4}a\left(\frac{x^2}{2}-\frac{a^2x^4}{4}\right)}{2a}-\frac{\left(1-a^2x^2\right)^2\arcsin(ax)^2}{4a^2}\right)\sqrt{c-a^2c}}{4\sqrt{1-a^2x^2}}\right)$$

$$\downarrow 5152$$

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

$$\left.\left.\left.\frac{1}{4}x\arcsin(ax)^3\left(c-a^2cx^2\right)^{3/2}-\frac{3ac\left(\frac{\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}\arcsin(ax)+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\arcsin(ax)+\frac{\arcsin(ax)^2}{4a}-\frac{ax^2}{4}\right)-\frac{1}{4}a\left(\frac{x^2}{2}-\frac{a^2x^4}{4}\right)}{2a}-\frac{\left(1-a^2x^2\right)^2\arcsin(ax)^2}{4a^2}\right)\sqrt{c-a^2c}}{4\sqrt{1-a^2x^2}}\right)\right)\right)$$

input

```
Int[(c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^3,x]
```

output

```
(x*(c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^3)/4 + (3*c*((x*Sqrt[c - a^2*c*x^2]*A
rcSin[a*x]^3)/2 + (Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^4)/(8*a*Sqrt[1 - a^2*x^
2]) - (3*a*Sqrt[c - a^2*c*x^2]*((x^2*ArcSin[a*x]^2)/2 - a*(x^2/(4*a) - (x*
Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(2*a^2) + ArcSin[a*x]^2/(4*a^3))))/(2*Sqrt[
1 - a^2*x^2])))/4 - (3*a*c*Sqrt[c - a^2*c*x^2]*(-1/4*((1 - a^2*x^2)^2*ArcS
in[a*x]^2)/a^2 + (-1/4*(a*(x^2/2 - (a^2*x^4)/4)) + (x*(1 - a^2*x^2)^(3/2)*
ArcSin[a*x])/4 + (3*(-1/4*(a*x^2) + (x*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/2 +
ArcSin[a*x]^2/(4*a)))/4)/(2*a)))/(4*Sqrt[1 - a^2*x^2])
```

Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5138
```
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] - Simp[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 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

rule 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5182

```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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 5210

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[f*(f*x)^(m - 1)*(d + e*x^2)^(p + 1)*((a +
 b*ArcSin[c*x])^n/(e*(m + 2*p + 1))), x] + (Simp[f^2*((m - 1)/(c^2*(m + 2*p
 + 1)))   Int[(f*x)^(m - 2)*(d + e*x^2)^p*(a + b*ArcSin[c*x])^n, x], x] + S
imp[b*f*(n/(c*(m + 2*p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^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] && IGtQ[m
, 1] && NeQ[m + 2*p + 1, 0]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.44 (sec) , antiderivative size = 474, normalized size of antiderivative = 1.35

method	result
default	$-\frac{3\sqrt{-c(a^2x^2-1)}\,\sqrt{-a^2x^2+1}\,\arcsin(ax)^4 c}{32a(a^2x^2-1)} - \frac{\sqrt{-c(a^2x^2-1)}\left(-8i\sqrt{-a^2x^2+1}\,a^4x^4+8a^5x^5+8i\sqrt{-a^2x^2+1}\,a^2x^2-12a^3x^3-i\sqrt{-}\right.$ $\left.2048a(a^2x^2-\right.$

input

```
int((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^3,x,method=_RETURNVERBOSE)
```

output
```
-3/32*(-c*(a^2*x^2-1))^(1/2)*(-a^2*x^2+1)^(1/2)/a/(a^2*x^2-1)*arcsin(a*x)^
4*c-1/2048*(-c*(a^2*x^2-1))^(1/2)*(-8*I*(-a^2*x^2+1)^(1/2)*a^4*x^4+8*a^5*x
^5+8*I*(-a^2*x^2+1)^(1/2)*a^2*x^2-12*a^3*x^3-I*(-a^2*x^2+1)^(1/2)+4*a*x)*(
24*I*arcsin(a*x)^2+32*arcsin(a*x)^3-3*I-12*arcsin(a*x))*c/a/(a^2*x^2-1)+1/
32*(-c*(a^2*x^2-1))^(1/2)*(2*I*(-a^2*x^2+1)^(1/2)*a^2*x^2+2*a^3*x^3-I*(-a^
2*x^2+1)^(1/2)-2*a*x)*(-6*I*arcsin(a*x)^2+4*arcsin(a*x)^3+3*I-6*arcsin(a*x
))*c/a/(a^2*x^2-1)-1/2048*(-c*(a^2*x^2-1))^(1/2)*(I*x^2*a^2-(-a^2*x^2+1)^(
1/2)*x*a-I)*(408*I*arcsin(a*x)^2+224*arcsin(a*x)^3-195*I-372*arcsin(a*x))*
cos(3*arcsin(a*x))*c/a/(a^2*x^2-1)+9/2048*(-c*(a^2*x^2-1))^(1/2)*(I*(-a^2*
x^2+1)^(1/2)*a*x+a^2*x^2-1)*(40*I*arcsin(a*x)^2+32*arcsin(a*x)^3-21*I-44*a
rcsin(a*x))*sin(3*arcsin(a*x))*c/a/(a^2*x^2-1)
```

Fricas [F]

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^3 \, dx = \int \left(-a^2 c x^2 + c\right)^{\frac{3}{2}} \arcsin\left(ax\right)^3 \, dx$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^3,x, algorithm="fricas")
```

output
```
integral(-(a^2*c*x^2 - c)*sqrt(-a^2*c*x^2 + c)*arcsin(a*x)^3, x)
```

Sympy [F]

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^3 \, dx = \int \left(-c(ax - 1)\left(ax + 1\right)\right)^{\frac{3}{2}} \operatorname{asin}^3\left(ax\right) dx$$

input
```
integrate((-a**2*c*x**2+c)**(3/2)*asin(a*x)**3,x)
```

output
```
Integral((-c*(a*x - 1)*(a*x + 1))**(3/2)*asin(a*x)**3, x)
```

Maxima [F]

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^3 \, dx = \int \left(-a^2 c x^2 + c\right)^{\frac{3}{2}} \arcsin\left(ax\right)^3 \, dx$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^3,x, algorithm="maxima")
```

output
```
integrate((-a^2*c*x^2 + c)^(3/2)*arcsin(a*x)^3, x)
```

Giac [F(-2)]

Exception generated.

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^3 \, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^3,x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^3 \, dx = \int \operatorname{asin}(a\,x)^3 \left(c - a^2\,c\,x^2\right)^{3/2} dx$$

input
```
int(asin(a*x)^3*(c - a^2*c*x^2)^(3/2),x)
```

output
```
int(asin(a*x)^3*(c - a^2*c*x^2)^(3/2), x)
```

Reduce [F]

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^3 \, dx = \sqrt{c}\, c \left(- \left(\int \sqrt{-a^2x^2+1}\, asin(ax)^3 \, x^2 dx \right) a^2 + \int \sqrt{-a^2x^2+1}\, asin(ax)^3 \, dx \right)$$

input
```
int((-a^2*c*x^2+c)^(3/2)*asin(a*x)^3,x)
```

output
```
sqrt(c)*c*( - int(sqrt( - a**2*x**2 + 1)*asin(a*x)**3*x**2,x)*a**2 + int(s
qrt( - a**2*x**2 + 1)*asin(a*x)**3,x))
```

3.64 $\int \sqrt{c-a^2cx^2}\arcsin(ax)^3\,dx$

Optimal result . . . 557
Mathematica [A] (verified) . . . 558
Rubi [A] (verified) . . . 558
Maple [C] (verified) . . . 561
Fricas [F] . . . 561
Sympy [F] . . . 562
Maxima [F] . . . 562
Giac [F(-2)] . . . 562
Mupad [F(-1)] . . . 563
Reduce [F] . . . 563

Optimal result

Integrand size = 22, antiderivative size = 215

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

output

```
3/8*a*x^2*(-a^2*c*x^2+c)^(1/2)/(-a^2*x^2+1)^(1/2)-3/4*x*(-a^2*c*x^2+c)^(1/
2)*arcsin(a*x)+3/8*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^2/a/(-a^2*x^2+1)^(1/2)
-3/4*a*x^2*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^2/(-a^2*x^2+1)^(1/2)+1/2*x*(-a
^2*c*x^2+c)^(1/2)*arcsin(a*x)^3+1/8*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^4/a/(
-a^2*x^2+1)^(1/2)
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.53

$$\int \sqrt{c-a^2cx^2}\arcsin(ax)^3\,dx$$
$$= \frac{\sqrt{c-a^2cx^2}\left(3a^2x^2-6ax\sqrt{1-a^2x^2}\arcsin(ax)+(3-6a^2x^2)\arcsin(ax)^2+4ax\sqrt{1-a^2x^2}\arcsin(ax)^3+\right.}{8a\sqrt{1-a^2x^2}}$$

input
```
Integrate[Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^3,x]
```

output
```
(Sqrt[c - a^2*c*x^2]*(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 + ArcS
in[a*x]^4))/(8*a*Sqrt[1 - a^2*x^2])
```

Rubi [A] (verified)

Time = 0.85 (sec) , antiderivative size = 170, normalized size of antiderivative = 0.79, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.273$, Rules used = {5156, 5138, 5152, 5210, 15, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \arcsin(ax)^3\sqrt{c-a^2cx^2}\,dx$$
$$\downarrow 5156$$
$$-\frac{3a\sqrt{c-a^2cx^2}\int x\arcsin(ax)^2dx}{2\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\arcsin(ax)^3}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2cx^2}$$
$$\downarrow 5138$$
$$-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\int\frac{x^2\arcsin(ax)}{\sqrt{1-a^2x^2}}dx\right)}{2\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\arcsin(ax)^3}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+$$
$$\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2cx^2}$$
$$\downarrow 5152$$

$$-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\int\frac{x^2\arcsin(ax)}{\sqrt{1-a^2x^2}}dx\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2cx^2}}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2cx^2}$$

$$\downarrow 5210$$

$$-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\left(\frac{\int\frac{\arcsin(ax)}{\sqrt{1-a^2x^2}}dx}{2a^2}+\frac{\int xdx}{2a}-\frac{x\sqrt{1-a^2x^2}\arcsin(ax)}{2a^2}\right)\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2cx^2}}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2cx^2}$$

$$\downarrow 15$$

$$-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^2-a\left(\frac{\int\frac{\arcsin(ax)}{\sqrt{1-a^2x^2}}dx}{2a^2}-\frac{x\sqrt{1-a^2x^2}\arcsin(ax)}{2a^2}+\frac{x^2}{4a}\right)\right)}{2\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^4\sqrt{c-a^2cx^2}}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^3\sqrt{c-a^2cx^2}$$

$$\downarrow 5152$$

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

input

```
Int[Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^3,x]
```

output

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

Defintions of rubi rules used

rule 15

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

rule 5138

```
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] - Simp[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 5152

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

rule 5156

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

rule 5210

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[f*(f*x)^(m - 1)*(d + e*x^2)^(p + 1)*((a +
 b*ArcSin[c*x])^n/(e*(m + 2*p + 1))), x] + (Simp[f^2*((m - 1)/(c^2*(m + 2*p
 + 1)))   Int[(f*x)^(m - 2)*(d + e*x^2)^p*(a + b*ArcSin[c*x])^n, x], x] + S
imp[b*f*(n/(c*(m + 2*p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^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] && IGtQ[m
, 1] && NeQ[m + 2*p + 1, 0]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.26 (sec) , antiderivative size = 260, normalized size of antiderivative = 1.21

method	result
default	$-\frac{\sqrt{-c(a^2x^2-1)}\sqrt{-a^2x^2+1}\arcsin(ax)^4}{8a(a^2x^2-1)}+\frac{\sqrt{-c(a^2x^2-1)}\left(-2i\sqrt{-a^2x^2+1}\,a^2x^2+2a^3x^3+i\sqrt{-a^2x^2+1}-2ax\right)\left(6i\arcsin(ax)^2+$

input
```
int((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^3,x,method=_RETURNVERBOSE)
```

output
```
-1/8*(-c*(a^2*x^2-1))^(1/2)*(-a^2*x^2+1)^(1/2)/a/(a^2*x^2-1)*arcsin(a*x)^4
+1/32*(-c*(a^2*x^2-1))^(1/2)*(-2*I*(-a^2*x^2+1)^(1/2)*a^2*x^2+2*a^3*x^3+I*
(-a^2*x^2+1)^(1/2)-2*a*x)*(6*I*arcsin(a*x)^2+4*arcsin(a*x)^3-3*I-6*arcsin(
a*x))/a/(a^2*x^2-1)+1/32*(-c*(a^2*x^2-1))^(1/2)*(2*I*(-a^2*x^2+1)^(1/2)*a^
2*x^2+2*a^3*x^3-I*(-a^2*x^2+1)^(1/2)-2*a*x)*(-6*I*arcsin(a*x)^2+4*arcsin(a
*x)^3+3*I-6*arcsin(a*x))/a/(a^2*x^2-1)
```

Fricas [F]

$$\int \sqrt{c-a^2cx^2}\arcsin(ax)^3\,dx = \int \sqrt{-a^2cx^2+c}\arcsin\left(ax\right)^3\,dx$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^3,x, algorithm="fricas")
```

output
```
integral(sqrt(-a^2*c*x^2 + c)*arcsin(a*x)^3, x)
```

Sympy [F]

$$\int \sqrt{c - a^2 c x^2}\, \arcsin(ax)^3\, dx = \int \sqrt{-c\,(ax-1)\,(ax+1)}\, \operatorname{asin}^3(ax)\, dx$$

input
```
integrate((-a**2*c*x**2+c)**(1/2)*asin(a*x)**3,x)
```

output
```
Integral(sqrt(-c*(a*x - 1)*(a*x + 1))*asin(a*x)**3, x)
```

Maxima [F]

$$\int \sqrt{c - a^2 c x^2}\, \arcsin(ax)^3\, dx = \int \sqrt{-a^2 c x^2 + c}\, \arcsin(ax)^3\, dx$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^3,x, algorithm="maxima")
```

output
```
integrate(sqrt(-a^2*c*x^2 + c)*arcsin(a*x)^3, x)
```

Giac [F(-2)]

Exception generated.

$$\int \sqrt{c - a^2 c x^2}\, \arcsin(ax)^3\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^3,x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{c-a^2cx^2}\,\arcsin(ax)^3\,dx = \int \operatorname{asin}(a\,x)^3\,\sqrt{c-a^2\,c\,x^2}\,dx$$

input
```
int(asin(a*x)^3*(c - a^2*c*x^2)^(1/2),x)
```

output
```
int(asin(a*x)^3*(c - a^2*c*x^2)^(1/2), x)
```

Reduce [F]

$$\int \sqrt{c-a^2cx^2}\,\arcsin(ax)^3\,dx = \sqrt{c}\left(\int \sqrt{-a^2x^2+1}\,asin(ax)^3\,dx\right)$$

input
```
int((-a^2*c*x^2+c)^(1/2)*asin(a*x)^3,x)
```

output
```
sqrt(c)*int(sqrt( - a**2*x**2 + 1)*asin(a*x)**3,x)
```

3.65 $\int \frac{\arcsin(ax)^3}{\sqrt{c-a^2cx^2}}\,dx$

Optimal result . . . 564
Mathematica [A] (verified) . . . 564
Rubi [A] (verified) . . . 565
Maple [A] (verified) . . . 565
Fricas [F] . . . 566
Sympy [F] . . . 566
Maxima [A] (verification not implemented) . . . 567
Giac [A] (verification not implemented) . . . 567
Mupad [F(-1)] . . . 567
Reduce [B] (verification not implemented) . . . 568

Optimal result

Integrand size = 22, antiderivative size = 42

$$\int \frac{\arcsin(ax)^3}{\sqrt{c-a^2cx^2}}\,dx = \frac{\sqrt{1-a^2x^2}\,\arcsin(ax)^4}{4a\sqrt{c-a^2cx^2}}$$

output
```
1/4*(-a^2*x^2+1)^(1/2)*arcsin(a*x)^4/a/(-a^2*c*x^2+c)^(1/2)
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.00

$$\int \frac{\arcsin(ax)^3}{\sqrt{c-a^2cx^2}}\,dx = \frac{\sqrt{1-a^2x^2}\,\arcsin(ax)^4}{4a\sqrt{c-a^2cx^2}}$$

input
```
Integrate[ArcSin[a*x]^3/Sqrt[c - a^2*c*x^2],x]
```

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

Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.045$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\arcsin(ax)^3}{\sqrt{c-a^2cx^2}}\,dx$$
$$\downarrow 5152$$
$$\frac{\sqrt{1-a^2x^2}\arcsin(ax)^4}{4a\sqrt{c-a^2cx^2}}$$

input
```
Int[ArcSin[a*x]^3/Sqrt[c - a^2*c*x^2],x]
```

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

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.24

method	result	size
default	$-\frac{\sqrt{-c(a^2x^2-1)}\sqrt{-a^2x^2+1}\arcsin(ax)^4}{4ac(a^2x^2-1)}$	52

input
```
int(arcsin(a*x)^3/(-a^2*c*x^2+c)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-c*(a^2*x^2-1))^(1/2)*(-a^2*x^2+1)^(1/2)/a/c/(a^2*x^2-1)*arcsin(a*x)
^4
```

Fricas [F]

$$\int \frac{\arcsin(ax)^3}{\sqrt{c-a^2cx^2}}\,dx = \int \frac{\arcsin\left(ax\right)^3}{\sqrt{-a^2cx^2+c}}\,dx$$

input
```
integrate(arcsin(a*x)^3/(-a^2*c*x^2+c)^(1/2),x, algorithm="fricas")
```

output
```
integral(-sqrt(-a^2*c*x^2 + c)*arcsin(a*x)^3/(a^2*c*x^2 - c), x)
```

Sympy [F]

$$\int \frac{\arcsin(ax)^3}{\sqrt{c-a^2cx^2}}\,dx = \int \frac{\operatorname{asin}^3\left(ax\right)}{\sqrt{-c\left(ax-1\right)\left(ax+1\right)}}\,dx$$

input
```
integrate(asin(a*x)**3/(-a**2*c*x**2+c)**(1/2),x)
```

output
```
Integral(asin(a*x)**3/sqrt(-c*(a*x - 1)*(a*x + 1)), x)
```

Maxima [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.33

$$\int \frac{\arcsin(ax)^3}{\sqrt{c-a^2cx^2}}\,dx = \frac{\arcsin(ax)^4}{4\,a\sqrt{c}}$$

input
```
integrate(arcsin(a*x)^3/(-a^2*c*x^2+c)^(1/2),x, algorithm="maxima")
```

output
```
1/4*arcsin(a*x)^4/(a*sqrt(c))
```

Giac [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.33

$$\int \frac{\arcsin(ax)^3}{\sqrt{c-a^2cx^2}}\,dx = \frac{\arcsin(ax)^4}{4\,a\sqrt{c}}$$

input
```
integrate(arcsin(a*x)^3/(-a^2*c*x^2+c)^(1/2),x, algorithm="giac")
```

output
```
1/4*arcsin(a*x)^4/(a*sqrt(c))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\arcsin(ax)^3}{\sqrt{c-a^2cx^2}}\,dx = \int \frac{\mathrm{asin}(a\,x)^3}{\sqrt{c-a^2\,c\,x^2}}\,dx$$

input
```
int(asin(a*x)^3/(c - a^2*c*x^2)^(1/2),x)
```

output
```
int(asin(a*x)^3/(c - a^2*c*x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 16, normalized size of antiderivative = 0.38

$$\int \frac{\arcsin(ax)^3}{\sqrt{c-a^2cx^2}}\,dx = \frac{\sqrt{c}\,asin(ax)^4}{4ac}$$

input
```
int(asin(a*x)^3/(-a^2*c*x^2+c)^(1/2),x)
```

output
```
(sqrt(c)*asin(a*x)**4)/(4*a*c)
```

3.66 $\int \frac{\arcsin(ax)^3}{\left(c-a^2cx^2\right)^{3/2}}\,dx$

Optimal result . . . 569
Mathematica [A] (verified) . . . 570
Rubi [A] (verified) . . . 570
Maple [A] (verified) . . . 573
Fricas [F] . . . 573
Sympy [F] . . . 574
Maxima [A] (verification not implemented) . . . 574
Giac [F] . . . 575
Mupad [F(-1)] . . . 575
Reduce [F] . . . 575

Optimal result

Integrand size = 22, antiderivative size = 238

$$\begin{aligned}\int \frac{\arcsin(ax)^3}{\left(c-a^2cx^2\right)^{3/2}}\,dx &= \frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}} - \frac{i\sqrt{1-a^2x^2}\arcsin(ax)^3}{ac\sqrt{c-a^2cx^2}} \\ &+ \frac{3\sqrt{1-a^2x^2}\arcsin(ax)^2\log\left(1+e^{2i\arcsin(ax)}\right)}{ac\sqrt{c-a^2cx^2}} \\ &- \frac{3i\sqrt{1-a^2x^2}\arcsin(ax)\,\mathrm{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)}{ac\sqrt{c-a^2cx^2}} \\ &+ \frac{3\sqrt{1-a^2x^2}\,\mathrm{PolyLog}\left(3,-e^{2i\arcsin(ax)}\right)}{2ac\sqrt{c-a^2cx^2}}\end{aligned}$$

output

```
x*arcsin(a*x)^3/c/(-a^2*c*x^2+c)^(1/2)-I*(-a^2*x^2+1)^(1/2)*arcsin(a*x)^3/
a/c/(-a^2*c*x^2+c)^(1/2)+3*(-a^2*x^2+1)^(1/2)*arcsin(a*x)^2*ln(1+(I*a*x+(-
a^2*x^2+1)^(1/2))^2)/a/c/(-a^2*c*x^2+c)^(1/2)-3*I*(-a^2*x^2+1)^(1/2)*arcsi
n(a*x)*polylog(2,-(I*a*x+(-a^2*x^2+1)^(1/2))^2)/a/c/(-a^2*c*x^2+c)^(1/2)+3
/2*(-a^2*x^2+1)^(1/2)*polylog(3,-(I*a*x+(-a^2*x^2+1)^(1/2))^2)/a/c/(-a^2*c
*x^2+c)^(1/2)
```

Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 157, normalized size of antiderivative = 0.66

$$\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{3/2}}\,dx = \frac{2\arcsin(ax)^2\left(\left(ax-i\sqrt{1-a^2x^2}\right)\arcsin(ax)+3\sqrt{1-a^2x^2}\log\left(1+e^{2i\arcsin(ax)}\right)\right)-}{2ac}$$

input
```
Integrate[ArcSin[a*x]^3/(c - a^2*c*x^2)^(3/2),x]
```

output
```
(2*ArcSin[a*x]^2*((a*x - I*Sqrt[1 - a^2*x^2])*ArcSin[a*x] + 3*Sqrt[1 - a^2
*x^2]*Log[1 + E^((2*I)*ArcSin[a*x])]) - (6*I)*Sqrt[1 - a^2*x^2]*ArcSin[a*x
]*PolyLog[2, -E^((2*I)*ArcSin[a*x])] + 3*Sqrt[1 - a^2*x^2]*PolyLog[3, -E^(
(2*I)*ArcSin[a*x])])/(2*a*c*Sqrt[c - a^2*c*x^2])
```

Rubi [A] (verified)

Time = 0.74 (sec) , antiderivative size = 154, normalized size of antiderivative = 0.65, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.364$, Rules used = {5160, 5180, 3042, 4202, 2620, 3011, 2720, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{3/2}}\,dx$$

$$\downarrow 5160$$

$$\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}} - \frac{3a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^2}{1-a^2x^2}dx}{c\sqrt{c-a^2cx^2}}$$

$$\downarrow 5180$$

$$\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}} - \frac{3\sqrt{1-a^2x^2}\int \frac{ax\arcsin(ax)^2}{\sqrt{1-a^2x^2}}d\arcsin(ax)}{ac\sqrt{c-a^2cx^2}}$$

$$\downarrow 3042$$

$$\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}} - \frac{3\sqrt{1-a^2x^2}\int \arcsin(ax)^2\tan(\arcsin(ax))d\arcsin(ax)}{ac\sqrt{c-a^2cx^2}}$$

$$\downarrow 4202$$

$$\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\int\frac{e^{2i\arcsin(ax)}\arcsin(ax)^2}{1+e^{2i\arcsin(ax)}}d\arcsin(ax)\right)}{ac\sqrt{c-a^2cx^2}}$$

$$\downarrow 2620$$

$$\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\left(i\int\arcsin(ax)\log\left(1+e^{2i\arcsin(ax)}\right)d\arcsin(ax)-\frac{1}{2}i\arcsin(ax)^2\log\left(1+e^{2i\arcs\right.\right.\right.}{ac\sqrt{c-a^2cx^2}}$$

$$\downarrow 3011$$

$$\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\left(i\left(\frac{1}{2}i\arcsin(ax)\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)-\frac{1}{2}i\int\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)d\,\mathrm{ar}\right.\right.\right.}{ac\sqrt{c-a^2cx^2}}$$

$$\downarrow 2720$$

$$\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\left(i\left(\frac{1}{2}i\arcsin(ax)\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)-\frac{1}{4}\int e^{-2i\arcsin(ax)}\operatorname{PolyLog}\left(2,-e^{2i\,a}\right.\right.\right.\right.}{ac\sqrt{c-a^2cx^2}}$$

$$\downarrow 7143$$

$$\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\left(i\left(\frac{1}{2}i\arcsin(ax)\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)-\frac{1}{4}\operatorname{PolyLog}\left(3,-e^{2i\arcsin(ax)}\right)\right)-\frac{1}{2}i\right.\right.\right.}{ac\sqrt{c-a^2cx^2}}$$

input
```
Int[ArcSin[a*x]^3/(c - a^2*c*x^2)^(3/2),x]
```

output
```
(x*ArcSin[a*x]^3)/(c*Sqrt[c - a^2*c*x^2]) - (3*Sqrt[1 - a^2*x^2]*((I/3)*Ar
cSin[a*x]^3 - (2*I)*((-1/2*I)*ArcSin[a*x]^2*Log[1 + E^((2*I)*ArcSin[a*x])]
 + I*((I/2)*ArcSin[a*x]*PolyLog[2, -E^((2*I)*ArcSin[a*x])] - PolyLog[3, -E
^((2*I)*ArcSin[a*x])]/4))))/(a*c*Sqrt[c - a^2*c*x^2])
```

Defintions of rubi rules used

rule 2620

```
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/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[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 2720

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[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 3011

```
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] + Simp[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 3042

```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4202

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

rule 5160

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2)^(3/2), x
_Symbol] :> Simp[x*((a + b*ArcSin[c*x])^n/(d*Sqrt[d + e*x^2])), x] - Simp[b
*c*(n/d)*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]   Int[x*((a + b*ArcSin[c*x
])^(n - 1)/(1 - c^2*x^2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d
 + e, 0] && GtQ[n, 0]
```

rule 5180

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

rule 7143

```
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]
```

Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 203, normalized size of antiderivative = 0.85

method	result
default	$-\frac{\sqrt{-c(a^2x^2-1)}\left(i\sqrt{-a^2x^2+1}+ax\right)\arcsin(ax)^3}{c^2a(a^2x^2-1)}+\frac{\sqrt{-a^2x^2+1}\sqrt{-c(a^2x^2-1)}\left(4i\arcsin(ax)^3-6\arcsin(ax)^2\ln\left(1+\left(iax+\sqrt{-}\right.\right.\right.$

input

```
int(arcsin(a*x)^3/(-a^2*c*x^2+c)^(3/2),x,method=_RETURNVERBOSE)
```

output

```
-(-c*(a^2*x^2-1))^(1/2)*(I*(-a^2*x^2+1)^(1/2)+a*x)*arcsin(a*x)^3/c^2/a/(a^
2*x^2-1)+1/2*(-a^2*x^2+1)^(1/2)*(-c*(a^2*x^2-1))^(1/2)*(4*I*arcsin(a*x)^3-
6*arcsin(a*x)^2*ln(1+(I*a*x+(-a^2*x^2+1)^(1/2))^2)+6*I*arcsin(a*x)*polylog
(2,-(I*a*x+(-a^2*x^2+1)^(1/2))^2)-3*polylog(3,-(I*a*x+(-a^2*x^2+1)^(1/2))^
2))/c^2/a/(a^2*x^2-1)
```

Fricas [F]

$$\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{3/2}}\,dx = \int \frac{\arcsin(ax)^3}{(-a^2cx^2+c)^{\frac{3}{2}}}\,dx$$

input

```
integrate(arcsin(a*x)^3/(-a^2*c*x^2+c)^(3/2),x, algorithm="fricas")
```

output
```
integral(sqrt(-a^2*c*x^2 + c)*arcsin(a*x)^3/(a^4*c^2*x^4 - 2*a^2*c^2*x^2 +
 c^2), x)
```

Sympy [F]

$$\int \frac{\arcsin(ax)^3}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \int \frac{\operatorname{asin}^3(ax)}{\left(-c\left(ax-1\right)\left(ax+1\right)\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate(asin(a*x)**3/(-a**2*c*x**2+c)**(3/2),x)
```

output
```
Integral(asin(a*x)**3/(-c*(a*x - 1)*(a*x + 1))**(3/2), x)
```

Maxima [A] (verification not implemented)

Time = 0.64 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.21

$$\int \frac{\arcsin(ax)^3}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \frac{x\arcsin\left(ax\right)^3}{\sqrt{-a^2cx^2+cc}} - \frac{3\arcsin\left(ax\right)^2\log\left(x^2-\frac{1}{a^2}\right)}{2\,ac^{\frac{3}{2}}}$$

input
```
integrate(arcsin(a*x)^3/(-a^2*c*x^2+c)^(3/2),x, algorithm="maxima")
```

output
```
x*arcsin(a*x)^3/(sqrt(-a^2*c*x^2 + c)*c) - 3/2*arcsin(a*x)^2*log(x^2 - 1/a
^2)/(a*c^(3/2))
```

Giac [F]

$$\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{3/2}}\,dx = \int \frac{\arcsin(ax)^3}{(-a^2cx^2+c)^{\frac{3}{2}}}\,dx$$

input
```
integrate(arcsin(a*x)^3/(-a^2*c*x^2+c)^(3/2),x, algorithm="giac")
```

output
```
integrate(arcsin(a*x)^3/(-a^2*c*x^2 + c)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{3/2}}\,dx = \int \frac{\text{asin}(a\,x)^3}{(c-a^2\,c\,x^2)^{3/2}}\,dx$$

input
```
int(asin(a*x)^3/(c - a^2*c*x^2)^(3/2),x)
```

output
```
int(asin(a*x)^3/(c - a^2*c*x^2)^(3/2), x)
```

Reduce [F]

$$\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{3/2}}\,dx = -\frac{\int \frac{asin(ax)^3}{\sqrt{-a^2x^2+1}\,a^2x^2-\sqrt{-a^2x^2+1}}dx}{\sqrt{c}\,c}$$

input
```
int(asin(a*x)^3/(-a^2*c*x^2+c)^(3/2),x)
```

output
```
( - int(asin(a*x)**3/(sqrt( - a**2*x**2 + 1)*a**2*x**2 - sqrt( - a**2*x**2
 + 1)),x))/(sqrt(c)*c)
```

3.67 $\int \frac{\arcsin(ax)^3}{\left(c-a^2cx^2\right)^{5/2}}\,dx$

Optimal result . . . 576
Mathematica [A] (verified) . . . 577
Rubi [A] (verified) . . . 577
Maple [A] (verified) . . . 583
Fricas [F] . . . 583
Sympy [F] . . . 584
Maxima [A] (verification not implemented) . . . 584
Giac [F(-2)] . . . 584
Mupad [F(-1)] . . . 585
Reduce [F] . . . 585

Optimal result

Integrand size = 22, antiderivative size = 388

$$\int \frac{\arcsin(ax)^3}{\left(c-a^2cx^2\right)^{5/2}}\,dx = \frac{x\arcsin(ax)}{c^2\sqrt{c-a^2cx^2}} - \frac{\arcsin(ax)^2}{2ac^2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}} + \frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}} + \frac{2x\arcsin(ax)^3}{3c^2\sqrt{c-a^2cx^2}} - \frac{2i\sqrt{1-a^2x^2}\arcsin(ax)^3}{3ac^2\sqrt{c-a^2cx^2}} + \frac{2\sqrt{1-a^2x^2}\arcsin(ax)^2\log\left(1+e^{2i\arcsin(ax)}\right)}{ac^2\sqrt{c-a^2cx^2}} + \frac{\sqrt{1-a^2x^2}\log\left(1-a^2x^2\right)}{2ac^2\sqrt{c-a^2cx^2}} - \frac{2i\sqrt{1-a^2x^2}\arcsin(ax)\,\mathrm{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)}{ac^2\sqrt{c-a^2cx^2}} + \frac{\sqrt{1-a^2x^2}\,\mathrm{PolyLog}\left(3,-e^{2i\arcsin(ax)}\right)}{ac^2\sqrt{c-a^2cx^2}}$$

output
```
x*arcsin(a*x)/c^2/(-a^2*c*x^2+c)^(1/2)-1/2*arcsin(a*x)^2/a/c^2/(-a^2*x^2+1
)^(1/2)/(-a^2*c*x^2+c)^(1/2)+1/3*x*arcsin(a*x)^3/c/(-a^2*c*x^2+c)^(3/2)+2/
3*x*arcsin(a*x)^3/c^2/(-a^2*c*x^2+c)^(1/2)-2/3*I*(-a^2*x^2+1)^(1/2)*arcsin
(a*x)^3/a/c^2/(-a^2*c*x^2+c)^(1/2)+2*(-a^2*x^2+1)^(1/2)*arcsin(a*x)^2*ln(1
+(I*a*x+(-a^2*x^2+1)^(1/2))^2)/a/c^2/(-a^2*c*x^2+c)^(1/2)+1/2*(-a^2*x^2+1)
^(1/2)*ln(-a^2*x^2+1)/a/c^2/(-a^2*c*x^2+c)^(1/2)-2*I*(-a^2*x^2+1)^(1/2)*ar
csin(a*x)*polylog(2,-(I*a*x+(-a^2*x^2+1)^(1/2))^2)/a/c^2/(-a^2*c*x^2+c)^(1
/2)+(-a^2*x^2+1)^(1/2)*polylog(3,-(I*a*x+(-a^2*x^2+1)^(1/2))^2)/a/c^2/(-a^
2*c*x^2+c)^(1/2)
```

Mathematica [A] (verified)

Time = 0.43 (sec) , antiderivative size = 211, normalized size of antiderivative = 0.54

$$\int \frac{\arcsin(ax)^3}{\left(c-a^2cx^2\right)^{5/2}}\,dx = \frac{(1-a^2x^2)^{3/2}\left(\frac{6ax\arcsin(ax)}{\sqrt{1-a^2x^2}}+\frac{3\arcsin(ax)^2}{-1+a^2x^2}-4i\arcsin(ax)^3+\frac{2ax\arcsin(ax)^3}{(1-a^2x^2)^{3/2}}+\frac{4ax\arcsin(a}{\sqrt{1-a^2x^2}}\right.}{}$$

input
```
Integrate[ArcSin[a*x]^3/(c - a^2*c*x^2)^(5/2),x]
```

output
```
((1 - a^2*x^2)^(3/2)*((6*a*x*ArcSin[a*x])/Sqrt[1 - a^2*x^2] + (3*ArcSin[a*
x]^2)/(-1 + a^2*x^2) - (4*I)*ArcSin[a*x]^3 + (2*a*x*ArcSin[a*x]^3)/(1 - a^
2*x^2)^(3/2) + (4*a*x*ArcSin[a*x]^3)/Sqrt[1 - a^2*x^2] + 12*ArcSin[a*x]^2*
Log[1 + E^((2*I)*ArcSin[a*x])] + 3*Log[1 - a^2*x^2] - (12*I)*ArcSin[a*x]*P
olyLog[2, -E^((2*I)*ArcSin[a*x])] + 6*PolyLog[3, -E^((2*I)*ArcSin[a*x])]))
/(6*a*c*(c - a^2*c*x^2)^(3/2))
```

Rubi [A] (verified)

Time = 1.68 (sec) , antiderivative size = 296, normalized size of antiderivative = 0.76, number of steps used = 13, number of rules used = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.545$, Rules used = {5162, 5160, 5180, 3042, 4202, 2620, 3011, 2720, 5182, 5160, 240, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{5/2}}\,dx$$

$$\downarrow 5162$$

$$-\frac{a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^2}{(1-a^2x^2)^2}dx}{c^2\sqrt{c-a^2cx^2}}+\frac{2\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{3/2}}dx}{3c}+\frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5160$$

$$-\frac{a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^2}{(1-a^2x^2)^2}dx}{c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^2}{1-a^2x^2}dx}{c\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5180$$

$$-\frac{a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^2}{(1-a^2x^2)^2}dx}{c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\int \frac{ax\arcsin(ax)^2}{\sqrt{1-a^2x^2}}d\arcsin(ax)}{ac\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 3042$$

$$-\frac{a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^2}{(1-a^2x^2)^2}dx}{c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\int \arcsin(ax)^2\tan(\arcsin(ax))d\arcsin(ax)}{ac\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 4202$$

$$-\frac{a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^2}{(1-a^2x^2)^2}dx}{c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\int \frac{e^{2i\arcsin(ax)}\arcsin(ax)^2}{1+e^{2i\arcsin(ax)}}d\arcsin(ax)\right)}{ac\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 2620$$

$$\frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 3011$$

$$-\frac{a\sqrt{1-a^2x^2}\int\frac{x\arcsin(ax)^2}{\left(1-a^2x^2\right)^2}dx}{c^2\sqrt{c-a^2cx^2}}+2\left(\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\left(i\int\arcsin(ax)\log\left(1+e^{2i\arcsin(ax)}\right)d\arcsin(ax)-\frac{1}{2}i\arcsin(ax)^2\log\left(1+e^{2i\arcsin(ax)}\right)\right)\right)}{ac\sqrt{c-a^2cx^2}}\right)+\frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 3011$$

$$-\frac{a\sqrt{1-a^2x^2}\int\frac{x\arcsin(ax)^2}{\left(1-a^2x^2\right)^2}dx}{c^2\sqrt{c-a^2cx^2}}+2\left(\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\left(i\left(\frac{1}{2}i\arcsin(ax)\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)-\frac{1}{2}i\int\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)d\arcsin(ax)\right)-\right.\right.}{ac\sqrt{c-a^2cx^2}}\right)+\frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 2720$$

$$-\frac{a\sqrt{1-a^2x^2}\int\frac{x\arcsin(ax)^2}{\left(1-a^2x^2\right)^2}dx}{c^2\sqrt{c-a^2cx^2}}+2\left(\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\left(i\left(\frac{1}{2}i\arcsin(ax)\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)-\frac{1}{4}\int e^{-2i\arcsin(ax)}\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)d\right.\right.\right.}{ac\sqrt{c-a^2cx^2}}\right)+\frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5182$$

$$-\frac{a\sqrt{1-a^2x^2}\left(\frac{\arcsin(ax)^2}{2a^2\left(1-a^2x^2\right)}-\frac{\int\frac{\arcsin(ax)}{\left(1-a^2x^2\right)^{3/2}}dx}{a}\right)}{c^2\sqrt{c-a^2cx^2}}+2\left(\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\left(i\left(\frac{1}{2}i\arcsin(ax)\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)-\frac{1}{4}\int e^{-2i\arcsin(ax)}\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)d\right.\right.\right.}{ac\sqrt{c-a^2cx^2}}\right)+\frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5160$$

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

$$\frac{2\left(\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\left(i\left(\frac{1}{2}i\arcsin(ax)\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)-\frac{1}{4}\int e^{-2i\arcsin(ax)}\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)dx\right)\right)\right)}{ac\sqrt{c-a^2cx^2}}\right)}{3c}$$

$$\frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 240$$

$$\frac{2\left(\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\left(i\left(\frac{1}{2}i\arcsin(ax)\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)-\frac{1}{4}\int e^{-2i\arcsin(ax)}\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)dx\right)\right)\right)}{ac\sqrt{c-a^2cx^2}}\right)}{3c}$$

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

$$\downarrow 7143$$

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

$$\frac{2\left(\frac{x\arcsin(ax)^3}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\left(\frac{1}{3}i\arcsin(ax)^3-2i\left(i\left(\frac{1}{2}i\arcsin(ax)\operatorname{PolyLog}\left(2,-e^{2i\arcsin(ax)}\right)-\frac{1}{4}\operatorname{PolyLog}\left(3,-e^{2i\arcsin(ax)}\right)\right)-\frac{1}{2}i\arcsin(ax)^2\right.\right.\right.}{ac\sqrt{c-a^2cx^2}}\right)}{3c}$$

$$\frac{x\arcsin(ax)^3}{3c\left(c-a^2cx^2\right)^{3/2}}$$

input

```
Int[ArcSin[a*x]^3/(c - a^2*c*x^2)^(5/2),x]
```

output

```
(x*ArcSin[a*x]^3)/(3*c*(c - a^2*c*x^2)^(3/2)) - (a*Sqrt[1 - a^2*x^2]*(ArcS
in[a*x]^2/(2*a^2*(1 - a^2*x^2)) - ((x*ArcSin[a*x])/Sqrt[1 - a^2*x^2] + Log
[1 - a^2*x^2]/(2*a))/a))/(c^2*Sqrt[c - a^2*c*x^2]) + (2*((x*ArcSin[a*x]^3)
/(c*Sqrt[c - a^2*c*x^2]) - (3*Sqrt[1 - a^2*x^2]*((I/3)*ArcSin[a*x]^3 - (2*
I)*((-1/2*I)*ArcSin[a*x]^2*Log[1 + E^((2*I)*ArcSin[a*x])] + I*((I/2)*ArcSi
n[a*x]*PolyLog[2, -E^((2*I)*ArcSin[a*x])] - PolyLog[3, -E^((2*I)*ArcSin[a*
x])]/4))))/(a*c*Sqrt[c - a^2*c*x^2])))/(3*c)
```

Defintions of rubi rules used

rule 240

```
Int[(x_)/((a_) + (b_.)*(x_)^2), x_Symbol] :> Simp[Log[RemoveContent[a + b*x
^2, x]]/(2*b), x] /; FreeQ[{a, b}, x]
```

rule 2620

```
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/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[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 2720

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Simp[v/D[v, x]
   Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Funct
ionOfExponentialQ[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 3011

```
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] + Simp[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 3042

```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4202

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

rule 5160

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/((d_) + (e_.)*(x_)^2)^(3/2), x
_Symbol] :> Simp[x*((a + b*ArcSin[c*x])^n/(d*Sqrt[d + e*x^2])), x] - Simp[b
*c*(n/d)*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]   Int[x*((a + b*ArcSin[c*x
])^(n - 1)/(1 - c^2*x^2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d
 + e, 0] && GtQ[n, 0]
```

rule 5162

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_), x_
Symbol] :> Simp[(-x)*(d + e*x^2)^(p + 1)*((a + b*ArcSin[c*x])^n/(2*d*(p + 1
))), x] + (Simp[(2*p + 3)/(2*d*(p + 1))   Int[(d + e*x^2)^(p + 1)*(a + b*Ar
cSin[c*x])^n, x], x] + Simp[b*c*(n/(2*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2
*x^2)^p]   Int[x*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x
]) /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && LtQ[p,
 -1] && NeQ[p, -3/2]
```

rule 5180

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

rule 5182

```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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 7143

```
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]
```

Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 535, normalized size of antiderivative = 1.38

method	result
default	$-\frac{\sqrt{-c(a^2x^2-1)}\left(2i\sqrt{-a^2x^2+1}\,a^2x^2+2a^3x^3-2i\sqrt{-a^2x^2+1}-3ax\right)\arcsin(ax)\left(-6i\arcsin(ax)a^4x^4-6\arcsin(ax)\sqrt{-a^2x^2+1}\,a^3x$

input
```
int(arcsin(a*x)^3/(-a^2*c*x^2+c)^(5/2),x,method=_RETURNVERBOSE)
```

output
```
-1/6*(-c*(a^2*x^2-1))^(1/2)*(2*I*(-a^2*x^2+1)^(1/2)*a^2*x^2+2*a^3*x^3-2*I*
(-a^2*x^2+1)^(1/2)-3*a*x)*arcsin(a*x)*(-6*I*arcsin(a*x)*a^4*x^4-6*arcsin(a
*x)*(-a^2*x^2+1)^(1/2)*a^3*x^3+6*I*(-a^2*x^2+1)^(1/2)*a^3*x^3-6*a^4*x^4+6*
x^2*arcsin(a*x)^2*a^2+12*I*arcsin(a*x)*a^2*x^2+9*arcsin(a*x)*(-a^2*x^2+1)^
(1/2)*a*x-6*I*(-a^2*x^2+1)^(1/2)*a*x+18*a^2*x^2-8*arcsin(a*x)^2-6*I*arcsin
(a*x)-12)/c^3/(3*a^6*x^6-10*a^4*x^4+11*a^2*x^2-4)/a+2*(-c*(a^2*x^2-1))^(1/
2)*(-a^2*x^2+1)^(1/2)/a/c^3/(a^2*x^2-1)*ln(I*a*x+(-a^2*x^2+1)^(1/2))-(-c*(
a^2*x^2-1))^(1/2)*(-a^2*x^2+1)^(1/2)/a/c^3/(a^2*x^2-1)*ln(1+(I*a*x+(-a^2*x
^2+1)^(1/2))^2)+1/3*(-c*(a^2*x^2-1))^(1/2)*(-a^2*x^2+1)^(1/2)*(4*I*arcsin(
a*x)^3-6*arcsin(a*x)^2*ln(1+(I*a*x+(-a^2*x^2+1)^(1/2))^2)+6*I*arcsin(a*x)*
polylog(2,-(I*a*x+(-a^2*x^2+1)^(1/2))^2)-3*polylog(3,-(I*a*x+(-a^2*x^2+1)^
(1/2))^2))/a/c^3/(a^2*x^2-1)
```

Fricas [F]

$$\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{5/2}}\,dx = \int \frac{\arcsin(ax)^3}{(-a^2cx^2+c)^{\frac{5}{2}}}\,dx$$

input
```
integrate(arcsin(a*x)^3/(-a^2*c*x^2+c)^(5/2),x, algorithm="fricas")
```

output
```
integral(-sqrt(-a^2*c*x^2 + c)*arcsin(a*x)^3/(a^6*c^3*x^6 - 3*a^4*c^3*x^4
+ 3*a^2*c^3*x^2 - c^3), x)
```

Sympy [F]

$$\int \frac{\arcsin(ax)^3}{\left(c-a^2cx^2\right)^{5/2}}\,dx = \int \frac{\operatorname{asin}^3(ax)}{\left(-c\left(ax-1\right)\left(ax+1\right)\right)^{\frac{5}{2}}}\,dx$$

input
```
integrate(asin(a*x)**3/(-a**2*c*x**2+c)**(5/2),x)
```

output
```
Integral(asin(a*x)**3/(-c*(a*x - 1)*(a*x + 1))**(5/2), x)
```

Maxima [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 106, normalized size of antiderivative = 0.27

$$\int \frac{\arcsin(ax)^3}{\left(c-a^2cx^2\right)^{5/2}}\,dx = \frac{1}{2}\,a\left(\frac{1}{a^4c^{\frac{5}{2}}x^2-a^2c^{\frac{5}{2}}}+\frac{2\,\log\left(ax+1\right)}{a^2c^{\frac{5}{2}}}+\frac{2\,\log\left(ax-1\right)}{a^2c^{\frac{5}{2}}}\right)\arcsin\left(ax\right)^2 + \frac{1}{3}\left(\frac{2\,x}{\sqrt{-a^2cx^2+cc^2}}+\frac{x}{\left(-a^2cx^2+c\right)^{\frac{3}{2}}c}\right)\arcsin\left(ax\right)^3$$

input
```
integrate(arcsin(a*x)^3/(-a^2*c*x^2+c)^(5/2),x, algorithm="maxima")
```

output
```
1/2*a*(1/(a^4*c^(5/2)*x^2 - a^2*c^(5/2)) + 2*log(a*x + 1)/(a^2*c^(5/2)) +
2*log(a*x - 1)/(a^2*c^(5/2)))*arcsin(a*x)^2 + 1/3*(2*x/(sqrt(-a^2*c*x^2 +
c)*c^2) + x/((-a^2*c*x^2 + c)^(3/2)*c))*arcsin(a*x)^3
```

Giac [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^3}{\left(c-a^2cx^2\right)^{5/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(a*x)^3/(-a^2*c*x^2+c)^(5/2),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{5/2}}\,dx = \int \frac{\text{asin}(a\,x)^3}{(c-a^2\,c\,x^2)^{5/2}}\,dx$$

input
```
int(asin(a*x)^3/(c - a^2*c*x^2)^(5/2),x)
```

output
```
int(asin(a*x)^3/(c - a^2*c*x^2)^(5/2), x)
```

Reduce [F]

$$\int \frac{\arcsin(ax)^3}{(c-a^2cx^2)^{5/2}}\,dx = \frac{\int \frac{asin(ax)^3}{\sqrt{-a^2x^2+1}\,a^4x^4-2\sqrt{-a^2x^2+1}\,a^2x^2+\sqrt{-a^2x^2+1}}dx}{\sqrt{c}\,c^2}$$

input
```
int(asin(a*x)^3/(-a^2*c*x^2+c)^(5/2),x)
```

output
```
int(asin(a*x)**3/(sqrt( - a**2*x**2 + 1)*a**4*x**4 - 2*sqrt( - a**2*x**2 +
 1)*a**2*x**2 + sqrt( - a**2*x**2 + 1)),x)/(sqrt(c)*c**2)
```

3.68 $\int \frac{(d-c^2dx^2)^{5/2}}{a+b\arcsin(cx)}\,dx$

Optimal result . . . 586
Mathematica [A] (verified) . . . 587
Rubi [A] (verified) . . . 587
Maple [C] (verified) . . . 589
Fricas [F] . . . 590
Sympy [F] . . . 590
Maxima [F] . . . 591
Giac [A] (verification not implemented) . . . 591
Mupad [F(-1)] . . . 592
Reduce [F] . . . 592

Optimal result

Integrand size = 26, antiderivative size = 430

$$\begin{aligned}\int \frac{(d-c^2dx^2)^{5/2}}{a+b\arcsin(cx)}\,dx &= \frac{15d^2\sqrt{d-c^2dx^2}\cos\left(\frac{2a}{b}\right)\operatorname{CosIntegral}\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{32bc\sqrt{1-c^2x^2}}\\ &+\frac{3d^2\sqrt{d-c^2dx^2}\cos\left(\frac{4a}{b}\right)\operatorname{CosIntegral}\left(\frac{4(a+b\arcsin(cx))}{b}\right)}{16bc\sqrt{1-c^2x^2}}\\ &+\frac{d^2\sqrt{d-c^2dx^2}\cos\left(\frac{6a}{b}\right)\operatorname{CosIntegral}\left(\frac{6(a+b\arcsin(cx))}{b}\right)}{32bc\sqrt{1-c^2x^2}}\\ &+\frac{5d^2\sqrt{d-c^2dx^2}\log(a+b\arcsin(cx))}{16bc\sqrt{1-c^2x^2}}\\ &+\frac{15d^2\sqrt{d-c^2dx^2}\sin\left(\frac{2a}{b}\right)\operatorname{Si}\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{32bc\sqrt{1-c^2x^2}}\\ &+\frac{3d^2\sqrt{d-c^2dx^2}\sin\left(\frac{4a}{b}\right)\operatorname{Si}\left(\frac{4(a+b\arcsin(cx))}{b}\right)}{16bc\sqrt{1-c^2x^2}}\\ &+\frac{d^2\sqrt{d-c^2dx^2}\sin\left(\frac{6a}{b}\right)\operatorname{Si}\left(\frac{6(a+b\arcsin(cx))}{b}\right)}{32bc\sqrt{1-c^2x^2}}\end{aligned}$$

output
```
15/32*d^2*(-c^2*d*x^2+d)^(1/2)*cos(2*a/b)*Ci(2*(a+b*arcsin(c*x))/b)/b/c/(-
c^2*x^2+1)^(1/2)+3/16*d^2*(-c^2*d*x^2+d)^(1/2)*cos(4*a/b)*Ci(4*(a+b*arcsin
(c*x))/b)/b/c/(-c^2*x^2+1)^(1/2)+1/32*d^2*(-c^2*d*x^2+d)^(1/2)*cos(6*a/b)*
Ci(6*(a+b*arcsin(c*x))/b)/b/c/(-c^2*x^2+1)^(1/2)+5/16*d^2*(-c^2*d*x^2+d)^(
1/2)*ln(a+b*arcsin(c*x))/b/c/(-c^2*x^2+1)^(1/2)+15/32*d^2*(-c^2*d*x^2+d)^(
1/2)*sin(2*a/b)*Si(2*(a+b*arcsin(c*x))/b)/b/c/(-c^2*x^2+1)^(1/2)+3/16*d^2*
(-c^2*d*x^2+d)^(1/2)*sin(4*a/b)*Si(4*(a+b*arcsin(c*x))/b)/b/c/(-c^2*x^2+1)
^(1/2)+1/32*d^2*(-c^2*d*x^2+d)^(1/2)*sin(6*a/b)*Si(6*(a+b*arcsin(c*x))/b)/
b/c/(-c^2*x^2+1)^(1/2)
```

Mathematica [A] (verified)

Time = 0.88 (sec) , antiderivative size = 197, normalized size of antiderivative = 0.46

$$\int \frac{(d-c^2dx^2)^{5/2}}{a+b\arcsin(cx)}\,dx = \frac{d^2\sqrt{d-c^2dx^2}\left(15\cos\left(\frac{2a}{b}\right)\text{CosIntegral}\left(2\left(\frac{a}{b}+\arcsin(cx)\right)\right)+6\cos\left(\frac{4a}{b}\right)\text{CosIntegr}\right.$$

input
```
Integrate[(d - c^2*d*x^2)^(5/2)/(a + b*ArcSin[c*x]),x]
```

output
```
(d^2*Sqrt[d - c^2*d*x^2]*(15*Cos[(2*a)/b]*CosIntegral[2*(a/b + ArcSin[c*x]
)] + 6*Cos[(4*a)/b]*CosIntegral[4*(a/b + ArcSin[c*x])] + Cos[(6*a)/b]*CosI
ntegral[6*(a/b + ArcSin[c*x])] + 18*Log[a + b*ArcSin[c*x]] - 8*Log[8*(a +
b*ArcSin[c*x])] + 15*Sin[(2*a)/b]*SinIntegral[2*(a/b + ArcSin[c*x])] + 6*S
in[(4*a)/b]*SinIntegral[4*(a/b + ArcSin[c*x])] + Sin[(6*a)/b]*SinIntegral[
6*(a/b + ArcSin[c*x])]))/(32*b*c*Sqrt[1 - c^2*x^2])
```

Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 203, normalized size of antiderivative = 0.47, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d-c^2dx^2\right)^{5/2}}{a+b\arcsin(cx)}\,dx$$

$$\downarrow 5168$$

$$\frac{d^2\sqrt{d-c^2dx^2}\int \frac{\cos^6\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{bc\sqrt{1-c^2x^2}}$$

$$\downarrow 3042$$

$$\frac{d^2\sqrt{d-c^2dx^2}\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)^6}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{bc\sqrt{1-c^2x^2}}$$

$$\downarrow 3793$$

$$\frac{d^2\sqrt{d-c^2dx^2}\int \left(\frac{\cos\left(\frac{6a}{b}-\frac{6(a+b\arcsin(cx))}{b}\right)}{32(a+b\arcsin(cx))}+\frac{3\cos\left(\frac{4a}{b}-\frac{4(a+b\arcsin(cx))}{b}\right)}{16(a+b\arcsin(cx))}+\frac{15\cos\left(\frac{2a}{b}-\frac{2(a+b\arcsin(cx))}{b}\right)}{32(a+b\arcsin(cx))}+\frac{5}{16(a+b\arcsin(cx))}\right)c}{bc\sqrt{1-c^2x^2}}$$

$$\downarrow 2009$$

$$d^2\sqrt{d-c^2dx^2}\left(\frac{15}{32}\cos\left(\frac{2a}{b}\right)\text{CosIntegral}\left(\frac{2(a+b\arcsin(cx))}{b}\right)+\frac{3}{16}\cos\left(\frac{4a}{b}\right)\text{CosIntegral}\left(\frac{4(a+b\arcsin(cx))}{b}\right)+\frac{1}{32}\cos\left(\frac{6a}{b}\right.\right.$$

input

```
Int[(d - c^2*d*x^2)^(5/2)/(a + b*ArcSin[c*x]),x]
```

output

```
(d^2*Sqrt[d - c^2*d*x^2]*((15*Cos[(2*a)/b]*CosIntegral[(2*(a + b*ArcSin[c*
x]))/b])/32 + (3*Cos[(4*a)/b]*CosIntegral[(4*(a + b*ArcSin[c*x]))/b])/16 +
 (Cos[(6*a)/b]*CosIntegral[(6*(a + b*ArcSin[c*x]))/b])/32 + (5*Log[a + b*A
rcSin[c*x]])/16 + (15*Sin[(2*a)/b]*SinIntegral[(2*(a + b*ArcSin[c*x]))/b])
/32 + (3*Sin[(4*a)/b]*SinIntegral[(4*(a + b*ArcSin[c*x]))/b])/16 + (Sin[(6
*a)/b]*SinIntegral[(6*(a + b*ArcSin[c*x]))/b])/32))/(b*c*Sqrt[1 - c^2*x^2]
)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.48 (sec) , antiderivative size = 318, normalized size of antiderivative = 0.74

method	result
default	$-\frac{\sqrt{-d(c^2x^2-1)}\left(i\sqrt{-c^2x^2+1}\,cx+c^2x^2-1\right)\left(-20i\ln(a+b\arcsin(cx))cx-20\sqrt{-c^2x^2+1}\,\ln(a+b\arcsin(cx))+\text{expIntegral}_1(6i\arcs\right.$

input
```
int((-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
-1/64*(-d*(c^2*x^2-1))^(1/2)*(I*(-c^2*x^2+1)^(1/2)*c*x+c^2*x^2-1)*(-20*I*l
n(a+b*arcsin(c*x))*c*x-20*(-c^2*x^2+1)^(1/2)*ln(a+b*arcsin(c*x))+Ei(1,6*I*
arcsin(c*x)+6*I*a/b)*exp(I*(b*arcsin(c*x)+6*a)/b)+Ei(1,-6*I*arcsin(c*x)-6*
I*a/b)*exp(-I*(-b*arcsin(c*x)+6*a)/b)+6*Ei(1,4*I*arcsin(c*x)+4*I*a/b)*exp(
I*(b*arcsin(c*x)+4*a)/b)+15*Ei(1,2*I*arcsin(c*x)+2*I*a/b)*exp(I*(b*arcsin(
c*x)+2*a)/b)+15*Ei(1,-2*I*arcsin(c*x)-2*I*a/b)*exp(-I*(-b*arcsin(c*x)+2*a)
/b)+6*Ei(1,-4*I*arcsin(c*x)-4*I*a/b)*exp(-I*(-b*arcsin(c*x)+4*a)/b))*d^2/c
/(c^2*x^2-1)/b
```

Fricas [F]

$$\int \frac{(d-c^2dx^2)^{5/2}}{a+b\arcsin(cx)}\,dx = \int \frac{(-c^2dx^2+d)^{\frac{5}{2}}}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral((c^4*d^2*x^4 - 2*c^2*d^2*x^2 + d^2)*sqrt(-c^2*d*x^2 + d)/(b*arcsi
n(c*x) + a), x)
```

Sympy [F]

$$\int \frac{(d-c^2dx^2)^{5/2}}{a+b\arcsin(cx)}\,dx = \int \frac{(-d(cx-1)(cx+1))^{\frac{5}{2}}}{a+b\operatorname{asin}(cx)}\,dx$$

input
```
integrate((-c**2*d*x**2+d)**(5/2)/(a+b*asin(c*x)),x)
```

output
```
Integral((-d*(c*x - 1)*(c*x + 1))**(5/2)/(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \frac{(d-c^2dx^2)^{5/2}}{a+b\arcsin(cx)}\,dx = \int \frac{(-c^2dx^2+d)^{\frac{5}{2}}}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate((-c^2*d*x^2 + d)^(5/2)/(b*arcsin(c*x) + a), x)
```

Giac [A] (verification not implemented)

Time = 0.49 (sec) , antiderivative size = 525, normalized size of antiderivative = 1.22

$$\int \frac{(d-c^2dx^2)^{5/2}}{a+b\arcsin(cx)}\,dx = \text{Too large to display}$$

input
```
integrate((-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
1/32*(32*d^(5/2)*cos(a/b)^6*cos_integral(6*a/b + 6*arcsin(c*x))/(b*c^2) +
32*d^(5/2)*cos(a/b)^5*sin(a/b)*sin_integral(6*a/b + 6*arcsin(c*x))/(b*c^2)
 - 48*d^(5/2)*cos(a/b)^4*cos_integral(6*a/b + 6*arcsin(c*x))/(b*c^2) + 48*
d^(5/2)*cos(a/b)^4*cos_integral(4*a/b + 4*arcsin(c*x))/(b*c^2) - 32*d^(5/2
)*cos(a/b)^3*sin(a/b)*sin_integral(6*a/b + 6*arcsin(c*x))/(b*c^2) + 48*d^(
5/2)*cos(a/b)^3*sin(a/b)*sin_integral(4*a/b + 4*arcsin(c*x))/(b*c^2) + 18*
d^(5/2)*cos(a/b)^2*cos_integral(6*a/b + 6*arcsin(c*x))/(b*c^2) - 48*d^(5/2
)*cos(a/b)^2*cos_integral(4*a/b + 4*arcsin(c*x))/(b*c^2) + 30*d^(5/2)*cos(
a/b)^2*cos_integral(2*a/b + 2*arcsin(c*x))/(b*c^2) + 6*d^(5/2)*cos(a/b)*si
n(a/b)*sin_integral(6*a/b + 6*arcsin(c*x))/(b*c^2) - 24*d^(5/2)*cos(a/b)*s
in(a/b)*sin_integral(4*a/b + 4*arcsin(c*x))/(b*c^2) + 30*d^(5/2)*cos(a/b)*
sin(a/b)*sin_integral(2*a/b + 2*arcsin(c*x))/(b*c^2) - d^(5/2)*cos_integra
l(6*a/b + 6*arcsin(c*x))/(b*c^2) + 6*d^(5/2)*cos_integral(4*a/b + 4*arcsin
(c*x))/(b*c^2) - 15*d^(5/2)*cos_integral(2*a/b + 2*arcsin(c*x))/(b*c^2) +
10*d^(5/2)*log(b*arcsin(c*x) + a)/(b*c^2))*c
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d-c^2dx^2)^{5/2}}{a+b\arcsin(cx)}\,dx = \int \frac{(d-c^2\,d\,x^2)^{5/2}}{a+b\,\text{asin}\,(c\,x)}\,dx$$

input
```
int((d - c^2*d*x^2)^(5/2)/(a + b*asin(c*x)),x)
```

output
```
int((d - c^2*d*x^2)^(5/2)/(a + b*asin(c*x)), x)
```

Reduce [F]

$$\int \frac{(d-c^2dx^2)^{5/2}}{a+b\arcsin(cx)}\,dx = \sqrt{d}\,d^2\left(\int \frac{\sqrt{-c^2x^2+1}}{asin\,(cx)\,b+a}dx + \left(\int \frac{\sqrt{-c^2x^2+1}\,x^4}{asin\,(cx)\,b+a}dx\right)c^4 - 2\left(\int \frac{\sqrt{-c^2x^2+1}\,x^2}{asin\,(cx)\,b+a}dx\right)c^2\right)$$

input
```
int((-c^2*d*x^2+d)^(5/2)/(a+b*asin(c*x)),x)
```

output
```
sqrt(d)*d**2*(int(sqrt( - c**2*x**2 + 1)/(asin(c*x)*b + a),x) + int((sqrt(
 - c**2*x**2 + 1)*x**4)/(asin(c*x)*b + a),x)*c**4 - 2*int((sqrt( - c**2*x*
*2 + 1)*x**2)/(asin(c*x)*b + a),x)*c**2)
```

3.69 $\int \frac{(d-c^2dx^2)^{3/2}}{a+b\arcsin(cx)}\,dx$

Optimal result . . . 593
Mathematica [A] (verified) . . . 594
Rubi [A] (verified) . . . 594
Maple [C] (verified) . . . 596
Fricas [F] . . . 596
Sympy [F] . . . 597
Maxima [F] . . . 597
Giac [A] (verification not implemented) . . . 597
Mupad [F(-1)] . . . 598
Reduce [F] . . . 598

Optimal result

Integrand size = 26, antiderivative size = 294

$$\int \frac{(d-c^2dx^2)^{3/2}}{a+b\arcsin(cx)}\,dx = \frac{d\sqrt{d-c^2dx^2}\cos\left(\frac{2a}{b}\right)\operatorname{CosIntegral}\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{2bc\sqrt{1-c^2x^2}} + \frac{d\sqrt{d-c^2dx^2}\cos\left(\frac{4a}{b}\right)\operatorname{CosIntegral}\left(\frac{4(a+b\arcsin(cx))}{b}\right)}{8bc\sqrt{1-c^2x^2}} + \frac{3d\sqrt{d-c^2dx^2}\log(a+b\arcsin(cx))}{8bc\sqrt{1-c^2x^2}} + \frac{d\sqrt{d-c^2dx^2}\sin\left(\frac{2a}{b}\right)\operatorname{Si}\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{2bc\sqrt{1-c^2x^2}} + \frac{d\sqrt{d-c^2dx^2}\sin\left(\frac{4a}{b}\right)\operatorname{Si}\left(\frac{4(a+b\arcsin(cx))}{b}\right)}{8bc\sqrt{1-c^2x^2}}$$

output

```
1/2*d*(-c^2*d*x^2+d)^(1/2)*cos(2*a/b)*Ci(2*(a+b*arcsin(c*x))/b)/b/c/(-c^2*
x^2+1)^(1/2)+1/8*d*(-c^2*d*x^2+d)^(1/2)*cos(4*a/b)*Ci(4*(a+b*arcsin(c*x))/
b)/b/c/(-c^2*x^2+1)^(1/2)+3/8*d*(-c^2*d*x^2+d)^(1/2)*ln(a+b*arcsin(c*x))/b
/c/(-c^2*x^2+1)^(1/2)+1/2*d*(-c^2*d*x^2+d)^(1/2)*sin(2*a/b)*Si(2*(a+b*arcs
in(c*x))/b)/b/c/(-c^2*x^2+1)^(1/2)+1/8*d*(-c^2*d*x^2+d)^(1/2)*sin(4*a/b)*S
i(4*(a+b*arcsin(c*x))/b)/b/c/(-c^2*x^2+1)^(1/2)
```

Mathematica [A] (verified)

Time = 0.54 (sec) , antiderivative size = 151, normalized size of antiderivative = 0.51

$$\int \frac{(d-c^2dx^2)^{3/2}}{a+b\arcsin(cx)}\,dx = \frac{d\sqrt{d-c^2dx^2}\left(4\cos\left(\frac{2a}{b}\right)\text{CosIntegral}\left(2\left(\frac{a}{b}+\arcsin(cx)\right)\right)+\cos\left(\frac{4a}{b}\right)\text{CosIntegral}\left(\right.\right.}{}$$

input
```
Integrate[(d - c^2*d*x^2)^(3/2)/(a + b*ArcSin[c*x]),x]
```

output
```
(d*Sqrt[d - c^2*d*x^2]*(4*Cos[(2*a)/b]*CosIntegral[2*(a/b + ArcSin[c*x])]
+ Cos[(4*a)/b]*CosIntegral[4*(a/b + ArcSin[c*x])] + 4*Log[a + b*ArcSin[c*x
]] - Log[8*(a + b*ArcSin[c*x])] + 4*Sin[(2*a)/b]*SinIntegral[2*(a/b + ArcS
in[c*x])] + Sin[(4*a)/b]*SinIntegral[4*(a/b + ArcSin[c*x])]))/(8*b*c*Sqrt[
1 - c^2*x^2])
```

Rubi [A] (verified)

Time = 0.48 (sec) , antiderivative size = 151, normalized size of antiderivative = 0.51, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d-c^2dx^2)^{3/2}}{a+b\arcsin(cx)}\,dx$$

$$\downarrow 5168$$

$$\frac{d\sqrt{d-c^2dx^2}\int \frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{bc\sqrt{1-c^2x^2}}$$

$$\downarrow 3042$$

$$\frac{d\sqrt{d-c^2dx^2}\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)^4}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{bc\sqrt{1-c^2x^2}}$$

$$\downarrow 3793$$

$$\frac{d\sqrt{d-c^2dx^2}\int\left(\frac{\cos\left(\frac{4a}{b}-\frac{4(a+b\arcsin(cx))}{b}\right)}{8(a+b\arcsin(cx))}+\frac{\cos\left(\frac{2a}{b}-\frac{2(a+b\arcsin(cx))}{b}\right)}{2(a+b\arcsin(cx))}+\frac{3}{8(a+b\arcsin(cx))}\right)d(a+b\arcsin(cx))}{bc\sqrt{1-c^2x^2}}$$

$$\downarrow \text{ 2009}$$

$$\frac{d\sqrt{d-c^2dx^2}\left(\frac{1}{2}\cos\left(\frac{2a}{b}\right)\text{CosIntegral}\left(\frac{2(a+b\arcsin(cx))}{b}\right)+\frac{1}{8}\cos\left(\frac{4a}{b}\right)\text{CosIntegral}\left(\frac{4(a+b\arcsin(cx))}{b}\right)+\frac{1}{2}\sin\left(\frac{2a}{b}\right)\text{Si}\right.}{bc\sqrt{1-c^2x^2}}$$

input
```
Int[(d - c^2*d*x^2)^(3/2)/(a + b*ArcSin[c*x]),x]
```

output
```
(d*Sqrt[d - c^2*d*x^2]*((Cos[(2*a)/b]*CosIntegral[(2*(a + b*ArcSin[c*x]))/
b])/2 + (Cos[(4*a)/b]*CosIntegral[(4*(a + b*ArcSin[c*x]))/b])/8 + (3*Log[a
 + b*ArcSin[c*x]])/8 + (Sin[(2*a)/b]*SinIntegral[(2*(a + b*ArcSin[c*x]))/b
])/2 + (Sin[(4*a)/b]*SinIntegral[(4*(a + b*ArcSin[c*x]))/b])/8))/(b*c*Sqrt
[1 - c^2*x^2])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.14 (sec) , antiderivative size = 243, normalized size of antiderivative = 0.83

method	result
default	$-\frac{\sqrt{-d(c^2x^2-1)}\left(i\sqrt{-c^2x^2+1}\,cx+c^2x^2-1\right)\left(-6i\ln(a+b\arcsin(cx))cx-6\sqrt{-c^2x^2+1}\,\ln(a+b\arcsin(cx))+\text{expIntegral}_1\left(4i\arcsin\right.\right.$

input
```
int((-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
-1/16*(-d*(c^2*x^2-1))^(1/2)*(I*(-c^2*x^2+1)^(1/2)*c*x+c^2*x^2-1)*(-6*I*ln
(a+b*arcsin(c*x))*c*x-6*(-c^2*x^2+1)^(1/2)*ln(a+b*arcsin(c*x))+Ei(1,4*I*ar
csin(c*x)+4*I*a/b)*exp(I*(b*arcsin(c*x)+4*a)/b)+Ei(1,-4*I*arcsin(c*x)-4*I*
a/b)*exp(-I*(-b*arcsin(c*x)+4*a)/b)+4*Ei(1,2*I*arcsin(c*x)+2*I*a/b)*exp(I*
(b*arcsin(c*x)+2*a)/b)+4*Ei(1,-2*I*arcsin(c*x)-2*I*a/b)*exp(-I*(-b*arcsin(
c*x)+2*a)/b))*d/c/(c^2*x^2-1)/b
```

Fricas [F]

$$\int \frac{(d-c^2dx^2)^{3/2}}{a+b\arcsin(cx)}\,dx = \int \frac{(-c^2dx^2+d)^{\frac{3}{2}}}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral((-c^2*d*x^2 + d)^(3/2)/(b*arcsin(c*x) + a), x)
```

Sympy [F]

$$\int \frac{(d-c^2dx^2)^{3/2}}{a+b\arcsin(cx)}\,dx = \int \frac{(-d(cx-1)\,(cx+1))^{\frac{3}{2}}}{a+b\operatorname{asin}(cx)}\,dx$$

input
```
integrate((-c**2*d*x**2+d)**(3/2)/(a+b*asin(c*x)),x)
```

output
```
Integral((-d*(c*x - 1)*(c*x + 1))**(3/2)/(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \frac{(d-c^2dx^2)^{3/2}}{a+b\arcsin(cx)}\,dx = \int \frac{(-c^2dx^2+d)^{\frac{3}{2}}}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate((-c^2*d*x^2 + d)^(3/2)/(b*arcsin(c*x) + a), x)
```

Giac [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 285, normalized size of antiderivative = 0.97

$$\int \frac{(d-c^2dx^2)^{3/2}}{a+b\arcsin(cx)}\,dx = \frac{1}{8}\left(\frac{8\,d^{\frac{3}{2}}\cos\left(\frac{a}{b}\right)^4 \operatorname{Ci}\left(\frac{4a}{b}+4\arcsin(cx)\right)}{bc^2} + \frac{8\,d^{\frac{3}{2}}\cos\left(\frac{a}{b}\right)^3\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{4a}{b}+4\arcsin\right.\right.$$

input
```
integrate((-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
1/8*(8*d^(3/2)*cos(a/b)^4*cos_integral(4*a/b + 4*arcsin(c*x))/(b*c^2) + 8*
d^(3/2)*cos(a/b)^3*sin(a/b)*sin_integral(4*a/b + 4*arcsin(c*x))/(b*c^2) -
8*d^(3/2)*cos(a/b)^2*cos_integral(4*a/b + 4*arcsin(c*x))/(b*c^2) + 8*d^(3/
2)*cos(a/b)^2*cos_integral(2*a/b + 2*arcsin(c*x))/(b*c^2) - 4*d^(3/2)*cos(
a/b)*sin(a/b)*sin_integral(4*a/b + 4*arcsin(c*x))/(b*c^2) + 8*d^(3/2)*cos(
a/b)*sin(a/b)*sin_integral(2*a/b + 2*arcsin(c*x))/(b*c^2) + d^(3/2)*cos_in
tegral(4*a/b + 4*arcsin(c*x))/(b*c^2) - 4*d^(3/2)*cos_integral(2*a/b + 2*a
rcsin(c*x))/(b*c^2) + 3*d^(3/2)*log(b*arcsin(c*x) + a)/(b*c^2))*c
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d-c^2dx^2)^{3/2}}{a+b\arcsin(cx)}\,dx = \int \frac{(d-c^2\,d\,x^2)^{3/2}}{a+b\,\text{asin}\,(c\,x)}\,dx$$

input
```
int((d - c^2*d*x^2)^(3/2)/(a + b*asin(c*x)),x)
```

output
```
int((d - c^2*d*x^2)^(3/2)/(a + b*asin(c*x)), x)
```

Reduce [F]

$$\int \frac{(d-c^2dx^2)^{3/2}}{a+b\arcsin(cx)}\,dx = \sqrt{d}\,d\left(\int \frac{\sqrt{-c^2x^2+1}}{asin\,(cx)\,b+a}dx - \left(\int \frac{\sqrt{-c^2x^2+1}\,x^2}{asin\,(cx)\,b+a}dx\right)c^2\right)$$

input
```
int((-c^2*d*x^2+d)^(3/2)/(a+b*asin(c*x)),x)
```

output
```
sqrt(d)*d*(int(sqrt( - c**2*x**2 + 1)/(asin(c*x)*b + a),x) - int((sqrt( -
c**2*x**2 + 1)*x**2)/(asin(c*x)*b + a),x)*c**2)
```

3.70 $\int \frac{\sqrt{d-c^2dx^2}}{a+b\arcsin(cx)}\,dx$

Optimal result . . . 599
Mathematica [A] (verified) . . . 600
Rubi [A] (verified) . . . 600
Maple [C] (verified) . . . 602
Fricas [F] . . . 602
Sympy [F] . . . 602
Maxima [F] . . . 603
Giac [A] (verification not implemented) . . . 603
Mupad [F(-1)] . . . 604
Reduce [F] . . . 604

Optimal result

Integrand size = 26, antiderivative size = 169

$$\int \frac{\sqrt{d-c^2dx^2}}{a+b\arcsin(cx)}\,dx = \frac{\sqrt{d-c^2dx^2}\cos\left(\frac{2a}{b}\right)\operatorname{CosIntegral}\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{2bc\sqrt{1-c^2x^2}} + \frac{\sqrt{d-c^2dx^2}\log(a+b\arcsin(cx))}{2bc\sqrt{1-c^2x^2}} + \frac{\sqrt{d-c^2dx^2}\sin\left(\frac{2a}{b}\right)\operatorname{Si}\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{2bc\sqrt{1-c^2x^2}}$$

output

```
1/2*(-c^2*d*x^2+d)^(1/2)*cos(2*a/b)*Ci(2*(a+b*arcsin(c*x))/b)/b/c/(-c^2*x^
2+1)^(1/2)+1/2*(-c^2*d*x^2+d)^(1/2)*ln(a+b*arcsin(c*x))/b/c/(-c^2*x^2+1)^(
1/2)+1/2*(-c^2*d*x^2+d)^(1/2)*sin(2*a/b)*Si(2*(a+b*arcsin(c*x))/b)/b/c/(-c
^2*x^2+1)^(1/2)
```

Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 92, normalized size of antiderivative = 0.54

$$\int \frac{\sqrt{d-c^2dx^2}}{a+b\arcsin(cx)}\,dx$$
$$= \frac{\sqrt{d\,(1-c^2x^2)}\left(\cos\left(\frac{2a}{b}\right)\text{CosIntegral}\left(2\left(\frac{a}{b}+\arcsin(cx)\right)\right)+\log(a+b\arcsin(cx))+\sin\left(\frac{2a}{b}\right)\text{Si}\left(2\left(\frac{a}{b}+\arc\right.\right.\right.}{2bc\sqrt{1-c^2x^2}}$$

input
```
Integrate[Sqrt[d - c^2*d*x^2]/(a + b*ArcSin[c*x]),x]
```

output
```
(Sqrt[d*(1 - c^2*x^2)]*(Cos[(2*a)/b]*CosIntegral[2*(a/b + ArcSin[c*x])] +
Log[a + b*ArcSin[c*x]] + Sin[(2*a)/b]*SinIntegral[2*(a/b + ArcSin[c*x])]))
/(2*b*c*Sqrt[1 - c^2*x^2])
```

Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 100, normalized size of antiderivative = 0.59, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d-c^2dx^2}}{a+b\arcsin(cx)}\,dx$$
$$\downarrow 5168$$
$$\frac{\sqrt{d-c^2dx^2}\int \frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{bc\sqrt{1-c^2x^2}}$$
$$\downarrow 3042$$
$$\frac{\sqrt{d-c^2dx^2}\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)^2}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{bc\sqrt{1-c^2x^2}}$$
$$\downarrow 3793$$

$$\frac{\sqrt{d-c^2dx^2}\int\left(\frac{\cos\left(\frac{2a}{b}-\frac{2(a+b\arcsin(cx))}{b}\right)}{2(a+b\arcsin(cx))}+\frac{1}{2(a+b\arcsin(cx))}\right)d(a+b\arcsin(cx))}{bc\sqrt{1-c^2x^2}}$$

$$\downarrow \text{2009}$$

$$\frac{\sqrt{d-c^2dx^2}\left(\frac{1}{2}\cos\left(\frac{2a}{b}\right)\text{CosIntegral}\left(\frac{2(a+b\arcsin(cx))}{b}\right)+\frac{1}{2}\sin\left(\frac{2a}{b}\right)\text{Si}\left(\frac{2(a+b\arcsin(cx))}{b}\right)+\frac{1}{2}\log(a+b\arcsin(cx))\right)}{bc\sqrt{1-c^2x^2}}$$

input
```
Int[Sqrt[d - c^2*d*x^2]/(a + b*ArcSin[c*x]),x]
```

output
```
(Sqrt[d - c^2*d*x^2]*((Cos[(2*a)/b]*CosIntegral[(2*(a + b*ArcSin[c*x]))/b]
)/2 + Log[a + b*ArcSin[c*x]]/2 + (Sin[(2*a)/b]*SinIntegral[(2*(a + b*ArcSi
n[c*x]))/b])/2))/(b*c*Sqrt[1 - c^2*x^2])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.13 (sec) , antiderivative size = 169, normalized size of antiderivative = 1.00

method	result
default	$-\frac{\sqrt{-d(c^2x^2-1)}\left(i\sqrt{-c^2x^2+1}\,cx+c^2x^2-1\right)\left(-2i\ln(a+b\arcsin(cx))cx-2\sqrt{-c^2x^2+1}\,\ln(a+b\arcsin(cx))+\text{expIntegral}_1\left(2i\arcsin\right.\right.}{4c(c^2x^2-1)b}$

input
```
int((-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-d*(c^2*x^2-1))^(1/2)*(I*(-c^2*x^2+1)^(1/2)*c*x+c^2*x^2-1)*(-2*I*ln(
a+b*arcsin(c*x))*c*x-2*(-c^2*x^2+1)^(1/2)*ln(a+b*arcsin(c*x))+Ei(1,2*I*arc
sin(c*x)+2*I*a/b)*exp(I*(b*arcsin(c*x)+2*a)/b)+Ei(1,-2*I*arcsin(c*x)-2*I*a
/b)*exp(-I*(-b*arcsin(c*x)+2*a)/b))/c/(c^2*x^2-1)/b
```

Fricas [F]

$$\int \frac{\sqrt{d-c^2dx^2}}{a+b\arcsin(cx)}\,dx = \int \frac{\sqrt{-c^2dx^2+d}}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(sqrt(-c^2*d*x^2 + d)/(b*arcsin(c*x) + a), x)
```

Sympy [F]

$$\int \frac{\sqrt{d-c^2dx^2}}{a+b\arcsin(cx)}\,dx = \int \frac{\sqrt{-d\,(cx-1)\,(cx+1)}}{a+b\,\text{asin}\,(cx)}\,dx$$

input
```
integrate((-c**2*d*x**2+d)**(1/2)/(a+b*asin(c*x)),x)
```

output
```
Integral(sqrt(-d*(c*x - 1)*(c*x + 1))/(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \frac{\sqrt{d-c^2dx^2}}{a+b\arcsin(cx)}\,dx = \int \frac{\sqrt{-c^2dx^2+d}}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate(sqrt(-c^2*d*x^2 + d)/(b*arcsin(c*x) + a), x)
```

Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 109, normalized size of antiderivative = 0.64

$$\int \frac{\sqrt{d-c^2dx^2}}{a+b\arcsin(cx)}\,dx$$
$$= \frac{1}{2}\,c\sqrt{d}\left(\frac{2\cos\left(\frac{a}{b}\right)^2 \operatorname{Ci}\left(\frac{2a}{b}+2\arcsin(cx)\right)}{bc^2} + \frac{2\cos\left(\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{2a}{b}+2\arcsin(cx)\right)}{bc^2} - \frac{\operatorname{Ci}\left(\frac{2a}{b}+2\arcs\right.}{bc^2}\right.$$

input
```
integrate((-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
1/2*c*sqrt(d)*(2*cos(a/b)^2*cos_integral(2*a/b + 2*arcsin(c*x))/(b*c^2) +
2*cos(a/b)*sin(a/b)*sin_integral(2*a/b + 2*arcsin(c*x))/(b*c^2) - cos_inte
gral(2*a/b + 2*arcsin(c*x))/(b*c^2) + log(b*arcsin(c*x) + a)/(b*c^2))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d-c^2dx^2}}{a+b\arcsin(cx)}\,dx = \int \frac{\sqrt{d-c^2\,d\,x^2}}{a+b\,\mathrm{asin}\,(c\,x)}\,dx$$

input
```
int((d - c^2*d*x^2)^(1/2)/(a + b*asin(c*x)),x)
```

output
```
int((d - c^2*d*x^2)^(1/2)/(a + b*asin(c*x)), x)
```

Reduce [F]

$$\int \frac{\sqrt{d-c^2dx^2}}{a+b\arcsin(cx)}\,dx = \sqrt{d}\left(\int \frac{\sqrt{-c^2x^2+1}}{asin\,(cx)\,b+a}dx\right)$$

input
```
int((-c^2*d*x^2+d)^(1/2)/(a+b*asin(c*x)),x)
```

output
```
sqrt(d)*int(sqrt( - c**2*x**2 + 1)/(asin(c*x)*b + a),x)
```

3.71 $\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}\,dx$

Optimal result . . . 605
Mathematica [A] (verified) . . . 605
Rubi [A] (verified) . . . 606
Maple [A] (verified) . . . 606
Fricas [A] (verification not implemented) . . . 607
Sympy [F] . . . 607
Maxima [F] . . . 608
Giac [F(-2)] . . . 608
Mupad [F(-1)] . . . 608
Reduce [B] (verification not implemented) . . . 609

Optimal result

Integrand size = 26, antiderivative size = 45

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}\,dx = \frac{\sqrt{1-c^2x^2}\log(a+b\arcsin(cx))}{bc\sqrt{d-c^2dx^2}}$$

output
```
(-c^2*x^2+1)^(1/2)*ln(a+b*arcsin(c*x))/b/c/(-c^2*d*x^2+d)^(1/2)
```

Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}\,dx = \frac{\sqrt{1-c^2x^2}\log(a+b\arcsin(cx))}{bc\sqrt{d-c^2dx^2}}$$

input
```
Integrate[1/(Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x])),x]
```

output
```
(Sqrt[1 - c^2*x^2]*Log[a + b*ArcSin[c*x]])/(b*c*Sqrt[d - c^2*d*x^2])
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.038$, Rules used = {5150}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}\,dx$$
$$\downarrow 5150$$
$$\frac{\sqrt{1-c^2x^2}\log(a+b\arcsin(cx))}{bc\sqrt{d-c^2dx^2}}$$

input
```
Int[1/(Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x])),x]
```

output
```
(Sqrt[1 - c^2*x^2]*Log[a + b*ArcSin[c*x]])/(b*c*Sqrt[d - c^2*d*x^2])
```

Defintions of rubi rules used

rule 5150
```
Int[1/(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*Sqrt[(d_) + (e_.)*(x_)^2]), x_Sym
bol] :> Simp[(1/(b*c))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*Log[a + b*Ar
cSin[c*x]], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d + e, 0]
```

Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.29

method	result	size
default	$-\frac{\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}\,\ln(a+b\arcsin(cx))}{cd(c^2x^2-1)b}$	58

input
```
int(1/(-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
-(-d*(c^2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/c/d/(c^2*x^2-1)*ln(a+b*arcsin(c
*x))/b
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.29

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}\,dx = -\frac{\sqrt{-c^2dx^2+d}\sqrt{-c^2x^2+1}\log\left(-\frac{2\,(b\arcsin(cx)+a)}{b}\right)}{bc^3dx^2-bcd}$$

input
```
integrate(1/(-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
-sqrt(-c^2*d*x^2 + d)*sqrt(-c^2*x^2 + 1)*log(-2*(b*arcsin(c*x) + a)/b)/(b*
c^3*d*x^2 - b*c*d)
```

Sympy [F]

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}\,dx = \int \frac{1}{\sqrt{-d\,(cx-1)\,(cx+1)}\,(a+b\operatorname{asin}(cx))}\,dx$$

input
```
integrate(1/(-c**2*d*x**2+d)**(1/2)/(a+b*asin(c*x)),x)
```

output
```
Integral(1/(sqrt(-d*(c*x - 1)*(c*x + 1))*(a + b*asin(c*x))), x)
```

Maxima [F]

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}\,dx = \int \frac{1}{\sqrt{-c^2dx^2+d}(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate(1/(sqrt(-c^2*d*x^2 + d)*(b*arcsin(c*x) + a)), x)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(1/(-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}(c\,x))\,\sqrt{d-c^2\,d\,x^2}}\,dx$$

input
```
int(1/((a + b*asin(c*x))*(d - c^2*d*x^2)^(1/2)),x)
```

output
```
int(1/((a + b*asin(c*x))*(d - c^2*d*x^2)^(1/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.47

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}\,dx = \frac{\sqrt{d}\log(asin(cx)\,b+a)}{bcd}$$

input
```
int(1/(-c^2*d*x^2+d)^(1/2)/(a+b*asin(c*x)),x)
```

output
```
(sqrt(d)*log(asin(c*x)*b + a))/(b*c*d)
```

3.72 $\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))}\,dx$

Optimal result 610
Mathematica [N/A] 610
Rubi [N/A] 611
Maple [N/A] 611
Fricas [N/A] 612
Sympy [N/A] 612
Maxima [N/A] 612
Giac [N/A] 613
Mupad [N/A] 613
Reduce [N/A] 614

Optimal result

Integrand size = 26, antiderivative size = 26

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))}\,dx = \text{Int}\left(\frac{1}{\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))},x\right)$$

output
```
Defer(Int)(1/(-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x)
```

Mathematica [N/A]

Not integrable

Time = 6.07 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))}\,dx = \int \frac{1}{\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))}\,dx$$

input
```
Integrate[1/((d - c^2*d*x^2)^(3/2)*(a + b*ArcSin[c*x])),x]
```

output
```
Integrate[1/((d - c^2*d*x^2)^(3/2)*(a + b*ArcSin[c*x])), x]
```

Rubi [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d-c^2dx^2)^{3/2}\,(a+b\arcsin(cx))}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d-c^2dx^2)^{3/2}\,(a+b\arcsin(cx))}dx$$

input
```
Int[1/((d - c^2*d*x^2)^(3/2)*(a + b*ArcSin[c*x])),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{1}{(-c^2d\,x^2+d)^{\frac{3}{2}}\,(a+b\arcsin(cx))}dx$$

input
```
int(1/(-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x)
```

output
```
int(1/(-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x)
```

Fricas [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 81, normalized size of antiderivative = 3.12

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(-c^2dx^2+d\right)^{\frac{3}{2}}\left(b\arcsin\left(cx\right)+a\right)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(sqrt(-c^2*d*x^2 + d)/(a*c^4*d^2*x^4 - 2*a*c^2*d^2*x^2 + a*d^2 + (
b*c^4*d^2*x^4 - 2*b*c^2*d^2*x^2 + b*d^2)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 3.98 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(-d\left(cx-1\right)\left(cx+1\right)\right)^{\frac{3}{2}}\left(a+b\operatorname{asin}\left(cx\right)\right)}\,dx$$

input
```
integrate(1/(-c**2*d*x**2+d)**(3/2)/(a+b*asin(c*x)),x)
```

output
```
Integral(1/((-d*(c*x - 1)*(c*x + 1))**(3/2)*(a + b*asin(c*x))), x)
```

Maxima [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(-c^2dx^2+d\right)^{\frac{3}{2}}\left(b\arcsin\left(cx\right)+a\right)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate(1/((-c^2*d*x^2 + d)^(3/2)*(b*arcsin(c*x) + a)), x)
```

Giac [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(-c^2dx^2+d\right)^{\frac{3}{2}}\left(b\arcsin\left(cx\right)+a\right)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
integrate(1/((-c^2*d*x^2 + d)^(3/2)*(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(a+b\,\mathrm{asin}\left(c\,x\right)\right)\,\left(d-c^2\,d\,x^2\right)^{3/2}}\,dx$$

input
```
int(1/((a + b*asin(c*x))*(d - c^2*d*x^2)^(3/2)),x)
```

output
```
int(1/((a + b*asin(c*x))*(d - c^2*d*x^2)^(3/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 88, normalized size of antiderivative = 3.38

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)}\,dx = -\frac{\int \frac{1}{\sqrt{-c^2x^2+1}\,a\sin(cx)b\,c^2x^2-\sqrt{-c^2x^2+1}\,a\sin(cx)b+\sqrt{-c^2x^2+1}\,a\,c^2x^2-\sqrt{-c^2x^2+1}\,a}dx}{\sqrt{d}\,d}$$

input
```
int(1/(-c^2*d*x^2+d)^(3/2)/(a+b*asin(c*x)),x)
```

output
```
( - int(1/(sqrt( - c**2*x**2 + 1)*asin(c*x)*b*c**2*x**2 - sqrt( - c**2*x**
2 + 1)*asin(c*x)*b + sqrt( - c**2*x**2 + 1)*a*c**2*x**2 - sqrt( - c**2*x**
2 + 1)*a),x))/(sqrt(d)*d)
```

3.73 $\int \frac{1}{(d-c^2dx^2)^{5/2}(a+b\arcsin(cx))}\,dx$

Optimal result . . . 615
Mathematica [N/A] . . . 615
Rubi [N/A] . . . 616
Maple [N/A] . . . 616
Fricas [N/A] . . . 617
Sympy [N/A] . . . 617
Maxima [N/A] . . . 618
Giac [N/A] . . . 618
Mupad [N/A] . . . 618
Reduce [N/A] . . . 619

Optimal result

Integrand size = 26, antiderivative size = 26

$$\int \frac{1}{(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))}\,dx = \text{Int}\left(\frac{1}{(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))},x\right)$$

output
```
Defer(Int)(1/(-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x)
```

Mathematica [N/A]

Not integrable

Time = 3.71 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{1}{(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))}\,dx$$

input
```
Integrate[1/((d - c^2*d*x^2)^(5/2)*(a + b*ArcSin[c*x])),x]
```

output
```
Integrate[1/((d - c^2*d*x^2)^(5/2)*(a + b*ArcSin[c*x])), x]
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))}dx$$

input
```
Int[1/((d - c^2*d*x^2)^(5/2)*(a + b*ArcSin[c*x])),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.67 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{1}{(-c^2d\,x^2+d)^{\frac{5}{2}}\,(a+b\arcsin(cx))}dx$$

input
```
int(1/(-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x)
```

output
```
int(1/(-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x)
```

Fricas [N/A]

Not integrable

Time = 0.10 (sec) , antiderivative size = 108, normalized size of antiderivative = 4.15

$$\int \frac{1}{\left(d-c^2dx^2\right)^{5/2}\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(-c^2dx^2+d\right)^{\frac{5}{2}}\left(b\arcsin\left(cx\right)+a\right)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(-sqrt(-c^2*d*x^2 + d)/(a*c^6*d^3*x^6 - 3*a*c^4*d^3*x^4 + 3*a*c^2*
d^3*x^2 - a*d^3 + (b*c^6*d^3*x^6 - 3*b*c^4*d^3*x^4 + 3*b*c^2*d^3*x^2 - b*d
^3)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 9.05 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{1}{\left(d-c^2dx^2\right)^{5/2}\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(-d\left(cx-1\right)\left(cx+1\right)\right)^{\frac{5}{2}}\left(a+b\operatorname{asin}\left(cx\right)\right)}\,dx$$

input
```
integrate(1/(-c**2*d*x**2+d)**(5/2)/(a+b*asin(c*x)),x)
```

output
```
Integral(1/((-d*(c*x - 1)*(c*x + 1))**(5/2)*(a + b*asin(c*x))), x)
```

Maxima [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(d-c^2dx^2\right)^{5/2}\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(-c^2dx^2+d\right)^{\frac{5}{2}}\left(b\arcsin\left(cx\right)+a\right)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate(1/((-c^2*d*x^2 + d)^(5/2)*(b*arcsin(c*x) + a)), x)
```

Giac [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(d-c^2dx^2\right)^{5/2}\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(-c^2dx^2+d\right)^{\frac{5}{2}}\left(b\arcsin\left(cx\right)+a\right)}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
integrate(1/((-c^2*d*x^2 + d)^(5/2)*(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(d-c^2dx^2\right)^{5/2}\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(a+b\,\mathrm{asin}\left(c\,x\right)\right)\,\left(d-c^2\,d\,x^2\right)^{5/2}}\,dx$$

input
```
int(1/((a + b*asin(c*x))*(d - c^2*d*x^2)^(5/2)),x)
```

output
```
int(1/((a + b*asin(c*x))*(d - c^2*d*x^2)^(5/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 129, normalized size of antiderivative = 4.96

$$\int \frac{1}{(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))}\,dx = \frac{\int \frac{1}{\sqrt{-c^2x^2+1}\,asin(cx)b\,c^4x^4-2\sqrt{-c^2x^2+1}\,asin(cx)b\,c^2x^2+\sqrt{-c^2x^2+1}\,asin(cx)b+\sqrt{-c}}}{\sqrt{d}\,d^2}$$

input
```
int(1/(-c^2*d*x^2+d)^(5/2)/(a+b*asin(c*x)),x)
```

output
```
int(1/(sqrt( - c**2*x**2 + 1)*asin(c*x)*b*c**4*x**4 - 2*sqrt( - c**2*x**2
+ 1)*asin(c*x)*b*c**2*x**2 + sqrt( - c**2*x**2 + 1)*asin(c*x)*b + sqrt( -
c**2*x**2 + 1)*a*c**4*x**4 - 2*sqrt( - c**2*x**2 + 1)*a*c**2*x**2 + sqrt(
- c**2*x**2 + 1)*a),x)/(sqrt(d)*d**2)
```

3.74 $\int \frac{(d-c^2dx^2)^{5/2}}{(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 620
Mathematica [A] (verified) . . . 621
Rubi [A] (verified) . . . 622
Maple [C] (verified) . . . 624
Fricas [F] . . . 625
Sympy [F] . . . 625
Maxima [F] . . . 625
Giac [B] (verification not implemented) . . . 626
Mupad [F(-1)] . . . 627
Reduce [F] . . . 627

Optimal result

Integrand size = 26, antiderivative size = 429

$$\begin{aligned}\int \frac{(d-c^2dx^2)^{5/2}}{(a+b\arcsin(cx))^2}\,dx &= -\frac{d^2(1-c^2x^2)^{5/2}\sqrt{d-c^2dx^2}}{bc(a+b\arcsin(cx))}\\ &+\frac{15d^2\sqrt{d-c^2dx^2}\,\text{CosIntegral}\left(\frac{2(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{2a}{b}\right)}{16b^2c\sqrt{1-c^2x^2}}\\ &+\frac{3d^2\sqrt{d-c^2dx^2}\,\text{CosIntegral}\left(\frac{4(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{4a}{b}\right)}{4b^2c\sqrt{1-c^2x^2}}\\ &+\frac{3d^2\sqrt{d-c^2dx^2}\,\text{CosIntegral}\left(\frac{6(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{6a}{b}\right)}{16b^2c\sqrt{1-c^2x^2}}\\ &-\frac{15d^2\sqrt{d-c^2dx^2}\cos\left(\frac{2a}{b}\right)\text{Si}\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{16b^2c\sqrt{1-c^2x^2}}\\ &-\frac{3d^2\sqrt{d-c^2dx^2}\cos\left(\frac{4a}{b}\right)\text{Si}\left(\frac{4(a+b\arcsin(cx))}{b}\right)}{4b^2c\sqrt{1-c^2x^2}}\\ &-\frac{3d^2\sqrt{d-c^2dx^2}\cos\left(\frac{6a}{b}\right)\text{Si}\left(\frac{6(a+b\arcsin(cx))}{b}\right)}{16b^2c\sqrt{1-c^2x^2}}\end{aligned}$$

output

```
-d^2*(-c^2*x^2+1)^(5/2)*(-c^2*d*x^2+d)^(1/2)/b/c/(a+b*arcsin(c*x))+15/16*d
^2*(-c^2*d*x^2+d)^(1/2)*Ci(2*(a+b*arcsin(c*x))/b)*sin(2*a/b)/b^2/c/(-c^2*x
^2+1)^(1/2)+3/4*d^2*(-c^2*d*x^2+d)^(1/2)*Ci(4*(a+b*arcsin(c*x))/b)*sin(4*a
/b)/b^2/c/(-c^2*x^2+1)^(1/2)+3/16*d^2*(-c^2*d*x^2+d)^(1/2)*Ci(6*(a+b*arcsi
n(c*x))/b)*sin(6*a/b)/b^2/c/(-c^2*x^2+1)^(1/2)-15/16*d^2*(-c^2*d*x^2+d)^(1
/2)*cos(2*a/b)*Si(2*(a+b*arcsin(c*x))/b)/b^2/c/(-c^2*x^2+1)^(1/2)-3/4*d^2*
(-c^2*d*x^2+d)^(1/2)*cos(4*a/b)*Si(4*(a+b*arcsin(c*x))/b)/b^2/c/(-c^2*x^2+
1)^(1/2)-3/16*d^2*(-c^2*d*x^2+d)^(1/2)*cos(6*a/b)*Si(6*(a+b*arcsin(c*x))/b
)/b^2/c/(-c^2*x^2+1)^(1/2)
```

Mathematica [A] (verified)

Time = 0.80 (sec) , antiderivative size = 343, normalized size of antiderivative = 0.80

$$\int \frac{(d-c^2dx^2)^{5/2}}{(a+b\arcsin(cx))^2}\,dx = \frac{d^2\sqrt{d-c^2dx^2}\left(-16b+48bc^2x^2-48bc^4x^4+16bc^6x^6+15(a+b\arcsin(cx))\cos\right.}{}$$

input

```
Integrate[(d - c^2*d*x^2)^(5/2)/(a + b*ArcSin[c*x])^2,x]
```

output

```
(d^2*Sqrt[d - c^2*d*x^2]*(-16*b + 48*b*c^2*x^2 - 48*b*c^4*x^4 + 16*b*c^6*x
^6 + 15*(a + b*ArcSin[c*x])*CosIntegral[2*(a/b + ArcSin[c*x])]*Sin[(2*a)/b
] + 12*(a + b*ArcSin[c*x])*CosIntegral[4*(a/b + ArcSin[c*x])]*Sin[(4*a)/b]
 + 3*a*CosIntegral[6*(a/b + ArcSin[c*x])]*Sin[(6*a)/b] + 3*b*ArcSin[c*x]*C
osIntegral[6*(a/b + ArcSin[c*x])]*Sin[(6*a)/b] - 15*a*Cos[(2*a)/b]*SinInte
gral[2*(a/b + ArcSin[c*x])] - 15*b*ArcSin[c*x]*Cos[(2*a)/b]*SinIntegral[2*
(a/b + ArcSin[c*x])] - 12*a*Cos[(4*a)/b]*SinIntegral[4*(a/b + ArcSin[c*x])
] - 12*b*ArcSin[c*x]*Cos[(4*a)/b]*SinIntegral[4*(a/b + ArcSin[c*x])] - 3*a
*Cos[(6*a)/b]*SinIntegral[6*(a/b + ArcSin[c*x])] - 3*b*ArcSin[c*x]*Cos[(6*
a)/b]*SinIntegral[6*(a/b + ArcSin[c*x])]))/(16*b^2*c*Sqrt[1 - c^2*x^2]*(a
+ b*ArcSin[c*x]))
```

Rubi [A] (verified)

Time = 0.79 (sec) , antiderivative size = 239, normalized size of antiderivative = 0.56, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$, Rules used = {5166, 5224, 25, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d-c^2dx^2\right)^{5/2}}{(a+b\arcsin(cx))^2}\,dx$$

$$\downarrow 5166$$

$$-\frac{6cd^2\sqrt{d-c^2dx^2}\int \frac{x\left(1-c^2x^2\right)^2}{a+b\arcsin(cx)}dx}{b\sqrt{1-c^2x^2}}-\frac{\sqrt{1-c^2x^2}\left(d-c^2dx^2\right)^{5/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 5224$$

$$-\frac{6d^2\sqrt{d-c^2dx^2}\int -\frac{\cos^5\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c\sqrt{1-c^2x^2}}-\frac{\sqrt{1-c^2x^2}\left(d-c^2dx^2\right)^{5/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 25$$

$$\frac{6d^2\sqrt{d-c^2dx^2}\int \frac{\cos^5\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c\sqrt{1-c^2x^2}}-\frac{\sqrt{1-c^2x^2}\left(d-c^2dx^2\right)^{5/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 4906$$

$$\frac{6d^2\sqrt{d-c^2dx^2}\int \left(\frac{\sin\left(\frac{6a}{b}-\frac{6(a+b\arcsin(cx))}{b}\right)}{32(a+b\arcsin(cx))}+\frac{\sin\left(\frac{4a}{b}-\frac{4(a+b\arcsin(cx))}{b}\right)}{8(a+b\arcsin(cx))}+\frac{5\sin\left(\frac{2a}{b}-\frac{2(a+b\arcsin(cx))}{b}\right)}{32(a+b\arcsin(cx))}\right)d(a+b\arcsin(cx))}{b^2c\sqrt{1-c^2x^2}}-\frac{\sqrt{1-c^2x^2}\left(d-c^2dx^2\right)^{5/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 2009$$

$$-\frac{6d^2\sqrt{d-c^2dx^2}\left(-\frac{5}{32}\sin\left(\frac{2a}{b}\right)\operatorname{CosIntegral}\left(\frac{2(a+b\arcsin(cx))}{b}\right)-\frac{1}{8}\sin\left(\frac{4a}{b}\right)\operatorname{CosIntegral}\left(\frac{4(a+b\arcsin(cx))}{b}\right)-\frac{1}{32}\sin$$

$$\frac{\sqrt{1-c^2x^2}\left(d-c^2dx^2\right)^{5/2}}{bc(a+b\arcsin(cx))}$$

input
```
Int[(d - c^2*d*x^2)^(5/2)/(a + b*ArcSin[c*x])^2,x]
```

output
```
-((Sqrt[1 - c^2*x^2]*(d - c^2*d*x^2)^(5/2))/(b*c*(a + b*ArcSin[c*x]))) - (
6*d^2*Sqrt[d - c^2*d*x^2]*((-5*CosIntegral[(2*(a + b*ArcSin[c*x]))/b]*Sin[
(2*a)/b])/32 - (CosIntegral[(4*(a + b*ArcSin[c*x]))/b]*Sin[(4*a)/b])/8 - (
CosIntegral[(6*(a + b*ArcSin[c*x]))/b]*Sin[(6*a)/b])/32 + (5*Cos[(2*a)/b]*
SinIntegral[(2*(a + b*ArcSin[c*x]))/b])/32 + (Cos[(4*a)/b]*SinIntegral[(4*
(a + b*ArcSin[c*x]))/b])/8 + (Cos[(6*a)/b]*SinIntegral[(6*(a + b*ArcSin[c*
x]))/b])/32))/(b^2*c*Sqrt[1 - c^2*x^2])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.40 (sec) , antiderivative size = 716, normalized size of antiderivative = 1.67

method	result
default	$\frac{\sqrt{-d(c^2x^2-1)}\left(i\sqrt{-c^2x^2+1}\,cx+c^2x^2-1\right)\left(24i\,\mathrm{expIntegral}_1\left(4i\arcsin(cx)+\frac{4ia}{b}\right)\mathrm{e}^{\frac{i(b\arcsin(cx)+4a)}{b}}a-12icxb-6i\,\mathrm{expIntegral}_1\left(-6i$

input

```
int((-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output

```
1/64*(-d*(c^2*x^2-1))^(1/2)*(I*(-c^2*x^2+1)^(1/2)*c*x+c^2*x^2-1)*(24*I*Ei(
1,4*I*arcsin(c*x)+4*I*a/b)*exp(I*(b*arcsin(c*x)+4*a)/b)*a-12*I*c*x*b-6*I*E
i(1,-6*I*arcsin(c*x)-6*I*a/b)*exp(-I*(-b*arcsin(c*x)+6*a)/b)*a+24*I*Ei(1,4
*I*arcsin(c*x)+4*I*a/b)*exp(I*(b*arcsin(c*x)+4*a)/b)*b*arcsin(c*x)-30*I*ex
p(-I*(-b*arcsin(c*x)+2*a)/b)*Ei(1,-2*I*arcsin(c*x)-2*I*a/b)*a+56*I*b*c^3*x
^3-7*cos(5*arcsin(c*x))*b-21*cos(3*arcsin(c*x))*b-36*(-c^2*x^2+1)^(1/2)*b-
30*I*exp(-I*(-b*arcsin(c*x)+2*a)/b)*Ei(1,-2*I*arcsin(c*x)-2*I*a/b)*b*arcsi
n(c*x)-9*I*sin(3*arcsin(c*x))*b+30*I*Ei(1,2*I*arcsin(c*x)+2*I*a/b)*exp(I*(
b*arcsin(c*x)+2*a)/b)*a+64*I*b*c^7*x^7-24*I*Ei(1,-4*I*arcsin(c*x)-4*I*a/b)
*exp(-I*(-b*arcsin(c*x)+4*a)/b)*a-112*I*b*c^5*x^5+30*I*Ei(1,2*I*arcsin(c*x
)+2*I*a/b)*exp(I*(b*arcsin(c*x)+2*a)/b)*b*arcsin(c*x)-5*I*sin(5*arcsin(c*x
))*b+64*b*c^6*x^6*(-c^2*x^2+1)^(1/2)-6*I*Ei(1,-6*I*arcsin(c*x)-6*I*a/b)*ex
p(-I*(-b*arcsin(c*x)+6*a)/b)*b*arcsin(c*x)-80*x^4*c^4*(-c^2*x^2+1)^(1/2)*b
-24*I*Ei(1,-4*I*arcsin(c*x)-4*I*a/b)*exp(-I*(-b*arcsin(c*x)+4*a)/b)*b*arcs
in(c*x)+24*x^2*c^2*(-c^2*x^2+1)^(1/2)*b+6*I*exp(I*(b*arcsin(c*x)+6*a)/b)*E
i(1,6*I*arcsin(c*x)+6*I*a/b)*b*arcsin(c*x)+6*I*exp(I*(b*arcsin(c*x)+6*a)/b
)*Ei(1,6*I*arcsin(c*x)+6*I*a/b)*a)*d^2/c/(c^2*x^2-1)/b^2/(a+b*arcsin(c*x))
```

Fricas [F]

$$\int \frac{(d-c^2dx^2)^{5/2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(-c^2dx^2+d)^{\frac{5}{2}}}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral((c^4*d^2*x^4 - 2*c^2*d^2*x^2 + d^2)*sqrt(-c^2*d*x^2 + d)/(b^2*arc
sin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2), x)
```

Sympy [F]

$$\int \frac{(d-c^2dx^2)^{5/2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(-d(cx-1)(cx+1))^{\frac{5}{2}}}{(a+b\operatorname{asin}(cx))^2}\,dx$$

input
```
integrate((-c**2*d*x**2+d)**(5/2)/(a+b*asin(c*x))**2,x)
```

output
```
Integral((-d*(c*x - 1)*(c*x + 1))**(5/2)/(a + b*asin(c*x))**2, x)
```

Maxima [F]

$$\int \frac{(d-c^2dx^2)^{5/2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(-c^2dx^2+d)^{\frac{5}{2}}}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
(c^6*d^2*x^6 - 3*c^4*d^2*x^4 + 3*c^2*d^2*x^2 - d^2 - (b^2*c*arctan2(c*x, s
qrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)*integrate(6*(c^5*d^2*x^5 - 2*c^3*d^2
*x^3 + c*d^2*x)/(b^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b), x)
)*sqrt(d)/(b^2*c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1615 vs. $2(389) = 778$.

Time = 1.07 (sec) , antiderivative size = 1615, normalized size of antiderivative = 3.76

$$\int \frac{(d - c^2 dx^2)^{5/2}}{(a + b \arcsin(cx))^2}\, dx = \text{Too large to display}$$

input

```
integrate((-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output

```
1/16*(96*b*d^(5/2)*arcsin(c*x)*cos(a/b)^5*cos_integral(6*a/b + 6*arcsin(c*
x))*sin(a/b)/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) - 96*b*d^(5/2)*arcsin(c*x)*
cos(a/b)^6*sin_integral(6*a/b + 6*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^
2*c^2) + 96*a*d^(5/2)*cos(a/b)^5*cos_integral(6*a/b + 6*arcsin(c*x))*sin(a
/b)/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) - 96*a*d^(5/2)*cos(a/b)^6*sin_integr
al(6*a/b + 6*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) - 96*b*d^(5/2)
*arcsin(c*x)*cos(a/b)^3*cos_integral(6*a/b + 6*arcsin(c*x))*sin(a/b)/(b^3*
c^2*arcsin(c*x) + a*b^2*c^2) + 96*b*d^(5/2)*arcsin(c*x)*cos(a/b)^3*cos_int
egral(4*a/b + 4*arcsin(c*x))*sin(a/b)/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) +
144*b*d^(5/2)*arcsin(c*x)*cos(a/b)^4*sin_integral(6*a/b + 6*arcsin(c*x))/(
b^3*c^2*arcsin(c*x) + a*b^2*c^2) - 96*b*d^(5/2)*arcsin(c*x)*cos(a/b)^4*sin
_integral(4*a/b + 4*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) - 96*a*
d^(5/2)*cos(a/b)^3*cos_integral(6*a/b + 6*arcsin(c*x))*sin(a/b)/(b^3*c^2*a
rcsin(c*x) + a*b^2*c^2) + 96*a*d^(5/2)*cos(a/b)^3*cos_integral(4*a/b + 4*a
rcsin(c*x))*sin(a/b)/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) + 144*a*d^(5/2)*cos
(a/b)^4*sin_integral(6*a/b + 6*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2*c
^2) - 96*a*d^(5/2)*cos(a/b)^4*sin_integral(4*a/b + 4*arcsin(c*x))/(b^3*c^2
*arcsin(c*x) + a*b^2*c^2) + 18*b*d^(5/2)*arcsin(c*x)*cos(a/b)*cos_integral
(6*a/b + 6*arcsin(c*x))*sin(a/b)/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) - 48*b*
d^(5/2)*arcsin(c*x)*cos(a/b)*cos_integral(4*a/b + 4*arcsin(c*x))*sin(a/...
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d-c^2dx^2)^{5/2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(d-c^2\,d\,x^2)^{5/2}}{(a+b\,\mathrm{asin}\,(c\,x))^2}\,dx$$

input
```
int((d - c^2*d*x^2)^(5/2)/(a + b*asin(c*x))^2,x)
```

output
```
int((d - c^2*d*x^2)^(5/2)/(a + b*asin(c*x))^2, x)
```

Reduce [F]

$$\int \frac{(d-c^2dx^2)^{5/2}}{(a+b\arcsin(cx))^2}\,dx = \sqrt{d}\,d^2\left(\int \frac{\sqrt{-c^2x^2+1}}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx + \left(\int \frac{\sqrt{-c^2x^2+1}\,x^4}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx\right)c^4 - 2\left(\int \frac{\sqrt{-c^2x^2+1}\,x^2}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx\right)c^2\right)$$

input
```
int((-c^2*d*x^2+d)^(5/2)/(a+b*asin(c*x))^2,x)
```

output
```
sqrt(d)*d**2*(int(sqrt( - c**2*x**2 + 1)/(asin(c*x)**2*b**2 + 2*asin(c*x)*
a*b + a**2),x) + int((sqrt( - c**2*x**2 + 1)*x**4)/(asin(c*x)**2*b**2 + 2*
asin(c*x)*a*b + a**2),x)*c**4 - 2*int((sqrt( - c**2*x**2 + 1)*x**2)/(asin(
c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x)*c**2)
```

3.75 $\int \frac{(d-c^2dx^2)^{3/2}}{(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 628
Mathematica [A] (verified) . . . 629
Rubi [A] (verified) . . . 629
Maple [C] (verified) . . . 631
Fricas [F] . . . 632
Sympy [F] . . . 632
Maxima [F] . . . 633
Giac [B] (verification not implemented) . . . 633
Mupad [F(-1)] . . . 634
Reduce [F] . . . 635

Optimal result

Integrand size = 26, antiderivative size = 288

$$\begin{aligned}\int \frac{(d-c^2dx^2)^{3/2}}{(a+b\arcsin(cx))^2}\,dx &= -\frac{d(1-c^2x^2)^{3/2}\sqrt{d-c^2dx^2}}{bc(a+b\arcsin(cx))}\\ &+\frac{d\sqrt{d-c^2dx^2}\,\text{CosIntegral}\left(\frac{2(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{2a}{b}\right)}{b^2c\sqrt{1-c^2x^2}}\\ &+\frac{d\sqrt{d-c^2dx^2}\,\text{CosIntegral}\left(\frac{4(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{4a}{b}\right)}{2b^2c\sqrt{1-c^2x^2}}\\ &-\frac{d\sqrt{d-c^2dx^2}\cos\left(\frac{2a}{b}\right)\text{Si}\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{b^2c\sqrt{1-c^2x^2}}\\ &-\frac{d\sqrt{d-c^2dx^2}\cos\left(\frac{4a}{b}\right)\text{Si}\left(\frac{4(a+b\arcsin(cx))}{b}\right)}{2b^2c\sqrt{1-c^2x^2}}\end{aligned}$$

output

```
-d*(-c^2*x^2+1)^(3/2)*(-c^2*d*x^2+d)^(1/2)/b/c/(a+b*arcsin(c*x))+d*(-c^2*d
*x^2+d)^(1/2)*Ci(2*(a+b*arcsin(c*x))/b)*sin(2*a/b)/b^2/c/(-c^2*x^2+1)^(1/2
)+1/2*d*(-c^2*d*x^2+d)^(1/2)*Ci(4*(a+b*arcsin(c*x))/b)*sin(4*a/b)/b^2/c/(-
c^2*x^2+1)^(1/2)-d*(-c^2*d*x^2+d)^(1/2)*cos(2*a/b)*Si(2*(a+b*arcsin(c*x))/
b)/b^2/c/(-c^2*x^2+1)^(1/2)-1/2*d*(-c^2*d*x^2+d)^(1/2)*cos(4*a/b)*Si(4*(a+
b*arcsin(c*x))/b)/b^2/c/(-c^2*x^2+1)^(1/2)
```

Mathematica [A] (verified)

Time = 0.50 (sec) , antiderivative size = 230, normalized size of antiderivative = 0.80

$$\int \frac{(d-c^2dx^2)^{3/2}}{(a+b\arcsin(cx))^2}\,dx = \frac{d\sqrt{1-c^2x^2}(-1+c^2x^2)\sqrt{-d\,(-1+c^2x^2)}}{bc(a+b\arcsin(cx))}$$
$$+\frac{d\sqrt{-d\,(1-c^2x^2)^2}\sqrt{d-c^2dx^2}\left(2\,\text{CosIntegral}\left(2\left(\frac{a}{b}+\arcsin(cx)\right)\right)\sin\left(\frac{2a}{b}\right)+\text{CosIntegral}\left(4\left(\frac{a}{b}+\arcsin(c\right.\right.}{2b^2c\sqrt{1-c^2x^2}\sqrt{(-1+c^2x^2)\,(d}}$$

input
```
Integrate[(d - c^2*d*x^2)^(3/2)/(a + b*ArcSin[c*x])^2,x]
```

output
```
(d*Sqrt[1 - c^2*x^2]*(-1 + c^2*x^2)*Sqrt[-(d*(-1 + c^2*x^2))])/(b*c*(a + b
*ArcSin[c*x])) + (d*Sqrt[-(d*(1 - c^2*x^2)^2)]*Sqrt[d - c^2*d*x^2]*(2*CosI
ntegral[2*(a/b + ArcSin[c*x])]*Sin[(2*a)/b] + CosIntegral[4*(a/b + ArcSin[
c*x])]*Sin[(4*a)/b] - 2*Cos[(2*a)/b]*SinIntegral[2*(a/b + ArcSin[c*x])] -
Cos[(4*a)/b]*SinIntegral[4*(a/b + ArcSin[c*x])]))/(2*b^2*c*Sqrt[1 - c^2*x^
2]*Sqrt[(-1 + c^2*x^2)*(d - c^2*d*x^2)])
```

Rubi [A] (verified)

Time = 0.70 (sec) , antiderivative size = 187, normalized size of antiderivative = 0.65, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$, Rules used = {5166, 5224, 25, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d-c^2dx^2)^{3/2}}{(a+b\arcsin(cx))^2}\,dx$$
$$\downarrow 5166$$
$$-\frac{4cd\sqrt{d-c^2dx^2}\int \frac{x(1-c^2x^2)}{a+b\arcsin(cx)}dx}{b\sqrt{1-c^2x^2}} - \frac{\sqrt{1-c^2x^2}(d-c^2dx^2)^{3/2}}{bc(a+b\arcsin(cx))}$$
$$\downarrow 5224$$

$$-\frac{4d\sqrt{d-c^2dx^2}\int -\frac{\cos^3\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c\sqrt{1-c^2x^2}}-\frac{\sqrt{1-c^2x^2}\left(d-c^2dx^2\right)^{3/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 25$$

$$\frac{4d\sqrt{d-c^2dx^2}\int \frac{\cos^3\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c\sqrt{1-c^2x^2}}-\frac{\sqrt{1-c^2x^2}\left(d-c^2dx^2\right)^{3/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 4906$$

$$\frac{4d\sqrt{d-c^2dx^2}\int \left(\frac{\sin\left(\frac{4a}{b}-\frac{4(a+b\arcsin(cx))}{b}\right)}{8(a+b\arcsin(cx))}+\frac{\sin\left(\frac{2a}{b}-\frac{2(a+b\arcsin(cx))}{b}\right)}{4(a+b\arcsin(cx))}\right)d(a+b\arcsin(cx))}{b^2c\sqrt{1-c^2x^2}}-\frac{\sqrt{1-c^2x^2}\left(d-c^2dx^2\right)^{3/2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 2009$$

$$-\frac{4d\sqrt{d-c^2dx^2}\left(-\frac{1}{4}\sin\left(\frac{2a}{b}\right)\text{CosIntegral}\left(\frac{2(a+b\arcsin(cx))}{b}\right)-\frac{1}{8}\sin\left(\frac{4a}{b}\right)\text{CosIntegral}\left(\frac{4(a+b\arcsin(cx))}{b}\right)+\frac{1}{4}\cos\left(\frac{2a}{b}\right.\right.}{b^2c\sqrt{1-c^2x^2}}$$

$$\frac{\sqrt{1-c^2x^2}\left(d-c^2dx^2\right)^{3/2}}{bc(a+b\arcsin(cx))}$$

input

```
Int[(d - c^2*d*x^2)^(3/2)/(a + b*ArcSin[c*x])^2,x]
```

output

```
-((Sqrt[1 - c^2*x^2]*(d - c^2*d*x^2)^(3/2))/(b*c*(a + b*ArcSin[c*x]))) - (
4*d*Sqrt[d - c^2*d*x^2]*(-1/4*(CosIntegral[(2*(a + b*ArcSin[c*x]))/b]*Sin[
(2*a)/b]) - (CosIntegral[(4*(a + b*ArcSin[c*x]))/b]*Sin[(4*a)/b])/8 + (Cos
[(2*a)/b]*SinIntegral[(2*(a + b*ArcSin[c*x]))/b])/4 + (Cos[(4*a)/b]*SinInt
egral[(4*(a + b*ArcSin[c*x]))/b])/8))/(b^2*c*Sqrt[1 - c^2*x^2])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.20 (sec) , antiderivative size = 500, normalized size of antiderivative = 1.74

method	result
default	$-\frac{\sqrt{-d(c^2x^2-1)}\left(i\sqrt{-c^2x^2+1}\,cx+c^2x^2-1\right)\left(4i\,\mathrm{expIntegral}_1\left(-4i\arcsin(cx)-\frac{4ia}{b}\right)\mathrm{e}^{-\frac{i(-b\arcsin(cx)+4a)}{b}}a+16x^4c^4\sqrt{-c^2x^2+1}\,b+\right.$

input
```
int((-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
-1/16*(-d*(c^2*x^2-1))^(1/2)*(I*(-c^2*x^2+1)^(1/2)*c*x+c^2*x^2-1)*(4*I*exp
(-I*(-b*arcsin(c*x)+4*a)/b)*Ei(1,-4*I*arcsin(c*x)-4*I*a/b)*a+16*x^4*c^4*(-
c^2*x^2+1)^(1/2)*b+8*I*Ei(1,-2*I*arcsin(c*x)-2*I*a/b)*exp(-I*(-b*arcsin(c*
x)+2*a)/b)*a-12*x^2*c^2*(-c^2*x^2+1)^(1/2)*b+16*I*b*c^5*x^5+7*I*c*x*b-4*I*
Ei(1,4*I*arcsin(c*x)+4*I*a/b)*exp(I*(b*arcsin(c*x)+4*a)/b)*a+8*I*Ei(1,-2*I
*arcsin(c*x)-2*I*a/b)*exp(-I*(-b*arcsin(c*x)+2*a)/b)*b*arcsin(c*x)-4*I*Ei(
1,4*I*arcsin(c*x)+4*I*a/b)*exp(I*(b*arcsin(c*x)+4*a)/b)*b*arcsin(c*x)-20*I
*b*c^3*x^3-8*I*Ei(1,2*I*arcsin(c*x)+2*I*a/b)*exp(I*(b*arcsin(c*x)+2*a)/b)*
b*arcsin(c*x)+3*I*sin(3*arcsin(c*x))*b-8*I*Ei(1,2*I*arcsin(c*x)+2*I*a/b)*e
xp(I*(b*arcsin(c*x)+2*a)/b)*a+4*I*exp(-I*(-b*arcsin(c*x)+4*a)/b)*Ei(1,-4*I
*arcsin(c*x)-4*I*a/b)*b*arcsin(c*x)+11*(-c^2*x^2+1)^(1/2)*b+5*cos(3*arcsin
(c*x))*b)*d/c/(c^2*x^2-1)/b^2/(a+b*arcsin(c*x))
```

Fricas [F]

$$\int \frac{(d-c^2dx^2)^{3/2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(-c^2dx^2+d)^{\frac{3}{2}}}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral((-c^2*d*x^2 + d)^(3/2)/(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a
^2), x)
```

Sympy [F]

$$\int \frac{(d-c^2dx^2)^{3/2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(-d(cx-1)(cx+1))^{\frac{3}{2}}}{(a+b\operatorname{asin}(cx))^2}\,dx$$

input
```
integrate((-c**2*d*x**2+d)**(3/2)/(a+b*asin(c*x))**2,x)
```

output
```
Integral((-d*(c*x - 1)*(c*x + 1))**(3/2)/(a + b*asin(c*x))**2, x)
```

Maxima [F]

$$\int \frac{(d-c^2dx^2)^{3/2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(-c^2dx^2+d)^{\frac{3}{2}}}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
-(c^4*d*x^4 - 2*c^2*d*x^2 - (b^2*c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x +
1)) + a*b*c)*integrate(4*(c^3*d*x^3 - c*d*x)/(b^2*arctan2(c*x, sqrt(c*x +
1)*sqrt(-c*x + 1)) + a*b), x) + d)*sqrt(d)/(b^2*c*arctan2(c*x, sqrt(c*x +
1)*sqrt(-c*x + 1)) + a*b*c)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 871 vs. $2(264) = 528$.

Time $= 0.89$ (sec) , antiderivative size $= 871$, normalized size of antiderivative $= 3.02$

$$\int \frac{(d-c^2dx^2)^{3/2}}{(a+b\arcsin(cx))^2}\,dx = \text{Too large to display}$$

input
```
integrate((-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output

```
1/2*(8*b*d^(3/2)*arcsin(c*x)*cos(a/b)^3*cos_integral(4*a/b + 4*arcsin(c*x)
)*sin(a/b)/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) - 8*b*d^(3/2)*arcsin(c*x)*cos
(a/b)^4*sin_integral(4*a/b + 4*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2*c
^2) + 8*a*d^(3/2)*cos(a/b)^3*cos_integral(4*a/b + 4*arcsin(c*x))*sin(a/b)/
(b^3*c^2*arcsin(c*x) + a*b^2*c^2) - 8*a*d^(3/2)*cos(a/b)^4*sin_integral(4*
a/b + 4*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) - 4*b*d^(3/2)*arcsi
n(c*x)*cos(a/b)*cos_integral(4*a/b + 4*arcsin(c*x))*sin(a/b)/(b^3*c^2*arcs
in(c*x) + a*b^2*c^2) + 4*b*d^(3/2)*arcsin(c*x)*cos(a/b)*cos_integral(2*a/b
 + 2*arcsin(c*x))*sin(a/b)/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) + 8*b*d^(3/2)
*arcsin(c*x)*cos(a/b)^2*sin_integral(4*a/b + 4*arcsin(c*x))/(b^3*c^2*arcsi
n(c*x) + a*b^2*c^2) - 4*b*d^(3/2)*arcsin(c*x)*cos(a/b)^2*sin_integral(2*a/
b + 2*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) - 4*a*d^(3/2)*cos(a/b
)*cos_integral(4*a/b + 4*arcsin(c*x))*sin(a/b)/(b^3*c^2*arcsin(c*x) + a*b^
2*c^2) + 4*a*d^(3/2)*cos(a/b)*cos_integral(2*a/b + 2*arcsin(c*x))*sin(a/b)
/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) + 8*a*d^(3/2)*cos(a/b)^2*sin_integral(4
*a/b + 4*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) - 4*a*d^(3/2)*cos(
a/b)^2*sin_integral(2*a/b + 2*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2*c^
2) - 2*(c^2*x^2 - 1)^2*b*d^(3/2)/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) - b*d^(
3/2)*arcsin(c*x)*sin_integral(4*a/b + 4*arcsin(c*x))/(b^3*c^2*arcsin(c*x)
+ a*b^2*c^2) + 2*b*d^(3/2)*arcsin(c*x)*sin_integral(2*a/b + 2*arcsin(c*...
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d-c^2dx^2)^{3/2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(d-c^2\,d\,x^2)^{3/2}}{(a+b\,\mathrm{asin}\,(c\,x))^2}\,dx$$

input

```
int((d - c^2*d*x^2)^(3/2)/(a + b*asin(c*x))^2,x)
```

output

```
int((d - c^2*d*x^2)^(3/2)/(a + b*asin(c*x))^2, x)
```

Reduce [F]

$$\int \frac{(d-c^2dx^2)^{3/2}}{(a+b\arcsin(cx))^2}\,dx = \sqrt{d}\,d\left(\int \frac{\sqrt{-c^2x^2+1}}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx - \left(\int \frac{\sqrt{-c^2x^2+1}\,x^2}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx\right)c^2\right)$$

input
```
int((-c^2*d*x^2+d)^(3/2)/(a+b*asin(c*x))^2,x)
```

output
```
sqrt(d)*d*(int(sqrt( - c**2*x**2 + 1)/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b
 + a**2),x) - int((sqrt( - c**2*x**2 + 1)*x**2)/(asin(c*x)**2*b**2 + 2*asi
n(c*x)*a*b + a**2),x)*c**2)
```

3.76 $\int \frac{\sqrt{d-c^2dx^2}}{(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 636
Mathematica [A] (verified) . . . 637
Rubi [A] (verified) . . . 637
Maple [C] (verified) . . . 641
Fricas [F] . . . 641
Sympy [F] . . . 642
Maxima [F] . . . 642
Giac [B] (verification not implemented) . . . 642
Mupad [F(-1)] . . . 643
Reduce [F] . . . 643

Optimal result

Integrand size = 26, antiderivative size = 163

$$\int \frac{\sqrt{d-c^2dx^2}}{(a+b\arcsin(cx))^2}\,dx = -\frac{\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}{bc(a+b\arcsin(cx))} + \frac{\sqrt{d-c^2dx^2}\,\text{CosIntegral}\left(\frac{2(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{2a}{b}\right)}{b^2c\sqrt{1-c^2x^2}} - \frac{\sqrt{d-c^2dx^2}\cos\left(\frac{2a}{b}\right)\text{Si}\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{b^2c\sqrt{1-c^2x^2}}$$

output

```
-(-c^2*x^2+1)^(1/2)*(-c^2*d*x^2+d)^(1/2)/b/c/(a+b*arcsin(c*x))+(-c^2*d*x^2
+d)^(1/2)*Ci(2*(a+b*arcsin(c*x))/b)*sin(2*a/b)/b^2/c/(-c^2*x^2+1)^(1/2)-(-
c^2*d*x^2+d)^(1/2)*cos(2*a/b)*Si(2*(a+b*arcsin(c*x))/b)/b^2/c/(-c^2*x^2+1)
^(1/2)
```

Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 118, normalized size of antiderivative = 0.72

$$\int \frac{\sqrt{d-c^2dx^2}}{(a+b\arcsin(cx))^2}\,dx$$
$$= \frac{d\sqrt{1-c^2x^2}\left(b(-1+c^2x^2)+(a+b\arcsin(cx))\,\text{CosIntegral}\left(2\left(\frac{a}{b}+\arcsin(cx)\right)\right)\sin\left(\frac{2a}{b}\right)-(a+b\arcsin(\right.}{b^2c\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}$$

input
```
Integrate[Sqrt[d - c^2*d*x^2]/(a + b*ArcSin[c*x])^2,x]
```

output
```
(d*Sqrt[1 - c^2*x^2]*(b*(-1 + c^2*x^2) + (a + b*ArcSin[c*x])*CosIntegral[2
*(a/b + ArcSin[c*x])]*Sin[(2*a)/b] - (a + b*ArcSin[c*x])*Cos[(2*a)/b]*SinI
ntegral[2*(a/b + ArcSin[c*x])]))/(b^2*c*Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[
c*x]))
```

Rubi [A] (verified)

Time = 0.83 (sec) , antiderivative size = 131, normalized size of antiderivative = 0.80, number of steps used = 12, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.423$, Rules used = {5166, 5146, 25, 4906, 27, 3042, 3784, 25, 3042, 3780, 3783}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d-c^2dx^2}}{(a+b\arcsin(cx))^2}\,dx$$
$$\downarrow 5166$$
$$-\frac{2c\sqrt{d-c^2dx^2}\int \frac{x}{a+b\arcsin(cx)}\,dx}{b\sqrt{1-c^2x^2}} - \frac{\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}{bc(a+b\arcsin(cx))}$$
$$\downarrow 5146$$
$$-\frac{2\sqrt{d-c^2dx^2}\int -\frac{\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c\sqrt{1-c^2x^2}} - \frac{\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 25$$

$$\frac{2\sqrt{d-c^2dx^2}\int\frac{\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c\sqrt{1-c^2x^2}}-\frac{\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 4906$$

$$\frac{2\sqrt{d-c^2dx^2}\int\frac{\sin\left(\frac{2a}{b}-\frac{2(a+b\arcsin(cx))}{b}\right)}{2(a+b\arcsin(cx))}d(a+b\arcsin(cx))}{b^2c\sqrt{1-c^2x^2}}-\frac{\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 27$$

$$\frac{\sqrt{d-c^2dx^2}\int\frac{\sin\left(\frac{2a}{b}-\frac{2(a+b\arcsin(cx))}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c\sqrt{1-c^2x^2}}-\frac{\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 3042$$

$$\frac{\sqrt{d-c^2dx^2}\int\frac{\sin\left(\frac{2a}{b}-\frac{2(a+b\arcsin(cx))}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c\sqrt{1-c^2x^2}}-\frac{\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 3784$$

$$-\frac{\sqrt{d-c^2dx^2}\left(-\sin\left(\frac{2a}{b}\right)\int\frac{\cos\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))-\cos\left(\frac{2a}{b}\right)\int-\frac{\sin\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(\right.\right.}{b^2c\sqrt{1-c^2x^2}}$$

$$\downarrow 25$$

$$-\frac{\sqrt{d-c^2dx^2}\left(\cos\left(\frac{2a}{b}\right)\int\frac{\sin\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))-\sin\left(\frac{2a}{b}\right)\int\frac{\cos\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))\right.}{b^2c\sqrt{1-c^2x^2}}$$

$$\downarrow 3042$$

$$-\frac{\sqrt{d-c^2dx^2}\left(\cos\left(\frac{2a}{b}\right)\int\frac{\sin\left(\frac{2(a+b\arcsin(cx))}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))-\sin\left(\frac{2a}{b}\right)\int\frac{\sin\left(\frac{2(a+b\arcsin(cx))}{b}+\frac{\pi}{2}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx)\right.}{\frac{b^2c\sqrt{1-c^2x^2}}{\frac{\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}{bc(a+b\arcsin(cx))}}}$$

$$\downarrow 3780$$

$$-\frac{\sqrt{d-c^2dx^2}\left(\cos\left(\frac{2a}{b}\right)\mathrm{Si}\left(\frac{2(a+b\arcsin(cx))}{b}\right)-\sin\left(\frac{2a}{b}\right)\int\frac{\sin\left(\frac{2(a+b\arcsin(cx))}{b}+\frac{\pi}{2}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))\right)}{\frac{b^2c\sqrt{1-c^2x^2}}{\frac{\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}{bc(a+b\arcsin(cx))}}}-$$

$$\downarrow 3783$$

$$-\frac{\sqrt{d-c^2dx^2}\left(\cos\left(\frac{2a}{b}\right)\mathrm{Si}\left(\frac{2(a+b\arcsin(cx))}{b}\right)-\sin\left(\frac{2a}{b}\right)\mathrm{CosIntegral}\left(\frac{2(a+b\arcsin(cx))}{b}\right)\right)}{\frac{b^2c\sqrt{1-c^2x^2}}{\frac{\sqrt{1-c^2x^2}\sqrt{d-c^2dx^2}}{bc(a+b\arcsin(cx))}}}-$$

input
```
Int[Sqrt[d - c^2*d*x^2]/(a + b*ArcSin[c*x])^2,x]
```

output
```
-((Sqrt[1 - c^2*x^2]*Sqrt[d - c^2*d*x^2])/(b*c*(a + b*ArcSin[c*x]))) - (Sq
rt[d - c^2*d*x^2]*(-(CosIntegral[(2*(a + b*ArcSin[c*x]))/b]*Sin[(2*a)/b])
+ Cos[(2*a)/b]*SinIntegral[(2*(a + b*ArcSin[c*x]))/b]))/(b^2*c*Sqrt[1 - c^
2*x^2])
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3780
```
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 3783
```
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 3784
```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[Cos[(d*
e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Simp[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 4906
```
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 5146
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[1
/(b*c^(m + 1))   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b], x], x, a
+ b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

rule 5166
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

Maple [C] (verified)

Result contains complex when optimal does not.

Time = 0.16 (sec) , antiderivative size = 281, normalized size of antiderivative = 1.72

method	result
default	$-\frac{\sqrt{-d(c^2x^2-1)}\left(ic^2x^2-cx\sqrt{-c^2x^2+1}-i\right)\left(2i\sqrt{-c^2x^2+1}\,b\,c^2x^2-2b\,c^3x^3+\text{expIntegral}_1\left(-2i\arcsin(cx)-\frac{2ia}{b}\right)e^{-\frac{i(-b\arcsin(cx)+2}{b}}\right.$

input
```
int((-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
-1/2*(-d*(c^2*x^2-1))^(1/2)*(I*c^2*x^2-c*x*(-c^2*x^2+1)^(1/2)-I)*(2*I*(-c^
2*x^2+1)^(1/2)*b*c^2*x^2-2*b*c^3*x^3+Ei(1,-2*I*arcsin(c*x)-2*I*a/b)*exp(-I
*(-b*arcsin(c*x)+2*a)/b)*b*arcsin(c*x)-Ei(1,2*I*arcsin(c*x)+2*I*a/b)*exp(I
*(b*arcsin(c*x)+2*a)/b)*b*arcsin(c*x)-2*I*(-c^2*x^2+1)^(1/2)*b+Ei(1,-2*I*a
rcsin(c*x)-2*I*a/b)*exp(-I*(-b*arcsin(c*x)+2*a)/b)*a-Ei(1,2*I*arcsin(c*x)+
2*I*a/b)*exp(I*(b*arcsin(c*x)+2*a)/b)*a+2*x*b*c)/c/(c^2*x^2-1)/b^2/(a+b*ar
csin(c*x))
```

Fricas [F]

$$\int \frac{\sqrt{d-c^2dx^2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{\sqrt{-c^2dx^2+d}}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(sqrt(-c^2*d*x^2 + d)/(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2
), x)
```

Sympy [F]

$$\int \frac{\sqrt{d-c^2dx^2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{\sqrt{-d\,(cx-1)\,(cx+1)}}{(a+b\,\mathrm{asin}\,(cx))^2}\,dx$$

input
```
integrate((-c**2*d*x**2+d)**(1/2)/(a+b*asin(c*x))**2,x)
```

output
```
Integral(sqrt(-d*(c*x - 1)*(c*x + 1))/(a + b*asin(c*x))**2, x)
```

Maxima [F]

$$\int \frac{\sqrt{d-c^2dx^2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{\sqrt{-c^2dx^2+d}}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
(c^2*x^2 - 2*(b^2*c^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c^2
)*integrate(x/(b^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b), x) -
 1)*sqrt(d)/(b^2*c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 323 vs. $2(151) = 302$.

Time $= 0.69$ (sec) , antiderivative size $= 323$, normalized size of antiderivative $= 1.98$

$$\int \frac{\sqrt{d-c^2dx^2}}{(a+b\arcsin(cx))^2}\,dx$$
$$= \left(\frac{2\,b\arcsin(cx)\cos\left(\frac{a}{b}\right)\mathrm{Ci}\left(\frac{2a}{b}+2\arcsin(cx)\right)\sin\left(\frac{a}{b}\right)}{b^3c^2\arcsin(cx)+ab^2c^2} - \frac{2\,b\arcsin(cx)\cos\left(\frac{a}{b}\right)^2\mathrm{Si}\left(\frac{2a}{b}+2\arcsin(cx)\right)}{b^3c^2\arcsin(cx)+ab^2c^2}$$

input
```
integrate((-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
(2*b*arcsin(c*x)*cos(a/b)*cos_integral(2*a/b + 2*arcsin(c*x))*sin(a/b)/(b^
3*c^2*arcsin(c*x) + a*b^2*c^2) - 2*b*arcsin(c*x)*cos(a/b)^2*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)*cos
_integral(2*a/b + 2*arcsin(c*x))*sin(a/b)/(b^3*c^2*arcsin(c*x) + a*b^2*c^2
) - 2*a*cos(a/b)^2*sin_integral(2*a/b + 2*arcsin(c*x))/(b^3*c^2*arcsin(c*x
) + a*b^2*c^2) + b*arcsin(c*x)*sin_integral(2*a/b + 2*arcsin(c*x))/(b^3*c^
2*arcsin(c*x) + a*b^2*c^2) + (c^2*x^2 - 1)*b/(b^3*c^2*arcsin(c*x) + a*b^2*
c^2) + a*sin_integral(2*a/b + 2*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2*
c^2))*c*sqrt(d)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d-c^2dx^2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{\sqrt{d-c^2\,d\,x^2}}{(a+b\,\mathrm{asin}\,(c\,x))^2}\,dx$$

input
```
int((d - c^2*d*x^2)^(1/2)/(a + b*asin(c*x))^2,x)
```

output
```
int((d - c^2*d*x^2)^(1/2)/(a + b*asin(c*x))^2, x)
```

Reduce [F]

$$\int \frac{\sqrt{d-c^2dx^2}}{(a+b\arcsin(cx))^2}\,dx = \sqrt{d}\left(\int \frac{\sqrt{-c^2x^2+1}}{asin\,(cx)^2\,b^2+2asin\,(cx)\,ab+a^2}dx\right)$$

input
```
int((-c^2*d*x^2+d)^(1/2)/(a+b*asin(c*x))^2,x)
```

output
```
sqrt(d)*int(sqrt( - c**2*x**2 + 1)/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b +
a**2),x)
```

3.77 $\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 644
Mathematica [A] (verified) . . . 644
Rubi [A] (verified) . . . 645
Maple [A] (verified) . . . 645
Fricas [A] (verification not implemented) . . . 646
Sympy [F] . . . 646
Maxima [A] (verification not implemented) . . . 647
Giac [F(-2)] . . . 647
Mupad [F(-1)] . . . 647
Reduce [B] (verification not implemented) . . . 648

Optimal result

Integrand size = 26, antiderivative size = 47

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}\,dx = -\frac{\sqrt{1-c^2x^2}}{bc\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}$$

output
```
-(-c^2*x^2+1)^(1/2)/b/c/(-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x))
```

Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}\,dx = -\frac{\sqrt{1-c^2x^2}}{bc\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}$$

input
```
Integrate[1/(Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x])^2),x]
```

output
```
-(Sqrt[1 - c^2*x^2]/(b*c*Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x])))
```

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.038$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}\,dx$$
$$\downarrow 5152$$
$$-\frac{\sqrt{1-c^2x^2}}{bc\sqrt{d-c^2dx^2}(a+b\arcsin(cx))}$$

input
```
Int[1/(Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x])^2),x]
```

output
```
-(Sqrt[1 - c^2*x^2]/(b*c*Sqrt[d - c^2*d*x^2]*(a + b*ArcSin[c*x])))
```

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.23

method	result	size
default	$\frac{\sqrt{-d(c^2x^2-1)}\sqrt{-c^2x^2+1}}{cd(c^2x^2-1)(a+b\arcsin(cx))b}$	58

input
```
int(1/(-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
(-d*(c^2*x^2-1))^(1/2)*(-c^2*x^2+1)^(1/2)/c/d/(c^2*x^2-1)/(a+b*arcsin(c*x)
)/b
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.47

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}\,dx = \frac{\sqrt{-c^2dx^2+d}\sqrt{-c^2x^2+1}}{abc^3dx^2-abcd+(b^2c^3dx^2-b^2cd)\arcsin(cx)}$$

input
```
integrate(1/(-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas"
)
```

output
```
sqrt(-c^2*d*x^2 + d)*sqrt(-c^2*x^2 + 1)/(a*b*c^3*d*x^2 - a*b*c*d + (b^2*c^
3*d*x^2 - b^2*c*d)*arcsin(c*x))
```

Sympy [F]

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{\sqrt{-d\,(cx-1)\,(cx+1)}\,(a+b\operatorname{asin}(cx))^2}\,dx$$

input
```
integrate(1/(-c**2*d*x**2+d)**(1/2)/(a+b*asin(c*x))**2,x)
```

output
```
Integral(1/(sqrt(-d*(c*x - 1)*(c*x + 1))*(a + b*asin(c*x))**2), x)
```

Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 39, normalized size of antiderivative = 0.83

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}\,dx = -\frac{\sqrt{d}}{b^2cd\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)+abcd}$$

input
```
integrate(1/(-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima"
)
```

output
```
-sqrt(d)/(b^2*c*d*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c*d)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(1/(-c^2*d*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}\,(c\,x))^2\,\sqrt{d-c^2\,d\,x^2}}\,dx$$

input
```
int(1/((a + b*asin(c*x))^2*(d - c^2*d*x^2)^(1/2)),x)
```

output
```
int(1/((a + b*asin(c*x))^2*(d - c^2*d*x^2)^(1/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.55

$$\int \frac{1}{\sqrt{d-c^2dx^2}(a+b\arcsin(cx))^2}\,dx = \frac{\sqrt{d}\,asin(cx)}{acd\,(asin\,(cx)\,b+a)}$$

input
```
int(1/(-c^2*d*x^2+d)^(1/2)/(a+b*asin(c*x))^2,x)
```

output
```
(sqrt(d)*asin(c*x))/(a*c*d*(asin(c*x)*b + a))
```

3.78 $\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 649
Mathematica [N/A] . . . 649
Rubi [N/A] . . . 650
Maple [N/A] . . . 650
Fricas [N/A] . . . 651
Sympy [N/A] . . . 651
Maxima [N/A] . . . 652
Giac [N/A] . . . 652
Mupad [N/A] . . . 653
Reduce [N/A] . . . 653

Optimal result

Integrand size = 26, antiderivative size = 26

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2}\,dx = \text{Int}\left(\frac{1}{\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2},x\right)$$

output
```
Defer(Int)(1/(-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 11.68 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{\left(d-c^2dx^2\right)^{3/2}(a+b\arcsin(cx))^2}\,dx$$

input
```
Integrate[1/((d - c^2*d*x^2)^(3/2)*(a + b*ArcSin[c*x])^2),x]
```

output
```
Integrate[1/((d - c^2*d*x^2)^(3/2)*(a + b*ArcSin[c*x])^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.44 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d-c^2dx^2)^{3/2}\,(a+b\arcsin(cx))^2}\,dx$$

$$\downarrow 5166$$

$$\frac{2c\sqrt{1-c^2x^2}\int \frac{x}{(1-c^2x^2)^2(a+b\arcsin(cx))}dx}{bd\sqrt{d-c^2dx^2}} - \frac{\sqrt{1-c^2x^2}}{bc\,(d-c^2dx^2)^{3/2}\,(a+b\arcsin(cx))}$$

$$\downarrow 5234$$

$$\frac{2c\sqrt{1-c^2x^2}\int \frac{x}{(1-c^2x^2)^2(a+b\arcsin(cx))}dx}{bd\sqrt{d-c^2dx^2}} - \frac{\sqrt{1-c^2x^2}}{bc\,(d-c^2dx^2)^{3/2}\,(a+b\arcsin(cx))}$$

input
```
Int[1/((d - c^2*d*x^2)^(3/2)*(a + b*ArcSin[c*x])^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{1}{(-c^2d\,x^2+d)^{\frac{3}{2}}\,(a+b\arcsin(cx))^2}\,dx$$

input
```
int(1/(-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x)
```

output
```
int(1/(-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 133, normalized size of antiderivative = 5.12

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2}\,dx = \int \frac{1}{\left(-c^2dx^2+d\right)^{\frac{3}{2}}\left(b\arcsin\left(cx\right)+a\right)^2}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas"
)
```

output
```
integral(sqrt(-c^2*d*x^2 + d)/(a^2*c^4*d^2*x^4 - 2*a^2*c^2*d^2*x^2 + a^2*d
^2 + (b^2*c^4*d^2*x^4 - 2*b^2*c^2*d^2*x^2 + b^2*d^2)*arcsin(c*x)^2 + 2*(a*
b*c^4*d^2*x^4 - 2*a*b*c^2*d^2*x^2 + a*b*d^2)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 14.14 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2}\,dx = \int \frac{1}{\left(-d\left(cx-1\right)\left(cx+1\right)\right)^{\frac{3}{2}}\left(a+b\,\mathrm{asin}\left(cx\right)\right)^2}\,dx$$

input
```
integrate(1/(-c**2*d*x**2+d)**(3/2)/(a+b*asin(c*x))**2,x)
```

output
```
Integral(1/((-d*(c*x - 1)*(c*x + 1))**(3/2)*(a + b*asin(c*x))**2), x)
```

Maxima [N/A]

Not integrable

Time = 0.66 (sec) , antiderivative size = 238, normalized size of antiderivative = 9.15

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2}\,dx = \int \frac{1}{\left(-c^2dx^2+d\right)^{\frac{3}{2}}\left(b\arcsin\left(cx\right)+a\right)^2}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima"
)
```

output
```
(2*(a*b*c^4*d^2*x^2 - a*b*c^2*d^2 + (b^2*c^4*d^2*x^2 - b^2*c^2*d^2)*arctan
2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)))*integrate(x/(a*b*c^4*d^2*x^4 - 2*a*b
*c^2*d^2*x^2 + a*b*d^2 + (b^2*c^4*d^2*x^4 - 2*b^2*c^2*d^2*x^2 + b^2*d^2)*a
rctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))), x) + 1)*sqrt(d)/(a*b*c^3*d^2*x
^2 - a*b*c*d^2 + (b^2*c^3*d^2*x^2 - b^2*c*d^2)*arctan2(c*x, sqrt(c*x + 1)*
sqrt(-c*x + 1)))
```

Giac [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(d-c^2dx^2\right)^{3/2}\left(a+b\arcsin(cx)\right)^2}\,dx = \int \frac{1}{\left(-c^2dx^2+d\right)^{\frac{3}{2}}\left(b\arcsin\left(cx\right)+a\right)^2}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
integrate(1/((-c^2*d*x^2 + d)^(3/2)*(b*arcsin(c*x) + a)^2), x)
```

Mupad [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d-c^2dx^2)^{3/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}\,(c\,x))^2\,(d-c^2\,d\,x^2)^{3/2}}\,dx$$

input
```
int(1/((a + b*asin(c*x))^2*(d - c^2*d*x^2)^(3/2)),x)
```

output
```
int(1/((a + b*asin(c*x))^2*(d - c^2*d*x^2)^(3/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 144, normalized size of antiderivative = 5.54

$$\int \frac{1}{(d-c^2dx^2)^{3/2}\,(a+b\arcsin(cx))^2}\,dx = -\frac{\int \frac{1}{\sqrt{-c^2x^2+1}\,asin(cx)^2b^2c^2x^2-\sqrt{-c^2x^2+1}\,asin(cx)^2b^2+2\sqrt{-c^2x^2+1}\,asin(cx)ab\,c^2x^2-2\sqrt{-c^2x^2+1}\,asin(cx)ab+\sqrt{-c^2x^2+1}\,a^2c^2x^2-\sqrt{-c^2x}}}{\sqrt{d}\,d}$$

input
```
int(1/(-c^2*d*x^2+d)^(3/2)/(a+b*asin(c*x))^2,x)
```

output
```
( - int(1/(sqrt( - c**2*x**2 + 1)*asin(c*x)**2*b**2*c**2*x**2 - sqrt( - c*
*2*x**2 + 1)*asin(c*x)**2*b**2 + 2*sqrt( - c**2*x**2 + 1)*asin(c*x)*a*b*c*
*2*x**2 - 2*sqrt( - c**2*x**2 + 1)*asin(c*x)*a*b + sqrt( - c**2*x**2 + 1)*
a**2*c**2*x**2 - sqrt( - c**2*x**2 + 1)*a**2),x))/(sqrt(d)*d)
```

3.79 $\int \frac{1}{\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))^2}\,dx$

Optimal result 654
Mathematica [N/A] 654
Rubi [N/A] 655
Maple [N/A] 655
Fricas [N/A] 656
Sympy [N/A] 656
Maxima [N/A] 657
Giac [N/A] 657
Mupad [N/A] 658
Reduce [N/A] 658

Optimal result

Integrand size = 26, antiderivative size = 26

$$\int \frac{1}{\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))^2}\,dx = \text{Int}\left(\frac{1}{\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))^2},x\right)$$

output
```
Defer(Int)(1/(-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 14.35 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{1}{\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{\left(d-c^2dx^2\right)^{5/2}(a+b\arcsin(cx))^2}\,dx$$

input
```
Integrate[1/((d - c^2*d*x^2)^(5/2)*(a + b*ArcSin[c*x])^2),x]
```

output
```
Integrate[1/((d - c^2*d*x^2)^(5/2)*(a + b*ArcSin[c*x])^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.45 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))^2}\,dx$$

$$\downarrow 5166$$

$$\frac{4c\sqrt{1-c^2x^2}\int \frac{x}{(1-c^2x^2)^3(a+b\arcsin(cx))}dx}{bd^2\sqrt{d-c^2dx^2}} - \frac{\sqrt{1-c^2x^2}}{bc\,(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))}$$

$$\downarrow 5234$$

$$\frac{4c\sqrt{1-c^2x^2}\int \frac{x}{(1-c^2x^2)^3(a+b\arcsin(cx))}dx}{bd^2\sqrt{d-c^2dx^2}} - \frac{\sqrt{1-c^2x^2}}{bc\,(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))}$$

input
```
Int[1/((d - c^2*d*x^2)^(5/2)*(a + b*ArcSin[c*x])^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.64 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{1}{(-c^2d\,x^2+d)^{\frac{5}{2}}\,(a+b\arcsin(cx))^2}\,dx$$

input
```
int(1/(-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x)
```

output
```
int(1/(-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.10 (sec) , antiderivative size = 178, normalized size of antiderivative = 6.85

$$\int \frac{1}{(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(-c^2dx^2+d)^{\frac{5}{2}}\,(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas"
)
```

output
```
integral(-sqrt(-c^2*d*x^2 + d)/(a^2*c^6*d^3*x^6 - 3*a^2*c^4*d^3*x^4 + 3*a^
2*c^2*d^3*x^2 - a^2*d^3 + (b^2*c^6*d^3*x^6 - 3*b^2*c^4*d^3*x^4 + 3*b^2*c^2
*d^3*x^2 - b^2*d^3)*arcsin(c*x)^2 + 2*(a*b*c^6*d^3*x^6 - 3*a*b*c^4*d^3*x^4
 + 3*a*b*c^2*d^3*x^2 - a*b*d^3)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 30.81 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{1}{(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(-d\,(cx-1)\,(cx+1))^{\frac{5}{2}}\,(a+b\operatorname{asin}(cx))^2}\,dx$$

input
```
integrate(1/(-c**2*d*x**2+d)**(5/2)/(a+b*asin(c*x))**2,x)
```

output
```
Integral(1/((-d*(c*x - 1)*(c*x + 1))**(5/2)*(a + b*asin(c*x))**2), x)
```

Maxima [N/A]

Not integrable

Time = 0.82 (sec) , antiderivative size = 318, normalized size of antiderivative = 12.23

$$\int \frac{1}{(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(-c^2dx^2+d)^{\frac{5}{2}}(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima"
)
```

output
```
-(4*(a*b*c^6*d^3*x^4 - 2*a*b*c^4*d^3*x^2 + a*b*c^2*d^3 + (b^2*c^6*d^3*x^4
- 2*b^2*c^4*d^3*x^2 + b^2*c^2*d^3)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x +
1)))*integrate(x/(a*b*c^6*d^3*x^6 - 3*a*b*c^4*d^3*x^4 + 3*a*b*c^2*d^3*x^2
- a*b*d^3 + (b^2*c^6*d^3*x^6 - 3*b^2*c^4*d^3*x^4 + 3*b^2*c^2*d^3*x^2 - b^2
*d^3)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))), x) + 1)*sqrt(d)/(a*b*c^
5*d^3*x^4 - 2*a*b*c^3*d^3*x^2 + a*b*c*d^3 + (b^2*c^5*d^3*x^4 - 2*b^2*c^3*d
^3*x^2 + b^2*c*d^3)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)))
```

Giac [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d-c^2dx^2)^{5/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(-c^2dx^2+d)^{\frac{5}{2}}(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
integrate(1/((-c^2*d*x^2 + d)^(5/2)*(b*arcsin(c*x) + a)^2), x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(d-c^2dx^2\right)^{5/2}\left(a+b\arcsin(cx)\right)^2}\,dx = \int \frac{1}{\left(a+b\,\mathrm{asin}\left(c\,x\right)\right)^2\left(d-c^2\,d\,x^2\right)^{5/2}}\,dx$$

input
```
int(1/((a + b*asin(c*x))^2*(d - c^2*d*x^2)^(5/2)),x)
```

output
```
int(1/((a + b*asin(c*x))^2*(d - c^2*d*x^2)^(5/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 216, normalized size of antiderivative = 8.31

$$\int \frac{1}{\left(d-c^2dx^2\right)^{5/2}\left(a+b\arcsin(cx)\right)^2}\,dx = \frac{\int \frac{}{\sqrt{-c^2x^2+1}\,asin(cx)^2b^2c^4x^4-2\sqrt{-c^2x^2+1}\,asin(cx)^2b^2c^2x^2+\sqrt{-c^2x^2+1}\,asin(cx)^2b^2}$$

input
```
int(1/(-c^2*d*x^2+d)^(5/2)/(a+b*asin(c*x))^2,x)
```

output
```
int(1/(sqrt( - c**2*x**2 + 1)*asin(c*x)**2*b**2*c**4*x**4 - 2*sqrt( - c**2
*x**2 + 1)*asin(c*x)**2*b**2*c**2*x**2 + sqrt( - c**2*x**2 + 1)*asin(c*x)*
*2*b**2 + 2*sqrt( - c**2*x**2 + 1)*asin(c*x)*a*b*c**4*x**4 - 4*sqrt( - c**
2*x**2 + 1)*asin(c*x)*a*b*c**2*x**2 + 2*sqrt( - c**2*x**2 + 1)*asin(c*x)*a
*b + sqrt( - c**2*x**2 + 1)*a**2*c**4*x**4 - 2*sqrt( - c**2*x**2 + 1)*a**2
*c**2*x**2 + sqrt( - c**2*x**2 + 1)*a**2),x)/(sqrt(d)*d**2)
```

3.80 $\int (d - c^2 dx^2)^2 \sqrt{a + b \arcsin(cx)}\, dx$

Optimal result 660
Mathematica [C] (verified) 661
Rubi [A] (verified) 662
Maple [A] (verified) 669
Fricas [F(-2)] 670
Sympy [F] 670
Maxima [F] 670
Giac [C] (verification not implemented) 671
Mupad [F(-1)] 672
Reduce [F] 672

Optimal result

Integrand size = 26, antiderivative size = 665

$$
\begin{aligned}
&\int \left(d-c^2dx^2\right)^2\sqrt{a+b\arcsin(cx)}\,dx \\
&= \frac{8}{15}d^2x\sqrt{a+b\arcsin(cx)}+\frac{4}{15}d^2x\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)} \\
&\quad+\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)} \\
&\quad-\frac{11\sqrt{b}d^2\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{120c} \\
&\quad-\frac{4\sqrt{b}d^2\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{15c} \\
&\quad-\frac{\sqrt{b}d^2\sqrt{\frac{\pi}{6}}\cos\left(\frac{3a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{15c} \\
&\quad-\frac{\sqrt{b}d^2\sqrt{\frac{3\pi}{2}}\cos\left(\frac{3a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{80c} \\
&\quad-\frac{\sqrt{b}d^2\sqrt{\frac{\pi}{10}}\cos\left(\frac{5a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{80c} \\
&\quad+\frac{11\sqrt{b}d^2\sqrt{\frac{\pi}{2}}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{120c} \\
&\quad+\frac{4\sqrt{b}d^2\sqrt{2\pi}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{15c} \\
&\quad+\frac{\sqrt{b}d^2\sqrt{\frac{\pi}{6}}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{3a}{b}\right)}{15c} \\
&\quad+\frac{\sqrt{b}d^2\sqrt{\frac{3\pi}{2}}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{3a}{b}\right)}{80c} \\
&\quad+\frac{\sqrt{b}d^2\sqrt{\frac{\pi}{10}}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{5a}{b}\right)}{80c}
\end{aligned}
$$

output

```
8/15*d^2*x*(a+b*arcsin(c*x))^(1/2)+4/15*d^2*x*(-c^2*x^2+1)*(a+b*arcsin(c*x
))^(1/2)+1/5*d^2*x*(-c^2*x^2+1)^2*(a+b*arcsin(c*x))^(1/2)-5/16*b^(1/2)*d^2
*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/
2)/b^(1/2))/c-5/288*b^(1/2)*d^2*6^(1/2)*Pi^(1/2)*cos(3*a/b)*FresnelS(6^(1/
2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c-1/800*b^(1/2)*d^2*10^(1/2)*
Pi^(1/2)*cos(5*a/b)*FresnelS(10^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(
1/2))/c+5/16*b^(1/2)*d^2*2^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*a
rcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/c+5/288*b^(1/2)*d^2*6^(1/2)*Pi^(1/2)*F
resnelC(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(3*a/b)/c+1/8
00*b^(1/2)*d^2*10^(1/2)*Pi^(1/2)*FresnelC(10^(1/2)/Pi^(1/2)*(a+b*arcsin(c*
x))^(1/2)/b^(1/2))*sin(5*a/b)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.73 (sec) , antiderivative size = 344, normalized size of antiderivative = 0.52

$$\int \left(d - c^2 d x^2\right)^2 \sqrt{a + b \arcsin(cx)}\, dx$$

$$= \frac{bd^2 e^{-\frac{5ia}{b}} \left(2250 e^{\frac{4ia}{b}} \sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\, \Gamma\left(\frac{3}{2}, -\frac{i(a+b\arcsin(cx))}{b}\right) + 2250 e^{\frac{6ia}{b}} \sqrt{\frac{i(a+b\arcsin(cx))}{b}}\, \Gamma\left(\frac{3}{2}, \frac{i(a+b\arcsin(cx))}{b}\right)\right.}{}$$

input

```
Integrate[(d - c^2*d*x^2)^2*Sqrt[a + b*ArcSin[c*x]],x]
```

output

```
(b*d^2*(2250*E^(((4*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/2,
 ((-I)*(a + b*ArcSin[c*x]))/b] + 2250*E^(((6*I)*a)/b)*Sqrt[(I*(a + b*ArcSi
n[c*x]))/b]*Gamma[3/2, (I*(a + b*ArcSin[c*x]))/b] + 125*Sqrt[3]*E^(((2*I)*
a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((-3*I)*(a + b*ArcSin[
c*x]))/b] + 125*Sqrt[3]*E^(((8*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Ga
mma[3/2, ((3*I)*(a + b*ArcSin[c*x]))/b] + 9*Sqrt[5]*Sqrt[((-I)*(a + b*ArcS
in[c*x]))/b]*Gamma[3/2, ((-5*I)*(a + b*ArcSin[c*x]))/b] + 9*Sqrt[5]*E^(((1
0*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((5*I)*(a + b*ArcSin
[c*x]))/b]))/(7200*c*E^(((5*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Rubi [A] (verified)

Time = 3.05 (sec) , antiderivative size = 735, normalized size of antiderivative = 1.11, number of steps used = 17, number of rules used = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.615$, Rules used = {5158, 27, 5158, 5130, 5224, 25, 3042, 3787, 25, 3042, 3785, 3786, 3832, 3833, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d - c^2 d x^2\right)^2 \sqrt{a + b \arcsin(cx)}\, dx$$

$$\downarrow 5158$$

$$-\frac{1}{10} bcd^2 \int \frac{x\left(1 - c^2 x^2\right)^{3/2}}{\sqrt{a + b \arcsin(cx)}} dx + \frac{4}{5} d \int d\left(1 - c^2 x^2\right) \sqrt{a + b \arcsin(cx)} dx + \frac{1}{5} d^2 x \left(1 - c^2 x^2\right)^2 \sqrt{a + b \arcsin(cx)}$$

$$\downarrow 27$$

$$-\frac{1}{10} bcd^2 \int \frac{x\left(1 - c^2 x^2\right)^{3/2}}{\sqrt{a + b \arcsin(cx)}} dx + \frac{4}{5} d^2 \int \left(1 - c^2 x^2\right) \sqrt{a + b \arcsin(cx)} dx + \frac{1}{5} d^2 x \left(1 - c^2 x^2\right)^2 \sqrt{a + b \arcsin(cx)}$$

$$\downarrow 5158$$

$$-\frac{1}{10} bcd^2 \int \frac{x\left(1 - c^2 x^2\right)^{3/2}}{\sqrt{a + b \arcsin(cx)}} dx + \frac{4}{5} d^2 \left(-\frac{1}{6} bc \int \frac{x\sqrt{1 - c^2 x^2}}{\sqrt{a + b \arcsin(cx)}} dx + \frac{2}{3} \int \sqrt{a + b \arcsin(cx)} dx + \frac{1}{3} x \left(1 - c^2 x^2\right) \sqrt{a + b \arcsin(cx)}\right) + \frac{1}{5} d^2 x \left(1 - c^2 x^2\right)^2 \sqrt{a + b \arcsin(cx)}$$

$$\downarrow 5130$$

$$\frac{4}{5} d^2 \left(\frac{2}{3}\left(x \sqrt{a + b \arcsin(cx)} - \frac{1}{2} bc \int \frac{x}{\sqrt{1 - c^2 x^2} \sqrt{a + b \arcsin(cx)}} dx\right) - \frac{1}{6} bc \int \frac{x\sqrt{1 - c^2 x^2}}{\sqrt{a + b \arcsin(cx)}} dx + \frac{1}{3} x \left(1 - \right.\right.$$

$$\frac{1}{10} bcd^2 \int \frac{x\left(1 - c^2 x^2\right)^{3/2}}{\sqrt{a + b \arcsin(cx)}} dx + \frac{1}{5} d^2 x \left(1 - c^2 x^2\right)^2 \sqrt{a + b \arcsin(cx)}$$

$$\downarrow 5224$$

$$\frac{4}{5}d^2\left(\frac{2}{3}\left(x\sqrt{a+b\arcsin(cx)}-\frac{\int-\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}\right)-\frac{\int-\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}$$

$$\frac{d^2\int-\frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{10c}+$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 25$$

$$\frac{4}{5}d^2\left(\frac{2}{3}\left(\frac{\int\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}+x\sqrt{a+b\arcsin(cx)}\right)+\frac{\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}$$

$$\frac{d^2\int\frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{10c}+$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3042$$

$$\frac{4}{5}d^2\left(\frac{2}{3}\left(\frac{\int\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}+x\sqrt{a+b\arcsin(cx)}\right)+\frac{\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}$$

$$\frac{d^2\int\frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{10c}+$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3787$$

$$\frac{4}{5}d^2\left(\frac{\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+\frac{2}{3}\left(x\sqrt{a+b\arcsin(cx)}-\frac{-\sin\left(\frac{a}{b}\right)\int\frac{\cos\left(\frac{a+b}{\sqrt{a+b}}\right.}{\sqrt{a+b}}\right.$$

$$\frac{d^2\int\frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{10c}+$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 25$$

$$\frac{4}{5}d^2\left(\frac{\int \frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+\frac{2}{3}\left(x\sqrt{a+b\arcsin(cx)}-\frac{\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arc}{}\right.}{\sqrt{a+b\arc}}\right.\right.$$

$$\frac{d^2\int \frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{10c}+$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3042$$

$$\frac{4}{5}d^2\left(\frac{\int \frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+\frac{2}{3}\left(x\sqrt{a+b\arcsin(cx)}-\frac{\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arc}{}\right.}{\sqrt{a+b\arc}}\right.\right.$$

$$\frac{d^2\int \frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{10c}+$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3785$$

$$\frac{4}{5}d^2\left(\frac{\int \frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+\frac{2}{3}\left(x\sqrt{a+b\arcsin(cx)}-\frac{\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arc}{}\right.}{\sqrt{a+b\arc}}\right.\right.$$

$$\frac{d^2\int \frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{10c}+$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3786$$

$$\frac{4}{5}d^2\left(\frac{\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+\frac{2}{3}\left(x\sqrt{a+b\arcsin(cx)}-\frac{2\cos\left(\frac{a}{b}\right)\int\sin\left(\frac{a+}{}\right.\right.\right.$$

$$\frac{d^2\int\frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{10c}+$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3832$$

$$\frac{4}{5}d^2\left(\frac{2}{3}\left(x\sqrt{a+b\arcsin(cx)}-\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-2\sin\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\right.\right.$$

$$\frac{d^2\int\frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{10c}+$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3833$$

$$\frac{4}{5}d^2\left(\frac{\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+\frac{1}{3}x\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)}+\frac{2}{3}\left(x\sqrt{a\right.\right.$$

$$\frac{d^2\int\frac{\cos^4\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{10c}+$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 4906$$

$$\frac{4}{5}d^2\left(\frac{\int\left(\frac{\sin\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{4\sqrt{a+b\arcsin(cx)}}+\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{4\sqrt{a+b\arcsin(cx)}}\right)d(a+b\arcsin(cx))}{6c}+\frac{1}{3}x\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)}+\frac{2}{3}\right.$$

$$\left.\frac{d^2\int\left(\frac{\sin\left(\frac{5a}{b}-\frac{5(a+b\arcsin(cx))}{b}\right)}{16\sqrt{a+b\arcsin(cx)}}+\frac{3\sin\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{16\sqrt{a+b\arcsin(cx)}}+\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{8\sqrt{a+b\arcsin(cx)}}\right)d(a+b\arcsin(cx))}{10c}+\right.$$

$$\left.\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)}\right)$$

$$\downarrow 2009$$

$$\frac{4}{5}d^2\left(\frac{1}{3}x\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)}+\frac{2}{3}\left(x\sqrt{a+b\arcsin(cx)}-\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{\right.}\right.$$

$$\left.\left.\frac{1}{5}d^2x\left(1-c^2x^2\right)^2\sqrt{a+b\arcsin(cx)}-\right.\right.$$

$$\left.d^2\left(-\frac{1}{4}\sqrt{\frac{\pi}{2}}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\frac{1}{8}\sqrt{\frac{3\pi}{2}}\sqrt{b}\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\frac{1}{8}\sqrt{\frac{\pi}{10}}\right.$$

input
```
Int[(d - c^2*d*x^2)^2*Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
(d^2*x*(1 - c^2*x^2)^2*Sqrt[a + b*ArcSin[c*x]])/5 + (4*d^2*((x*(1 - c^2*x^
2)*Sqrt[a + b*ArcSin[c*x]])/3 + (2*(x*Sqrt[a + b*ArcSin[c*x]] - (Sqrt[b]*S
qrt[2*Pi]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]
- Sqrt[b]*Sqrt[2*Pi]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]
]*Sin[a/b])/(2*c)))/3 - ((Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]
*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/2 + (Sqrt[b]*Sqrt[Pi/6]*Cos[(3*a)/b]*F
resnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/2 - (Sqrt[b]*Sqrt[P
i/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/2 -
(Sqrt[b]*Sqrt[Pi/6]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]
*Sin[(3*a)/b])/2)/(6*c)))/5 - (d^2*((Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelS[
(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/4 + (Sqrt[b]*Sqrt[(3*Pi)/2]
*Cos[(3*a)/b]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/8 +
(Sqrt[b]*Sqrt[Pi/10]*Cos[(5*a)/b]*FresnelS[(Sqrt[10/Pi]*Sqrt[a + b*ArcSin[
c*x]])/Sqrt[b]])/8 - (Sqrt[b]*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*A
rcSin[c*x]])/Sqrt[b]]*Sin[a/b])/4 - (Sqrt[b]*Sqrt[(3*Pi)/2]*FresnelC[(Sqrt
[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/8 - (Sqrt[b]*Sqrt[P
i/10]*FresnelC[(Sqrt[10/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(5*a)/b]
)/8))/(10*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3787
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Cos
[(d*e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/Sqrt[c + d*x], x], x] + Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 4906
```
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 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 542, normalized size of antiderivative = 0.82

method	result
default	$-\frac{d^2\left(-2250\sqrt{2}\sqrt{\pi}\sqrt{-\frac{1}{b}}\sqrt{a+b\arcsin(cx)}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}b}\right)b-2250\sqrt{2}\sqrt{\pi}\sqrt{-\frac{1}{b}}\sqrt{a+b\arcsin(cx)}\sin\left(\frac{a}{b}\right)$

input

```
int((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output

```
-1/7200/c*d^2/(a+b*arcsin(c*x))^(1/2)*(-2250*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-2250*2^(1/2)*Pi^(1/2)*(-1/b)^(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-125*2^(1/2)*Pi^(1/2)*(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)*
cos(3*a/b)*FresnelS(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2
)/b)*b-125*2^(1/2)*Pi^(1/2)*(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(3*a/b
)*FresnelC(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b-9*
cos(5*a/b)*FresnelS(5*2^(1/2)/Pi^(1/2)/(-5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2
)/b)*2^(1/2)*Pi^(1/2)*(-5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)*b-9*sin(5*a/b)*
FresnelC(5*2^(1/2)/Pi^(1/2)/(-5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*2^(1/2
)*Pi^(1/2)*(-5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)*b+4500*arcsin(c*x)*sin(-(a
+b*arcsin(c*x))/b+a/b)*b+4500*sin(-(a+b*arcsin(c*x))/b+a/b)*a+750*arcsin(c
*x)*sin(-3*(a+b*arcsin(c*x))/b+3*a/b)*b+750*sin(-3*(a+b*arcsin(c*x))/b+3*a
/b)*a+90*arcsin(c*x)*sin(-5*(a+b*arcsin(c*x))/b+5*a/b)*b+90*sin(-5*(a+b*ar
csin(c*x))/b+5*a/b)*a)
```

Fricas [F(-2)]

Exception generated.

$$\int \left(d - c^2 dx^2\right)^2 \sqrt{a + b \arcsin(cx)}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \left(d - c^2 dx^2\right)^2 \sqrt{a + b \arcsin(cx)}\, dx = d^2 \left(\int \left(-2c^2 x^2 \sqrt{a + b \operatorname{asin}(cx)}\right) dx + \int c^4 x^4 \sqrt{a + b \operatorname{asin}(cx)}\, dx + \int \sqrt{a + b \operatorname{asin}(cx)}\, dx \right)$$

input
```
integrate((-c**2*d*x**2+d)**2*(a+b*asin(c*x))**(1/2),x)
```

output
```
d**2*(Integral(-2*c**2*x**2*sqrt(a + b*asin(c*x)), x) + Integral(c**4*x**4
*sqrt(a + b*asin(c*x)), x) + Integral(sqrt(a + b*asin(c*x)), x))
```

Maxima [F]

$$\int \left(d - c^2 dx^2\right)^2 \sqrt{a + b \arcsin(cx)}\, dx = \int \left(c^2 dx^2 - d\right)^2 \sqrt{b \arcsin(cx) + a}\, dx$$

input
```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
integrate((c^2*d*x^2 - d)^2*sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 1.63 (sec) , antiderivative size = 1859, normalized size of antiderivative = 2.80

$$\int \left(d - c^2 d x^2\right)^2 \sqrt{a + b \arcsin(cx)}\, dx = \text{Too large to display}$$

input
```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output
```
5/16*sqrt(2)*sqrt(pi)*a*b^2*d^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^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c) + 5/32*I*sqrt(2)*sqrt(pi)*
b^3*d^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^3/sqrt(abs(b))
 + b^2*sqrt(abs(b)))*c) + 5/16*sqrt(2)*sqrt(pi)*a*b^2*d^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^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c)
 - 5/32*I*sqrt(2)*sqrt(pi)*b^3*d^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^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c) - 1/32*sqrt(6)*sqrt(pi
)*a*b^(3/2)*d^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)/((b^2 + I*b^3/a
bs(b))*c) - 1/32*sqrt(6)*sqrt(pi)*a*b^(3/2)*d^2*erf(-1/2*sqrt(6)*sqrt(b*ar
csin(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)/((b^2 - I*b^3/abs(b))*c) + 1/16*sqrt(pi)*a*b^(3/2)*d^2*e
rf(-1/2*sqrt(10)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I*sqrt(10)*sqrt(b*a
rcsin(c*x) + a)*sqrt(b)/abs(b))*e^(5*I*a/b)/((sqrt(10)*b^2 + I*sqrt(10)*b^
3/abs(b))*c) + 1/160*I*sqrt(pi)*b^(5/2)*d^2*erf(-1/2*sqrt(10)*sqrt(b*arcsi
n(c*x) + a)/sqrt(b) - 1/2*I*sqrt(10)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/ab...
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right)^2 \sqrt{a + b \arcsin(cx)}\, dx = \int \sqrt{a + b \operatorname{asin}(c\,x)}\, \left(d - c^2\, d\, x^2\right)^2 dx$$

input
```
int((a + b*asin(c*x))^(1/2)*(d - c^2*d*x^2)^2,x)
```

output
```
int((a + b*asin(c*x))^(1/2)*(d - c^2*d*x^2)^2, x)
```

Reduce [F]

$$\int \left(d - c^2 dx^2\right)^2 \sqrt{a + b \arcsin(cx)}\, dx = d^2 \left(\int \sqrt{asin\,(cx)\, b + a}\, dx + \left(\int \sqrt{asin\,(cx)\, b + a}\, x^4 dx \right) c^4 - 2 \left(\int \sqrt{asin\,(cx)\, b + a}\, x^2 dx \right) c^2 \right)$$

input
```
int((-c^2*d*x^2+d)^2*(a+b*asin(c*x))^(1/2),x)
```

output
```
d**2*(int(sqrt(asin(c*x)*b + a),x) + int(sqrt(asin(c*x)*b + a)*x**4,x)*c**
4 - 2*int(sqrt(asin(c*x)*b + a)*x**2,x)*c**2)
```

3.81 $\int (d - c^2 dx^2) \sqrt{a + b \arcsin(cx)}\, dx$

Optimal result . . . 673
Mathematica [C] (verified) . . . 674
Rubi [A] (verified) . . . 675
Maple [A] (verified) . . . 681
Fricas [F(-2)] . . . 681
Sympy [F] . . . 682
Maxima [F] . . . 682
Giac [C] (verification not implemented) . . . 682
Mupad [F(-1)] . . . 683
Reduce [F] . . . 684

Optimal result

Integrand size = 24, antiderivative size = 381

$$\begin{aligned}\int (d - c^2 dx^2) \sqrt{a + b \arcsin(cx)}\, dx = {} & \frac{2}{3} dx \sqrt{a + b \arcsin(cx)} \\ & + \frac{1}{3} dx (1 - c^2 x^2) \sqrt{a + b \arcsin(cx)} \\ & - \frac{\sqrt{b} d \sqrt{\frac{\pi}{2}} \cos\left(\frac{a}{b}\right) \operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}} \sqrt{a + b \arcsin(cx)}}{\sqrt{b}}\right)}{12c} \\ & - \frac{\sqrt{b} d \sqrt{2\pi} \cos\left(\frac{a}{b}\right) \operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}} \sqrt{a + b \arcsin(cx)}}{\sqrt{b}}\right)}{3c} \\ & - \frac{\sqrt{b} d \sqrt{\frac{\pi}{6}} \cos\left(\frac{3a}{b}\right) \operatorname{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}} \sqrt{a + b \arcsin(cx)}}{\sqrt{b}}\right)}{12c} \\ & + \frac{\sqrt{b} d \sqrt{\frac{\pi}{2}} \operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}} \sqrt{a + b \arcsin(cx)}}{\sqrt{b}}\right) \sin\left(\frac{a}{b}\right)}{12c} \\ & + \frac{\sqrt{b} d \sqrt{2\pi} \operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}} \sqrt{a + b \arcsin(cx)}}{\sqrt{b}}\right) \sin\left(\frac{a}{b}\right)}{3c} \\ & + \frac{\sqrt{b} d \sqrt{\frac{\pi}{6}} \operatorname{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}} \sqrt{a + b \arcsin(cx)}}{\sqrt{b}}\right) \sin\left(\frac{3a}{b}\right)}{12c}\end{aligned}$$

output
```
2/3*d*x*(a+b*arcsin(c*x))^(1/2)+1/3*d*x*(-c^2*x^2+1)*(a+b*arcsin(c*x))^(1/
2)-3/8*b^(1/2)*d*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*
arcsin(c*x))^(1/2)/b^(1/2))/c-1/72*b^(1/2)*d*6^(1/2)*Pi^(1/2)*cos(3*a/b)*F
resnelS(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c+3/8*b^(1/2)*d*
2^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2)
)*sin(a/b)/c+1/72*b^(1/2)*d*6^(1/2)*Pi^(1/2)*FresnelC(6^(1/2)/Pi^(1/2)*(a+
b*arcsin(c*x))^(1/2)/b^(1/2))*sin(3*a/b)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.31 (sec) , antiderivative size = 227, normalized size of antiderivative = 0.60

$$\int \left(d - c^2 d x^2\right) \sqrt{a + b \arcsin(cx)}\, dx$$

$$= \frac{bde^{-\frac{3ia}{b}} \left(27e^{\frac{2ia}{b}} \sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2}, -\frac{i(a+b\arcsin(cx))}{b}\right) + 27e^{\frac{4ia}{b}} \sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2}, \frac{i(a+b\arcsin(cx))}{b}\right) + \sqrt{}\right.}{72c\sqrt{a + b\arcsin(}}$$

input
```
Integrate[(d - c^2*d*x^2)*Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
(b*d*(27*E^(((2*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((-
I)*(a + b*ArcSin[c*x]))/b] + 27*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*A
rcSin[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])))/(72*c*E^(((3*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Rubi [A] (verified)

Time = 1.68 (sec) , antiderivative size = 371, normalized size of antiderivative = 0.97, number of steps used = 15, number of rules used = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.583$, Rules used = {5158, 5130, 5224, 25, 3042, 3787, 25, 3042, 3785, 3786, 3832, 3833, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d - c^2 d x^2\right) \sqrt{a + b \arcsin(cx)}\, dx$$

$$\downarrow 5158$$

$$-\frac{1}{6} bcd \int \frac{x\sqrt{1 - c^2 x^2}}{\sqrt{a + b \arcsin(cx)}} dx + \frac{2}{3} d \int \sqrt{a + b \arcsin(cx)} dx + \frac{1}{3} dx \left(1 - c^2 x^2\right) \sqrt{a + b \arcsin(cx)}$$

$$\downarrow 5130$$

$$\frac{2}{3} d \left(x \sqrt{a + b \arcsin(cx)} - \frac{1}{2} bc \int \frac{x}{\sqrt{1 - c^2 x^2} \sqrt{a + b \arcsin(cx)}} dx \right) - \frac{1}{6} bcd \int \frac{x\sqrt{1 - c^2 x^2}}{\sqrt{a + b \arcsin(cx)}} dx + \frac{1}{3} dx \left(1 - c^2 x^2\right) \sqrt{a + b \arcsin(cx)}$$

$$\downarrow 5224$$

$$\frac{2}{3} d \left(x \sqrt{a + b \arcsin(cx)} - \frac{\int -\frac{\sin\left(\frac{a}{b} - \frac{a + b \arcsin(cx)}{b}\right)}{\sqrt{a + b \arcsin(cx)}} d(a + b \arcsin(cx))}{2c} \right) - \frac{d \int -\frac{\cos^2\left(\frac{a}{b} - \frac{a + b \arcsin(cx)}{b}\right) \sin\left(\frac{a}{b} - \frac{a + b \arcsin(cx)}{b}\right)}{\sqrt{a + b \arcsin(cx)}} d(a + b \arcsin(cx))}{6c} + \frac{1}{3} dx \left(1 - c^2 x^2\right) \sqrt{a + b \arcsin(cx)}$$

$$\downarrow 25$$

$$\frac{2}{3}d\left(\frac{\int\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}+x\sqrt{a+b\arcsin(cx)}\right)+\frac{d\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+\frac{1}{3}dx\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3042$$

$$\frac{2}{3}d\left(\frac{\int\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}+x\sqrt{a+b\arcsin(cx)}\right)+\frac{d\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+\frac{1}{3}dx\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3787$$

$$\frac{d\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+\frac{2}{3}d\left(x\sqrt{a+b\arcsin(cx)}-\frac{-\sin\left(\frac{a}{b}\right)\int\frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\cos\left(\frac{a}{b}\right)\int-\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}\right)+\frac{1}{3}dx\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 25$$

$$\frac{d\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+\frac{2}{3}d\left(x\sqrt{a+b\arcsin(cx)}-\frac{\cos\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int\frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}\right)+\frac{1}{3}dx\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3042$$

$$\frac{d\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+$$

$$\frac{2}{3}d\left(x\sqrt{a+b\arcsin(cx)}-\frac{\cos\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arc}{2c}\right.$$

$$\left.\frac{1}{3}dx(1-c^2x^2)\sqrt{a+b\arcsin(cx)}\right)$$

$$\downarrow 3785$$

$$\frac{d\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+$$

$$\frac{2}{3}d\left(x\sqrt{a+b\arcsin(cx)}-\frac{\cos\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-2\sin\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b}}{2c}\right.$$

$$\left.\frac{1}{3}dx(1-c^2x^2)\sqrt{a+b\arcsin(cx)}\right)$$

$$\downarrow 3786$$

$$\frac{d\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+$$

$$\frac{2}{3}d\left(x\sqrt{a+b\arcsin(cx)}-\frac{2\cos\left(\frac{a}{b}\right)\int\sin\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}-2\sin\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{}}{2c}\right.$$

$$\left.\frac{1}{3}dx(1-c^2x^2)\sqrt{a+b\arcsin(cx)}\right)$$

$$\downarrow 3832$$

$$\frac{2}{3}d\left(x\sqrt{a+b\arcsin(cx)}-\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-2\sin\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+}}{2c}\right.$$

$$\left.\frac{d\int\frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+\frac{1}{3}dx(1-c^2x^2)\sqrt{a+b\arcsin(cx)}\right)$$

$$\downarrow 3833$$

$$\frac{d\int \frac{\cos^2\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c}+$$

$$\frac{1}{3}dx\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)}+$$

$$\frac{2}{3}d\left(x\sqrt{a+b\arcsin(cx)}-\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right.\right.$$

$$\downarrow 4906$$

$$\frac{d\int\left(\frac{\sin\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{4\sqrt{a+b\arcsin(cx)}}+\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{4\sqrt{a+b\arcsin(cx)}}\right)d(a+b\arcsin(cx))}{6c}+$$

$$\frac{1}{3}dx\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)}+$$

$$\frac{2}{3}d\left(x\sqrt{a+b\arcsin(cx)}-\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right.\right.$$

$$\downarrow 2009$$

$$\frac{1}{3}dx\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)}+$$

$$\frac{2}{3}d\left(x\sqrt{a+b\arcsin(cx)}-\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right.\right.$$

$$\frac{d\left(-\frac{1}{2}\sqrt{\frac{\pi}{2}}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\frac{1}{2}\sqrt{\frac{\pi}{6}}\sqrt{b}\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\frac{1}{2}\sqrt{\frac{\pi}{2}}\sqrt{b}\right.}{6c}$$

input
```
Int[(d - c^2*d*x^2)*Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
(d*x*(1 - c^2*x^2)*Sqrt[a + b*ArcSin[c*x]])/3 + (2*d*(x*Sqrt[a + b*ArcSin[
c*x]] - (Sqrt[b]*Sqrt[2*Pi]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSi
n[c*x]])/Sqrt[b]] - Sqrt[b]*Sqrt[2*Pi]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*Arc
Sin[c*x]])/Sqrt[b]]*Sin[a/b])/(2*c)))/3 - (d*((Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]
*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/2 + (Sqrt[b]*Sqrt
[Pi/6]*Cos[(3*a)/b]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]
)/2 - (Sqrt[b]*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sq
rt[b]]*Sin[a/b])/2 - (Sqrt[b]*Sqrt[Pi/6]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b*A
rcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/2))/(6*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3787
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Cos
[(d*e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/Sqrt[c + d*x], x], x] + Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 4906
```
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 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 364, normalized size of antiderivative = 0.96

method	result
default	$-\frac{d\left(-27\sqrt{2}\,\sqrt{\pi}\,\sqrt{-\frac{1}{b}}\,\sqrt{a+b\arcsin(cx)}\,\cos\left(\frac{a}{b}\right)\mathrm{FresnelS}\left(\frac{\sqrt{2}\,\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\,\sqrt{-\frac{1}{b}}\,b}\right)b-27\sqrt{2}\,\sqrt{\pi}\,\sqrt{-\frac{1}{b}}\,\sqrt{a+b\arcsin(cx)}\,\sin\left(\frac{a}{b}\right)\mathrm{Fresne}\right.}{}$

input
```
int((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output
```
-1/72/c*d/(a+b*arcsin(c*x))^(1/2)*(-27*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*ar
csin(c*x))^(1/2)/b)*b-27*2^(1/2)*Pi^(1/2)*(-1/b)^(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-2^(1/2)*Pi^(1/2)*(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)*cos(3*a/b)*F
resnelS(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b-2^(1/
2)*Pi^(1/2)*(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(3*a/b)*FresnelC(3*2^(
1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b+54*arcsin(c*x)*sin
(-(a+b*arcsin(c*x))/b+a/b)*b+54*sin(-(a+b*arcsin(c*x))/b+a/b)*a+6*arcsin(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)
```

Fricas [F(-2)]

Exception generated.

$$\int \left(d - c^2 d x^2\right)\sqrt{a + b\arcsin(cx)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int (d - c^2 dx^2)\sqrt{a + b\arcsin(cx)}\,dx = -d\left(\int c^2x^2\sqrt{a + b\operatorname{asin}(cx)}\,dx + \int \left(-\sqrt{a + b\operatorname{asin}(cx)}\right)\,dx\right)$$

input
```
integrate((-c**2*d*x**2+d)*(a+b*asin(c*x))**(1/2),x)
```

output
```
-d*(Integral(c**2*x**2*sqrt(a + b*asin(c*x)), x) + Integral(-sqrt(a + b*as
in(c*x)), x))
```

Maxima [F]

$$\int (d - c^2 dx^2)\sqrt{a + b\arcsin(cx)}\,dx = \int -(c^2 dx^2 - d)\sqrt{b\arcsin(cx) + a}\,dx$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
-integrate((c^2*d*x^2 - d)*sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 1.10 (sec) , antiderivative size = 1103, normalized size of antiderivative = 2.90

$$\int (d - c^2 dx^2)\sqrt{a + b\arcsin(cx)}\,dx = \text{Too large to display}$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output

```
3/8*sqrt(2)*sqrt(pi)*a*b^2*d*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) + 3/16*I*sqrt(2)*sqrt(pi)*b^3
*d*erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*s
qrt(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)*a*b^2*d*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) - 3/16*
I*sqrt(2)*sqrt(pi)*b^3*d*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)/((-
I*b^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c) + 1/4*sqrt(pi)*a*b^(3/2)*d*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) + 1/24*I*sqrt(pi)*b^(5/2)*d*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) + 1/4*sqrt(pi)*a*b^(3/2)*d*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) - 1/24*I*sqrt(pi)*b^(5/2)*d*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...
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right) \sqrt{a + b \arcsin(cx)}\, dx = \int \sqrt{a + b \operatorname{asin}(c\,x)}\, \left(d - c^2\, d\, x^2\right)\, dx$$

input

```
int((a + b*asin(c*x))^(1/2)*(d - c^2*d*x^2),x)
```

output

```
int((a + b*asin(c*x))^(1/2)*(d - c^2*d*x^2), x)
```

Reduce [F]

$$\int \left(d - c^2 dx^2\right) \sqrt{a + b \arcsin(cx)}\, dx = d\left(\int \sqrt{asin\,(cx)\, b + a} dx - \left(\int \sqrt{asin\,(cx)\, b + a}\, x^2 dx\right) c^2\right)$$

input
```
int((-c^2*d*x^2+d)*(a+b*asin(c*x))^(1/2),x)
```

output
```
d*(int(sqrt(asin(c*x)*b + a),x) - int(sqrt(asin(c*x)*b + a)*x**2,x)*c**2)
```

3.82 $\int \sqrt{a+b\arcsin(cx)}\,dx$

Optimal result . . . 685
Mathematica [C] (verified) . . . 686
Rubi [A] (verified) . . . 686
Maple [A] (verified) . . . 689
Fricas [F(-2)] . . . 690
Sympy [F] . . . 690
Maxima [F] . . . 691
Giac [C] (verification not implemented) . . . 691
Mupad [F(-1)] . . . 692
Reduce [F] . . . 692

Optimal result

Integrand size = 12, antiderivative size = 120

$$\int \sqrt{a+b\arcsin(cx)}\,dx = x\sqrt{a+b\arcsin(cx)} - \frac{\sqrt{b}\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{c} + \frac{\sqrt{b}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{c}$$

output

```
x*(a+b*arcsin(c*x))^(1/2)-1/2*b^(1/2)*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelS(2
^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c+1/2*b^(1/2)*2^(1/2)*Pi^
(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/
c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.02 (sec) , antiderivative size = 119, normalized size of antiderivative = 0.99

$$\int \sqrt{a+b\arcsin(cx)}\,dx$$
$$= \frac{be^{-\frac{ia}{b}}\left(\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+e^{\frac{2ia}{b}}\sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},\frac{i(a+b\arcsin(cx))}{b}\right)\right)}{2c\sqrt{a+b\arcsin(cx)}}$$

input
```
Integrate[Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
(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]])
```

Rubi [A] (verified)

Time = 0.69 (sec) , antiderivative size = 118, normalized size of antiderivative = 0.98, number of steps used = 12, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.917$, Rules used = {5130, 5224, 25, 3042, 3787, 25, 3042, 3785, 3786, 3832, 3833}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{a+b\arcsin(cx)}\,dx$$
$$\downarrow 5130$$
$$x\sqrt{a+b\arcsin(cx)} - \frac{1}{2}bc\int \frac{x}{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}dx$$
$$\downarrow 5224$$
$$x\sqrt{a+b\arcsin(cx)} - \frac{\int -\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}$$

$$\downarrow 25$$

$$\frac{\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}+x\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3042$$

$$\frac{\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}+x\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3787$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-}{\frac{-\sin\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\cos\left(\frac{a}{b}\right)\int -\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}}$$

$$\downarrow 25$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-}{\frac{\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}}$$

$$\downarrow 3042$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-}{\frac{\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}}$$

$$\downarrow 3785$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-}{\frac{\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-2\sin\left(\frac{a}{b}\right)\int \cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{2c}}$$

$$\downarrow 3786$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-}{\frac{2\cos\left(\frac{a}{b}\right)\int \sin\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}-2\sin\left(\frac{a}{b}\right)\int \cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{2c}}$$

$$\downarrow 3832$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-2\sin\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{2c}$$

$$\downarrow 3833$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2c}$$

input
```
Int[Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
x*Sqrt[a + b*ArcSin[c*x]] - (Sqrt[b]*Sqrt[2*Pi]*Cos[a/b]*FresnelS[(Sqrt[2/
Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]] - Sqrt[b]*Sqrt[2*Pi]*FresnelC[(Sqrt[
2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(2*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3787
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Cos
[(d*e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/Sqrt[c + d*x], x], x] + Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.00 (sec) , antiderivative size = 187, normalized size of antiderivative = 1.56

method	result
default	$-\frac{-\sqrt{2}\sqrt{\pi}\sqrt{-\frac{1}{b}}\sqrt{a+b\arcsin(cx)}\cos\left(\frac{a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}b}\right)b-\sqrt{2}\sqrt{\pi}\sqrt{-\frac{1}{b}}\sqrt{a+b\arcsin(cx)}\sin\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{2}}{2c\sqrt{a+b\arcsin(cx)}}\right.$

input
```
int((a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output
```
-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)*FresnelC(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)
```

Fricas [F(-2)]

Exception generated.

$$\int \sqrt{a+b\arcsin(cx)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \sqrt{a+b\arcsin(cx)}\,dx = \int \sqrt{a+b\operatorname{asin}(cx)}\,dx$$

input
```
integrate((a+b*asin(c*x))**(1/2),x)
```

output
```
Integral(sqrt(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \sqrt{a + b \arcsin(cx)}\, dx = \int \sqrt{b \arcsin(cx) + a}\, dx$$

input
```
integrate((a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
integrate(sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.38 (sec) , antiderivative size = 531, normalized size of antiderivative = 4.42

$$\int \sqrt{a + b \arcsin(cx)}\, dx = \text{Too large to display}$$

input
```
integrate((a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output
```
1/2*sqrt(2)*sqrt(pi)*a*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)/((I
*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c) + 1/4*I*sqrt(2)*sqrt(pi)*b^2*erf(-1
/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arc
sin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/((I*b^2/sqrt(abs(b)) + b*sqrt(abs(
b)))*c) + 1/2*sqrt(2)*sqrt(pi)*a*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)/((-I*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c) - 1/4*I*sqrt(2)*sqrt(pi)
*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) - sqrt(pi)*a*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*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b)))) - sqrt(pi)*a*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)/(c*(-I*sqrt(2)*b/sqrt(abs(b))
+ sqrt(2)*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
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{a+b\arcsin(cx)}\,dx = \int \sqrt{a+b\,\mathrm{asin}\,(c\,x)}\,dx$$

input
```
int((a + b*asin(c*x))^(1/2),x)
```

output
```
int((a + b*asin(c*x))^(1/2), x)
```

Reduce [F]

$$\int \sqrt{a+b\arcsin(cx)}\,dx = \int \sqrt{asin\,(cx)\,b+a}dx$$

input
```
int((a+b*asin(c*x))^(1/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a),x)
```

3.83 $\int \frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}\,dx$

Optimal result . . . 693
Mathematica [N/A] . . . 693
Rubi [N/A] . . . 694
Maple [N/A] . . . 694
Fricas [F(-2)] . . . 695
Sympy [N/A] . . . 695
Maxima [N/A] . . . 695
Giac [N/A] . . . 696
Mupad [N/A] . . . 696
Reduce [N/A] . . . 697

Optimal result

Integrand size = 26, antiderivative size = 26

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}\,dx = \text{Int}\left(\frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}, x\right)$$

output
```
Defer(Int)((a+b*arcsin(c*x))^(1/2)/(-c^2*d*x^2+d),x)
```

Mathematica [N/A]

Not integrable

Time = 5.08 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}\,dx = \int \frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}\,dx$$

input
```
Integrate[Sqrt[a + b*ArcSin[c*x]]/(d - c^2*d*x^2),x]
```

output
```
Integrate[Sqrt[a + b*ArcSin[c*x]]/(d - c^2*d*x^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{a + b \arcsin(cx)}}{d - c^2 dx^2} \, dx$$
$$\downarrow 5174$$
$$\int \frac{\sqrt{a + b \arcsin(cx)}}{d - c^2 dx^2} dx$$

input
```
Int[Sqrt[a + b*ArcSin[c*x]]/(d - c^2*d*x^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{a + b \arcsin(cx)}}{-c^2 d x^2 + d} dx$$

input
```
int((a+b*arcsin(c*x))^(1/2)/(-c^2*d*x^2+d),x)
```

output
```
int((a+b*arcsin(c*x))^(1/2)/(-c^2*d*x^2+d),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^(1/2)/(-c^2*d*x^2+d),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 0.67 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}\,dx = -\frac{\int \frac{\sqrt{a+b\operatorname{asin}(cx)}}{c^2x^2-1}\,dx}{d}$$

input
```
integrate((a+b*asin(c*x))**(1/2)/(-c**2*d*x**2+d),x)
```

output
```
-Integral(sqrt(a + b*asin(c*x))/(c**2*x**2 - 1), x)/d
```

Maxima [N/A]

Not integrable

Time = 0.41 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}\,dx = \int -\frac{\sqrt{b\arcsin(cx)+a}}{c^2dx^2-d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(1/2)/(-c^2*d*x^2+d),x, algorithm="maxima")
```

output
```
-integrate(sqrt(b*arcsin(c*x) + a)/(c^2*d*x^2 - d), x)
```

Giac [N/A]

Not integrable

Time = 1.39 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}\,dx = \int -\frac{\sqrt{b\arcsin(cx)+a}}{c^2dx^2-d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(1/2)/(-c^2*d*x^2+d),x, algorithm="giac")
```

output
```
integrate(-sqrt(b*arcsin(c*x) + a)/(c^2*d*x^2 - d), x)
```

Mupad [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}\,dx = \int \frac{\sqrt{a+b\operatorname{asin}(c\,x)}}{d-c^2\,d\,x^2}\,dx$$

input
```
int((a + b*asin(c*x))^(1/2)/(d - c^2*d*x^2),x)
```

output
```
int((a + b*asin(c*x))^(1/2)/(d - c^2*d*x^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d-c^2dx^2}\,dx = -\frac{\int \frac{\sqrt{asin(cx)b+a}}{c^2x^2-1}dx}{d}$$

input
```
int((a+b*asin(c*x))^(1/2)/(-c^2*d*x^2+d),x)
```

output
```
( - int(sqrt(asin(c*x)*b + a)/(c**2*x**2 - 1),x))/d
```

3.84 $\int \frac{\sqrt{a+b\arcsin(cx)}}{\left(d-c^2dx^2\right)^2}\,dx$

Optimal result . . . 698
Mathematica [N/A] . . . 698
Rubi [N/A] . . . 699
Maple [N/A] . . . 700
Fricas [F(-2)] . . . 700
Sympy [N/A] . . . 700
Maxima [N/A] . . . 701
Giac [N/A] . . . 701
Mupad [N/A] . . . 702
Reduce [N/A] . . . 702

Optimal result

Integrand size = 26, antiderivative size = 26

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{\left(d-c^2dx^2\right)^2}\,dx = \text{Int}\left(\frac{\sqrt{a+b\arcsin(cx)}}{\left(d-c^2dx^2\right)^2}, x\right)$$

output
```
Defer(Int)((a+b*arcsin(c*x))^(1/2)/(-c^2*d*x^2+d)^2,x)
```

Mathematica [N/A]

Not integrable

Time = 43.80 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{\left(d-c^2dx^2\right)^2}\,dx = \int \frac{\sqrt{a+b\arcsin(cx)}}{\left(d-c^2dx^2\right)^2}\,dx$$

input
```
Integrate[Sqrt[a + b*ArcSin[c*x]]/(d - c^2*d*x^2)^2,x]
```

output
```
Integrate[Sqrt[a + b*ArcSin[c*x]]/(d - c^2*d*x^2)^2, x]
```

Rubi [N/A]

Not integrable

Time = 0.73 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{\left(d-c^2dx^2\right)^2}\,dx$$

$$\downarrow 5162$$

$$-\frac{bc\int \frac{x}{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}dx}{4d^2}+\frac{\int \frac{\sqrt{a+b\arcsin(cx)}}{d\left(1-c^2x^2\right)}dx}{2d}+\frac{x\sqrt{a+b\arcsin(cx)}}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 27$$

$$-\frac{bc\int \frac{x}{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}dx}{4d^2}+\frac{\int \frac{\sqrt{a+b\arcsin(cx)}}{1-c^2x^2}dx}{2d^2}+\frac{x\sqrt{a+b\arcsin(cx)}}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 5174$$

$$-\frac{bc\int \frac{x}{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}dx}{4d^2}+\frac{\int \frac{\sqrt{a+b\arcsin(cx)}}{1-c^2x^2}dx}{2d^2}+\frac{x\sqrt{a+b\arcsin(cx)}}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 5234$$

$$-\frac{bc\int \frac{x}{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}dx}{4d^2}+\frac{\int \frac{\sqrt{a+b\arcsin(cx)}}{1-c^2x^2}dx}{2d^2}+\frac{x\sqrt{a+b\arcsin(cx)}}{2d^2\left(1-c^2x^2\right)}$$

input
```
Int[Sqrt[a + b*ArcSin[c*x]]/(d - c^2*d*x^2)^2,x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{(-c^2dx^2+d)^2}dx$$

input
```
int((a+b*arcsin(c*x))^(1/2)/(-c^2*d*x^2+d)^2,x)
```

output
```
int((a+b*arcsin(c*x))^(1/2)/(-c^2*d*x^2+d)^2,x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{(d-c^2dx^2)^2}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^(1/2)/(-c^2*d*x^2+d)^2,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 1.82 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{(d-c^2dx^2)^2}\,dx = \frac{\int \frac{\sqrt{a+b\operatorname{asin}(cx)}}{c^4x^4-2c^2x^2+1}\,dx}{d^2}$$

input
```
integrate((a+b*asin(c*x))**(1/2)/(-c**2*d*x**2+d)**2,x)
```

output
```
Integral(sqrt(a + b*asin(c*x))/(c**4*x**4 - 2*c**2*x**2 + 1), x)/d**2
```

Maxima [N/A]

Not integrable

Time = 0.47 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{\left(d-c^2dx^2\right)^2}\,dx = \int \frac{\sqrt{b\arcsin\left(cx\right)+a}}{\left(c^2dx^2-d\right)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(1/2)/(-c^2*d*x^2+d)^2,x, algorithm="maxima")
```

output
```
integrate(sqrt(b*arcsin(c*x) + a)/(c^2*d*x^2 - d)^2, x)
```

Giac [N/A]

Not integrable

Time = 8.74 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{\left(d-c^2dx^2\right)^2}\,dx = \int \frac{\sqrt{b\arcsin\left(cx\right)+a}}{\left(c^2dx^2-d\right)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(1/2)/(-c^2*d*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate(sqrt(b*arcsin(c*x) + a)/(c^2*d*x^2 - d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{\left(d-c^2dx^2\right)^2}\,dx = \int \frac{\sqrt{a+b\,\mathrm{asin}\left(c\,x\right)}}{\left(d-c^2\,d\,x^2\right)^2}\,dx$$

input
```
int((a + b*asin(c*x))^(1/2)/(d - c^2*d*x^2)^2,x)
```

output
```
int((a + b*asin(c*x))^(1/2)/(d - c^2*d*x^2)^2, x)
```

Reduce [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.35

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{\left(d-c^2dx^2\right)^2}\,dx = \frac{\int \frac{\sqrt{asin(cx)b+a}}{c^4x^4-2c^2x^2+1}dx}{d^2}$$

input
```
int((a+b*asin(c*x))^(1/2)/(-c^2*d*x^2+d)^2,x)
```

output
```
int(sqrt(asin(c*x)*b + a)/(c**4*x**4 - 2*c**2*x**2 + 1),x)/d**2
```

3.85 $\int (d - c^2 d x^2)^2 (a + b \arcsin(cx))^{3/2} \, dx$

Optimal result . . . 703
Mathematica [C] (verified) . . . 704
Rubi [A] (verified) . . . 705
Maple [A] (verified) . . . 713
Fricas [F(-2)] . . . 713
Sympy [F] . . . 714
Maxima [F] . . . 714
Giac [C] (verification not implemented) . . . 715
Mupad [F(-1)] . . . 716
Reduce [F] . . . 716

Optimal result

Integrand size = 26, antiderivative size = 680

$$\int (d - c^2 d x^2)^2 (a + b \arcsin(cx))^{3/2} \, dx = \frac{4bd^2\sqrt{1 - c^2x^2}\sqrt{a + b \arcsin(cx)}}{5c}$$
$$+ \frac{8}{15} d^2 x (a + b \arcsin(cx))^{3/2} + \frac{4}{15} d^2 x \left(1 - c^2 x^2\right) (a + b \arcsin(cx))^{3/2}$$
$$+ \frac{1}{5} d^2 x \left(1 - c^2 x^2\right)^2 (a + b \arcsin(cx))^{3/2} + \frac{2bd^2\sqrt{a + b \arcsin(cx)} \cos^3\left(\frac{a}{b} - \frac{a + b \arcsin(cx)}{b}\right)}{15c} + \frac{3bd^2\sqrt{a + b \arcsin}$$

output

```
4/5*b*d^2*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))^(1/2)/c+8/15*d^2*x*(a+b*arc
sin(c*x))^(3/2)+4/15*d^2*x*(-c^2*x^2+1)*(a+b*arcsin(c*x))^(3/2)+1/5*d^2*x*
(-c^2*x^2+1)^2*(a+b*arcsin(c*x))^(3/2)+2/15*b*d^2*(a+b*arcsin(c*x))^(1/2)*
cos(a/b-(a+b*arcsin(c*x))/b)^3/c+3/50*b*d^2*(a+b*arcsin(c*x))^(1/2)*cos(a/
b-(a+b*arcsin(c*x))/b)^5/c-15/32*b^(3/2)*d^2*2^(1/2)*Pi^(1/2)*cos(a/b)*Fre
snelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c-5/576*b^(3/2)*d^
2*6^(1/2)*Pi^(1/2)*cos(3*a/b)*FresnelC(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^
(1/2)/b^(1/2))/c-3/8000*b^(3/2)*d^2*10^(1/2)*Pi^(1/2)*cos(5*a/b)*FresnelC(
10^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c-15/32*b^(3/2)*d^2*2^(
1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*s
in(a/b)/c-5/576*b^(3/2)*d^2*6^(1/2)*Pi^(1/2)*FresnelS(6^(1/2)/Pi^(1/2)*(a+
b*arcsin(c*x))^(1/2)/b^(1/2))*sin(3*a/b)/c-3/8000*b^(3/2)*d^2*10^(1/2)*Pi^
(1/2)*FresnelS(10^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(5*a/
b)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 12.09 (sec) , antiderivative size = 1686, normalized size of antiderivative = 2.48

$$\int \left(d - c^2 d x^2\right)^2 \left(a + b \arcsin(cx)\right)^{3/2} dx = \text{Too large to display}$$

input

```
Integrate[(d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])^(3/2),x]
```

output

```
(a*b*d^2*(Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((-I)*(a + b*ArcSi
n[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]]) - (a
*b*d^2*(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*A
rcSin[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])))/(36*c*E^(((3*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]]) + (a*b*d^2*(150*E^(((
4*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((-I)*(a + b*ArcS
in[c*x]))/b] + 150*E^(((6*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3
/2, (I*(a + b*ArcSin[c*x]))/b] - 25*Sqrt[3]*E^(((2*I)*a)/b)*Sqrt[((-I)*(a
 + b*ArcSin[c*x]))/b]*Gamma[3/2, ((-3*I)*(a + b*ArcSin[c*x]))/b] - 25*Sqrt[
3]*E^(((8*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((3*I)*(a +
b*ArcSin[c*x]))/b] + 3*Sqrt[5]*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/
2, ((-5*I)*(a + b*ArcSin[c*x]))/b] + 3*Sqrt[5]*E^(((10*I)*a)/b)*Sqrt[(I*(a
 + b*ArcSin[c*x]))/b]*Gamma[3/2, ((5*I)*(a + b*ArcSin[c*x]))/b]))/(2400*c*
E^(((5*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]]) + (Sqrt[b]*d^2*(2*Sqrt[b]*Sqrt[a
+ b*ArcSin[c*x]]*(3*Sqrt[1 - c^2*x^2] + 2*c*x*ArcSin[c*x]) - Sqrt[2*Pi]*Fr
esnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*(3*b*Cos[a/b] + 2*...
```

Rubi [A] (verified)

Time = 4.14 (sec) , antiderivative size = 852, normalized size of antiderivative = 1.25, number of steps used = 19, number of rules used = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.692$, Rules used = {5158, 27, 5158, 5130, 5182, 5134, 3042, 3787, 25, 3042, 3785, 3786, 3832, 3833, 5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d - c^2 d x^2\right)^2 (a + b \arcsin(cx))^{3/2}\, dx$$

$$\downarrow 5158$$

$$-\frac{3}{10} bcd^2 \int x \left(1 - c^2 x^2\right)^{3/2} \sqrt{a + b \arcsin(cx)}\, dx + \frac{4}{5} d \int d\left(1 - c^2 x^2\right) (a + b \arcsin(cx))^{3/2} dx + \frac{1}{5} d^2 x \left(1 - c^2 x^2\right)^2 (a + b \arcsin(cx))^{3/2}$$

$$\downarrow 27$$

$$-\frac{3}{10}bcd^2\int x\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}dx+\frac{4}{5}d^2\int\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}dx+\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 5158$$

$$-\frac{3}{10}bcd^2\int x\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}dx+\frac{4}{5}d^2\left(-\frac{1}{2}bc\int x\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}dx+\frac{2}{3}\int(a+b\arcsin(cx))^{3/2}dx+\frac{1}{3}x\left(1-c^2x^2\right)(a+b\arcsin(cx))\right.$$
$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 5130$$

$$\frac{4}{5}d^2\left(\frac{2}{3}\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\int\frac{x\sqrt{a+b\arcsin(cx)}}{\sqrt{1-c^2x^2}}dx\right)-\frac{1}{2}bc\int x\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}dx+\frac{1}{3}\right.$$
$$\frac{3}{10}bcd^2\int x\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}dx+\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 5182$$

$$\frac{4}{5}d^2\left(\frac{2}{3}\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{b\int\frac{1}{\sqrt{a+b\arcsin(cx)}}dx}{2c}-\frac{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{c^2}\right)\right)-\frac{1}{2}bc\left(\frac{b\int\frac{}{\sqrt{a}}\right.\right.$$
$$\frac{3}{10}bcd^2\left(\frac{b\int\frac{\left(1-c^2x^2\right)^2}{\sqrt{a+b\arcsin(cx)}}dx}{10c}-\frac{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}{5c^2}\right)+\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+$$
$$b\arcsin(cx))^{3/2}$$

$$\downarrow 5134$$

$$-\frac{3}{10}bcd^2\left(\frac{b\int\frac{\left(1-c^2x^2\right)^2}{\sqrt{a+b\arcsin(cx)}}dx}{10c}-\frac{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}{5c^2}\right)+$$
$$\frac{4}{5}d^2\left(-\frac{1}{2}bc\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{2}{3}\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\int\frac{c}{}\right.\right.\right.$$
$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 3042$$

$$-\frac{3}{10}bcd^2\left(\frac{b\int\frac{\left(1-c^2x^2\right)^2}{\sqrt{a+b\arcsin(cx)}}dx}{10c}-\frac{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}{5c^2}\right)+$$

$$\frac{4}{5}d^2\left(-\frac{1}{2}bc\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{2}{3}\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\int\frac{\text{si}}{}\right.\right.\right.$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 3787$$

$$-\frac{3}{10}bcd^2\left(\frac{b\int\frac{\left(1-c^2x^2\right)^2}{\sqrt{a+b\arcsin(cx)}}dx}{10c}-\frac{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}{5c^2}\right)+$$

$$\frac{4}{5}d^2\left(-\frac{1}{2}bc\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{2}{3}\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\cos}{}\right.\right.\right.$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 25$$

$$-\frac{3}{10}bcd^2\left(\frac{b\int\frac{\left(1-c^2x^2\right)^2}{\sqrt{a+b\arcsin(cx)}}dx}{10c}-\frac{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}{5c^2}\right)+$$

$$\frac{4}{5}d^2\left(-\frac{1}{2}bc\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{2}{3}\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sin}{}\right.\right.\right.$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 3042$$

$$-\frac{3}{10}bcd^2\left(\frac{b\int\frac{\left(1-c^2x^2\right)^2}{\sqrt{a+b\arcsin(cx)}}dx}{10c}-\frac{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}{5c^2}\right)+$$

$$\frac{4}{5}d^2\left(-\frac{1}{2}bc\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{2}{3}\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sin}{}\right.\right.\right.$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 3785$$

$$-\frac{3}{10}bcd^2\left(\frac{b\int\frac{\left(1-c^2x^2\right)^2}{\sqrt{a+b\arcsin(cx)}}dx}{10c}-\frac{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}{5c^2}\right)+$$

$$\frac{4}{5}d^2\left(-\frac{1}{2}bc\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{2}{3}\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\sin\right.\right.\right.$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 3786$$

$$-\frac{3}{10}bcd^2\left(\frac{b\int\frac{\left(1-c^2x^2\right)^2}{\sqrt{a+b\arcsin(cx)}}dx}{10c}-\frac{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}{5c^2}\right)+$$

$$\frac{4}{5}d^2\left(-\frac{1}{2}bc\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{2}{3}\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(2\sin\right.\right.\right.$$

$$\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 3832$$

$$\frac{4}{5}d^2\left(\frac{2}{3}\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{2\cos\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}+\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{Fres}}{2c^2}\right.\right.\right.$$

$$\frac{3}{10}bcd^2\left(\frac{b\int\frac{\left(1-c^2x^2\right)^2}{\sqrt{a+b\arcsin(cx)}}dx}{10c}-\frac{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}{5c^2}\right)+\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+$$

$$b\arcsin(cx))^{3/2}$$

$$\downarrow 3833$$

$$\frac{4}{5}d^2\left(-\frac{1}{2}bc\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{2}{3}\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sqrt{2\pi}}{}\right.\right.\right.$$

$$\frac{3}{10}bcd^2\left(\frac{b\int\frac{\left(1-c^2x^2\right)^2}{\sqrt{a+b\arcsin(cx)}}dx}{10c}-\frac{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}{5c^2}\right)+\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+$$

$$b\arcsin(cx))^{3/2}$$

$$\downarrow 5168$$

$$\frac{4}{5}d^2\left(-\frac{1}{2}bc\left(\frac{\int\frac{\cos^3\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c^2}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{2}{3}\left(x(a+b\arcsin\right.\right.$$

$$\left.\left.\frac{3}{10}bcd^2\left(\frac{\int\frac{\cos^5\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{10c^2}-\frac{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}{5c^2}\right)+\right.\right.$$

$$\left.\left.\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}\right.\right.$$

$$\downarrow 3042$$

$$\frac{4}{5}d^2\left(-\frac{1}{2}bc\left(\frac{\int\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)^3}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c^2}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{2}{3}\left(x(a+b\arcsin\right.\right.$$

$$\left.\left.\frac{3}{10}bcd^2\left(\frac{\int\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)^5}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{10c^2}-\frac{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}{5c^2}\right)+\right.\right.$$

$$\left.\left.\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}\right.\right.$$

$$\downarrow 3793$$

$$\frac{4}{5}d^2\left(-\frac{1}{2}bc\left(\frac{\int\left(\frac{\cos\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{4\sqrt{a+b\arcsin(cx)}}+\frac{3\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{4\sqrt{a+b\arcsin(cx)}}\right)d(a+b\arcsin(cx))}{6c^2}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsi}}{3c^2}\right.\right.$$

$$\left.\left.\frac{3}{10}bcd^2\left(\frac{\int\left(\frac{\cos\left(\frac{5a}{b}-\frac{5(a+b\arcsin(cx))}{b}\right)}{16\sqrt{a+b\arcsin(cx)}}+\frac{5\cos\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{16\sqrt{a+b\arcsin(cx)}}+\frac{5\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{8\sqrt{a+b\arcsin(cx)}}\right)d(a+b\arcsin(cx))}{10c^2}-\frac{(1-}{}\right.\right.\right.$$

$$\left.\left.\frac{1}{5}d^2x\left(1-c^2x^2\right)^2(a+b\arcsin(cx))^{3/2}\right.\right.$$

$$\downarrow 2009$$

$$\frac{1}{5}x\left(1-c^2x^2\right)^2\left(a+b\arcsin(cx)\right)^{3/2}d^2+$$

$$\frac{4}{5}\left(\frac{1}{3}x\left(1-c^2x^2\right)\left(a+b\arcsin(cx)\right)^{3/2}+\frac{2}{3}\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sqrt{b}\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\,a}}{\sqrt{b}}\right.\right.\right.\right.$$

$$\frac{3}{10}bc\left(\frac{\frac{5}{4}\sqrt{b}\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\frac{5}{8}\sqrt{b}\sqrt{\frac{\pi}{6}}\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\frac{1}{8}\sqrt{b}\sqrt{}\right.\right.$$

input

```
Int[(d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])^(3/2),x]
```

output

```
(d^2*x*(1 - c^2*x^2)^2*(a + b*ArcSin[c*x])^(3/2))/5 + (4*d^2*((x*(1 - c^2*
x^2)*(a + b*ArcSin[c*x])^(3/2))/3 + (2*(x*(a + b*ArcSin[c*x])^(3/2) - (3*b
*c*(-((Sqrt[1 - c^2*x^2]*Sqrt[a + b*ArcSin[c*x]])/c^2) + (Sqrt[b]*Sqrt[2*P
i]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]] + Sqrt[
b]*Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a
/b])/(2*c^2)))/2))/3 - (b*c*(-1/3*((1 - c^2*x^2)^(3/2)*Sqrt[a + b*ArcSin[c
*x]])/c^2 + ((3*Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a +
b*ArcSin[c*x]])/Sqrt[b]])/2 + (Sqrt[b]*Sqrt[Pi/6]*Cos[(3*a)/b]*FresnelC[(S
qrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/2 + (3*Sqrt[b]*Sqrt[Pi/2]*Fre
snelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/2 + (Sqrt[b]
*Sqrt[Pi/6]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*
a)/b])/2)/(6*c^2)))/2))/5 - (3*b*c*d^2*(-1/5*((1 - c^2*x^2)^(5/2)*Sqrt[a +
 b*ArcSin[c*x]])/c^2 + ((5*Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi
]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/4 + (5*Sqrt[b]*Sqrt[Pi/6]*Cos[(3*a)/b
]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/8 + (Sqrt[b]*Sqr
t[Pi/10]*Cos[(5*a)/b]*FresnelC[(Sqrt[10/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[
b]])/8 + (5*Sqrt[b]*Sqrt[Pi/2]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]
])/Sqrt[b]]*Sin[a/b])/4 + (5*Sqrt[b]*Sqrt[Pi/6]*FresnelS[(Sqrt[6/Pi]*Sqrt[
a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/8 + (Sqrt[b]*Sqrt[Pi/10]*Fresne
lS[(Sqrt[10/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(5*a)/b])/8)/(10*...
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3787
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Cos
[(d*e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/Sqrt[c + d*x], x], x] + Simp[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 3793
```
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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5134
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[1/(b*c)   Su
bst[Int[x^n*Cos[-a/b + x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b,
c, n}, x]
```

rule 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

rule 5182
```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 821, normalized size of antiderivative = 1.21

method	result	size
default	Expression too large to display	821

input
```
int((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^(3/2),x,method=_RETURNVERBOSE)
```

output
```
-1/72000/c*d^2*(625*(a+b*arcsin(c*x))^(1/2)*cos(3*a/b)*FresnelC(3*2^(1/2)/
Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(-3/b)^(1/2)*2^(1/2)*Pi^(
1/2)*b^2-625*(a+b*arcsin(c*x))^(1/2)*sin(3*a/b)*FresnelS(3*2^(1/2)/Pi^(1/2
)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(-3/b)^(1/2)*2^(1/2)*Pi^(1/2)*b^
2+33750*(-1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*cos(a/b)*Fre
snelC(2^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b^2-33750*(
-1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(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)*b^2+27*Pi^(1/2)*2^(1
/2)*(a+b*arcsin(c*x))^(1/2)*(-5/b)^(1/2)*cos(5*a/b)*FresnelC(5*2^(1/2)/Pi^
(1/2)/(-5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b^2-27*Pi^(1/2)*2^(1/2)*(a+b
*arcsin(c*x))^(1/2)*(-5/b)^(1/2)*sin(5*a/b)*FresnelS(5*2^(1/2)/Pi^(1/2)/(-
5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b^2+45000*arcsin(c*x)^2*sin(-(a+b*ar
csin(c*x))/b+a/b)*b^2+7500*arcsin(c*x)^2*sin(-3*(a+b*arcsin(c*x))/b+3*a/b)
*b^2+900*arcsin(c*x)^2*sin(-5*(a+b*arcsin(c*x))/b+5*a/b)*b^2+90000*arcsin(
c*x)*sin(-(a+b*arcsin(c*x))/b+a/b)*a*b-67500*arcsin(c*x)*cos(-(a+b*arcsin(
c*x))/b+a/b)*b^2+15000*arcsin(c*x)*sin(-3*(a+b*arcsin(c*x))/b+3*a/b)*a*b-3
750*arcsin(c*x)*cos(-3*(a+b*arcsin(c*x))/b+3*a/b)*b^2+1800*arcsin(c*x)*sin
(-5*(a+b*arcsin(c*x))/b+5*a/b)*a*b-270*arcsin(c*x)*cos(-5*(a+b*arcsin(c*x)
)/b+5*a/b)*b^2+45000*sin(-(a+b*arcsin(c*x))/b+a/b)*a^2-67500*cos(-(a+b*arc
sin(c*x))/b+a/b)*a*b+7500*sin(-3*(a+b*arcsin(c*x))/b+3*a/b)*a^2-3750*co...
```

Fricas [F(-2)]

Exception generated.

$$\int \left(d - c^2 d x^2\right)^2 \left(a + b \arcsin(cx)\right)^{3/2} dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \left(d - c^2 dx^2\right)^2 (a + b \arcsin(cx))^{3/2}\, dx = d^2 \left(\int a\sqrt{a + b \operatorname{asin}(cx)}\, dx + \int b\sqrt{a + b \operatorname{asin}(cx)} \operatorname{asin}(cx)\, dx + \int \left(-2ac^2x^2\sqrt{a + b \operatorname{asin}(cx)}\right) dx + \int ac^4x^4\sqrt{a + b \operatorname{asin}(cx)}\, dx + \int \left(-2bc^2x^2\sqrt{a + b \operatorname{asin}(cx)} \operatorname{asin}(cx)\right) dx + \int bc^4x^4\sqrt{a + b \operatorname{asin}(cx)} \operatorname{asin}(cx)\, dx \right)$$

input
```
integrate((-c**2*d*x**2+d)**2*(a+b*asin(c*x))**(3/2),x)
```

output
```
d**2*(Integral(a*sqrt(a + b*asin(c*x)), x) + Integral(b*sqrt(a + b*asin(c*
x))*asin(c*x), x) + Integral(-2*a*c**2*x**2*sqrt(a + b*asin(c*x)), x) + In
tegral(a*c**4*x**4*sqrt(a + b*asin(c*x)), x) + Integral(-2*b*c**2*x**2*sqr
t(a + b*asin(c*x))*asin(c*x), x) + Integral(b*c**4*x**4*sqrt(a + b*asin(c*
x))*asin(c*x), x))
```

Maxima [F]

$$\int \left(d - c^2 dx^2\right)^2 (a + b \arcsin(cx))^{3/2}\, dx = \int \left(c^2 dx^2 - d\right)^2 (b \arcsin(cx) + a)^{\frac{3}{2}}\, dx$$

input
```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
integrate((c^2*d*x^2 - d)^2*(b*arcsin(c*x) + a)^(3/2), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 2.98 (sec) , antiderivative size = 3630, normalized size of antiderivative = 5.34

$$\int \left(d - c^2 dx^2\right)^2 \left(a + b \arcsin(cx)\right)^{3/2} dx = \text{Too large to display}$$

input

```
integrate((-c^2*d*x^2+d)^2*(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output

```
1/4800*(3000*sqrt(2)*sqrt(pi)*a^2*b*d^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))) + 1500*I*sqrt(2)*sqrt(pi
)*a*b^2*d^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))) + 3000*sqrt(2)*sqrt(pi)*a^2*b*d^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))) - 1500*
I*sqrt(2)*sqrt(pi)*a*b^2*d^2*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqr
t(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))) - 300*sqrt(6)*sqrt(pi)*a^2*sqrt(b)
*d^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)/(b + I*b^2/abs(b)) - 300*s
qrt(6)*sqrt(pi)*a^2*sqrt(b)*d^2*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/s
qrt(b) + 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(-3*I*a/b
)/(b - I*b^2/abs(b)) + 600*sqrt(pi)*a^2*sqrt(b)*d^2*erf(-1/2*sqrt(10)*sqrt
(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I*sqrt(10)*sqrt(b*arcsin(c*x) + a)*sqrt(
b)/abs(b))*e^(5*I*a/b)/(sqrt(10)*b + I*sqrt(10)*b^2/abs(b)) + 60*I*sqrt(pi
)*a*b^(3/2)*d^2*erf(-1/2*sqrt(10)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I*
sqrt(10)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(5*I*a/b)/(sqrt(10)*...
```

Mupad [F(-1)]

Timed out.

$$\int \left(d-c^2dx^2\right)^2 (a+b\arcsin(cx))^{3/2}\,dx = \int (a+b\,\mathrm{asin}(c\,x))^{3/2}\left(d-c^2\,d\,x^2\right)^2 dx$$

input
```
int((a + b*asin(c*x))^(3/2)*(d - c^2*d*x^2)^2,x)
```

output
```
int((a + b*asin(c*x))^(3/2)*(d - c^2*d*x^2)^2, x)
```

Reduce [F]

$$\begin{aligned}\int \left(d-c^2dx^2\right)^2 (a+b\arcsin(cx))^{3/2}\,dx &= d^2\left(\left(\int \sqrt{asin\,(cx)\,b+a}dx\right)a\right.\\ &+\left(\int \sqrt{asin\,(cx)\,b+a}\,asin(cx)\,x^4dx\right)b\,c^4\\ &-2\left(\int \sqrt{asin\,(cx)\,b+a}\,asin(cx)\,x^2dx\right)b\,c^2\\ &+\left(\int \sqrt{asin\,(cx)\,b+a}\,asin(cx)\,dx\right)b\\ &+\left.\left(\int \sqrt{asin\,(cx)\,b+a}\,x^4dx\right)a\,c^4-2\left(\int \sqrt{asin\,(cx)\,b+a}\,x^2dx\right)a\,c^2\right)\end{aligned}$$

input
```
int((-c^2*d*x^2+d)^2*(a+b*asin(c*x))^(3/2),x)
```

output
```
d**2*(int(sqrt(asin(c*x)*b + a),x)*a + int(sqrt(asin(c*x)*b + a)*asin(c*x)
*x**4,x)*b*c**4 - 2*int(sqrt(asin(c*x)*b + a)*asin(c*x)*x**2,x)*b*c**2 + i
nt(sqrt(asin(c*x)*b + a)*asin(c*x),x)*b + int(sqrt(asin(c*x)*b + a)*x**4,x
)*a*c**4 - 2*int(sqrt(asin(c*x)*b + a)*x**2,x)*a*c**2)
```

3.86 $\int (d - c^2 dx^2) (a + b \arcsin(cx))^{3/2} \, dx$

Optimal result . . . 717
Mathematica [C] (verified) . . . 718
Rubi [A] (verified) . . . 719
Maple [A] (verified) . . . 726
Fricas [F(-2)] . . . 727
Sympy [F] . . . 727
Maxima [F] . . . 728
Giac [C] (verification not implemented) . . . 728
Mupad [F(-1)] . . . 729
Reduce [F] . . . 730

Optimal result

Integrand size = 24, antiderivative size = 348

$$\int (d - c^2 dx^2) (a + b \arcsin(cx))^{3/2} \, dx = \frac{bd\sqrt{1 - c^2x^2}\sqrt{a + b \arcsin(cx)}}{c}$$
$$+ \frac{2}{3} dx (a + b \arcsin(cx))^{3/2} + \frac{1}{3} dx \left(1 - c^2 x^2\right) (a + b \arcsin(cx))^{3/2}$$
$$+ \frac{bd\sqrt{a + b \arcsin(cx)} \cos^3\left(\frac{a}{b} - \frac{a + b \arcsin(cx)}{b}\right)}{6c}$$
$$- \frac{9b^{3/2} d \sqrt{\frac{\pi}{2}} \cos\left(\frac{a}{b}\right) \text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a + b \arcsin(cx)}}{\sqrt{b}}\right)}{8c}$$
$$- \frac{b^{3/2} d \sqrt{\frac{\pi}{6}} \cos\left(\frac{3a}{b}\right) \text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a + b \arcsin(cx)}}{\sqrt{b}}\right)}{24c}$$
$$- \frac{9b^{3/2} d \sqrt{\frac{\pi}{2}} \text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a + b \arcsin(cx)}}{\sqrt{b}}\right) \sin\left(\frac{a}{b}\right)}{8c}$$
$$- \frac{b^{3/2} d \sqrt{\frac{\pi}{6}} \text{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a + b \arcsin(cx)}}{\sqrt{b}}\right) \sin\left(\frac{3a}{b}\right)}{24c}$$

output
```
b*d*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))^(1/2)/c+2/3*d*x*(a+b*arcsin(c*x))
^(3/2)+1/3*d*x*(-c^2*x^2+1)*(a+b*arcsin(c*x))^(3/2)+1/6*b*d*(a+b*arcsin(c*
x))^(1/2)*cos(a/b-(a+b*arcsin(c*x))/b)^3/c-9/16*b^(3/2)*d*2^(1/2)*Pi^(1/2)
*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c-1/1
44*b^(3/2)*d*6^(1/2)*Pi^(1/2)*cos(3*a/b)*FresnelC(6^(1/2)/Pi^(1/2)*(a+b*ar
csin(c*x))^(1/2)/b^(1/2))/c-9/16*b^(3/2)*d*2^(1/2)*Pi^(1/2)*FresnelS(2^(1/
2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/c-1/144*b^(3/2)*d*6^
(1/2)*Pi^(1/2)*FresnelS(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*
sin(3*a/b)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 7.23 (sec) , antiderivative size = 844, normalized size of antiderivative = 2.43

$$\int \left(d - c^2 d x^2\right) \left(a + b \arcsin(cx)\right)^{3/2} dx = \text{Too large to display}$$

input
```
Integrate[(d - c^2*d*x^2)*(a + b*ArcSin[c*x])^(3/2),x]
```

output

```
(a*b*d*(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]]) - (a*b
*d*(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*ArcSi
n[c*x]))/b]*Gamma[3/2, ((-3*I)*(a + b*ArcSin[c*x]))/b] + E^(((6*I)*a)/b)*S
qrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((3*I)*(a + b*ArcSin[c*x]))/b]))
)/(72*c*E^(((3*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]]) + (Sqrt[b]*d*(2*Sqrt[b]*S
qrt[a + b*ArcSin[c*x]]*(3*Sqrt[1 - c^2*x^2] + 2*c*x*ArcSin[c*x]) - Sqrt[2*
Pi]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*(3*b*Cos[a/b] +
 2*a*Sin[a/b]) + Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/
Sqrt[b]]*(2*a*Cos[a/b] - 3*b*Sin[a/b])))/(4*c) - (Sqrt[b]*d*(18*Sqrt[b]*Sq
rt[a + b*ArcSin[c*x]]*(3*Sqrt[1 - c^2*x^2] + 2*c*x*ArcSin[c*x]) - 9*Sqrt[2
*Pi]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*(3*b*Cos[a/b]
 + 2*a*Sin[a/b]) + 9*Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]
])/Sqrt[b]]*(2*a*Cos[a/b] - 3*b*Sin[a/b]) + Sqrt[6*Pi]*FresnelC[(Sqrt[6/Pi
]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*(b*Cos[(3*a)/b] + 2*a*Sin[(3*a)/b]) -
Sqrt[6*Pi]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*(2*a*Cos
[(3*a)/b] - b*Sin[(3*a)/b]) - 6*Sqrt[b]*Sqrt[a + b*ArcSin[c*x]]*(Cos[3*...
```

Rubi [A] (verified)

Time = 2.19 (sec) , antiderivative size = 448, normalized size of antiderivative = 1.29, number of steps used = 17, number of rules used = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.667$, Rules used = {5158, 5130, 5182, 5134, 3042, 3787, 25, 3042, 3785, 3786, 3832, 3833, 5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d - c^2 d x^2\right) \left(a + b \arcsin(cx)\right)^{3/2} dx$$

$$\downarrow 5158$$

$$-\frac{1}{2} bcd \int x \sqrt{1 - c^2 x^2} \sqrt{a + b \arcsin(cx)} dx + \frac{2}{3} d \int (a + b \arcsin(cx))^{3/2} dx + \frac{1}{3} dx \left(1 - c^2 x^2\right) (a + b \arcsin(cx))^{3/2}$$

$$\downarrow 5130$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\int\frac{x\sqrt{a+b\arcsin(cx)}}{\sqrt{1-c^2x^2}}dx\right)-\frac{1}{2}bcd\int x\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}dx+\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 5182$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{b\int\frac{1}{\sqrt{a+b\arcsin(cx)}}dx}{2c}-\frac{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{c^2}\right)\right)-\frac{1}{2}bcd\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 5134$$

$$-\frac{1}{2}bcd\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\int\frac{\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c^2}-\frac{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{c^2}\right)\right)+\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 3042$$

$$-\frac{1}{2}bcd\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\int\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c^2}-\frac{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{c^2}\right)\right)+\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 3787$$

$$-\frac{1}{2}bcd\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\cos\left(\frac{a}{b}\right)\int\frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int-\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a\right.\right.$$

$$\left.\left.\frac{}{2c^2}\right.\right.$$

$$\left.\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}\right)$$

$$\downarrow 25$$

$$-\frac{1}{2}bcd\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))+\cos\left(\frac{a}{b}\right)\int\frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+\right.\right.\right.$$

$$\left.\left.\left.\frac{}{2c^2}\right.\right.\right.$$

$$\left.\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}\right)$$

$$\downarrow 3042$$

$$-\frac{1}{2}bcd\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))+\cos\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(\right.\right.\right.$$

$$\left.\left.\left.\frac{}{2c^2}\right.\right.\right.$$

$$\left.\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}\right)$$

$$\downarrow 3785$$

$$-\frac{1}{2}bcd\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))+2\cos\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)\right.\right.\right.$$

$$\left.\left.\left.\frac{}{2c^2}\right.\right.\right.$$

$$\left.\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}\right)$$

$$\downarrow 3786$$

$$-\frac{1}{2}bcd\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{2\sin\left(\frac{a}{b}\right)\int\sin\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}+2\cos\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(}{b}\right.\right.\right.$$

$$\left.\left.\left.\frac{}{2c^2}\right.\right.\right.$$

$$\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 3832$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{2\cos\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}+\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\right.\right.\right.$$

$$\left.\left.\left.\frac{}{2c^2}\right.\right.\right.$$

$$\frac{1}{2}bcd\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+\frac{1}{3}dx\left(1-c^2x^2\right)(a+$$

$$b\arcsin(cx))^{3/2}$$

$$\downarrow 3833$$

$$-\frac{1}{2}bcd\left(\frac{b\int\frac{1-c^2x^2}{\sqrt{a+b\arcsin(cx)}}dx}{6c}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{}}{}\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{}{2c^2}\right.\right.\right.\right.$$

$$\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 5168$$

$$-\frac{1}{2}bcd\left(\frac{\int\frac{\cos^3\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c^2}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{}}{}\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{}{2c^2}\right.\right.\right.\right.$$

$$\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}$$

$$\downarrow 3042$$

$$-\frac{1}{2}bcd\left(\frac{\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)^3}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{6c^2}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{}}{2c^2}\right.\right.\right.$$

$$\left.\left.\left.\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}\right)\right)\right)$$

$$\downarrow 3793$$

$$-\frac{1}{2}bcd\left(\frac{\int\left(\frac{\cos\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{4\sqrt{a+b\arcsin(cx)}}+\frac{3\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{4\sqrt{a+b\arcsin(cx)}}\right)d(a+b\arcsin(cx))}{6c^2}-\frac{\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}{3c^2}\right)+$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{}}{2c^2}\right.\right.\right.$$

$$\left.\left.\left.\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}\right)\right)\right)$$

$$\downarrow 2009$$

$$\frac{2}{3}d\left(x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{}}{2c^2}\right.\right.\right.$$

$$\frac{1}{2}bcd\left(\frac{\frac{3}{2}\sqrt{\frac{\pi}{2}}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\frac{1}{2}\sqrt{\frac{\pi}{6}}\sqrt{b}\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\frac{3}{2}\sqrt{\frac{\pi}{2}}}{6c^2}\right.$$

$$\left.\left.\left.\frac{1}{3}dx\left(1-c^2x^2\right)(a+b\arcsin(cx))^{3/2}\right)\right)\right)$$

input
```
Int[(d - c^2*d*x^2)*(a + b*ArcSin[c*x])^(3/2),x]
```

output
```
(d*x*(1 - c^2*x^2)*(a + b*ArcSin[c*x])^(3/2))/3 + (2*d*(x*(a + b*ArcSin[c*
x])^(3/2) - (3*b*c*(-((Sqrt[1 - c^2*x^2]*Sqrt[a + b*ArcSin[c*x]])/c^2) + (
Sqrt[b]*Sqrt[2*Pi]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/
Sqrt[b]] + Sqrt[b]*Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]]
)/Sqrt[b]]*Sin[a/b])/(2*c^2)))/2))/3 - (b*c*d*(-1/3*((1 - c^2*x^2)^(3/2)*S
qrt[a + b*ArcSin[c*x]])/c^2 + ((3*Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sq
rt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/2 + (Sqrt[b]*Sqrt[Pi/6]*Cos[(3
*a)/b]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/2 + (3*Sqrt
[b]*Sqrt[Pi/2]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[
a/b])/2 + (Sqrt[b]*Sqrt[Pi/6]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]]
)/Sqrt[b]]*Sin[(3*a)/b])/2)/(6*c^2)))/2
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3787
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Cos
[(d*e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/Sqrt[c + d*x], x], x] + Simp[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 3793
```
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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5134
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[1/(b*c)   Su
bst[Int[x^n*Cos[-a/b + x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b,
c, n}, x]
```

rule 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

rule 5182
```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 548, normalized size of antiderivative = 1.57

method	result
default	$-\frac{d\left(\sqrt{a+b\arcsin(cx)}\,\cos\left(\frac{3a}{b}\right)\mathrm{FresnelC}\left(\frac{3\sqrt{2}\,\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\,\sqrt{-\frac{3}{b}\,b}}\right)\sqrt{-\frac{3}{b}}\,\sqrt{2}\sqrt{\pi}\,b^2-\sqrt{a+b\arcsin(cx)}\,\sin\left(\frac{3a}{b}\right)\mathrm{FresnelS}\left(\frac{3\sqrt{2}\,\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\,\sqrt{-}\right.\right.$

input
```
int((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^(3/2),x,method=_RETURNVERBOSE)
```

output
```
-1/144/c*d*((a+b*arcsin(c*x))^(1/2)*cos(3*a/b)*FresnelC(3*2^(1/2)/Pi^(1/2)
/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(-3/b)^(1/2)*2^(1/2)*Pi^(1/2)*b^2
-(a+b*arcsin(c*x))^(1/2)*sin(3*a/b)*FresnelS(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/
2)*(a+b*arcsin(c*x))^(1/2)/b)*(-3/b)^(1/2)*2^(1/2)*Pi^(1/2)*b^2+81*(-1/b)^
(1/2)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*cos(a/b)*FresnelC(2^(1/2)/P
i^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b^2-81*(-1/b)^(1/2)*Pi^(1/
2)*2^(1/2)*(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)*b^2+108*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+2
16*arcsin(c*x)*sin(-(a+b*arcsin(c*x))/b+a/b)*a*b-162*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+108*sin(-(a+b*arcs
in(c*x))/b+a/b)*a^2-162*cos(-(a+b*arcsin(c*x))/b+a/b)*a*b+12*sin(-3*(a+b*a
rcsin(c*x))/b+3*a/b)*a^2-6*cos(-3*(a+b*arcsin(c*x))/b+3*a/b)*a*b)/(a+b*arc
sin(c*x))^(1/2)
```

Fricas [F(-2)]

Exception generated.

$$\int \left(d - c^2 dx^2\right) \left(a + b \arcsin(cx)\right)^{3/2} dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\begin{aligned}
&\int \left(d - c^2 dx^2\right) \left(a + b \arcsin(cx)\right)^{3/2} dx = \\
&-d\left(\int \left(-a\sqrt{a + b\operatorname{asin}(cx)}\right) dx + \int \left(-b\sqrt{a + b\operatorname{asin}(cx)}\operatorname{asin}(cx)\right) dx\right. \\
&\left. + \int ac^2x^2\sqrt{a + b\operatorname{asin}(cx)}\, dx + \int bc^2x^2\sqrt{a + b\operatorname{asin}(cx)}\operatorname{asin}(cx)\, dx\right)
\end{aligned}$$

input
```
integrate((-c**2*d*x**2+d)*(a+b*asin(c*x))**(3/2),x)
```

output
```
-d*(Integral(-a*sqrt(a + b*asin(c*x)), x) + Integral(-b*sqrt(a + b*asin(c*
x))*asin(c*x), x) + Integral(a*c**2*x**2*sqrt(a + b*asin(c*x)), x) + Integ
ral(b*c**2*x**2*sqrt(a + b*asin(c*x))*asin(c*x), x))
```

Maxima [F]

$$\int \left(d - c^2 dx^2\right) \left(a + b \arcsin(cx)\right)^{3/2} dx = \int -\left(c^2 dx^2 - d\right) \left(b \arcsin\left(cx\right) + a\right)^{\frac{3}{2}} dx$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
-integrate((c^2*d*x^2 - d)*(b*arcsin(c*x) + a)^(3/2), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 1.74 (sec) , antiderivative size = 2144, normalized size of antiderivative = 6.16

$$\int \left(d - c^2 dx^2\right) \left(a + b \arcsin(cx)\right)^{3/2} dx = \text{Too large to display}$$

input
```
integrate((-c^2*d*x^2+d)*(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output

```
1/96*(72*sqrt(2)*sqrt(pi)*a^2*b*d*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))) + 36*I*sqrt(2)*sqrt(pi)*a*b^2*
d*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^2/sqrt(abs(b)) + b*sq
rt(abs(b))) + 72*sqrt(2)*sqrt(pi)*a^2*b*d*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))) - 36*I*sqrt(2)*sqrt(p
i)*a*b^2*d*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)/(-I*b^2/sqrt(abs(
b)) + b*sqrt(abs(b))) + 48*sqrt(pi)*a^2*sqrt(b)*d*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)) + 8*I*sqrt(pi)*a*b^(
3/2)*d*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I*sqrt(6)*sq
rt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(3*I*a/b)/(sqrt(6)*b + I*sqrt(6)*b
^2/abs(b)) - 36*sqrt(2)*sqrt(pi)*a^2*d*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/sqrt(abs(b)) + sqrt(abs(b))) - 36*I*sqrt(2)*sqrt(pi)*a*b*d
*erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqr
t(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/(I*b/sqrt(abs(b)) + sqrt...
```

Mupad [F(-1)]

Timed out.

$$\int \left(d - c^2 dx^2\right) \left(a + b \arcsin(cx)\right)^{3/2} dx = \int \left(a + b \operatorname{asin}(c\,x)\right)^{3/2} \left(d - c^2\, d\, x^2\right)\, dx$$

input

```
int((a + b*asin(c*x))^(3/2)*(d - c^2*d*x^2),x)
```

output

```
int((a + b*asin(c*x))^(3/2)*(d - c^2*d*x^2), x)
```

Reduce [F]

$$\int (d - c^2 dx^2)\,(a + b\arcsin(cx))^{3/2}\,dx = d\left(\left(\int \sqrt{asin\,(cx)\,b + a}dx\right)a - \left(\int \sqrt{asin\,(cx)\,b + a}\,asin(cx)\,x^2 dx\right)b\,c^2 + \left(\int \sqrt{asin\,(cx)\,b + a}\,asin(cx)\,dx\right)b - \left(\int \sqrt{asin\,(cx)\,b + a}\,x^2 dx\right)a\,c^2\right)$$

input

```
int((-c^2*d*x^2+d)*(a+b*asin(c*x))^(3/2),x)
```

output

```
d*(int(sqrt(asin(c*x)*b + a),x)*a - int(sqrt(asin(c*x)*b + a)*asin(c*x)*x*
*2,x)*b*c**2 + int(sqrt(asin(c*x)*b + a)*asin(c*x),x)*b - int(sqrt(asin(c*
x)*b + a)*x**2,x)*a*c**2)
```

3.87 $\int (a + b \arcsin(cx))^{3/2}\, dx$

Optimal result . . . 731
Mathematica [C] (verified) . . . 732
Rubi [A] (verified) . . . 732
Maple [B] (verified) . . . 736
Fricas [F(-2)] . . . 737
Sympy [F] . . . 737
Maxima [F] . . . 737
Giac [C] (verification not implemented) . . . 738
Mupad [F(-1)] . . . 739
Reduce [F] . . . 739

Optimal result

Integrand size = 12, antiderivative size = 159

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \frac{3b\sqrt{1-c^2x^2}\sqrt{a + b \arcsin(cx)}}{2c} + x(a + b \arcsin(cx))^{3/2} - \frac{3b^{3/2}\sqrt{\frac{\pi}{2}} \cos\left(\frac{a}{b}\right) \text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b \arcsin(cx)}}{\sqrt{b}}\right)}{2c} - \frac{3b^{3/2}\sqrt{\frac{\pi}{2}}\, \text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b \arcsin(cx)}}{\sqrt{b}}\right) \sin\left(\frac{a}{b}\right)}{2c}$$

output

```
3/2*b*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))^(1/2)/c+x*(a+b*arcsin(c*x))^(3/
2)-3/4*b^(3/2)*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*ar
csin(c*x))^(1/2)/b^(1/2))/c-3/4*b^(3/2)*2^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/
Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.87 (sec) , antiderivative size = 289, normalized size of antiderivative = 1.82

$$\int (a + b\arcsin(cx))^{3/2}\,dx = \frac{abe^{-\frac{ia}{b}}\left(\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+e^{\frac{2ia}{b}}\sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},\frac{i(a+b\arcsin(cx))}{b}\right)\right)}{2c\sqrt{a+b\arcsin(cx)}} + \frac{\sqrt{b}\left(2\sqrt{b}\sqrt{a+b\arcsin(cx)}\left(3\sqrt{1-c^2x^2}+2cx\arcsin(cx)\right)-\sqrt{2\pi}\,\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\left(3b\cos\left(\frac{a}{b}\right)\right.\right.}{4c}$$

input
```
Integrate[(a + b*ArcSin[c*x])^(3/2),x]
```

output
```
(a*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]]) + (Sqrt[
b]*(2*Sqrt[b]*Sqrt[a + b*ArcSin[c*x]]*(3*Sqrt[1 - c^2*x^2] + 2*c*x*ArcSin[
c*x]) - Sqrt[2*Pi]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*
(3*b*Cos[a/b] + 2*a*Sin[a/b]) + Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b
*ArcSin[c*x]])/Sqrt[b]]*(2*a*Cos[a/b] - 3*b*Sin[a/b])))/(4*c)
```

Rubi [A] (verified)

Time = 0.82 (sec) , antiderivative size = 155, normalized size of antiderivative = 0.97, number of steps used = 12, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.917$, Rules used = {5130, 5182, 5134, 3042, 3787, 25, 3042, 3785, 3786, 3832, 3833}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (a + b\arcsin(cx))^{3/2}\,dx$$

$$\downarrow \text{5130}$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\int\frac{x\sqrt{a+b\arcsin(cx)}}{\sqrt{1-c^2x^2}}dx$$

$$\downarrow 5182$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{b\int\frac{1}{\sqrt{a+b\arcsin(cx)}}dx}{2c}-\frac{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{c^2}\right)$$

$$\downarrow 5134$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\int\frac{\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c^2}-\frac{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{c^2}\right)$$

$$\downarrow 3042$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\int\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c^2}-\frac{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{c^2}\right)$$

$$\downarrow 3787$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\cos\left(\frac{a}{b}\right)\int\frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int-\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c^2}-\frac{\sqrt{1-c^2x^2}}{}\right.$$

$$\downarrow 25$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))+\cos\left(\frac{a}{b}\right)\int\frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c^2}-\frac{\sqrt{1-c^2x^2}\sqrt{}}{}\right.$$

$$\downarrow 3042$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))+\cos\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c^2}-\frac{\sqrt{1-c^2x}}{}\right.$$

$$\downarrow 3785$$

$$x(a+b\arcsin(cx))^{3/2} - \frac{3}{2}bc\left(\frac{\sin\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx)) + 2\cos\left(\frac{a}{b}\right)\int \cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{2c^2} - \frac{\sqrt{1-c}}{}\right.$$

$$\downarrow 3786$$

$$x(a+b\arcsin(cx))^{3/2} - \frac{3}{2}bc\left(\frac{2\sin\left(\frac{a}{b}\right)\int \sin\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)} + 2\cos\left(\frac{a}{b}\right)\int \cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{2c^2} - \frac{\sqrt{}}{}\right.$$

$$\downarrow 3832$$

$$x(a+b\arcsin(cx))^{3/2} - \frac{3}{2}bc\left(\frac{2\cos\left(\frac{a}{b}\right)\int \cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)} + \sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2c^2} - \frac{\sqrt{1-}}{}\right.$$

$$\downarrow 3833$$

$$x(a+b\arcsin(cx))^{3/2} - \frac{3}{2}bc\left(\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right) + \sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2c^2} - \frac{\sqrt{1-c^2x}}{}\right.$$

input

```
Int[(a + b*ArcSin[c*x])^(3/2),x]
```

output

```
x*(a + b*ArcSin[c*x])^(3/2) - (3*b*c*(-((Sqrt[1 - c^2*x^2]*Sqrt[a + b*ArcS
in[c*x]])/c^2) + (Sqrt[b]*Sqrt[2*Pi]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a
+ b*ArcSin[c*x]])/Sqrt[b]] + Sqrt[b]*Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[
a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(2*c^2)))/2
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3787
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Cos
[(d*e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/Sqrt[c + d*x], x], x] + Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5134

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[1/(b*c)   Su
bst[Int[x^n*Cos[-a/b + x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b,
c, n}, x]
```

rule 5182

```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 277 vs. 2(123) = 246.

Time = 0.00 (sec) , antiderivative size = 278, normalized size of antiderivative = 1.75

method	result
default	$-\frac{3\sqrt{-\frac{1}{b}}\sqrt{\pi}\sqrt{2}\sqrt{a+b\arcsin(cx)}\cos\left(\frac{a}{b}\right)\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}\,b}\right)b^2-3\sqrt{-\frac{1}{b}}\sqrt{\pi}\sqrt{2}\sqrt{a+b\arcsin(cx)}\sin\left(\frac{a}{b}\right)\mathrm{FresnelS}\left(\sqrt{}\right.$

input

```
int((a+b*arcsin(c*x))^(3/2),x,method=_RETURNVERBOSE)
```

output

```
-1/4/c*(3*(-1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*cos(a/b)*F
resnelC(2^(1/2)/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)*2^(1/2)*(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)*b^2+4*arcsin(c*x)^2*si
n(-(a+b*arcsin(c*x))/b+a/b)*b^2+8*arcsin(c*x)*sin(-(a+b*arcsin(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)/(a+b*arcsin(c*x))^(1/
2)
```

Fricas [F(-2)]

Exception generated.

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \int (a + b \operatorname{asin}(cx))^{\frac{3}{2}}\, dx$$

input
```
integrate((a+b*asin(c*x))**(3/2),x)
```

output
```
Integral((a + b*asin(c*x))**(3/2), x)
```

Maxima [F]

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \int (b \arcsin(cx) + a)^{\frac{3}{2}}\, dx$$

input
```
integrate((a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
integrate((b*arcsin(c*x) + a)^(3/2), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.99 (sec) , antiderivative size = 1157, normalized size of antiderivative = 7.28

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \text{Too large to display}$$

input
```
integrate((a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output
```
sqrt(2)*sqrt(pi)*a^2*b^2*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)/((I
*b^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c) + 1/2*I*sqrt(2)*sqrt(pi)*a*b^3*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^3/sqrt(abs(b)) + b^2*sqr
t(abs(b)))*c) + 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^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c) - 1/2*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) - 1/2*sqrt(2)*sqrt(pi)*a^2*b*erf(-1/2*I*sq
rt(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(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) + 3/8*sqrt(2)*sqrt(pi)*b^3*e
rf(-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*sqrt(2)*sqrt(pi)*a^2*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...
```

Mupad [F(-1)]

Timed out.

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \int (a + b\, \text{asin}(c\, x))^{3/2}\, dx$$

input
```
int((a + b*asin(c*x))^(3/2),x)
```

output
```
int((a + b*asin(c*x))^(3/2), x)
```

Reduce [F]

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \left(\int \sqrt{asin\,(cx)\, b + a} dx \right) a + \left(\int \sqrt{asin\,(cx)\, b + a}\, asin(cx)\, dx \right) b$$

input
```
int((a+b*asin(c*x))^(3/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a),x)*a + int(sqrt(asin(c*x)*b + a)*asin(c*x),x)*b
```

3.88 $\int \frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}\,dx$

Optimal result . . . 740
Mathematica [N/A] . . . 740
Rubi [N/A] . . . 741
Maple [N/A] . . . 741
Fricas [F(-2)] . . . 742
Sympy [N/A] . . . 742
Maxima [N/A] . . . 742
Giac [N/A] . . . 743
Mupad [N/A] . . . 743
Reduce [N/A] . . . 744

Optimal result

Integrand size = 26, antiderivative size = 26

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}\,dx = \text{Int}\left(\frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}, x\right)$$

output
```
Defer(Int)((a+b*arcsin(c*x))^(3/2)/(-c^2*d*x^2+d),x)
```

Mathematica [N/A]

Not integrable

Time = 7.36 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}\,dx = \int \frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}\,dx$$

input
```
Integrate[(a + b*ArcSin[c*x])^(3/2)/(d - c^2*d*x^2),x]
```

output
```
Integrate[(a + b*ArcSin[c*x])^(3/2)/(d - c^2*d*x^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a + b \arcsin(cx))^{3/2}}{d - c^2 dx^2} \, dx$$

$$\downarrow 5174$$

$$\int \frac{(a + b \arcsin(cx))^{3/2}}{d - c^2 dx^2} dx$$

input
```
Int[(a + b*ArcSin[c*x])^(3/2)/(d - c^2*d*x^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{(a + b \arcsin(cx))^{\frac{3}{2}}}{-c^2 d x^2 + d} dx$$

input
```
int((a+b*arcsin(c*x))^(3/2)/(-c^2*d*x^2+d),x)
```

output
```
int((a+b*arcsin(c*x))^(3/2)/(-c^2*d*x^2+d),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^(3/2)/(-c^2*d*x^2+d),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 5.71 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.08

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}\,dx = -\frac{\int \frac{a\sqrt{a+b\operatorname{asin}(cx)}}{c^2x^2-1}\,dx + \int \frac{b\sqrt{a+b\operatorname{asin}(cx)}\operatorname{asin}(cx)}{c^2x^2-1}\,dx}{d}$$

input
```
integrate((a+b*asin(c*x))**(3/2)/(-c**2*d*x**2+d),x)
```

output
```
-(Integral(a*sqrt(a + b*asin(c*x))/(c**2*x**2 - 1), x) + Integral(b*sqrt(a
 + b*asin(c*x))*asin(c*x)/(c**2*x**2 - 1), x))/d
```

Maxima [N/A]

Not integrable

Time = 0.56 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}\,dx = \int -\frac{(b\arcsin(cx)+a)^{\frac{3}{2}}}{c^2dx^2-d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(3/2)/(-c^2*d*x^2+d),x, algorithm="maxima")
```

output
```
-integrate((b*arcsin(c*x) + a)^(3/2)/(c^2*d*x^2 - d), x)
```

Giac [N/A]

Not integrable

Time = 1.35 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}\,dx = \int -\frac{(b\arcsin(cx)+a)^{\frac{3}{2}}}{c^2dx^2-d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(3/2)/(-c^2*d*x^2+d),x, algorithm="giac")
```

output
```
integrate(-(b*arcsin(c*x) + a)^(3/2)/(c^2*d*x^2 - d), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}\,dx = \int \frac{(a+b\,\mathrm{asin}(c\,x))^{3/2}}{d-c^2\,d\,x^2}\,dx$$

input
```
int((a + b*asin(c*x))^(3/2)/(d - c^2*d*x^2),x)
```

output
```
int((a + b*asin(c*x))^(3/2)/(d - c^2*d*x^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.35

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d-c^2dx^2}\,dx = \frac{-\left(\int \frac{\sqrt{asin(cx)b+a}}{c^2x^2-1}dx\right)a - \left(\int \frac{\sqrt{asin(cx)b+a}\,asin(cx)}{c^2x^2-1}dx\right)b}{d}$$

input
```
int((a+b*asin(c*x))^(3/2)/(-c^2*d*x^2+d),x)
```

output
```
( - (int(sqrt(asin(c*x)*b + a)/(c**2*x**2 - 1),x)*a + int((sqrt(asin(c*x)*
b + a)*asin(c*x))/(c**2*x**2 - 1),x)*b))/d
```

3.89 $\int \frac{(a+b\arcsin(cx))^{3/2}}{\left(d-c^2dx^2\right)^2}\,dx$

Optimal result . . . 745
Mathematica [N/A] . . . 745
Rubi [N/A] . . . 746
Maple [N/A] . . . 747
Fricas [F(-2)] . . . 747
Sympy [N/A] . . . 748
Maxima [N/A] . . . 748
Giac [N/A] . . . 749
Mupad [N/A] . . . 749
Reduce [N/A] . . . 749

Optimal result

Integrand size = 26, antiderivative size = 26

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d-c^2dx^2)^2}\,dx = \text{Int}\left(\frac{(a+b\arcsin(cx))^{3/2}}{(d-c^2dx^2)^2},x\right)$$

output
```
Defer(Int)((a+b*arcsin(c*x))^(3/2)/(-c^2*d*x^2+d)^2,x)
```

Mathematica [N/A]

Not integrable

Time = 64.28 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d-c^2dx^2)^2}\,dx = \int \frac{(a+b\arcsin(cx))^{3/2}}{(d-c^2dx^2)^2}\,dx$$

input
```
Integrate[(a + b*ArcSin[c*x])^(3/2)/(d - c^2*d*x^2)^2,x]
```

output
```
Integrate[(a + b*ArcSin[c*x])^(3/2)/(d - c^2*d*x^2)^2, x]
```

Rubi [N/A]

Not integrable

Time = 0.85 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d-c^2dx^2)^2}\,dx$$

$$\downarrow 5162$$

$$-\frac{3bc\int \frac{x\sqrt{a+b\arcsin(cx)}}{(1-c^2x^2)^{3/2}}dx}{4d^2}+\frac{\int \frac{(a+b\arcsin(cx))^{3/2}}{d(1-c^2x^2)}dx}{2d}+\frac{x(a+b\arcsin(cx))^{3/2}}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 27$$

$$-\frac{3bc\int \frac{x\sqrt{a+b\arcsin(cx)}}{(1-c^2x^2)^{3/2}}dx}{4d^2}+\frac{\int \frac{(a+b\arcsin(cx))^{3/2}}{1-c^2x^2}dx}{2d^2}+\frac{x(a+b\arcsin(cx))^{3/2}}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 5174$$

$$-\frac{3bc\int \frac{x\sqrt{a+b\arcsin(cx)}}{(1-c^2x^2)^{3/2}}dx}{4d^2}+\frac{\int \frac{(a+b\arcsin(cx))^{3/2}}{1-c^2x^2}dx}{2d^2}+\frac{x(a+b\arcsin(cx))^{3/2}}{2d^2\left(1-c^2x^2\right)}$$

$$\downarrow 5182$$

$$-\frac{3bc\left(\frac{\sqrt{a+b\arcsin(cx)}}{c^2\sqrt{1-c^2x^2}}-\frac{b\int \frac{1}{\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)}}dx}{2c}\right)}{4d^2}+\frac{\int \frac{(a+b\arcsin(cx))^{3/2}}{1-c^2x^2}dx}{2d^2}+\frac{x(a+b\arcsin(cx))^{3/2}}{2d^2\left(1-c^2x^2\right)}+$$

$$\downarrow 5174$$

$$-\frac{3bc\left(\frac{\sqrt{a+b\arcsin(cx)}}{c^2\sqrt{1-c^2x^2}}-\frac{b\int \frac{1}{\left(1-c^2x^2\right)\sqrt{a+b\arcsin(cx)}}dx}{2c}\right)}{4d^2}+\frac{\int \frac{(a+b\arcsin(cx))^{3/2}}{1-c^2x^2}dx}{2d^2}+\frac{x(a+b\arcsin(cx))^{3/2}}{2d^2\left(1-c^2x^2\right)}+$$

input
```
Int[(a + b*ArcSin[c*x])^(3/2)/(d - c^2*d*x^2)^2,x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{(a+b\arcsin(cx))^{\frac{3}{2}}}{(-c^2dx^2+d)^2}dx$$

input
```
int((a+b*arcsin(c*x))^(3/2)/(-c^2*d*x^2+d)^2,x)
```

output
```
int((a+b*arcsin(c*x))^(3/2)/(-c^2*d*x^2+d)^2,x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d-c^2dx^2)^2}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^(3/2)/(-c^2*d*x^2+d)^2,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 10.59 (sec) , antiderivative size = 71, normalized size of antiderivative = 2.73

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{\left(d-c^2dx^2\right)^2}\,dx = \frac{\int \frac{a\sqrt{a+b\operatorname{asin}(cx)}}{c^4x^4-2c^2x^2+1}\,dx + \int \frac{b\sqrt{a+b\operatorname{asin}(cx)}\operatorname{asin}(cx)}{c^4x^4-2c^2x^2+1}\,dx}{d^2}$$

input
```
integrate((a+b*asin(c*x))**(3/2)/(-c**2*d*x**2+d)**2,x)
```

output
```
(Integral(a*sqrt(a + b*asin(c*x))/(c**4*x**4 - 2*c**2*x**2 + 1), x) + Inte
gral(b*sqrt(a + b*asin(c*x))*asin(c*x)/(c**4*x**4 - 2*c**2*x**2 + 1), x))/
d**2
```

Maxima [N/A]

Not integrable

Time = 0.61 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{\left(d-c^2dx^2\right)^2}\,dx = \int \frac{\left(b\arcsin(cx)+a\right)^{\frac{3}{2}}}{\left(c^2dx^2-d\right)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(3/2)/(-c^2*d*x^2+d)^2,x, algorithm="maxima")
```

output
```
integrate((b*arcsin(c*x) + a)^(3/2)/(c^2*d*x^2 - d)^2, x)
```

Giac [N/A]

Not integrable

Time = 6.73 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d-c^2dx^2)^2}\,dx = \int \frac{(b\arcsin(cx)+a)^{\frac{3}{2}}}{(c^2dx^2-d)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(3/2)/(-c^2*d*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*arcsin(c*x) + a)^(3/2)/(c^2*d*x^2 - d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d-c^2dx^2)^2}\,dx = \int \frac{(a+b\,\mathrm{asin}(c\,x))^{3/2}}{(d-c^2\,d\,x^2)^2}\,dx$$

input
```
int((a + b*asin(c*x))^(3/2)/(d - c^2*d*x^2)^2,x)
```

output
```
int((a + b*asin(c*x))^(3/2)/(d - c^2*d*x^2)^2, x)
```

Reduce [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 75, normalized size of antiderivative = 2.88

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d-c^2dx^2)^2}\,dx = \frac{\left(\int \frac{\sqrt{asin(cx)b+a}}{c^4x^4-2c^2x^2+1}dx\right)a + \left(\int \frac{\sqrt{asin(cx)b+a}\,asin(cx)}{c^4x^4-2c^2x^2+1}dx\right)b}{d^2}$$

input
```
int((a+b*asin(c*x))^(3/2)/(-c^2*d*x^2+d)^2,x)
```

output
```
(int(sqrt(asin(c*x)*b + a)/(c**4*x**4 - 2*c**2*x**2 + 1),x)*a + int((sqrt(
asin(c*x)*b + a)*asin(c*x))/(c**4*x**4 - 2*c**2*x**2 + 1),x)*b)/d**2
```

3.90 $\int \frac{(d-c^2dx^2)^3}{\sqrt{a+b\arcsin(cx)}}\,dx$

Optimal result 752
Mathematica [C] (verified) 753
Rubi [A] (verified) 754
Maple [A] (verified) 756
Fricas [F(-2)] 756
Sympy [F] 757
Maxima [F] 757
Giac [C] (verification not implemented) 758
Mupad [F(-1)] 759
Reduce [F] 759

Optimal result

Integrand size = 26, antiderivative size = 471

$$\int \frac{(d-c^2dx^2)^3}{\sqrt{a+b\arcsin(cx)}}\,dx = \frac{35d^3\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{32\sqrt{b}c} + \frac{7d^3\sqrt{\frac{3\pi}{2}}\cos\left(\frac{3a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{32\sqrt{b}c} + \frac{7d^3\sqrt{\frac{\pi}{10}}\cos\left(\frac{5a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{32\sqrt{b}c} + \frac{d^3\sqrt{\frac{\pi}{14}}\cos\left(\frac{7a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{14}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{32\sqrt{b}c} + \frac{35d^3\sqrt{\frac{\pi}{2}}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{32\sqrt{b}c} + \frac{7d^3\sqrt{\frac{3\pi}{2}}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{3a}{b}\right)}{32\sqrt{b}c} + \frac{7d^3\sqrt{\frac{\pi}{10}}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{5a}{b}\right)}{32\sqrt{b}c} + \frac{d^3\sqrt{\frac{\pi}{14}}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{14}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{7a}{b}\right)}{32\sqrt{b}c}$$

output

```
35/64*d^3*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(
c*x))^(1/2)/b^(1/2))/b^(1/2)/c+7/64*d^3*6^(1/2)*Pi^(1/2)*cos(3*a/b)*Fresne
lC(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(1/2)/c+7/320*d^3*1
0^(1/2)*Pi^(1/2)*cos(5*a/b)*FresnelC(10^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(
1/2)/b^(1/2))/b^(1/2)/c+1/448*d^3*14^(1/2)*Pi^(1/2)*cos(7*a/b)*FresnelC(14
^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(1/2)/c+35/64*d^3*2^(1/
2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin
(a/b)/b^(1/2)/c+7/64*d^3*6^(1/2)*Pi^(1/2)*FresnelS(6^(1/2)/Pi^(1/2)*(a+b*a
rcsin(c*x))^(1/2)/b^(1/2))*sin(3*a/b)/b^(1/2)/c+7/320*d^3*10^(1/2)*Pi^(1/2
)*FresnelS(10^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(5*a/b)/b
^(1/2)/c+1/448*d^3*14^(1/2)*Pi^(1/2)*FresnelS(14^(1/2)/Pi^(1/2)*(a+b*arcsi
n(c*x))^(1/2)/b^(1/2))*sin(7*a/b)/b^(1/2)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 1.49 (sec) , antiderivative size = 455, normalized size of antiderivative = 0.97

$$\int \frac{(d-c^2dx^2)^3}{\sqrt{a+b\arcsin(cx)}}\,dx$$

$$= \frac{id^3e^{-\frac{7ia}{b}}\left(-1225e^{\frac{6ia}{b}}\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+1225e^{\frac{8ia}{b}}\sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},\frac{i(a+b\arcsin(cx)}{b}\right.\right.}{}$$

input

```
Integrate[(d - c^2*d*x^2)^3/Sqrt[a + b*ArcSin[c*x]],x]
```

output

```
((I/4480)*d^3*(-1225*E^(((6*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Ga
mma[1/2, ((-I)*(a + b*ArcSin[c*x]))/b] + 1225*E^(((8*I)*a)/b)*Sqrt[(I*(a +
 b*ArcSin[c*x]))/b]*Gamma[1/2, (I*(a + b*ArcSin[c*x]))/b] - 245*Sqrt[3]*E^
(((4*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-3*I)*(a + b
*ArcSin[c*x]))/b] + 245*Sqrt[3]*E^(((10*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x
]))/b]*Gamma[1/2, ((3*I)*(a + b*ArcSin[c*x]))/b] - 49*Sqrt[5]*E^(((2*I)*a)
/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-5*I)*(a + b*ArcSin[c*
x]))/b] + 49*Sqrt[5]*E^(((12*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamm
a[1/2, ((5*I)*(a + b*ArcSin[c*x]))/b] - 5*Sqrt[7]*Sqrt[((-I)*(a + b*ArcSin
[c*x]))/b]*Gamma[1/2, ((-7*I)*(a + b*ArcSin[c*x]))/b] + 5*Sqrt[7]*E^(((14*
I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((7*I)*(a + b*ArcSin[c
*x]))/b]))/(c*E^(((7*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Rubi [A] (verified)

Time = 0.91 (sec) , antiderivative size = 433, normalized size of antiderivative = 0.92, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d - c^2 d x^2\right)^3}{\sqrt{a + b \arcsin(cx)}}\, dx$$

$$\downarrow 5168$$

$$\frac{d^3 \int \frac{\cos^7\left(\frac{a}{b} - \frac{a + b \arcsin(cx)}{b}\right)}{\sqrt{a + b \arcsin(cx)}} d(a + b \arcsin(cx))}{bc}$$

$$\downarrow 3042$$

$$\frac{d^3 \int \frac{\sin\left(\frac{a}{b} - \frac{a + b \arcsin(cx)}{b} + \frac{\pi}{2}\right)^7}{\sqrt{a + b \arcsin(cx)}} d(a + b \arcsin(cx))}{bc}$$

$$\downarrow 3793$$

$$\frac{d^3 \int \left(\frac{\cos\left(\frac{7a}{b} - \frac{7(a + b \arcsin(cx))}{b}\right)}{64\sqrt{a + b \arcsin(cx)}} + \frac{7 \cos\left(\frac{5a}{b} - \frac{5(a + b \arcsin(cx))}{b}\right)}{64\sqrt{a + b \arcsin(cx)}} + \frac{21 \cos\left(\frac{3a}{b} - \frac{3(a + b \arcsin(cx))}{b}\right)}{64\sqrt{a + b \arcsin(cx)}} + \frac{35 \cos\left(\frac{a}{b} - \frac{a + b \arcsin(cx)}{b}\right)}{64\sqrt{a + b \arcsin(cx)}} \right) d(a + b$$

$$bc$$

$$\downarrow 2009$$

$$d^3\left(\frac{35}{32}\sqrt{\frac{\pi}{2}}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\frac{7}{32}\sqrt{\frac{3\pi}{2}}\sqrt{b}\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\frac{7}{32}\sqrt{\frac{1}{2}}$$

input
```
Int[(d - c^2*d*x^2)^3/Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
(d^3*((35*Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcS
in[c*x]])/Sqrt[b]])/32 + (7*Sqrt[b]*Sqrt[(3*Pi)/2]*Cos[(3*a)/b]*FresnelC[(
Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/32 + (7*Sqrt[b]*Sqrt[Pi/10]*
Cos[(5*a)/b]*FresnelC[(Sqrt[10/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/32 +
 (Sqrt[b]*Sqrt[Pi/14]*Cos[(7*a)/b]*FresnelC[(Sqrt[14/Pi]*Sqrt[a + b*ArcSin
[c*x]])/Sqrt[b]])/32 + (35*Sqrt[b]*Sqrt[Pi/2]*FresnelS[(Sqrt[2/Pi]*Sqrt[a
+ b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/32 + (7*Sqrt[b]*Sqrt[(3*Pi)/2]*Fresne
lS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/32 + (7*Sqr
t[b]*Sqrt[Pi/10]*FresnelS[(Sqrt[10/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*S
in[(5*a)/b])/32 + (Sqrt[b]*Sqrt[Pi/14]*FresnelS[(Sqrt[14/Pi]*Sqrt[a + b*Ar
cSin[c*x]])/Sqrt[b]]*Sin[(7*a)/b])/32))/(b*c)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168

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

Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 413, normalized size of antiderivative = 0.88

method	result
default	$\frac{d^3\sqrt{\pi}\sqrt{2}\sqrt{-\frac{1}{b}}\left(1225\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}\,b}\right)-1225\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}\,b}\right)-245\cos\left(\frac{3a}{b}\right)\text{FresnelC}$

input

```
int((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output

```
1/2240/c*d^3*Pi^(1/2)*2^(1/2)*(-1/b)^(1/2)*(1225*cos(a/b)*FresnelC(2^(1/2)
/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)-1225*sin(a/b)*FresnelS(2
^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)-245*cos(3*a/b)*Fre
snelC(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(-1/b)^(1
/2)*(-3/b)^(1/2)*b+245*sin(3*a/b)*FresnelS(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)
*(a+b*arcsin(c*x))^(1/2)/b)*(-1/b)^(1/2)*(-3/b)^(1/2)*b-49*cos(5*a/b)*Fres
nelC(5*2^(1/2)/Pi^(1/2)/(-5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(-1/b)^(1/
2)*(-5/b)^(1/2)*b+49*sin(5*a/b)*FresnelS(5*2^(1/2)/Pi^(1/2)/(-5/b)^(1/2)*(
a+b*arcsin(c*x))^(1/2)/b)*(-1/b)^(1/2)*(-5/b)^(1/2)*b-5*cos(7*a/b)*Fresnel
C(7*2^(1/2)/Pi^(1/2)/(-7/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(-1/b)^(1/2)*
(-7/b)^(1/2)*b+5*sin(7*a/b)*FresnelS(7*2^(1/2)/Pi^(1/2)/(-7/b)^(1/2)*(a+b*
arcsin(c*x))^(1/2)/b)*(-1/b)^(1/2)*(-7/b)^(1/2)*b)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(d-c^2dx^2)^3}{\sqrt{a+b\arcsin(cx)}}\,dx = \text{Exception raised: TypeError}$$

input

```
integrate((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{\left(d-c^2dx^2\right)^3}{\sqrt{a+b\arcsin(cx)}}\,dx = -d^3\left(\int \frac{3c^2x^2}{\sqrt{a+b\operatorname{asin}(cx)}}\,dx + \int\left(-\frac{3c^4x^4}{\sqrt{a+b\operatorname{asin}(cx)}}\right)dx + \int \frac{c^6x^6}{\sqrt{a+b\operatorname{asin}(cx)}}\,dx + \int\left(-\frac{1}{\sqrt{a+b\operatorname{asin}(cx)}}\right)dx\right)$$

input
```
integrate((-c**2*d*x**2+d)**3/(a+b*asin(c*x))**(1/2),x)
```

output
```
-d**3*(Integral(3*c**2*x**2/sqrt(a + b*asin(c*x)), x) + Integral(-3*c**4*x
**4/sqrt(a + b*asin(c*x)), x) + Integral(c**6*x**6/sqrt(a + b*asin(c*x)),
x) + Integral(-1/sqrt(a + b*asin(c*x)), x))
```

Maxima [F]

$$\int \frac{\left(d-c^2dx^2\right)^3}{\sqrt{a+b\arcsin(cx)}}\,dx = \int -\frac{\left(c^2dx^2-d\right)^3}{\sqrt{b\arcsin(cx)+a}}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
-integrate((c^2*d*x^2 - d)^3/sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.72 (sec) , antiderivative size = 657, normalized size of antiderivative = 1.39

$$\int \frac{(d - c^2 dx^2)^3}{\sqrt{a + b \arcsin(cx)}}\, dx = \text{Too large to display}$$

input
```
integrate((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output
```
-1/64*sqrt(pi)*d^3*erf(-1/2*sqrt(14)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/2
*I*sqrt(14)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(7*I*a/b)/((sqrt(14)
*sqrt(b) + I*sqrt(14)*b^(3/2)/abs(b))*c) - 7/64*sqrt(pi)*d^3*erf(-1/2*sqrt
(10)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I*sqrt(10)*sqrt(b*arcsin(c*x) +
 a)*sqrt(b)/abs(b))*e^(5*I*a/b)/((sqrt(10)*sqrt(b) + I*sqrt(10)*b^(3/2)/ab
s(b))*c) - 21/64*sqrt(pi)*d^3*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqr
t(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) - 35/64*sqrt(pi)*d^3*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)/(c*(I*sqrt(2)*b/sqrt(abs(b)) + sq
rt(2)*sqrt(abs(b)))) - 35/64*sqrt(pi)*d^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)/(c*(-I*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b)))) - 21/
64*sqrt(pi)*d^3*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)*sqrt
(b) - I*sqrt(6)*b^(3/2)/abs(b))*c) - 7/64*sqrt(pi)*d^3*erf(-1/2*sqrt(10)*s
qrt(b*arcsin(c*x) + a)/sqrt(b) + 1/2*I*sqrt(10)*sqrt(b*arcsin(c*x) + a)*sq
rt(b)/abs(b))*e^(-5*I*a/b)/((sqrt(10)*sqrt(b) - I*sqrt(10)*b^(3/2)/abs(b))
*c) - 1/64*sqrt(pi)*d^3*erf(-1/2*sqrt(14)*sqrt(b*arcsin(c*x) + a)/sqrt(b)
+ 1/2*I*sqrt(14)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(-7*I*a/b)/(...
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d-c^2dx^2)^3}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{(d-c^2\,d\,x^2)^3}{\sqrt{a+b\,\mathrm{asin}\,(c\,x)}}\,dx$$

input
```
int((d - c^2*d*x^2)^3/(a + b*asin(c*x))^(1/2),x)
```

output
```
int((d - c^2*d*x^2)^3/(a + b*asin(c*x))^(1/2), x)
```

Reduce [F]

$$\int \frac{(d-c^2dx^2)^3}{\sqrt{a+b\arcsin(cx)}}\,dx = d^3\left(\int \frac{\sqrt{asin\,(cx)\,b+a}}{asin\,(cx)\,b+a}dx - \left(\int \frac{\sqrt{asin\,(cx)\,b+a}\,x^6}{asin\,(cx)\,b+a}dx\right)c^6 + 3\left(\int \frac{\sqrt{asin\,(cx)\,b+a}\,x^4}{asin\,(cx)\,b+a}dx\right)c^4 - 3\left(\int \frac{\sqrt{asin\,(cx)\,b+a}\,x^2}{asin\,(cx)\,b+a}dx\right)c^2\right)$$

input
```
int((-c^2*d*x^2+d)^3/(a+b*asin(c*x))^(1/2),x)
```

output
```
d**3*(int(sqrt(asin(c*x)*b + a)/(asin(c*x)*b + a),x) - int((sqrt(asin(c*x)
*b + a)*x**6)/(asin(c*x)*b + a),x)*c**6 + 3*int((sqrt(asin(c*x)*b + a)*x**
4)/(asin(c*x)*b + a),x)*c**4 - 3*int((sqrt(asin(c*x)*b + a)*x**2)/(asin(c*
x)*b + a),x)*c**2)
```

3.91 $\int \frac{\left(d-c^2dx^2\right)^2}{\sqrt{a+b\arcsin(cx)}}\,dx$

Optimal result . . . 760
Mathematica [C] (verified) . . . 761
Rubi [A] (verified) . . . 762
Maple [A] (verified) . . . 763
Fricas [F(-2)] . . . 764
Sympy [F] . . . 764
Maxima [F] . . . 765
Giac [C] (verification not implemented) . . . 765
Mupad [F(-1)] . . . 766
Reduce [F] . . . 766

Optimal result

Integrand size = 26, antiderivative size = 353

$$\int \frac{\left(d-c^2dx^2\right)^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \frac{5d^2\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{4\sqrt{b}c} + \frac{5d^2\sqrt{\frac{\pi}{6}}\cos\left(\frac{3a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{8\sqrt{b}c} + \frac{d^2\sqrt{\frac{\pi}{10}}\cos\left(\frac{5a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{8\sqrt{b}c} + \frac{5d^2\sqrt{\frac{\pi}{2}}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{4\sqrt{b}c} + \frac{5d^2\sqrt{\frac{\pi}{6}}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{3a}{b}\right)}{8\sqrt{b}c} + \frac{d^2\sqrt{\frac{\pi}{10}}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{5a}{b}\right)}{8\sqrt{b}c}$$

output
```
5/8*d^2*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*
x))^(1/2)/b^(1/2))/b^(1/2)/c+5/48*d^2*6^(1/2)*Pi^(1/2)*cos(3*a/b)*FresnelC
(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(1/2)/c+1/80*d^2*10^(
1/2)*Pi^(1/2)*cos(5*a/b)*FresnelC(10^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2
)/b^(1/2))/b^(1/2)/c+5/8*d^2*2^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*(a
+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/b^(1/2)/c+5/48*d^2*6^(1/2)*Pi^(1/2
)*FresnelS(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(3*a/b)/b^
(1/2)/c+1/80*d^2*10^(1/2)*Pi^(1/2)*FresnelS(10^(1/2)/Pi^(1/2)*(a+b*arcsin(
c*x))^(1/2)/b^(1/2))*sin(5*a/b)/b^(1/2)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.60 (sec) , antiderivative size = 345, normalized size of antiderivative = 0.98

$$\int \frac{(d-c^2dx^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx$$
$$= \frac{id^2e^{-\frac{5ia}{b}}\left(-150e^{\frac{4ia}{b}}\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+150e^{\frac{6ia}{b}}\sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},\frac{i(a+b\arcsin(cx))}{b}\right)\right.}{}$$

input
```
Integrate[(d - c^2*d*x^2)^2/Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
((I/480)*d^2*(-150*E^(((4*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamm
a[1/2, ((-I)*(a + b*ArcSin[c*x]))/b] + 150*E^(((6*I)*a)/b)*Sqrt[(I*(a + b*
ArcSin[c*x]))/b]*Gamma[1/2, (I*(a + b*ArcSin[c*x]))/b] - 25*Sqrt[3]*E^(((2
*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-3*I)*(a + b*Arc
Sin[c*x]))/b] + 25*Sqrt[3]*E^(((8*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]
*Gamma[1/2, ((3*I)*(a + b*ArcSin[c*x]))/b] - 3*Sqrt[5]*Sqrt[((-I)*(a + b*A
rcSin[c*x]))/b]*Gamma[1/2, ((-5*I)*(a + b*ArcSin[c*x]))/b] + 3*Sqrt[5]*E^(
((10*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((5*I)*(a + b*Arc
Sin[c*x]))/b]))/(c*E^(((5*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Rubi [A] (verified)

Time = 0.74 (sec) , antiderivative size = 327, normalized size of antiderivative = 0.93, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.154$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d - c^2 dx^2\right)^2}{\sqrt{a + b \arcsin(cx)}}\, dx$$

$$\downarrow 5168$$

$$\frac{d^2 \int \frac{\cos^5\left(\frac{a}{b} - \frac{a + b \arcsin(cx)}{b}\right)}{\sqrt{a + b \arcsin(cx)}} d(a + b \arcsin(cx))}{bc}$$

$$\downarrow 3042$$

$$\frac{d^2 \int \frac{\sin\left(\frac{a}{b} - \frac{a + b \arcsin(cx)}{b} + \frac{\pi}{2}\right)^5}{\sqrt{a + b \arcsin(cx)}} d(a + b \arcsin(cx))}{bc}$$

$$\downarrow 3793$$

$$\frac{d^2 \int \left(\frac{\cos\left(\frac{5a}{b} - \frac{5(a + b \arcsin(cx))}{b}\right)}{16\sqrt{a + b \arcsin(cx)}} + \frac{5 \cos\left(\frac{3a}{b} - \frac{3(a + b \arcsin(cx))}{b}\right)}{16\sqrt{a + b \arcsin(cx)}} + \frac{5 \cos\left(\frac{a}{b} - \frac{a + b \arcsin(cx)}{b}\right)}{8\sqrt{a + b \arcsin(cx)}}\right) d(a + b \arcsin(cx))}{bc}$$

$$\downarrow 2009$$

$$d^2 \left(\frac{5}{4}\sqrt{\frac{\pi}{2}}\sqrt{b} \cos\left(\frac{a}{b}\right) \text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a + b \arcsin(cx)}}{\sqrt{b}}\right) + \frac{5}{8}\sqrt{\frac{\pi}{6}}\sqrt{b} \cos\left(\frac{3a}{b}\right) \text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a + b \arcsin(cx)}}{\sqrt{b}}\right) + \frac{1}{8}\sqrt{\frac{\pi}{10}}\sqrt{}$$

input

```
Int[(d - c^2*d*x^2)^2/Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
(d^2*((5*Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSi
n[c*x]])/Sqrt[b]])/4 + (5*Sqrt[b]*Sqrt[Pi/6]*Cos[(3*a)/b]*FresnelC[(Sqrt[6
/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/8 + (Sqrt[b]*Sqrt[Pi/10]*Cos[(5*a)
/b]*FresnelC[(Sqrt[10/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/8 + (5*Sqrt[b
]*Sqrt[Pi/2]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/
b])/4 + (5*Sqrt[b]*Sqrt[Pi/6]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]]
)/Sqrt[b]]*Sin[(3*a)/b])/8 + (Sqrt[b]*Sqrt[Pi/10]*FresnelS[(Sqrt[10/Pi]*Sq
rt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(5*a)/b])/8))/(b*c)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 307, normalized size of antiderivative = 0.87

method	result
default	$\frac{d^2\sqrt{\pi}\sqrt{2}\sqrt{-\frac{1}{b}}\left(150\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}\,b}\right)-150\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}\,b}\right)-25\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{3\sqrt{}}{}\right.$

input
```
int((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output
```
1/240/c*d^2*Pi^(1/2)*2^(1/2)*(-1/b)^(1/2)*(150*cos(a/b)*FresnelC(2^(1/2)/P
i^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)-150*sin(a/b)*FresnelS(2^(1
/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)-25*cos(3*a/b)*Fresnel
C(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(-1/b)^(1/2)*
(-3/b)^(1/2)*b+25*sin(3*a/b)*FresnelS(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b
*arcsin(c*x))^(1/2)/b)*(-1/b)^(1/2)*(-3/b)^(1/2)*b-3*cos(5*a/b)*FresnelC(5
*2^(1/2)/Pi^(1/2)/(-5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(-1/b)^(1/2)*(-5
/b)^(1/2)*b+3*sin(5*a/b)*FresnelS(5*2^(1/2)/Pi^(1/2)/(-5/b)^(1/2)*(a+b*arc
sin(c*x))^(1/2)/b)*(-1/b)^(1/2)*(-5/b)^(1/2)*b)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\left(d - c^2 d x^2\right)^2}{\sqrt{a + b \arcsin(cx)}}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{\left(d - c^2 d x^2\right)^2}{\sqrt{a + b \arcsin(cx)}}\, dx = d^2 \left(\int \left(-\frac{2c^2 x^2}{\sqrt{a + b \operatorname{asin}(cx)}} \right) dx + \int \frac{c^4 x^4}{\sqrt{a + b \operatorname{asin}(cx)}}\, dx + \int \frac{1}{\sqrt{a + b \operatorname{asin}(cx)}}\, dx \right)$$

input
```
integrate((-c**2*d*x**2+d)**2/(a+b*asin(c*x))**(1/2),x)
```

output
```
d**2*(Integral(-2*c**2*x**2/sqrt(a + b*asin(c*x)), x) + Integral(c**4*x**4
/sqrt(a + b*asin(c*x)), x) + Integral(1/sqrt(a + b*asin(c*x)), x))
```

Maxima [F]

$$\int \frac{(d-c^2dx^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{(c^2dx^2-d)^2}{\sqrt{b\arcsin(cx)+a}}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
integrate((c^2*d*x^2 - d)^2/sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.56 (sec) , antiderivative size = 493, normalized size of antiderivative = 1.40

$$\int \frac{(d-c^2dx^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \text{Too large to display}$$

input
```
integrate((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output

```
-1/16*sqrt(pi)*d^2*erf(-1/2*sqrt(10)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/2
*I*sqrt(10)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(5*I*a/b)/((sqrt(10)
*sqrt(b) + I*sqrt(10)*b^(3/2)/abs(b))*c) - 5/16*sqrt(pi)*d^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)*sqrt(b) + I*sqrt(6)*b^(3/2)/abs(b)
)*c) - 5/8*sqrt(pi)*d^2*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*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b)))) - 5/8*sqrt(pi)*d^2*erf(1
/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arc
sin(c*x) + a)*sqrt(abs(b))/b)*e^(-I*a/b)/(c*(-I*sqrt(2)*b/sqrt(abs(b)) + s
qrt(2)*sqrt(abs(b)))) - 5/16*sqrt(pi)*d^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)*sqrt(b) - I*sqrt(6)*b^(3/2)/abs(b))*c) - 1/16*sqrt(p
i)*d^2*erf(-1/2*sqrt(10)*sqrt(b*arcsin(c*x) + a)/sqrt(b) + 1/2*I*sqrt(10)*
sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(-5*I*a/b)/((sqrt(10)*sqrt(b) -
I*sqrt(10)*b^(3/2)/abs(b))*c)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d-c^2dx^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{(d-c^2\,d\,x^2)^2}{\sqrt{a+b\,\mathrm{asin}\,(c\,x)}}\,dx$$

input

```
int((d - c^2*d*x^2)^2/(a + b*asin(c*x))^(1/2),x)
```

output

```
int((d - c^2*d*x^2)^2/(a + b*asin(c*x))^(1/2), x)
```

Reduce [F]

$$\int \frac{(d-c^2dx^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx = d^2\left(\int \frac{\sqrt{asin\,(cx)\,b+a}}{asin\,(cx)\,b+a}dx + \left(\int \frac{\sqrt{asin\,(cx)\,b+a}\,x^4}{asin\,(cx)\,b+a}dx\right)c^4 - 2\left(\int \frac{\sqrt{asin\,(cx)\,b+a}\,x^2}{asin\,(cx)\,b+a}dx\right)c^2\right)$$

input
```
int((-c^2*d*x^2+d)^2/(a+b*asin(c*x))^(1/2),x)
```

output
```
d**2*(int(sqrt(asin(c*x)*b + a)/(asin(c*x)*b + a),x) + int((sqrt(asin(c*x)
*b + a)*x**4)/(asin(c*x)*b + a),x)*c**4 - 2*int((sqrt(asin(c*x)*b + a)*x**
2)/(asin(c*x)*b + a),x)*c**2)
```

3.92 $\int \frac{d-c^2dx^2}{\sqrt{a+b\arcsin(cx)}}\,dx$

Optimal result . . . 768
Mathematica [C] (verified) . . . 769
Rubi [A] (verified) . . . 769
Maple [A] (verified) . . . 771
Fricas [F(-2)] . . . 771
Sympy [F] . . . 772
Maxima [F] . . . 772
Giac [C] (verification not implemented) . . . 773
Mupad [F(-1)] . . . 774
Reduce [F] . . . 774

Optimal result

Integrand size = 24, antiderivative size = 227

$$\int \frac{d-c^2dx^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \frac{3d\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c} + \frac{d\sqrt{\frac{\pi}{6}}\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c} + \frac{3d\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{2\sqrt{b}c} + \frac{d\sqrt{\frac{\pi}{6}}\,\text{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{3a}{b}\right)}{2\sqrt{b}c}$$

output

```
3/4*d*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x)
)^(1/2)/b^(1/2))/b^(1/2)/c+1/12*d*6^(1/2)*Pi^(1/2)*cos(3*a/b)*FresnelC(6^(
1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(1/2)/c+3/4*d*2^(1/2)*Pi^
(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/
b^(1/2)/c+1/12*d*6^(1/2)*Pi^(1/2)*FresnelS(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*
x))^(1/2)/b^(1/2))*sin(3*a/b)/b^(1/2)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.31 (sec) , antiderivative size = 229, normalized size of antiderivative = 1.01

$$\int \frac{d - c^2 dx^2}{\sqrt{a + b \arcsin(cx)}}\, dx$$

$$= \frac{ide^{-\frac{3ia}{b}}\left(-9e^{\frac{2ia}{b}}\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2}, -\frac{i(a+b\arcsin(cx))}{b}\right) + 9e^{\frac{4ia}{b}}\sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2}, \frac{i(a+b\arcsin(cx))}{b}\right) + \sqrt{3}\right.}{24c\sqrt{a + b\arcsin}}$$

input

```
Integrate[(d - c^2*d*x^2)/Sqrt[a + b*ArcSin[c*x]],x]
```

output

```
((I/24)*d*(-9*E^(((2*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2
, ((-I)*(a + b*ArcSin[c*x]))/b] + 9*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*E^(((3*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Rubi [A] (verified)

Time = 0.61 (sec) , antiderivative size = 219, normalized size of antiderivative = 0.96, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{d - c^2 dx^2}{\sqrt{a + b \arcsin(cx)}}\, dx$$

$$\downarrow 5168$$

$$\frac{d \int \frac{\cos^3\left(\frac{a}{b} - \frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}} d(a + b\arcsin(cx))}{bc}$$

$$\downarrow 3042$$

$$\frac{d\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)^3}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 3793$$

$$\frac{d\int \left(\frac{\cos\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{4\sqrt{a+b\arcsin(cx)}}+\frac{3\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{4\sqrt{a+b\arcsin(cx)}}\right)d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 2009$$

$$\frac{d\left(\frac{3}{2}\sqrt{\frac{\pi}{2}}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\frac{1}{2}\sqrt{\frac{\pi}{6}}\sqrt{b}\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\frac{3}{2}\sqrt{\frac{\pi}{2}}\sqrt{b}s\right.}{bc}$$

input
```
Int[(d - c^2*d*x^2)/Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
(d*((3*Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[
c*x]])/Sqrt[b]])/2 + (Sqrt[b]*Sqrt[Pi/6]*Cos[(3*a)/b]*FresnelC[(Sqrt[6/Pi]
*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/2 + (3*Sqrt[b]*Sqrt[Pi/2]*FresnelS[(Sq
rt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/2 + (Sqrt[b]*Sqrt[Pi/
6]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/2)
)/(b*c)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168

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

Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 198, normalized size of antiderivative = 0.87

method	result
default	$-\frac{d\sqrt{\pi}\,\sqrt{2}\,\sqrt{-\frac{3}{b}}\left(3\cos\left(\frac{a}{b}\right)\mathrm{FresnelC}\left(\frac{\sqrt{2}\,\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\,\sqrt{-\frac{1}{b}}\,b}\right)\sqrt{-\frac{1}{b}}\,\sqrt{-\frac{3}{b}}\,b-3\sin\left(\frac{a}{b}\right)\mathrm{FresnelS}\left(\frac{\sqrt{2}\,\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\,\sqrt{-\frac{1}{b}}\,b}\right)\sqrt{-\frac{1}{b}}\,\sqrt{-\frac{3}{b}}\,b-}{12c}$

input

```
int((-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output

```
-1/12/c*d*Pi^(1/2)*2^(1/2)*(-3/b)^(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)*(-1/b)^(1/2)*(-3/b)^(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)
*(-1/b)^(1/2)*(-3/b)^(1/2)*b-cos(3*a/b)*FresnelC(3*2^(1/2)/Pi^(1/2)/(-3/b)
^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)+sin(3*a/b)*FresnelS(3*2^(1/2)/Pi^(1/2)/(
-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b))
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{d - c^2 dx^2}{\sqrt{a + b\arcsin(cx)}}\,dx = \text{Exception raised: TypeError}$$

input

```
integrate((-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{d - c^2 dx^2}{\sqrt{a + b \arcsin(cx)}}\, dx = -d\left(\int \frac{c^2 x^2}{\sqrt{a + b \operatorname{asin}(cx)}}\, dx + \int \left(-\frac{1}{\sqrt{a + b \operatorname{asin}(cx)}}\right) dx\right)$$

input
```
integrate((-c**2*d*x**2+d)/(a+b*asin(c*x))**(1/2),x)
```

output
```
-d*(Integral(c**2*x**2/sqrt(a + b*asin(c*x)), x) + Integral(-1/sqrt(a + b*
asin(c*x)), x))
```

Maxima [F]

$$\int \frac{d - c^2 dx^2}{\sqrt{a + b \arcsin(cx)}}\, dx = \int -\frac{c^2 dx^2 - d}{\sqrt{b \arcsin(cx) + a}}\, dx$$

input
```
integrate((-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
-integrate((c^2*d*x^2 - d)/sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.43 (sec) , antiderivative size = 321, normalized size of antiderivative = 1.41

$$\int \frac{d-c^2dx^2}{\sqrt{a+b\arcsin(cx)}}\,dx = -\frac{\sqrt{\pi}d\,\mathrm{erf}\left(-\frac{\sqrt{6}\sqrt{b\arcsin(cx)+a}}{2\sqrt{b}}-\frac{i\sqrt{6}\sqrt{b\arcsin(cx)+a}\sqrt{b}}{2|b|}\right)e^{\left(\frac{3ia}{b}\right)}}{4\left(\sqrt{6}\sqrt{b}+\frac{i\sqrt{6}b^{\frac{3}{2}}}{|b|}\right)c}$$
$$-\frac{3\sqrt{\pi}d\,\mathrm{erf}\left(-\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}}-\frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(\frac{ia}{b}\right)}}{4c\left(\frac{i\sqrt{2}b}{\sqrt{|b|}}+\sqrt{2}\sqrt{|b|}\right)}$$
$$-\frac{3\sqrt{\pi}d\,\mathrm{erf}\left(\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}}-\frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(-\frac{ia}{b}\right)}}{4c\left(-\frac{i\sqrt{2}b}{\sqrt{|b|}}+\sqrt{2}\sqrt{|b|}\right)}$$
$$-\frac{\sqrt{\pi}d\,\mathrm{erf}\left(-\frac{\sqrt{6}\sqrt{b\arcsin(cx)+a}}{2\sqrt{b}}+\frac{i\sqrt{6}\sqrt{b\arcsin(cx)+a}\sqrt{b}}{2|b|}\right)e^{\left(-\frac{3ia}{b}\right)}}{4\left(\sqrt{6}\sqrt{b}-\frac{i\sqrt{6}b^{\frac{3}{2}}}{|b|}\right)c}$$

input
```
integrate((-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output
```
-1/4*sqrt(pi)*d*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)*sqrt(
b) + I*sqrt(6)*b^(3/2)/abs(b))*c) - 3/4*sqrt(pi)*d*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)*sqr
t(abs(b))/b)*e^(I*a/b)/(c*(I*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b))
)) - 3/4*sqrt(pi)*d*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*s
qrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b)))) - 1/4*sqrt(pi)*d*erf(-1/2*s
qrt(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)/ab
s(b))*c)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{d-c^2dx^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{d-c^2\,d\,x^2}{\sqrt{a+b\,\text{asin}\,(c\,x)}}\,dx$$

input
```
int((d - c^2*d*x^2)/(a + b*asin(c*x))^(1/2),x)
```

output
```
int((d - c^2*d*x^2)/(a + b*asin(c*x))^(1/2), x)
```

Reduce [F]

$$\int \frac{d-c^2dx^2}{\sqrt{a+b\arcsin(cx)}}\,dx = d\left(\int \frac{\sqrt{asin\,(cx)\,b+a}}{asin\,(cx)\,b+a}dx - \left(\int \frac{\sqrt{asin\,(cx)\,b+a}\,x^2}{asin\,(cx)\,b+a}dx\right)c^2\right)$$

input
```
int((-c^2*d*x^2+d)/(a+b*asin(c*x))^(1/2),x)
```

output
```
d*(int(sqrt(asin(c*x)*b + a)/(asin(c*x)*b + a),x) - int((sqrt(asin(c*x)*b
+ a)*x**2)/(asin(c*x)*b + a),x)*c**2)
```

3.93 $\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx$

Optimal result . . . 775
Mathematica [C] (verified) . . . 775
Rubi [A] (verified) . . . 776
Maple [A] (verified) . . . 779
Fricas [F(-2)] . . . 779
Sympy [F] . . . 780
Maxima [F] . . . 780
Giac [C] (verification not implemented) . . . 780
Mupad [F(-1)] . . . 781
Reduce [F] . . . 781

Optimal result

Integrand size = 12, antiderivative size = 101

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \frac{\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c} + \frac{\sqrt{2\pi}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{\sqrt{b}c}$$

output

```
2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2
)/b^(1/2))/b^(1/2)/c+2^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsi
n(c*x))^(1/2)/b^(1/2))*sin(a/b)/b^(1/2)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.02 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.20

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \frac{ie^{-\frac{ia}{b}}\left(-\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+e^{\frac{2ia}{b}}\sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},\frac{i(a+b\arcsin(cx))}{b}\right)\right)}{2c\sqrt{a+b\arcsin(cx)}}$$

input
```
Integrate[1/Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
((I/2)*(-(Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-I)*(a + b*ArcSi
n[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]])
```

Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 102, normalized size of antiderivative = 1.01, number of steps used = 10, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.750$, Rules used = {5134, 3042, 3787, 25, 3042, 3785, 3786, 3832, 3833}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx$$
$$\downarrow 5134$$
$$\frac{\int \frac{\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}\,d(a+b\arcsin(cx))}{bc}$$
$$\downarrow 3042$$
$$\frac{\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}\,d(a+b\arcsin(cx))}{bc}$$
$$\downarrow 3787$$

$$\frac{\cos\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx)) - \sin\left(\frac{a}{b}\right)\int -\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 25$$

$$\frac{\sin\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx)) + \cos\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 3042$$

$$\frac{\sin\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx)) + \cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 3785$$

$$\frac{\sin\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx)) + 2\cos\left(\frac{a}{b}\right)\int \cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{bc}$$

$$\downarrow 3786$$

$$\frac{2\sin\left(\frac{a}{b}\right)\int \sin\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)} + 2\cos\left(\frac{a}{b}\right)\int \cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{bc}$$

$$\downarrow 3832$$

$$\frac{2\cos\left(\frac{a}{b}\right)\int \cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)} + \sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{bc}$$

$$\downarrow 3833$$

$$\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right) + \sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{bc}$$

input
```
Int[1/Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
(Sqrt[b]*Sqrt[2*Pi]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])
/Sqrt[b]] + Sqrt[b]*Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]
])/Sqrt[b]]*Sin[a/b])/(b*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3787
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Cos
[(d*e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/Sqrt[c + d*x], x], x] + Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 5134

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[1/(b*c)  Subst[Int[x^n*Cos[-a/b + x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, n}, x]
```

Maple [A] (verified)

Time = 0.00 (sec) , antiderivative size = 90, normalized size of antiderivative = 0.89

method	result	size
default	$\frac{\sqrt{2}\sqrt{\pi}\sqrt{-\frac{1}{b}}\left(\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}b}\right)-\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}b}\right)\right)}{c}$	90

input

```
int(1/(a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output

```
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
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \text{Exception raised: TypeError}$$

input

```
integrate(1/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   integrate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\sqrt{a+b\operatorname{asin}(cx)}}\,dx$$

input
```
integrate(1/(a+b*asin(c*x))**(1/2),x)
```

output
```
Integral(1/sqrt(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\sqrt{b\arcsin(cx)+a}}\,dx$$

input
```
integrate(1/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
integrate(1/sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.20 (sec) , antiderivative size = 159, normalized size of antiderivative = 1.57

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = -\frac{\sqrt{\pi}\operatorname{erf}\left(-\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}} - \frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(\frac{ia}{b}\right)}}{c\left(\frac{i\sqrt{2}b}{\sqrt{|b|}}+\sqrt{2}\sqrt{|b|}\right)} - \frac{\sqrt{\pi}\operatorname{erf}\left(\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}} - \frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(-\frac{ia}{b}\right)}}{c\left(-\frac{i\sqrt{2}b}{\sqrt{|b|}}+\sqrt{2}\sqrt{|b|}\right)}$$

input
```
integrate(1/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output
```
-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*(I*sqrt(2)*b/sq
rt(abs(b)) + sqrt(2)*sqrt(abs(b)))) - sqrt(pi)*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)/(c*(-I*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b))))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\sqrt{a+b\,\mathrm{asin}\,(c\,x)}}\,dx$$

input
```
int(1/(a + b*asin(c*x))^(1/2),x)
```

output
```
int(1/(a + b*asin(c*x))^(1/2), x)
```

Reduce [F]

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{\sqrt{asin\,(cx)\,b+a}}{asin\,(cx)\,b+a}dx$$

input
```
int(1/(a+b*asin(c*x))^(1/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a)/(asin(c*x)*b + a),x)
```

3.94 $\int \frac{1}{(d-c^2dx^2)\sqrt{a+b\arcsin(cx)}}\,dx$

Optimal result . . . 782
Mathematica [N/A] . . . 782
Rubi [N/A] . . . 783
Maple [N/A] . . . 783
Fricas [F(-2)] . . . 784
Sympy [N/A] . . . 784
Maxima [N/A] . . . 784
Giac [N/A] . . . 785
Mupad [N/A] . . . 785
Reduce [N/A] . . . 786

Optimal result

Integrand size = 26, antiderivative size = 26

$$\int \frac{1}{(d-c^2dx^2)\sqrt{a+b\arcsin(cx)}}\,dx = \text{Int}\left(\frac{1}{(d-c^2dx^2)\sqrt{a+b\arcsin(cx)}},x\right)$$

output
```
Defer(Int)(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(1/2),x)
```

Mathematica [N/A]

Not integrable

Time = 0.52 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{1}{(d-c^2dx^2)\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{(d-c^2dx^2)\sqrt{a+b\arcsin(cx)}}\,dx$$

input
```
Integrate[1/((d - c^2*d*x^2)*Sqrt[a + b*ArcSin[c*x]]),x]
```

output
```
Integrate[1/((d - c^2*d*x^2)*Sqrt[a + b*ArcSin[c*x]]), x]
```

Rubi [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d - c^2 d x^2)\sqrt{a + b\arcsin(cx)}}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d - c^2 d x^2)\sqrt{a + b\arcsin(cx)}}dx$$

input
```
Int[1/((d - c^2*d*x^2)*Sqrt[a + b*ArcSin[c*x]]),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{1}{(-c^2 d\, x^2 + d)\sqrt{a + b\arcsin(cx)}}dx$$

input
```
int(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(1/2),x)
```

output
```
int(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{(d-c^2dx^2)\sqrt{a+b\arcsin(cx)}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 1.83 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.38

$$\int \frac{1}{(d-c^2dx^2)\sqrt{a+b\arcsin(cx)}}\,dx = -\frac{\int \frac{1}{c^2x^2\sqrt{a+b\operatorname{asin}(cx)}-\sqrt{a+b\operatorname{asin}(cx)}}\,dx}{d}$$

input
```
integrate(1/(-c**2*d*x**2+d)/(a+b*asin(c*x))**(1/2),x)
```

output
```
-Integral(1/(c**2*x**2*sqrt(a + b*asin(c*x)) - sqrt(a + b*asin(c*x))), x)/
d
```

Maxima [N/A]

Not integrable

Time = 0.42 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{1}{(d-c^2dx^2)\sqrt{a+b\arcsin(cx)}}\,dx = \int -\frac{1}{(c^2dx^2-d)\sqrt{b\arcsin(cx)+a}}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
-integrate(1/((c^2*d*x^2 - d)*sqrt(b*arcsin(c*x) + a)), x)
```

Giac [N/A]

Not integrable

Time = 1.58 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{1}{(d - c^2 dx^2)\sqrt{a + b\arcsin(cx)}}\,dx = \int -\frac{1}{(c^2 dx^2 - d)\sqrt{b\arcsin(cx) + a}}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output
```
integrate(-1/((c^2*d*x^2 - d)*sqrt(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d - c^2 dx^2)\sqrt{a + b\arcsin(cx)}}\,dx = \int \frac{1}{\sqrt{a + b\,\mathrm{asin}(c\,x)}\,(d - c^2\,d\,x^2)}\,dx$$

input
```
int(1/((a + b*asin(c*x))^(1/2)*(d - c^2*d*x^2)),x)
```

output
```
int(1/((a + b*asin(c*x))^(1/2)*(d - c^2*d*x^2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.92

$$\int \frac{1}{(d-c^2dx^2)\sqrt{a+b\arcsin(cx)}}\,dx = -\frac{\int \frac{\sqrt{asin(cx)b+a}}{asin(cx)b\,c^2x^2-asin(cx)b+a\,c^2x^2-a}dx}{d}$$

input
```
int(1/(-c^2*d*x^2+d)/(a+b*asin(c*x))^(1/2),x)
```

output
```
( - int(sqrt(asin(c*x)*b + a)/(asin(c*x)*b*c**2*x**2 - asin(c*x)*b + a*c**
2*x**2 - a),x))/d
```

3.95 $\int \frac{1}{(d-c^2dx^2)^2\sqrt{a+b\arcsin(cx)}}\,dx$

Optimal result . . . 787
Mathematica [N/A] . . . 787
Rubi [N/A] . . . 788
Maple [N/A] . . . 788
Fricas [F(-2)] . . . 789
Sympy [N/A] . . . 789
Maxima [N/A] . . . 790
Giac [N/A] . . . 790
Mupad [N/A] . . . 790
Reduce [N/A] . . . 791

Optimal result

Integrand size = 26, antiderivative size = 26

$$\int \frac{1}{(d-c^2dx^2)^2\sqrt{a+b\arcsin(cx)}}\,dx = \text{Int}\left(\frac{1}{(d-c^2dx^2)^2\sqrt{a+b\arcsin(cx)}},x\right)$$

output
```
Defer(Int)(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x)
```

Mathematica [N/A]

Not integrable

Time = 0.73 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{1}{(d-c^2dx^2)^2\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{(d-c^2dx^2)^2\sqrt{a+b\arcsin(cx)}}\,dx$$

input
```
Integrate[1/((d - c^2*d*x^2)^2*Sqrt[a + b*ArcSin[c*x]]),x]
```

output
```
Integrate[1/((d - c^2*d*x^2)^2*Sqrt[a + b*ArcSin[c*x]]), x]
```

Rubi [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\left(d - c^2 dx^2\right)^2 \sqrt{a + b \arcsin(cx)}}\, dx$$
$$\downarrow 5174$$
$$\int \frac{1}{\left(d - c^2 dx^2\right)^2 \sqrt{a + b \arcsin(cx)}} dx$$

input
```
Int[1/((d - c^2*d*x^2)^2*Sqrt[a + b*ArcSin[c*x]]),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{1}{\left(-c^2 d\, x^2 + d\right)^2 \sqrt{a + b \arcsin\left(cx\right)}} dx$$

input
```
int(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x)
```

output
```
int(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\sqrt{a+b\arcsin(cx)}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas"
)
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 3.77 (sec) , antiderivative size = 56, normalized size of antiderivative = 2.15

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\sqrt{a+b\arcsin(cx)}}\,dx = \frac{\int \frac{1}{c^4x^4\sqrt{a+b\operatorname{asin}(cx)}-2c^2x^2\sqrt{a+b\operatorname{asin}(cx)}+\sqrt{a+b\operatorname{asin}(cx)}}\,dx}{d^2}$$

input
```
integrate(1/(-c**2*d*x**2+d)**2/(a+b*asin(c*x))**(1/2),x)
```

output
```
Integral(1/(c**4*x**4*sqrt(a + b*asin(c*x)) - 2*c**2*x**2*sqrt(a + b*asin(
c*x)) + sqrt(a + b*asin(c*x))), x)/d**2
```

Maxima [N/A]

Not integrable

Time = 0.60 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\left(c^2dx^2-d\right)^2\sqrt{b\arcsin\left(cx\right)+a}}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima"
)
```

output
```
integrate(1/((c^2*d*x^2 - d)^2*sqrt(b*arcsin(c*x) + a)), x)
```

Giac [N/A]

Not integrable

Time = 14.57 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\left(c^2dx^2-d\right)^2\sqrt{b\arcsin\left(cx\right)+a}}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output
```
integrate(1/((c^2*d*x^2 - d)^2*sqrt(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\sqrt{a+b\,\mathrm{asin}\left(c\,x\right)}\,\left(d-c^2\,d\,x^2\right)^2}\,dx$$

input
```
int(1/((a + b*asin(c*x))^(1/2)*(d - c^2*d*x^2)^2),x)
```

output
```
int(1/((a + b*asin(c*x))^(1/2)*(d - c^2*d*x^2)^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 68, normalized size of antiderivative = 2.62

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\sqrt{a+b\arcsin(cx)}}\,dx = \frac{\int \frac{\sqrt{asin(cx)b+a}}{asin(cx)b\,c^4x^4-2asin(cx)b\,c^2x^2+asin(cx)b+a\,c^4x^4-2a\,c^2x^2+a}dx}{d^2}$$

input
```
int(1/(-c^2*d*x^2+d)^2/(a+b*asin(c*x))^(1/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a)/(asin(c*x)*b*c**4*x**4 - 2*asin(c*x)*b*c**2*x**2
 + asin(c*x)*b + a*c**4*x**4 - 2*a*c**2*x**2 + a),x)/d**2
```

3.96 $\int \frac{\left(d-c^2dx^2\right)^3}{(a+b\arcsin(cx))^{3/2}}\,dx$

Optimal result 793
Mathematica [C] (verified) 794
Rubi [A] (verified) 795
Maple [A] (verified) 798
Fricas [F(-2)] 799
Sympy [F] 799
Maxima [F] 800
Giac [F] 800
Mupad [F(-1)] 800
Reduce [F] 801

Optimal result

Integrand size = 26, antiderivative size = 508

$$\int \frac{\left(d-c^2dx^2\right)^3}{(a+b\arcsin(cx))^{3/2}}\,dx = -\frac{2d^3(1-c^2x^2)^{7/2}}{bc\sqrt{a+b\arcsin(cx)}}$$
$$-\frac{35d^3\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{16b^{3/2}c}$$
$$-\frac{21d^3\sqrt{\frac{3\pi}{2}}\cos\left(\frac{3a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{16b^{3/2}c}$$
$$-\frac{7d^3\sqrt{\frac{5\pi}{2}}\cos\left(\frac{5a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{16b^{3/2}c}$$
$$-\frac{d^3\sqrt{\frac{7\pi}{2}}\cos\left(\frac{7a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{14}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{16b^{3/2}c}$$
$$+\frac{35d^3\sqrt{\frac{\pi}{2}}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{16b^{3/2}c}$$
$$+\frac{21d^3\sqrt{\frac{3\pi}{2}}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{3a}{b}\right)}{16b^{3/2}c}$$
$$+\frac{7d^3\sqrt{\frac{5\pi}{2}}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{5a}{b}\right)}{16b^{3/2}c}$$
$$+\frac{d^3\sqrt{\frac{7\pi}{2}}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{14}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{7a}{b}\right)}{16b^{3/2}c}$$

output

```
-2*d^3*(-c^2*x^2+1)^(7/2)/b/c/(a+b*arcsin(c*x))^(1/2)-35/32*d^3*2^(1/2)*Pi
^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))
/b^(3/2)/c-21/32*d^3*6^(1/2)*Pi^(1/2)*cos(3*a/b)*FresnelS(6^(1/2)/Pi^(1/2)
*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(3/2)/c-7/32*d^3*10^(1/2)*Pi^(1/2)*cos
(5*a/b)*FresnelS(10^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(3/2
)/c-1/32*d^3*14^(1/2)*Pi^(1/2)*cos(7*a/b)*FresnelS(14^(1/2)/Pi^(1/2)*(a+b*
arcsin(c*x))^(1/2)/b^(1/2))/b^(3/2)/c+35/32*d^3*2^(1/2)*Pi^(1/2)*FresnelC(
2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/b^(3/2)/c+21/32
*d^3*6^(1/2)*Pi^(1/2)*FresnelC(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^
(1/2))*sin(3*a/b)/b^(3/2)/c+7/32*d^3*10^(1/2)*Pi^(1/2)*FresnelC(10^(1/2)/P
i^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(5*a/b)/b^(3/2)/c+1/32*d^3*14^
(1/2)*Pi^(1/2)*FresnelC(14^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))
*sin(7*a/b)/b^(3/2)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 2.68 (sec) , antiderivative size = 692, normalized size of antiderivative = 1.36

$$\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^{3/2}}\,dx = \frac{d^3e^{-\frac{7i(a+b\arcsin(cx))}{b}}\left(-e^{\frac{7ia}{b}} - 7e^{\frac{7ia}{b}+2i\arcsin(cx)} - 21e^{\frac{7ia}{b}+4i\arcsin(cx)} - 35e^{\frac{7ia}{b}+6i\arc}\right.}{}$$

input

```
Integrate[(d - c^2*d*x^2)^3/(a + b*ArcSin[c*x])^(3/2),x]
```

output

```
(d^3*(-E^(((7*I)*a)/b) - 7*E^(((7*I)*a)/b + (2*I)*ArcSin[c*x]) - 21*E^(((7
*I)*a)/b + (4*I)*ArcSin[c*x]) - 35*E^(((7*I)*a)/b + (6*I)*ArcSin[c*x]) - 3
5*E^(((7*I)*a)/b + (8*I)*ArcSin[c*x]) - 21*E^(((7*I)*a)/b + (10*I)*ArcSin[
c*x]) - 7*E^(((7*I)*a)/b + (12*I)*ArcSin[c*x]) - E^(((7*I)*(a + 2*b*ArcSin
[c*x]))/b) + 35*E^(((6*I)*a)/b + (7*I)*ArcSin[c*x])*Sqrt[((-I)*(a + b*ArcS
in[c*x]))/b]*Gamma[1/2, ((-I)*(a + b*ArcSin[c*x]))/b] + 35*E^(((8*I)*a)/b
 + (7*I)*ArcSin[c*x])*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, (I*(a + b*
ArcSin[c*x]))/b] + 21*Sqrt[3]*E^(((4*I)*a)/b + (7*I)*ArcSin[c*x])*Sqrt[((-
I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-3*I)*(a + b*ArcSin[c*x]))/b] + 21
*Sqrt[3]*E^(((10*I)*a)/b + (7*I)*ArcSin[c*x])*Sqrt[(I*(a + b*ArcSin[c*x]))
/b]*Gamma[1/2, ((3*I)*(a + b*ArcSin[c*x]))/b] + 7*Sqrt[5]*E^(((2*I)*a)/b +
 (7*I)*ArcSin[c*x])*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-5*I)*
(a + b*ArcSin[c*x]))/b] + 7*Sqrt[5]*E^(((12*I)*a)/b + (7*I)*ArcSin[c*x])*S
qrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((5*I)*(a + b*ArcSin[c*x]))/b] +
 Sqrt[7]*E^((7*I)*ArcSin[c*x])*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/
2, ((-7*I)*(a + b*ArcSin[c*x]))/b] + Sqrt[7]*E^(((7*I)*(2*a + b*ArcSin[c*x
]))/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((7*I)*(a + b*ArcSin[c*x
]))/b]))/(64*b*c*E^(((7*I)*(a + b*ArcSin[c*x]))/b)*Sqrt[a + b*ArcSin[c*x]]
)
```

Rubi [A] (verified)

Time = 1.05 (sec) , antiderivative size = 472, normalized size of antiderivative = 0.93, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$, Rules used = {5166, 5224, 25, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d - c^2 d x^2\right)^3}{(a + b \arcsin(cx))^{3/2}}\, dx$$

$$\downarrow 5166$$

$$-\frac{14cd^3 \int \frac{x\left(1-c^2x^2\right)^{5/2}}{\sqrt{a+b\arcsin(cx)}}dx}{b} - \frac{2d^3\left(1 - c^2x^2\right)^{7/2}}{bc\sqrt{a + b\arcsin(cx)}}$$

$$\downarrow 5224$$

$$-\frac{14d^3\int -\frac{\cos^6\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{b^2c}-\frac{2d^3\left(1-c^2x^2\right)^{7/2}}{bc\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 25$$

$$\frac{14d^3\int \frac{\cos^6\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{b^2c}-\frac{2d^3\left(1-c^2x^2\right)^{7/2}}{bc\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 4906$$

$$\frac{14d^3\int\left(\frac{\sin\left(\frac{7a}{b}-\frac{7(a+b\arcsin(cx))}{b}\right)}{64\sqrt{a+b\arcsin(cx)}}+\frac{5\sin\left(\frac{5a}{b}-\frac{5(a+b\arcsin(cx))}{b}\right)}{64\sqrt{a+b\arcsin(cx)}}+\frac{9\sin\left(\frac{3a}{b}-\frac{3(a+b\arcsin(cx))}{b}\right)}{64\sqrt{a+b\arcsin(cx)}}+\frac{5\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{64\sqrt{a+b\arcsin(cx)}}\right)d(a+b}{b^2c}$$

$$\frac{2d^3\left(1-c^2x^2\right)^{7/2}}{bc\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 2009$$

$$-\frac{14d^3\left(-\frac{5}{32}\sqrt{\frac{\pi}{2}}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\frac{3}{32}\sqrt{\frac{3\pi}{2}}\sqrt{b}\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\right.}{\frac{2d^3\left(1-c^2x^2\right)^{7/2}}{bc\sqrt{a+b\arcsin(cx)}}}$$

input
```
Int[(d - c^2*d*x^2)^3/(a + b*ArcSin[c*x])^(3/2),x]
```

output
```
(-2*d^3*(1 - c^2*x^2)^(7/2))/(b*c*Sqrt[a + b*ArcSin[c*x]]) - (14*d^3*((5*S
qrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/S
qrt[b]])/32 + (3*Sqrt[b]*Sqrt[(3*Pi)/2]*Cos[(3*a)/b]*FresnelS[(Sqrt[6/Pi]*
Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/32 + (Sqrt[b]*Sqrt[(5*Pi)/2]*Cos[(5*a)/
b]*FresnelS[(Sqrt[10/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/32 + (Sqrt[b]*
Sqrt[Pi/14]*Cos[(7*a)/b]*FresnelS[(Sqrt[14/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sq
rt[b]])/32 - (5*Sqrt[b]*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[
c*x]])/Sqrt[b]]*Sin[a/b])/32 - (3*Sqrt[b]*Sqrt[(3*Pi)/2]*FresnelC[(Sqrt[6/
Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/32 - (Sqrt[b]*Sqrt[(5*
Pi)/2]*FresnelC[(Sqrt[10/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(5*a)/b
])/32 - (Sqrt[b]*Sqrt[Pi/14]*FresnelC[(Sqrt[14/Pi]*Sqrt[a + b*ArcSin[c*x]]
)/Sqrt[b]]*Sin[(7*a)/b])/32))/(b^2*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 596, normalized size of antiderivative = 1.17

method	result
default	$-\frac{d^3\left(-21\sqrt{\pi}\,\sqrt{2}\,\sqrt{a+b\arcsin(cx)}\,\cos\left(\frac{3a}{b}\right)\mathrm{FresnelS}\left(\frac{3\sqrt{2}\,\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\,\sqrt{-\frac{3}{b}}\,b}\right)\sqrt{-\frac{3}{b}}-21\sqrt{\pi}\,\sqrt{2}\,\sqrt{a+b\arcsin(cx)}\,\sin\left(\frac{3a}{b}\right)\mathrm{FresnelC}\right.$

input

```
int((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x))^(3/2),x,method=_RETURNVERBOSE)
```

output

```
-1/32/c*d^3/b/(a+b*arcsin(c*x))^(1/2)*(-21*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*
x))^(1/2)*cos(3*a/b)*FresnelS(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(
c*x))^(1/2)/b)*(-3/b)^(1/2)-21*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*si
n(3*a/b)*FresnelC(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/
b)*(-3/b)^(1/2)-35*(-1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*c
os(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)-
35*(-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)-7*cos(5*a/b)*Fre
snelS(5*2^(1/2)/Pi^(1/2)/(-5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(a+b*arcs
in(c*x))^(1/2)*Pi^(1/2)*2^(1/2)*(-5/b)^(1/2)-7*sin(5*a/b)*FresnelC(5*2^(1/
2)/Pi^(1/2)/(-5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(a+b*arcsin(c*x))^(1/2
)*Pi^(1/2)*2^(1/2)*(-5/b)^(1/2)-cos(7*a/b)*FresnelS(7*2^(1/2)/Pi^(1/2)/(-7
/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(a+b*arcsin(c*x))^(1/2)*Pi^(1/2)*2^(1
/2)*(-7/b)^(1/2)-sin(7*a/b)*FresnelC(7*2^(1/2)/Pi^(1/2)/(-7/b)^(1/2)*(a+b*
arcsin(c*x))^(1/2)/b)*(a+b*arcsin(c*x))^(1/2)*Pi^(1/2)*2^(1/2)*(-7/b)^(1/2
)+35*cos(-(a+b*arcsin(c*x))/b+a/b)+7*cos(-5*(a+b*arcsin(c*x))/b+5*a/b)+21*
cos(-3*(a+b*arcsin(c*x))/b+3*a/b)+cos(-7*(a+b*arcsin(c*x))/b+7*a/b))
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\begin{aligned}\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^{3/2}}\,dx = \\ -d^3\left(\int \frac{3c^2x^2}{a\sqrt{a+b\operatorname{asin}(cx)}+b\sqrt{a+b\operatorname{asin}(cx)}\operatorname{asin}(cx)}\,dx\right. \\ + \int \left(-\frac{3c^4x^4}{a\sqrt{a+b\operatorname{asin}(cx)}+b\sqrt{a+b\operatorname{asin}(cx)}\operatorname{asin}(cx)}\right)dx \\ + \int \frac{c^6x^6}{a\sqrt{a+b\operatorname{asin}(cx)}+b\sqrt{a+b\operatorname{asin}(cx)}\operatorname{asin}(cx)}\,dx \\ \left. + \int \left(-\frac{1}{a\sqrt{a+b\operatorname{asin}(cx)}+b\sqrt{a+b\operatorname{asin}(cx)}\operatorname{asin}(cx)}\right)dx\right)\end{aligned}$$

input
```
integrate((-c**2*d*x**2+d)**3/(a+b*asin(c*x))**(3/2),x)
```

output
```
-d**3*(Integral(3*c**2*x**2/(a*sqrt(a + b*asin(c*x)) + b*sqrt(a + b*asin(c
*x))*asin(c*x)), x) + Integral(-3*c**4*x**4/(a*sqrt(a + b*asin(c*x)) + b*s
qrt(a + b*asin(c*x))*asin(c*x)), x) + Integral(c**6*x**6/(a*sqrt(a + b*asi
n(c*x)) + b*sqrt(a + b*asin(c*x))*asin(c*x)), x) + Integral(-1/(a*sqrt(a +
 b*asin(c*x)) + b*sqrt(a + b*asin(c*x))*asin(c*x)), x))
```

Maxima [F]

$$\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^{3/2}}\,dx = \int -\frac{(c^2dx^2-d)^3}{(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
-integrate((c^2*d*x^2 - d)^3/(b*arcsin(c*x) + a)^(3/2), x)
```

Giac [F]

$$\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^{3/2}}\,dx = \int -\frac{(c^2dx^2-d)^3}{(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^3/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output
```
integrate(-(c^2*d*x^2 - d)^3/(b*arcsin(c*x) + a)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{(d-c^2\,d\,x^2)^3}{(a+b\,\mathrm{asin}\,(c\,x))^{3/2}}\,dx$$

input
```
int((d - c^2*d*x^2)^3/(a + b*asin(c*x))^(3/2),x)
```

output
```
int((d - c^2*d*x^2)^3/(a + b*asin(c*x))^(3/2), x)
```

Reduce [F]

$$\int \frac{(d-c^2dx^2)^3}{(a+b\arcsin(cx))^{3/2}}\,dx = \text{too large to display}$$

input
```
int((-c^2*d*x^2+d)^3/(a+b*asin(c*x))^(3/2),x)
```

output
```
(d**3*(28*sqrt(asin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*asin(c*x)*b + 28*as
in(c*x)*int(sqrt(asin(c*x)*b + a)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)
**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 -
a**2),x)*a*b**2*c - 8*asin(c*x)*int((sqrt(asin(c*x)*b + a)*x**8)/(asin(c*x
)**2*b**2*c**2*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*as
in(c*x)*a*b + a**2*c**2*x**2 - a**2),x)*a*b**2*c**9 + 32*asin(c*x)*int((sq
rt(asin(c*x)*b + a)*x**6)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2*b**2
 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a**2),x)
*a*b**2*c**7 - 52*asin(c*x)*int((sqrt(asin(c*x)*b + a)*x**4)/(asin(c*x)**2
*b**2*c**2*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c
*x)*a*b + a**2*c**2*x**2 - a**2),x)*a*b**2*c**5 + 24*asin(c*x)*int((sqrt(a
sin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*asin(c*x)*x**3)/(asin(c*x)**2*b**2*
c**2*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*
b + a**2*c**2*x**2 - a**2),x)*a*b**2*c**4 - 28*asin(c*x)*int((sqrt(asin(c*
x)*b + a)*sqrt( - c**2*x**2 + 1)*asin(c*x)**2*x)/(asin(c*x)**2*b**2*c**2*x
**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a*
*2*c**2*x**2 - a**2),x)*b**3*c**2 + 24*asin(c*x)*int((sqrt(asin(c*x)*b + a
)*sqrt( - c**2*x**2 + 1)*x**3)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2
*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a**
2),x)*a**2*b*c**4 + 28*asin(c*x)*int((sqrt(asin(c*x)*b + a)*sqrt( - c**...
```

3.97 $\int \frac{\left(d-c^2dx^2\right)^2}{(a+b\arcsin(cx))^{3/2}}\,dx$

Optimal result . . . 802
Mathematica [C] (verified) . . . 803
Rubi [A] (verified) . . . 804
Maple [A] (verified) . . . 806
Fricas [F(-2)] . . . 807
Sympy [F] . . . 807
Maxima [F] . . . 808
Giac [F] . . . 808
Mupad [F(-1)] . . . 808
Reduce [F] . . . 809

Optimal result

Integrand size = 26, antiderivative size = 390

$$\int \frac{\left(d-c^2dx^2\right)^2}{(a+b\arcsin(cx))^{3/2}}\,dx = -\frac{2d^2(1-c^2x^2)^{5/2}}{bc\sqrt{a+b\arcsin(cx)}}$$
$$-\frac{5d^2\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2b^{3/2}c}$$
$$-\frac{5d^2\sqrt{\frac{3\pi}{2}}\cos\left(\frac{3a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{4b^{3/2}c}$$
$$-\frac{d^2\sqrt{\frac{5\pi}{2}}\cos\left(\frac{5a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{4b^{3/2}c}$$
$$+\frac{5d^2\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{2b^{3/2}c}$$
$$+\frac{5d^2\sqrt{\frac{3\pi}{2}}\,\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{3a}{b}\right)}{4b^{3/2}c}$$
$$+\frac{d^2\sqrt{\frac{5\pi}{2}}\,\text{FresnelC}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{5a}{b}\right)}{4b^{3/2}c}$$

output

```
-2*d^2*(-c^2*x^2+1)^(5/2)/b/c/(a+b*arcsin(c*x))^(1/2)-5/4*d^2*2^(1/2)*Pi^(
1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b
^(3/2)/c-5/8*d^2*6^(1/2)*Pi^(1/2)*cos(3*a/b)*FresnelS(6^(1/2)/Pi^(1/2)*(a+
b*arcsin(c*x))^(1/2)/b^(1/2))/b^(3/2)/c-1/8*d^2*10^(1/2)*Pi^(1/2)*cos(5*a/
b)*FresnelS(10^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(3/2)/c+5
/4*d^2*2^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/
b^(1/2))*sin(a/b)/b^(3/2)/c+5/8*d^2*6^(1/2)*Pi^(1/2)*FresnelC(6^(1/2)/Pi^(
1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(3*a/b)/b^(3/2)/c+1/8*d^2*10^(1/2
)*Pi^(1/2)*FresnelC(10^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin
(5*a/b)/b^(3/2)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 1.39 (sec) , antiderivative size = 522, normalized size of antiderivative = 1.34

$$\int \frac{(d-c^2dx^2)^2}{(a+b\arcsin(cx))^{3/2}}\,dx = \frac{d^2e^{-\frac{5i(a+b\arcsin(cx))}{b}}\left(-e^{\frac{5ia}{b}} - 5e^{\frac{5ia}{b}+2i\arcsin(cx)} - 10e^{\frac{5ia}{b}+4i\arcsin(cx)} - 10e^{\frac{5ia}{b}+6i\arc}\right.}{}$$

input

```
Integrate[(d - c^2*d*x^2)^2/(a + b*ArcSin[c*x])^(3/2),x]
```

output

```
(d^2*(-E^(((5*I)*a)/b) - 5*E^(((5*I)*a)/b + (2*I)*ArcSin[c*x]) - 10*E^(((5
*I)*a)/b + (4*I)*ArcSin[c*x]) - 10*E^(((5*I)*a)/b + (6*I)*ArcSin[c*x]) - 5
*E^(((5*I)*a)/b + (8*I)*ArcSin[c*x]) - E^(((5*I)*(a + 2*b*ArcSin[c*x]))/b)
 + 10*E^(((4*I)*a)/b + (5*I)*ArcSin[c*x])*Sqrt[((-I)*(a + b*ArcSin[c*x]))/
b]*Gamma[1/2, ((-I)*(a + b*ArcSin[c*x]))/b] + 10*E^(((6*I)*a)/b + (5*I)*Ar
cSin[c*x])*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, (I*(a + b*ArcSin[c*x
]))/b] + 5*Sqrt[3]*E^(((2*I)*a)/b + (5*I)*ArcSin[c*x])*Sqrt[((-I)*(a + b*A
rcSin[c*x]))/b]*Gamma[1/2, ((-3*I)*(a + b*ArcSin[c*x]))/b] + 5*Sqrt[3]*E^(
((8*I)*a)/b + (5*I)*ArcSin[c*x])*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2
, ((3*I)*(a + b*ArcSin[c*x]))/b] + Sqrt[5]*E^((5*I)*ArcSin[c*x])*Sqrt[((-I
)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-5*I)*(a + b*ArcSin[c*x]))/b] + Sqr
t[5]*E^(((5*I)*(2*a + b*ArcSin[c*x]))/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*G
amma[1/2, ((5*I)*(a + b*ArcSin[c*x]))/b]))/(16*b*c*E^(((5*I)*(a + b*ArcSin
[c*x]))/b)*Sqrt[a + b*ArcSin[c*x]])
```

Rubi [A] (verified)

Time = 0.88 (sec) , antiderivative size = 366, normalized size of antiderivative = 0.94, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$, Rules used = {5166, 5224, 25, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d - c^2 d x^2\right)^2}{(a + b \arcsin(cx))^{3/2}}\, dx$$

$$\downarrow 5166$$

$$-\frac{10cd^2 \int \frac{x\left(1-c^2x^2\right)^{3/2}}{\sqrt{a+b\arcsin(cx)}}dx}{b} - \frac{2d^2\left(1 - c^2x^2\right)^{5/2}}{bc\sqrt{a + b\arcsin(cx)}}$$

$$\downarrow 5224$$

$$-\frac{10d^2 \int -\frac{\cos^4\left(\frac{a}{b} - \frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b} - \frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a + b\arcsin(cx))}{b^2 c} - \frac{2d^2\left(1 - c^2x^2\right)^{5/2}}{bc\sqrt{a + b\arcsin(cx)}}$$

$$\downarrow 25$$

$$\frac{10d^2 \int \frac{\cos^4\left(\frac{a}{b} - \frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b} - \frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a + b\arcsin(cx))}{b^2 c} - \frac{2d^2\left(1 - c^2x^2\right)^{5/2}}{bc\sqrt{a + b\arcsin(cx)}}$$

$$\downarrow 4906$$

$$\frac{10d^2 \int \left(\frac{\sin\left(\frac{5a}{b} - \frac{5(a+b\arcsin(cx))}{b}\right)}{16\sqrt{a+b\arcsin(cx)}} + \frac{3\sin\left(\frac{3a}{b} - \frac{3(a+b\arcsin(cx))}{b}\right)}{16\sqrt{a+b\arcsin(cx)}} + \frac{\sin\left(\frac{a}{b} - \frac{a+b\arcsin(cx)}{b}\right)}{8\sqrt{a+b\arcsin(cx)}}\right) d(a + b\arcsin(cx))}{b^2 c} - \frac{2d^2\left(1 - c^2x^2\right)^{5/2}}{bc\sqrt{a + b\arcsin(cx)}}$$

$$\downarrow 2009$$

$$-\frac{10d^2\left(-\frac{1}{4}\sqrt{\frac{\pi}{2}}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\frac{1}{8}\sqrt{\frac{3\pi}{2}}\sqrt{b}\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\frac{1}{8}\right.}{\frac{2d^2\left(1-c^2x^2\right)^{5/2}}{bc\sqrt{a+b\arcsin(cx)}}}$$

input
```
Int[(d - c^2*d*x^2)^2/(a + b*ArcSin[c*x])^(3/2),x]
```

output
```
(-2*d^2*(1 - c^2*x^2)^(5/2))/(b*c*Sqrt[a + b*ArcSin[c*x]]) - (10*d^2*((Sqr
t[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqr
t[b]])/4 + (Sqrt[b]*Sqrt[(3*Pi)/2]*Cos[(3*a)/b]*FresnelS[(Sqrt[6/Pi]*Sqrt[
a + b*ArcSin[c*x]])/Sqrt[b]])/8 + (Sqrt[b]*Sqrt[Pi/10]*Cos[(5*a)/b]*Fresne
lS[(Sqrt[10/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/8 - (Sqrt[b]*Sqrt[Pi/2]
*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/4 - (Sqr
t[b]*Sqrt[(3*Pi)/2]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]
*Sin[(3*a)/b])/8 - (Sqrt[b]*Sqrt[Pi/10]*FresnelC[(Sqrt[10/Pi]*Sqrt[a + b*A
rcSin[c*x]])/Sqrt[b]]*Sin[(5*a)/b])/8))/(b^2*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 451, normalized size of antiderivative = 1.16

method	result
default	$-\frac{d^2\left(-5\sqrt{\pi}\,\sqrt{2}\,\sqrt{a+b\arcsin(cx)}\,\cos\left(\frac{3a}{b}\right)\mathrm{FresnelS}\left(\frac{3\sqrt{2}\,\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\,\sqrt{-\frac{3}{b}}\,b}\right)\sqrt{-\frac{3}{b}}-5\sqrt{\pi}\,\sqrt{2}\,\sqrt{a+b\arcsin(cx)}\,\sin\left(\frac{3a}{b}\right)\mathrm{FresnelC}\left(\frac{3}{}\right.\right.}{}$

input

```
int((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x,method=_RETURNVERBOSE)
```

output

```
-1/8/c*d^2/b/(a+b*arcsin(c*x))^(1/2)*(-5*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x)
)^(1/2)*cos(3*a/b)*FresnelS(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*
x))^(1/2)/b)*(-3/b)^(1/2)-5*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(3
*a/b)*FresnelC(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*
(-3/b)^(1/2)-cos(5*a/b)*FresnelS(5*2^(1/2)/Pi^(1/2)/(-5/b)^(1/2)*(a+b*arcs
in(c*x))^(1/2)/b)*(a+b*arcsin(c*x))^(1/2)*Pi^(1/2)*2^(1/2)*(-5/b)^(1/2)-si
n(5*a/b)*FresnelC(5*2^(1/2)/Pi^(1/2)/(-5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/
b)*(a+b*arcsin(c*x))^(1/2)*Pi^(1/2)*2^(1/2)*(-5/b)^(1/2)-10*(-1/b)^(1/2)*P
i^(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)-10*(-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(-5*(a+b*arcsin(c*x))/b+5*a/b)+5*cos(-3*(a+b*a
rcsin(c*x))/b+3*a/b)+10*cos(-(a+b*arcsin(c*x))/b+a/b))
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(d-c^2dx^2)^2}{(a+b\arcsin(cx))^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{(d-c^2dx^2)^2}{(a+b\arcsin(cx))^{3/2}}\,dx = d^2\left(\int\left(-\frac{2c^2x^2}{a\sqrt{a+b\operatorname{asin}(cx)}+b\sqrt{a+b\operatorname{asin}(cx)}\operatorname{asin}(cx)}\right)dx + \int\frac{c^4x^4}{a\sqrt{a+b\operatorname{asin}(cx)}+b\sqrt{a+b\operatorname{asin}(cx)}\operatorname{asin}(cx)}\,dx + \int\frac{1}{a\sqrt{a+b\operatorname{asin}(cx)}+b\sqrt{a+b\operatorname{asin}(cx)}\operatorname{asin}(cx)}\,dx\right)$$

input
```
integrate((-c**2*d*x**2+d)**2/(a+b*asin(c*x))**(3/2),x)
```

output
```
d**2*(Integral(-2*c**2*x**2/(a*sqrt(a + b*asin(c*x)) + b*sqrt(a + b*asin(c
*x))*asin(c*x)), x) + Integral(c**4*x**4/(a*sqrt(a + b*asin(c*x)) + b*sqrt
(a + b*asin(c*x))*asin(c*x)), x) + Integral(1/(a*sqrt(a + b*asin(c*x)) + b
*sqrt(a + b*asin(c*x))*asin(c*x)), x))
```

Maxima [F]

$$\int \frac{(d-c^2dx^2)^2}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{(c^2dx^2-d)^2}{(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
integrate((c^2*d*x^2 - d)^2/(b*arcsin(c*x) + a)^(3/2), x)
```

Giac [F]

$$\int \frac{(d-c^2dx^2)^2}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{(c^2dx^2-d)^2}{(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate((-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output
```
integrate((c^2*d*x^2 - d)^2/(b*arcsin(c*x) + a)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d-c^2dx^2)^2}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{(d-c^2\,d\,x^2)^2}{(a+b\,\mathrm{asin}\,(c\,x))^{3/2}}\,dx$$

input
```
int((d - c^2*d*x^2)^2/(a + b*asin(c*x))^(3/2),x)
```

output
```
int((d - c^2*d*x^2)^2/(a + b*asin(c*x))^(3/2), x)
```

Reduce [F]

$$\int \frac{(d - c^2 dx^2)^2}{(a + b \arcsin(cx))^{3/2}}\, dx = \text{too large to display}$$

input

```
int((-c^2*d*x^2+d)^2/(a+b*asin(c*x))^(3/2),x)
```

output

```
(d**2*(20*sqrt(asin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*asin(c*x)*b + 20*as
in(c*x)*int(sqrt(asin(c*x)*b + a)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)
**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 -
a**2),x)*a*b**2*c + 8*asin(c*x)*int((sqrt(asin(c*x)*b + a)*x**6)/(asin(c*x
)**2*b**2*c**2*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*as
in(c*x)*a*b + a**2*c**2*x**2 - a**2),x)*a*b**2*c**7 - 28*asin(c*x)*int((sq
rt(asin(c*x)*b + a)*x**4)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2*b**2
 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a**2),x)
*a*b**2*c**5 + 24*asin(c*x)*int((sqrt(asin(c*x)*b + a)*sqrt( - c**2*x**2 +
 1)*asin(c*x)*x**3)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2*b**2 + 2*a
sin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a**2),x)*a*b**
2*c**4 - 20*asin(c*x)*int((sqrt(asin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*as
in(c*x)**2*x)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2*b**2 + 2*asin(c*
x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a**2),x)*b**3*c**2 +
 24*asin(c*x)*int((sqrt(asin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*x**3)/(asi
n(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 -
 2*asin(c*x)*a*b + a**2*c**2*x**2 - a**2),x)*a**2*b*c**4 + 20*asin(c*x)*in
t((sqrt(asin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*x)/(asin(c*x)**2*b**2*c**2
*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b +
a**2*c**2*x**2 - a**2),x)*a**2*b*c**2 + 5*asin(c*x)*int((sqrt(asin(c*x)...
```

3.98 $\int \frac{d-c^2dx^2}{(a+b\arcsin(cx))^{3/2}}\,dx$

Optimal result . . . 810
Mathematica [C] (verified) . . . 811
Rubi [A] (verified) . . . 812
Maple [A] (verified) . . . 814
Fricas [F(-2)] . . . 814
Sympy [F] . . . 815
Maxima [F] . . . 815
Giac [F] . . . 816
Mupad [F(-1)] . . . 816
Reduce [F] . . . 816

Optimal result

Integrand size = 24, antiderivative size = 253

$$\int \frac{d-c^2dx^2}{(a+b\arcsin(cx))^{3/2}}\,dx = -\frac{2d(1-c^2x^2)^{3/2}}{bc\sqrt{a+b\arcsin(cx)}} - \frac{3d\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c} - \frac{d\sqrt{\frac{3\pi}{2}}\cos\left(\frac{3a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c} + \frac{3d\sqrt{\frac{\pi}{2}}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{b^{3/2}c} + \frac{d\sqrt{\frac{3\pi}{2}}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{3a}{b}\right)}{b^{3/2}c}$$

output
```
-2*d*(-c^2*x^2+1)^(3/2)/b/c/(a+b*arcsin(c*x))^(1/2)-3/2*d*2^(1/2)*Pi^(1/2)
*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(3/
2)/c-1/2*d*6^(1/2)*Pi^(1/2)*cos(3*a/b)*FresnelS(6^(1/2)/Pi^(1/2)*(a+b*arcs
in(c*x))^(1/2)/b^(1/2))/b^(3/2)/c+3/2*d*2^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/
Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/b^(3/2)/c+1/2*d*6^(1/2)
*Pi^(1/2)*FresnelC(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(3
*a/b)/b^(3/2)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.58 (sec) , antiderivative size = 348, normalized size of antiderivative = 1.38

$$\int \frac{d - c^2 d x^2}{(a + b \arcsin(cx))^{3/2}}\, dx = \frac{d e^{-\frac{3i(a+b\arcsin(cx))}{b}} \left(-e^{\frac{3ia}{b}} - 3e^{\frac{3ia}{b}+2i\arcsin(cx)} - 3e^{\frac{3ia}{b}+4i\arcsin(cx)} - e^{\frac{3i(a+2b\arcsin(cx)}{b}} \right.$$

input
```
Integrate[(d - c^2*d*x^2)/(a + b*ArcSin[c*x])^(3/2),x]
```

output
```
(d*(-E^(((3*I)*a)/b) - 3*E^(((3*I)*a)/b + (2*I)*ArcSin[c*x]) - 3*E^(((3*I)
*a)/b + (4*I)*ArcSin[c*x]) - E^(((3*I)*(a + 2*b*ArcSin[c*x]))/b) + 3*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] + 3*E^(((4*I)*a)/b + (3*I)*ArcSin[c*x])*S
qrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, (I*(a + b*ArcSin[c*x]))/b] + Sqr
t[3]*E^((3*I)*ArcSin[c*x])*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, (
(-3*I)*(a + b*ArcSin[c*x]))/b] + Sqrt[3]*E^((3*I)*((2*a)/b + ArcSin[c*x]))
*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((3*I)*(a + b*ArcSin[c*x]))/b]
))/(4*b*c*E^(((3*I)*(a + b*ArcSin[c*x]))/b)*Sqrt[a + b*ArcSin[c*x]])
```

Rubi [A] (verified)

Time = 0.69 (sec) , antiderivative size = 256, normalized size of antiderivative = 1.01, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.208$, Rules used = {5166, 5224, 25, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{d - c^2 d x^2}{(a + b \arcsin(cx))^{3/2}}\, dx$$

$$\downarrow 5166$$

$$-\frac{6cd \int \frac{x\sqrt{1-c^2x^2}}{\sqrt{a+b\arcsin(cx)}} dx}{b} - \frac{2d\left(1 - c^2x^2\right)^{3/2}}{bc\sqrt{a + b\arcsin(cx)}}$$

$$\downarrow 5224$$

$$-\frac{6d \int -\frac{\cos^2\left(\frac{a}{b} - \frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b} - \frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}} d(a + b\arcsin(cx))}{b^2 c} - \frac{2d\left(1 - c^2x^2\right)^{3/2}}{bc\sqrt{a + b\arcsin(cx)}}$$

$$\downarrow 25$$

$$\frac{6d \int \frac{\cos^2\left(\frac{a}{b} - \frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b} - \frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}} d(a + b\arcsin(cx))}{b^2 c} - \frac{2d\left(1 - c^2x^2\right)^{3/2}}{bc\sqrt{a + b\arcsin(cx)}}$$

$$\downarrow 4906$$

$$\frac{6d \int \left(\frac{\sin\left(\frac{3a}{b} - \frac{3(a+b\arcsin(cx))}{b}\right)}{4\sqrt{a+b\arcsin(cx)}} + \frac{\sin\left(\frac{a}{b} - \frac{a+b\arcsin(cx)}{b}\right)}{4\sqrt{a+b\arcsin(cx)}}\right) d(a + b\arcsin(cx))}{b^2 c} - \frac{2d\left(1 - c^2x^2\right)^{3/2}}{bc\sqrt{a + b\arcsin(cx)}}$$

$$\downarrow 2009$$

$$-\frac{6d\left(-\frac{1}{2}\sqrt{\frac{\pi}{2}}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right) - \frac{1}{2}\sqrt{\frac{\pi}{6}}\sqrt{b}\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right) + \frac{1}{2}\sqrt{\frac{\pi}{2}}\right.}{b^2 c}$$

$$\frac{2d\left(1 - c^2x^2\right)^{3/2}}{bc\sqrt{a + b\arcsin(cx)}}$$

input
```
Int[(d - c^2*d*x^2)/(a + b*ArcSin[c*x])^(3/2),x]
```

output
```
(-2*d*(1 - c^2*x^2)^(3/2))/(b*c*Sqrt[a + b*ArcSin[c*x]]) - (6*d*((Sqrt[b]*
Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]
)/2 + (Sqrt[b]*Sqrt[Pi/6]*Cos[(3*a)/b]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*Arc
Sin[c*x]])/Sqrt[b]])/2 - (Sqrt[b]*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a +
 b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/2 - (Sqrt[b]*Sqrt[Pi/6]*FresnelC[(Sqrt
[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/2))/(b^2*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 304, normalized size of antiderivative = 1.20

method	result
default	$-\frac{d\left(-\sqrt{\pi}\sqrt{2}\sqrt{a+b\arcsin(cx)}\cos\left(\frac{3a}{b}\right)\text{FresnelS}\left(\frac{3\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{3}{b}}b}\right)\sqrt{-\frac{3}{b}}-\sqrt{\pi}\sqrt{2}\sqrt{a+b\arcsin(cx)}\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{3\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{3}{b}}b}\right)\sqrt{-\frac{3}{b}}\right.}{\left.}$

input
```
int((-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(3/2),x,method=_RETURNVERBOSE)
```

output
```
-1/2/c*d/b/(a+b*arcsin(c*x))^(1/2)*(-Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1
/2)*cos(3*a/b)*FresnelS(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^
(1/2)/b)*(-3/b)^(1/2)-Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(3*a/b)*
FresnelC(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(-3/b)
^(1/2)-3*(-1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*cos(a/b)*Fr
esnelS(2^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)-3*(-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)+3*cos(-(a+b*arcsin(c*x))/b+
a/b)+cos(-3*(a+b*arcsin(c*x))/b+3*a/b))
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{d - c^2 dx^2}{(a + b\arcsin(cx))^{3/2}}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{d - c^2 dx^2}{(a + b \arcsin(cx))^{3/2}}\, dx =$$
$$-d\left(\int \frac{c^2 x^2}{a\sqrt{a + b \operatorname{asin}(cx)} + b\sqrt{a + b \operatorname{asin}(cx)} \operatorname{asin}(cx)}\, dx\right.$$
$$\left. + \int \left(-\frac{1}{a\sqrt{a + b \operatorname{asin}(cx)} + b\sqrt{a + b \operatorname{asin}(cx)} \operatorname{asin}(cx)}\right) dx\right)$$

input
```
integrate((-c**2*d*x**2+d)/(a+b*asin(c*x))**(3/2),x)
```

output
```
-d*(Integral(c**2*x**2/(a*sqrt(a + b*asin(c*x)) + b*sqrt(a + b*asin(c*x))*
asin(c*x)), x) + Integral(-1/(a*sqrt(a + b*asin(c*x)) + b*sqrt(a + b*asin(
c*x))*asin(c*x)), x))
```

Maxima [F]

$$\int \frac{d - c^2 dx^2}{(a + b \arcsin(cx))^{3/2}}\, dx = \int -\frac{c^2 dx^2 - d}{(b \arcsin(cx) + a)^{\frac{3}{2}}}\, dx$$

input
```
integrate((-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
-integrate((c^2*d*x^2 - d)/(b*arcsin(c*x) + a)^(3/2), x)
```

Giac [F]

$$\int \frac{d - c^2 dx^2}{(a + b \arcsin(cx))^{3/2}}\, dx = \int -\frac{c^2 dx^2 - d}{(b \arcsin(cx) + a)^{\frac{3}{2}}}\, dx$$

input
```
integrate((-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output
```
integrate(-(c^2*d*x^2 - d)/(b*arcsin(c*x) + a)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{d - c^2 dx^2}{(a + b \arcsin(cx))^{3/2}}\, dx = \int \frac{d - c^2\, d\, x^2}{(a + b \operatorname{asin}(c\, x))^{3/2}}\, dx$$

input
```
int((d - c^2*d*x^2)/(a + b*asin(c*x))^(3/2),x)
```

output
```
int((d - c^2*d*x^2)/(a + b*asin(c*x))^(3/2), x)
```

Reduce [F]

$$\int \frac{d - c^2 dx^2}{(a + b \arcsin(cx))^{3/2}}\, dx = \text{Too large to display}$$

input
```
int((-c^2*d*x^2+d)/(a+b*asin(c*x))^(3/2),x)
```

output

```
(d*(12*sqrt(asin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*asin(c*x)*b + 12*asin(
c*x)*int(sqrt(asin(c*x)*b + a)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2
*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a**
2),x)*a*b**2*c - 12*asin(c*x)*int((sqrt(asin(c*x)*b + a)*x**4)/(asin(c*x)*
*2*b**2*c**2*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin
(c*x)*a*b + a**2*c**2*x**2 - a**2),x)*a*b**2*c**5 + 24*asin(c*x)*int((sqrt
(asin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*asin(c*x)*x**3)/(asin(c*x)**2*b**
2*c**2*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*
a*b + a**2*c**2*x**2 - a**2),x)*a*b**2*c**4 - 12*asin(c*x)*int((sqrt(asin(
c*x)*b + a)*sqrt( - c**2*x**2 + 1)*asin(c*x)**2*x)/(asin(c*x)**2*b**2*c**2
*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b +
a**2*c**2*x**2 - a**2),x)*b**3*c**2 + 24*asin(c*x)*int((sqrt(asin(c*x)*b +
 a)*sqrt( - c**2*x**2 + 1)*x**3)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)*
*2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a
**2),x)*a**2*b*c**4 + 12*asin(c*x)*int((sqrt(asin(c*x)*b + a)*sqrt( - c**2
*x**2 + 1)*x)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2*b**2 + 2*asin(c*
x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a**2),x)*a**2*b*c**2
 + 3*asin(c*x)*int((sqrt(asin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*x)/(asin(
c*x)**2*b**2*c**2*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2
*asin(c*x)*a*b + a**2*c**2*x**2 - a**2),x)*b**3*c**2 - 8*sqrt(asin(c*x)...
```

3.99 $\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx$

Optimal result . . . 818
Mathematica [C] (verified) . . . 819
Rubi [A] (verified) . . . 819
Maple [A] (verified) . . . 823
Fricas [F(-2)] . . . 823
Sympy [F] . . . 824
Maxima [F] . . . 824
Giac [F] . . . 824
Mupad [F(-1)] . . . 825
Reduce [F] . . . 825

Optimal result

Integrand size = 12, antiderivative size = 137

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = -\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}} - \frac{2\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c} + \frac{2\sqrt{2\pi}\,\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{b^{3/2}c}$$

output

```
-2*(-c^2*x^2+1)^(1/2)/b/c/(a+b*arcsin(c*x))^(1/2)-2*2^(1/2)*Pi^(1/2)*cos(a
/b)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(3/2)/c+2
*2^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2
))*sin(a/b)/b^(3/2)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.09 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.22

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \frac{e^{-\frac{i(a+b\arcsin(cx))}{b}}\left(e^{i\arcsin(cx)}\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+e^{\frac{ia}{b}}\left(-1-\right.\right.}{bc\sqrt{a+b\arcsin}}$$

input
```
Integrate[(a + b*ArcSin[c*x])^(-3/2),x]
```

output
```
(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*
ArcSin[c*x]))/b]))/(b*c*E^((I*(a + b*ArcSin[c*x]))/b)*Sqrt[a + b*ArcSin[c*
x]])
```

Rubi [A] (verified)

Time = 0.74 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.01, number of steps used = 12, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.917$, Rules used = {5132, 5224, 25, 3042, 3787, 25, 3042, 3785, 3786, 3832, 3833}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx$$

$$\downarrow 5132$$

$$-\frac{2c\int \frac{x}{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}dx}{b}-\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 5224$$

$$-\frac{2\int -\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{b^2c}-\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 25$$

$$\frac{2\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{b^2c}-\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 3042$$

$$\frac{2\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{b^2c}-\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 3787$$

$$-\frac{2\left(-\sin\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\cos\left(\frac{a}{b}\right)\int -\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))\right)}{\frac{b^2c}{2\sqrt{1-c^2x^2}}}-$$

$$\downarrow 25$$

$$-\frac{2\left(\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))\right)}{\frac{b^2c}{2\sqrt{1-c^2x^2}}}-$$

$$\downarrow 3042$$

$$-\frac{2\left(\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))\right)}{\frac{b^2c}{2\sqrt{1-c^2x^2}}}-$$

$$\downarrow 3785$$

$$-\frac{2\left(\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-2\sin\left(\frac{a}{b}\right)\int \cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}\right)}{\frac{b^2c}{2\sqrt{1-c^2x^2}}}-$$

$$\downarrow 3786$$

$$-\frac{2\left(2\cos\left(\frac{a}{b}\right)\int\sin\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}-2\sin\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}\right)}{\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}b^2c}-$$

$$\downarrow 3832$$

$$-\frac{2\left(\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-2\sin\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}\right)}{\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}b^2c}-$$

$$\downarrow 3833$$

$$-\frac{2\left(\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\right)}{\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}b^2c}-$$

input

```
Int[(a + b*ArcSin[c*x])^(-3/2),x]
```

output

```
(-2*Sqrt[1 - c^2*x^2])/(b*c*Sqrt[a + b*ArcSin[c*x]]) - (2*(Sqrt[b]*Sqrt[2*
Pi]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]] - Sqrt
[b]*Sqrt[2*Pi]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[
a/b]))/(b^2*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3787
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Cos
[(d*e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/Sqrt[c + d*x], x], x] + Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 5132
```
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] + Simp[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 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.00 (sec) , antiderivative size = 158, normalized size of antiderivative = 1.15

method	result
default	$-\frac{2\left(-\sqrt{-\frac{1}{b}}\,\sqrt{\pi}\,\sqrt{2}\,\sqrt{a+b\arcsin(cx)}\,\cos\left(\frac{a}{b}\right)\mathrm{FresnelS}\left(\frac{\sqrt{2}\,\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\,\sqrt{-\frac{1}{b}}\,b}\right)-\sqrt{-\frac{1}{b}}\,\sqrt{\pi}\,\sqrt{2}\,\sqrt{a+b\arcsin(cx)}\,\sin\left(\frac{a}{b}\right)\mathrm{FresnelC}\left(\sqrt{}\right.\right.}{cb\sqrt{a+b\arcsin(cx)}}$

input

```
int(1/(a+b*arcsin(c*x))^(3/2),x,method=_RETURNVERBOSE)
```

output

```
-2/c/b/(a+b*arcsin(c*x))^(1/2)*(-(-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))
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input

```
integrate(1/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(a+b\operatorname{asin}(cx))^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(a+b*asin(c*x))**(3/2),x)
```

output
```
Integral((a + b*asin(c*x))**(-3/2), x)
```

Maxima [F]

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
integrate((b*arcsin(c*x) + a)^(-3/2), x)
```

Giac [F]

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output
```
integrate((b*arcsin(c*x) + a)^(-3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(a+b\operatorname{asin}(c\,x))^{3/2}}\,dx$$

input
```
int(1/(a + b*asin(c*x))^(3/2),x)
```

output
```
int(1/(a + b*asin(c*x))^(3/2), x)
```

Reduce [F]

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \frac{2asin(cx)\left(\int \frac{\sqrt{asin(cx)b+a}\,\sqrt{-c^2x^2+1}\,x}{asin(cx)b\,c^2x^2-asin(cx)b+a\,c^2x^2-a}dx\right)b\,c^2-2\sqrt{asin\,(cx)\,b+a}\,\sqrt{-c^2}}{bc\,(asin\,(cx)\,b+a)}$$

input
```
int(1/(a+b*asin(c*x))^(3/2),x)
```

output
```
(2*(asin(c*x)*int((sqrt(asin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*x)/(asin(c
*x)*b*c**2*x**2 - asin(c*x)*b + a*c**2*x**2 - a),x)*b*c**2 - sqrt(asin(c*x
)*b + a)*sqrt( - c**2*x**2 + 1) + int((sqrt(asin(c*x)*b + a)*sqrt( - c**2*
x**2 + 1)*x)/(asin(c*x)*b*c**2*x**2 - asin(c*x)*b + a*c**2*x**2 - a),x)*a*
c**2))/(b*c*(asin(c*x)*b + a))
```

3.100 $\int \frac{1}{(d-c^2dx^2)(a+b\arcsin(cx))^{3/2}}\,dx$

Optimal result . . . 826
Mathematica [N/A] . . . 826
Rubi [N/A] . . . 827
Maple [N/A] . . . 827
Fricas [F(-2)] . . . 828
Sympy [N/A] . . . 828
Maxima [N/A] . . . 829
Giac [N/A] . . . 829
Mupad [N/A] . . . 829
Reduce [N/A] . . . 830

Optimal result

Integrand size = 26, antiderivative size = 26

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \text{Int}\left(\frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^{3/2}},x\right)$$

output
```
Defer(Int)(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(3/2),x)
```

Mathematica [N/A]

Not integrable

Time = 0.57 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^{3/2}}\,dx$$

input
```
Integrate[1/((d - c^2*d*x^2)*(a + b*ArcSin[c*x])^(3/2)),x]
```

output
```
Integrate[1/((d - c^2*d*x^2)*(a + b*ArcSin[c*x])^(3/2)), x]
```

Rubi [N/A]

Not integrable

Time = 0.43 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d - c^2 d x^2)\,(a + b \arcsin(cx))^{3/2}}\,dx$$

$$\downarrow 5166$$

$$\frac{2c \int \frac{x}{(1-c^2x^2)^{3/2}\sqrt{a+b\arcsin(cx)}}dx}{bd} - \frac{2}{bcd\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 5234$$

$$\frac{2c \int \frac{x}{(1-c^2x^2)^{3/2}\sqrt{a+b\arcsin(cx)}}dx}{bd} - \frac{2}{bcd\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}$$

input
```
Int[1/((d - c^2*d*x^2)*(a + b*ArcSin[c*x])^(3/2)),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{1}{(-c^2 d\, x^2 + d)\,(a + b \arcsin(cx))^{\frac{3}{2}}}\,dx$$

input
```
int(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(3/2),x)
```

output
```
int(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 4.47 (sec) , antiderivative size = 83, normalized size of antiderivative = 3.19

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = -\frac{\int \frac{1}{ac^2x^2\sqrt{a+b\operatorname{asin}(cx)}-a\sqrt{a+b\operatorname{asin}(cx)}+bc^2x^2\sqrt{a+b\operatorname{asin}(cx)}\operatorname{asin}(cx)-b\sqrt{a+b\operatorname{asin}(cx)}\operatorname{asin}(cx)}\,dx}{d}$$

input
```
integrate(1/(-c**2*d*x**2+d)/(a+b*asin(c*x))**(3/2),x)
```

output
```
-Integral(1/(a*c**2*x**2*sqrt(a + b*asin(c*x)) - a*sqrt(a + b*asin(c*x)) +
 b*c**2*x**2*sqrt(a + b*asin(c*x))*asin(c*x) - b*sqrt(a + b*asin(c*x))*asi
n(c*x)), x)/d
```

Maxima [N/A]

Not integrable

Time = 0.48 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.12

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \int -\frac{1}{(c^2dx^2-d)(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
-integrate(1/((c^2*d*x^2 - d)*(b*arcsin(c*x) + a)^(3/2)), x)
```

Giac [N/A]

Not integrable

Time = 7.61 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \int -\frac{1}{(c^2dx^2-d)(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output
```
integrate(-1/((c^2*d*x^2 - d)*(b*arcsin(c*x) + a)^(3/2)), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d-c^2dx^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}\,(c\,x))^{3/2}\,\left(d-c^2\,d\,x^2\right)}\,dx$$

input
```
int(1/((a + b*asin(c*x))^(3/2)*(d - c^2*d*x^2)),x)
```

output
```
int(1/((a + b*asin(c*x))^(3/2)*(d - c^2*d*x^2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 84, normalized size of antiderivative = 3.23

$$\int \frac{1}{\left(d-c^2dx^2\right)\left(a+b\arcsin(cx)\right)^{3/2}}\,dx = -\frac{\int \frac{\sqrt{asin(cx)b+a}}{asin(cx)^2b^2c^2x^2-asin(cx)^2b^2+2asin(cx)abc^2x^2-2asin(cx)ab+a^2c^2x^2-a^2}dx}{d}$$

input
```
int(1/(-c^2*d*x^2+d)/(a+b*asin(c*x))^(3/2),x)
```

output
```
( - int(sqrt(asin(c*x)*b + a)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2*
b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a**2
),x))/d
```

3.101 $\int \frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))^{3/2}}\,dx$

Optimal result 831
Mathematica [N/A] 831
Rubi [N/A] 832
Maple [N/A] 832
Fricas [F(-2)] 833
Sympy [N/A] 833
Maxima [N/A] 834
Giac [F(-1)] 834
Mupad [N/A] 834
Reduce [N/A] 835

Optimal result

Integrand size = 26, antiderivative size = 26

$$\int \frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))^{3/2}}\,dx = \text{Int}\left(\frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))^{3/2}},x\right)$$

output
```
Defer(Int)(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x)
```

Mathematica [N/A]

Not integrable

Time = 0.78 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.08

$$\int \frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{\left(d-c^2dx^2\right)^2(a+b\arcsin(cx))^{3/2}}\,dx$$

input
```
Integrate[1/((d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])^(3/2)),x]
```

output
```
Integrate[1/((d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])^(3/2)), x]
```

Rubi [N/A]

Not integrable

Time = 0.44 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^{3/2}}\,dx$$

$$\downarrow 5166$$

$$\frac{6c\int \frac{x}{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}dx}{bd^2} - \frac{2}{bcd^2\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 5234$$

$$\frac{6c\int \frac{x}{\left(1-c^2x^2\right)^{5/2}\sqrt{a+b\arcsin(cx)}}dx}{bd^2} - \frac{2}{bcd^2\left(1-c^2x^2\right)^{3/2}\sqrt{a+b\arcsin(cx)}}$$

input
```
Int[1/((d - c^2*d*x^2)^2*(a + b*ArcSin[c*x])^(3/2)),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

$$\int \frac{1}{\left(-c^2d\,x^2+d\right)^2\left(a+b\arcsin\left(cx\right)\right)^{\frac{3}{2}}}dx$$

input
```
int(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x)
```

output
```
int(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas"
)
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 16.28 (sec) , antiderivative size = 133, normalized size of antiderivative = 5.12

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^{3/2}}\,dx = \frac{\int \frac{1}{ac^4x^4\sqrt{a+b\operatorname{asin}(cx)}-2ac^2x^2\sqrt{a+b\operatorname{asin}(cx)}+a\sqrt{a+b\operatorname{asin}(cx)}+bc^4x^4\sqrt{a+b\operatorname{asin}(cx)}}}{d^2}$$

input
```
integrate(1/(-c**2*d*x**2+d)**2/(a+b*asin(c*x))**(3/2),x)
```

output
```
Integral(1/(a*c**4*x**4*sqrt(a + b*asin(c*x)) - 2*a*c**2*x**2*sqrt(a + b*a
sin(c*x)) + a*sqrt(a + b*asin(c*x)) + b*c**4*x**4*sqrt(a + b*asin(c*x))*as
in(c*x) - 2*b*c**2*x**2*sqrt(a + b*asin(c*x))*asin(c*x) + b*sqrt(a + b*asi
n(c*x))*asin(c*x)), x)/d**2
```

Maxima [N/A]

Not integrable

Time = 0.52 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.04

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^{3/2}}\,dx = \int \frac{1}{(c^2dx^2-d)^2(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima"
)
```

output
```
integrate(1/((c^2*d*x^2 - d)^2*(b*arcsin(c*x) + a)^(3/2)), x)
```

Giac [F(-1)]

Timed out.

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^{3/2}}\,dx = \text{Timed out}$$

input
```
integrate(1/(-c^2*d*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output
```
Timed out
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^{3/2}}\,dx = \int \frac{1}{\left(a+b\,\mathrm{asin}\left(c\,x\right)\right)^{3/2}\left(d-c^2\,d\,x^2\right)^2}\,dx$$

input
```
int(1/((a + b*asin(c*x))^(3/2)*(d - c^2*d*x^2)^2),x)
```

output
```
int(1/((a + b*asin(c*x))^(3/2)*(d - c^2*d*x^2)^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 122, normalized size of antiderivative = 4.69

$$\int \frac{1}{\left(d-c^2dx^2\right)^2\left(a+b\arcsin(cx)\right)^{3/2}}\,dx = \frac{\int \frac{\sqrt{asin(cx)b+a}}{asin(cx)^2b^2c^4x^4-2asin(cx)^2b^2c^2x^2+asin(cx)^2b^2+2asin(cx)ab\,c^4x^4-4asin(cx)ab\,c^2}}{d^2}$$

input
```
int(1/(-c^2*d*x^2+d)^2/(a+b*asin(c*x))^(3/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a)/(asin(c*x)**2*b**2*c**4*x**4 - 2*asin(c*x)**2*b*
**2*c**2*x**2 + asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**4*x**4 - 4*asin(c*x)
*a*b*c**2*x**2 + 2*asin(c*x)*a*b + a**2*c**4*x**4 - 2*a**2*c**2*x**2 + a**
2),x)/d**2
```

3.102 $\int (c - a^2cx^2)^{3/2} \sqrt{\arcsin(ax)}\, dx$

Optimal result . . . 836
Mathematica [C] (verified) . . . 837
Rubi [A] (verified) . . . 837
Maple [F] . . . 842
Fricas [F(-2)] . . . 843
Sympy [F] . . . 843
Maxima [F(-2)] . . . 843
Giac [F(-2)] . . . 844
Mupad [F(-1)] . . . 844
Reduce [F] . . . 844

Optimal result

Integrand size = 24, antiderivative size = 227

$$\int (c - a^2cx^2)^{3/2} \sqrt{\arcsin(ax)}\, dx = \frac{3}{8}cx\sqrt{c - a^2cx^2}\sqrt{\arcsin(ax)} + \frac{1}{4}x(c - a^2cx^2)^{3/2}\sqrt{\arcsin(ax)} + \frac{c\sqrt{c - a^2cx^2}\arcsin(ax)^{3/2}}{4a\sqrt{1 - a^2x^2}} - \frac{c\sqrt{\frac{\pi}{2}}\sqrt{c - a^2cx^2}\,\text{FresnelS}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)}{64a\sqrt{1 - a^2x^2}} - \frac{c\sqrt{\pi}\sqrt{c - a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a\sqrt{1 - a^2x^2}}$$

output

```
3/8*c*x*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)+1/4*x*(-a^2*c*x^2+c)^(3/2)*
arcsin(a*x)^(1/2)+1/4*c*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(3/2)/a/(-a^2*x^2
+1)^(1/2)-1/128*c*2^(1/2)*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelS(2*2^(1/2)
/Pi^(1/2)*arcsin(a*x)^(1/2))/a/(-a^2*x^2+1)^(1/2)-1/8*c*Pi^(1/2)*(-a^2*c*x
^2+c)^(1/2)*FresnelS(2*arcsin(a*x)^(1/2)/Pi^(1/2))/a/(-a^2*x^2+1)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.18 (sec) , antiderivative size = 166, normalized size of antiderivative = 0.73

$$\int (c - a^2 c x^2)^{3/2} \sqrt{\arcsin(ax)}\, dx = \frac{c\sqrt{c-a^2cx^2}\left(32\arcsin(ax)^2 + 8\sqrt{2}\sqrt{-i\arcsin(ax)}\Gamma\left(\frac{3}{2}, -2i\arcsin(ax)\right) + 8\right.}{}$$

input
```
Integrate[(c - a^2*c*x^2)^(3/2)*Sqrt[ArcSin[a*x]],x]
```

output
```
(c*Sqrt[c - a^2*c*x^2]*(32*ArcSin[a*x]^2 + 8*Sqrt[2]*Sqrt[(-I)*ArcSin[a*x]
]*Gamma[3/2, (-2*I)*ArcSin[a*x]] + 8*Sqrt[2]*Sqrt[I*ArcSin[a*x]]*Gamma[3/2
, (2*I)*ArcSin[a*x]] + Sqrt[(-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*Sqrt[1 - a
^2*x^2]*Sqrt[ArcSin[a*x]])
```

Rubi [A] (verified)

Time = 1.57 (sec) , antiderivative size = 260, normalized size of antiderivative = 1.15, number of steps used = 13, number of rules used = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.500$, Rules used = {5158, 5156, 5146, 4906, 27, 3042, 3786, 3832, 5152, 5224, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{\arcsin(ax)}\left(c - a^2 c x^2\right)^{3/2}\, dx$$

$$\downarrow 5158$$

$$-\frac{ac\sqrt{c-a^2cx^2}\int \frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx}{8\sqrt{1-a^2x^2}} + \frac{3}{4}c\int \sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}dx + \frac{1}{4}x\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5156$$

$$-\frac{ac\sqrt{c-a^2cx^2}\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx}{8\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(-\frac{a\sqrt{c-a^2cx^2}\int\frac{x}{\sqrt{\arcsin(ax)}}dx}{4\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}\right)+$$
$$\frac{1}{4}x\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5146$$

$$-\frac{ac\sqrt{c-a^2cx^2}\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx}{8\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(-\frac{\sqrt{c-a^2cx^2}\int\frac{ax\sqrt{1-a^2x^2}}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}\right)+$$
$$\frac{1}{4}x\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 4906$$

$$-\frac{ac\sqrt{c-a^2cx^2}\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx}{8\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(\frac{\sqrt{c-a^2cx^2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}-\frac{\sqrt{c-a^2cx^2}\int\frac{\sin(2\arcsin(ax))}{2\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}\right)+$$
$$\frac{1}{4}x\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 27$$

$$-\frac{ac\sqrt{c-a^2cx^2}\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx}{8\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(\frac{\sqrt{c-a^2cx^2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}-\frac{\sqrt{c-a^2cx^2}\int\frac{\sin(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}\right)+$$
$$\frac{1}{4}x\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 3042$$

$$-\frac{ac\sqrt{c-a^2cx^2}\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx}{8\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(\frac{\sqrt{c-a^2cx^2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}-\frac{\sqrt{c-a^2cx^2}\int\frac{\sin(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}\right)+$$
$$\frac{1}{4}x\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 3786$$

$$-\frac{ac\sqrt{c-a^2cx^2}\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx}{8\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(\frac{\sqrt{c-a^2cx^2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}-\frac{\sqrt{c-a^2cx^2}\int\sin(2\arcsin(ax))d\sqrt{\arcsin(ax)}}{4a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}\right)$$
$$\frac{1}{4}x\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 3832$$

$$\frac{3}{4}c\left(\frac{\sqrt{c-a^2cx^2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}-\frac{\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}\right)-$$
$$\frac{ac\sqrt{c-a^2cx^2}\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx}{8\sqrt{1-a^2x^2}}+\frac{1}{4}x\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5152$$

$$-\frac{ac\sqrt{c-a^2cx^2}\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx}{8\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(-\frac{\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}}{3a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}\right)+$$
$$\frac{1}{4}x\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5224$$

$$-\frac{c\sqrt{c-a^2cx^2}\int\frac{ax\left(1-a^2x^2\right)^{3/2}}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a\sqrt{1-a^2x^2}}+$$

$$\frac{3}{4}c\left(-\frac{\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}}{3a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}\right)+$$

$$\frac{1}{4}x\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 4906$$

$$-\frac{c\sqrt{c-a^2cx^2}\int\left(\frac{\sin(2\arcsin(ax))}{4\sqrt{\arcsin(ax)}}+\frac{\sin(4\arcsin(ax))}{8\sqrt{\arcsin(ax)}}\right)d\arcsin(ax)}{8a\sqrt{1-a^2x^2}}+$$

$$\frac{3}{4}c\left(-\frac{\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}}{3a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}\right)+$$

$$\frac{1}{4}x\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 2009$$

$$-\frac{c\sqrt{c-a^2cx^2}\left(\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)+\frac{1}{4}\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)\right)}{8a\sqrt{1-a^2x^2}}+$$

$$\frac{3}{4}c\left(-\frac{\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}}{3a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}\right)+$$

$$\frac{1}{4}x\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}$$

input

```
Int[(c - a^2*c*x^2)^(3/2)*Sqrt[ArcSin[a*x]],x]
```

output

```
(x*(c - a^2*c*x^2)^(3/2)*Sqrt[ArcSin[a*x]])/4 - (c*Sqrt[c - a^2*c*x^2]*((S
qrt[Pi/2]*FresnelS[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/8 + (Sqrt[Pi]*FresnelS
[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/4))/(8*a*Sqrt[1 - a^2*x^2]) + (3*c*((x*S
qrt[c - a^2*c*x^2]*Sqrt[ArcSin[a*x]])/2 + (Sqrt[c - a^2*c*x^2]*ArcSin[a*x]
^(3/2))/(3*a*Sqrt[1 - a^2*x^2]) - (Sqrt[Pi]*Sqrt[c - a^2*c*x^2]*FresnelS[(
2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(8*a*Sqrt[1 - a^2*x^2])))/4
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 4906
```
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 5146
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[1
/(b*c^(m + 1))   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b], x], x, a
+ b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156

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

rule 5158

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

rule 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [F]

$$\int \left(-a^2 c\, x^2 + c\right)^{\frac{3}{2}} \sqrt{\arcsin\left(a x\right)}\, dx$$

input

```
int((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(1/2),x)
```

output

```
int((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \left(c - a^2 c x^2\right)^{3/2} \sqrt{\arcsin(ax)}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \left(c - a^2 c x^2\right)^{3/2} \sqrt{\arcsin(ax)}\, dx = \int \left(-c(ax-1)\,(ax+1)\right)^{\frac{3}{2}} \sqrt{\operatorname{asin}(ax)}\, dx$$

input
```
integrate((-a**2*c*x**2+c)**(3/2)*asin(a*x)**(1/2),x)
```

output
```
Integral((-c*(a*x - 1)*(a*x + 1))**(3/2)*sqrt(asin(a*x)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \left(c - a^2 c x^2\right)^{3/2} \sqrt{\arcsin(ax)}\, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F(-2)]

Exception generated.

$$\int \left(c - a^2 c x^2\right)^{3/2} \sqrt{\arcsin(ax)}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(1/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \left(c - a^2 c x^2\right)^{3/2} \sqrt{\arcsin(ax)}\, dx = \int \sqrt{\operatorname{asin}(a\,x)}\, \left(c - a^2\, c\, x^2\right)^{3/2} dx$$

input
```
int(asin(a*x)^(1/2)*(c - a^2*c*x^2)^(3/2),x)
```

output
```
int(asin(a*x)^(1/2)*(c - a^2*c*x^2)^(3/2), x)
```

Reduce [F]

$$\int \left(c - a^2 c x^2\right)^{3/2} \sqrt{\arcsin(ax)}\, dx = \sqrt{c}\, c \left(- \left(\int \sqrt{-a^2x^2+1}\, \sqrt{asin\,(ax)}\, x^2 dx \right) a^2 + \int \sqrt{-a^2x^2+1}\, \sqrt{asin\,(ax)} dx \right)$$

input
```
int((-a^2*c*x^2+c)^(3/2)*asin(a*x)^(1/2),x)
```

output
```
sqrt(c)*c*( - int(sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*x**2,x)*a**2 + in
t(sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)),x))
```

3.103 $\int \sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}\,dx$

Optimal result . . . 845
Mathematica [C] (verified) . . . 845
Rubi [A] (verified) . . . 846
Maple [F] . . . 849
Fricas [F(-2)] . . . 849
Sympy [F] . . . 850
Maxima [F(-2)] . . . 850
Giac [F(-2)] . . . 850
Mupad [F(-1)] . . . 851
Reduce [F] . . . 851

Optimal result

Integrand size = 24, antiderivative size = 130

$$\int \sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}\,dx = \frac{1}{2}x\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)} + \frac{\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}{3a\sqrt{1-a^2x^2}} - \frac{\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a\sqrt{1-a^2x^2}}$$

output

```
1/2*x*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)+1/3*(-a^2*c*x^2+c)^(1/2)*arcs
in(a*x)^(3/2)/a/(-a^2*x^2+1)^(1/2)-1/8*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*Fresn
elS(2*arcsin(a*x)^(1/2)/Pi^(1/2))/a/(-a^2*x^2+1)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.04 (sec) , antiderivative size = 138, normalized size of antiderivative = 1.06

$$\int \sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}\,dx = \frac{\sqrt{c-a^2cx^2}\left(16\arcsin(ax)\left(3ax\sqrt{1-a^2x^2}+2\arcsin(ax)\right)+3\sqrt{2}\sqrt{-i\arcsin(ax)}\Gamma\left(\frac{1}{2},-2i\arcsin(ax)\right)\right.}{96a\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}$$

input
```
Integrate[Sqrt[c - a^2*c*x^2]*Sqrt[ArcSin[a*x]],x]
```

output
```
(Sqrt[c - a^2*c*x^2]*(16*ArcSin[a*x]*(3*a*x*Sqrt[1 - a^2*x^2] + 2*ArcSin[a
*x]) + 3*Sqrt[2]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-2*I)*ArcSin[a*x]] + 3
*Sqrt[2]*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (2*I)*ArcSin[a*x]]))/(96*a*Sqrt[1
- a^2*x^2]*Sqrt[ArcSin[a*x]])
```

Rubi [A] (verified)

Time = 0.89 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {5156, 5146, 4906, 27, 3042, 3786, 3832, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}\,dx$$

$$\downarrow 5156$$

$$-\frac{a\sqrt{c-a^2cx^2}\int \frac{x}{\sqrt{\arcsin(ax)}}dx}{4\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}$$

$$\downarrow 5146$$

$$-\frac{\sqrt{c-a^2cx^2}\int \frac{ax\sqrt{1-a^2x^2}}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}$$

$$\downarrow 4906$$

$$\frac{\sqrt{c-a^2cx^2}\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}-\frac{\sqrt{c-a^2cx^2}\int \frac{\sin(2\arcsin(ax))}{2\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}$$

$$\downarrow 27$$

$$\frac{\sqrt{c-a^2cx^2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}-\frac{\sqrt{c-a^2cx^2}\int\frac{\sin(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}$$

$$\downarrow 3042$$

$$\frac{\sqrt{c-a^2cx^2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}-\frac{\sqrt{c-a^2cx^2}\int\frac{\sin(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}$$

$$\downarrow 3786$$

$$\frac{\sqrt{c-a^2cx^2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}-\frac{\sqrt{c-a^2cx^2}\int\sin(2\arcsin(ax))d\sqrt{\arcsin(ax)}}{4a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}$$

$$\downarrow 3832$$

$$\frac{\sqrt{c-a^2cx^2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}-\frac{\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}$$

$$\downarrow 5152$$

$$-\frac{\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}}{3a\sqrt{1-a^2x^2}}+\frac{1}{2}x\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}$$

input
```
Int[Sqrt[c - a^2*c*x^2]*Sqrt[ArcSin[a*x]],x]
```

output
```
(x*Sqrt[c - a^2*c*x^2]*Sqrt[ArcSin[a*x]])/2 + (Sqrt[c - a^2*c*x^2]*ArcSin[
a*x]^(3/2))/(3*a*Sqrt[1 - a^2*x^2]) - (Sqrt[Pi]*Sqrt[c - a^2*c*x^2]*Fresne
lS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(8*a*Sqrt[1 - a^2*x^2])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 4906
```
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 5146
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[1
/(b*c^(m + 1))   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b], x], x, a
+ b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156

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

Maple [F]

$$\int \sqrt{-a^2 c\, x^2 + c}\, \sqrt{\arcsin\left(ax\right)} dx$$

input

```
int((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2),x)
```

output

```
int((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \sqrt{c - a^2 c x^2}\, \sqrt{\arcsin(ax)}\, dx = \text{Exception raised: TypeError}$$

input

```
integrate((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}\,dx = \int \sqrt{-c\,(ax-1)\,(ax+1)}\sqrt{\operatorname{asin}(ax)}\,dx$$

input
```
integrate((-a**2*c*x**2+c)**(1/2)*asin(a*x)**(1/2),x)
```

output
```
Integral(sqrt(-c*(a*x - 1)*(a*x + 1))*sqrt(asin(a*x)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F(-2)]

Exception generated.

$$\int \sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}\,dx = \int \sqrt{\text{asin}\,(a\,x)}\,\sqrt{c-a^2\,c\,x^2}\,dx$$

input
```
int(asin(a*x)^(1/2)*(c - a^2*c*x^2)^(1/2),x)
```

output
```
int(asin(a*x)^(1/2)*(c - a^2*c*x^2)^(1/2), x)
```

Reduce [F]

$$\int \sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}\,dx = \sqrt{c}\left(\int \sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}dx\right)$$

input
```
int((-a^2*c*x^2+c)^(1/2)*asin(a*x)^(1/2),x)
```

output
```
sqrt(c)*int(sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)),x)
```

3.104 $\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{c-a^2cx^2}}\,dx$

Optimal result . . . 852
Mathematica [A] (verified) . . . 852
Rubi [A] (verified) . . . 853
Maple [A] (verified) . . . 853
Fricas [F(-2)] . . . 854
Sympy [F] . . . 854
Maxima [F(-2)] . . . 855
Giac [A] (verification not implemented) . . . 855
Mupad [F(-1)] . . . 855
Reduce [B] (verification not implemented) . . . 856

Optimal result

Integrand size = 24, antiderivative size = 44

$$\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{c-a^2cx^2}}\,dx = \frac{2\sqrt{1-a^2x^2}\,\arcsin(ax)^{3/2}}{3a\sqrt{c-a^2cx^2}}$$

output
```
2/3*(-a^2*x^2+1)^(1/2)*arcsin(a*x)^(3/2)/a/(-a^2*c*x^2+c)^(1/2)
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{c-a^2cx^2}}\,dx = \frac{2\sqrt{1-a^2x^2}\,\arcsin(ax)^{3/2}}{3a\sqrt{c-a^2cx^2}}$$

input
```
Integrate[Sqrt[ArcSin[a*x]]/Sqrt[c - a^2*c*x^2],x]
```

output
```
(2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2))/(3*a*Sqrt[c - a^2*c*x^2])
```

Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{c - a^2 c x^2}}\, dx$$

$$\downarrow 5152$$

$$\frac{2\sqrt{1 - a^2 x^2}\, \arcsin(ax)^{3/2}}{3a\sqrt{c - a^2 c x^2}}$$

input
```
Int[Sqrt[ArcSin[a*x]]/Sqrt[c - a^2*c*x^2],x]
```

output
```
(2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2))/(3*a*Sqrt[c - a^2*c*x^2])
```

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 38, normalized size of antiderivative = 0.86

method	result	size
default	$\frac{2\arcsin(ax)^{\frac{3}{2}}\sqrt{-a^2x^2+1}}{3a\sqrt{-c(a^2x^2-1)}}$	38

input
```
int(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
2/3*arcsin(a*x)^(3/2)/a/(-c*(a^2*x^2-1))^(1/2)*(-a^2*x^2+1)^(1/2)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{c-a^2cx^2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{c-a^2cx^2}}\,dx = \int \frac{\sqrt{\operatorname{asin}(ax)}}{\sqrt{-c\,(ax-1)\,(ax+1)}}\,dx$$

input
```
integrate(asin(a*x)**(1/2)/(-a**2*c*x**2+c)**(1/2),x)
```

output
```
Integral(sqrt(asin(a*x))/sqrt(-c*(a*x - 1)*(a*x + 1)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{c-a^2cx^2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.32

$$\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{c-a^2cx^2}}\,dx = \frac{2\,\arcsin(ax)^{\frac{3}{2}}}{3\,a\sqrt{c}}$$

input
```
integrate(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(1/2),x, algorithm="giac")
```

output
```
2/3*arcsin(a*x)^(3/2)/(a*sqrt(c))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{c-a^2cx^2}}\,dx = \int \frac{\sqrt{\operatorname{asin}(a\,x)}}{\sqrt{c-a^2\,c\,x^2}}\,dx$$

input
```
int(asin(a*x)^(1/2)/(c - a^2*c*x^2)^(1/2),x)
```

output
```
int(asin(a*x)^(1/2)/(c - a^2*c*x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.43

$$\int \frac{\sqrt{\arcsin(ax)}}{\sqrt{c-a^2cx^2}}\,dx = \frac{2\sqrt{c}\,\sqrt{asin\,(ax)}\,asin(ax)}{3ac}$$

input
```
int(asin(a*x)^(1/2)/(-a^2*c*x^2+c)^(1/2),x)
```

output
```
(2*sqrt(c)*sqrt(asin(a*x))*asin(a*x))/(3*a*c)
```

3.105 $\int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{3/2}}\,dx$

Optimal result . . . 857
Mathematica [N/A] . . . 857
Rubi [N/A] . . . 858
Maple [N/A] . . . 858
Fricas [F(-2)] . . . 859
Sympy [N/A] . . . 859
Maxima [F(-2)] . . . 860
Giac [N/A] . . . 860
Mupad [N/A] . . . 860
Reduce [N/A] . . . 861

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{3/2}}\,dx = \text{Int}\left(\frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{3/2}},x\right)$$

output
```
Defer(Int)(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(3/2),x)
```

Mathematica [N/A]

Not integrable

Time = 1.65 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{3/2}}\,dx = \int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{3/2}}\,dx$$

input
```
Integrate[Sqrt[ArcSin[a*x]]/(c - a^2*c*x^2)^(3/2),x]
```

output
```
Integrate[Sqrt[ArcSin[a*x]]/(c - a^2*c*x^2)^(3/2), x]
```

Rubi [N/A]

Not integrable

Time = 0.39 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{3/2}}\,dx$$

$$\downarrow 5160$$

$$\frac{x\sqrt{\arcsin(ax)}}{c\sqrt{c-a^2cx^2}} - \frac{a\sqrt{1-a^2x^2}\int \frac{x}{(1-a^2x^2)\sqrt{\arcsin(ax)}}dx}{2c\sqrt{c-a^2cx^2}}$$

$$\downarrow 5234$$

$$\frac{x\sqrt{\arcsin(ax)}}{c\sqrt{c-a^2cx^2}} - \frac{a\sqrt{1-a^2x^2}\int \frac{x}{(1-a^2x^2)\sqrt{\arcsin(ax)}}dx}{2c\sqrt{c-a^2cx^2}}$$

input
```
Int[Sqrt[ArcSin[a*x]]/(c - a^2*c*x^2)^(3/2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.36 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\sqrt{\arcsin(ax)}}{(-a^2c\,x^2+c)^{\frac{3}{2}}}\,dx$$

input
```
int(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(3/2),x)
```

output
```
int(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 2.99 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \int \frac{\sqrt{\operatorname{asin}(ax)}}{\left(-c\left(ax-1\right)\left(ax+1\right)\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate(asin(a*x)**(1/2)/(-a**2*c*x**2+c)**(3/2),x)
```

output
```
Integral(sqrt(asin(a*x))/(-c*(a*x - 1)*(a*x + 1))**(3/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.42 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \int \frac{\sqrt{\arcsin\left(ax\right)}}{\left(-a^2cx^2+c\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(3/2),x, algorithm="giac")
```

output
```
integrate(sqrt(arcsin(a*x))/(-a^2*c*x^2 + c)^(3/2), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \int \frac{\sqrt{\mathrm{asin}\left(a\,x\right)}}{\left(c-a^2\,c\,x^2\right)^{3/2}}\,dx$$

input
```
int(asin(a*x)^(1/2)/(c - a^2*c*x^2)^(3/2),x)
```

output
```
int(asin(a*x)^(1/2)/(c - a^2*c*x^2)^(3/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.83

$$\int \frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \frac{\sqrt{c}\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin(ax)}}{a^4x^4-2a^2x^2+1}dx\right)}{c^2}$$

input
```
int(asin(a*x)^(1/2)/(-a^2*c*x^2+c)^(3/2),x)
```

output
```
(sqrt(c)*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/(a**4*x**4 - 2*a**2*
x**2 + 1),x))/c**2
```

3.106 $\int \frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{5/2}}\,dx$

Optimal result . . . 862
Mathematica [N/A] . . . 862
Rubi [N/A] . . . 863
Maple [N/A] . . . 864
Fricas [F(-2)] . . . 864
Sympy [N/A] . . . 864
Maxima [F(-2)] . . . 865
Giac [N/A] . . . 865
Mupad [N/A] . . . 866
Reduce [N/A] . . . 866

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{5/2}}\,dx = \text{Int}\left(\frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{5/2}},x\right)$$

output
```
Defer(Int)(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(5/2),x)
```

Mathematica [N/A]

Not integrable

Time = 1.98 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{5/2}}\,dx = \int \frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{5/2}}\,dx$$

input
```
Integrate[Sqrt[ArcSin[a*x]]/(c - a^2*c*x^2)^(5/2),x]
```

output
```
Integrate[Sqrt[ArcSin[a*x]]/(c - a^2*c*x^2)^(5/2), x]
```

Rubi [N/A]

Not integrable

Time = 0.67 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{5/2}}\,dx$$

$$\downarrow 5162$$

$$-\frac{a\sqrt{1-a^2x^2}\int \frac{x}{(1-a^2x^2)^2\sqrt{\arcsin(ax)}}dx}{6c^2\sqrt{c-a^2cx^2}}+\frac{2\int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{3/2}}dx}{3c}+\frac{x\sqrt{\arcsin(ax)}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5160$$

$$-\frac{a\sqrt{1-a^2x^2}\int \frac{x}{(1-a^2x^2)^2\sqrt{\arcsin(ax)}}dx}{6c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\sqrt{\arcsin(ax)}}{c\sqrt{c-a^2cx^2}}-\frac{a\sqrt{1-a^2x^2}\int \frac{x}{\left(1-a^2x^2\right)\sqrt{\arcsin(ax)}}dx}{2c\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\sqrt{\arcsin(ax)}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5234$$

$$-\frac{a\sqrt{1-a^2x^2}\int \frac{x}{(1-a^2x^2)^2\sqrt{\arcsin(ax)}}dx}{6c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\sqrt{\arcsin(ax)}}{c\sqrt{c-a^2cx^2}}-\frac{a\sqrt{1-a^2x^2}\int \frac{x}{\left(1-a^2x^2\right)\sqrt{\arcsin(ax)}}dx}{2c\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\sqrt{\arcsin(ax)}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

input
```
Int[Sqrt[ArcSin[a*x]]/(c - a^2*c*x^2)^(5/2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.40 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\sqrt{\arcsin(ax)}}{(-a^2 c\, x^2 + c)^{\frac{5}{2}}}\, dx$$

input
```
int(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(5/2),x)
```

output
```
int(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(5/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{\arcsin(ax)}}{(c - a^2 c x^2)^{5/2}}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(5/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 24.88 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\sqrt{\arcsin(ax)}}{(c - a^2 c x^2)^{5/2}}\, dx = \int \frac{\sqrt{\operatorname{asin}(ax)}}{(-c\,(ax-1)\,(ax+1))^{\frac{5}{2}}}\, dx$$

input
```
integrate(asin(a*x)**(1/2)/(-a**2*c*x**2+c)**(5/2),x)
```

output
```
Integral(sqrt(asin(a*x))/(-c*(a*x - 1)*(a*x + 1))**(5/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{5/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.48 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{\arcsin(ax)}}{\left(c-a^2cx^2\right)^{5/2}}\,dx = \int \frac{\sqrt{\arcsin\left(ax\right)}}{\left(-a^2cx^2+c\right)^{\frac{5}{2}}}\,dx$$

input
```
integrate(arcsin(a*x)^(1/2)/(-a^2*c*x^2+c)^(5/2),x, algorithm="giac")
```

output
```
integrate(sqrt(arcsin(a*x))/(-a^2*c*x^2 + c)^(5/2), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{5/2}}\,dx = \int \frac{\sqrt{\operatorname{asin}(a\,x)}}{(c-a^2\,c\,x^2)^{5/2}}\,dx$$

input
```
int(asin(a*x)^(1/2)/(c - a^2*c*x^2)^(5/2),x)
```

output
```
int(asin(a*x)^(1/2)/(c - a^2*c*x^2)^(5/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.21

$$\int \frac{\sqrt{\arcsin(ax)}}{(c-a^2cx^2)^{5/2}}\,dx = -\frac{\sqrt{c}\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin(ax)}}{a^6x^6-3a^4x^4+3a^2x^2-1}dx\right)}{c^3}$$

input
```
int(asin(a*x)^(1/2)/(-a^2*c*x^2+c)^(5/2),x)
```

output
```
( - sqrt(c)*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/(a**6*x**6 - 3*a*
*4*x**4 + 3*a**2*x**2 - 1),x))/c**3
```

3.107 $\int (c - a^2cx^2)^{3/2} \arcsin(ax)^{3/2}\, dx$

Optimal result . . . 867
Mathematica [C] (verified) . . . 868
Rubi [A] (verified) . . . 868
Maple [F] . . . 874
Fricas [F(-2)] . . . 874
Sympy [F(-1)] . . . 875
Maxima [F(-2)] . . . 875
Giac [F(-2)] . . . 875
Mupad [F(-1)] . . . 876
Reduce [F] . . . 876

Optimal result

Integrand size = 24, antiderivative size = 363

$$\int (c - a^2cx^2)^{3/2} \arcsin(ax)^{3/2}\, dx = \frac{27c\sqrt{c - a^2cx^2}\sqrt{\arcsin(ax)}}{256a\sqrt{1 - a^2x^2}}$$
$$- \frac{9acx^2\sqrt{c - a^2cx^2}\sqrt{\arcsin(ax)}}{32\sqrt{1 - a^2x^2}} + \frac{3c(1 - a^2x^2)^{3/2}\sqrt{c - a^2cx^2}\sqrt{\arcsin(ax)}}{32a}$$
$$+ \frac{3}{8}cx\sqrt{c - a^2cx^2}\arcsin(ax)^{3/2} + \frac{1}{4}x\left(c - a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2} + \frac{3c\sqrt{c - a^2cx^2}\arcsin(ax)^{5/2}}{20a\sqrt{1 - a^2x^2}} - \frac{3c\sqrt{\frac{\pi}{2}}\sqrt{c -}}{}$$

output

```
27/256*c*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)/a/(-a^2*x^2+1)^(1/2)-9/32*
a*c*x^2*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)/(-a^2*x^2+1)^(1/2)+3/32*c*(
-a^2*x^2+1)^(3/2)*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)/a+3/8*c*x*(-a^2*c
*x^2+c)^(1/2)*arcsin(a*x)^(3/2)+1/4*x*(-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(3/
2)+3/20*c*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(5/2)/a/(-a^2*x^2+1)^(1/2)-3/10
24*c*2^(1/2)*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelC(2*2^(1/2)/Pi^(1/2)*arc
sin(a*x)^(1/2))/a/(-a^2*x^2+1)^(1/2)-3/32*c*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*
FresnelC(2*arcsin(a*x)^(1/2)/Pi^(1/2))/a/(-a^2*x^2+1)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.36 (sec) , antiderivative size = 186, normalized size of antiderivative = 0.51

$$\int (c - a^2 c x^2)^{3/2} \arcsin(ax)^{3/2}\, dx = \frac{c\sqrt{c-a^2cx^2}\left(-240\sqrt{\pi}\sqrt{\arcsin(ax)^2}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right) + \sqrt{\arcsin(ax)}\right.$$

input
```
Integrate[(c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^(3/2),x]
```

output
```
(c*Sqrt[c - a^2*c*x^2]*(-240*Sqrt[Pi]*Sqrt[ArcSin[a*x]^2]*FresnelC[(2*Sqrt
[ArcSin[a*x]])/Sqrt[Pi]] + Sqrt[ArcSin[a*x]]*(5*Sqrt[I*ArcSin[a*x]]*Gamma[
5/2, (-4*I)*ArcSin[a*x]] + 5*Sqrt[(-I)*ArcSin[a*x]]*Gamma[5/2, (4*I)*ArcSi
n[a*x]] + 32*Sqrt[ArcSin[a*x]^2]*(12*ArcSin[a*x]^2 + 15*Cos[2*ArcSin[a*x]]
 + 20*ArcSin[a*x]*Sin[2*ArcSin[a*x]])))/(2560*a*Sqrt[1 - a^2*x^2]*Sqrt[Ar
cSin[a*x]^2])
```

Rubi [A] (verified)

Time = 2.32 (sec) , antiderivative size = 339, normalized size of antiderivative = 0.93, number of steps used = 14, number of rules used = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.542$, Rules used = {5158, 5156, 5140, 5152, 5182, 5168, 3042, 3793, 2009, 5224, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \arcsin(ax)^{3/2} \left(c - a^2 c x^2\right)^{3/2}\, dx$$

$$\downarrow 5158$$

$$-\frac{3ac\sqrt{c-a^2cx^2}\int x\left(1-a^2x^2\right)\sqrt{\arcsin(ax)}dx}{8\sqrt{1-a^2x^2}} + \frac{3}{4}c\int \sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}dx + \frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5156$$

$$-\frac{3ac\sqrt{c-a^2cx^2}\int x\left(1-a^2x^2\right)\sqrt{\arcsin(ax)}dx}{8\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\int x\sqrt{\arcsin(ax)}dx}{4\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\arcsin(ax)^{3/2}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}\right)+$$
$$\frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5140$$

$$-\frac{3ac\sqrt{c-a^2cx^2}\int x\left(1-a^2x^2\right)\sqrt{\arcsin(ax)}dx}{8\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{1}{4}a\int\frac{x^2}{\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\arcsin(ax)^{3/2}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin\right.$$
$$\frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5152$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{1}{4}a\int\frac{x^2}{\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(a\right.$$
$$\frac{3ac\sqrt{c-a^2cx^2}\int x\left(1-a^2x^2\right)\sqrt{\arcsin(ax)}dx}{8\sqrt{1-a^2x^2}}+\frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5182$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{1}{4}a\int\frac{x^2}{\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(a\right.$$
$$\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\int\frac{\left(1-a^2x^2\right)^{3/2}}{\sqrt{\arcsin(ax)}}dx}{8a}-\frac{\left(1-a^2x^2\right)^2\sqrt{\arcsin(ax)}}{4a^2}\right)}{8\sqrt{1-a^2x^2}}+\frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5168$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{1}{4}a\int\frac{x^2}{\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(a\right.$$
$$\left.\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\int\frac{\left(1-a^2x^2\right)^2}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a^2}-\frac{\left(1-a^2x^2\right)^2\sqrt{\arcsin(ax)}}{4a^2}\right)}{8\sqrt{1-a^2x^2}}+\right.$$
$$\left.\frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}\right)$$

$$\downarrow 3042$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{1}{4}a\int\frac{x^2}{\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(a\right.$$
$$\left.\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\int\frac{\sin\left(\arcsin(ax)+\frac{\pi}{2}\right)^4}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a^2}-\frac{\left(1-a^2x^2\right)^2\sqrt{\arcsin(ax)}}{4a^2}\right)}{8\sqrt{1-a^2x^2}}+\right.$$
$$\left.\frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}\right)$$

$$\downarrow 3793$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{1}{4}a\int\frac{x^2}{\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(a\right.$$
$$\left.\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\int\left(\frac{\cos(2\arcsin(ax))}{2\sqrt{\arcsin(ax)}}+\frac{\cos(4\arcsin(ax))}{8\sqrt{\arcsin(ax)}}+\frac{3}{8\sqrt{\arcsin(ax)}}\right)d\arcsin(ax)}{8a^2}-\frac{\left(1-a^2x^2\right)^2\sqrt{\arcsin(ax)}}{4a^2}\right)}{8\sqrt{1-a^2x^2}}+\right.$$
$$\left.\frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}\right)$$

$$\downarrow 2009$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{1}{4}a\int\frac{x^2}{\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(a\right.$$

$$\left.\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)+\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+\frac{3}{4}\sqrt{\arcsin(ax)}}{8a^2}-\frac{\left(1-a^2x^2\right)^2\sqrt{\arcsin(ax)}}{4a^2}\right)}{8\sqrt{1-a^2x^2}}+\right.$$

$$\frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5224$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{\int\frac{a^2x^2}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{3/2}\right.$$

$$\left.\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)+\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+\frac{3}{4}\sqrt{\arcsin(ax)}}{8a^2}-\frac{\left(1-a^2x^2\right)^2\sqrt{\arcsin(ax)}}{4a^2}\right)}{8\sqrt{1-a^2x^2}}+\right.$$

$$\frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 3042$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{\int\frac{\sin(\arcsin(ax))^2}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)\right.$$

$$\left.\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)+\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+\frac{3}{4}\sqrt{\arcsin(ax)}}{8a^2}-\frac{\left(1-a^2x^2\right)^2\sqrt{\arcsin(ax)}}{4a^2}\right)}{8\sqrt{1-a^2x^2}}+\right.$$

$$\frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 3793$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{\int\left(\frac{1}{2\sqrt{\arcsin(ax)}}-\frac{\cos(2\arcsin(ax))}{2\sqrt{\arcsin(ax)}}\right)d\arcsin(ax)}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\right.$$

$$\left.\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)+\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+\frac{3}{4}\sqrt{\arcsin(ax)}}{8a^2}-\frac{\left(1-a^2x^2\right)^2\sqrt{\arcsin(ax)}}{4a^2}\right)}{8\sqrt{1-a^2x^2}}+\right.$$

$$\left.\frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}\right)$$

$$\downarrow \text{2009}$$

$$-\frac{3ac\sqrt{c-a^2cx^2}\left(\frac{\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)+\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+\frac{3}{4}\sqrt{\arcsin(ax)}}{8a^2}-\frac{\left(1-a^2x^2\right)^2\sqrt{\arcsin(ax)}}{4a^2}\right)}{8\sqrt{1-a^2x^2}}+$$

$$\frac{3}{4}c\left(-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{\sqrt{\arcsin(ax)}-\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\right.$$

$$\left.\frac{1}{4}x\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}\right)$$

input
```
Int[(c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^(3/2),x]
```

output
```
(x*(c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^(3/2))/4 - (3*a*c*Sqrt[c - a^2*c*x^2]
*(-1/4*((1 - a^2*x^2)^2*Sqrt[ArcSin[a*x]])/a^2 + ((3*Sqrt[ArcSin[a*x]])/4
+ (Sqrt[Pi/2]*FresnelC[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/8 + (Sqrt[Pi]*Fres
nelC[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/2)/(8*a^2)))/(8*Sqrt[1 - a^2*x^2]) +
 (3*c*((x*Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(3/2))/2 + (Sqrt[c - a^2*c*x^2]*
ArcSin[a*x]^(5/2))/(5*a*Sqrt[1 - a^2*x^2]) - (3*a*Sqrt[c - a^2*c*x^2]*((x^
2*Sqrt[ArcSin[a*x]])/2 - (Sqrt[ArcSin[a*x]] - (Sqrt[Pi]*FresnelC[(2*Sqrt[A
rcSin[a*x]])/Sqrt[Pi]])/2)/(4*a^2)))/(4*Sqrt[1 - a^2*x^2])))/4
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5140
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[x
^(m + 1)*((a + b*ArcSin[c*x])^n/(m + 1)), x] - Simp[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 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

rule 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

rule 5182
```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [F]

$$\int \left(-a^2 c\, x^2 + c\right)^{\frac{3}{2}} \arcsin\left(ax\right)^{\frac{3}{2}}\, dx$$

input
```
int((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(3/2),x)
```

output
```
int((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^{3/2}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^{3/2}\, dx = \text{Timed out}$$

input
```
integrate((-a**2*c*x**2+c)**(3/2)*asin(a*x)**(3/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^{3/2}\, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F(-2)]

Exception generated.

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^{3/2}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(3/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(a x)^{3/2}\, dx = \int \operatorname{asin}(a\,x)^{3/2} \left(c - a^2\, c\, x^2\right)^{3/2} dx$$

input
```
int(asin(a*x)^(3/2)*(c - a^2*c*x^2)^(3/2),x)
```

output
```
int(asin(a*x)^(3/2)*(c - a^2*c*x^2)^(3/2), x)
```

Reduce [F]

$$\int (c$$

$$-a^2 c x^2)^{3/2} \arcsin(a x)^{3/2}\, dx = \sqrt{c}\, c \left(- \left(\int \sqrt{-a^2 x^2 + 1}\, \sqrt{asin\,(ax)}\, asin(ax)\, x^2 dx \right) a^2 + \int \sqrt{-a^2 x^2 + 1}\, \sqrt{}$$

input
```
int((-a^2*c*x^2+c)^(3/2)*asin(a*x)^(3/2),x)
```

output
```
sqrt(c)*c*( - int(sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*asin(a*x)*x**2,x)
*a**2 + int(sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*asin(a*x),x))
```

3.108 $\int \sqrt{c - a^2 c x^2} \arcsin(ax)^{3/2}\, dx$

Optimal result . . . 877
Mathematica [C] (verified) . . . 878
Rubi [A] (verified) . . . 878
Maple [F] . . . 881
Fricas [F(-2)] . . . 881
Sympy [F] . . . 882
Maxima [F(-2)] . . . 882
Giac [F(-2)] . . . 882
Mupad [F(-1)] . . . 883
Reduce [F] . . . 883

Optimal result

Integrand size = 24, antiderivative size = 219

$$\int \sqrt{c - a^2 c x^2} \arcsin(ax)^{3/2}\, dx = \frac{3\sqrt{c - a^2 c x^2}\sqrt{\arcsin(ax)}}{16a\sqrt{1 - a^2 x^2}} - \frac{3ax^2\sqrt{c - a^2 c x^2}\sqrt{\arcsin(ax)}}{8\sqrt{1 - a^2 x^2}} + \frac{1}{2}x\sqrt{c - a^2 c x^2}\arcsin(ax)^{3/2} + \frac{\sqrt{c - a^2 c x^2}\arcsin(ax)^{5/2}}{5a\sqrt{1 - a^2 x^2}} - \frac{3\sqrt{\pi}\sqrt{c - a^2 c x^2}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{32a\sqrt{1 - a^2 x^2}}$$

output

```
3/16*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)/a/(-a^2*x^2+1)^(1/2)-3/8*a*x^2
*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)/(-a^2*x^2+1)^(1/2)+1/2*x*(-a^2*c*x
^2+c)^(1/2)*arcsin(a*x)^(3/2)+1/5*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(5/2)/a
/(-a^2*x^2+1)^(1/2)-3/32*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelC(2*arcsin(a
*x)^(1/2)/Pi^(1/2))/a/(-a^2*x^2+1)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.06 (sec) , antiderivative size = 144, normalized size of antiderivative = 0.66

$$\int \sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}\,dx = \frac{\sqrt{c-a^2cx^2}\left(32\arcsin(ax)^2\left(5ax\sqrt{1-a^2x^2}+2\arcsin(ax)\right)+15i\sqrt{2}\sqrt{-}\right.}{320a\sqrt{1-a}}$$

input
```
Integrate[Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(3/2),x]
```

output
```
(Sqrt[c - a^2*c*x^2]*(32*ArcSin[a*x]^2*(5*a*x*Sqrt[1 - a^2*x^2] + 2*ArcSin
[a*x]) + (15*I)*Sqrt[2]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[3/2, (-2*I)*ArcSin[a*
x]] - (15*I)*Sqrt[2]*Sqrt[I*ArcSin[a*x]]*Gamma[3/2, (2*I)*ArcSin[a*x]]))/(
320*a*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])
```

Rubi [A] (verified)

Time = 0.90 (sec) , antiderivative size = 164, normalized size of antiderivative = 0.75, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.292$, Rules used = {5156, 5140, 5152, 5224, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}\,dx$$

$$\downarrow 5156$$

$$-\frac{3a\sqrt{c-a^2cx^2}\int x\sqrt{\arcsin(ax)}dx}{4\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\arcsin(ax)^{3/2}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 5140$$

$$-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{1}{4}a\int\frac{x^2}{\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\arcsin(ax)^{3/2}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 5152$$

$$-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{1}{4}a\int\frac{x^2}{\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 5224$$

$$-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{\int\frac{a^2x^2}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 3042$$

$$-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{\int\frac{\sin(\arcsin(ax))^2}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 3793$$

$$-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{\int\left(\frac{1}{2\sqrt{\arcsin(ax)}}-\frac{\cos(2\arcsin(ax))}{2\sqrt{\arcsin(ax)}}\right)d\arcsin(ax)}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 2009$$

$$-\frac{3a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\sqrt{\arcsin(ax)}-\frac{\sqrt{\arcsin(ax)}-\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{4a^2}\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}{5a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}$$

input
```
Int[Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(3/2),x]
```

output
```
(x*Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(3/2))/2 + (Sqrt[c - a^2*c*x^2]*ArcSin[
a*x]^(5/2))/(5*a*Sqrt[1 - a^2*x^2]) - (3*a*Sqrt[c - a^2*c*x^2]*((x^2*Sqrt[
ArcSin[a*x]])/2 - (Sqrt[ArcSin[a*x]] - (Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a
*x]])/Sqrt[Pi]])/2)/(4*a^2)))/(4*Sqrt[1 - a^2*x^2])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5140
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[x
^(m + 1)*((a + b*ArcSin[c*x])^n/(m + 1)), x] - Simp[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 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156

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

rule 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [F]

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

input

```
int((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(3/2),x)
```

output

```
int((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \sqrt{c - a^2 c x^2}\, \arcsin(ax)^{3/2}\, dx = \text{Exception raised: TypeError}$$

input

```
integrate((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(3/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \sqrt{c - a^2 c x^2}\, \arcsin(ax)^{3/2}\, dx = \int \sqrt{-c\,(ax-1)\,(ax+1)}\, \operatorname{asin}^{\frac{3}{2}}(ax)\, dx$$

input
```
integrate((-a**2*c*x**2+c)**(1/2)*asin(a*x)**(3/2),x)
```

output
```
Integral(sqrt(-c*(a*x - 1)*(a*x + 1))*asin(a*x)**(3/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \sqrt{c - a^2 c x^2}\, \arcsin(ax)^{3/2}\, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F(-2)]

Exception generated.

$$\int \sqrt{c - a^2 c x^2}\, \arcsin(ax)^{3/2}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(3/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{c-a^2cx^2}\,\arcsin(ax)^{3/2}\,dx = \int \mathrm{asin}(a\,x)^{3/2}\,\sqrt{c-a^2\,c\,x^2}\,dx$$

input
```
int(asin(a*x)^(3/2)*(c - a^2*c*x^2)^(1/2),x)
```

output
```
int(asin(a*x)^(3/2)*(c - a^2*c*x^2)^(1/2), x)
```

Reduce [F]

$$\int \sqrt{c-a^2cx^2}\,\arcsin(ax)^{3/2}\,dx = \sqrt{c}\left(\int \sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,asin(ax)\,dx\right)$$

input
```
int((-a^2*c*x^2+c)^(1/2)*asin(a*x)^(3/2),x)
```

output
```
sqrt(c)*int(sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*asin(a*x),x)
```

3.109 $\int \frac{\arcsin(ax)^{3/2}}{\sqrt{c-a^2cx^2}}\,dx$

Optimal result . . . 884
Mathematica [A] (verified) . . . 884
Rubi [A] (verified) . . . 885
Maple [A] (verified) . . . 885
Fricas [F(-2)] . . . 886
Sympy [F] . . . 886
Maxima [F(-2)] . . . 887
Giac [A] (verification not implemented) . . . 887
Mupad [F(-1)] . . . 887
Reduce [B] (verification not implemented) . . . 888

Optimal result

Integrand size = 24, antiderivative size = 44

$$\int \frac{\arcsin(ax)^{3/2}}{\sqrt{c-a^2cx^2}}\,dx = \frac{2\sqrt{1-a^2x^2}\,\arcsin(ax)^{5/2}}{5a\sqrt{c-a^2cx^2}}$$

output
```
2/5*(-a^2*x^2+1)^(1/2)*arcsin(a*x)^(5/2)/a/(-a^2*c*x^2+c)^(1/2)
```

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00

$$\int \frac{\arcsin(ax)^{3/2}}{\sqrt{c-a^2cx^2}}\,dx = \frac{2\sqrt{1-a^2x^2}\,\arcsin(ax)^{5/2}}{5a\sqrt{c-a^2cx^2}}$$

input
```
Integrate[ArcSin[a*x]^(3/2)/Sqrt[c - a^2*c*x^2],x]
```

output
```
(2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(5/2))/(5*a*Sqrt[c - a^2*c*x^2])
```

Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\arcsin(ax)^{3/2}}{\sqrt{c-a^2cx^2}}\,dx$$
$$\downarrow 5152$$
$$\frac{2\sqrt{1-a^2x^2}\arcsin(ax)^{5/2}}{5a\sqrt{c-a^2cx^2}}$$

input
```
Int[ArcSin[a*x]^(3/2)/Sqrt[c - a^2*c*x^2],x]
```

output
```
(2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(5/2))/(5*a*Sqrt[c - a^2*c*x^2])
```

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 38, normalized size of antiderivative = 0.86

method	result	size
default	$\frac{2\arcsin(ax)^{\frac{5}{2}}\sqrt{-a^2x^2+1}}{5a\sqrt{-c(a^2x^2-1)}}$	38

input
```
int(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
2/5*arcsin(a*x)^(5/2)/a/(-c*(a^2*x^2-1))^(1/2)*(-a^2*x^2+1)^(1/2)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^{3/2}}{\sqrt{c-a^2cx^2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{\arcsin(ax)^{3/2}}{\sqrt{c-a^2cx^2}}\,dx = \int \frac{\operatorname{asin}^{\frac{3}{2}}(ax)}{\sqrt{-c\,(ax-1)\,(ax+1)}}\,dx$$

input
```
integrate(asin(a*x)**(3/2)/(-a**2*c*x**2+c)**(1/2),x)
```

output
```
Integral(asin(a*x)**(3/2)/sqrt(-c*(a*x - 1)*(a*x + 1)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^{3/2}}{\sqrt{c-a^2cx^2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.32

$$\int \frac{\arcsin(ax)^{3/2}}{\sqrt{c-a^2cx^2}}\,dx = \frac{2\,\arcsin(ax)^{\frac{5}{2}}}{5\,a\sqrt{c}}$$

input
```
integrate(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(1/2),x, algorithm="giac")
```

output
```
2/5*arcsin(a*x)^(5/2)/(a*sqrt(c))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\arcsin(ax)^{3/2}}{\sqrt{c-a^2cx^2}}\,dx = \int \frac{\mathrm{asin}(a\,x)^{3/2}}{\sqrt{c-a^2\,c\,x^2}}\,dx$$

input
```
int(asin(a*x)^(3/2)/(c - a^2*c*x^2)^(1/2),x)
```

output
```
int(asin(a*x)^(3/2)/(c - a^2*c*x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.48

$$\int \frac{\arcsin(ax)^{3/2}}{\sqrt{c-a^2cx^2}}\,dx = \frac{2\sqrt{c}\,\sqrt{asin\,(ax)}\,asin(ax)^2}{5ac}$$

input
```
int(asin(a*x)^(3/2)/(-a^2*c*x^2+c)^(1/2),x)
```

output
```
(2*sqrt(c)*sqrt(asin(a*x))*asin(a*x)**2)/(5*a*c)
```

3.110 $\int \frac{\arcsin(ax)^{3/2}}{\left(c-a^2cx^2\right)^{3/2}}\,dx$

Optimal result . . . 889
Mathematica [N/A] . . . 889
Rubi [N/A] . . . 890
Maple [N/A] . . . 890
Fricas [F(-2)] . . . 891
Sympy [N/A] . . . 891
Maxima [F(-2)] . . . 892
Giac [N/A] . . . 892
Mupad [N/A] . . . 892
Reduce [N/A] . . . 893

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{3/2}}\,dx = \text{Int}\left(\frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{3/2}},x\right)$$

output
```
Defer(Int)(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(3/2),x)
```

Mathematica [N/A]

Not integrable

Time = 1.93 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{3/2}}\,dx = \int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{3/2}}\,dx$$

input
```
Integrate[ArcSin[a*x]^(3/2)/(c - a^2*c*x^2)^(3/2),x]
```

output
```
Integrate[ArcSin[a*x]^(3/2)/(c - a^2*c*x^2)^(3/2), x]
```

Rubi [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{3/2}}\,dx$$

$$\downarrow 5160$$

$$\frac{x\arcsin(ax)^{3/2}}{c\sqrt{c-a^2cx^2}} - \frac{3a\sqrt{1-a^2x^2}\int \frac{x\sqrt{\arcsin(ax)}}{1-a^2x^2}dx}{2c\sqrt{c-a^2cx^2}}$$

$$\downarrow 5234$$

$$\frac{x\arcsin(ax)^{3/2}}{c\sqrt{c-a^2cx^2}} - \frac{3a\sqrt{1-a^2x^2}\int \frac{x\sqrt{\arcsin(ax)}}{1-a^2x^2}dx}{2c\sqrt{c-a^2cx^2}}$$

input
```
Int[ArcSin[a*x]^(3/2)/(c - a^2*c*x^2)^(3/2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\arcsin(ax)^{\frac{3}{2}}}{(-a^2c\,x^2+c)^{\frac{3}{2}}}dx$$

input
```
int(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(3/2),x)
```

output
```
int(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^{3/2}}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 16.18 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\arcsin(ax)^{3/2}}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \int \frac{\operatorname{asin}^{\frac{3}{2}}(ax)}{\left(-c\left(ax-1\right)\left(ax+1\right)\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate(asin(a*x)**(3/2)/(-a**2*c*x**2+c)**(3/2),x)
```

output
```
Integral(asin(a*x)**(3/2)/(-c*(a*x - 1)*(a*x + 1))**(3/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.60 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{3/2}}\,dx = \int \frac{\arcsin\left(ax\right)^{\frac{3}{2}}}{\left(-a^2cx^2+c\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(3/2),x, algorithm="giac")
```

output
```
integrate(arcsin(a*x)^(3/2)/(-a^2*c*x^2 + c)^(3/2), x)
```

Mupad [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{3/2}}\,dx = \int \frac{\mathrm{asin}(a\,x)^{3/2}}{(c-a^2\,c\,x^2)^{3/2}}\,dx$$

input
```
int(asin(a*x)^(3/2)/(c - a^2*c*x^2)^(3/2),x)
```

output
```
int(asin(a*x)^(3/2)/(c - a^2*c*x^2)^(3/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 93, normalized size of antiderivative = 3.88

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{3/2}}\,dx = \frac{\sqrt{c}\left(-2\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,asin(ax)\,x+3\left(\int \frac{\sqrt{asin(ax)}\,x}{a^2x^2-1}dx\right)a^3x^2-3\left(\int \frac{\sqrt{asin(}}{a^2x^2}\right.\right.}{2c^2\left(a^2x^2-1\right)}$$

input
```
int(asin(a*x)^(3/2)/(-a^2*c*x^2+c)^(3/2),x)
```

output
```
(sqrt(c)*( - 2*sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*asin(a*x)*x + 3*int(
(sqrt(asin(a*x))*x)/(a**2*x**2 - 1),x)*a**3*x**2 - 3*int((sqrt(asin(a*x))*
x)/(a**2*x**2 - 1),x)*a))/(2*c**2*(a**2*x**2 - 1))
```

3.111 $\int \frac{\arcsin(ax)^{3/2}}{\left(c-a^2cx^2\right)^{5/2}}\,dx$

Optimal result . . . 894
Mathematica [N/A] . . . 894
Rubi [N/A] . . . 895
Maple [N/A] . . . 896
Fricas [F(-2)] . . . 897
Sympy [N/A] . . . 897
Maxima [F(-2)] . . . 897
Giac [N/A] . . . 898
Mupad [N/A] . . . 898
Reduce [N/A] . . . 899

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}}\,dx = \text{Int}\left(\frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}},x\right)$$

output
```
Defer(Int)(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(5/2),x)
```

Mathematica [N/A]

Not integrable

Time = 2.78 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}}\,dx = \int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}}\,dx$$

input
```
Integrate[ArcSin[a*x]^(3/2)/(c - a^2*c*x^2)^(5/2),x]
```

output
```
Integrate[ArcSin[a*x]^(3/2)/(c - a^2*c*x^2)^(5/2), x]
```

Rubi [N/A]

Not integrable

Time = 0.92 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}}\,dx$$

$$\downarrow 5162$$

$$-\frac{a\sqrt{1-a^2x^2}\int \frac{x\sqrt{\arcsin(ax)}}{(1-a^2x^2)^2}dx}{2c^2\sqrt{c-a^2cx^2}}+\frac{2\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{3/2}}dx}{3c}+\frac{x\arcsin(ax)^{3/2}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5160$$

$$-\frac{a\sqrt{1-a^2x^2}\int \frac{x\sqrt{\arcsin(ax)}}{(1-a^2x^2)^2}dx}{2c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\arcsin(ax)^{3/2}}{c\sqrt{c-a^2cx^2}}-\frac{3a\sqrt{1-a^2x^2}\int \frac{x\sqrt{\arcsin(ax)}}{1-a^2x^2}dx}{2c\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\arcsin(ax)^{3/2}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5182$$

$$-\frac{a\sqrt{1-a^2x^2}\left(\frac{\sqrt{\arcsin(ax)}}{2a^2(1-a^2x^2)}-\frac{\int \frac{1}{\left(1-a^2x^2\right)^{3/2}\sqrt{\arcsin(ax)}}dx}{4a}\right)}{2c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\arcsin(ax)^{3/2}}{c\sqrt{c-a^2cx^2}}-\frac{3a\sqrt{1-a^2x^2}\int \frac{x\sqrt{\arcsin(ax)}}{1-a^2x^2}dx}{2c\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\arcsin(ax)^{3/2}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5174$$

$$-\frac{a\sqrt{1-a^2x^2}\left(\frac{\sqrt{\arcsin(ax)}}{2a^2(1-a^2x^2)}-\frac{\int\frac{1}{\left(1-a^2x^2\right)^{3/2}\sqrt{\arcsin(ax)}}dx}{4a}\right)}{2c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\arcsin(ax)^{3/2}}{c\sqrt{c-a^2cx^2}}-\frac{3a\sqrt{1-a^2x^2}\int\frac{x\sqrt{\arcsin(ax)}}{1-a^2x^2}dx}{2c\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\arcsin(ax)^{3/2}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5234$$

$$-\frac{a\sqrt{1-a^2x^2}\left(\frac{\sqrt{\arcsin(ax)}}{2a^2(1-a^2x^2)}-\frac{\int\frac{1}{\left(1-a^2x^2\right)^{3/2}\sqrt{\arcsin(ax)}}dx}{4a}\right)}{2c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\arcsin(ax)^{3/2}}{c\sqrt{c-a^2cx^2}}-\frac{3a\sqrt{1-a^2x^2}\int\frac{x\sqrt{\arcsin(ax)}}{1-a^2x^2}dx}{2c\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\arcsin(ax)^{3/2}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

input
```
Int[ArcSin[a*x]^(3/2)/(c - a^2*c*x^2)^(5/2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.40 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\arcsin(ax)^{\frac{3}{2}}}{\left(-a^2c\,x^2+c\right)^{\frac{5}{2}}}dx$$

input
```
int(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(5/2),x)
```

output
```
int(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(5/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(5/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 57.97 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}}\,dx = \int \frac{\operatorname{asin}^{\frac{3}{2}}(ax)}{(-c\,(ax-1)\,(ax+1))^{\frac{5}{2}}}\,dx$$

input
```
integrate(asin(a*x)**(3/2)/(-a**2*c*x**2+c)**(5/2),x)
```

output
```
Integral(asin(a*x)**(3/2)/(-c*(a*x - 1)*(a*x + 1))**(5/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.62 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}}\,dx = \int \frac{\arcsin\left(ax\right)^{\frac{3}{2}}}{(-a^2cx^2+c)^{\frac{5}{2}}}\,dx$$

input
```
integrate(arcsin(a*x)^(3/2)/(-a^2*c*x^2+c)^(5/2),x, algorithm="giac")
```

output
```
integrate(arcsin(a*x)^(3/2)/(-a^2*c*x^2 + c)^(5/2), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}}\,dx = \int \frac{\mathrm{asin}(a\,x)^{3/2}}{(c-a^2\,c\,x^2)^{5/2}}\,dx$$

input
```
int(asin(a*x)^(3/2)/(c - a^2*c*x^2)^(5/2),x)
```

output
```
int(asin(a*x)^(3/2)/(c - a^2*c*x^2)^(5/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 379, normalized size of antiderivative = 15.79

$$\int \frac{\arcsin(ax)^{3/2}}{(c-a^2cx^2)^{5/2}}\,dx = \frac{\sqrt{c}\left(-16\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,asin(ax)\,a^3x^3+24\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,asin(\right.}{}$$

input

```
int(asin(a*x)^(3/2)/(-a^2*c*x^2+c)^(5/2),x)
```

output

```
(sqrt(c)*( - 16*sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*asin(a*x)*a**3*x**3
 + 24*sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*asin(a*x)*a*x + 18*sqrt(asin(
a*x))*a**2*x**2 - 18*sqrt(asin(a*x)) + 24*int((sqrt(asin(a*x))*x**3)/(a**4
*x**4 - 2*a**2*x**2 + 1),x)*a**8*x**4 - 48*int((sqrt(asin(a*x))*x**3)/(a**
4*x**4 - 2*a**2*x**2 + 1),x)*a**6*x**2 + 24*int((sqrt(asin(a*x))*x**3)/(a*
*4*x**4 - 2*a**2*x**2 + 1),x)*a**4 + 9*int((sqrt( - a**2*x**2 + 1)*sqrt(as
in(a*x)))/(asin(a*x)*a**4*x**4 - 2*asin(a*x)*a**2*x**2 + asin(a*x)),x)*a**
5*x**4 - 18*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/(asin(a*x)*a**4*x
**4 - 2*asin(a*x)*a**2*x**2 + asin(a*x)),x)*a**3*x**2 + 9*int((sqrt( - a**
2*x**2 + 1)*sqrt(asin(a*x)))/(asin(a*x)*a**4*x**4 - 2*asin(a*x)*a**2*x**2
+ asin(a*x)),x)*a))/(24*a*c**3*(a**4*x**4 - 2*a**2*x**2 + 1))
```

3.112 $\int (c - a^2cx^2)^{3/2} \arcsin(ax)^{5/2}\, dx$

Optimal result . . . 900
Mathematica [C] (verified) . . . 901
Rubi [A] (verified) . . . 901
Maple [F] . . . 913
Fricas [F(-2)] . . . 913
Sympy [F(-1)] . . . 914
Maxima [F(-2)] . . . 914
Giac [F(-2)] . . . 914
Mupad [F(-1)] . . . 915
Reduce [F] . . . 915

Optimal result

Integrand size = 24, antiderivative size = 431

$$\int (c - a^2cx^2)^{3/2} \arcsin(ax)^{5/2}\, dx = -\frac{225}{512}cx\sqrt{c - a^2cx^2}\sqrt{\arcsin(ax)}$$
$$-\frac{15}{256}cx\left(1 - a^2x^2\right)\sqrt{c - a^2cx^2}\sqrt{\arcsin(ax)} + \frac{45c\sqrt{c - a^2cx^2}\arcsin(ax)^{3/2}}{256a\sqrt{1 - a^2x^2}}$$
$$-\frac{15acx^2\sqrt{c - a^2cx^2}\arcsin(ax)^{3/2}}{32\sqrt{1 - a^2x^2}} + \frac{5c(1 - a^2x^2)^{3/2}\sqrt{c - a^2cx^2}\arcsin(ax)^{3/2}}{32a}$$
$$+\frac{3}{8}cx\sqrt{c - a^2cx^2}\arcsin(ax)^{5/2} + \frac{1}{4}x\left(c - a^2cx^2\right)^{3/2}\arcsin(ax)^{5/2} + \frac{3c\sqrt{c - a^2cx^2}\arcsin(ax)^{7/2}}{28a\sqrt{1 - a^2x^2}} + \frac{15c\sqrt{\frac{\pi}{2}}\sqrt{c}}{}$$

output

```
-225/512*c*x*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)-15/256*c*x*(-a^2*x^2+1
)*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)+45/256*c*(-a^2*c*x^2+c)^(1/2)*arc
sin(a*x)^(3/2)/a/(-a^2*x^2+1)^(1/2)-15/32*a*c*x^2*(-a^2*c*x^2+c)^(1/2)*arc
sin(a*x)^(3/2)/(-a^2*x^2+1)^(1/2)+5/32*c*(-a^2*x^2+1)^(3/2)*(-a^2*c*x^2+c)
^(1/2)*arcsin(a*x)^(3/2)/a+3/8*c*x*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(5/2)+
1/4*x*(-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(5/2)+3/28*c*(-a^2*c*x^2+c)^(1/2)*a
rcsin(a*x)^(7/2)/a/(-a^2*x^2+1)^(1/2)+15/8192*c*2^(1/2)*Pi^(1/2)*(-a^2*c*x
^2+c)^(1/2)*FresnelS(2*2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))/a/(-a^2*x^2+1)^
(1/2)+15/128*c*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelS(2*arcsin(a*x)^(1/2)/
Pi^(1/2))/a/(-a^2*x^2+1)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.29 (sec) , antiderivative size = 180, normalized size of antiderivative = 0.42

$$\int (c - a^2cx^2)^{3/2} \arcsin(ax)^{5/2}\, dx = \frac{c\sqrt{c-a^2cx^2}\left(1536\arcsin(ax)^4 + 4480\arcsin(ax)^2\cos(2\arcsin(ax)) + 1680$$

input
```
Integrate[(c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^(5/2),x]
```

output
```
(c*Sqrt[c - a^2*c*x^2]*(1536*ArcSin[a*x]^4 + 4480*ArcSin[a*x]^2*Cos[2*ArcS
in[a*x]] + 1680*Sqrt[Pi]*Sqrt[ArcSin[a*x]]*FresnelS[(2*Sqrt[ArcSin[a*x]])/
Sqrt[Pi]] - 7*Sqrt[(-I)*ArcSin[a*x]]*Gamma[7/2, (-4*I)*ArcSin[a*x]] - 7*Sq
rt[I*ArcSin[a*x]]*Gamma[7/2, (4*I)*ArcSin[a*x]] - 3360*ArcSin[a*x]*Sin[2*A
rcSin[a*x]] + 3584*ArcSin[a*x]^3*Sin[2*ArcSin[a*x]]))/(14336*a*Sqrt[1 - a^
2*x^2]*Sqrt[ArcSin[a*x]])
```

Rubi [A] (verified)

Time = 5.10 (sec) , antiderivative size = 475, normalized size of antiderivative = 1.10, number of steps used = 26, number of rules used = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 1.042$, Rules used = {5158, 5156, 5140, 5152, 5182, 5158, 5156, 5146, 4906, 27, 3042, 3786, 3832, 5152, 5210, 5146, 4906, 27, 3042, 3786, 3832, 5152, 5224, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \arcsin(ax)^{5/2} \left(c - a^2cx^2\right)^{3/2} dx$$

$$\downarrow 5158$$

$$-\frac{5ac\sqrt{c-a^2cx^2}\int x(1-a^2x^2)\arcsin(ax)^{3/2}dx}{8\sqrt{1-a^2x^2}} + \frac{3}{4}c\int \sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}dx + \frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5156$$

$$-\frac{5ac\sqrt{c-a^2cx^2}\int x\left(1-a^2x^2\right)\arcsin(ax)^{3/2}dx}{8\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\int x\arcsin(ax)^{3/2}dx}{4\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\arcsin(ax)^{5/2}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}\right)+$$
$$\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5140$$

$$-\frac{5ac\sqrt{c-a^2cx^2}\int x\left(1-a^2x^2\right)\arcsin(ax)^{3/2}dx}{8\sqrt{1-a^2x^2}}+$$
$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\arcsin(ax)^{5/2}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\right)+$$
$$\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5152$$

$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\right)+$$
$$\frac{5ac\sqrt{c-a^2cx^2}\int x\left(1-a^2x^2\right)\arcsin(ax)^{3/2}dx}{8\sqrt{1-a^2x^2}}+\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5182$$

$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\right)+$$
$$\frac{5ac\sqrt{c-a^2cx^2}\left(\frac{3\int\left(1-a^2x^2\right)^{3/2}\sqrt{\arcsin(ax)}dx}{8a}-\frac{\left(1-a^2x^2\right)^2\arcsin(ax)^{3/2}}{4a^2}\right)}{8\sqrt{1-a^2x^2}}+$$
$$\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5158$$

$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\right.$$
$$\left.-\frac{5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\int\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}dx+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}\sqrt{\arcsin(ax)}\right)}{8a}-\frac{\left(1-a^2x^2\right)^2\arcsin(ax)^{3/2}}{4a^2}\right)}{8\sqrt{1-a^2x^2}}\right)$$
$$\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5156$$

$$-\frac{5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx-\frac{1}{4}a\int\frac{x}{\sqrt{\arcsin(ax)}}dx+\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}\right)+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}\sqrt{a}\right.}{8a}}{8\sqrt{1-a^2x^2}}$$
$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\right.$$
$$\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5146$$

$$-\frac{5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(-\frac{\int\frac{ax\sqrt{1-a^2x^2}}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a}+\frac{1}{2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx+\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}\right)+\frac{1}{4}x\left(1-a^2x^2\right.\right.}{8a}}{8\sqrt{1-a^2x^2}}$$
$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\right.$$
$$\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 4906$$

$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\right.$$

$$\left.5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx-\frac{\int\frac{\sin(2\arcsin(ax))}{2\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a}+\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}\right)\right)+\frac{1}{4}x\left(1-a^2x^2\right.\right.}{8a}$$

$$\left.\left.\vphantom{\frac{1}{1}}\right)\right)$$

$$\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 27$$

$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\right.$$

$$\left.5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx-\frac{\int\frac{\sin(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a}+\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}\right)\right)+\frac{1}{4}x\left(1-a^2x^2\right.\right.}{8a}$$

$$\left.\left.\vphantom{\frac{1}{1}}\right)\right)$$

$$\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 3042$$

$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\right.$$

$$\left.5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx-\frac{\int\frac{\sin(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a}+\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}\right)\right)+\frac{1}{4}x\left(1-a^2x^2\right.\right.}{8a}$$

$$\left.\left.\vphantom{\frac{1}{1}}\right)\right)$$

$$\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 3786$$

$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\right.$$

$$\left.5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx-\frac{\int\sin(2\arcsin(ax))d\sqrt{\arcsin(ax)}}{4a}+\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}\right)\right)+\frac{1}{4}x\left(1-a^2x^2\right.\right.}{8a}$$

$$\left.\left.}{8\sqrt{1-a^2x^2}}\right)$$

$$\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 3832$$

$$5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(\frac{3}{4}\left(\frac{1}{2}\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx+\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}-\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a}\right)-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{1}{4}x\left(1-a^2x^2\right)\right.}{8a}$$

$$-\left.\frac{}{8\sqrt{1-a^2x^2}}\right)$$

$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\right.$$

$$\left.\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}\right)$$

$$\downarrow 5152$$

$$5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}-\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a}+\frac{\arcsin(ax)^{3/2}}{3a}\right)\right)+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}}{8a}$$

$$-\frac{}{8\sqrt{1-a^2x^2}}$$

$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\right.$$

$$\left.\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}\right)$$

$$\downarrow 5210$$

$$5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}-\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a}+\frac{\arcsin(ax)^{3/2}}{3a}\right)\right)+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}}{8a}\right.$$

$$\left.-\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}+\frac{\int\frac{x}{\sqrt{\arcsin(ax)}}dx}{4a}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(}{7}\right.\right.$$

$$\left.\left.\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}\right.\right.$$

$$\downarrow 5146$$

$$5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}-\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a}+\frac{\arcsin(ax)^{3/2}}{3a}\right)\right)+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}}{8a}\right.$$

$$\left.-\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}+\frac{\int\frac{ax\sqrt{1-a^2x^2}}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a^3}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}+\right.\right.$$

$$\left.\left.\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}\right.\right.$$

$$\downarrow 4906$$

$$5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}-\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a}+\frac{\arcsin(ax)^{3/2}}{3a}\right)\right)+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}}{8a}\right.$$

$$\left.-\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\frac{\sin(2\arcsin(ax))}{2\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a^3}+\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}\right.\right.$$

$$\left.\left.\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}\right.\right.$$

$$\downarrow 27$$

$$5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}-\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a}+\frac{\arcsin(ax)^{3/2}}{3a}\right)\right)+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}}{8a}\right.$$

$$\left.-\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\frac{\sin(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a^3}+\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}\right.\right.$$

$$\left.\left.+\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}\right)\right)$$

$$\downarrow 3042$$

$$5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}-\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a}+\frac{\arcsin(ax)^{3/2}}{3a}\right)\right)+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}}{8a}\right.$$

$$\left.-\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\frac{\sin(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a^3}+\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}\right.\right.$$

$$\left.\left.+\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}\right)\right)$$

$$\downarrow 3786$$

$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\sin(2\arcsin(ax))d\sqrt{\arcsin(ax)}}{4a^3}+\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}-\frac{5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}-\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a}+\frac{\arcsin(ax)^{3/2}}{3a}\right)\right)+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}}{8a}\right)}{8\sqrt{1-a^2x^2}}\right)$$

$$\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 3832$$

$$\frac{3}{4}c\left(-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}+\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a^3}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}-\frac{5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}-\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a}+\frac{\arcsin(ax)^{3/2}}{3a}\right)\right)+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}}{8a}\right)}{8\sqrt{1-a^2x^2}}\right)$$

$$\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}$$

$$\downarrow 5152$$

$$5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{1}{8}a\int\frac{x\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}dx+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}-\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a}+\frac{\arcsin(ax)^{3/2}}{3a}\right)+\frac{1}{4}x\left(1-a^2x^2\right)^{3/2}\right.}{8a}\right.$$

$$\left.-\frac{\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}+\frac{3}{4}c\left(\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\sqrt{\pi}\,\text{Fres}\right.\right.\right.}{4}\right.}{8\sqrt{1-a^2x^2}}$$

$$\downarrow 5224$$

$$5ac\sqrt{c-a^2cx^2}\left(\frac{3\left(-\frac{\int\frac{ax\left(1-a^2x^2\right)^{3/2}}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a}+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}-\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a}+\frac{\arcsin(ax)^{3/2}}{3a}\right)+\frac{1}{4}x\left(1-\right.\right.\right.}{8a}\right.$$

$$\left.-\frac{\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}+\frac{3}{4}c\left(\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\sqrt{\pi}\,\text{Fres}\right.\right.\right.}{4}\right.}{8\sqrt{1-a^2x^2}}$$

$$\downarrow 4906$$

$$\frac{3}{4}c\left(\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}-\frac{5ac\sqrt{c-a^2cx^2}\left(\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}+\frac{3}{4}c\left(\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}-\frac{5ac\sqrt{c-a^2cx^2}\left(\frac{1}{4}x\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}+\frac{3}{4}c\left(\frac{3\left(-\frac{\int\left(\frac{\sin(2\arcsin(ax))}{4\sqrt{\arcsin(ax)}}+\frac{\sin(4\arcsin(ax))}{8\sqrt{\arcsin(ax)}}\right)d\arcsin(ax)}{8a}+\frac{3}{4}\left(\frac{1}{2}x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}-\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a}+\frac{\arcsin}{}\right.\right.\right.

output
```
(x*(c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^(5/2))/4 + (3*c*((x*Sqrt[c - a^2*c*x^
2]*ArcSin[a*x]^(5/2))/2 + (Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(7/2))/(7*a*Sqr
t[1 - a^2*x^2]) - (5*a*Sqrt[c - a^2*c*x^2]*((x^2*ArcSin[a*x]^(3/2))/2 - (3
*a*(-1/2*(x*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/a^2 + ArcSin[a*x]^(3/2)/(
3*a^3) + (Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(8*a^3)))/4))
/(4*Sqrt[1 - a^2*x^2])))/4 - (5*a*c*Sqrt[c - a^2*c*x^2]*(-1/4*((1 - a^2*x^
2)^2*ArcSin[a*x]^(3/2))/a^2 + (3*((x*(1 - a^2*x^2)^(3/2)*Sqrt[ArcSin[a*x]]
)/4 - ((Sqrt[Pi/2]*FresnelS[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/8 + (Sqrt[Pi]
*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/4)/(8*a) + (3*((x*Sqrt[1 - a^2*
x^2]*Sqrt[ArcSin[a*x]])/2 + ArcSin[a*x]^(3/2)/(3*a) - (Sqrt[Pi]*FresnelS[(
2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(8*a)))/4))/(8*a)))/(8*Sqrt[1 - a^2*x^2])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 4906
```
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 5140
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[x
^(m + 1)*((a + b*ArcSin[c*x])^n/(m + 1)), x] - Simp[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 5146
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[1
/(b*c^(m + 1))   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b], x], x, a
+ b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

rule 5158
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[x*(d + e*x^2)^p*((a + b*ArcSin[c*x])^n/(2*p + 1)), x] + (S
imp[2*d*(p/(2*p + 1))   Int[(d + e*x^2)^(p - 1)*(a + b*ArcSin[c*x])^n, x],
x] - Simp[b*c*(n/(2*p + 1))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[x*(1
- c^2*x^2)^(p - 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c
, d, e}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && GtQ[p, 0]
```

rule 5182
```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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 5210

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[f*(f*x)^(m - 1)*(d + e*x^2)^(p + 1)*((a +
 b*ArcSin[c*x])^n/(e*(m + 2*p + 1))), x] + (Simp[f^2*((m - 1)/(c^2*(m + 2*p
 + 1)))   Int[(f*x)^(m - 2)*(d + e*x^2)^p*(a + b*ArcSin[c*x])^n, x], x] + S
imp[b*f*(n/(c*(m + 2*p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^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] && IGtQ[m
, 1] && NeQ[m + 2*p + 1, 0]
```

rule 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [F]

$$\int \left(-a^2 c\, x^2 + c\right)^{\frac{3}{2}} \arcsin\left(ax\right)^{\frac{5}{2}}\, dx$$

input

```
int((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(5/2),x)
```

output

```
int((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(5/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^{5/2}\, dx = \text{Exception raised: TypeError}$$

input

```
integrate((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(5/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^{5/2}\, dx = \text{Timed out}$$

input
```
integrate((-a**2*c*x**2+c)**(3/2)*asin(a*x)**(5/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^{5/2}\, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F(-2)]

Exception generated.

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(ax)^{5/2}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)*arcsin(a*x)^(5/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \left(c - a^2 c x^2\right)^{3/2} \arcsin(a x)^{5/2}\, dx = \int \operatorname{asin}(a\,x)^{5/2} \left(c - a^2\, c\, x^2\right)^{3/2} dx$$

input
```
int(asin(a*x)^(5/2)*(c - a^2*c*x^2)^(3/2),x)
```

output
```
int(asin(a*x)^(5/2)*(c - a^2*c*x^2)^(3/2), x)
```

Reduce [F]

$$\int (c$$

$$-a^2 c x^2)^{3/2} \arcsin(a x)^{5/2}\, dx = \sqrt{c}\, c \left(- \left(\int \sqrt{-a^2 x^2 + 1}\, \sqrt{asin\,(ax)}\, asin(ax)^2\, x^2 dx \right) a^2 + \int \sqrt{-a^2 x^2 + 1}\, \sqrt{}$$

input
```
int((-a^2*c*x^2+c)^(3/2)*asin(a*x)^(5/2),x)
```

output
```
sqrt(c)*c*( - int(sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*asin(a*x)**2*x**2
,x)*a**2 + int(sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*asin(a*x)**2,x))
```

3.113 $\int \sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}\,dx$

Optimal result . . . 916
Mathematica [C] (verified) . . . 917
Rubi [A] (verified) . . . 917
Maple [F] . . . 921
Fricas [F(-2)] . . . 922
Sympy [F(-1)] . . . 922
Maxima [F(-2)] . . . 922
Giac [F(-2)] . . . 923
Mupad [F(-1)] . . . 923
Reduce [F] . . . 923

Optimal result

Integrand size = 24, antiderivative size = 247

$$\int \sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}\,dx = -\frac{15}{32}x\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}$$
$$+\frac{5\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}{16a\sqrt{1-a^2x^2}}-\frac{5ax^2\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}{8\sqrt{1-a^2x^2}}$$
$$+\frac{1}{2}x\sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}+\frac{\sqrt{c-a^2cx^2}\arcsin(ax)^{7/2}}{7a\sqrt{1-a^2x^2}}+\frac{15\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{128a\sqrt{1-a^2x^2}}$$

output

```
-15/32*x*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)+5/16*(-a^2*c*x^2+c)^(1/2)*
arcsin(a*x)^(3/2)/a/(-a^2*x^2+1)^(1/2)-5/8*a*x^2*(-a^2*c*x^2+c)^(1/2)*arcs
in(a*x)^(3/2)/(-a^2*x^2+1)^(1/2)+1/2*x*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(5
/2)+1/7*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(7/2)/a/(-a^2*x^2+1)^(1/2)+15/128
*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelS(2*arcsin(a*x)^(1/2)/Pi^(1/2))/a/(-
a^2*x^2+1)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.05 (sec) , antiderivative size = 140, normalized size of antiderivative = 0.57

$$\int \sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}\,dx = \frac{\sqrt{c-a^2cx^2}\left(64\arcsin(ax)^3\left(7ax\sqrt{1-a^2x^2}+2\arcsin(ax)\right)-35\sqrt{2}\sqrt{-i}\right.}{896a\sqrt{1-a^2}}$$

input

```
Integrate[Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(5/2),x]
```

output

```
(Sqrt[c - a^2*c*x^2]*(64*ArcSin[a*x]^3*(7*a*x*Sqrt[1 - a^2*x^2] + 2*ArcSin
[a*x]) - 35*Sqrt[2]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[5/2, (-2*I)*ArcSin[a*x]]
- 35*Sqrt[2]*Sqrt[I*ArcSin[a*x]]*Gamma[5/2, (2*I)*ArcSin[a*x]]))/(896*a*Sq
rt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])
```

Rubi [A] (verified)

Time = 1.59 (sec) , antiderivative size = 202, normalized size of antiderivative = 0.82, number of steps used = 12, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.458$, Rules used = {5156, 5140, 5152, 5210, 5146, 4906, 27, 3042, 3786, 3832, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}\,dx$$

$$\downarrow 5156$$

$$-\frac{5a\sqrt{c-a^2cx^2}\int x\arcsin(ax)^{3/2}dx}{4\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\arcsin(ax)^{5/2}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 5140$$

$$-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\sqrt{c-a^2cx^2}\int\frac{\arcsin(ax)^{5/2}}{\sqrt{1-a^2x^2}}dx}{2\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 5152$$

$$-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\int\frac{x^2\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 5210$$

$$-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}+\frac{\int\frac{x}{\sqrt{\arcsin(ax)}}dx}{4a}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 5146$$

$$-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}+\frac{\int\frac{ax\sqrt{1-a^2x^2}}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a^3}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 4906$$

$$-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\frac{\sin(2\arcsin(ax))}{2\sqrt{\arcsin(ax)}}d\arcsin(ax)}{4a^3}+\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}+\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 27$$

$$-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\frac{\sin(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a^3}+\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}+$$
$$\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 3042$$

$$-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\frac{\sin(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{8a^3}+\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}+$$
$$\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 3786$$

$$-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\sin(2\arcsin(ax))d\sqrt{\arcsin(ax)}}{4a^3}+\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}+$$
$$\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 3832$$

$$-\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\int\frac{\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}dx}{2a^2}+\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a^3}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}+$$
$$\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}$$

$$\downarrow 5152$$

$$\frac{\arcsin(ax)^{7/2}\sqrt{c-a^2cx^2}}{7a\sqrt{1-a^2x^2}}+\frac{1}{2}x\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}-$$
$$\frac{5a\sqrt{c-a^2cx^2}\left(\frac{1}{2}x^2\arcsin(ax)^{3/2}-\frac{3}{4}a\left(\frac{\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a^3}+\frac{\arcsin(ax)^{3/2}}{3a^3}-\frac{x\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{2a^2}\right)\right)}{4\sqrt{1-a^2x^2}}$$

input
```
Int[Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(5/2),x]
```

output
```
(x*Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(5/2))/2 + (Sqrt[c - a^2*c*x^2]*ArcSin[
a*x]^(7/2))/(7*a*Sqrt[1 - a^2*x^2]) - (5*a*Sqrt[c - a^2*c*x^2]*((x^2*ArcSi
n[a*x]^(3/2))/2 - (3*a*(-1/2*(x*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/a^2 +
 ArcSin[a*x]^(3/2)/(3*a^3) + (Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt
[Pi]])/(8*a^3)))/4))/(4*Sqrt[1 - a^2*x^2])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 4906
```
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 5140
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[x
^(m + 1)*((a + b*ArcSin[c*x])^n/(m + 1)), x] - Simp[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 5146
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[1
/(b*c^(m + 1))   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b], x], x, a
+ b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

rule 5210
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[f*(f*x)^(m - 1)*(d + e*x^2)^(p + 1)*((a +
 b*ArcSin[c*x])^n/(e*(m + 2*p + 1))), x] + (Simp[f^2*((m - 1)/(c^2*(m + 2*p
 + 1)))   Int[(f*x)^(m - 2)*(d + e*x^2)^p*(a + b*ArcSin[c*x])^n, x], x] + S
imp[b*f*(n/(c*(m + 2*p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^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] && IGtQ[m
, 1] && NeQ[m + 2*p + 1, 0]
```

Maple [F]

$$\int \sqrt{-a^2 c\, x^2 + c}\, \arcsin(ax)^{\frac{5}{2}}\, dx$$

input
```
int((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(5/2),x)
```

output
```
int((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(5/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \sqrt{c - a^2 c x^2} \arcsin(ax)^{5/2}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(5/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \sqrt{c - a^2 c x^2} \arcsin(ax)^{5/2}\, dx = \text{Timed out}$$

input
```
integrate((-a**2*c*x**2+c)**(1/2)*asin(a*x)**(5/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \sqrt{c - a^2 c x^2} \arcsin(ax)^{5/2}\, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F(-2)]

Exception generated.

$$\int \sqrt{c - a^2 c x^2}\, \arcsin(ax)^{5/2}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(5/2),x, algorithm="giac")
```

output
```
Exception raised: TypeError >> an error occurred running a Giac command:IN
PUT:sage2:=int(sage0,sageVARx):;OUTPUT:sym2poly/r2sym(const gen & e,const
index_m & i,const vecteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{c - a^2 c x^2}\, \arcsin(ax)^{5/2}\, dx = \int \text{asin}(a\,x)^{5/2}\, \sqrt{c - a^2\, c\, x^2}\, dx$$

input
```
int(asin(a*x)^(5/2)*(c - a^2*c*x^2)^(1/2),x)
```

output
```
int(asin(a*x)^(5/2)*(c - a^2*c*x^2)^(1/2), x)
```

Reduce [F]

$$\int \sqrt{c - a^2 c x^2}\, \arcsin(ax)^{5/2}\, dx = \sqrt{c} \left(\int \sqrt{-a^2 x^2 + 1}\, \sqrt{asin\,(ax)}\, asin(ax)^2\, dx \right)$$

input
```
int((-a^2*c*x^2+c)^(1/2)*asin(a*x)^(5/2),x)
```

output
```
sqrt(c)*int(sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*asin(a*x)**2,x)
```

3.114 $\int \frac{\arcsin(ax)^{5/2}}{\sqrt{c-a^2cx^2}}\,dx$

Optimal result . . . 924
Mathematica [A] (verified) . . . 924
Rubi [A] (verified) . . . 925
Maple [A] (verified) . . . 925
Fricas [F(-2)] . . . 926
Sympy [F(-1)] . . . 926
Maxima [F(-2)] . . . 927
Giac [A] (verification not implemented) . . . 927
Mupad [F(-1)] . . . 927
Reduce [B] (verification not implemented) . . . 928

Optimal result

Integrand size = 24, antiderivative size = 44

$$\int \frac{\arcsin(ax)^{5/2}}{\sqrt{c-a^2cx^2}}\,dx = \frac{2\sqrt{1-a^2x^2}\,\arcsin(ax)^{7/2}}{7a\sqrt{c-a^2cx^2}}$$

output
```
2/7*(-a^2*x^2+1)^(1/2)*arcsin(a*x)^(7/2)/a/(-a^2*c*x^2+c)^(1/2)
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00

$$\int \frac{\arcsin(ax)^{5/2}}{\sqrt{c-a^2cx^2}}\,dx = \frac{2\sqrt{1-a^2x^2}\,\arcsin(ax)^{7/2}}{7a\sqrt{c-a^2cx^2}}$$

input
```
Integrate[ArcSin[a*x]^(5/2)/Sqrt[c - a^2*c*x^2],x]
```

output
```
(2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(7/2))/(7*a*Sqrt[c - a^2*c*x^2])
```

Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\arcsin(ax)^{5/2}}{\sqrt{c-a^2cx^2}}\,dx$$
$$\downarrow 5152$$
$$\frac{2\sqrt{1-a^2x^2}\arcsin(ax)^{7/2}}{7a\sqrt{c-a^2cx^2}}$$

input
```
Int[ArcSin[a*x]^(5/2)/Sqrt[c - a^2*c*x^2],x]
```

output
```
(2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(7/2))/(7*a*Sqrt[c - a^2*c*x^2])
```

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [A] (verified)

Time = 0.10 (sec) , antiderivative size = 38, normalized size of antiderivative = 0.86

method	result	size
default	$\frac{2\arcsin(ax)^{\frac{7}{2}}\sqrt{-a^2x^2+1}}{7a\sqrt{-c(a^2x^2-1)}}$	38

input
```
int(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
2/7*arcsin(a*x)^(7/2)/a/(-c*(a^2*x^2-1))^(1/2)*(-a^2*x^2+1)^(1/2)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^{5/2}}{\sqrt{c-a^2cx^2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{\arcsin(ax)^{5/2}}{\sqrt{c-a^2cx^2}}\,dx = \text{Timed out}$$

input
```
integrate(asin(a*x)**(5/2)/(-a**2*c*x**2+c)**(1/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^{5/2}}{\sqrt{c-a^2cx^2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.32

$$\int \frac{\arcsin(ax)^{5/2}}{\sqrt{c-a^2cx^2}}\,dx = \frac{2\,\arcsin(ax)^{\frac{7}{2}}}{7\,a\sqrt{c}}$$

input
```
integrate(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(1/2),x, algorithm="giac")
```

output
```
2/7*arcsin(a*x)^(7/2)/(a*sqrt(c))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\arcsin(ax)^{5/2}}{\sqrt{c-a^2cx^2}}\,dx = \int \frac{\mathrm{asin}(a\,x)^{5/2}}{\sqrt{c-a^2\,c\,x^2}}\,dx$$

input
```
int(asin(a*x)^(5/2)/(c - a^2*c*x^2)^(1/2),x)
```

output
```
int(asin(a*x)^(5/2)/(c - a^2*c*x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.48

$$\int \frac{\arcsin(ax)^{5/2}}{\sqrt{c-a^2cx^2}}\,dx = \frac{2\sqrt{c}\,\sqrt{asin\,(ax)}\,asin(ax)^3}{7ac}$$

input
```
int(asin(a*x)^(5/2)/(-a^2*c*x^2+c)^(1/2),x)
```

output
```
(2*sqrt(c)*sqrt(asin(a*x))*asin(a*x)**3)/(7*a*c)
```

3.115 $\int \frac{\arcsin(ax)^{5/2}}{\left(c-a^2cx^2\right)^{3/2}}\,dx$

Optimal result . . . 929
Mathematica [N/A] . . . 929
Rubi [N/A] . . . 930
Maple [N/A] . . . 930
Fricas [F(-2)] . . . 931
Sympy [F(-1)] . . . 931
Maxima [F(-2)] . . . 931
Giac [N/A] . . . 932
Mupad [N/A] . . . 932
Reduce [N/A] . . . 933

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{3/2}}\,dx = \text{Int}\left(\frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{3/2}},x\right)$$

output
```
Defer(Int)(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(3/2),x)
```

Mathematica [N/A]

Not integrable

Time = 1.85 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{3/2}}\,dx = \int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{3/2}}\,dx$$

input
```
Integrate[ArcSin[a*x]^(5/2)/(c - a^2*c*x^2)^(3/2),x]
```

output
```
Integrate[ArcSin[a*x]^(5/2)/(c - a^2*c*x^2)^(3/2), x]
```

Rubi [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{3/2}}\,dx$$

$$\downarrow 5160$$

$$\frac{x\arcsin(ax)^{5/2}}{c\sqrt{c-a^2cx^2}} - \frac{5a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^{3/2}}{1-a^2x^2}dx}{2c\sqrt{c-a^2cx^2}}$$

$$\downarrow 5234$$

$$\frac{x\arcsin(ax)^{5/2}}{c\sqrt{c-a^2cx^2}} - \frac{5a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^{3/2}}{1-a^2x^2}dx}{2c\sqrt{c-a^2cx^2}}$$

input
```
Int[ArcSin[a*x]^(5/2)/(c - a^2*c*x^2)^(3/2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\arcsin(ax)^{\frac{5}{2}}}{(-a^2c\,x^2+c)^{\frac{3}{2}}}dx$$

input
```
int(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(3/2),x)
```

output
```
int(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^{5/2}}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{\arcsin(ax)^{5/2}}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \text{Timed out}$$

input
```
integrate(asin(a*x)**(5/2)/(-a**2*c*x**2+c)**(3/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^{5/2}}{\left(c-a^2cx^2\right)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.60 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{3/2}}\,dx = \int \frac{\arcsin(ax)^{\frac{5}{2}}}{(-a^2cx^2+c)^{\frac{3}{2}}}\,dx$$

input
```
integrate(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(3/2),x, algorithm="giac")
```

output
```
integrate(arcsin(a*x)^(5/2)/(-a^2*c*x^2 + c)^(3/2), x)
```

Mupad [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{3/2}}\,dx = \int \frac{\mathrm{asin}(a\,x)^{5/2}}{(c-a^2\,c\,x^2)^{3/2}}\,dx$$

input
```
int(asin(a*x)^(5/2)/(c - a^2*c*x^2)^(3/2),x)
```

output
```
int(asin(a*x)^(5/2)/(c - a^2*c*x^2)^(3/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 103, normalized size of antiderivative = 4.29

$$\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{3/2}}\,dx = \frac{\sqrt{c}\left(-2\sqrt{-a^2x^2+1}\,\sqrt{asin\left(ax\right)}\,asin(ax)^2\,x+5\left(\int \frac{\sqrt{asin(ax)}\,asin(ax)x}{a^2x^2-1}dx\right)a^3x^2-5\left(\right.\right.}{2c^2\left(a^2x^2-1\right)}$$

input
```
int(asin(a*x)^(5/2)/(-a^2*c*x^2+c)^(3/2),x)
```

output
```
(sqrt(c)*( - 2*sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*asin(a*x)**2*x + 5*i
nt((sqrt(asin(a*x))*asin(a*x)*x)/(a**2*x**2 - 1),x)*a**3*x**2 - 5*int((sqr
t(asin(a*x))*asin(a*x)*x)/(a**2*x**2 - 1),x)*a))/(2*c**2*(a**2*x**2 - 1))
```

3.116 $\int \frac{\arcsin(ax)^{5/2}}{\left(c-a^2cx^2\right)^{5/2}}\,dx$

Optimal result . . . 934
Mathematica [N/A] . . . 934
Rubi [N/A] . . . 935
Maple [N/A] . . . 936
Fricas [F(-2)] . . . 937
Sympy [F(-1)] . . . 937
Maxima [F(-2)] . . . 937
Giac [N/A] . . . 938
Mupad [N/A] . . . 938
Reduce [N/A] . . . 938

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{5/2}}\,dx = \text{Int}\left(\frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{5/2}},x\right)$$

output
```
Defer(Int)(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(5/2),x)
```

Mathematica [N/A]

Not integrable

Time = 1.79 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{5/2}}\,dx = \int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{5/2}}\,dx$$

input
```
Integrate[ArcSin[a*x]^(5/2)/(c - a^2*c*x^2)^(5/2),x]
```

output
```
Integrate[ArcSin[a*x]^(5/2)/(c - a^2*c*x^2)^(5/2), x]
```

Rubi [N/A]

Not integrable

Time = 0.99 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{5/2}}\,dx$$

$$\downarrow 5162$$

$$-\frac{5a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^{3/2}}{(1-a^2x^2)^2}dx}{6c^2\sqrt{c-a^2cx^2}}+\frac{2\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{3/2}}dx}{3c}+\frac{x\arcsin(ax)^{5/2}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5160$$

$$-\frac{5a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^{3/2}}{(1-a^2x^2)^2}dx}{6c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\arcsin(ax)^{5/2}}{c\sqrt{c-a^2cx^2}}-\frac{5a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^{3/2}}{1-a^2x^2}dx}{2c\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\arcsin(ax)^{5/2}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5182$$

$$-\frac{5a\sqrt{1-a^2x^2}\left(\frac{\arcsin(ax)^{3/2}}{2a^2\left(1-a^2x^2\right)}-\frac{3\int \frac{\sqrt{\arcsin(ax)}}{\left(1-a^2x^2\right)^{3/2}}dx}{4a}\right)}{6c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\arcsin(ax)^{5/2}}{c\sqrt{c-a^2cx^2}}-\frac{5a\sqrt{1-a^2x^2}\int \frac{x\arcsin(ax)^{3/2}}{1-a^2x^2}dx}{2c\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\arcsin(ax)^{5/2}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5160$$

$$-\frac{5a\sqrt{1-a^2x^2}\left(\frac{\arcsin(ax)^{3/2}}{2a^2(1-a^2x^2)}-\frac{3\left(\frac{x\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}-\frac{1}{2}a\int\frac{x}{\left(1-a^2x^2\right)\sqrt{\arcsin(ax)}}dx\right)}{4a}\right)}{6c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\arcsin(ax)^{5/2}}{c\sqrt{c-a^2cx^2}}-\frac{5a\sqrt{1-a^2x^2}\int\frac{x\arcsin(ax)^{3/2}}{1-a^2x^2}dx}{2c\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\arcsin(ax)^{5/2}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5234$$

$$-\frac{5a\sqrt{1-a^2x^2}\left(\frac{\arcsin(ax)^{3/2}}{2a^2(1-a^2x^2)}-\frac{3\left(\frac{x\sqrt{\arcsin(ax)}}{\sqrt{1-a^2x^2}}-\frac{1}{2}a\int\frac{x}{\left(1-a^2x^2\right)\sqrt{\arcsin(ax)}}dx\right)}{4a}\right)}{6c^2\sqrt{c-a^2cx^2}}+\frac{2\left(\frac{x\arcsin(ax)^{5/2}}{c\sqrt{c-a^2cx^2}}-\frac{5a\sqrt{1-a^2x^2}\int\frac{x\arcsin(ax)^{3/2}}{1-a^2x^2}dx}{2c\sqrt{c-a^2cx^2}}\right)}{3c}+\frac{x\arcsin(ax)^{5/2}}{3c\left(c-a^2cx^2\right)^{3/2}}$$

input
```
Int[ArcSin[a*x]^(5/2)/(c - a^2*c*x^2)^(5/2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.39 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\arcsin(ax)^{\frac{5}{2}}}{\left(-a^2c\,x^2+c\right)^{\frac{5}{2}}}dx$$

input
```
int(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(5/2),x)
```

output
```
int(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(5/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^{5/2}}{\left(c-a^2cx^2\right)^{5/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(5/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{\arcsin(ax)^{5/2}}{\left(c-a^2cx^2\right)^{5/2}}\,dx = \text{Timed out}$$

input
```
integrate(asin(a*x)**(5/2)/(-a**2*c*x**2+c)**(5/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\arcsin(ax)^{5/2}}{\left(c-a^2cx^2\right)^{5/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.64 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{5/2}}\,dx = \int \frac{\arcsin(ax)^{\frac{5}{2}}}{(-a^2cx^2+c)^{\frac{5}{2}}}\,dx$$

input
```
integrate(arcsin(a*x)^(5/2)/(-a^2*c*x^2+c)^(5/2),x, algorithm="giac")
```

output
```
integrate(arcsin(a*x)^(5/2)/(-a^2*c*x^2 + c)^(5/2), x)
```

Mupad [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{5/2}}\,dx = \int \frac{\mathrm{asin}(a\,x)^{5/2}}{(c-a^2\,c\,x^2)^{5/2}}\,dx$$

input
```
int(asin(a*x)^(5/2)/(c - a^2*c*x^2)^(5/2),x)
```

output
```
int(asin(a*x)^(5/2)/(c - a^2*c*x^2)^(5/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 320, normalized size of antiderivative = 13.33

$$\int \frac{\arcsin(ax)^{5/2}}{(c-a^2cx^2)^{5/2}}\,dx = \frac{\sqrt{c}\left(-4\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,asin(ax)^2\,a^2x^3+6\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,asin(a\right.}{}$$

input
```
int(asin(a*x)^(5/2)/(-a^2*c*x^2+c)^(5/2),x)
```

output
```
(sqrt(c)*( - 4*sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*asin(a*x)**2*a**2*x**
*3 + 6*sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*asin(a*x)**2*x + 10*int((sqr
t(asin(a*x))*asin(a*x)*x**3)/(a**4*x**4 - 2*a**2*x**2 + 1),x)*a**7*x**4 -
20*int((sqrt(asin(a*x))*asin(a*x)*x**3)/(a**4*x**4 - 2*a**2*x**2 + 1),x)*a
**5*x**2 + 10*int((sqrt(asin(a*x))*asin(a*x)*x**3)/(a**4*x**4 - 2*a**2*x**
2 + 1),x)*a**3 - 15*int((sqrt(asin(a*x))*asin(a*x)*x)/(a**4*x**4 - 2*a**2*
x**2 + 1),x)*a**5*x**4 + 30*int((sqrt(asin(a*x))*asin(a*x)*x)/(a**4*x**4 -
 2*a**2*x**2 + 1),x)*a**3*x**2 - 15*int((sqrt(asin(a*x))*asin(a*x)*x)/(a**
4*x**4 - 2*a**2*x**2 + 1),x)*a))/(6*c**3*(a**4*x**4 - 2*a**2*x**2 + 1))
```

3.117 $\int (a^2-x^2)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx$

Optimal result . . . 940
Mathematica [C] (verified) . . . 941
Rubi [A] (verified) . . . 941
Maple [F] . . . 947
Fricas [F(-2)] . . . 948
Sympy [F] . . . 948
Maxima [F(-2)] . . . 948
Giac [F] . . . 949
Mupad [F(-1)] . . . 949
Reduce [F] . . . 949

Optimal result

Integrand size = 24, antiderivative size = 226

$$\int (a^2-x^2)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx = \frac{3}{8}a^2x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)} + \frac{1}{4}x(a^2-x^2)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)} + \frac{a^3\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}}{4\sqrt{1-\frac{x^2}{a^2}}} - \frac{a^3\sqrt{\frac{\pi}{2}}\sqrt{a^2-x^2}\,\text{FresnelS}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)}{64\sqrt{1-\frac{x^2}{a^2}}} - \frac{a^3\sqrt{\pi}\sqrt{a^2-x^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}$$

output

```
3/8*a^2*x*(a^2-x^2)^(1/2)*arcsin(x/a)^(1/2)+1/4*x*(a^2-x^2)^(3/2)*arcsin(x
/a)^(1/2)+1/4*a^3*(a^2-x^2)^(1/2)*arcsin(x/a)^(3/2)/(1-x^2/a^2)^(1/2)-1/12
8*a^3*2^(1/2)*Pi^(1/2)*(a^2-x^2)^(1/2)*FresnelS(2*2^(1/2)/Pi^(1/2)*arcsin(
x/a)^(1/2))/(1-x^2/a^2)^(1/2)-1/8*a^3*Pi^(1/2)*(a^2-x^2)^(1/2)*FresnelS(2*
arcsin(x/a)^(1/2)/Pi^(1/2))/(1-x^2/a^2)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.14 (sec) , antiderivative size = 183, normalized size of antiderivative = 0.81

$$\int (a^2 - x^2)^{3/2} \sqrt{\arcsin\left(\frac{x}{a}\right)}\, dx = \frac{a^3\sqrt{a^2-x^2}\left(32\arcsin\left(\frac{x}{a}\right)^2 + 8\sqrt{2}\sqrt{-i\arcsin\left(\frac{x}{a}\right)}\Gamma\left(\frac{3}{2}, -2i\arcsin\left(\frac{x}{a}\right)\right) + 8\sqrt{2}\right.$$

input
```
Integrate[(a^2 - x^2)^(3/2)*Sqrt[ArcSin[x/a]],x]
```

output
```
(a^3*Sqrt[a^2 - x^2]*(32*ArcSin[x/a]^2 + 8*Sqrt[2]*Sqrt[(-I)*ArcSin[x/a]]*
Gamma[3/2, (-2*I)*ArcSin[x/a]] + 8*Sqrt[2]*Sqrt[I*ArcSin[x/a]]*Gamma[3/2,
(2*I)*ArcSin[x/a]] + Sqrt[(-I)*ArcSin[x/a]]*Gamma[3/2, (-4*I)*ArcSin[x/a]]
 + Sqrt[I*ArcSin[x/a]]*Gamma[3/2, (4*I)*ArcSin[x/a]]))/(128*Sqrt[1 - x^2/a
^2]*Sqrt[ArcSin[x/a]])
```

Rubi [A] (verified)

Time = 1.58 (sec) , antiderivative size = 259, normalized size of antiderivative = 1.15, number of steps used = 14, number of rules used = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.542$, Rules used = {5158, 27, 5156, 5146, 4906, 27, 3042, 3786, 3832, 5152, 5224, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (a^2 - x^2)^{3/2} \sqrt{\arcsin\left(\frac{x}{a}\right)}\, dx$$

$$\downarrow 5158$$

$$\frac{3}{4}a^2 \int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}dx - \frac{a\sqrt{a^2-x^2}\int \frac{x(a^2-x^2)}{a^2\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{8\sqrt{1-\frac{x^2}{a^2}}} + \frac{1}{4}x(a^2-x^2)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 27$$

$$\frac{3}{4}a^2\int\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}dx-\frac{\sqrt{a^2-x^2}\int\frac{x\left(a^2-x^2\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 5156$$

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

$$\frac{\sqrt{a^2-x^2}\int\frac{x\left(a^2-x^2\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 5146$$

$$\frac{3}{4}a^2\left(-\frac{a\sqrt{a^2-x^2}\int\frac{x\sqrt{1-\frac{x^2}{a^2}}}{a\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)}{4\sqrt{1-\frac{x^2}{a^2}}}+\frac{\sqrt{a^2-x^2}\int\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)-$$

$$\frac{\sqrt{a^2-x^2}\int\frac{x\left(a^2-x^2\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 4906$$

$$-\frac{\sqrt{a^2-x^2}\int\frac{x\left(a^2-x^2\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+$$

$$\frac{3}{4}a^2\left(\frac{\sqrt{a^2-x^2}\int\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}-\frac{a\sqrt{a^2-x^2}\int\frac{\sin\left(2\arcsin\left(\frac{x}{a}\right)\right)}{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)}{4\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+$$

$$\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 27$$

$$-\frac{\sqrt{a^2-x^2}\int\frac{x\left(a^2-x^2\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+$$

$$\frac{3}{4}a^2\left(\frac{\sqrt{a^2-x^2}\int\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}-\frac{a\sqrt{a^2-x^2}\int\frac{\sin\left(2\arcsin\left(\frac{x}{a}\right)\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+$$

$$\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 3042$$

$$-\frac{\sqrt{a^2-x^2}\int\frac{x\left(a^2-x^2\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+$$

$$\frac{3}{4}a^2\left(\frac{\sqrt{a^2-x^2}\int\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}-\frac{a\sqrt{a^2-x^2}\int\frac{\sin\left(2\arcsin\left(\frac{x}{a}\right)\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+$$

$$\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 3786$$

$$-\frac{\sqrt{a^2-x^2}\int\frac{x\left(a^2-x^2\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+$$

$$\frac{3}{4}a^2\left(\frac{\sqrt{a^2-x^2}\int\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}-\frac{a\sqrt{a^2-x^2}\int\sin\left(2\arcsin\left(\frac{x}{a}\right)\right)d\sqrt{\arcsin\left(\frac{x}{a}\right)}}{4\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+$$

$$\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 3832$$

$$\frac{3}{4}a^2\left(\frac{\sqrt{a^2-x^2}\int\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}-\frac{\sqrt{\pi}a\sqrt{a^2-x^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)-$$

$$\frac{\sqrt{a^2-x^2}\int\frac{x\left(a^2-x^2\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 5152$$

$$-\frac{\sqrt{a^2-x^2}\int\frac{x\left(a^2-x^2\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+$$

$$\frac{3}{4}a^2\left(-\frac{\sqrt{\pi}a\sqrt{a^2-x^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}}{3\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+$$

$$\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 5224$$

$$-\frac{a^3\sqrt{a^2-x^2}\int\frac{x\left(1-\frac{x^2}{a^2}\right)^{3/2}}{a\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}+$$

$$\frac{3}{4}a^2\left(-\frac{\sqrt{\pi}a\sqrt{a^2-x^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}}{3\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+$$

$$\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 4906$$

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

$$\frac{3}{4}a^2\left(-\frac{\sqrt{\pi}a\sqrt{a^2-x^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}}{3\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+$$

$$\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow \text{2009}$$

$$\frac{3}{4}a^2\left(-\frac{\sqrt{\pi}a\sqrt{a^2-x^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}}{3\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+$$

$$\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}-$$

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

input

```
Int[(a^2 - x^2)^(3/2)*Sqrt[ArcSin[x/a]],x]
```

output

```
(x*(a^2 - x^2)^(3/2)*Sqrt[ArcSin[x/a]])/4 - (a^3*Sqrt[a^2 - x^2]*((Sqrt[Pi
/2]*FresnelS[2*Sqrt[2/Pi]*Sqrt[ArcSin[x/a]]])/8 + (Sqrt[Pi]*FresnelS[(2*Sq
rt[ArcSin[x/a]])/Sqrt[Pi]])/4))/(8*Sqrt[1 - x^2/a^2]) + (3*a^2*((x*Sqrt[a^
2 - x^2]*Sqrt[ArcSin[x/a]])/2 + (a*Sqrt[a^2 - x^2]*ArcSin[x/a]^(3/2))/(3*S
qrt[1 - x^2/a^2]) - (a*Sqrt[Pi]*Sqrt[a^2 - x^2]*FresnelS[(2*Sqrt[ArcSin[x/
a]])/Sqrt[Pi]])/(8*Sqrt[1 - x^2/a^2])))/4
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 4906
```
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 5146
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[1
/(b*c^(m + 1))   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b], x], x, a
+ b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156

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

rule 5158

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

rule 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [F]

$$\int \left(a^2 - x^2\right)^{\frac{3}{2}} \sqrt{\arcsin\left(\frac{x}{a}\right)}\, dx$$

input

```
int((a^2-x^2)^(3/2)*arcsin(x/a)^(1/2),x)
```

output

```
int((a^2-x^2)^(3/2)*arcsin(x/a)^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \left(a^2 - x^2\right)^{3/2} \sqrt{\arcsin\left(\frac{x}{a}\right)}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((a^2-x^2)^(3/2)*arcsin(x/a)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \left(a^2 - x^2\right)^{3/2} \sqrt{\arcsin\left(\frac{x}{a}\right)}\, dx = \int \left(-(-a+x)\,(a+x)\right)^{\frac{3}{2}} \sqrt{\operatorname{asin}\left(\frac{x}{a}\right)}\, dx$$

input
```
integrate((a**2-x**2)**(3/2)*asin(x/a)**(1/2),x)
```

output
```
Integral((-(-a + x)*(a + x))**(3/2)*sqrt(asin(x/a)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \left(a^2 - x^2\right)^{3/2} \sqrt{\arcsin\left(\frac{x}{a}\right)}\, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a^2-x^2)^(3/2)*arcsin(x/a)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F]

$$\int \left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx=\int \left(a^2-x^2\right)^{\frac{3}{2}}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx$$

input
```
integrate((a^2-x^2)^(3/2)*arcsin(x/a)^(1/2),x, algorithm="giac")
```

output
```
integrate((a^2 - x^2)^(3/2)*sqrt(arcsin(x/a)), x)
```

Mupad [F(-1)]

Timed out.

$$\int \left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx=\int \sqrt{\text{asin}\left(\frac{x}{a}\right)}\left(a^2-x^2\right)^{3/2}\,dx$$

input
```
int(asin(x/a)^(1/2)*(a^2 - x^2)^(3/2),x)
```

output
```
int(asin(x/a)^(1/2)*(a^2 - x^2)^(3/2), x)
```

Reduce [F]

$$\int \left(a^2-x^2\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx=$$
$$-\left(\int \sqrt{a^2-x^2}\sqrt{asin\left(\frac{x}{a}\right)}\,x^2dx\right)+\left(\int \sqrt{a^2-x^2}\sqrt{asin\left(\frac{x}{a}\right)}dx\right)a^2$$

input
```
int((a^2-x^2)^(3/2)*asin(x/a)^(1/2),x)
```

output
```
 - int(sqrt(a**2 - x**2)*sqrt(asin(x/a))*x**2,x) + int(sqrt(a**2 - x**2)*s
qrt(asin(x/a)),x)*a**2
```

3.118 $\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx$

Optimal result . . . 950
Mathematica [C] (verified) . . . 951
Rubi [A] (verified) . . . 951
Maple [F] . . . 954
Fricas [F(-2)] . . . 954
Sympy [F] . . . 955
Maxima [F(-2)] . . . 955
Giac [F] . . . 955
Mupad [F(-1)] . . . 956
Reduce [F] . . . 956

Optimal result

Integrand size = 24, antiderivative size = 126

$$\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx = \frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)} + \frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}}{3\sqrt{1-\frac{x^2}{a^2}}} - \frac{a\sqrt{\pi}\sqrt{a^2-x^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}$$

output

```
1/2*x*(a^2-x^2)^(1/2)*arcsin(x/a)^(1/2)+1/3*a*(a^2-x^2)^(1/2)*arcsin(x/a)^
(3/2)/(1-x^2/a^2)^(1/2)-1/8*a*Pi^(1/2)*(a^2-x^2)^(1/2)*FresnelS(2*arcsin(x
/a)^(1/2)/Pi^(1/2))/(1-x^2/a^2)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.05 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.17

$$\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx$$
$$= \frac{\sqrt{a^2-x^2}\left(48x\sqrt{1-\frac{x^2}{a^2}}\arcsin\left(\frac{x}{a}\right)+32a\arcsin\left(\frac{x}{a}\right)^2+3\sqrt{2}a\sqrt{-i\arcsin\left(\frac{x}{a}\right)}\Gamma\left(\frac{1}{2},-2i\arcsin\left(\frac{x}{a}\right)\right)+3\sqrt{2}\right.}{96\sqrt{1-\frac{x^2}{a^2}}\sqrt{\arcsin\left(\frac{x}{a}\right)}}$$

input
```
Integrate[Sqrt[a^2 - x^2]*Sqrt[ArcSin[x/a]],x]
```

output
```
(Sqrt[a^2 - x^2]*(48*x*Sqrt[1 - x^2/a^2]*ArcSin[x/a] + 32*a*ArcSin[x/a]^2
+ 3*Sqrt[2]*a*Sqrt[(-I)*ArcSin[x/a]]*Gamma[1/2, (-2*I)*ArcSin[x/a]] + 3*Sq
rt[2]*a*Sqrt[I*ArcSin[x/a]]*Gamma[1/2, (2*I)*ArcSin[x/a]]))/(96*Sqrt[1 - x
^2/a^2]*Sqrt[ArcSin[x/a]])
```

Rubi [A] (verified)

Time = 0.84 (sec) , antiderivative size = 126, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {5156, 5146, 4906, 27, 3042, 3786, 3832, 5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx$$
$$\downarrow 5156$$
$$-\frac{\sqrt{a^2-x^2}\int \frac{x}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{\sqrt{a^2-x^2}\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$
$$\downarrow 5146$$

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

$$\downarrow 4906$$

$$\frac{\sqrt{a^2-x^2}\int\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}-\frac{a\sqrt{a^2-x^2}\int\frac{\sin\left(2\arcsin\left(\frac{x}{a}\right)\right)}{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)}{4\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 27$$

$$\frac{\sqrt{a^2-x^2}\int\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}-\frac{a\sqrt{a^2-x^2}\int\frac{\sin\left(2\arcsin\left(\frac{x}{a}\right)\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 3042$$

$$\frac{\sqrt{a^2-x^2}\int\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}-\frac{a\sqrt{a^2-x^2}\int\frac{\sin\left(2\arcsin\left(\frac{x}{a}\right)\right)}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 3786$$

$$\frac{\sqrt{a^2-x^2}\int\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}-\frac{a\sqrt{a^2-x^2}\int\sin\left(2\arcsin\left(\frac{x}{a}\right)\right)d\sqrt{\arcsin\left(\frac{x}{a}\right)}}{4\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 3832$$

$$\frac{\sqrt{a^2-x^2}\int\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}-\frac{\sqrt{\pi}a\sqrt{a^2-x^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

$$\downarrow 5152$$

$$-\frac{\sqrt{\pi}a\sqrt{a^2-x^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)}{8\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}}{3\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}$$

input
```
Int[Sqrt[a^2 - x^2]*Sqrt[ArcSin[x/a]],x]
```

output
```
(x*Sqrt[a^2 - x^2]*Sqrt[ArcSin[x/a]])/2 + (a*Sqrt[a^2 - x^2]*ArcSin[x/a]^(
3/2))/(3*Sqrt[1 - x^2/a^2]) - (a*Sqrt[Pi]*Sqrt[a^2 - x^2]*FresnelS[(2*Sqrt
[ArcSin[x/a]])/Sqrt[Pi]])/(8*Sqrt[1 - x^2/a^2])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 4906
```
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 5146
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[1
/(b*c^(m + 1))   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b], x], x, a
+ b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

Maple [F]

$$\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx$$

input
```
int((a^2-x^2)^(1/2)*arcsin(x/a)^(1/2),x)
```

output
```
int((a^2-x^2)^(1/2)*arcsin(x/a)^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a^2-x^2)^(1/2)*arcsin(x/a)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx = \int \sqrt{-(-a+x)(a+x)}\sqrt{\operatorname{asin}\left(\frac{x}{a}\right)}\,dx$$

input
```
integrate((a**2-x**2)**(1/2)*asin(x/a)**(1/2),x)
```

output
```
Integral(sqrt(-(-a + x)*(a + x))*sqrt(asin(x/a)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a^2-x^2)^(1/2)*arcsin(x/a)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F]

$$\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx = \int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx$$

input
```
integrate((a^2-x^2)^(1/2)*arcsin(x/a)^(1/2),x, algorithm="giac")
```

output
```
integrate(sqrt(a^2 - x^2)*sqrt(arcsin(x/a)), x)
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx = \int \sqrt{\operatorname{asin}\left(\frac{x}{a}\right)}\sqrt{a^2-x^2}\,dx$$

input
```
int(asin(x/a)^(1/2)*(a^2 - x^2)^(1/2),x)
```

output
```
int(asin(x/a)^(1/2)*(a^2 - x^2)^(1/2), x)
```

Reduce [F]

$$\int \sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}\,dx = \int \sqrt{a^2-x^2}\sqrt{asin\left(\frac{x}{a}\right)}dx$$

input
```
int((a^2-x^2)^(1/2)*asin(x/a)^(1/2),x)
```

output
```
int(sqrt(a**2 - x**2)*sqrt(asin(x/a)),x)
```

3.119 $\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx$

Optimal result . . . 957
Mathematica [A] (verified) . . . 957
Rubi [A] (verified) . . . 958
Maple [A] (verified) . . . 958
Fricas [A] (verification not implemented) . . . 959
Sympy [F] . . . 959
Maxima [F(-2)] . . . 960
Giac [A] (verification not implemented) . . . 960
Mupad [F(-1)] . . . 960
Reduce [B] (verification not implemented) . . . 961

Optimal result

Integrand size = 24, antiderivative size = 42

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx = \frac{2a\sqrt{1-\frac{x^2}{a^2}}\arcsin\left(\frac{x}{a}\right)^{3/2}}{3\sqrt{a^2-x^2}}$$

output
```
2/3*a*(1-x^2/a^2)^(1/2)*arcsin(x/a)^(3/2)/(a^2-x^2)^(1/2)
```

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx = \frac{2a\sqrt{1-\frac{x^2}{a^2}}\arcsin\left(\frac{x}{a}\right)^{3/2}}{3\sqrt{a^2-x^2}}$$

input
```
Integrate[Sqrt[ArcSin[x/a]]/Sqrt[a^2 - x^2],x]
```

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

Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx$$

$$\downarrow 5152$$

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

input
```
Int[Sqrt[ArcSin[x/a]]/Sqrt[a^2 - x^2],x]
```

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

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 38, normalized size of antiderivative = 0.90

method	result	size
default	$\frac{2\arcsin\left(\frac{x}{a}\right)^{\frac{3}{2}}a\sqrt{\frac{a^2-x^2}{a^2}}}{3\sqrt{a^2-x^2}}$	38

input
```
int(arcsin(x/a)^(1/2)/(a^2-x^2)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
2/3*arcsin(x/a)^(3/2)*a/(a^2-x^2)^(1/2)*((a^2-x^2)/a^2)^(1/2)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 36, normalized size of antiderivative = 0.86

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx = -\frac{2}{3}\sqrt{-\arctan\left(-\frac{x}{\sqrt{a^2-x^2}}\right)}\arctan\left(-\frac{x}{\sqrt{a^2-x^2}}\right)$$

input
```
integrate(arcsin(x/a)^(1/2)/(a^2-x^2)^(1/2),x, algorithm="fricas")
```

output
```
-2/3*sqrt(-arctan(-x/sqrt(a^2 - x^2)))*arctan(-x/sqrt(a^2 - x^2))
```

Sympy [F]

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx = \int \frac{\sqrt{\operatorname{asin}\left(\frac{x}{a}\right)}}{\sqrt{-(-a+x)(a+x)}}\,dx$$

input
```
integrate(asin(x/a)**(1/2)/(a**2-x**2)**(1/2),x)
```

output
```
Integral(sqrt(asin(x/a))/sqrt(-(-a + x)*(a + x)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(x/a)^(1/2)/(a^2-x^2)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.36

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx = \frac{2\,|a|\arcsin\left(\frac{x}{a}\right)^{\frac{3}{2}}}{3\,a}$$

input
```
integrate(arcsin(x/a)^(1/2)/(a^2-x^2)^(1/2),x, algorithm="giac")
```

output
```
2/3*abs(a)*arcsin(x/a)^(3/2)/a
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx = \int \frac{\sqrt{\operatorname{asin}\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx$$

input
```
int(asin(x/a)^(1/2)/(a^2 - x^2)^(1/2),x)
```

output
```
int(asin(x/a)^(1/2)/(a^2 - x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.36

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{a^2-x^2}}\,dx = \frac{2\sqrt{asin\left(\frac{x}{a}\right)}\,asin\left(\frac{x}{a}\right)}{3}$$

input
```
int(asin(x/a)^(1/2)/(a^2-x^2)^(1/2),x)
```

output
```
(2*sqrt(asin(x/a))*asin(x/a))/3
```

3.120 $\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx$

Optimal result . . . 962
Mathematica [N/A] . . . 962
Rubi [N/A] . . . 963
Maple [N/A] . . . 964
Fricas [F(-2)] . . . 964
Sympy [N/A] . . . 964
Maxima [F(-2)] . . . 965
Giac [N/A] . . . 965
Mupad [N/A] . . . 966
Reduce [N/A] . . . 966

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx = \text{Int}\left(\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}, x\right)$$

output
```
Defer(Int)(arcsin(x/a)^(1/2)/(a^2-x^2)^(3/2),x)
```

Mathematica [N/A]

Not integrable

Time = 2.41 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx = \int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx$$

input
```
Integrate[Sqrt[ArcSin[x/a]]/(a^2 - x^2)^(3/2),x]
```

output
```
Integrate[Sqrt[ArcSin[x/a]]/(a^2 - x^2)^(3/2), x]
```

Rubi [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx$$

$$\downarrow 5160$$

$$\frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2\sqrt{a^2-x^2}} - \frac{\sqrt{1-\frac{x^2}{a^2}}\int \frac{a^2 x}{\left(a^2-x^2\right)\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{2a^3\sqrt{a^2-x^2}}$$

$$\downarrow 27$$

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

$$\downarrow 5234$$

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

input
```
Int[Sqrt[ArcSin[x/a]]/(a^2 - x^2)^(3/2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.48 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{\frac{3}{2}}}dx$$

input
```
int(arcsin(x/a)^(1/2)/(a^2-x^2)^(3/2),x)
```

output
```
int(arcsin(x/a)^(1/2)/(a^2-x^2)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(x/a)^(1/2)/(a^2-x^2)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 2.76 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx = \int \frac{\sqrt{\operatorname{asin}\left(\frac{x}{a}\right)}}{\left(-\left(-a+x\right)\left(a+x\right)\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate(asin(x/a)**(1/2)/(a**2-x**2)**(3/2),x)
```

output
```
Integral(sqrt(asin(x/a))/(-(-a + x)*(a + x))**(3/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(x/a)^(1/2)/(a^2-x^2)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.52 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx = \int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate(arcsin(x/a)^(1/2)/(a^2-x^2)^(3/2),x, algorithm="giac")
```

output
```
integrate(sqrt(arcsin(x/a))/(a^2 - x^2)^(3/2), x)
```

Mupad [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx = \int \frac{\sqrt{\text{asin}\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx$$

input
```
int(asin(x/a)^(1/2)/(a^2 - x^2)^(3/2),x)
```

output
```
int(asin(x/a)^(1/2)/(a^2 - x^2)^(3/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.54

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}\,dx = \int \frac{\sqrt{a^2-x^2}\,\sqrt{asin\left(\frac{x}{a}\right)}}{a^4-2a^2x^2+x^4}dx$$

input
```
int(asin(x/a)^(1/2)/(a^2-x^2)^(3/2),x)
```

output
```
int((sqrt(a**2 - x**2)*sqrt(asin(x/a)))/(a**4 - 2*a**2*x**2 + x**4),x)
```

3.121 $\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx$

Optimal result . . . 967
Mathematica [N/A] . . . 967
Rubi [N/A] . . . 968
Maple [N/A] . . . 969
Fricas [F(-2)] . . . 970
Sympy [N/A] . . . 970
Maxima [F(-2)] . . . 970
Giac [N/A] . . . 971
Mupad [N/A] . . . 971
Reduce [N/A] . . . 972

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx = \text{Int}\left(\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}, x\right)$$

output
```
Defer(Int)(arcsin(x/a)^(1/2)/(a^2-x^2)^(5/2),x)
```

Mathematica [N/A]

Not integrable

Time = 2.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx = \int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx$$

input
```
Integrate[Sqrt[ArcSin[x/a]]/(a^2 - x^2)^(5/2),x]
```

output
```
Integrate[Sqrt[ArcSin[x/a]]/(a^2 - x^2)^(5/2), x]
```

Rubi [N/A]

Not integrable

Time = 0.58 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx$$

$$\downarrow 5162$$

$$\frac{2\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}dx}{3a^2} - \frac{\sqrt{1-\frac{x^2}{a^2}}\int \frac{a^4 x}{\left(a^2-x^2\right)^2\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{6a^5\sqrt{a^2-x^2}} + \frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{3a^2\left(a^2-x^2\right)^{3/2}}$$

$$\downarrow 27$$

$$-\frac{\sqrt{1-\frac{x^2}{a^2}}\int \frac{x}{\left(a^2-x^2\right)^2\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{6a\sqrt{a^2-x^2}} + \frac{2\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{3/2}}dx}{3a^2} + \frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{3a^2\left(a^2-x^2\right)^{3/2}}$$

$$\downarrow 5160$$

$$-\frac{\sqrt{1-\frac{x^2}{a^2}}\int \frac{x}{\left(a^2-x^2\right)^2\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{6a\sqrt{a^2-x^2}} + \frac{2\left(\frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2\sqrt{a^2-x^2}} - \frac{\sqrt{1-\frac{x^2}{a^2}}\int \frac{a^2 x}{\left(a^2-x^2\right)\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{2a^3\sqrt{a^2-x^2}}\right)}{3a^2} + \frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{3a^2\left(a^2-x^2\right)^{3/2}}$$

$$\downarrow 27$$

$$-\frac{\sqrt{1-\frac{x^2}{a^2}}\int\frac{x}{(a^2-x^2)^2\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{6a\sqrt{a^2-x^2}}+\frac{2\left(\frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2\sqrt{a^2-x^2}}-\frac{\sqrt{1-\frac{x^2}{a^2}}\int\frac{x}{\left(a^2-x^2\right)\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{2a\sqrt{a^2-x^2}}\right)}{3a^2}+\frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{3a^2\left(a^2-x^2\right)^{3/2}}$$

$$\downarrow 5234$$

$$-\frac{\sqrt{1-\frac{x^2}{a^2}}\int\frac{x}{(a^2-x^2)^2\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{6a\sqrt{a^2-x^2}}+\frac{2\left(\frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2\sqrt{a^2-x^2}}-\frac{\sqrt{1-\frac{x^2}{a^2}}\int\frac{x}{\left(a^2-x^2\right)\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{2a\sqrt{a^2-x^2}}\right)}{3a^2}+\frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{3a^2\left(a^2-x^2\right)^{3/2}}$$

input
```
Int[Sqrt[ArcSin[x/a]]/(a^2 - x^2)^(5/2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.66 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{\frac{5}{2}}}dx$$

input
```
int(arcsin(x/a)^(1/2)/(a^2-x^2)^(5/2),x)
```

output
```
int(arcsin(x/a)^(1/2)/(a^2-x^2)^(5/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(x/a)^(1/2)/(a^2-x^2)^(5/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 26.04 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx = \int \frac{\sqrt{\operatorname{asin}\left(\frac{x}{a}\right)}}{\left(-\left(-a+x\right)\left(a+x\right)\right)^{\frac{5}{2}}}\,dx$$

input
```
integrate(asin(x/a)**(1/2)/(a**2-x**2)**(5/2),x)
```

output
```
Integral(sqrt(asin(x/a))/(-(-a + x)*(a + x))**(5/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(x/a)^(1/2)/(a^2-x^2)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.56 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx = \int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{\frac{5}{2}}}\,dx$$

input
```
integrate(arcsin(x/a)^(1/2)/(a^2-x^2)^(5/2),x, algorithm="giac")
```

output
```
integrate(sqrt(arcsin(x/a))/(a^2 - x^2)^(5/2), x)
```

Mupad [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx = \int \frac{\sqrt{\operatorname{asin}\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx$$

input
```
int(asin(x/a)^(1/2)/(a^2 - x^2)^(5/2),x)
```

output
```
int(asin(x/a)^(1/2)/(a^2 - x^2)^(5/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.96

$$\int \frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^{5/2}}\,dx = \int \frac{\sqrt{a^2-x^2}\,\sqrt{asin\left(\frac{x}{a}\right)}}{a^6-3a^4x^2+3a^2x^4-x^6}dx$$

input

```
int(asin(x/a)^(1/2)/(a^2-x^2)^(5/2),x)
```

output

```
int((sqrt(a**2 - x**2)*sqrt(asin(x/a)))/(a**6 - 3*a**4*x**2 + 3*a**2*x**4
- x**6),x)
```

3.122 $\int (a^2-x^2)^{3/2} \arcsin\left(\frac{x}{a}\right)^{3/2} dx$

Optimal result . . . 973
Mathematica [C] (verified) . . . 974
Rubi [A] (verified) . . . 974
Maple [F] . . . 981
Fricas [F(-2)] . . . 982
Sympy [F(-1)] . . . 982
Maxima [F(-2)] . . . 982
Giac [F] . . . 983
Mupad [F(-1)] . . . 983
Reduce [F] . . . 983

Optimal result

Integrand size = 24, antiderivative size = 359

$$\int (a^2-x^2)^{3/2} \arcsin\left(\frac{x}{a}\right)^{3/2} dx = \frac{27a^3\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}}{256\sqrt{1-\frac{x^2}{a^2}}}$$
$$-\frac{9ax^2\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}}{32\sqrt{1-\frac{x^2}{a^2}}}+\frac{3(a^2-x^2)^{5/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}}{32a\sqrt{1-\frac{x^2}{a^2}}}$$
$$+\frac{3}{8}a^2x\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}+\frac{1}{4}x(a^2-x^2)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}+\frac{3a^3\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{20\sqrt{1-\frac{x^2}{a^2}}}-\frac{3a^3\sqrt{\frac{\pi}{2}}\sqrt{a^2-}}{}$$

output

```
27/256*a^3*(a^2-x^2)^(1/2)*arcsin(x/a)^(1/2)/(1-x^2/a^2)^(1/2)-9/32*a*x^2*
(a^2-x^2)^(1/2)*arcsin(x/a)^(1/2)/(1-x^2/a^2)^(1/2)+3/32*(a^2-x^2)^(5/2)*a
rcsin(x/a)^(1/2)/a/(1-x^2/a^2)^(1/2)+3/8*a^2*x*(a^2-x^2)^(1/2)*arcsin(x/a)
^(3/2)+1/4*x*(a^2-x^2)^(3/2)*arcsin(x/a)^(3/2)+3/20*a^3*(a^2-x^2)^(1/2)*ar
csin(x/a)^(5/2)/(1-x^2/a^2)^(1/2)-3/1024*a^3*2^(1/2)*Pi^(1/2)*(a^2-x^2)^(1
/2)*FresnelC(2*2^(1/2)/Pi^(1/2)*arcsin(x/a)^(1/2))/(1-x^2/a^2)^(1/2)-3/32*
a^3*Pi^(1/2)*(a^2-x^2)^(1/2)*FresnelC(2*arcsin(x/a)^(1/2)/Pi^(1/2))/(1-x^2
/a^2)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.33 (sec) , antiderivative size = 209, normalized size of antiderivative = 0.58

$$\int (a^2 - x^2)^{3/2} \arcsin\left(\frac{x}{a}\right)^{3/2} dx = \frac{a^3\sqrt{a^2-x^2}\left(-240\sqrt{\pi}\sqrt{\arcsin\left(\frac{x}{a}\right)^2}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right) + \sqrt{\arcsin\left(\frac{x}{a}\right)}\left(5\right.\right.}{}$$

input
```
Integrate[(a^2 - x^2)^(3/2)*ArcSin[x/a]^(3/2),x]
```

output
```
(a^3*Sqrt[a^2 - x^2]*(-240*Sqrt[Pi]*Sqrt[ArcSin[x/a]^2]*FresnelC[(2*Sqrt[A
rcSin[x/a]])/Sqrt[Pi]] + Sqrt[ArcSin[x/a]]*(5*Sqrt[I*ArcSin[x/a]]*Gamma[5/
2, (-4*I)*ArcSin[x/a]] + 5*Sqrt[(-I)*ArcSin[x/a]]*Gamma[5/2, (4*I)*ArcSin[
x/a]] + 32*Sqrt[ArcSin[x/a]^2]*(12*ArcSin[x/a]^2 + 15*Cos[2*ArcSin[x/a]] +
 20*ArcSin[x/a]*Sin[2*ArcSin[x/a]])))/(2560*Sqrt[1 - x^2/a^2]*Sqrt[ArcSin
[x/a]^2])
```

Rubi [A] (verified)

Time = 2.52 (sec) , antiderivative size = 348, normalized size of antiderivative = 0.97, number of steps used = 15, number of rules used = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.583$, Rules used = {5158, 27, 5156, 5140, 5152, 5182, 5168, 3042, 3793, 2009, 5224, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (a^2 - x^2)^{3/2} \arcsin\left(\frac{x}{a}\right)^{3/2} dx$$

$$\downarrow 5158$$

$$\frac{3}{4}a^2\int\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}dx-\frac{3a\sqrt{a^2-x^2}\int\frac{x\left(a^2-x^2\right)\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2}dx}{8\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}$$

$$\downarrow 27$$

$$\frac{3}{4}a^2\int\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}dx-\frac{3\sqrt{a^2-x^2}\int x\left(a^2-x^2\right)\sqrt{\arcsin\left(\frac{x}{a}\right)}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}$$

$$\downarrow 5156$$

$$\frac{3}{4}a^2\left(-\frac{3\sqrt{a^2-x^2}\int x\sqrt{\arcsin\left(\frac{x}{a}\right)}dx}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{\sqrt{a^2-x^2}\int\frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}\right)-\frac{3\sqrt{a^2-x^2}\int x\left(a^2-x^2\right)\sqrt{\arcsin\left(\frac{x}{a}\right)}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}$$

$$\downarrow 5140$$

$$\frac{3}{4}a^2\left(-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{\int\frac{x^2}{\sqrt{1-\frac{x^2}{a^2}}\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a}\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{\sqrt{a^2-x^2}\int\frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\right.$$

$$\frac{3\sqrt{a^2-x^2}\int x\left(a^2-x^2\right)\sqrt{\arcsin\left(\frac{x}{a}\right)}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}$$

$$\downarrow 5152$$

$$\frac{3}{4}a^2\left(-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{\int\frac{x^2}{\sqrt{1-\frac{x^2}{a^2}}\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a}\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\right.$$

$$\left.\frac{3\sqrt{a^2-x^2}\int x\left(a^2-x^2\right)\sqrt{\arcsin\left(\frac{x}{a}\right)}dx}{8a\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}\right)$$

$$\downarrow 5182$$

$$\frac{3}{4}a^2\left(-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{\int\frac{x^2}{\sqrt{1-\frac{x^2}{a^2}}\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a}\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\right.$$

$$\left.\frac{3\sqrt{a^2-x^2}\left(\frac{1}{8}a^3\int\frac{\left(1-\frac{x^2}{a^2}\right)^{3/2}}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx-\frac{1}{4}\left(a^2-x^2\right)^2\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)}{8a\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}\right)$$

$$\downarrow 5168$$

$$\frac{3}{4}a^2\left(-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{\int\frac{x^2}{\sqrt{1-\frac{x^2}{a^2}}\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a}\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\right.$$

$$\left.\frac{3\sqrt{a^2-x^2}\left(\frac{1}{8}a^4\int\frac{\left(1-\frac{x^2}{a^2}\right)^2}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)-\frac{1}{4}\left(a^2-x^2\right)^2\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)}{8a\sqrt{1-\frac{x^2}{a^2}}}+\right.$$

$$\left.\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}\right)$$

$$\downarrow 3042$$

$$\frac{3}{4}a^2\left(-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{\int\frac{x^2}{\sqrt{1-\frac{x^2}{a^2}}\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a}\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\left(\right.\right.$$

$$\left.\left.\frac{3\sqrt{a^2-x^2}\left(\frac{1}{8}a^4\int\frac{\sin\left(\arcsin\left(\frac{x}{a}\right)+\frac{\pi}{2}\right)^4}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)-\frac{1}{4}\left(a^2-x^2\right)^2\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)}{8a\sqrt{1-\frac{x^2}{a^2}}}+\right.\right.$$

$$\left.\left.\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}\right.\right.$$

$$\downarrow 3793$$

$$\frac{3}{4}a^2\left(-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{\int\frac{x^2}{\sqrt{1-\frac{x^2}{a^2}}\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a}\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\left(\right.\right.$$

$$\left.\left.\frac{3\sqrt{a^2-x^2}\left(\frac{1}{8}a^4\int\left(\frac{\cos\left(2\arcsin\left(\frac{x}{a}\right)\right)}{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}+\frac{\cos\left(4\arcsin\left(\frac{x}{a}\right)\right)}{8\sqrt{\arcsin\left(\frac{x}{a}\right)}}+\frac{3}{8\sqrt{\arcsin\left(\frac{x}{a}\right)}}\right)d\arcsin\left(\frac{x}{a}\right)-\frac{1}{4}\left(a^2-x^2\right)^2\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)}{8a\sqrt{1-\frac{x^2}{a^2}}}+\right.\right.$$

$$\left.\left.\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}\right.\right.$$

$$\downarrow 2009$$

$$\frac{3}{4}a^2\left(-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{\int\frac{x^2}{\sqrt{1-\frac{x^2}{a^2}}\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a}\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\left(\right.\right.$$

$$\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}-$$

$$\frac{3\sqrt{a^2-x^2}\left(\frac{1}{8}a^4\left(\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)+\frac{3}{4}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)-\frac{1}{4}(a^2\right.}{8a\sqrt{1-\frac{x^2}{a^2}}}$$

$$\downarrow 5224$$

$$\frac{3}{4}a^2\left(-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{1}{4}a^2\int\frac{x^2}{a^2\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-\right.$$

$$\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}-$$

$$\frac{3\sqrt{a^2-x^2}\left(\frac{1}{8}a^4\left(\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)+\frac{3}{4}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)-\frac{1}{4}(a^2\right.}{8a\sqrt{1-\frac{x^2}{a^2}}}$$

$$\downarrow 3042$$

$$\frac{3}{4}a^2\left(-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{1}{4}a^2\int\frac{\sin\left(\arcsin\left(\frac{x}{a}\right)\right)^2}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-\right.$$

$$\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}-$$

$$\frac{3\sqrt{a^2-x^2}\left(\frac{1}{8}a^4\left(\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)+\frac{3}{4}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)-\frac{1}{4}(a^2\right.}{8a\sqrt{1-\frac{x^2}{a^2}}}$$

$$\downarrow 3793$$

$$\frac{3}{4}a^2\left(-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{1}{4}a^2\int\left(\frac{1}{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}-\frac{\cos\left(2\arcsin\left(\frac{x}{a}\right)\right)}{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}\right)d\arcsin\left(\frac{x}{a}\right)\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin}{5\sqrt{1-\frac{x^2}{a^2}}}\right.$$

$$\left.\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}-\right.$$

$$\frac{3\sqrt{a^2-x^2}\left(\frac{1}{8}a^4\left(\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)+\frac{3}{4}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)-\frac{1}{4}(a^2\right.}{8a\sqrt{1-\frac{x^2}{a^2}}}$$

$$\downarrow \text{2009}$$

$$\frac{3}{4}a^2\left(-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{1}{4}a^2\left(\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)\right)\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin}{5\sqrt{1-}}\right.$$

$$\left.\frac{1}{4}x\left(a^2-x^2\right)^{3/2}\arcsin\left(\frac{x}{a}\right)^{3/2}-\right.$$

$$\frac{3\sqrt{a^2-x^2}\left(\frac{1}{8}a^4\left(\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)+\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)+\frac{3}{4}\sqrt{\arcsin\left(\frac{x}{a}\right)}\right)-\frac{1}{4}(a^2\right.}{8a\sqrt{1-\frac{x^2}{a^2}}}$$

input

```
Int[(a^2 - x^2)^(3/2)*ArcSin[x/a]^(3/2),x]
```

output

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

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5140
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[x
^(m + 1)*((a + b*ArcSin[c*x])^n/(m + 1)), x] - Simp[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 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

rule 5156
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[x*Sqrt[d + e*x^2]*((a + b*ArcSin[c*x])^n/2), x] + (Simp[(1/2
)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2]]   Int[(a + b*ArcSin[c*x])^n/Sqrt[
1 - c^2*x^2], x], x] - Simp[b*c*(n/2)*Simp[Sqrt[d + e*x^2]/Sqrt[1 - c^2*x^2
]]   Int[x*(a + b*ArcSin[c*x])^(n - 1), x], x]) /; FreeQ[{a, b, c, d, e}, x
] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

rule 5158

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

rule 5168

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

rule 5182

```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [F]

$$\int \left(a^2 - x^2\right)^{\frac{3}{2}} \arcsin\left(\frac{x}{a}\right)^{\frac{3}{2}} dx$$

input

```
int((a^2-x^2)^(3/2)*arcsin(x/a)^(3/2),x)
```

output

```
int((a^2-x^2)^(3/2)*arcsin(x/a)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \left(a^2 - x^2\right)^{3/2} \arcsin\left(\frac{x}{a}\right)^{3/2} dx = \text{Exception raised: TypeError}$$

input
```
integrate((a^2-x^2)^(3/2)*arcsin(x/a)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \left(a^2 - x^2\right)^{3/2} \arcsin\left(\frac{x}{a}\right)^{3/2} dx = \text{Timed out}$$

input
```
integrate((a**2-x**2)**(3/2)*asin(x/a)**(3/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \left(a^2 - x^2\right)^{3/2} \arcsin\left(\frac{x}{a}\right)^{3/2} dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a^2-x^2)^(3/2)*arcsin(x/a)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F]

$$\int \left(a^2-x^2\right)^{3/2} \arcsin\left(\frac{x}{a}\right)^{3/2} dx = \int \left(a^2-x^2\right)^{\frac{3}{2}} \arcsin\left(\frac{x}{a}\right)^{\frac{3}{2}} dx$$

input
```
integrate((a^2-x^2)^(3/2)*arcsin(x/a)^(3/2),x, algorithm="giac")
```

output
```
integrate((a^2 - x^2)^(3/2)*arcsin(x/a)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \left(a^2-x^2\right)^{3/2} \arcsin\left(\frac{x}{a}\right)^{3/2} dx = \int \text{asin}\left(\frac{x}{a}\right)^{3/2} \left(a^2-x^2\right)^{3/2} dx$$

input
```
int(asin(x/a)^(3/2)*(a^2 - x^2)^(3/2),x)
```

output
```
int(asin(x/a)^(3/2)*(a^2 - x^2)^(3/2), x)
```

Reduce [F]

$$\int \left(a^2-x^2\right)^{3/2} \arcsin\left(\frac{x}{a}\right)^{3/2} dx = -\left(\int \sqrt{a^2-x^2}\sqrt{asin\left(\frac{x}{a}\right)}\, asin\left(\frac{x}{a}\right) x^2 dx\right) + \left(\int \sqrt{a^2-x^2}\sqrt{asin\left(\frac{x}{a}\right)}\, asin\left(\frac{x}{a}\right) dx\right) a^2$$

input
```
int((a^2-x^2)^(3/2)*asin(x/a)^(3/2),x)
```

output
```
- int(sqrt(a**2 - x**2)*sqrt(asin(x/a))*asin(x/a)*x**2,x) + int(sqrt(a**2
- x**2)*sqrt(asin(x/a))*asin(x/a),x)*a**2
```

3.123 $\int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}\,dx$

Optimal result . . . 984
Mathematica [C] (verified) . . . 985
Rubi [A] (verified) . . . 985
Maple [F] . . . 988
Fricas [F(-2)] . . . 989
Sympy [F] . . . 989
Maxima [F(-2)] . . . 989
Giac [F] . . . 990
Mupad [F(-1)] . . . 990
Reduce [F] . . . 990

Optimal result

Integrand size = 24, antiderivative size = 215

$$\int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}\,dx = \frac{3a\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}}{16\sqrt{1-\frac{x^2}{a^2}}} - \frac{3x^2\sqrt{a^2-x^2}\sqrt{\arcsin\left(\frac{x}{a}\right)}}{8a\sqrt{1-\frac{x^2}{a^2}}} + \frac{1}{2}x\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2} + \frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}} - \frac{3a\sqrt{\pi}\sqrt{a^2-x^2}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)}{32\sqrt{1-\frac{x^2}{a^2}}}$$

output

```
3/16*a*(a^2-x^2)^(1/2)*arcsin(x/a)^(1/2)/(1-x^2/a^2)^(1/2)-3/8*x^2*(a^2-x^
2)^(1/2)*arcsin(x/a)^(1/2)/a/(1-x^2/a^2)^(1/2)+1/2*x*(a^2-x^2)^(1/2)*arcsi
n(x/a)^(3/2)+1/5*a*(a^2-x^2)^(1/2)*arcsin(x/a)^(5/2)/(1-x^2/a^2)^(1/2)-3/3
2*a*Pi^(1/2)*(a^2-x^2)^(1/2)*FresnelC(2*arcsin(x/a)^(1/2)/Pi^(1/2))/(1-x^2
/a^2)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.06 (sec) , antiderivative size = 154, normalized size of antiderivative = 0.72

$$\int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}dx = \frac{\sqrt{a^2-x^2}\left(160x\sqrt{1-\frac{x^2}{a^2}}\arcsin\left(\frac{x}{a}\right)^2+64a\arcsin\left(\frac{x}{a}\right)^3+15i\sqrt{2}a\sqrt{-i\arc}\right.}{320\sqrt{1-\frac{x^2}{a^2}}}$$

input
```
Integrate[Sqrt[a^2 - x^2]*ArcSin[x/a]^(3/2),x]
```

output
```
(Sqrt[a^2 - x^2]*(160*x*Sqrt[1 - x^2/a^2]*ArcSin[x/a]^2 + 64*a*ArcSin[x/a]
^3 + (15*I)*Sqrt[2]*a*Sqrt[(-I)*ArcSin[x/a]]*Gamma[3/2, (-2*I)*ArcSin[x/a]
] - (15*I)*Sqrt[2]*a*Sqrt[I*ArcSin[x/a]]*Gamma[3/2, (2*I)*ArcSin[x/a]]))/(
320*Sqrt[1 - x^2/a^2]*Sqrt[ArcSin[x/a]])
```

Rubi [A] (verified)

Time = 1.07 (sec) , antiderivative size = 168, normalized size of antiderivative = 0.78, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.292$, Rules used = {5156, 5140, 5152, 5224, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}dx$$

$$\downarrow 5156$$

$$-\frac{3\sqrt{a^2-x^2}\int x\sqrt{\arcsin\left(\frac{x}{a}\right)}dx}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{\sqrt{a^2-x^2}\int\frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}$$

$$\downarrow 5140$$

$$-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{\int\frac{x^2}{\sqrt{1-\frac{x^2}{a^2}}\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a}\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{\sqrt{a^2-x^2}\int\frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{1-\frac{x^2}{a^2}}}dx}{2\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}$$

$$\downarrow 5152$$

$$-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{\int\frac{x^2}{\sqrt{1-\frac{x^2}{a^2}}\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a}\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}$$

$$\downarrow 5224$$

$$-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{1}{4}a^2\int\frac{x^2}{a^2\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}$$

$$\downarrow 3042$$

$$-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{1}{4}a^2\int\frac{\sin\left(\arcsin\left(\frac{x}{a}\right)\right)^2}{\sqrt{\arcsin\left(\frac{x}{a}\right)}}d\arcsin\left(\frac{x}{a}\right)\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}$$

$$\downarrow 3793$$

$$-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{1}{4}a^2\int\left(\frac{1}{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}-\frac{\cos\left(2\arcsin\left(\frac{x}{a}\right)\right)}{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}\right)d\arcsin\left(\frac{x}{a}\right)\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}$$

$$\downarrow 2009$$

$$-\frac{3\sqrt{a^2-x^2}\left(\frac{1}{2}x^2\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{1}{4}a^2\left(\sqrt{\arcsin\left(\frac{x}{a}\right)}-\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\sqrt{\pi}}\right)\right)\right)}{4a\sqrt{1-\frac{x^2}{a^2}}}+$$
$$\frac{a\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{1-\frac{x^2}{a^2}}}+\frac{1}{2}x\sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}$$

input
```
Int[Sqrt[a^2 - x^2]*ArcSin[x/a]^(3/2),x]
```

output
```
(x*Sqrt[a^2 - x^2]*ArcSin[x/a]^(3/2))/2 + (a*Sqrt[a^2 - x^2]*ArcSin[x/a]^(
5/2))/(5*Sqrt[1 - x^2/a^2]) - (3*Sqrt[a^2 - x^2]*((x^2*Sqrt[ArcSin[x/a]])/
2 - (a^2*(Sqrt[ArcSin[x/a]] - (Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[x/a]])/Sqr
t[Pi]])/2))/4))/(4*a*Sqrt[1 - x^2/a^2])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5140
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[x
^(m + 1)*((a + b*ArcSin[c*x])^n/(m + 1)), x] - Simp[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 5152

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

rule 5156

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

rule 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [F]

$$\int \sqrt{a^2 - x^2} \arcsin\left(\frac{x}{a}\right)^{\frac{3}{2}} dx$$

input

```
int((a^2-x^2)^(1/2)*arcsin(x/a)^(3/2),x)
```

output

```
int((a^2-x^2)^(1/2)*arcsin(x/a)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a^2-x^2)^(1/2)*arcsin(x/a)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}\,dx = \int \sqrt{-\left(-a+x\right)\left(a+x\right)}\operatorname{asin}^{\frac{3}{2}}\left(\frac{x}{a}\right)dx$$

input
```
integrate((a**2-x**2)**(1/2)*asin(x/a)**(3/2),x)
```

output
```
Integral(sqrt(-(-a + x)*(a + x))*asin(x/a)**(3/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a^2-x^2)^(1/2)*arcsin(x/a)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F]

$$\int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}\,dx = \int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{\frac{3}{2}}\,dx$$

input
```
integrate((a^2-x^2)^(1/2)*arcsin(x/a)^(3/2),x, algorithm="giac")
```

output
```
integrate(sqrt(a^2 - x^2)*arcsin(x/a)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}\,dx = \int \mathrm{asin}\left(\frac{x}{a}\right)^{3/2}\sqrt{a^2-x^2}\,dx$$

input
```
int(asin(x/a)^(3/2)*(a^2 - x^2)^(1/2),x)
```

output
```
int(asin(x/a)^(3/2)*(a^2 - x^2)^(1/2), x)
```

Reduce [F]

$$\int \sqrt{a^2-x^2}\arcsin\left(\frac{x}{a}\right)^{3/2}\,dx = \int \sqrt{a^2-x^2}\sqrt{asin\left(\frac{x}{a}\right)}\,asin\left(\frac{x}{a}\right)\,dx$$

input
```
int((a^2-x^2)^(1/2)*asin(x/a)^(3/2),x)
```

output
```
int(sqrt(a**2 - x**2)*sqrt(asin(x/a))*asin(x/a),x)
```

3.124 $\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx$

Optimal result . . . 991
Mathematica [A] (verified) . . . 991
Rubi [A] (verified) . . . 992
Maple [A] (verified) . . . 992
Fricas [A] (verification not implemented) . . . 993
Sympy [F] . . . 993
Maxima [F(-2)] . . . 994
Giac [A] (verification not implemented) . . . 994
Mupad [F(-1)] . . . 994
Reduce [B] (verification not implemented) . . . 995

Optimal result

Integrand size = 24, antiderivative size = 42

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx = \frac{2a\sqrt{1-\frac{x^2}{a^2}}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{a^2-x^2}}$$

output
```
2/5*a*(1-x^2/a^2)^(1/2)*arcsin(x/a)^(5/2)/(a^2-x^2)^(1/2)
```

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.00

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx = \frac{2a\sqrt{1-\frac{x^2}{a^2}}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{a^2-x^2}}$$

input
```
Integrate[ArcSin[x/a]^(3/2)/Sqrt[a^2 - x^2],x]
```

output
```
(2*a*Sqrt[1 - x^2/a^2]*ArcSin[x/a]^(5/2))/(5*Sqrt[a^2 - x^2])
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx$$

$$\downarrow 5152$$

$$\frac{2a\sqrt{1-\frac{x^2}{a^2}}\arcsin\left(\frac{x}{a}\right)^{5/2}}{5\sqrt{a^2-x^2}}$$

input
```
Int[ArcSin[x/a]^(3/2)/Sqrt[a^2 - x^2],x]
```

output
```
(2*a*Sqrt[1 - x^2/a^2]*ArcSin[x/a]^(5/2))/(5*Sqrt[a^2 - x^2])
```

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 38, normalized size of antiderivative = 0.90

method	result	size
default	$\frac{2\arcsin\left(\frac{x}{a}\right)^{\frac{5}{2}}a\sqrt{\frac{a^2-x^2}{a^2}}}{5\sqrt{a^2-x^2}}$	38

input
```
int(arcsin(x/a)^(3/2)/(a^2-x^2)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
2/5*arcsin(x/a)^(5/2)*a/(a^2-x^2)^(1/2)*((a^2-x^2)/a^2)^(1/2)
```

Fricas [A] (verification not implemented)

Time = 0.09 (sec) , antiderivative size = 38, normalized size of antiderivative = 0.90

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx = \frac{2}{5}\sqrt{-\arctan\left(-\frac{x}{\sqrt{a^2-x^2}}\right)}\arctan\left(-\frac{x}{\sqrt{a^2-x^2}}\right)^2$$

input
```
integrate(arcsin(x/a)^(3/2)/(a^2-x^2)^(1/2),x, algorithm="fricas")
```

output
```
2/5*sqrt(-arctan(-x/sqrt(a^2 - x^2)))*arctan(-x/sqrt(a^2 - x^2))^2
```

Sympy [F]

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx = \int \frac{\operatorname{asin}^{\frac{3}{2}}\left(\frac{x}{a}\right)}{\sqrt{-(-a+x)(a+x)}}\,dx$$

input
```
integrate(asin(x/a)**(3/2)/(a**2-x**2)**(1/2),x)
```

output
```
Integral(asin(x/a)**(3/2)/sqrt(-(-a + x)*(a + x)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(x/a)^(3/2)/(a^2-x^2)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.36

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx = \frac{2\,|a|\,\arcsin\left(\frac{x}{a}\right)^{\frac{5}{2}}}{5\,a}$$

input
```
integrate(arcsin(x/a)^(3/2)/(a^2-x^2)^(1/2),x, algorithm="giac")
```

output
```
2/5*abs(a)*arcsin(x/a)^(5/2)/a
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx = \int \frac{\mathrm{asin}\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx$$

input
```
int(asin(x/a)^(3/2)/(a^2 - x^2)^(1/2),x)
```

output
```
int(asin(x/a)^(3/2)/(a^2 - x^2)^(1/2), x)
```

Reduce [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.40

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\sqrt{a^2-x^2}}\,dx = \frac{2\sqrt{asin\left(\frac{x}{a}\right)}\,asin\left(\frac{x}{a}\right)^2}{5}$$

input
```
int(asin(x/a)^(3/2)/(a^2-x^2)^(1/2),x)
```

output
```
(2*sqrt(asin(x/a))*asin(x/a)**2)/5
```

3.125 $\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx$

Optimal result . . . 996
Mathematica [N/A] . . . 996
Rubi [N/A] . . . 997
Maple [N/A] . . . 998
Fricas [F(-2)] . . . 998
Sympy [N/A] . . . 998
Maxima [F(-2)] . . . 999
Giac [N/A] . . . 999
Mupad [N/A] . . . 1000
Reduce [N/A] . . . 1000

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx = \text{Int}\left(\frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}, x\right)$$

output
```
Defer(Int)(arcsin(x/a)^(3/2)/(a^2-x^2)^(3/2),x)
```

Mathematica [N/A]

Not integrable

Time = 2.68 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx = \int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx$$

input
```
Integrate[ArcSin[x/a]^(3/2)/(a^2 - x^2)^(3/2),x]
```

output
```
Integrate[ArcSin[x/a]^(3/2)/(a^2 - x^2)^(3/2), x]
```

Rubi [N/A]

Not integrable

Time = 0.37 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx$$

$$\downarrow 5160$$

$$\frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{a^2\sqrt{a^2-x^2}} - \frac{3\sqrt{1-\frac{x^2}{a^2}}\int \frac{a^2x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2-x^2}\,dx}{2a^3\sqrt{a^2-x^2}}$$

$$\downarrow 27$$

$$\frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{a^2\sqrt{a^2-x^2}} - \frac{3\sqrt{1-\frac{x^2}{a^2}}\int \frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2-x^2}\,dx}{2a\sqrt{a^2-x^2}}$$

$$\downarrow 5234$$

$$\frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{a^2\sqrt{a^2-x^2}} - \frac{3\sqrt{1-\frac{x^2}{a^2}}\int \frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2-x^2}\,dx}{2a\sqrt{a^2-x^2}}$$

input
```
Int[ArcSin[x/a]^(3/2)/(a^2 - x^2)^(3/2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.59 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{\frac{3}{2}}}{\left(a^2-x^2\right)^{\frac{3}{2}}}dx$$

input
```
int(arcsin(x/a)^(3/2)/(a^2-x^2)^(3/2),x)
```

output
```
int(arcsin(x/a)^(3/2)/(a^2-x^2)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(x/a)^(3/2)/(a^2-x^2)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 18.30 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx = \int \frac{\operatorname{asin}^{\frac{3}{2}}\left(\frac{x}{a}\right)}{\left(-\left(-a+x\right)\left(a+x\right)\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate(asin(x/a)**(3/2)/(a**2-x**2)**(3/2),x)
```

output
```
Integral(asin(x/a)**(3/2)/(-(-a + x)*(a + x))**(3/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(x/a)^(3/2)/(a^2-x^2)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.64 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx = \int \frac{\arcsin\left(\frac{x}{a}\right)^{\frac{3}{2}}}{\left(a^2-x^2\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate(arcsin(x/a)^(3/2)/(a^2-x^2)^(3/2),x, algorithm="giac")
```

output
```
integrate(arcsin(x/a)^(3/2)/(a^2 - x^2)^(3/2), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx = \int \frac{\mathrm{asin}\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx$$

input
```
int(asin(x/a)^(3/2)/(a^2 - x^2)^(3/2),x)
```

output
```
int(asin(x/a)^(3/2)/(a^2 - x^2)^(3/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 97, normalized size of antiderivative = 4.04

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}\,dx = \frac{2\sqrt{a^2-x^2}\,\sqrt{asin\left(\frac{x}{a}\right)}\,asin\left(\frac{x}{a}\right)x - 3\left(\int \frac{\sqrt{asin\left(\frac{x}{a}\right)}\,x}{a^2-x^2}dx\right)a^2 + 3\left(\int \frac{\sqrt{asin\left(\frac{x}{a}\right)}\,x}{a^2-x^2}dx\right)x^2}{2a^2\left(a^2-x^2\right)}$$

input
```
int(asin(x/a)^(3/2)/(a^2-x^2)^(3/2),x)
```

output
```
(2*sqrt(a**2 - x**2)*sqrt(asin(x/a))*asin(x/a)*x - 3*int((sqrt(asin(x/a))*
x)/(a**2 - x**2),x)*a**2 + 3*int((sqrt(asin(x/a))*x)/(a**2 - x**2),x)*x**2
)/(2*a**2*(a**2 - x**2))
```

3.126 $\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx$

Optimal result 1001
Mathematica [N/A] 1001
Rubi [N/A] 1002
Maple [N/A] 1004
Fricas [F(-2)] 1004
Sympy [N/A] 1004
Maxima [F(-2)] 1005
Giac [N/A] 1005
Mupad [N/A] 1006
Reduce [N/A] 1006

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx = \text{Int}\left(\frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}, x\right)$$

output
```
Defer(Int)(arcsin(x/a)^(3/2)/(a^2-x^2)^(5/2),x)
```

Mathematica [N/A]

Not integrable

Time = 2.74 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx = \int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx$$

input
```
Integrate[ArcSin[x/a]^(3/2)/(a^2 - x^2)^(5/2),x]
```

output
```
Integrate[ArcSin[x/a]^(3/2)/(a^2 - x^2)^(5/2), x]
```

Rubi [N/A]

Not integrable

Time = 0.95 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx$$

$$\downarrow 5162$$

$$\frac{2\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}dx}{3a^2} - \frac{\sqrt{1-\frac{x^2}{a^2}}\int \frac{a^4 x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^2}dx}{2a^5\sqrt{a^2-x^2}} + \frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{3a^2\left(a^2-x^2\right)^{3/2}}$$

$$\downarrow 27$$

$$-\frac{\sqrt{1-\frac{x^2}{a^2}}\int \frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^2}dx}{2a\sqrt{a^2-x^2}} + \frac{2\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{3/2}}dx}{3a^2} + \frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{3a^2\left(a^2-x^2\right)^{3/2}}$$

$$\downarrow 5160$$

$$-\frac{\sqrt{1-\frac{x^2}{a^2}}\int \frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^2}dx}{2a\sqrt{a^2-x^2}} + \frac{2\left(\frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{a^2\sqrt{a^2-x^2}} - \frac{3\sqrt{1-\frac{x^2}{a^2}}\int \frac{a^2 x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2-x^2}dx}{2a^3\sqrt{a^2-x^2}}\right)}{3a^2} + \frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{3a^2\left(a^2-x^2\right)^{3/2}}$$

$$\downarrow 27$$

$$-\frac{\sqrt{1-\frac{x^2}{a^2}}\int \frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{\left(a^2-x^2\right)^2}dx}{2a\sqrt{a^2-x^2}} + \frac{2\left(\frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{a^2\sqrt{a^2-x^2}} - \frac{3\sqrt{1-\frac{x^2}{a^2}}\int \frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2-x^2}dx}{2a\sqrt{a^2-x^2}}\right)}{3a^2} + \frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{3a^2\left(a^2-x^2\right)^{3/2}}$$

$$\downarrow 5182$$

$$\frac{2\left(\frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{a^2\sqrt{a^2-x^2}}-\frac{3\sqrt{1-\frac{x^2}{a^2}}\int\frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2-x^2}dx}{2a\sqrt{a^2-x^2}}\right)}{3a^2}-\frac{\sqrt{1-\frac{x^2}{a^2}}\left(\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{2(a^2-x^2)}-\frac{\int\frac{1}{\left(1-\frac{x^2}{a^2}\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a^3}\right)}{2a\sqrt{a^2-x^2}}+\frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{3a^2\left(a^2-x^2\right)^{3/2}}$$

$$\downarrow 5174$$

$$\frac{2\left(\frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{a^2\sqrt{a^2-x^2}}-\frac{3\sqrt{1-\frac{x^2}{a^2}}\int\frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2-x^2}dx}{2a\sqrt{a^2-x^2}}\right)}{3a^2}-\frac{\sqrt{1-\frac{x^2}{a^2}}\left(\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{2(a^2-x^2)}-\frac{\int\frac{1}{\left(1-\frac{x^2}{a^2}\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a^3}\right)}{2a\sqrt{a^2-x^2}}+\frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{3a^2\left(a^2-x^2\right)^{3/2}}$$

$$\downarrow 5234$$

$$\frac{2\left(\frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{a^2\sqrt{a^2-x^2}}-\frac{3\sqrt{1-\frac{x^2}{a^2}}\int\frac{x\sqrt{\arcsin\left(\frac{x}{a}\right)}}{a^2-x^2}dx}{2a\sqrt{a^2-x^2}}\right)}{3a^2}-\frac{\sqrt{1-\frac{x^2}{a^2}}\left(\frac{\sqrt{\arcsin\left(\frac{x}{a}\right)}}{2(a^2-x^2)}-\frac{\int\frac{1}{\left(1-\frac{x^2}{a^2}\right)^{3/2}\sqrt{\arcsin\left(\frac{x}{a}\right)}}dx}{4a^3}\right)}{2a\sqrt{a^2-x^2}}+\frac{x\arcsin\left(\frac{x}{a}\right)^{3/2}}{3a^2\left(a^2-x^2\right)^{3/2}}$$

input
```
Int[ArcSin[x/a]^(3/2)/(a^2 - x^2)^(5/2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.68 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{\frac{3}{2}}}{\left(a^2-x^2\right)^{\frac{5}{2}}}dx$$

input
```
int(arcsin(x/a)^(3/2)/(a^2-x^2)^(5/2),x)
```

output
```
int(arcsin(x/a)^(3/2)/(a^2-x^2)^(5/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(arcsin(x/a)^(3/2)/(a^2-x^2)^(5/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 62.91 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx = \int \frac{\operatorname{asin}^{\frac{3}{2}}\left(\frac{x}{a}\right)}{\left(-\left(-a+x\right)\left(a+x\right)\right)^{\frac{5}{2}}}\,dx$$

input
```
integrate(asin(x/a)**(3/2)/(a**2-x**2)**(5/2),x)
```

output
```
Integral(asin(x/a)**(3/2)/(-(-a + x)*(a + x))**(5/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(arcsin(x/a)^(3/2)/(a^2-x^2)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.70 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx = \int \frac{\arcsin\left(\frac{x}{a}\right)^{\frac{3}{2}}}{\left(a^2-x^2\right)^{\frac{5}{2}}}\,dx$$

input
```
integrate(arcsin(x/a)^(3/2)/(a^2-x^2)^(5/2),x, algorithm="giac")
```

output
```
integrate(arcsin(x/a)^(3/2)/(a^2 - x^2)^(5/2), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx = \int \frac{\text{asin}\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx$$

input
```
int(asin(x/a)^(3/2)/(a^2 - x^2)^(5/2),x)
```

output
```
int(asin(x/a)^(3/2)/(a^2 - x^2)^(5/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 407, normalized size of antiderivative = 16.96

$$\int \frac{\arcsin\left(\frac{x}{a}\right)^{3/2}}{\left(a^2-x^2\right)^{5/2}}\,dx = \frac{24\sqrt{a^2-x^2}\,\sqrt{asin\left(\frac{x}{a}\right)}\,asin\left(\frac{x}{a}\right)a^2x - 16\sqrt{a^2-x^2}\,\sqrt{asin\left(\frac{x}{a}\right)}\,asin\left(\frac{x}{a}\right)x^3 - 18\sqrt{asin}}{}$$

input
```
int(asin(x/a)^(3/2)/(a^2-x^2)^(5/2),x)
```

output
```
(24*sqrt(a**2 - x**2)*sqrt(asin(x/a))*asin(x/a)*a**2*x - 16*sqrt(a**2 - x*
*2)*sqrt(asin(x/a))*asin(x/a)*x**3 - 18*sqrt(asin(x/a))*a**4 + 18*sqrt(asi
n(x/a))*a**2*x**2 + 24*int((sqrt(asin(x/a))*x**3)/(a**4 - 2*a**2*x**2 + x*
*4),x)*a**4 - 48*int((sqrt(asin(x/a))*x**3)/(a**4 - 2*a**2*x**2 + x**4),x)
*a**2*x**2 + 24*int((sqrt(asin(x/a))*x**3)/(a**4 - 2*a**2*x**2 + x**4),x)*
x**4 + 9*int((sqrt(a**2 - x**2)*sqrt(asin(x/a)))/(asin(x/a)*a**4 - 2*asin(
x/a)*a**2*x**2 + asin(x/a)*x**4),x)*a**6 - 18*int((sqrt(a**2 - x**2)*sqrt(
asin(x/a)))/(asin(x/a)*a**4 - 2*asin(x/a)*a**2*x**2 + asin(x/a)*x**4),x)*a
**4*x**2 + 9*int((sqrt(a**2 - x**2)*sqrt(asin(x/a)))/(asin(x/a)*a**4 - 2*a
sin(x/a)*a**2*x**2 + asin(x/a)*x**4),x)*a**2*x**4)/(24*a**4*(a**4 - 2*a**2
*x**2 + x**4))
```

3.127 $\int \frac{(c-a^2cx^2)^{5/2}}{\sqrt{\arcsin(ax)}}\,dx$

Optimal result . . . 1007
Mathematica [C] (verified) . . . 1008
Rubi [A] (verified) . . . 1008
Maple [F] . . . 1010
Fricas [F(-2)] . . . 1010
Sympy [F(-1)] . . . 1011
Maxima [F(-2)] . . . 1011
Giac [C] (verification not implemented) . . . 1011
Mupad [F(-1)] . . . 1012
Reduce [F] . . . 1013

Optimal result

Integrand size = 24, antiderivative size = 244

$$\int \frac{(c-a^2cx^2)^{5/2}}{\sqrt{\arcsin(ax)}}\,dx = \frac{5c^2\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}{8a\sqrt{1-a^2x^2}} + \frac{3c^2\sqrt{\frac{\pi}{2}}\sqrt{c-a^2cx^2}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)}{16a\sqrt{1-a^2x^2}} + \frac{c^2\sqrt{\frac{\pi}{3}}\sqrt{c-a^2cx^2}\,\text{FresnelC}\left(2\sqrt{\frac{3}{\pi}}\sqrt{\arcsin(ax)}\right)}{32a\sqrt{1-a^2x^2}} + \frac{15c^2\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{32a\sqrt{1-a^2x^2}}$$

output

```
5/8*c^2*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)/a/(-a^2*x^2+1)^(1/2)+3/32*c
^2*2^(1/2)*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelC(2*2^(1/2)/Pi^(1/2)*arcsi
n(a*x)^(1/2))/a/(-a^2*x^2+1)^(1/2)+1/96*c^2*3^(1/2)*Pi^(1/2)*(-a^2*c*x^2+c
)^(1/2)*FresnelC(2*3^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))/a/(-a^2*x^2+1)^(1/2
)+15/32*c^2*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelC(2*arcsin(a*x)^(1/2)/Pi^
(1/2))/a/(-a^2*x^2+1)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.45 (sec) , antiderivative size = 336, normalized size of antiderivative = 1.38

$$\int \frac{(c-a^2cx^2)^{5/2}}{\sqrt{\arcsin(ax)}}\,dx = \frac{c^2\sqrt{c-a^2cx^2}\left(240\arcsin(ax)\sqrt{\arcsin(ax)^2}+3i\sqrt{2}\left(16(i\arcsin(ax))^{3/2}+\sqrt{-i\arc}\right.\right.$$

input
```
Integrate[(c - a^2*c*x^2)^(5/2)/Sqrt[ArcSin[a*x]],x]
```

output
```
(c^2*Sqrt[c - a^2*c*x^2]*(240*ArcSin[a*x]*Sqrt[ArcSin[a*x]^2] + (3*I)*Sqrt
[2]*(16*(I*ArcSin[a*x])^(3/2) + Sqrt[(-I)*ArcSin[a*x]]*Sqrt[ArcSin[a*x]^2]
)*Gamma[1/2, (-2*I)*ArcSin[a*x]] - (45*I)*Sqrt[2]*((-I)*ArcSin[a*x])^(3/2)
*Gamma[1/2, (2*I)*ArcSin[a*x]] + (24*I)*(I*ArcSin[a*x])^(3/2)*Gamma[1/2, (
-4*I)*ArcSin[a*x]] + (6*I)*Sqrt[(-I)*ArcSin[a*x]]*Sqrt[ArcSin[a*x]^2]*Gamm
a[1/2, (-4*I)*ArcSin[a*x]] - (18*I)*((-I)*ArcSin[a*x])^(3/2)*Gamma[1/2, (4
*I)*ArcSin[a*x]] - I*Sqrt[6]*Sqrt[(-I)*ArcSin[a*x]]*Sqrt[ArcSin[a*x]^2]*Ga
mma[1/2, (-6*I)*ArcSin[a*x]] - I*Sqrt[6]*((-I)*ArcSin[a*x])^(3/2)*Gamma[1/
2, (6*I)*ArcSin[a*x]]))/(384*a*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]]*Sqrt[Ar
cSin[a*x]^2])
```

Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 140, normalized size of antiderivative = 0.57, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(c-a^2cx^2\right)^{5/2}}{\sqrt{\arcsin(ax)}}\,dx$$

$$\downarrow 5168$$

$$\frac{c^2\sqrt{c-a^2cx^2}\int \frac{\left(1-a^2x^2\right)^3}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a\sqrt{1-a^2x^2}}$$

$$\downarrow 3042$$

$$\frac{c^2\sqrt{c-a^2cx^2}\int \frac{\sin\left(\arcsin(ax)+\frac{\pi}{2}\right)^6}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a\sqrt{1-a^2x^2}}$$

$$\downarrow 3793$$

$$\frac{c^2\sqrt{c-a^2cx^2}\int \left(\frac{15\cos(2\arcsin(ax))}{32\sqrt{\arcsin(ax)}}+\frac{3\cos(4\arcsin(ax))}{16\sqrt{\arcsin(ax)}}+\frac{\cos(6\arcsin(ax))}{32\sqrt{\arcsin(ax)}}+\frac{5}{16\sqrt{\arcsin(ax)}}\right)d\arcsin(ax)}{a\sqrt{1-a^2x^2}}$$

$$\downarrow 2009$$

$$\frac{c^2\sqrt{c-a^2cx^2}\left(\frac{3}{16}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)+\frac{1}{32}\sqrt{\frac{\pi}{3}}\,\text{FresnelC}\left(2\sqrt{\frac{3}{\pi}}\sqrt{\arcsin(ax)}\right)+\frac{15}{32}\sqrt{\pi}\,\text{FresnelC}\left(\right.\right.}{a\sqrt{1-a^2x^2}}$$

input
```
Int[(c - a^2*c*x^2)^(5/2)/Sqrt[ArcSin[a*x]],x]
```

output
```
(c^2*Sqrt[c - a^2*c*x^2]*((5*Sqrt[ArcSin[a*x]])/8 + (3*Sqrt[Pi/2]*FresnelC
[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/16 + (Sqrt[Pi/3]*FresnelC[2*Sqrt[3/Pi]*S
qrt[ArcSin[a*x]]])/32 + (15*Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]])/Sqrt[P
i]])/32))/(a*Sqrt[1 - a^2*x^2])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168

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

Maple [F]

$$\int \frac{(-a^2 c\, x^2 + c)^{\frac{5}{2}}}{\sqrt{\arcsin(ax)}}\, dx$$

input

```
int((-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(1/2),x)
```

output

```
int((-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(c - a^2 c x^2)^{5/2}}{\sqrt{\arcsin(ax)}}\, dx = \text{Exception raised: TypeError}$$

input

```
integrate((-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{\left(c-a^2cx^2\right)^{5/2}}{\sqrt{\arcsin(ax)}}\,dx = \text{Timed out}$$

input
```
integrate((-a**2*c*x**2+c)**(5/2)/asin(a*x)**(1/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\left(c-a^2cx^2\right)^{5/2}}{\sqrt{\arcsin(ax)}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.71 (sec) , antiderivative size = 159, normalized size of antiderivative = 0.65

$$\int \frac{(c-a^2cx^2)^{5/2}}{\sqrt{\arcsin(ax)}}\,dx = -\frac{(i+1)\sqrt{3}\sqrt{\pi}c^{\frac{5}{2}}\operatorname{erf}\left((i-1)\sqrt{3}\sqrt{\arcsin(ax)}\right)}{384\,a} + \frac{(i-1)\sqrt{3}\sqrt{\pi}c^{\frac{5}{2}}\operatorname{erf}\left(-(i+1)\sqrt{3}\sqrt{\arcsin(ax)}\right)}{384\,a} - \frac{(3i+3)\sqrt{2}\sqrt{\pi}c^{\frac{5}{2}}\operatorname{erf}\left((i-1)\sqrt{2}\sqrt{\arcsin(ax)}\right)}{128\,a} + \frac{(3i-3)\sqrt{2}\sqrt{\pi}c^{\frac{5}{2}}\operatorname{erf}\left(-(i+1)\sqrt{2}\sqrt{\arcsin(ax)}\right)}{128\,a} - \frac{(15i+15)\sqrt{\pi}c^{\frac{5}{2}}\operatorname{erf}\left((i-1)\sqrt{\arcsin(ax)}\right)}{128\,a} + \frac{(15i-15)\sqrt{\pi}c^{\frac{5}{2}}\operatorname{erf}\left(-(i+1)\sqrt{\arcsin(ax)}\right)}{128\,a} + \frac{5\,c^{\frac{5}{2}}\sqrt{\arcsin(ax)}}{8\,a}$$

input
```
integrate((-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(1/2),x, algorithm="giac")
```

output
```
-(1/384*I + 1/384)*sqrt(3)*sqrt(pi)*c^(5/2)*erf((I - 1)*sqrt(3)*sqrt(arcsi
n(a*x)))/a + (1/384*I - 1/384)*sqrt(3)*sqrt(pi)*c^(5/2)*erf(-(I + 1)*sqrt(
3)*sqrt(arcsin(a*x)))/a - (3/128*I + 3/128)*sqrt(2)*sqrt(pi)*c^(5/2)*erf((
I - 1)*sqrt(2)*sqrt(arcsin(a*x)))/a + (3/128*I - 3/128)*sqrt(2)*sqrt(pi)*c
^(5/2)*erf(-(I + 1)*sqrt(2)*sqrt(arcsin(a*x)))/a - (15/128*I + 15/128)*sqr
t(pi)*c^(5/2)*erf((I - 1)*sqrt(arcsin(a*x)))/a + (15/128*I - 15/128)*sqrt(
pi)*c^(5/2)*erf(-(I + 1)*sqrt(arcsin(a*x)))/a + 5/8*c^(5/2)*sqrt(arcsin(a*
x))/a
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(c-a^2cx^2)^{5/2}}{\sqrt{\arcsin(ax)}}\,dx = \int \frac{(c-a^2\,c\,x^2)^{5/2}}{\sqrt{\operatorname{asin}(a\,x)}}\,dx$$

input
```
int((c - a^2*c*x^2)^(5/2)/asin(a*x)^(1/2),x)
```

output
```
int((c - a^2*c*x^2)^(5/2)/asin(a*x)^(1/2), x)
```

Reduce [F]

$$\int \frac{(c-a^2cx^2)^{5/2}}{\sqrt{\arcsin(ax)}}\,dx = \sqrt{c}\,c^2\left(\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,x^4}{asin\,(ax)}dx\right)a^4 - 2\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,x^2}{asin\,(ax)}dx\right)a^2 + \int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}}{asin\,(ax)}dx\right)$$

input
```
int((-a^2*c*x^2+c)^(5/2)/asin(a*x)^(1/2),x)
```

output
```
sqrt(c)*c**2*(int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*x**4)/asin(a*x),
x)*a**4 - 2*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*x**2)/asin(a*x),x)
*a**2 + int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/asin(a*x),x))
```

3.128 $\int \frac{(c-a^2cx^2)^{3/2}}{\sqrt{\arcsin(ax)}}\,dx$

Optimal result . . . 1014
Mathematica [C] (verified) . . . 1015
Rubi [A] (verified) . . . 1015
Maple [F] . . . 1017
Fricas [F(-2)] . . . 1017
Sympy [F] . . . 1017
Maxima [F(-2)] . . . 1018
Giac [C] (verification not implemented) . . . 1018
Mupad [F(-1)] . . . 1019
Reduce [F] . . . 1019

Optimal result

Integrand size = 24, antiderivative size = 170

$$\int \frac{(c-a^2cx^2)^{3/2}}{\sqrt{\arcsin(ax)}}\,dx = \frac{3c\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}{4a\sqrt{1-a^2x^2}} + \frac{c\sqrt{\frac{\pi}{2}}\sqrt{c-a^2cx^2}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)}{8a\sqrt{1-a^2x^2}} + \frac{c\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{2a\sqrt{1-a^2x^2}}$$

output

```
3/4*c*(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)/a/(-a^2*x^2+1)^(1/2)+1/16*c*2
^(1/2)*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelC(2*2^(1/2)/Pi^(1/2)*arcsin(a*
x)^(1/2))/a/(-a^2*x^2+1)^(1/2)+1/2*c*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*Fresnel
C(2*arcsin(a*x)^(1/2)/Pi^(1/2))/a/(-a^2*x^2+1)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.24 (sec) , antiderivative size = 182, normalized size of antiderivative = 1.07

$$\int \frac{(c-a^2cx^2)^{3/2}}{\sqrt{\arcsin(ax)}}\,dx = \frac{c\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}\left(24\sqrt{\arcsin(ax)^2}-4\sqrt{2}\sqrt{i\arcsin(ax)}\Gamma\left(\frac{1}{2},-2i\arcsin(ax\right.\right.$$

input
```
Integrate[(c - a^2*c*x^2)^(3/2)/Sqrt[ArcSin[a*x]],x]
```

output
```
(c*Sqrt[c - a^2*c*x^2]*Sqrt[ArcSin[a*x]]*(24*Sqrt[ArcSin[a*x]^2] - 4*Sqrt[
2]*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (-2*I)*ArcSin[a*x]] - 4*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)*ArcSin[a
*x]]))/(32*a*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]^2])
```

Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 105, normalized size of antiderivative = 0.62, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(c-a^2cx^2)^{3/2}}{\sqrt{\arcsin(ax)}}\,dx$$

$$\downarrow 5168$$

$$\frac{c\sqrt{c-a^2cx^2}\int \frac{(1-a^2x^2)^2}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a\sqrt{1-a^2x^2}}$$

$$\downarrow 3042$$

$$\frac{c\sqrt{c-a^2cx^2}\int \frac{\sin\left(\arcsin(ax)+\frac{\pi}{2}\right)^4}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a\sqrt{1-a^2x^2}}$$

$$\downarrow 3793$$

$$\frac{c\sqrt{c-a^2cx^2}\int\left(\frac{\cos(2\arcsin(ax))}{2\sqrt{\arcsin(ax)}}+\frac{\cos(4\arcsin(ax))}{8\sqrt{\arcsin(ax)}}+\frac{3}{8\sqrt{\arcsin(ax)}}\right)d\arcsin(ax)}{a\sqrt{1-a^2x^2}}$$

$$\downarrow 2009$$

$$\frac{c\sqrt{c-a^2cx^2}\left(\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)+\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+\frac{3}{4}\sqrt{\arcsin(ax)}\right)}{a\sqrt{1-a^2x^2}}$$

input
```
Int[(c - a^2*c*x^2)^(3/2)/Sqrt[ArcSin[a*x]],x]
```

output
```
(c*Sqrt[c - a^2*c*x^2]*((3*Sqrt[ArcSin[a*x]])/4 + (Sqrt[Pi/2]*FresnelC[2*S
qrt[2/Pi]*Sqrt[ArcSin[a*x]]])/8 + (Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]])
/Sqrt[Pi]])/2))/(a*Sqrt[1 - a^2*x^2])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

Maple [F]

$$\int \frac{(-a^2 c\, x^2 + c)^{\frac{3}{2}}}{\sqrt{\arcsin(ax)}}\, dx$$

input
```
int((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(1/2),x)
```

output
```
int((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(c - a^2 c x^2)^{3/2}}{\sqrt{\arcsin(ax)}}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{(c - a^2 c x^2)^{3/2}}{\sqrt{\arcsin(ax)}}\, dx = \int \frac{(-c(ax-1)\,(ax+1))^{\frac{3}{2}}}{\sqrt{\operatorname{asin}(ax)}}\, dx$$

input
```
integrate((-a**2*c*x**2+c)**(3/2)/asin(a*x)**(1/2),x)
```

output
```
Integral((-c*(a*x - 1)*(a*x + 1))**(3/2)/sqrt(asin(a*x)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\left(c-a^2cx^2\right)^{3/2}}{\sqrt{\arcsin(ax)}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.61 (sec) , antiderivative size = 107, normalized size of antiderivative = 0.63

$$\begin{aligned}\int \frac{\left(c-a^2cx^2\right)^{3/2}}{\sqrt{\arcsin(ax)}}\,dx &= -\frac{(i+1)\,\sqrt{2}\sqrt{\pi}c^{\frac{3}{2}}\operatorname{erf}\left((i-1)\,\sqrt{2}\sqrt{\arcsin\left(ax\right)}\right)}{64\,a}\\ &+\frac{(i-1)\,\sqrt{2}\sqrt{\pi}c^{\frac{3}{2}}\operatorname{erf}\left(-(i+1)\,\sqrt{2}\sqrt{\arcsin\left(ax\right)}\right)}{64\,a}\\ &-\frac{(i+1)\,\sqrt{\pi}c^{\frac{3}{2}}\operatorname{erf}\left((i-1)\,\sqrt{\arcsin\left(ax\right)}\right)}{8\,a}\\ &+\frac{(i-1)\,\sqrt{\pi}c^{\frac{3}{2}}\operatorname{erf}\left(-(i+1)\,\sqrt{\arcsin\left(ax\right)}\right)}{8\,a}+\frac{3\,c^{\frac{3}{2}}\sqrt{\arcsin\left(ax\right)}}{4\,a}\end{aligned}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(1/2),x, algorithm="giac")
```

output
```
-(1/64*I + 1/64)*sqrt(2)*sqrt(pi)*c^(3/2)*erf((I - 1)*sqrt(2)*sqrt(arcsin(
a*x)))/a + (1/64*I - 1/64)*sqrt(2)*sqrt(pi)*c^(3/2)*erf(-(I + 1)*sqrt(2)*s
qrt(arcsin(a*x)))/a - (1/8*I + 1/8)*sqrt(pi)*c^(3/2)*erf((I - 1)*sqrt(arcs
in(a*x)))/a + (1/8*I - 1/8)*sqrt(pi)*c^(3/2)*erf(-(I + 1)*sqrt(arcsin(a*x)
))/a + 3/4*c^(3/2)*sqrt(arcsin(a*x))/a
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(c-a^2cx^2)^{3/2}}{\sqrt{\arcsin(ax)}}\,dx = \int \frac{(c-a^2\,c\,x^2)^{3/2}}{\sqrt{\text{asin}\,(a\,x)}}\,dx$$

input
```
int((c - a^2*c*x^2)^(3/2)/asin(a*x)^(1/2),x)
```

output
```
int((c - a^2*c*x^2)^(3/2)/asin(a*x)^(1/2), x)
```

Reduce [F]

$$\int \frac{(c-a^2cx^2)^{3/2}}{\sqrt{\arcsin(ax)}}\,dx = \sqrt{c}\,c\left(-\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,x^2}{asin\,(ax)}dx\right)a^2 + \int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}}{asin\,(ax)}dx\right)$$

input
```
int((-a^2*c*x^2+c)^(3/2)/asin(a*x)^(1/2),x)
```

output
```
sqrt(c)*c*( - int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*x**2)/asin(a*x),
x)*a**2 + int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/asin(a*x),x))
```

3.129 $\int \frac{\sqrt{c-a^2cx^2}}{\sqrt{\arcsin(ax)}}\,dx$

Optimal result . . . 1020
Mathematica [C] (verified) . . . 1020
Rubi [A] (verified) . . . 1021
Maple [F] . . . 1022
Fricas [F(-2)] . . . 1023
Sympy [F] . . . 1023
Maxima [F(-2)] . . . 1023
Giac [C] (verification not implemented) . . . 1024
Mupad [F(-1)] . . . 1024
Reduce [F] . . . 1025

Optimal result

Integrand size = 24, antiderivative size = 99

$$\int \frac{\sqrt{c-a^2cx^2}}{\sqrt{\arcsin(ax)}}\,dx = \frac{\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}{a\sqrt{1-a^2x^2}} + \frac{\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{2a\sqrt{1-a^2x^2}}$$

output

```
(-a^2*c*x^2+c)^(1/2)*arcsin(a*x)^(1/2)/a/(-a^2*x^2+1)^(1/2)+1/2*Pi^(1/2)*(
-a^2*c*x^2+c)^(1/2)*FresnelC(2*arcsin(a*x)^(1/2)/Pi^(1/2))/a/(-a^2*x^2+1)^
(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.12 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.19

$$\int \frac{\sqrt{c-a^2cx^2}}{\sqrt{\arcsin(ax)}}\,dx$$
$$= \frac{\sqrt{c\left(1-a^2x^2\right)}\left(8\arcsin(ax) - i\sqrt{2}\sqrt{-i\arcsin(ax)}\,\Gamma\left(\frac{1}{2}, -2i\arcsin(ax)\right) + i\sqrt{2}\sqrt{i\arcsin(ax)}\,\Gamma\left(\frac{1}{2}, 2i\arcsin(ax)\right)\right)}{8a\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}$$

input
```
Integrate[Sqrt[c - a^2*c*x^2]/Sqrt[ArcSin[a*x]],x]
```

output
```
(Sqrt[c*(1 - a^2*x^2)]*(8*ArcSin[a*x] - I*Sqrt[2]*Sqrt[(-I)*ArcSin[a*x]]*G
amma[1/2, (-2*I)*ArcSin[a*x]] + I*Sqrt[2]*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (
2*I)*ArcSin[a*x]]))/(8*a*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 67, normalized size of antiderivative = 0.68, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {5168, 3042, 3793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{c-a^2cx^2}}{\sqrt{\arcsin(ax)}}\,dx$$

$$\downarrow 5168$$

$$\frac{\sqrt{c-a^2cx^2}\int \frac{1-a^2x^2}{\sqrt{\arcsin(ax)}}\,d\arcsin(ax)}{a\sqrt{1-a^2x^2}}$$

$$\downarrow 3042$$

$$\frac{\sqrt{c-a^2cx^2}\int \frac{\sin\left(\arcsin(ax)+\frac{\pi}{2}\right)^2}{\sqrt{\arcsin(ax)}}\,d\arcsin(ax)}{a\sqrt{1-a^2x^2}}$$

$$\downarrow 3793$$

$$\frac{\sqrt{c-a^2cx^2}\int \left(\frac{\cos(2\arcsin(ax))}{2\sqrt{\arcsin(ax)}}+\frac{1}{2\sqrt{\arcsin(ax)}}\right)d\arcsin(ax)}{a\sqrt{1-a^2x^2}}$$

$$\downarrow 2009$$

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

input
```
Int[Sqrt[c - a^2*c*x^2]/Sqrt[ArcSin[a*x]],x]
```

output
```
(Sqrt[c - a^2*c*x^2]*(Sqrt[ArcSin[a*x]] + (Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSi
n[a*x]])/Sqrt[Pi]])/2))/(a*Sqrt[1 - a^2*x^2])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

Maple [F]

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

input
```
int((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(1/2),x)
```

output
```
int((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{c-a^2cx^2}}{\sqrt{\arcsin(ax)}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{\sqrt{c-a^2cx^2}}{\sqrt{\arcsin(ax)}}\,dx = \int \frac{\sqrt{-c\,(ax-1)\,(ax+1)}}{\sqrt{\operatorname{asin}\,(ax)}}\,dx$$

input
```
integrate((-a**2*c*x**2+c)**(1/2)/asin(a*x)**(1/2),x)
```

output
```
Integral(sqrt(-c*(a*x - 1)*(a*x + 1))/sqrt(asin(a*x)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{c-a^2cx^2}}{\sqrt{\arcsin(ax)}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.52 (sec) , antiderivative size = 51, normalized size of antiderivative = 0.52

$$\int \frac{\sqrt{c-a^2cx^2}}{\sqrt{\arcsin(ax)}}\,dx =$$
$$-\frac{1}{8}\sqrt{c}\left(\frac{(i+1)\,\sqrt{\pi}\,\mathrm{erf}\left((i-1)\,\sqrt{\arcsin(ax)}\right)}{a} - \frac{(i-1)\,\sqrt{\pi}\,\mathrm{erf}\left(-(i+1)\,\sqrt{\arcsin(ax)}\right)}{a} - \frac{8\,\sqrt{\arcsi}}{a}\right.$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(1/2),x, algorithm="giac")
```

output
```
-1/8*sqrt(c)*((I + 1)*sqrt(pi)*erf((I - 1)*sqrt(arcsin(a*x)))/a - (I - 1)*
sqrt(pi)*erf(-(I + 1)*sqrt(arcsin(a*x)))/a - 8*sqrt(arcsin(a*x))/a)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{c-a^2cx^2}}{\sqrt{\arcsin(ax)}}\,dx = \int \frac{\sqrt{c-a^2\,c\,x^2}}{\sqrt{\mathrm{asin}\,(a\,x)}}\,dx$$

input
```
int((c - a^2*c*x^2)^(1/2)/asin(a*x)^(1/2),x)
```

output
```
int((c - a^2*c*x^2)^(1/2)/asin(a*x)^(1/2), x)
```

Reduce [F]

$$\int \frac{\sqrt{c-a^2cx^2}}{\sqrt{\arcsin(ax)}}\,dx = \sqrt{c}\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}}{asin\,(ax)}dx\right)$$

input
```
int((-a^2*c*x^2+c)^(1/2)/asin(a*x)^(1/2),x)
```

output
```
sqrt(c)*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/asin(a*x),x)
```

3.130 $\int \frac{1}{\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}\,dx$

Optimal result . . . 1026
Mathematica [A] (verified) . . . 1026
Rubi [A] (verified) . . . 1027
Maple [A] (verified) . . . 1027
Fricas [F(-2)] . . . 1028
Sympy [F] . . . 1028
Maxima [F(-2)] . . . 1029
Giac [A] (verification not implemented) . . . 1029
Mupad [F(-1)] . . . 1029
Reduce [B] (verification not implemented) . . . 1030

Optimal result

Integrand size = 24, antiderivative size = 42

$$\int \frac{1}{\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}\,dx = \frac{2\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{a\sqrt{c-a^2cx^2}}$$

output
```
2*(-a^2*x^2+1)^(1/2)*arcsin(a*x)^(1/2)/a/(-a^2*c*x^2+c)^(1/2)
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}\,dx = \frac{2\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{a\sqrt{c-a^2cx^2}}$$

input
```
Integrate[1/(Sqrt[c - a^2*c*x^2]*Sqrt[ArcSin[a*x]]),x]
```

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

Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}}\,dx$$
$$\downarrow 5152$$
$$\frac{2\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}{a\sqrt{c-a^2cx^2}}$$

input
```
Int[1/(Sqrt[c - a^2*c*x^2]*Sqrt[ArcSin[a*x]]),x]
```

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

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 38, normalized size of antiderivative = 0.90

method	result	size
default	$\frac{2\sqrt{\arcsin(ax)}\sqrt{-a^2x^2+1}}{a\sqrt{-c(a^2x^2-1)}}$	38

input
```
int(1/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
2*arcsin(a*x)^(1/2)/a/(-c*(a^2*x^2-1))^(1/2)*(-a^2*x^2+1)^(1/2)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{1}{\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}\,dx = \int \frac{1}{\sqrt{-c\,(ax-1)\,(ax+1)}\sqrt{\operatorname{asin}\,(ax)}}\,dx$$

input
```
integrate(1/(-a**2*c*x**2+c)**(1/2)/asin(a*x)**(1/2),x)
```

output
```
Integral(1/(sqrt(-c*(a*x - 1)*(a*x + 1))*sqrt(asin(a*x))), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{1}{\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.33

$$\int \frac{1}{\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}\,dx = \frac{2\sqrt{\arcsin(ax)}}{a\sqrt{c}}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(1/2),x, algorithm="giac")
```

output
```
2*sqrt(arcsin(a*x))/(a*sqrt(c))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{1}{\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}\,dx = \int \frac{1}{\sqrt{\operatorname{asin}(a\,x)}\sqrt{c-a^2\,c\,x^2}}\,dx$$

input
```
int(1/(asin(a*x)^(1/2)*(c - a^2*c*x^2)^(1/2)),x)
```

output
```
int(1/(asin(a*x)^(1/2)*(c - a^2*c*x^2)^(1/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.36

$$\int \frac{1}{\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}\,dx = \frac{2\sqrt{c}\,\sqrt{asin\,(ax)}}{ac}$$

input
```
int(1/(-a^2*c*x^2+c)^(1/2)/asin(a*x)^(1/2),x)
```

output
```
(2*sqrt(c)*sqrt(asin(a*x)))/(a*c)
```

3.131 $\int \frac{1}{(c-a^2cx^2)^{3/2}\sqrt{\arcsin(ax)}}\,dx$

Optimal result . . . 1031
Mathematica [N/A] . . . 1031
Rubi [N/A] . . . 1032
Maple [N/A] . . . 1032
Fricas [F(-2)] . . . 1033
Sympy [N/A] . . . 1033
Maxima [F(-2)] . . . 1033
Giac [N/A] . . . 1034
Mupad [N/A] . . . 1034
Reduce [N/A] . . . 1034

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{1}{(c-a^2cx^2)^{3/2}\sqrt{\arcsin(ax)}}\,dx = \text{Int}\left(\frac{1}{(c-a^2cx^2)^{3/2}\sqrt{\arcsin(ax)}},x\right)$$

output
```
Defer(Int)(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(1/2),x)
```

Mathematica [N/A]

Not integrable

Time = 1.90 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{(c-a^2cx^2)^{3/2}\sqrt{\arcsin(ax)}}\,dx = \int \frac{1}{(c-a^2cx^2)^{3/2}\sqrt{\arcsin(ax)}}\,dx$$

input
```
Integrate[1/((c - a^2*c*x^2)^(3/2)*Sqrt[ArcSin[a*x]]),x]
```

output
```
Integrate[1/((c - a^2*c*x^2)^(3/2)*Sqrt[ArcSin[a*x]]), x]
```

Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\sqrt{\arcsin(ax)}\,(c-a^2cx^2)^{3/2}}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{\sqrt{\arcsin(ax)}\,(c-a^2cx^2)^{3/2}}dx$$

input
```
Int[1/((c - a^2*c*x^2)^(3/2)*Sqrt[ArcSin[a*x]]),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.33 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{1}{(-a^2c\,x^2+c)^{\frac{3}{2}}\,\sqrt{\arcsin(ax)}}dx$$

input
```
int(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(1/2),x)
```

output
```
int(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{(c-a^2cx^2)^{3/2}\sqrt{\arcsin(ax)}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 6.74 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{1}{(c-a^2cx^2)^{3/2}\sqrt{\arcsin(ax)}}\,dx = \int \frac{1}{(-c\,(ax-1)\,(ax+1))^{\frac{3}{2}}\sqrt{\operatorname{asin}\,(ax)}}\,dx$$

input
```
integrate(1/(-a**2*c*x**2+c)**(3/2)/asin(a*x)**(1/2),x)
```

output
```
Integral(1/((-c*(a*x - 1)*(a*x + 1))**(3/2)*sqrt(asin(a*x))), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{1}{(c-a^2cx^2)^{3/2}\sqrt{\arcsin(ax)}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\sqrt{\arcsin(ax)}}\,dx = \int \frac{1}{\left(-a^2cx^2+c\right)^{\frac{3}{2}}\sqrt{\arcsin\left(ax\right)}}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(1/2),x, algorithm="giac")
```

output
```
integrate(1/((-a^2*c*x^2 + c)^(3/2)*sqrt(arcsin(a*x))), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\sqrt{\arcsin(ax)}}\,dx = \int \frac{1}{\sqrt{\operatorname{asin}\left(a\,x\right)}\,\left(c-a^2\,c\,x^2\right)^{3/2}}\,dx$$

input
```
int(1/(asin(a*x)^(1/2)*(c - a^2*c*x^2)^(3/2)),x)
```

output
```
int(1/(asin(a*x)^(1/2)*(c - a^2*c*x^2)^(3/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.29

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\sqrt{\arcsin(ax)}}\,dx = \frac{\sqrt{c}\left(\int \frac{\sqrt{-a^2x^2+1}\sqrt{asin(ax)}}{asin(ax)a^4x^4-2asin(ax)a^2x^2+asin(ax)}dx\right)}{c^2}$$

input
```
int(1/(-a^2*c*x^2+c)^(3/2)/asin(a*x)^(1/2),x)
```

output

```
(sqrt(c)*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/(asin(a*x)*a**4*x**4
 - 2*asin(a*x)*a**2*x**2 + asin(a*x)),x))/c**2
```

3.132 $\int \frac{1}{(c-a^2cx^2)^{5/2}\sqrt{\arcsin(ax)}}\,dx$

Optimal result . . . 1036
Mathematica [N/A] . . . 1036
Rubi [N/A] . . . 1037
Maple [N/A] . . . 1037
Fricas [F(-2)] . . . 1038
Sympy [N/A] . . . 1038
Maxima [F(-2)] . . . 1038
Giac [N/A] . . . 1039
Mupad [N/A] . . . 1039
Reduce [N/A] . . . 1039

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\sqrt{\arcsin(ax)}}\,dx = \text{Int}\left(\frac{1}{(c-a^2cx^2)^{5/2}\sqrt{\arcsin(ax)}},x\right)$$

output
```
Defer(Int)(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(1/2),x)
```

Mathematica [N/A]

Not integrable

Time = 2.17 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\sqrt{\arcsin(ax)}}\,dx = \int \frac{1}{(c-a^2cx^2)^{5/2}\sqrt{\arcsin(ax)}}\,dx$$

input
```
Integrate[1/((c - a^2*c*x^2)^(5/2)*Sqrt[ArcSin[a*x]]),x]
```

output
```
Integrate[1/((c - a^2*c*x^2)^(5/2)*Sqrt[ArcSin[a*x]]), x]
```

Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\sqrt{\arcsin(ax)}\,(c-a^2cx^2)^{5/2}}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{\sqrt{\arcsin(ax)}\,(c-a^2cx^2)^{5/2}}dx$$

input
```
Int[1/((c - a^2*c*x^2)^(5/2)*Sqrt[ArcSin[a*x]]),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.39 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{1}{(-a^2c\,x^2+c)^{\frac{5}{2}}\,\sqrt{\arcsin(ax)}}dx$$

input
```
int(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(1/2),x)
```

output
```
int(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\sqrt{\arcsin(ax)}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 64.75 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\sqrt{\arcsin(ax)}}\,dx = \int \frac{1}{(-c\,(ax-1)\,(ax+1))^{\frac{5}{2}}\sqrt{\operatorname{asin}\,(ax)}}\,dx$$

input
```
integrate(1/(-a**2*c*x**2+c)**(5/2)/asin(a*x)**(1/2),x)
```

output
```
Integral(1/((-c*(a*x - 1)*(a*x + 1))**(5/2)*sqrt(asin(a*x))), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\sqrt{\arcsin(ax)}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\sqrt{\arcsin(ax)}}\,dx = \int \frac{1}{(-a^2cx^2+c)^{\frac{5}{2}}\sqrt{\arcsin(ax)}}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(1/2),x, algorithm="giac")
```

output
```
integrate(1/((-a^2*c*x^2 + c)^(5/2)*sqrt(arcsin(a*x))), x)
```

Mupad [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\sqrt{\arcsin(ax)}}\,dx = \int \frac{1}{\sqrt{\operatorname{asin}(a\,x)}\,(c-a^2\,c\,x^2)^{5/2}}\,dx$$

input
```
int(1/(asin(a*x)^(1/2)*(c - a^2*c*x^2)^(5/2)),x)
```

output
```
int(1/(asin(a*x)^(1/2)*(c - a^2*c*x^2)^(5/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.92

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\sqrt{\arcsin(ax)}}\,dx = -\frac{\sqrt{c}\left(\int \frac{\sqrt{-a^2x^2+1}\sqrt{asin(ax)}}{asin(ax)a^6x^6-3asin(ax)a^4x^4+3asin(ax)a^2x^2-asin(ax)}dx\right)}{c^3}$$

input
```
int(1/(-a^2*c*x^2+c)^(5/2)/asin(a*x)^(1/2),x)
```

output

```
( - sqrt(c)*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/(asin(a*x)*a**6*x
**6 - 3*asin(a*x)*a**4*x**4 + 3*asin(a*x)*a**2*x**2 - asin(a*x)),x))/c**3
```

3.133 $\int \frac{(c-a^2cx^2)^{5/2}}{\arcsin(ax)^{3/2}}\,dx$

Optimal result . . . 1041
Mathematica [C] (verified) . . . 1042
Rubi [A] (verified) . . . 1042
Maple [F] . . . 1044
Fricas [F(-2)] . . . 1045
Sympy [F(-1)] . . . 1045
Maxima [F(-2)] . . . 1045
Giac [F] . . . 1046
Mupad [F(-1)] . . . 1046
Reduce [F] . . . 1046

Optimal result

Integrand size = 24, antiderivative size = 240

$$\int \frac{(c-a^2cx^2)^{5/2}}{\arcsin(ax)^{3/2}}\,dx = -\frac{2c^2(1-a^2x^2)^{5/2}\sqrt{c-a^2cx^2}}{a\sqrt{\arcsin(ax)}} - \frac{3c^2\sqrt{\frac{\pi}{2}}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)}{2a\sqrt{1-a^2x^2}} - \frac{c^2\sqrt{3\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(2\sqrt{\frac{3}{\pi}}\sqrt{\arcsin(ax)}\right)}{8a\sqrt{1-a^2x^2}} - \frac{15c^2\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{8a\sqrt{1-a^2x^2}}$$

output

```
-2*c^2*(-a^2*x^2+1)^(5/2)*(-a^2*c*x^2+c)^(1/2)/a/arcsin(a*x)^(1/2)-3/4*c^2
*2^(1/2)*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelS(2*2^(1/2)/Pi^(1/2)*arcsin(
a*x)^(1/2))/a/(-a^2*x^2+1)^(1/2)-1/8*c^2*3^(1/2)*Pi^(1/2)*(-a^2*c*x^2+c)^(
1/2)*FresnelS(2*3^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))/a/(-a^2*x^2+1)^(1/2)-1
5/8*c^2*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelS(2*arcsin(a*x)^(1/2)/Pi^(1/2
))/a/(-a^2*x^2+1)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.77 (sec) , antiderivative size = 404, normalized size of antiderivative = 1.68

$$\int \frac{(c-a^2cx^2)^{5/2}}{\arcsin(ax)^{3/2}}\,dx =$$

$$-\frac{c^2e^{-6i\arcsin(ax)}\sqrt{c-a^2cx^2}\left(1+6e^{2i\arcsin(ax)}+15e^{4i\arcsin(ax)}+20e^{6i\arcsin(ax)}+15e^{8i\arcsin(ax)}+6e^{10i\arcsin(ax}\right.}{}$$

input
```
Integrate[(c - a^2*c*x^2)^(5/2)/ArcSin[a*x]^(3/2),x]
```

output
```
-1/32*(c^2*Sqrt[c - a^2*c*x^2]*(1 + 6*E^((2*I)*ArcSin[a*x]) + 15*E^((4*I)*
ArcSin[a*x]) + 20*E^((6*I)*ArcSin[a*x]) + 15*E^((8*I)*ArcSin[a*x]) + 6*E^(
(10*I)*ArcSin[a*x]) + E^((12*I)*ArcSin[a*x]) + 64*E^((6*I)*ArcSin[a*x])*Sq
rt[Pi]*Sqrt[ArcSin[a*x]]*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]] + Sqrt[2
]*E^((6*I)*ArcSin[a*x])*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-2*I)*ArcSin[a*
x]] + Sqrt[2]*E^((6*I)*ArcSin[a*x])*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (2*I)*A
rcSin[a*x]] - 12*E^((6*I)*ArcSin[a*x])*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (
-4*I)*ArcSin[a*x]] - 12*E^((6*I)*ArcSin[a*x])*Sqrt[I*ArcSin[a*x]]*Gamma[1/
2, (4*I)*ArcSin[a*x]] - Sqrt[6]*E^((6*I)*ArcSin[a*x])*Sqrt[(-I)*ArcSin[a*x
]]*Gamma[1/2, (-6*I)*ArcSin[a*x]] - Sqrt[6]*E^((6*I)*ArcSin[a*x])*Sqrt[I*A
rcSin[a*x]]*Gamma[1/2, (6*I)*ArcSin[a*x]]))/(a*E^((6*I)*ArcSin[a*x])*Sqrt[
1 - a^2*x^2]*Sqrt[ArcSin[a*x]])
```

Rubi [A] (verified)

Time = 0.54 (sec) , antiderivative size = 172, normalized size of antiderivative = 0.72, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {5166, 5224, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(c-a^2cx^2)^{5/2}}{\arcsin(ax)^{3/2}}\,dx$$

$$\downarrow 5166$$

$$-\frac{12ac^2\sqrt{c-a^2cx^2}\int\frac{x\left(1-a^2x^2\right)^2}{\sqrt{\arcsin(ax)}}dx}{\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{5/2}}{a\sqrt{\arcsin(ax)}}$$

$$\downarrow 5224$$

$$-\frac{12c^2\sqrt{c-a^2cx^2}\int\frac{ax\left(1-a^2x^2\right)^{5/2}}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{5/2}}{a\sqrt{\arcsin(ax)}}$$

$$\downarrow 4906$$

$$-\frac{12c^2\sqrt{c-a^2cx^2}\int\left(\frac{5\sin(2\arcsin(ax))}{32\sqrt{\arcsin(ax)}}+\frac{\sin(4\arcsin(ax))}{8\sqrt{\arcsin(ax)}}+\frac{\sin(6\arcsin(ax))}{32\sqrt{\arcsin(ax)}}\right)d\arcsin(ax)}{a\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{5/2}}{a\sqrt{\arcsin(ax)}}$$

$$\downarrow 2009$$

$$-\frac{12c^2\sqrt{c-a^2cx^2}\left(\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)+\frac{1}{32}\sqrt{\frac{\pi}{3}}\,\text{FresnelS}\left(2\sqrt{\frac{3}{\pi}}\sqrt{\arcsin(ax)}\right)+\frac{5}{32}\sqrt{\pi}\,\text{FresnelS}\right.}{a\sqrt{1-a^2x^2}}$$
$$-\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{5/2}}{a\sqrt{\arcsin(ax)}}$$

input
```
Int[(c - a^2*c*x^2)^(5/2)/ArcSin[a*x]^(3/2),x]
```

output
```
(-2*Sqrt[1 - a^2*x^2]*(c - a^2*c*x^2)^(5/2))/(a*Sqrt[ArcSin[a*x]]) - (12*c
^2*Sqrt[c - a^2*c*x^2]*((Sqrt[Pi/2]*FresnelS[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]
]])/8 + (Sqrt[Pi/3]*FresnelS[2*Sqrt[3/Pi]*Sqrt[ArcSin[a*x]]])/32 + (5*Sqrt
[Pi]*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/32))/(a*Sqrt[1 - a^2*x^2])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [F]

$$\int \frac{(-a^2 c\, x^2 + c)^{\frac{5}{2}}}{\arcsin(ax)^{\frac{3}{2}}} dx$$

input
```
int((-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(3/2),x)
```

output
```
int((-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(c - a^2 c x^2)^{5/2}}{\arcsin(ax)^{3/2}}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(c - a^2 c x^2)^{5/2}}{\arcsin(ax)^{3/2}}\, dx = \text{Timed out}$$

input
```
integrate((-a**2*c*x**2+c)**(5/2)/asin(a*x)**(3/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(c - a^2 c x^2)^{5/2}}{\arcsin(ax)^{3/2}}\, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F]

$$\int \frac{(c-a^2cx^2)^{5/2}}{\arcsin(ax)^{3/2}}\,dx = \int \frac{(-a^2cx^2+c)^{\frac{5}{2}}}{\arcsin(ax)^{\frac{3}{2}}}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(3/2),x, algorithm="giac")
```

output
```
integrate((-a^2*c*x^2 + c)^(5/2)/arcsin(a*x)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(c-a^2cx^2)^{5/2}}{\arcsin(ax)^{3/2}}\,dx = \int \frac{(c-a^2\,c\,x^2)^{5/2}}{\operatorname{asin}(a\,x)^{3/2}}\,dx$$

input
```
int((c - a^2*c*x^2)^(5/2)/asin(a*x)^(3/2),x)
```

output
```
int((c - a^2*c*x^2)^(5/2)/asin(a*x)^(3/2), x)
```

Reduce [F]

$$\int \frac{(c-a^2cx^2)^{5/2}}{\arcsin(ax)^{3/2}}\,dx = \sqrt{c}\,c^2\left(\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,x^4}{asin\,(ax)^2}dx\right)a^4 - 2\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,x^2}{asin\,(ax)^2}dx\right)a^2 + \int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}}{asin\,(ax)^2}dx\right)$$

input
```
int((-a^2*c*x^2+c)^(5/2)/asin(a*x)^(3/2),x)
```

output
```
sqrt(c)*c**2*(int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*x**4)/asin(a*x)*
*2,x)*a**4 - 2*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*x**2)/asin(a*x)
**2,x)*a**2 + int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/asin(a*x)**2,x)
)
```

3.134 $\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{3/2}}\,dx$

Optimal result . . . 1047
Mathematica [C] (verified) . . . 1048
Rubi [A] (verified) . . . 1048
Maple [F] . . . 1050
Fricas [F(-2)] . . . 1050
Sympy [F] . . . 1051
Maxima [F(-2)] . . . 1051
Giac [F] . . . 1051
Mupad [F(-1)] . . . 1052
Reduce [F] . . . 1052

Optimal result

Integrand size = 24, antiderivative size = 164

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{3/2}}\,dx = -\frac{2c(1-a^2x^2)^{3/2}\sqrt{c-a^2cx^2}}{a\sqrt{\arcsin(ax)}} - \frac{c\sqrt{\frac{\pi}{2}}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)}{a\sqrt{1-a^2x^2}} - \frac{2c\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{a\sqrt{1-a^2x^2}}$$

output

```
-2*c*(-a^2*x^2+1)^(3/2)*(-a^2*c*x^2+c)^(1/2)/a/arcsin(a*x)^(1/2)-1/2*c*2^(
1/2)*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelS(2*2^(1/2)/Pi^(1/2)*arcsin(a*x)
^(1/2))/a/(-a^2*x^2+1)^(1/2)-2*c*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelS(2*
arcsin(a*x)^(1/2)/Pi^(1/2))/a/(-a^2*x^2+1)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.32 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.29

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{3/2}}\,dx =$$

$$-\frac{ce^{-4i\arcsin(ax)}\sqrt{c-a^2cx^2}\left(1+6e^{4i\arcsin(ax)}+e^{8i\arcsin(ax)}+8e^{4i\arcsin(ax)}\cos(2\arcsin(ax))+16e^{4i\arcsin(ax)}\sqrt{}\right.}{}$$

input
```
Integrate[(c - a^2*c*x^2)^(3/2)/ArcSin[a*x]^(3/2),x]
```

output
```
-1/8*(c*Sqrt[c - a^2*c*x^2]*(1 + 6*E^((4*I)*ArcSin[a*x]) + E^((8*I)*ArcSin
[a*x]) + 8*E^((4*I)*ArcSin[a*x])*Cos[2*ArcSin[a*x]] + 16*E^((4*I)*ArcSin[a
*x])*Sqrt[Pi]*Sqrt[ArcSin[a*x]]*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]] -
 2*E^((4*I)*ArcSin[a*x])*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-4*I)*ArcSin[a
*x]] - 2*E^((4*I)*ArcSin[a*x])*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (4*I)*ArcSin
[a*x]]))/(a*E^((4*I)*ArcSin[a*x])*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])
```

Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 137, normalized size of antiderivative = 0.84, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {5166, 5224, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{3/2}}\,dx$$

$$\downarrow 5166$$

$$-\frac{8ac\sqrt{c-a^2cx^2}\int \frac{x(1-a^2x^2)}{\sqrt{\arcsin(ax)}}dx}{\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}(c-a^2cx^2)^{3/2}}{a\sqrt{\arcsin(ax)}}$$

$$\downarrow 5224$$

$$-\frac{8c\sqrt{c-a^2cx^2}\int\frac{ax\left(1-a^2x^2\right)^{3/2}}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{3/2}}{a\sqrt{\arcsin(ax)}}$$

$$\downarrow 4906$$

$$-\frac{8c\sqrt{c-a^2cx^2}\int\left(\frac{\sin(2\arcsin(ax))}{4\sqrt{\arcsin(ax)}}+\frac{\sin(4\arcsin(ax))}{8\sqrt{\arcsin(ax)}}\right)d\arcsin(ax)}{a\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{3/2}}{a\sqrt{\arcsin(ax)}}$$

$$\downarrow 2009$$

$$-\frac{8c\sqrt{c-a^2cx^2}\left(\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)+\frac{1}{4}\sqrt{\pi}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)\right)}{a\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{3/2}}{a\sqrt{\arcsin(ax)}}$$

input
```
Int[(c - a^2*c*x^2)^(3/2)/ArcSin[a*x]^(3/2),x]
```

output
```
(-2*Sqrt[1 - a^2*x^2]*(c - a^2*c*x^2)^(3/2))/(a*Sqrt[ArcSin[a*x]]) - (8*c*
Sqrt[c - a^2*c*x^2]*((Sqrt[Pi/2]*FresnelS[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])
/8 + (Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/4))/(a*Sqrt[1 - a
^2*x^2])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 4906
```
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 5166

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [F]

$$\int \frac{(-a^2 c\, x^2 + c)^{\frac{3}{2}}}{\arcsin(ax)^{\frac{3}{2}}}\, dx$$

input

```
int((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(3/2),x)
```

output

```
int((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(c - a^2 c x^2)^{3/2}}{\arcsin(ax)^{3/2}}\, dx = \text{Exception raised: TypeError}$$

input

```
integrate((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{\left(c - a^2 c x^2\right)^{3/2}}{\arcsin(ax)^{3/2}}\,dx = \int \frac{\left(-c(ax-1)\,(ax+1)\right)^{\frac{3}{2}}}{\operatorname{asin}^{\frac{3}{2}}(ax)}\,dx$$

input
```
integrate((-a**2*c*x**2+c)**(3/2)/asin(a*x)**(3/2),x)
```

output
```
Integral((-c*(a*x - 1)*(a*x + 1))**(3/2)/asin(a*x)**(3/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\left(c - a^2 c x^2\right)^{3/2}}{\arcsin(ax)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F]

$$\int \frac{\left(c - a^2 c x^2\right)^{3/2}}{\arcsin(ax)^{3/2}}\,dx = \int \frac{\left(-a^2 c x^2 + c\right)^{\frac{3}{2}}}{\arcsin\left(ax\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(3/2),x, algorithm="giac")
```

output
```
integrate((-a^2*c*x^2 + c)^(3/2)/arcsin(a*x)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{3/2}}\,dx = \int \frac{(c-a^2\,c\,x^2)^{3/2}}{\operatorname{asin}(a\,x)^{3/2}}\,dx$$

input
```
int((c - a^2*c*x^2)^(3/2)/asin(a*x)^(3/2),x)
```

output
```
int((c - a^2*c*x^2)^(3/2)/asin(a*x)^(3/2), x)
```

Reduce [F]

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{3/2}}\,dx = \sqrt{c}\,c\left(-\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,x^2}{asin\,(ax)^2}dx\right)a^2+\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}}{asin\,(ax)^2}dx\right)$$

input
```
int((-a^2*c*x^2+c)^(3/2)/asin(a*x)^(3/2),x)
```

output
```
sqrt(c)*c*( - int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*x**2)/asin(a*x)*
*2,x)*a**2 + int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/asin(a*x)**2,x))
```

3.135 $\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{3/2}}\,dx$

Optimal result . . . 1053
Mathematica [A] (verified) . . . 1053
Rubi [A] (verified) . . . 1054
Maple [F] . . . 1056
Fricas [F(-2)] . . . 1056
Sympy [F] . . . 1057
Maxima [F(-2)] . . . 1057
Giac [F] . . . 1057
Mupad [F(-1)] . . . 1058
Reduce [F] . . . 1058

Optimal result

Integrand size = 24, antiderivative size = 98

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{3/2}}\,dx = -\frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{a\sqrt{\arcsin(ax)}} - \frac{2\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{a\sqrt{1-a^2x^2}}$$

output

```
-2*(-a^2*x^2+1)^(1/2)*(-a^2*c*x^2+c)^(1/2)/a/arcsin(a*x)^(1/2)-2*Pi^(1/2)*
(-a^2*c*x^2+c)^(1/2)*FresnelS(2*arcsin(a*x)^(1/2)/Pi^(1/2))/a/(-a^2*x^2+1)
^(1/2)
```

Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 83, normalized size of antiderivative = 0.85

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{3/2}}\,dx = -\frac{\sqrt{c\left(1-a^2x^2\right)}\left(1+\cos(2\arcsin(ax))+2\sqrt{\pi}\sqrt{\arcsin(ax)}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)\right)}{a\sqrt{1-a^2x^2}\sqrt{\arcsin(ax)}}$$

input

```
Integrate[Sqrt[c - a^2*c*x^2]/ArcSin[a*x]^(3/2),x]
```

output

```
-((Sqrt[c*(1 - a^2*x^2)]*(1 + Cos[2*ArcSin[a*x]] + 2*Sqrt[Pi]*Sqrt[ArcSin[
a*x]]*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]]))/(a*Sqrt[1 - a^2*x^2]*Sqrt
[ArcSin[a*x]]))
```

Rubi [A] (verified)

Time = 0.50 (sec) , antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.292$, Rules used = {5166, 5146, 4906, 27, 3042, 3786, 3832}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{3/2}}\,dx$$

$$\downarrow 5166$$

$$-\frac{4a\sqrt{c-a^2cx^2}\int \frac{x}{\sqrt{\arcsin(ax)}}dx}{\sqrt{1-a^2x^2}} - \frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{a\sqrt{\arcsin(ax)}}$$

$$\downarrow 5146$$

$$-\frac{4\sqrt{c-a^2cx^2}\int \frac{ax\sqrt{1-a^2x^2}}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a\sqrt{1-a^2x^2}} - \frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{a\sqrt{\arcsin(ax)}}$$

$$\downarrow 4906$$

$$-\frac{4\sqrt{c-a^2cx^2}\int \frac{\sin(2\arcsin(ax))}{2\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a\sqrt{1-a^2x^2}} - \frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{a\sqrt{\arcsin(ax)}}$$

$$\downarrow 27$$

$$-\frac{2\sqrt{c-a^2cx^2}\int \frac{\sin(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a\sqrt{1-a^2x^2}} - \frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{a\sqrt{\arcsin(ax)}}$$

$$\downarrow 3042$$

$$-\frac{2\sqrt{c-a^2cx^2}\int \frac{\sin(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a\sqrt{1-a^2x^2}} - \frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{a\sqrt{\arcsin(ax)}}$$

$$\downarrow 3786$$

$$-\frac{4\sqrt{c-a^2cx^2}\int \sin(2\arcsin(ax))d\sqrt{\arcsin(ax)}}{a\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{a\sqrt{\arcsin(ax)}}$$

$$\downarrow 3832$$

$$-\frac{2\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelS}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{a\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{a\sqrt{\arcsin(ax)}}$$

input
```
Int[Sqrt[c - a^2*c*x^2]/ArcSin[a*x]^(3/2),x]
```

output
```
(-2*Sqrt[1 - a^2*x^2]*Sqrt[c - a^2*c*x^2])/(a*Sqrt[ArcSin[a*x]]) - (2*Sqrt
[Pi]*Sqrt[c - a^2*c*x^2]*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(a*Sqrt
[1 - a^2*x^2])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 4906
```
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 5146

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

rule 5166

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

Maple [F]

$$\int \frac{\sqrt{-a^2 c\, x^2 + c}}{\arcsin\left(a x\right)^{\frac{3}{2}}} dx$$

input

```
int((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(3/2),x)
```

output

```
int((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{c - a^2 c x^2}}{\arcsin(a x)^{3/2}}\, dx = \text{Exception raised: TypeError}$$

input

```
integrate((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{3/2}}\,dx = \int \frac{\sqrt{-c\,(ax-1)\,(ax+1)}}{\operatorname{asin}^{\frac{3}{2}}(ax)}\,dx$$

input
```
integrate((-a**2*c*x**2+c)**(1/2)/asin(a*x)**(3/2),x)
```

output
```
Integral(sqrt(-c*(a*x - 1)*(a*x + 1))/asin(a*x)**(3/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F]

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{3/2}}\,dx = \int \frac{\sqrt{-a^2cx^2+c}}{\arcsin\left(ax\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(3/2),x, algorithm="giac")
```

output
```
integrate(sqrt(-a^2*c*x^2 + c)/arcsin(a*x)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{3/2}}\,dx = \int \frac{\sqrt{c-a^2\,c\,x^2}}{\text{asin}\,(a\,x)^{3/2}}\,dx$$

input
```
int((c - a^2*c*x^2)^(1/2)/asin(a*x)^(3/2),x)
```

output
```
int((c - a^2*c*x^2)^(1/2)/asin(a*x)^(3/2), x)
```

Reduce [F]

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{3/2}}\,dx = \sqrt{c}\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}}{asin\,(ax)^2}dx\right)$$

input
```
int((-a^2*c*x^2+c)^(1/2)/asin(a*x)^(3/2),x)
```

output
```
sqrt(c)*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/asin(a*x)**2,x)
```

3.136 $\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}\,dx$

Optimal result . . . 1059
Mathematica [A] (verified) . . . 1059
Rubi [A] (verified) . . . 1060
Maple [A] (verified) . . . 1060
Fricas [A] (verification not implemented) . . . 1061
Sympy [F] . . . 1061
Maxima [F(-2)] . . . 1062
Giac [A] (verification not implemented) . . . 1062
Mupad [F(-1)] . . . 1062
Reduce [B] (verification not implemented) . . . 1063

Optimal result

Integrand size = 24, antiderivative size = 42

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}\,dx = -\frac{2\sqrt{1-a^2x^2}}{a\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}$$

output
```
-2*(-a^2*x^2+1)^(1/2)/a/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(1/2)
```

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}\,dx = -\frac{2\sqrt{1-a^2x^2}}{a\sqrt{c-a^2cx^2}\sqrt{\arcsin(ax)}}$$

input
```
Integrate[1/(Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(3/2)),x]
```

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

Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}}\,dx$$
$$\downarrow 5152$$
$$-\frac{2\sqrt{1-a^2x^2}}{a\sqrt{\arcsin(ax)}\sqrt{c-a^2cx^2}}$$

input
```
Int[1/(Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(3/2)),x]
```

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

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 38, normalized size of antiderivative = 0.90

method	result	size
default	$-\frac{2\sqrt{-a^2x^2+1}}{\sqrt{\arcsin(ax)}\,a\sqrt{-c(a^2x^2-1)}}$	38

input
```
int(1/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(3/2),x,method=_RETURNVERBOSE)
```

output
```
-2/arcsin(a*x)^(1/2)/a/(-c*(a^2*x^2-1))^(1/2)*(-a^2*x^2+1)^(1/2)
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.14

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}\,dx = \frac{2\sqrt{-a^2cx^2+c}\sqrt{-a^2x^2+1}}{(a^3cx^2-ac)\sqrt{\arcsin(ax)}}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

output
```
2*sqrt(-a^2*c*x^2 + c)*sqrt(-a^2*x^2 + 1)/((a^3*c*x^2 - a*c)*sqrt(arcsin(a
*x)))
```

Sympy [F]

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}\,dx = \int \frac{1}{\sqrt{-c\,(ax-1)\,(ax+1)}\,\operatorname{asin}^{\frac{3}{2}}(ax)}\,dx$$

input
```
integrate(1/(-a**2*c*x**2+c)**(1/2)/asin(a*x)**(3/2),x)
```

output
```
Integral(1/(sqrt(-c*(a*x - 1)*(a*x + 1))*asin(a*x)**(3/2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.33

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}\,dx = -\frac{2}{a\sqrt{c}\sqrt{\arcsin(ax)}}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(3/2),x, algorithm="giac")
```

output
```
-2/(a*sqrt(c)*sqrt(arcsin(a*x)))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}\,dx = \int \frac{1}{\text{asin}(a\,x)^{3/2}\sqrt{c-a^2\,c\,x^2}}\,dx$$

input
```
int(1/(asin(a*x)^(3/2)*(c - a^2*c*x^2)^(1/2)),x)
```

output
```
int(1/(asin(a*x)^(3/2)*(c - a^2*c*x^2)^(1/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.50

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}\,dx = -\frac{2\sqrt{c}\,\sqrt{asin\,(ax)}}{asin\,(ax)\,ac}$$

input
```
int(1/(-a^2*c*x^2+c)^(1/2)/asin(a*x)^(3/2),x)
```

output
```
( - 2*sqrt(c)*sqrt(asin(a*x)))/(asin(a*x)*a*c)
```

3.137 $\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}}\,dx$

Optimal result . . . 1064
Mathematica [N/A] . . . 1064
Rubi [N/A] . . . 1065
Maple [N/A] . . . 1065
Fricas [F(-2)] . . . 1066
Sympy [N/A] . . . 1066
Maxima [F(-2)] . . . 1067
Giac [N/A] . . . 1067
Mupad [N/A] . . . 1067
Reduce [N/A] . . . 1068

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}}\,dx = \text{Int}\left(\frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}},x\right)$$

output
```
Defer(Int)(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(3/2),x)
```

Mathematica [N/A]

Not integrable

Time = 1.90 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}}\,dx = \int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}}\,dx$$

input
```
Integrate[1/((c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^(3/2)),x]
```

output
```
Integrate[1/((c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^(3/2)), x]
```

Rubi [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}}\,dx$$

$$\downarrow 5166$$

$$\frac{4a\sqrt{1-a^2x^2}\int \frac{x}{\left(1-a^2x^2\right)^2\sqrt{\arcsin(ax)}}dx}{c\sqrt{c-a^2cx^2}} - \frac{2\sqrt{1-a^2x^2}}{a\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5234$$

$$\frac{4a\sqrt{1-a^2x^2}\int \frac{x}{\left(1-a^2x^2\right)^2\sqrt{\arcsin(ax)}}dx}{c\sqrt{c-a^2cx^2}} - \frac{2\sqrt{1-a^2x^2}}{a\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{3/2}}$$

input
```
Int[1/((c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^(3/2)),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

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

input
```
int(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(3/2),x)
```

output
```
int(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 45.42 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.12

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}}\,dx = \int \frac{1}{\left(-c\left(ax-1\right)\left(ax+1\right)\right)^{\frac{3}{2}}\operatorname{asin}^{\frac{3}{2}}\left(ax\right)}\,dx$$

input
```
integrate(1/(-a**2*c*x**2+c)**(3/2)/asin(a*x)**(3/2),x)
```

output
```
Integral(1/((-c*(a*x - 1)*(a*x + 1))**(3/2)*asin(a*x)**(3/2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}}\,dx = \int \frac{1}{\left(-a^2cx^2+c\right)^{\frac{3}{2}}\arcsin\left(ax\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(3/2),x, algorithm="giac")
```

output
```
integrate(1/((-a^2*c*x^2 + c)^(3/2)*arcsin(a*x)^(3/2)), x)
```

Mupad [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}}\,dx = \int \frac{1}{\mathrm{asin}\left(a\,x\right)^{3/2}\left(c-a^2\,c\,x^2\right)^{3/2}}\,dx$$

input
```
int(1/(asin(a*x)^(3/2)*(c - a^2*c*x^2)^(3/2)),x)
```

output
```
int(1/(asin(a*x)^(3/2)*(c - a^2*c*x^2)^(3/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.54

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{3/2}}\,dx = \frac{\sqrt{c}\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin(ax)}}{asin(ax)^2a^4x^4-2asin(ax)^2a^2x^2+asin(ax)^2}dx\right)}{c^2}$$

input
```
int(1/(-a^2*c*x^2+c)^(3/2)/asin(a*x)^(3/2),x)
```

output
```
(sqrt(c)*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/(asin(a*x)**2*a**4*x
**4 - 2*asin(a*x)**2*a**2*x**2 + asin(a*x)**2),x))/c**2
```

3.138 $\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{3/2}}\,dx$

Optimal result . . . 1069
Mathematica [N/A] . . . 1069
Rubi [N/A] . . . 1070
Maple [N/A] . . . 1070
Fricas [F(-2)] . . . 1071
Sympy [F(-1)] . . . 1071
Maxima [F(-2)] . . . 1071
Giac [N/A] . . . 1072
Mupad [N/A] . . . 1072
Reduce [N/A] . . . 1073

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{3/2}}\,dx = \text{Int}\left(\frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{3/2}},x\right)$$

output
```
Defer(Int)(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(3/2),x)
```

Mathematica [N/A]

Not integrable

Time = 2.08 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{3/2}}\,dx = \int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{3/2}}\,dx$$

input
```
Integrate[1/((c - a^2*c*x^2)^(5/2)*ArcSin[a*x]^(3/2)),x]
```

output
```
Integrate[1/((c - a^2*c*x^2)^(5/2)*ArcSin[a*x]^(3/2)), x]
```

Rubi [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{5/2}}\,dx$$

$$\downarrow 5166$$

$$\frac{8a\sqrt{1-a^2x^2}\int \frac{x}{\left(1-a^2x^2\right)^3\sqrt{\arcsin(ax)}}dx}{c^2\sqrt{c-a^2cx^2}} - \frac{2\sqrt{1-a^2x^2}}{a\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{5/2}}$$

$$\downarrow 5234$$

$$\frac{8a\sqrt{1-a^2x^2}\int \frac{x}{\left(1-a^2x^2\right)^3\sqrt{\arcsin(ax)}}dx}{c^2\sqrt{c-a^2cx^2}} - \frac{2\sqrt{1-a^2x^2}}{a\sqrt{\arcsin(ax)}\left(c-a^2cx^2\right)^{5/2}}$$

input
```
Int[1/((c - a^2*c*x^2)^(5/2)*ArcSin[a*x]^(3/2)),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.42 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{1}{\left(-a^2c\,x^2+c\right)^{\frac{5}{2}}\arcsin\left(ax\right)^{\frac{3}{2}}}\,dx$$

input
```
int(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(3/2),x)
```

output
```
int(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\arcsin(ax)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\arcsin(ax)^{3/2}}\,dx = \text{Timed out}$$

input
```
integrate(1/(-a**2*c*x**2+c)**(5/2)/asin(a*x)**(3/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\arcsin(ax)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\arcsin(ax)^{3/2}}\,dx = \int \frac{1}{(-a^2cx^2+c)^{\frac{5}{2}}\arcsin(ax)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(3/2),x, algorithm="giac")
```

output
```
integrate(1/((-a^2*c*x^2 + c)^(5/2)*arcsin(a*x)^(3/2)), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\arcsin(ax)^{3/2}}\,dx = \int \frac{1}{\mathrm{asin}(a\,x)^{3/2}\,(c-a^2\,c\,x^2)^{5/2}}\,dx$$

input
```
int(1/(asin(a*x)^(3/2)*(c - a^2*c*x^2)^(5/2)),x)
```

output
```
int(1/(asin(a*x)^(3/2)*(c - a^2*c*x^2)^(5/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 78, normalized size of antiderivative = 3.25

$$\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{3/2}}\,dx = -\frac{\sqrt{c}\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin(ax)}}{asin(ax)^2a^6x^6-3asin(ax)^2a^4x^4+3asin(ax)^2a^2x^2-asin(ax)^2}dx\right)}{c^3}$$

input
```
int(1/(-a^2*c*x^2+c)^(5/2)/asin(a*x)^(3/2),x)
```

output
```
( - sqrt(c)*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/(asin(a*x)**2*a**
6*x**6 - 3*asin(a*x)**2*a**4*x**4 + 3*asin(a*x)**2*a**2*x**2 - asin(a*x)**
2),x))/c**3
```

3.139 $\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{5/2}}\,dx$

Optimal result . . . 1074
Mathematica [C] (verified) . . . 1075
Rubi [A] (verified) . . . 1075
Maple [F] . . . 1079
Fricas [F(-2)] . . . 1079
Sympy [F(-1)] . . . 1080
Maxima [F(-2)] . . . 1080
Giac [F] . . . 1081
Mupad [F(-1)] . . . 1081
Reduce [F] . . . 1081

Optimal result

Integrand size = 24, antiderivative size = 196

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{5/2}}\,dx = -\frac{2c(1-a^2x^2)^{3/2}\sqrt{c-a^2cx^2}}{3a\arcsin(ax)^{3/2}} + \frac{16x(c-a^2cx^2)^{3/2}}{3\sqrt{\arcsin(ax)}} - \frac{4c\sqrt{2\pi}\sqrt{c-a^2cx^2}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)}{3a\sqrt{1-a^2x^2}} - \frac{8c\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{3a\sqrt{1-a^2x^2}}$$

output

```
-2/3*c*(-a^2*x^2+1)^(3/2)*(-a^2*c*x^2+c)^(1/2)/a/arcsin(a*x)^(3/2)+16/3*x*
(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(1/2)-4/3*c*2^(1/2)*Pi^(1/2)*(-a^2*c*x^2+
c)^(1/2)*FresnelC(2*2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))/a/(-a^2*x^2+1)^(1/
2)-8/3*c*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*FresnelC(2*arcsin(a*x)^(1/2)/Pi^(1/
2))/a/(-a^2*x^2+1)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.94 (sec) , antiderivative size = 251, normalized size of antiderivative = 1.28

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{5/2}}\,dx = \frac{c\sqrt{c-a^2cx^2}\left(-14-e^{-4i\arcsin(ax)}-e^{4i\arcsin(ax)}+16a^2x^2+8ie^{-4i\arcsin(ax)}\arcsin(ax)\right.}{}$$

input

```
Integrate[(c - a^2*c*x^2)^(3/2)/ArcSin[a*x]^(5/2),x]
```

output

```
(c*Sqrt[c - a^2*c*x^2]*(-14 - E^((-4*I)*ArcSin[a*x]) - E^((4*I)*ArcSin[a*x
]) + 16*a^2*x^2 + ((8*I)*ArcSin[a*x])/E^((4*I)*ArcSin[a*x]) - (8*I)*E^((4*
I)*ArcSin[a*x])*ArcSin[a*x] + 64*a*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x] - 16*Sq
rt[2]*((-I)*ArcSin[a*x])^(3/2)*Gamma[1/2, (-2*I)*ArcSin[a*x]] - 16*Sqrt[2]
*(I*ArcSin[a*x])^(3/2)*Gamma[1/2, (2*I)*ArcSin[a*x]] - 16*((-I)*ArcSin[a*x
])^(3/2)*Gamma[1/2, (-4*I)*ArcSin[a*x]] - 16*(I*ArcSin[a*x])^(3/2)*Gamma[1
/2, (4*I)*ArcSin[a*x]]))/(24*a*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2))
```

Rubi [A] (verified)

Time = 1.23 (sec) , antiderivative size = 199, normalized size of antiderivative = 1.02, number of steps used = 10, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.375$, Rules used = {5166, 5214, 5168, 3042, 3793, 2009, 5224, 4906, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{5/2}}\,dx$$

$$\downarrow 5166$$

$$-\frac{8ac\sqrt{c-a^2cx^2}\int \frac{x(1-a^2x^2)}{\arcsin(ax)^{3/2}}dx}{3\sqrt{1-a^2x^2}} - \frac{2\sqrt{1-a^2x^2}(c-a^2cx^2)^{3/2}}{3a\arcsin(ax)^{3/2}}$$

$$\downarrow 5214$$

$$-\frac{8ac\sqrt{c-a^2cx^2}\left(\frac{2\int\frac{\sqrt{1-a^2x^2}}{\sqrt{\arcsin(ax)}}dx}{a}-8a\int\frac{x^2\sqrt{1-a^2x^2}}{\sqrt{\arcsin(ax)}}dx-\frac{2x\left(1-a^2x^2\right)^{3/2}}{a\sqrt{\arcsin(ax)}}\right)}{3\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{3/2}}{3a\arcsin(ax)^{3/2}}$$

$$\downarrow 5168$$

$$-\frac{8ac\sqrt{c-a^2cx^2}\left(-8a\int\frac{x^2\sqrt{1-a^2x^2}}{\sqrt{\arcsin(ax)}}dx+\frac{2\int\frac{1-a^2x^2}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a^2}-\frac{2x\left(1-a^2x^2\right)^{3/2}}{a\sqrt{\arcsin(ax)}}\right)}{3\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{3/2}}{3a\arcsin(ax)^{3/2}}$$

$$\downarrow 3042$$

$$-\frac{8ac\sqrt{c-a^2cx^2}\left(-8a\int\frac{x^2\sqrt{1-a^2x^2}}{\sqrt{\arcsin(ax)}}dx+\frac{2\int\frac{\sin\left(\arcsin(ax)+\frac{\pi}{2}\right)^2}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a^2}-\frac{2x\left(1-a^2x^2\right)^{3/2}}{a\sqrt{\arcsin(ax)}}\right)}{3\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{3/2}}{3a\arcsin(ax)^{3/2}}$$

$$\downarrow 3793$$

$$-\frac{8ac\sqrt{c-a^2cx^2}\left(-8a\int\frac{x^2\sqrt{1-a^2x^2}}{\sqrt{\arcsin(ax)}}dx+\frac{2\int\left(\frac{\cos(2\arcsin(ax))}{2\sqrt{\arcsin(ax)}}+\frac{1}{2\sqrt{\arcsin(ax)}}\right)d\arcsin(ax)}{a^2}-\frac{2x\left(1-a^2x^2\right)^{3/2}}{a\sqrt{\arcsin(ax)}}\right)}{3\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{3/2}}{3a\arcsin(ax)^{3/2}}$$

$$\downarrow 2009$$

$$-\frac{8ac\sqrt{c-a^2cx^2}\left(-8a\int\frac{x^2\sqrt{1-a^2x^2}}{\sqrt{\arcsin(ax)}}dx+\frac{2\left(\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+\sqrt{\arcsin(ax)}\right)}{a^2}-\frac{2x\left(1-a^2x^2\right)^{3/2}}{a\sqrt{\arcsin(ax)}}\right)}{3\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{3/2}}{3a\arcsin(ax)^{3/2}}$$

$$\downarrow 5224$$

$$-\frac{8ac\sqrt{c-a^2cx^2}\left(-\frac{8\int\frac{a^2x^2\left(1-a^2x^2\right)}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a^2}+\frac{2\left(\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+\sqrt{\arcsin(ax)}\right)}{a^2}-\frac{2x\left(1-a^2x^2\right)^{3/2}}{a\sqrt{\arcsin(ax)}}\right)}{\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{3/2}}{3a\arcsin(ax)^{3/2}}}-$$

$$\downarrow 4906$$

$$-\frac{8ac\sqrt{c-a^2cx^2}\left(-\frac{8\int\left(\frac{1}{8\sqrt{\arcsin(ax)}}-\frac{\cos(4\arcsin(ax))}{8\sqrt{\arcsin(ax)}}\right)d\arcsin(ax)}{a^2}+\frac{2\left(\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+\sqrt{\arcsin(ax)}\right)}{a^2}-\frac{2x\left(1-a^2x^2\right)^{3/2}}{a\sqrt{\arcsin(ax)}}\right)}{\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{3/2}}{3a\arcsin(ax)^{3/2}}}-$$

$$\downarrow 2009$$

$$-\frac{8ac\sqrt{c-a^2cx^2}\left(-\frac{8\left(\frac{1}{4}\sqrt{\arcsin(ax)}-\frac{1}{8}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\arcsin(ax)}\right)\right)}{a^2}+\frac{2\left(\frac{1}{2}\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+\sqrt{\arcsin(ax)}\right)}{a^2}-\frac{2x\left(1-a^2x^2\right)^{3/2}}{a\sqrt{\arcsin(ax)}}\right)}{\frac{2\sqrt{1-a^2x^2}\left(c-a^2cx^2\right)^{3/2}}{3a\arcsin(ax)^{3/2}}}-$$

input

```
Int[(c - a^2*c*x^2)^(3/2)/ArcSin[a*x]^(5/2),x]
```

output

```
(-2*Sqrt[1 - a^2*x^2]*(c - a^2*c*x^2)^(3/2))/(3*a*ArcSin[a*x]^(3/2)) - (8*
a*c*Sqrt[c - a^2*c*x^2]*((-2*x*(1 - a^2*x^2)^(3/2))/(a*Sqrt[ArcSin[a*x]])
 - (8*(Sqrt[ArcSin[a*x]]/4 - (Sqrt[Pi/2]*FresnelC[2*Sqrt[2/Pi]*Sqrt[ArcSin[
a*x]]])/8))/a^2 + (2*(Sqrt[ArcSin[a*x]] + (Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSi
n[a*x]])/Sqrt[Pi]])/2))/a^2))/(3*Sqrt[1 - a^2*x^2])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3793
```
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 4906
```
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 5166
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

rule 5168
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Simp[(1/(b*c))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Subst[Int[
x^n*Cos[-a/b + x/b]^(2*p + 1), x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b
, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && IGtQ[2*p, 0]
```

rule 5214

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.)*((d_) + (e_.
)*(x_)^2)^(p_.), x_Symbol] :> Simp[(f*x)^m*Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*
((a + b*ArcSin[c*x])^(n + 1)/(b*c*(n + 1))), x] + (-Simp[f*(m/(b*c*(n + 1))
)*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   Int[(f*x)^(m - 1)*(1 - c^2*x^2)^(p
- 1/2)*(a + b*ArcSin[c*x])^(n + 1), x], x] + Simp[c*((m + 2*p + 1)/(b*f*(n
+ 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^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
}, x] && EqQ[c^2*d + e, 0] && LtQ[n, -1] && IGtQ[2*p, 0] && NeQ[m + 2*p + 1
, 0] && IGtQ[m, -3]
```

rule 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [F]

$$\int \frac{(-a^2 c\, x^2 + c)^{\frac{3}{2}}}{\arcsin(ax)^{\frac{5}{2}}} dx$$

input

```
int((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(5/2),x)
```

output

```
int((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(5/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(c - a^2 c x^2)^{3/2}}{\arcsin(ax)^{5/2}}\, dx = \text{Exception raised: TypeError}$$

input

```
integrate((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(5/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{5/2}}\,dx = \text{Timed out}$$

input
```
integrate((-a**2*c*x**2+c)**(3/2)/asin(a*x)**(5/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{5/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F]

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{5/2}}\,dx = \int \frac{(-a^2cx^2+c)^{\frac{3}{2}}}{\arcsin(ax)^{\frac{5}{2}}}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(5/2),x, algorithm="giac")
```

output
```
integrate((-a^2*c*x^2 + c)^(3/2)/arcsin(a*x)^(5/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{5/2}}\,dx = \int \frac{(c-a^2\,c\,x^2)^{3/2}}{\text{asin}(a\,x)^{5/2}}\,dx$$

input
```
int((c - a^2*c*x^2)^(3/2)/asin(a*x)^(5/2),x)
```

output
```
int((c - a^2*c*x^2)^(3/2)/asin(a*x)^(5/2), x)
```

Reduce [F]

$$\int \frac{(c-a^2cx^2)^{3/2}}{\arcsin(ax)^{5/2}}\,dx = \sqrt{c}\,c\left(-\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}\,x^2}{asin\,(ax)^3}dx\right)a^2+\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}}{asin\,(ax)^3}dx\right)$$

input
```
int((-a^2*c*x^2+c)^(3/2)/asin(a*x)^(5/2),x)
```

output
```
sqrt(c)*c*( - int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x))*x**2)/asin(a*x)*
*3,x)*a**2 + int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/asin(a*x)**3,x))
```

3.140 $\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{5/2}}\,dx$

Optimal result . . . 1082
Mathematica [C] (verified) . . . 1082
Rubi [A] (verified) . . . 1083
Maple [F] . . . 1085
Fricas [F(-2)] . . . 1085
Sympy [F] . . . 1086
Maxima [F(-2)] . . . 1086
Giac [F] . . . 1086
Mupad [F(-1)] . . . 1087
Reduce [F] . . . 1087

Optimal result

Integrand size = 24, antiderivative size = 130

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{5/2}}\,dx = -\frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{3a\arcsin(ax)^{3/2}} + \frac{8x\sqrt{c-a^2cx^2}}{3\sqrt{\arcsin(ax)}} - \frac{8\sqrt{\pi}\sqrt{c-a^2cx^2}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{3a\sqrt{1-a^2x^2}}$$

output
```
-2/3*(-a^2*x^2+1)^(1/2)*(-a^2*c*x^2+c)^(1/2)/a/arcsin(a*x)^(3/2)+8/3*x*(-a
^2*c*x^2+c)^(1/2)/arcsin(a*x)^(1/2)-8/3*Pi^(1/2)*(-a^2*c*x^2+c)^(1/2)*Fres
nelC(2*arcsin(a*x)^(1/2)/Pi^(1/2))/a/(-a^2*x^2+1)^(1/2)
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.31 (sec) , antiderivative size = 142, normalized size of antiderivative = 1.09

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{5/2}}\,dx = \frac{2\sqrt{c-a^2cx^2}\left(-1+a^2x^2+4ax\sqrt{1-a^2x^2}\arcsin(ax)-\sqrt{2}(-i\arcsin(ax))^{3/2}\Gamma\left(\frac{1}{2},-\right.\right.}{3a\sqrt{1-a^2x^2}\arcsin(ax)^{3/2}}$$

input
```
Integrate[Sqrt[c - a^2*c*x^2]/ArcSin[a*x]^(5/2),x]
```

output

```
(2*Sqrt[c - a^2*c*x^2]*(-1 + a^2*x^2 + 4*a*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x]
 - Sqrt[2]*((-I)*ArcSin[a*x])^(3/2)*Gamma[1/2, (-2*I)*ArcSin[a*x]] + (Sqrt
[2]*ArcSin[a*x]^2*Gamma[1/2, (2*I)*ArcSin[a*x]])/Sqrt[I*ArcSin[a*x]]))/(3*
a*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2))
```

Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 134, normalized size of antiderivative = 1.03, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.208$, Rules used = {5166, 5142, 3042, 3785, 3833}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{5/2}}\,dx$$

$$\downarrow 5166$$

$$-\frac{4a\sqrt{c-a^2cx^2}\int \frac{x}{\arcsin(ax)^{3/2}}dx}{3\sqrt{1-a^2x^2}} - \frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{3a\arcsin(ax)^{3/2}}$$

$$\downarrow 5142$$

$$-\frac{4a\sqrt{c-a^2cx^2}\left(\frac{2\int \frac{\cos(2\arcsin(ax))}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a^2} - \frac{2x\sqrt{1-a^2x^2}}{a\sqrt{\arcsin(ax)}}\right)}{3\sqrt{1-a^2x^2}} - \frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{3a\arcsin(ax)^{3/2}}$$

$$\downarrow 3042$$

$$-\frac{4a\sqrt{c-a^2cx^2}\left(\frac{2\int \frac{\sin\left(2\arcsin(ax)+\frac{\pi}{2}\right)}{\sqrt{\arcsin(ax)}}d\arcsin(ax)}{a^2} - \frac{2x\sqrt{1-a^2x^2}}{a\sqrt{\arcsin(ax)}}\right)}{3\sqrt{1-a^2x^2}} - \frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{3a\arcsin(ax)^{3/2}}$$

$$\downarrow 3785$$

$$-\frac{4a\sqrt{c-a^2cx^2}\left(\frac{4\int \cos(2\arcsin(ax))d\sqrt{\arcsin(ax)}}{a^2} - \frac{2x\sqrt{1-a^2x^2}}{a\sqrt{\arcsin(ax)}}\right)}{3\sqrt{1-a^2x^2}} - \frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{3a\arcsin(ax)^{3/2}}$$

$$\downarrow 3833$$

$$-\frac{4a\sqrt{c-a^2cx^2}\left(\frac{2\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)}{a^2}-\frac{2x\sqrt{1-a^2x^2}}{a\sqrt{\arcsin(ax)}}\right)}{3\sqrt{1-a^2x^2}}-\frac{2\sqrt{1-a^2x^2}\sqrt{c-a^2cx^2}}{3a\arcsin(ax)^{3/2}}$$

input
```
Int[Sqrt[c - a^2*c*x^2]/ArcSin[a*x]^(5/2),x]
```

output
```
(-2*Sqrt[1 - a^2*x^2]*Sqrt[c - a^2*c*x^2])/(3*a*ArcSin[a*x]^(3/2)) - (4*a*
Sqrt[c - a^2*c*x^2]*((-2*x*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) + (2*S
qrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/a^2))/(3*Sqrt[1 - a^2*x^
2])
```

Defintions of rubi rules used

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 5142
```
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] - Simp
[1/(b^2*c^(m + 1)*(n + 1))   Subst[Int[ExpandTrigReduce[x^(n + 1), Sin[-a/b
 + x/b]^(m - 1)*(m - (m + 1)*Sin[-a/b + x/b]^2), x], x], x, a + b*ArcSin[c*
x]], x] /; FreeQ[{a, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

rule 5166

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((d_) + (e_.)*(x_)^2)^(p_.), x_
Symbol] :> Simp[Sqrt[1 - c^2*x^2]*(d + e*x^2)^p*((a + b*ArcSin[c*x])^(n + 1
)/(b*c*(n + 1))), x] + Simp[c*((2*p + 1)/(b*(n + 1)))*Simp[(d + e*x^2)^p/(1
 - c^2*x^2)^p]   Int[x*(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] && LtQ[n, -1]
```

Maple [F]

$$\int \frac{\sqrt{-a^2 c\, x^2 + c}}{\arcsin\left(ax\right)^{\frac{5}{2}}} dx$$

input

```
int((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(5/2),x)
```

output

```
int((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(5/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{c - a^2 c x^2}}{\arcsin(ax)^{5/2}}\, dx = \text{Exception raised: TypeError}$$

input

```
integrate((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(5/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{5/2}}\,dx = \int \frac{\sqrt{-c\,(ax-1)\,(ax+1)}}{\operatorname{asin}^{\frac{5}{2}}(ax)}\,dx$$

input
```
integrate((-a**2*c*x**2+c)**(1/2)/asin(a*x)**(5/2),x)
```

output
```
Integral(sqrt(-c*(a*x - 1)*(a*x + 1))/asin(a*x)**(5/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{5/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [F]

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{5/2}}\,dx = \int \frac{\sqrt{-a^2cx^2+c}}{\arcsin\left(ax\right)^{\frac{5}{2}}}\,dx$$

input
```
integrate((-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(5/2),x, algorithm="giac")
```

output
```
integrate(sqrt(-a^2*c*x^2 + c)/arcsin(a*x)^(5/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{5/2}}\,dx = \int \frac{\sqrt{c-a^2\,c\,x^2}}{\text{asin}\,(a\,x)^{5/2}}\,dx$$

input
```
int((c - a^2*c*x^2)^(1/2)/asin(a*x)^(5/2),x)
```

output
```
int((c - a^2*c*x^2)^(1/2)/asin(a*x)^(5/2), x)
```

Reduce [F]

$$\int \frac{\sqrt{c-a^2cx^2}}{\arcsin(ax)^{5/2}}\,dx = \sqrt{c}\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin\,(ax)}}{asin\,(ax)^3}dx\right)$$

input
```
int((-a^2*c*x^2+c)^(1/2)/asin(a*x)^(5/2),x)
```

output
```
sqrt(c)*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/asin(a*x)**3,x)
```

3.141 $\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}}\,dx$

Optimal result . . . 1088
Mathematica [A] (verified) . . . 1088
Rubi [A] (verified) . . . 1089
Maple [A] (verified) . . . 1089
Fricas [A] (verification not implemented) . . . 1090
Sympy [F] . . . 1090
Maxima [F(-2)] . . . 1091
Giac [A] (verification not implemented) . . . 1091
Mupad [F(-1)] . . . 1091
Reduce [B] (verification not implemented) . . . 1092

Optimal result

Integrand size = 24, antiderivative size = 44

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}}\,dx = -\frac{2\sqrt{1-a^2x^2}}{3a\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}$$

output
```
-2/3*(-a^2*x^2+1)^(1/2)/a/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(3/2)
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}}\,dx = -\frac{2\sqrt{1-a^2x^2}}{3a\sqrt{c-a^2cx^2}\arcsin(ax)^{3/2}}$$

input
```
Integrate[1/(Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(5/2)),x]
```

output
```
(-2*Sqrt[1 - a^2*x^2])/(3*a*Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(3/2))
```

Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.042$, Rules used = {5152}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\arcsin(ax)^{5/2}\sqrt{c-a^2cx^2}}\,dx$$
$$\downarrow 5152$$
$$-\frac{2\sqrt{1-a^2x^2}}{3a\arcsin(ax)^{3/2}\sqrt{c-a^2cx^2}}$$

input
```
Int[1/(Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(5/2)),x]
```

output
```
(-2*Sqrt[1 - a^2*x^2])/(3*a*Sqrt[c - a^2*c*x^2]*ArcSin[a*x]^(3/2))
```

Defintions of rubi rules used

rule 5152
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(1/(b*c*(n + 1)))*Simp[Sqrt[1 - c^2*x^2]/Sqrt[d + e*x^2]]*(a
 + b*ArcSin[c*x])^(n + 1), x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d
+ e, 0] && NeQ[n, -1]
```

Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 38, normalized size of antiderivative = 0.86

method	result	size
default	$-\frac{2\sqrt{-a^2x^2+1}}{3\arcsin(ax)^{\frac{3}{2}}a\sqrt{-c(a^2x^2-1)}}$	38

input
```
int(1/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(5/2),x,method=_RETURNVERBOSE)
```

output
```
-2/3/arcsin(a*x)^(3/2)/a/(-c*(a^2*x^2-1))^(1/2)*(-a^2*x^2+1)^(1/2)
```

Fricas [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.09

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}}\,dx = \frac{2\sqrt{-a^2cx^2+c}\sqrt{-a^2x^2+1}}{3\left(a^3cx^2-ac\right)\arcsin\left(ax\right)^{\frac{3}{2}}}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(5/2),x, algorithm="fricas")
```

output
```
2/3*sqrt(-a^2*c*x^2 + c)*sqrt(-a^2*x^2 + 1)/((a^3*c*x^2 - a*c)*arcsin(a*x)
^(3/2))
```

Sympy [F]

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}}\,dx = \int \frac{1}{\sqrt{-c\left(ax-1\right)\left(ax+1\right)}\operatorname{asin}^{\frac{5}{2}}\left(ax\right)}\,dx$$

input
```
integrate(1/(-a**2*c*x**2+c)**(1/2)/asin(a*x)**(5/2),x)
```

output
```
Integral(1/(sqrt(-c*(a*x - 1)*(a*x + 1))*asin(a*x)**(5/2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.32

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}}\,dx = -\frac{2}{3\,a\sqrt{c}\arcsin\left(ax\right)^{\frac{3}{2}}}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(1/2)/arcsin(a*x)^(5/2),x, algorithm="giac")
```

output
```
-2/3/(a*sqrt(c)*arcsin(a*x)^(3/2))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}}\,dx = \int \frac{1}{\arcsin\left(a\,x\right)^{5/2}\sqrt{c-a^2\,c\,x^2}}\,dx$$

input
```
int(1/(asin(a*x)^(5/2)*(c - a^2*c*x^2)^(1/2)),x)
```

output
```
int(1/(asin(a*x)^(5/2)*(c - a^2*c*x^2)^(1/2)), x)
```

Reduce [B] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.48

$$\int \frac{1}{\sqrt{c-a^2cx^2}\arcsin(ax)^{5/2}}\,dx = -\frac{2\sqrt{c}\,\sqrt{asin\,(ax)}}{3asin\,(ax)^2\,ac}$$

input
```
int(1/(-a^2*c*x^2+c)^(1/2)/asin(a*x)^(5/2),x)
```

output
```
( - 2*sqrt(c)*sqrt(asin(a*x)))/(3*asin(a*x)**2*a*c)
```

3.142 $\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{5/2}}\,dx$

Optimal result . . . 1093
Mathematica [N/A] . . . 1093
Rubi [N/A] . . . 1094
Maple [N/A] . . . 1094
Fricas [F(-2)] . . . 1095
Sympy [F(-1)] . . . 1095
Maxima [F(-2)] . . . 1095
Giac [N/A] . . . 1096
Mupad [N/A] . . . 1096
Reduce [N/A] . . . 1097

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{5/2}}\,dx = \text{Int}\left(\frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{5/2}},x\right)$$

output
```
Defer(Int)(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(5/2),x)
```

Mathematica [N/A]

Not integrable

Time = 1.90 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{5/2}}\,dx = \int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{5/2}}\,dx$$

input
```
Integrate[1/((c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^(5/2)),x]
```

output
```
Integrate[1/((c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^(5/2)), x]
```

Rubi [N/A]

Not integrable

Time = 0.39 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{3/2}}\,dx$$

$$\downarrow 5166$$

$$\frac{4a\sqrt{1-a^2x^2}\int \frac{x}{\left(1-a^2x^2\right)^2\arcsin(ax)^{3/2}}dx}{3c\sqrt{c-a^2cx^2}} - \frac{2\sqrt{1-a^2x^2}}{3a\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}}$$

$$\downarrow 5234$$

$$\frac{4a\sqrt{1-a^2x^2}\int \frac{x}{\left(1-a^2x^2\right)^2\arcsin(ax)^{3/2}}dx}{3c\sqrt{c-a^2cx^2}} - \frac{2\sqrt{1-a^2x^2}}{3a\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{3/2}}$$

input
```
Int[1/((c - a^2*c*x^2)^(3/2)*ArcSin[a*x]^(5/2)),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{1}{\left(-a^2c\,x^2+c\right)^{\frac{3}{2}}\arcsin\left(ax\right)^{\frac{5}{2}}}dx$$

input
```
int(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(5/2),x)
```

output
```
int(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(5/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{(c-a^2cx^2)^{3/2}\arcsin(ax)^{5/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(5/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{1}{(c-a^2cx^2)^{3/2}\arcsin(ax)^{5/2}}\,dx = \text{Timed out}$$

input
```
integrate(1/(-a**2*c*x**2+c)**(3/2)/asin(a*x)**(5/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{1}{(c-a^2cx^2)^{3/2}\arcsin(ax)^{5/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{(c-a^2cx^2)^{3/2}\arcsin(ax)^{5/2}}\,dx = \int \frac{1}{(-a^2cx^2+c)^{\frac{3}{2}}\arcsin\left(ax\right)^{\frac{5}{2}}}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)^(3/2)/arcsin(a*x)^(5/2),x, algorithm="giac")
```

output
```
integrate(1/((-a^2*c*x^2 + c)^(3/2)*arcsin(a*x)^(5/2)), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{(c-a^2cx^2)^{3/2}\arcsin(ax)^{5/2}}\,dx = \int \frac{1}{\mathrm{asin}\left(a\,x\right)^{5/2}\,\left(c-a^2\,c\,x^2\right)^{3/2}}\,dx$$

input
```
int(1/(asin(a*x)^(5/2)*(c - a^2*c*x^2)^(3/2)),x)
```

output
```
int(1/(asin(a*x)^(5/2)*(c - a^2*c*x^2)^(3/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 61, normalized size of antiderivative = 2.54

$$\int \frac{1}{\left(c-a^2cx^2\right)^{3/2}\arcsin(ax)^{5/2}}\,dx = \frac{\sqrt{c}\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin(ax)}}{asin(ax)^3a^4x^4-2asin(ax)^3a^2x^2+asin(ax)^3}dx\right)}{c^2}$$

input
```
int(1/(-a^2*c*x^2+c)^(3/2)/asin(a*x)^(5/2),x)
```

output
```
(sqrt(c)*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/(asin(a*x)**3*a**4*x
**4 - 2*asin(a*x)**3*a**2*x**2 + asin(a*x)**3),x))/c**2
```

3.143 $\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{5/2}}\,dx$

Optimal result . . . 1098
Mathematica [N/A] . . . 1098
Rubi [N/A] . . . 1099
Maple [N/A] . . . 1099
Fricas [F(-2)] . . . 1100
Sympy [F(-1)] . . . 1100
Maxima [F(-2)] . . . 1100
Giac [N/A] . . . 1101
Mupad [N/A] . . . 1101
Reduce [N/A] . . . 1102

Optimal result

Integrand size = 24, antiderivative size = 24

$$\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{5/2}}\,dx = \text{Int}\left(\frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{5/2}},x\right)$$

output
```
Defer(Int)(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(5/2),x)
```

Mathematica [N/A]

Not integrable

Time = 2.07 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.08

$$\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{5/2}}\,dx = \int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{5/2}}\,dx$$

input
```
Integrate[1/((c - a^2*c*x^2)^(5/2)*ArcSin[a*x]^(5/2)),x]
```

output
```
Integrate[1/((c - a^2*c*x^2)^(5/2)*ArcSin[a*x]^(5/2)), x]
```

Rubi [N/A]

Not integrable

Time = 0.42 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\arcsin(ax)^{5/2}\left(c-a^2cx^2\right)^{5/2}}\,dx$$

$$\downarrow 5166$$

$$\frac{8a\sqrt{1-a^2x^2}\int \frac{x}{\left(1-a^2x^2\right)^3\arcsin(ax)^{3/2}}dx}{3c^2\sqrt{c-a^2cx^2}} - \frac{2\sqrt{1-a^2x^2}}{3a\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{5/2}}$$

$$\downarrow 5234$$

$$\frac{8a\sqrt{1-a^2x^2}\int \frac{x}{\left(1-a^2x^2\right)^3\arcsin(ax)^{3/2}}dx}{3c^2\sqrt{c-a^2cx^2}} - \frac{2\sqrt{1-a^2x^2}}{3a\arcsin(ax)^{3/2}\left(c-a^2cx^2\right)^{5/2}}$$

input
```
Int[1/((c - a^2*c*x^2)^(5/2)*ArcSin[a*x]^(5/2)),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.40 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.83

$$\int \frac{1}{\left(-a^2c\,x^2+c\right)^{\frac{5}{2}}\arcsin\left(ax\right)^{\frac{5}{2}}}dx$$

input
```
int(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(5/2),x)
```

output
```
int(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(5/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\arcsin(ax)^{5/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(5/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\arcsin(ax)^{5/2}}\,dx = \text{Timed out}$$

input
```
integrate(1/(-a**2*c*x**2+c)**(5/2)/asin(a*x)**(5/2),x)
```

output
```
Timed out
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\arcsin(ax)^{5/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: expt: undefined: 0 to a negati
ve exponent.
```

Giac [N/A]

Not integrable

Time = 0.37 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\arcsin(ax)^{5/2}}\,dx = \int \frac{1}{(-a^2cx^2+c)^{\frac{5}{2}}\arcsin(ax)^{\frac{5}{2}}}\,dx$$

input
```
integrate(1/(-a^2*c*x^2+c)^(5/2)/arcsin(a*x)^(5/2),x, algorithm="giac")
```

output
```
integrate(1/((-a^2*c*x^2 + c)^(5/2)*arcsin(a*x)^(5/2)), x)
```

Mupad [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.92

$$\int \frac{1}{(c-a^2cx^2)^{5/2}\arcsin(ax)^{5/2}}\,dx = \int \frac{1}{\operatorname{asin}(a\,x)^{5/2}\,(c-a^2\,c\,x^2)^{5/2}}\,dx$$

input
```
int(1/(asin(a*x)^(5/2)*(c - a^2*c*x^2)^(5/2)),x)
```

output
```
int(1/(asin(a*x)^(5/2)*(c - a^2*c*x^2)^(5/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 78, normalized size of antiderivative = 3.25

$$\int \frac{1}{\left(c-a^2cx^2\right)^{5/2}\arcsin(ax)^{5/2}}\,dx = -\frac{\sqrt{c}\left(\int \frac{\sqrt{-a^2x^2+1}\,\sqrt{asin(ax)}}{asin(ax)^3a^6x^6-3asin(ax)^3a^4x^4+3asin(ax)^3a^2x^2-asin(ax)^3}\,dx\right)}{c^3}$$

input
```
int(1/(-a^2*c*x^2+c)^(5/2)/asin(a*x)^(5/2),x)
```

output
```
( - sqrt(c)*int((sqrt( - a**2*x**2 + 1)*sqrt(asin(a*x)))/(asin(a*x)**3*a**
6*x**6 - 3*asin(a*x)**3*a**4*x**4 + 3*asin(a*x)**3*a**2*x**2 - asin(a*x)**
3),x))/c**3
```

3.144 $\int (d+ex^2)^4 (a+b\arcsin(cx))\,dx$

Optimal result . . . 1103
Mathematica [A] (verified) . . . 1104
Rubi [A] (verified) . . . 1104
Maple [A] (verified) . . . 1106
Fricas [A] (verification not implemented) . . . 1107
Sympy [A] (verification not implemented) . . . 1108
Maxima [A] (verification not implemented) . . . 1109
Giac [B] (verification not implemented) . . . 1110
Mupad [F(-1)] . . . 1110
Reduce [B] (verification not implemented) . . . 1111

Optimal result

Integrand size = 18, antiderivative size = 317

$$\begin{aligned}
&\int (d+ex^2)^4 (a+b\arcsin(cx))\,dx \\
&= \frac{b(315c^8d^4+420c^6d^3e+378c^4d^2e^2+180c^2de^3+35e^4)\sqrt{1-c^2x^2}}{315c^9} \\
&\quad - \frac{4be(105c^6d^3+189c^4d^2e+135c^2de^2+35e^3)(1-c^2x^2)^{3/2}}{945c^9} \\
&\quad + \frac{2be^2(63c^4d^2+90c^2de+35e^2)(1-c^2x^2)^{5/2}}{525c^9} \\
&\quad - \frac{4be^3(9c^2d+7e)(1-c^2x^2)^{7/2}}{441c^9} + \frac{be^4(1-c^2x^2)^{9/2}}{81c^9} \\
&\quad + d^4x(a+b\arcsin(cx)) + \frac{4}{3}d^3ex^3(a+b\arcsin(cx)) + \frac{6}{5}d^2e^2x^5(a+b\arcsin(cx)) + \frac{4}{7}de^3x^7(a+b\arcsin(cx)) +
\end{aligned}$$

output

```
1/315*b*(315*c^8*d^4+420*c^6*d^3*e+378*c^4*d^2*e^2+180*c^2*d*e^3+35*e^4)*(
-c^2*x^2+1)^(1/2)/c^9-4/945*b*e*(105*c^6*d^3+189*c^4*d^2*e+135*c^2*d*e^2+3
5*e^3)*(-c^2*x^2+1)^(3/2)/c^9+2/525*b*e^2*(63*c^4*d^2+90*c^2*d*e+35*e^2)*(
-c^2*x^2+1)^(5/2)/c^9-4/441*b*e^3*(9*c^2*d+7*e)*(-c^2*x^2+1)^(7/2)/c^9+1/8
1*b*e^4*(-c^2*x^2+1)^(9/2)/c^9+d^4*x*(a+b*arcsin(c*x))+4/3*d^3*e*x^3*(a+b*
arcsin(c*x))+6/5*d^2*e^2*x^5*(a+b*arcsin(c*x))+4/7*d*e^3*x^7*(a+b*arcsin(c
*x))+1/9*e^4*x^9*(a+b*arcsin(c*x))
```

Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 260, normalized size of antiderivative = 0.82

$$\int (d+ex^2)^4 (a+b\arcsin(cx))\,dx$$
$$= \frac{315ax(315d^4+420d^3ex^2+378d^2e^2x^4+180de^3x^6+35e^4x^8)+\frac{b\sqrt{1-c^2x^2}(4480e^4+320c^2e^3(81d+7ex^2)+48c^4e^2(1323}{}}{}$$

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

output
```
(315*a*x*(315*d^4 + 420*d^3*e*x^2 + 378*d^2*e^2*x^4 + 180*d*e^3*x^6 + 35*e
^4*x^8) + (b*Sqrt[1 - c^2*x^2]*(4480*e^4 + 320*c^2*e^3*(81*d + 7*e*x^2) +
48*c^4*e^2*(1323*d^2 + 270*d*e*x^2 + 35*e^2*x^4) + 8*c^6*e*(11025*d^3 + 39
69*d^2*e*x^2 + 1215*d*e^2*x^4 + 175*e^3*x^6) + c^8*(99225*d^4 + 44100*d^3*
e*x^2 + 23814*d^2*e^2*x^4 + 8100*d*e^3*x^6 + 1225*e^4*x^8)))/c^9 + 315*b*x
*(315*d^4 + 420*d^3*e*x^2 + 378*d^2*e^2*x^4 + 180*d*e^3*x^6 + 35*e^4*x^8)*
ArcSin[c*x])/99225
```

Rubi [A] (verified)

Time = 0.82 (sec) , antiderivative size = 317, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.278$, Rules used = {5170, 27, 2331, 2389, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^2)^4 (a+b\arcsin(cx))\,dx$$
$$\downarrow 5170$$
$$-bc\int \frac{x\left(35e^4x^8+180de^3x^6+378d^2e^2x^4+420d^3ex^2+315d^4\right)}{315\sqrt{1-c^2x^2}}dx+d^4x(a+b\arcsin(cx))+\frac{4}{3}d^3ex^3(a+b\arcsin(cx))+\frac{6}{5}d^2e^2x^5(a+b\arcsin(cx))+\frac{4}{7}de^3x^7(a+b\arcsin(cx))+\frac{1}{9}e^4x^9(a+b\arcsin(cx))$$
$$\downarrow 27$$

$$-\frac{1}{315}bc\int\frac{x\left(35e^4x^8+180de^3x^6+378d^2e^2x^4+420d^3ex^2+315d^4\right)}{\sqrt{1-c^2x^2}}dx+d^4x(a+b\arcsin(cx))+\frac{4}{3}d^3ex^3(a+b\arcsin(cx))+\frac{6}{5}d^2e^2x^5(a+b\arcsin(cx))+\frac{4}{7}de^3x^7(a+b\arcsin(cx))+\frac{1}{9}e^4x^9(a+b\arcsin(cx))$$

$$\downarrow 2331$$

$$-\frac{1}{630}bc\int\frac{35e^4x^8+180de^3x^6+378d^2e^2x^4+420d^3ex^2+315d^4}{\sqrt{1-c^2x^2}}dx^2+d^4x(a+b\arcsin(cx))+\frac{4}{3}d^3ex^3(a+b\arcsin(cx))+\frac{6}{5}d^2e^2x^5(a+b\arcsin(cx))+\frac{4}{7}de^3x^7(a+b\arcsin(cx))+\frac{1}{9}e^4x^9(a+b\arcsin(cx))$$

$$\downarrow 2389$$

$$-\frac{1}{630}bc\int\left(\frac{35\left(1-c^2x^2\right)^{7/2}e^4}{c^8}-\frac{20\left(9dc^2+7e\right)\left(1-c^2x^2\right)^{5/2}e^3}{c^8}+\frac{6\left(63d^2c^4+90dec^2+35e^2\right)\left(1-c^2x^2\right)^{3/2}e^2}{c^8}\right.$$

$$d^4x(a+b\arcsin(cx))+\frac{4}{3}d^3ex^3(a+b\arcsin(cx))+\frac{6}{5}d^2e^2x^5(a+b\arcsin(cx))+\frac{4}{7}de^3x^7(a+b\arcsin(cx))+\frac{1}{9}e^4x^9(a+b\arcsin(cx))$$

$$\downarrow 2009$$

$$d^4x(a+b\arcsin(cx))+\frac{4}{3}d^3ex^3(a+b\arcsin(cx))+\frac{6}{5}d^2e^2x^5(a+b\arcsin(cx))+\frac{4}{7}de^3x^7(a+b\arcsin(cx))+\frac{1}{9}e^4x^9(a+b\arcsin(cx))-\frac{1}{630}bc\left(\frac{40e^3\left(1-c^2x^2\right)^{7/2}\left(9c^2d+7e\right)}{7c^{10}}-\frac{70e^4\left(1-c^2x^2\right)^{9/2}}{9c^{10}}-\frac{12e^2\left(1-c^2x^2\right)^{5/2}\left(63c^4d^2+90c^2de+35e^2\right)}{5c^{10}}+\frac{8e\right.}$$

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

output
```
-1/630*(b*c*((-2*(315*c^8*d^4 + 420*c^6*d^3*e + 378*c^4*d^2*e^2 + 180*c^2*
d*e^3 + 35*e^4)*Sqrt[1 - c^2*x^2])/c^10 + (8*e*(105*c^6*d^3 + 189*c^4*d^2*
e + 135*c^2*d*e^2 + 35*e^3)*(1 - c^2*x^2)^(3/2))/(3*c^10) - (12*e^2*(63*c^
4*d^2 + 90*c^2*d*e + 35*e^2)*(1 - c^2*x^2)^(5/2))/(5*c^10) + (40*e^3*(9*c^
2*d + 7*e)*(1 - c^2*x^2)^(7/2))/(7*c^10) - (70*e^4*(1 - c^2*x^2)^(9/2))/(9
*c^10))) + d^4*x*(a + b*ArcSin[c*x]) + (4*d^3*e*x^3*(a + b*ArcSin[c*x]))/3
 + (6*d^2*e^2*x^5*(a + b*ArcSin[c*x]))/5 + (4*d*e^3*x^7*(a + b*ArcSin[c*x]
))/7 + (e^4*x^9*(a + b*ArcSin[c*x]))/9
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2331
```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/2   S
ubst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x)^p, x], x, x^2], x] /;
 FreeQ[{a, b, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]
```

rule 2389
```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[ExpandIntegrand
[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p
, 0] || EqQ[n, 1])
```

rule 5170
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])   u, x
] - Simp[b*c   Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && NeQ[c^2*d + e, 0] && (IGtQ[p, 0] || ILtQ[p + 1/2
, 0])
```

Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 440, normalized size of antiderivative = 1.39

method	result
parts	$a\left(\frac{1}{9}e^4x^9+\frac{4}{7}d\,e^3x^7+\frac{6}{5}d^2e^2x^5+\frac{4}{3}d^3e\,x^3+d^4x\right)+\frac{b\left(\frac{c\arcsin(cx)e^4x^9}{9}+\frac{4c\arcsin(cx)d\,e^3x^7}{7}+\frac{6c\arcsin($
derivativedivides	$\frac{a\left(d^4c^9x+\frac{4}{3}d^3c^9e\,x^3+\frac{6}{5}d^2c^9e^2x^5+\frac{4}{7}d\,c^9e^3x^7+\frac{1}{9}e^4c^9x^9\right)}{c^8}+\frac{b\left(\arcsin(cx)d^4c^9x+\frac{4\arcsin(cx)d^3c^9e\,x^3}{3}+\frac{6\arcsin(cx)d^2c^9e^2x^5}{5}+\frac{4}{}\right.}{}$
default	$\frac{a\left(d^4c^9x+\frac{4}{3}d^3c^9e\,x^3+\frac{6}{5}d^2c^9e^2x^5+\frac{4}{7}d\,c^9e^3x^7+\frac{1}{9}e^4c^9x^9\right)}{c^8}+\frac{b\left(\arcsin(cx)d^4c^9x+\frac{4\arcsin(cx)d^3c^9e\,x^3}{3}+\frac{6\arcsin(cx)d^2c^9e^2x^5}{5}+\frac{4}{}\right.}{}$
orering	$\frac{x\left(20825c^{10}e^5x^{10}+132525c^{10}d\,e^4x^8+366282c^{10}d^2e^3x^6+1400c^8e^5x^8+604170c^{10}d^3e^2x^4+12960c^8d\,e^4x^6+1025325c^{10}\right.}{}$

input
```
int((e*x^2+d)^4*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
a*(1/9*e^4*x^9+4/7*d*e^3*x^7+6/5*d^2*e^2*x^5+4/3*d^3*e*x^3+d^4*x)+b/c*(1/9
*c*arcsin(c*x)*e^4*x^9+4/7*c*arcsin(c*x)*d*e^3*x^7+6/5*c*arcsin(c*x)*d^2*e
^2*x^5+4/3*c*arcsin(c*x)*d^3*e*x^3+arcsin(c*x)*d^4*c*x-1/315/c^8*(35*e^4*(
-1/9*c^8*x^8*(-c^2*x^2+1)^(1/2)-8/63*c^6*x^6*(-c^2*x^2+1)^(1/2)-16/105*c^4
*x^4*(-c^2*x^2+1)^(1/2)-64/315*c^2*x^2*(-c^2*x^2+1)^(1/2)-128/315*(-c^2*x^
2+1)^(1/2))-315*d^4*c^8*(-c^2*x^2+1)^(1/2)+180*d*c^2*e^3*(-1/7*c^6*x^6*(-c
^2*x^2+1)^(1/2)-6/35*c^4*x^4*(-c^2*x^2+1)^(1/2)-8/35*c^2*x^2*(-c^2*x^2+1)^
(1/2)-16/35*(-c^2*x^2+1)^(1/2))+378*d^2*c^4*e^2*(-1/5*c^4*x^4*(-c^2*x^2+1)
^(1/2)-4/15*c^2*x^2*(-c^2*x^2+1)^(1/2)-8/15*(-c^2*x^2+1)^(1/2))+420*d^3*c^
6*e*(-1/3*c^2*x^2*(-c^2*x^2+1)^(1/2)-2/3*(-c^2*x^2+1)^(1/2))))
```

Fricas [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 321, normalized size of antiderivative = 1.01

$$\int \left(d+ex^2\right)^4\left(a+b\arcsin(cx)\right)dx$$
$$=\frac{11025\,ac^9e^4x^9+56700\,ac^9de^3x^7+119070\,ac^9d^2e^2x^5+132300\,ac^9d^3ex^3+99225\,ac^9d^4x+315\left(35\,bc^9e^4x\right.}{}$$

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

output

```
1/99225*(11025*a*c^9*e^4*x^9 + 56700*a*c^9*d*e^3*x^7 + 119070*a*c^9*d^2*e^
2*x^5 + 132300*a*c^9*d^3*e*x^3 + 99225*a*c^9*d^4*x + 315*(35*b*c^9*e^4*x^9
 + 180*b*c^9*d*e^3*x^7 + 378*b*c^9*d^2*e^2*x^5 + 420*b*c^9*d^3*e*x^3 + 315
*b*c^9*d^4*x)*arcsin(c*x) + (1225*b*c^8*e^4*x^8 + 99225*b*c^8*d^4 + 88200*
b*c^6*d^3*e + 63504*b*c^4*d^2*e^2 + 25920*b*c^2*d*e^3 + 100*(81*b*c^8*d*e^
3 + 14*b*c^6*e^4)*x^6 + 4480*b*e^4 + 6*(3969*b*c^8*d^2*e^2 + 1620*b*c^6*d*
e^3 + 280*b*c^4*e^4)*x^4 + 4*(11025*b*c^8*d^3*e + 7938*b*c^6*d^2*e^2 + 324
0*b*c^4*d*e^3 + 560*b*c^2*e^4)*x^2)*sqrt(-c^2*x^2 + 1))/c^9
```

Sympy [A] (verification not implemented)

Time = 1.28 (sec) , antiderivative size = 593, normalized size of antiderivative = 1.87

$$\int \left(d+ex^2\right)^4 \left(a+b\arcsin(cx)\right) dx$$

$$= \begin{cases} ad^4x + \frac{4ad^3ex^3}{3} + \frac{6ad^2e^2x^5}{5} + \frac{4ade^3x^7}{7} + \frac{ae^4x^9}{9} + bd^4x\operatorname{asin}(cx) + \frac{4bd^3ex^3\operatorname{asin}(cx)}{3} + \frac{6bd^2e^2x^5\operatorname{asin}(cx)}{5} + \frac{4bde^3x^7\,\text{as}}{7} \\ a\left(d^4x + \frac{4d^3ex^3}{3} + \frac{6d^2e^2x^5}{5} + \frac{4de^3x^7}{7} + \frac{e^4x^9}{9}\right) \end{cases}$$

input

```
integrate((e*x**2+d)**4*(a+b*asin(c*x)),x)
```

output

```
Piecewise((a*d**4*x + 4*a*d**3*e*x**3/3 + 6*a*d**2*e**2*x**5/5 + 4*a*d*e**
3*x**7/7 + a*e**4*x**9/9 + b*d**4*x*asin(c*x) + 4*b*d**3*e*x**3*asin(c*x)/
3 + 6*b*d**2*e**2*x**5*asin(c*x)/5 + 4*b*d*e**3*x**7*asin(c*x)/7 + b*e**4*
x**9*asin(c*x)/9 + b*d**4*sqrt(-c**2*x**2 + 1)/c + 4*b*d**3*e*x**2*sqrt(-c
**2*x**2 + 1)/(9*c) + 6*b*d**2*e**2*x**4*sqrt(-c**2*x**2 + 1)/(25*c) + 4*b
*d*e**3*x**6*sqrt(-c**2*x**2 + 1)/(49*c) + b*e**4*x**8*sqrt(-c**2*x**2 + 1
)/(81*c) + 8*b*d**3*e*sqrt(-c**2*x**2 + 1)/(9*c**3) + 8*b*d**2*e**2*x**2*s
qrt(-c**2*x**2 + 1)/(25*c**3) + 24*b*d*e**3*x**4*sqrt(-c**2*x**2 + 1)/(245
*c**3) + 8*b*e**4*x**6*sqrt(-c**2*x**2 + 1)/(567*c**3) + 16*b*d**2*e**2*sq
rt(-c**2*x**2 + 1)/(25*c**5) + 32*b*d*e**3*x**2*sqrt(-c**2*x**2 + 1)/(245*
c**5) + 16*b*e**4*x**4*sqrt(-c**2*x**2 + 1)/(945*c**5) + 64*b*d*e**3*sqrt(
-c**2*x**2 + 1)/(245*c**7) + 64*b*e**4*x**2*sqrt(-c**2*x**2 + 1)/(2835*c**
7) + 128*b*e**4*sqrt(-c**2*x**2 + 1)/(2835*c**9), Ne(c, 0)), (a*(d**4*x +
4*d**3*e*x**3/3 + 6*d**2*e**2*x**5/5 + 4*d*e**3*x**7/7 + e**4*x**9/9), Tru
e))
```

Maxima [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 424, normalized size of antiderivative = 1.34

$$\int \left(d+ex^2\right)^4 \left(a+b\arcsin(cx)\right) dx = \frac{1}{9}ae^4x^9 + \frac{4}{7}ade^3x^7 + \frac{6}{5}ad^2e^2x^5 + \frac{4}{3}ad^3ex^3$$
$$+ \frac{4}{9}\left(3x^3\arcsin(cx) + c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right)bd^3e$$
$$+ \frac{2}{25}\left(15x^5\arcsin(cx) + \left(\frac{3\sqrt{-c^2x^2+1}x^4}{c^2} + \frac{4\sqrt{-c^2x^2+1}x^2}{c^4} + \frac{8\sqrt{-c^2x^2+1}}{c^6}\right)c\right)bd^2e^2$$
$$+ \frac{4}{245}\left(35x^7\arcsin(cx) + \left(\frac{5\sqrt{-c^2x^2+1}x^6}{c^2} + \frac{6\sqrt{-c^2x^2+1}x^4}{c^4} + \frac{8\sqrt{-c^2x^2+1}x^2}{c^6} + \frac{16\sqrt{-c^2x^2+1}}{c^8}\right.\right.$$
$$+ \frac{1}{2835}\left(315x^9\arcsin(cx) + \left(\frac{35\sqrt{-c^2x^2+1}x^8}{c^2} + \frac{40\sqrt{-c^2x^2+1}x^6}{c^4} + \frac{48\sqrt{-c^2x^2+1}x^4}{c^6} + \frac{64\sqrt{-c^2x}}{c^8}\right.\right.$$
$$+ ad^4x + \frac{\left(cx\arcsin(cx) + \sqrt{-c^2x^2+1}\right)bd^4}{c}$$

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

output
```
1/9*a*e^4*x^9 + 4/7*a*d*e^3*x^7 + 6/5*a*d^2*e^2*x^5 + 4/3*a*d^3*e*x^3 + 4/
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*d^3*e + 2/25*(15*x^5*arcsin(c*x) + (3*sqrt(-c^2*x^2 + 1)*x^4/c^2
 + 4*sqrt(-c^2*x^2 + 1)*x^2/c^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c)*b*d^2*e^2 +
 4/245*(35*x^7*arcsin(c*x) + (5*sqrt(-c^2*x^2 + 1)*x^6/c^2 + 6*sqrt(-c^2*x
^2 + 1)*x^4/c^4 + 8*sqrt(-c^2*x^2 + 1)*x^2/c^6 + 16*sqrt(-c^2*x^2 + 1)/c^8
)*c)*b*d*e^3 + 1/2835*(315*x^9*arcsin(c*x) + (35*sqrt(-c^2*x^2 + 1)*x^8/c^
2 + 40*sqrt(-c^2*x^2 + 1)*x^6/c^4 + 48*sqrt(-c^2*x^2 + 1)*x^4/c^6 + 64*sqr
t(-c^2*x^2 + 1)*x^2/c^8 + 128*sqrt(-c^2*x^2 + 1)/c^10)*c)*b*e^4 + a*d^4*x
+ (c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))*b*d^4/c
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 766 vs. $2(289) = 578$.

Time = 0.14 (sec) , antiderivative size = 766, normalized size of antiderivative = 2.42

$$\int (d+ex^2)^4 (a+b\arcsin(cx))\,dx = \text{Too large to display}$$

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

output
```
1/9*a*e^4*x^9 + 4/7*a*d*e^3*x^7 + 6/5*a*d^2*e^2*x^5 + 4/3*a*d^3*e*x^3 + b*
d^4*x*arcsin(c*x) + a*d^4*x + 4/3*(c^2*x^2 - 1)*b*d^3*e*x*arcsin(c*x)/c^2
+ 4/3*b*d^3*e*x*arcsin(c*x)/c^2 + 6/5*(c^2*x^2 - 1)^2*b*d^2*e^2*x*arcsin(c
*x)/c^4 + sqrt(-c^2*x^2 + 1)*b*d^4/c + 12/5*(c^2*x^2 - 1)*b*d^2*e^2*x*arcs
in(c*x)/c^4 + 4/7*(c^2*x^2 - 1)^3*b*d*e^3*x*arcsin(c*x)/c^6 - 4/9*(-c^2*x^
2 + 1)^(3/2)*b*d^3*e/c^3 + 6/5*b*d^2*e^2*x*arcsin(c*x)/c^4 + 12/7*(c^2*x^2
 - 1)^2*b*d*e^3*x*arcsin(c*x)/c^6 + 1/9*(c^2*x^2 - 1)^4*b*e^4*x*arcsin(c*x
)/c^8 + 4/3*sqrt(-c^2*x^2 + 1)*b*d^3*e/c^3 + 6/25*(c^2*x^2 - 1)^2*sqrt(-c^
2*x^2 + 1)*b*d^2*e^2/c^5 + 12/7*(c^2*x^2 - 1)*b*d*e^3*x*arcsin(c*x)/c^6 +
4/9*(c^2*x^2 - 1)^3*b*e^4*x*arcsin(c*x)/c^8 - 4/5*(-c^2*x^2 + 1)^(3/2)*b*d
^2*e^2/c^5 + 4/49*(c^2*x^2 - 1)^3*sqrt(-c^2*x^2 + 1)*b*d*e^3/c^7 + 4/7*b*d
*e^3*x*arcsin(c*x)/c^6 + 2/3*(c^2*x^2 - 1)^2*b*e^4*x*arcsin(c*x)/c^8 + 6/5
*sqrt(-c^2*x^2 + 1)*b*d^2*e^2/c^5 + 12/35*(c^2*x^2 - 1)^2*sqrt(-c^2*x^2 +
1)*b*d*e^3/c^7 + 1/81*(c^2*x^2 - 1)^4*sqrt(-c^2*x^2 + 1)*b*e^4/c^9 + 4/9*(
c^2*x^2 - 1)*b*e^4*x*arcsin(c*x)/c^8 - 4/7*(-c^2*x^2 + 1)^(3/2)*b*d*e^3/c^
7 + 4/63*(c^2*x^2 - 1)^3*sqrt(-c^2*x^2 + 1)*b*e^4/c^9 + 1/9*b*e^4*x*arcsin
(c*x)/c^8 + 4/7*sqrt(-c^2*x^2 + 1)*b*d*e^3/c^7 + 2/15*(c^2*x^2 - 1)^2*sqrt
(-c^2*x^2 + 1)*b*e^4/c^9 - 4/27*(-c^2*x^2 + 1)^(3/2)*b*e^4/c^9 + 1/9*sqrt(
-c^2*x^2 + 1)*b*e^4/c^9
```

Mupad [F(-1)]

Timed out.

$$\int (d+ex^2)^4 (a+b\arcsin(cx))\,dx = \int (a+b\,\mathrm{asin}(c\,x))\,\left(e\,x^2+d\right)^4\,dx$$

input
```
int((a + b*asin(c*x))*(d + e*x^2)^4,x)
```

output
```
int((a + b*asin(c*x))*(d + e*x^2)^4, x)
```

Reduce [B] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 494, normalized size of antiderivative = 1.56

$$\int \left(d+ex^2\right)^4 \left(a+b\arcsin(cx)\right) dx$$
$$= \frac{99225\sqrt{-c^2x^2+1}\, b\, c^8 d^4 + 99225 a\, c^9 d^4 x + 11025 a\, c^9 e^4 x^9 + 132300 asin(cx)\, b\, c^9 d^3 e\, x^3 + 119070 asin(cx)}$$

input
```
int((e*x^2+d)^4*(a+b*asin(c*x)),x)
```

output
```
(99225*asin(c*x)*b*c**9*d**4*x + 132300*asin(c*x)*b*c**9*d**3*e*x**3 + 119
070*asin(c*x)*b*c**9*d**2*e**2*x**5 + 56700*asin(c*x)*b*c**9*d*e**3*x**7 +
 11025*asin(c*x)*b*c**9*e**4*x**9 + 99225*sqrt( - c**2*x**2 + 1)*b*c**8*d*
*4 + 44100*sqrt( - c**2*x**2 + 1)*b*c**8*d**3*e*x**2 + 23814*sqrt( - c**2*
x**2 + 1)*b*c**8*d**2*e**2*x**4 + 8100*sqrt( - c**2*x**2 + 1)*b*c**8*d*e**
3*x**6 + 1225*sqrt( - c**2*x**2 + 1)*b*c**8*e**4*x**8 + 88200*sqrt( - c**2
*x**2 + 1)*b*c**6*d**3*e + 31752*sqrt( - c**2*x**2 + 1)*b*c**6*d**2*e**2*x
**2 + 9720*sqrt( - c**2*x**2 + 1)*b*c**6*d*e**3*x**4 + 1400*sqrt( - c**2*x
**2 + 1)*b*c**6*e**4*x**6 + 63504*sqrt( - c**2*x**2 + 1)*b*c**4*d**2*e**2
+ 12960*sqrt( - c**2*x**2 + 1)*b*c**4*d*e**3*x**2 + 1680*sqrt( - c**2*x**2
 + 1)*b*c**4*e**4*x**4 + 25920*sqrt( - c**2*x**2 + 1)*b*c**2*d*e**3 + 2240
*sqrt( - c**2*x**2 + 1)*b*c**2*e**4*x**2 + 4480*sqrt( - c**2*x**2 + 1)*b*e
**4 + 99225*a*c**9*d**4*x + 132300*a*c**9*d**3*e*x**3 + 119070*a*c**9*d**2
*e**2*x**5 + 56700*a*c**9*d*e**3*x**7 + 11025*a*c**9*e**4*x**9)/(99225*c**
9)
```

3.145 $\int (d+ex^2)^3 (a+b\arcsin(cx))\,dx$

Optimal result 1112
Mathematica [A] (verified) 1113
Rubi [A] (verified) 1113
Maple [A] (verified) 1115
Fricas [A] (verification not implemented) 1116
Sympy [A] (verification not implemented) 1117
Maxima [A] (verification not implemented) 1118
Giac [B] (verification not implemented) 1119
Mupad [F(-1)] 1120
Reduce [B] (verification not implemented) 1120

Optimal result

Integrand size = 18, antiderivative size = 225

$$\int (d+ex^2)^3 (a+b\arcsin(cx))\,dx = \frac{b(35c^6d^3+35c^4d^2e+21c^2de^2+5e^3)\sqrt{1-c^2x^2}}{35c^7}$$
$$-\frac{be(35c^4d^2+42c^2de+15e^2)(1-c^2x^2)^{3/2}}{105c^7}$$
$$+\frac{3be^2(7c^2d+5e)(1-c^2x^2)^{5/2}}{175c^7}-\frac{be^3(1-c^2x^2)^{7/2}}{49c^7}$$
$$+d^3x(a+b\arcsin(cx))+d^2ex^3(a+b\arcsin(cx))+\frac{3}{5}de^2x^5(a+b\arcsin(cx))+\frac{1}{7}e^3x^7(a+b\arcsin(cx))$$

output

```
1/35*b*(35*c^6*d^3+35*c^4*d^2*e+21*c^2*d*e^2+5*e^3)*(-c^2*x^2+1)^(1/2)/c^7
-1/105*b*e*(35*c^4*d^2+42*c^2*d*e+15*e^2)*(-c^2*x^2+1)^(3/2)/c^7+3/175*b*e
^2*(7*c^2*d+5*e)*(-c^2*x^2+1)^(5/2)/c^7-1/49*b*e^3*(-c^2*x^2+1)^(7/2)/c^7+
d^3*x*(a+b*arcsin(c*x))+d^2*e*x^3*(a+b*arcsin(c*x))+3/5*d*e^2*x^5*(a+b*arc
sin(c*x))+1/7*e^3*x^7*(a+b*arcsin(c*x))
```

Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 187, normalized size of antiderivative = 0.83

$$\int \left(d+ex^2\right)^3 (a+b\arcsin(cx))\,dx$$
$$= \frac{105ax(35d^3+35d^2ex^2+21de^2x^4+5e^3x^6)+\frac{b\sqrt{1-c^2x^2}\left(240e^3+24c^2e^2(49d+5ex^2)+2c^4e(1225d^2+294dex^2+45e^2x^4)+c^6(3\right.}{c^7}}{3675}$$

input
```
Integrate[(d + e*x^2)^3*(a + b*ArcSin[c*x]),x]
```

output
```
(105*a*x*(35*d^3 + 35*d^2*e*x^2 + 21*d*e^2*x^4 + 5*e^3*x^6) + (b*Sqrt[1 -
c^2*x^2]*(240*e^3 + 24*c^2*e^2*(49*d + 5*e*x^2) + 2*c^4*e*(1225*d^2 + 294*
d*e*x^2 + 45*e^2*x^4) + c^6*(3675*d^3 + 1225*d^2*e*x^2 + 441*d*e^2*x^4 + 7
5*e^3*x^6)))/c^7 + 105*b*x*(35*d^3 + 35*d^2*e*x^2 + 21*d*e^2*x^4 + 5*e^3*x
^6)*ArcSin[c*x])/3675
```

Rubi [A] (verified)

Time = 0.68 (sec) , antiderivative size = 226, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.278$, Rules used = {5170, 27, 2331, 2389, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)^3 (a+b\arcsin(cx))\,dx$$
$$\downarrow 5170$$
$$-bc\int \frac{x\left(5e^3x^6+21de^2x^4+35d^2ex^2+35d^3\right)}{35\sqrt{1-c^2x^2}}dx + d^3x(a+b\arcsin(cx)) + d^2ex^3(a+b\arcsin(cx)) + \frac{3}{5}de^2x^5(a+b\arcsin(cx)) + \frac{1}{7}e^3x^7(a+b\arcsin(cx))$$
$$\downarrow 27$$

$$-\frac{1}{35}bc\int\frac{x\left(5e^3x^6+21de^2x^4+35d^2ex^2+35d^3\right)}{\sqrt{1-c^2x^2}}dx+d^3x(a+b\arcsin(cx))+d^2ex^3(a+b\arcsin(cx))+\frac{3}{5}de^2x^5(a+b\arcsin(cx))+\frac{1}{7}e^3x^7(a+b\arcsin(cx))$$

$$\downarrow 2331$$

$$-\frac{1}{70}bc\int\frac{5e^3x^6+21de^2x^4+35d^2ex^2+35d^3}{\sqrt{1-c^2x^2}}dx^2+d^3x(a+b\arcsin(cx))+d^2ex^3(a+b\arcsin(cx))+\frac{3}{5}de^2x^5(a+b\arcsin(cx))+\frac{1}{7}e^3x^7(a+b\arcsin(cx))$$

$$\downarrow 2389$$

$$-\frac{1}{70}bc\int\left(-\frac{5\left(1-c^2x^2\right)^{5/2}e^3}{c^6}+\frac{3\left(7dc^2+5e\right)\left(1-c^2x^2\right)^{3/2}e^2}{c^6}-\frac{\left(35d^2c^4+42dec^2+15e^2\right)\sqrt{1-c^2x^2}e}{c^6}+\frac{35d^3$$

$$d^3x(a+b\arcsin(cx))+d^2ex^3(a+b\arcsin(cx))+\frac{3}{5}de^2x^5(a+b\arcsin(cx))+\frac{1}{7}e^3x^7(a+b\arcsin(cx))$$

$$\downarrow 2009$$

$$d^3x(a+b\arcsin(cx))+d^2ex^3(a+b\arcsin(cx))+\frac{3}{5}de^2x^5(a+b\arcsin(cx))+\frac{1}{7}e^3x^7(a+b\arcsin(cx))-\frac{1}{70}bc\left(-\frac{6e^2\left(1-c^2x^2\right)^{5/2}\left(7c^2d+5e\right)}{5c^8}+\frac{10e^3\left(1-c^2x^2\right)^{7/2}}{7c^8}+\frac{2e\left(1-c^2x^2\right)^{3/2}\left(35c^4d^2+42c^2de+15e^2\right)}{3c^8}-\frac{2\sqrt{1}}{}\right.$$

input

```
Int[(d + e*x^2)^3*(a + b*ArcSin[c*x]),x]
```

output

```
-1/70*(b*c*((-2*(35*c^6*d^3 + 35*c^4*d^2*e + 21*c^2*d*e^2 + 5*e^3)*Sqrt[1
- c^2*x^2])/c^8 + (2*e*(35*c^4*d^2 + 42*c^2*d*e + 15*e^2)*(1 - c^2*x^2)^(3
/2))/(3*c^8) - (6*e^2*(7*c^2*d + 5*e)*(1 - c^2*x^2)^(5/2))/(5*c^8) + (10*e
^3*(1 - c^2*x^2)^(7/2))/(7*c^8))) + d^3*x*(a + b*ArcSin[c*x]) + d^2*e*x^3*
(a + b*ArcSin[c*x]) + (3*d*e^2*x^5*(a + b*ArcSin[c*x]))/5 + (e^3*x^7*(a +
b*ArcSin[c*x]))/7
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2331
```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/2   S
ubst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x)^p, x], x, x^2], x] /;
 FreeQ[{a, b, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]
```

rule 2389
```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[ExpandIntegrand
[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p
, 0] || EqQ[n, 1])
```

rule 5170
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])   u, x
] - Simp[b*c   Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && NeQ[c^2*d + e, 0] && (IGtQ[p, 0] || ILtQ[p + 1/2
, 0])
```

Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 305, normalized size of antiderivative = 1.36

method	result
parts	$a\left(\frac{1}{7}e^3x^7+\frac{3}{5}d\,e^2x^5+d^2e\,x^3+d^3x\right)+\frac{b\left(\frac{c\arcsin(cx)e^3x^7}{7}+\frac{3c\arcsin(cx)d\,e^2x^5}{5}+c\arcsin(cx)d^2e\,x^3+\arcsin$
derivativedivides	$\frac{a\left(d^3c^7x+d^2c^7e\,x^3+\frac{3}{5}d\,c^7e^2x^5+\frac{1}{7}e^3c^7x^7\right)}{c^6}+\frac{b\left(\arcsin(cx)d^3c^7x+\arcsin(cx)d^2c^7e\,x^3+\frac{3\arcsin(cx)d\,c^7e^2x^5}{5}+\frac{\arcsin(cx)e^3c^7x^7}{7}-\right.}{}$
default	$\frac{a\left(d^3c^7x+d^2c^7e\,x^3+\frac{3}{5}d\,c^7e^2x^5+\frac{1}{7}e^3c^7x^7\right)}{c^6}+\frac{b\left(\arcsin(cx)d^3c^7x+\arcsin(cx)d^2c^7e\,x^3+\frac{3\arcsin(cx)d\,c^7e^2x^5}{5}+\frac{\arcsin(cx)e^3c^7x^7}{7}-\right.}{}$
orering	$\frac{x\left(325e^4x^8c^8+1792c^8d\,e^3x^6+4410c^8d^2e^2x^4+30c^6e^4x^6+9800c^8d^3e\,x^2+294c^6d\,e^3x^4+1225c^8d^4+2450c^6d^2e^2x^2+60c^4\right.}{1225(e\,x^2+d)c^8}$

input
```
int((e*x^2+d)^3*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
a*(1/7*e^3*x^7+3/5*d*e^2*x^5+d^2*e*x^3+d^3*x)+b/c*(1/7*c*arcsin(c*x)*e^3*x
^7+3/5*c*arcsin(c*x)*d*e^2*x^5+c*arcsin(c*x)*d^2*e*x^3+arcsin(c*x)*d^3*c*x
-1/35/c^6*(5*e^3*(-1/7*c^6*x^6*(-c^2*x^2+1)^(1/2)-6/35*c^4*x^4*(-c^2*x^2+1
)^(1/2)-8/35*c^2*x^2*(-c^2*x^2+1)^(1/2)-16/35*(-c^2*x^2+1)^(1/2))-35*d^3*c
^6*(-c^2*x^2+1)^(1/2)+21*d*c^2*e^2*(-1/5*c^4*x^4*(-c^2*x^2+1)^(1/2)-4/15*c
^2*x^2*(-c^2*x^2+1)^(1/2)-8/15*(-c^2*x^2+1)^(1/2))+35*d^2*c^4*e*(-1/3*c^2*
x^2*(-c^2*x^2+1)^(1/2)-2/3*(-c^2*x^2+1)^(1/2))))
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 229, normalized size of antiderivative = 1.02

$$\int \left(d+ex^2\right)^3\left(a+b\arcsin(cx)\right)dx$$
$$=\frac{525\,ac^7e^3x^7+2205\,ac^7de^2x^5+3675\,ac^7d^2ex^3+3675\,ac^7d^3x+105\left(5\,bc^7e^3x^7+21\,bc^7de^2x^5+35\,bc^7d^2ex\right.}{}$$

input
```
integrate((e*x^2+d)^3*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output

```
1/3675*(525*a*c^7*e^3*x^7 + 2205*a*c^7*d*e^2*x^5 + 3675*a*c^7*d^2*e*x^3 +
3675*a*c^7*d^3*x + 105*(5*b*c^7*e^3*x^7 + 21*b*c^7*d*e^2*x^5 + 35*b*c^7*d^
2*e*x^3 + 35*b*c^7*d^3*x)*arcsin(c*x) + (75*b*c^6*e^3*x^6 + 3675*b*c^6*d^3
 + 2450*b*c^4*d^2*e + 1176*b*c^2*d*e^2 + 9*(49*b*c^6*d*e^2 + 10*b*c^4*e^3)
*x^4 + 240*b*e^3 + (1225*b*c^6*d^2*e + 588*b*c^4*d*e^2 + 120*b*c^2*e^3)*x^
2)*sqrt(-c^2*x^2 + 1))/c^7
```

Sympy [A] (verification not implemented)

Time = 0.75 (sec) , antiderivative size = 389, normalized size of antiderivative = 1.73

$$\int \left(d+ex^2\right)^3 \left(a+b\arcsin(cx)\right) dx$$

$$= \begin{cases} ad^3x + ad^2ex^3 + \frac{3ade^2x^5}{5} + \frac{ae^3x^7}{7} + bd^3x\operatorname{asin}(cx) + bd^2ex^3\operatorname{asin}(cx) + \frac{3bde^2x^5\operatorname{asin}(cx)}{5} + \frac{be^3x^7\operatorname{asin}(cx)}{7} + \frac{bd} \\ a\left(d^3x + d^2ex^3 + \frac{3de^2x^5}{5} + \frac{e^3x^7}{7}\right) \end{cases}$$

input

```
integrate((e*x**2+d)**3*(a+b*asin(c*x)),x)
```

output

```
Piecewise((a*d**3*x + a*d**2*e*x**3 + 3*a*d*e**2*x**5/5 + a*e**3*x**7/7 +
b*d**3*x*asin(c*x) + b*d**2*e*x**3*asin(c*x) + 3*b*d*e**2*x**5*asin(c*x)/5
 + b*e**3*x**7*asin(c*x)/7 + b*d**3*sqrt(-c**2*x**2 + 1)/c + b*d**2*e*x**2
*sqrt(-c**2*x**2 + 1)/(3*c) + 3*b*d*e**2*x**4*sqrt(-c**2*x**2 + 1)/(25*c)
+ b*e**3*x**6*sqrt(-c**2*x**2 + 1)/(49*c) + 2*b*d**2*e*sqrt(-c**2*x**2 + 1
)/(3*c**3) + 4*b*d*e**2*x**2*sqrt(-c**2*x**2 + 1)/(25*c**3) + 6*b*e**3*x**
4*sqrt(-c**2*x**2 + 1)/(245*c**3) + 8*b*d*e**2*sqrt(-c**2*x**2 + 1)/(25*c*
*5) + 8*b*e**3*x**2*sqrt(-c**2*x**2 + 1)/(245*c**5) + 16*b*e**3*sqrt(-c**2
*x**2 + 1)/(245*c**7), Ne(c, 0)), (a*(d**3*x + d**2*e*x**3 + 3*d*e**2*x**5
/5 + e**3*x**7/7), True))
```

Maxima [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 292, normalized size of antiderivative = 1.30

$$\int \left(d+ex^2\right)^3 \left(a+b\arcsin(cx)\right) dx = \frac{1}{7}ae^3x^7 + \frac{3}{5}ade^2x^5 + ad^2ex^3$$
$$+\frac{1}{3}\left(3\,x^3\arcsin\left(cx\right)+c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2}+\frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right)bd^2e$$
$$+\frac{1}{25}\left(15\,x^5\arcsin\left(cx\right)+\left(\frac{3\sqrt{-c^2x^2+1}x^4}{c^2}+\frac{4\sqrt{-c^2x^2+1}x^2}{c^4}+\frac{8\sqrt{-c^2x^2+1}}{c^6}\right)c\right)bde^2$$
$$+\frac{1}{245}\left(35\,x^7\arcsin\left(cx\right)+\left(\frac{5\sqrt{-c^2x^2+1}x^6}{c^2}+\frac{6\sqrt{-c^2x^2+1}x^4}{c^4}+\frac{8\sqrt{-c^2x^2+1}x^2}{c^6}+\frac{16\sqrt{-c^2x^2+1}}{c^8}\right.\right.$$
$$+ad^3x+\frac{\left(cx\arcsin\left(cx\right)+\sqrt{-c^2x^2+1}\right)bd^3}{c}$$

input
```
integrate((e*x^2+d)^3*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
1/7*a*e^3*x^7 + 3/5*a*d*e^2*x^5 + a*d^2*e*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))*b*d^2*e + 1/25*(
15*x^5*arcsin(c*x) + (3*sqrt(-c^2*x^2 + 1)*x^4/c^2 + 4*sqrt(-c^2*x^2 + 1)*
x^2/c^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c)*b*d*e^2 + 1/245*(35*x^7*arcsin(c*x)
 + (5*sqrt(-c^2*x^2 + 1)*x^6/c^2 + 6*sqrt(-c^2*x^2 + 1)*x^4/c^4 + 8*sqrt(-
c^2*x^2 + 1)*x^2/c^6 + 16*sqrt(-c^2*x^2 + 1)/c^8)*c)*b*e^3 + a*d^3*x + (c*
x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))*b*d^3/c
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 480 vs. 2(205) = 410.

Time = 0.13 (sec) , antiderivative size = 480, normalized size of antiderivative = 2.13

$$\begin{aligned}\int \left(d+ex^2\right)^3 \left(a+b\arcsin(cx)\right) dx &= \frac{1}{7}ae^3x^7+\frac{3}{5}ade^2x^5+ad^2ex^3+bd^3x\arcsin(cx)+ad^3x \\ &+\frac{(c^2x^2-1)bd^2ex\arcsin(cx)}{c^2}+\frac{bd^2ex\arcsin(cx)}{c^2} \\ &+\frac{3\left(c^2x^2-1\right)^2bde^2x\arcsin(cx)}{5c^4} \\ &+\frac{\sqrt{-c^2x^2+1}bd^3}{c}+\frac{6\left(c^2x^2-1\right)bde^2x\arcsin(cx)}{5c^4} \\ &+\frac{\left(c^2x^2-1\right)^3be^3x\arcsin(cx)}{7c^6} \\ &-\frac{\left(-c^2x^2+1\right)^{\frac{3}{2}}bd^2e}{3c^3}+\frac{3bde^2x\arcsin(cx)}{5c^4} \\ &+\frac{3\left(c^2x^2-1\right)^2be^3x\arcsin(cx)}{7c^6}+\frac{\sqrt{-c^2x^2+1}bd^2e}{c^3} \\ &+\frac{3\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}bde^2}{25c^5} \\ &+\frac{3\left(c^2x^2-1\right)be^3x\arcsin(cx)}{7c^6} \\ &-\frac{2\left(-c^2x^2+1\right)^{\frac{3}{2}}bde^2}{5c^5} \\ &+\frac{\left(c^2x^2-1\right)^3\sqrt{-c^2x^2+1}be^3}{49c^7} \\ &+\frac{be^3x\arcsin(cx)}{7c^6}+\frac{3\sqrt{-c^2x^2+1}bde^2}{5c^5} \\ &+\frac{3\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}be^3}{35c^7} \\ &-\frac{\left(-c^2x^2+1\right)^{\frac{3}{2}}be^3}{7c^7}+\frac{\sqrt{-c^2x^2+1}be^3}{7c^7}\end{aligned}$$

input

```
integrate((e*x^2+d)^3*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
1/7*a*e^3*x^7 + 3/5*a*d*e^2*x^5 + a*d^2*e*x^3 + b*d^3*x*arcsin(c*x) + a*d^
3*x + (c^2*x^2 - 1)*b*d^2*e*x*arcsin(c*x)/c^2 + b*d^2*e*x*arcsin(c*x)/c^2
+ 3/5*(c^2*x^2 - 1)^2*b*d*e^2*x*arcsin(c*x)/c^4 + sqrt(-c^2*x^2 + 1)*b*d^3
/c + 6/5*(c^2*x^2 - 1)*b*d*e^2*x*arcsin(c*x)/c^4 + 1/7*(c^2*x^2 - 1)^3*b*e
^3*x*arcsin(c*x)/c^6 - 1/3*(-c^2*x^2 + 1)^(3/2)*b*d^2*e/c^3 + 3/5*b*d*e^2*
x*arcsin(c*x)/c^4 + 3/7*(c^2*x^2 - 1)^2*b*e^3*x*arcsin(c*x)/c^6 + sqrt(-c^
2*x^2 + 1)*b*d^2*e/c^3 + 3/25*(c^2*x^2 - 1)^2*sqrt(-c^2*x^2 + 1)*b*d*e^2/c
^5 + 3/7*(c^2*x^2 - 1)*b*e^3*x*arcsin(c*x)/c^6 - 2/5*(-c^2*x^2 + 1)^(3/2)*
b*d*e^2/c^5 + 1/49*(c^2*x^2 - 1)^3*sqrt(-c^2*x^2 + 1)*b*e^3/c^7 + 1/7*b*e^
3*x*arcsin(c*x)/c^6 + 3/5*sqrt(-c^2*x^2 + 1)*b*d*e^2/c^5 + 3/35*(c^2*x^2 -
 1)^2*sqrt(-c^2*x^2 + 1)*b*e^3/c^7 - 1/7*(-c^2*x^2 + 1)^(3/2)*b*e^3/c^7 +
1/7*sqrt(-c^2*x^2 + 1)*b*e^3/c^7
```

Mupad [F(-1)]

Timed out.

$$\int (d+ex^2)^3\,(a+b\arcsin(cx))\,dx = \int (a+b\,\mathrm{asin}(c\,x))\,\left(e\,x^2+d\right)^3\,dx$$

input
```
int((a + b*asin(c*x))*(d + e*x^2)^3,x)
```

output
```
int((a + b*asin(c*x))*(d + e*x^2)^3, x)
```

Reduce [B] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 338, normalized size of antiderivative = 1.50

$$\int (d+ex^2)^3\,(a+b\arcsin(cx))\,dx$$
$$= \frac{3675\,asin(cx)\,b\,c^7d^3x + 3675\,asin(cx)\,b\,c^7d^2e\,x^3 + 2205\,asin(cx)\,b\,c^7d\,e^2x^5 + 525\,asin(cx)\,b\,c^7e^3x^7 + 3675}{}$$

input
```
int((e*x^2+d)^3*(a+b*asin(c*x)),x)
```

output

```
(3675*asin(c*x)*b*c**7*d**3*x + 3675*asin(c*x)*b*c**7*d**2*e*x**3 + 2205*a
sin(c*x)*b*c**7*d*e**2*x**5 + 525*asin(c*x)*b*c**7*e**3*x**7 + 3675*sqrt(
- c**2*x**2 + 1)*b*c**6*d**3 + 1225*sqrt( - c**2*x**2 + 1)*b*c**6*d**2*e*x
**2 + 441*sqrt( - c**2*x**2 + 1)*b*c**6*d*e**2*x**4 + 75*sqrt( - c**2*x**2
 + 1)*b*c**6*e**3*x**6 + 2450*sqrt( - c**2*x**2 + 1)*b*c**4*d**2*e + 588*s
qrt( - c**2*x**2 + 1)*b*c**4*d*e**2*x**2 + 90*sqrt( - c**2*x**2 + 1)*b*c**
4*e**3*x**4 + 1176*sqrt( - c**2*x**2 + 1)*b*c**2*d*e**2 + 120*sqrt( - c**2
*x**2 + 1)*b*c**2*e**3*x**2 + 240*sqrt( - c**2*x**2 + 1)*b*e**3 + 3675*a*c
**7*d**3*x + 3675*a*c**7*d**2*e*x**3 + 2205*a*c**7*d*e**2*x**5 + 525*a*c**
7*e**3*x**7)/(3675*c**7)
```

3.146 $\int (d+ex^2)^2 (a+b\arcsin(cx))\,dx$

Optimal result . . . 1122
Mathematica [A] (verified) . . . 1123
Rubi [A] (verified) . . . 1123
Maple [A] (verified) . . . 1125
Fricas [A] (verification not implemented) . . . 1126
Sympy [A] (verification not implemented) . . . 1127
Maxima [A] (verification not implemented) . . . 1127
Giac [A] (verification not implemented) . . . 1128
Mupad [F(-1)] . . . 1129
Reduce [B] (verification not implemented) . . . 1129

Optimal result

Integrand size = 18, antiderivative size = 150

$$\begin{aligned}\int (d+ex^2)^2 (a+b\arcsin(cx))\,dx = &\frac{b(15c^4d^2+10c^2de+3e^2)\sqrt{1-c^2x^2}}{15c^5}\\ &-\frac{2be(5c^2d+3e)\left(1-c^2x^2\right)^{3/2}}{45c^5}\\ &+\frac{be^2(1-c^2x^2)^{5/2}}{25c^5}+d^2x(a+b\arcsin(cx))\\ &+\frac{2}{3}dex^3(a+b\arcsin(cx))+\frac{1}{5}e^2x^5(a+b\arcsin(cx))\end{aligned}$$

output

```
1/15*b*(15*c^4*d^2+10*c^2*d*e+3*e^2)*(-c^2*x^2+1)^(1/2)/c^5-2/45*b*e*(5*c^
2*d+3*e)*(-c^2*x^2+1)^(3/2)/c^5+1/25*b*e^2*(-c^2*x^2+1)^(5/2)/c^5+d^2*x*(a
+b*arcsin(c*x))+2/3*d*e*x^3*(a+b*arcsin(c*x))+1/5*e^2*x^5*(a+b*arcsin(c*x)
)
```

Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.83

$$\int \left(d+ex^2\right)^2 (a+b\arcsin(cx))\,dx$$
$$= \frac{1}{225}\left(15ax\left(15d^2+10dex^2+3e^2x^4\right)\right.$$
$$+\frac{b\sqrt{1-c^2x^2}\left(24e^2+4c^2e(25d+3ex^2)+c^4(225d^2+50dex^2+9e^2x^4)\right)}{c^5}$$
$$\left.+15bx\left(15d^2+10dex^2+3e^2x^4\right)\arcsin(cx)\right)$$

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

output
```
(15*a*x*(15*d^2 + 10*d*e*x^2 + 3*e^2*x^4) + (b*Sqrt[1 - c^2*x^2]*(24*e^2 +
 4*c^2*e*(25*d + 3*e*x^2) + c^4*(225*d^2 + 50*d*e*x^2 + 9*e^2*x^4)))/c^5 +
 15*b*x*(15*d^2 + 10*d*e*x^2 + 3*e^2*x^4)*ArcSin[c*x])/225
```

Rubi [A] (verified)

Time = 0.46 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.01, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.278$, Rules used = {5170, 27, 1576, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)^2 (a+b\arcsin(cx))\,dx$$
$$\downarrow 5170$$
$$-bc\int \frac{x\left(3e^2x^4+10dex^2+15d^2\right)}{15\sqrt{1-c^2x^2}}dx + d^2x(a+b\arcsin(cx)) + \frac{2}{3}dex^3(a+b\arcsin(cx)) + \frac{1}{5}e^2x^5(a+b\arcsin(cx))$$
$$\downarrow 27$$

$$-\frac{1}{15}bc\int\frac{x\left(3e^2x^4+10dex^2+15d^2\right)}{\sqrt{1-c^2x^2}}dx+d^2x(a+b\arcsin(cx))+\frac{2}{3}dex^3(a+b\arcsin(cx))+\frac{1}{5}e^2x^5(a+b\arcsin(cx))$$

$$\downarrow 1576$$

$$-\frac{1}{30}bc\int\frac{3e^2x^4+10dex^2+15d^2}{\sqrt{1-c^2x^2}}dx^2+d^2x(a+b\arcsin(cx))+\frac{2}{3}dex^3(a+b\arcsin(cx))+\frac{1}{5}e^2x^5(a+b\arcsin(cx))$$

$$\downarrow 1140$$

$$-\frac{1}{30}bc\int\left(\frac{3\left(1-c^2x^2\right)^{3/2}e^2}{c^4}-\frac{2\left(5dc^2+3e\right)\sqrt{1-c^2x^2}e}{c^4}+\frac{15d^2c^4+10dec^2+3e^2}{c^4\sqrt{1-c^2x^2}}\right)dx^2+d^2x(a+b\arcsin(cx))+\frac{2}{3}dex^3(a+b\arcsin(cx))+\frac{1}{5}e^2x^5(a+b\arcsin(cx))$$

$$\downarrow 2009$$

$$d^2x(a+b\arcsin(cx))+\frac{2}{3}dex^3(a+b\arcsin(cx))+\frac{1}{5}e^2x^5(a+b\arcsin(cx))-\frac{1}{30}bc\left(\frac{4e\left(1-c^2x^2\right)^{3/2}\left(5c^2d+3e\right)}{3c^6}-\frac{6e^2\left(1-c^2x^2\right)^{5/2}}{5c^6}-\frac{2\sqrt{1-c^2x^2}\left(15c^4d^2+10c^2de+3e^2\right)}{c^6}\right)$$

input

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

output

```
-1/30*(b*c*((-2*(15*c^4*d^2 + 10*c^2*d*e + 3*e^2)*Sqrt[1 - c^2*x^2])/c^6 +
 (4*e*(5*c^2*d + 3*e)*(1 - c^2*x^2)^(3/2))/(3*c^6) - (6*e^2*(1 - c^2*x^2)^
(5/2))/(5*c^6))) + d^2*x*(a + b*ArcSin[c*x]) + (2*d*e*x^3*(a + b*ArcSin[c*
x]))/3 + (e^2*x^5*(a + b*ArcSin[c*x]))/5
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 1576
```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Simp[1/2   Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x]
, x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5170
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])   u, x
] - Simp[b*c   Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && NeQ[c^2*d + e, 0] && (IGtQ[p, 0] || ILtQ[p + 1/2
, 0])
```

Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 194, normalized size of antiderivative = 1.29

method	result
parts	$a\left(\frac{1}{5}e^2x^5+\frac{2}{3}de\,x^3+d^2x\right)+\frac{b\left(\frac{c\arcsin(cx)e^2x^5}{5}+\frac{2c\arcsin(cx)de\,x^3}{3}+\arcsin(cx)d^2cx-\frac{3e^2\left(-\frac{c^4x^4\sqrt{-c^2x^2+1}}{5}-$
derivativedivides	$\frac{a\left(d^2c^5x+\frac{2}{3}d\,c^5e\,x^3+\frac{1}{5}e^2c^5x^5\right)}{c^4}+\frac{b\left(\arcsin(cx)d^2c^5x+\frac{2\arcsin(cx)d\,c^5e\,x^3}{3}+\frac{\arcsin(cx)e^2c^5x^5}{5}-\frac{e^2\left(-\frac{c^4x^4\sqrt{-c^2x^2+1}}{5}-\frac{4c^2x^2\sqrt{}}{5}\right.\right.}{c}$
default	$\frac{a\left(d^2c^5x+\frac{2}{3}d\,c^5e\,x^3+\frac{1}{5}e^2c^5x^5\right)}{c^4}+\frac{b\left(\arcsin(cx)d^2c^5x+\frac{2\arcsin(cx)d\,c^5e\,x^3}{3}+\frac{\arcsin(cx)e^2c^5x^5}{5}-\frac{e^2\left(-\frac{c^4x^4\sqrt{-c^2x^2+1}}{5}-\frac{4c^2x^2\sqrt{}}{5}\right.\right.}{c}$
orering	$\frac{x\left(81e^3x^6c^6+395c^6de^2x^4+1275c^6d^2ex^2+12c^4e^3x^4+225c^6d^3+200c^4de^2x^2-900c^4d^2e+48c^2e^3x^2-400c^2de^2-96e^3\right)(}{225(ex^2+d)c^6}$

input
```
int((e*x^2+d)^2*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
a*(1/5*e^2*x^5+2/3*d*e*x^3+d^2*x)+b/c*(1/5*c*arcsin(c*x)*e^2*x^5+2/3*c*arc
sin(c*x)*d*e*x^3+arcsin(c*x)*d^2*c*x-1/15/c^4*(3*e^2*(-1/5*c^4*x^4*(-c^2*x
^2+1)^(1/2)-4/15*c^2*x^2*(-c^2*x^2+1)^(1/2)-8/15*(-c^2*x^2+1)^(1/2))-15*d^
2*c^4*(-c^2*x^2+1)^(1/2)+10*d*c^2*e*(-1/3*c^2*x^2*(-c^2*x^2+1)^(1/2)-2/3*(
-c^2*x^2+1)^(1/2))))
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.01

$$\int \left(d+ex^2\right)^2\left(a+b\arcsin(cx)\right)dx$$
$$=\frac{45\,ac^5e^2x^5+150\,ac^5dex^3+225\,ac^5d^2x+15\left(3\,bc^5e^2x^5+10\,bc^5dex^3+15\,bc^5d^2x\right)\arcsin\left(cx\right)+\left(9\,bc^4e^2x^{}\right.}{225\,c^5}$$

input
```
integrate((e*x^2+d)^2*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
1/225*(45*a*c^5*e^2*x^5 + 150*a*c^5*d*e*x^3 + 225*a*c^5*d^2*x + 15*(3*b*c^
5*e^2*x^5 + 10*b*c^5*d*e*x^3 + 15*b*c^5*d^2*x)*arcsin(c*x) + (9*b*c^4*e^2*
x^4 + 225*b*c^4*d^2 + 100*b*c^2*d*e + 24*b*e^2 + 2*(25*b*c^4*d*e + 6*b*c^2
*e^2)*x^2)*sqrt(-c^2*x^2 + 1))/c^5
```

Sympy [A] (verification not implemented)

Time = 0.50 (sec) , antiderivative size = 240, normalized size of antiderivative = 1.60

$$\int \left(d+ex^2\right)^2 \left(a+b\arcsin(cx)\right) dx$$
$$= \begin{cases} ad^2x + \frac{2adex^3}{3} + \frac{ae^2x^5}{5} + bd^2x\operatorname{asin}(cx) + \frac{2bdex^3\operatorname{asin}(cx)}{3} + \frac{be^2x^5\operatorname{asin}(cx)}{5} + \frac{bd^2\sqrt{-c^2x^2+1}}{c} + \frac{2bdex^2\sqrt{-c^2x^2+1}}{9c} + \frac{b}{} \\ a\left(d^2x + \frac{2dex^3}{3} + \frac{e^2x^5}{5}\right) \end{cases}$$

input
```
integrate((e*x**2+d)**2*(a+b*asin(c*x)),x)
```

output
```
Piecewise((a*d**2*x + 2*a*d*e*x**3/3 + a*e**2*x**5/5 + b*d**2*x*asin(c*x)
+ 2*b*d*e*x**3*asin(c*x)/3 + b*e**2*x**5*asin(c*x)/5 + b*d**2*sqrt(-c**2*x
**2 + 1)/c + 2*b*d*e*x**2*sqrt(-c**2*x**2 + 1)/(9*c) + b*e**2*x**4*sqrt(-c
**2*x**2 + 1)/(25*c) + 4*b*d*e*sqrt(-c**2*x**2 + 1)/(9*c**3) + 4*b*e**2*x*
*2*sqrt(-c**2*x**2 + 1)/(75*c**3) + 8*b*e**2*sqrt(-c**2*x**2 + 1)/(75*c**5
), Ne(c, 0)), (a*(d**2*x + 2*d*e*x**3/3 + e**2*x**5/5), True))
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 182, normalized size of antiderivative = 1.21

$$\int \left(d+ex^2\right)^2 \left(a+b\arcsin(cx)\right) dx$$
$$= \frac{1}{5}ae^2x^5 + \frac{2}{3}adex^3 + \frac{2}{9}\left(3x^3\arcsin(cx) + c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right)bde$$
$$+ \frac{1}{75}\left(15x^5\arcsin(cx) + \left(\frac{3\sqrt{-c^2x^2+1}x^4}{c^2} + \frac{4\sqrt{-c^2x^2+1}x^2}{c^4} + \frac{8\sqrt{-c^2x^2+1}}{c^6}\right)c\right)be^2$$
$$+ ad^2x + \frac{\left(cx\arcsin(cx) + \sqrt{-c^2x^2+1}\right)bd^2}{c}$$

input
```
integrate((e*x^2+d)^2*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
1/5*a*e^2*x^5 + 2/3*a*d*e*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))*b*d*e + 1/75*(15*x^5*arcsin(c*x)
 + (3*sqrt(-c^2*x^2 + 1)*x^4/c^2 + 4*sqrt(-c^2*x^2 + 1)*x^2/c^4 + 8*sqrt(-
c^2*x^2 + 1)/c^6)*c)*b*e^2 + a*d^2*x + (c*x*arcsin(c*x) + sqrt(-c^2*x^2 +
1))*b*d^2/c
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 265, normalized size of antiderivative = 1.77

$$\begin{aligned}\int \left(d+ex^2\right)^2 \left(a+b\arcsin(cx)\right) dx = {} & \frac{1}{5}\,ae^2x^5 + \frac{2}{3}\,adex^3 + bd^2x\arcsin\left(cx\right) \\ & + ad^2x + \frac{2\left(c^2x^2-1\right)bdex\arcsin\left(cx\right)}{3\,c^2} \\ & + \frac{2\,bdex\arcsin\left(cx\right)}{3\,c^2} + \frac{\left(c^2x^2-1\right)^2be^2x\arcsin\left(cx\right)}{5\,c^4} \\ & + \frac{\sqrt{-c^2x^2+1}bd^2}{c} + \frac{2\left(c^2x^2-1\right)be^2x\arcsin\left(cx\right)}{5\,c^4} \\ & - \frac{2\left(-c^2x^2+1\right)^{\frac{3}{2}}bde}{9\,c^3} + \frac{be^2x\arcsin\left(cx\right)}{5\,c^4} \\ & + \frac{2\sqrt{-c^2x^2+1}bde}{3\,c^3} + \frac{\left(c^2x^2-1\right)^2\sqrt{-c^2x^2+1}be^2}{25\,c^5} \\ & - \frac{2\left(-c^2x^2+1\right)^{\frac{3}{2}}be^2}{15\,c^5} + \frac{\sqrt{-c^2x^2+1}be^2}{5\,c^5}\end{aligned}$$

input
```
integrate((e*x^2+d)^2*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
1/5*a*e^2*x^5 + 2/3*a*d*e*x^3 + b*d^2*x*arcsin(c*x) + a*d^2*x + 2/3*(c^2*x
^2 - 1)*b*d*e*x*arcsin(c*x)/c^2 + 2/3*b*d*e*x*arcsin(c*x)/c^2 + 1/5*(c^2*x
^2 - 1)^2*b*e^2*x*arcsin(c*x)/c^4 + sqrt(-c^2*x^2 + 1)*b*d^2/c + 2/5*(c^2*
x^2 - 1)*b*e^2*x*arcsin(c*x)/c^4 - 2/9*(-c^2*x^2 + 1)^(3/2)*b*d*e/c^3 + 1/
5*b*e^2*x*arcsin(c*x)/c^4 + 2/3*sqrt(-c^2*x^2 + 1)*b*d*e/c^3 + 1/25*(c^2*x
^2 - 1)^2*sqrt(-c^2*x^2 + 1)*b*e^2/c^5 - 2/15*(-c^2*x^2 + 1)^(3/2)*b*e^2/c
^5 + 1/5*sqrt(-c^2*x^2 + 1)*b*e^2/c^5
```

Mupad [F(-1)]

Timed out.

$$\int \left(d+ex^2\right)^2 (a+b\arcsin(cx))\,dx = \int (a+b\,\mathrm{asin}(c\,x))\,\left(e\,x^2+d\right)^2\,dx$$

input
```
int((a + b*asin(c*x))*(d + e*x^2)^2,x)
```

output
```
int((a + b*asin(c*x))*(d + e*x^2)^2, x)
```

Reduce [B] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 208, normalized size of antiderivative = 1.39

$$\int \left(d+ex^2\right)^2 (a+b\arcsin(cx))\,dx$$
$$= \frac{225 asin(cx)\,b\,c^5d^2x + 150 asin(cx)\,b\,c^5de\,x^3 + 45 asin(cx)\,b\,c^5e^2x^5 + 225\sqrt{-c^2x^2+1}\,b\,c^4d^2 + 50\sqrt{-c^2x^2}$$

input
```
int((e*x^2+d)^2*(a+b*asin(c*x)),x)
```

output
```
(225*asin(c*x)*b*c**5*d**2*x + 150*asin(c*x)*b*c**5*d*e*x**3 + 45*asin(c*x
)*b*c**5*e**2*x**5 + 225*sqrt( - c**2*x**2 + 1)*b*c**4*d**2 + 50*sqrt( - c
**2*x**2 + 1)*b*c**4*d*e*x**2 + 9*sqrt( - c**2*x**2 + 1)*b*c**4*e**2*x**4
+ 100*sqrt( - c**2*x**2 + 1)*b*c**2*d*e + 12*sqrt( - c**2*x**2 + 1)*b*c**2
*e**2*x**2 + 24*sqrt( - c**2*x**2 + 1)*b*e**2 + 225*a*c**5*d**2*x + 150*a*
c**5*d*e*x**3 + 45*a*c**5*e**2*x**5)/(225*c**5)
```

3.147 $\int (d+ex^2)\,(a+b\arcsin(cx))\,dx$

Optimal result 1130
Mathematica [A] (verified) 1130
Rubi [A] (verified) 1131
Maple [A] (verified) 1133
Fricas [A] (verification not implemented) 1133
Sympy [A] (verification not implemented) 1134
Maxima [A] (verification not implemented) 1134
Giac [A] (verification not implemented) 1135
Mupad [F(-1)] 1135
Reduce [B] (verification not implemented) 1136

Optimal result

Integrand size = 16, antiderivative size = 81

$$\int (d+ex^2)\,(a+b\arcsin(cx))\,dx = \frac{b(3c^2d+e)\sqrt{1-c^2x^2}}{3c^3} - \frac{be(1-c^2x^2)^{3/2}}{9c^3} + dx(a+b\arcsin(cx)) + \frac{1}{3}ex^3(a+b\arcsin(cx))$$

output
```
1/3*b*(3*c^2*d+e)*(-c^2*x^2+1)^(1/2)/c^3-1/9*b*e*(-c^2*x^2+1)^(3/2)/c^3+d*
x*(a+b*arcsin(c*x))+1/3*e*x^3*(a+b*arcsin(c*x))
```

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 71, normalized size of antiderivative = 0.88

$$\int (d+ex^2)\,(a+b\arcsin(cx))\,dx = \frac{1}{9}\left(3ax\left(3d+ex^2\right) + \frac{b\sqrt{1-c^2x^2}(2e+c^2(9d+ex^2))}{c^3} + 3bx\left(3d+ex^2\right)\arcsin(cx)\right)$$

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

output

```
(3*a*x*(3*d + e*x^2) + (b*Sqrt[1 - c^2*x^2]*(2*e + c^2*(9*d + e*x^2)))/c^3
 + 3*b*x*(3*d + e*x^2)*ArcSin[c*x])/9
```

Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 84, normalized size of antiderivative = 1.04, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.312$, Rules used = {5170, 27, 353, 53, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)dx$$

$$\downarrow 5170$$

$$-bc\int \frac{x\left(ex^2+3d\right)}{3\sqrt{1-c^2x^2}}dx + dx(a+b\arcsin(cx)) + \frac{1}{3}ex^3(a+b\arcsin(cx))$$

$$\downarrow 27$$

$$-\frac{1}{3}bc\int \frac{x\left(ex^2+3d\right)}{\sqrt{1-c^2x^2}}dx + dx(a+b\arcsin(cx)) + \frac{1}{3}ex^3(a+b\arcsin(cx))$$

$$\downarrow 353$$

$$-\frac{1}{6}bc\int \frac{ex^2+3d}{\sqrt{1-c^2x^2}}dx^2 + dx(a+b\arcsin(cx)) + \frac{1}{3}ex^3(a+b\arcsin(cx))$$

$$\downarrow 53$$

$$-\frac{1}{6}bc\int \left(\frac{3dc^2+e}{c^2\sqrt{1-c^2x^2}} - \frac{e\sqrt{1-c^2x^2}}{c^2}\right)dx^2 + dx(a+b\arcsin(cx)) + \frac{1}{3}ex^3(a+b\arcsin(cx))$$

$$\downarrow 2009$$

$$dx(a+b\arcsin(cx)) + \frac{1}{3}ex^3(a+b\arcsin(cx)) - \frac{1}{6}bc\left(\frac{2e\left(1-c^2x^2\right)^{3/2}}{3c^4} - \frac{2\sqrt{1-c^2x^2}\left(3c^2d+e\right)}{c^4}\right)$$

input

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

output
```
-1/6*(b*c*((-2*(3*c^2*d + e)*Sqrt[1 - c^2*x^2])/c^4 + (2*e*(1 - c^2*x^2)^(
3/2))/(3*c^4))) + d*x*(a + b*ArcSin[c*x]) + (e*x^3*(a + b*ArcSin[c*x]))/3
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 53
```
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] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && LeQ[7*m + 4*n + 4, 0])
|| LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

rule 353
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_Symbol]
 :> Simp[1/2   Subst[Int[(a + b*x)^p*(c + d*x)^q, x], x, x^2], x] /; FreeQ[
{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5170
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])   u, x
] - Simp[b*c   Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && NeQ[c^2*d + e, 0] && (IGtQ[p, 0] || ILtQ[p + 1/2
, 0])
```

Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.23

method	result
parts	$a\left(\frac{1}{3}e\,x^3+dx\right)+\frac{b\left(\frac{c\arcsin(cx)e\,x^3}{3}+\arcsin(cx)cxd-\frac{e\left(-\frac{c^2x^2\sqrt{-c^2x^2+1}}{3}-\frac{2\sqrt{-c^2x^2+1}}{3}\right)-3d\,c^2\sqrt{-c^2x^2+1}}{3c^2}\right)}{c}$
derivativedivides	$\frac{\frac{a\left(c^3dx+\frac{1}{3}e\,c^3x^3\right)}{c^2}+\frac{b\left(\arcsin(cx)d\,c^3x+\frac{\arcsin(cx)e\,c^3x^3}{3}-\frac{e\left(-\frac{c^2x^2\sqrt{-c^2x^2+1}}{3}-\frac{2\sqrt{-c^2x^2+1}}{3}\right)}{3}+d\,c^2\sqrt{-c^2x^2+1}\right)}{c^2}}{c}$
default	$\frac{\frac{a\left(c^3dx+\frac{1}{3}e\,c^3x^3\right)}{c^2}+\frac{b\left(\arcsin(cx)d\,c^3x+\frac{\arcsin(cx)e\,c^3x^3}{3}-\frac{e\left(-\frac{c^2x^2\sqrt{-c^2x^2+1}}{3}-\frac{2\sqrt{-c^2x^2+1}}{3}\right)}{3}+d\,c^2\sqrt{-c^2x^2+1}\right)}{c^2}}{c}$
orering	$\frac{x\left(5e^2x^4c^4+30c^4de\,x^2+9c^4d^2+2c^2e^2x^2-18c^2de-4e^2\right)(a+b\arcsin(cx))}{9(e\,x^2+d)c^4}-\frac{\left(c^2e\,x^2+9c^2d+2e\right)(cx-1)(cx+1)\left(2ex(a-\right.$

input
```
int((e*x^2+d)*(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
a*(1/3*e*x^3+d*x)+b/c*(1/3*c*arcsin(c*x)*e*x^3+arcsin(c*x)*c*x*d-1/3/c^2*(
e*(-1/3*c^2*x^2*(-c^2*x^2+1)^(1/2)-2/3*(-c^2*x^2+1)^(1/2))-3*d*c^2*(-c^2*x
^2+1)^(1/2)))
```

Fricas [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.01

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)dx$$
$$=\frac{3\,ac^3ex^3+9\,ac^3dx+3\left(bc^3ex^3+3\,bc^3dx\right)\arcsin\left(cx\right)+\left(bc^2ex^2+9\,bc^2d+2\,be\right)\sqrt{-c^2x^2+1}}{9\,c^3}$$

input
```
integrate((e*x^2+d)*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
1/9*(3*a*c^3*e*x^3 + 9*a*c^3*d*x + 3*(b*c^3*e*x^3 + 3*b*c^3*d*x)*arcsin(c*
x) + (b*c^2*e*x^2 + 9*b*c^2*d + 2*b*e)*sqrt(-c^2*x^2 + 1))/c^3
```

Sympy [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.35

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)dx$$
$$= \begin{cases} adx + \frac{aex^3}{3} + bdx\,\mathrm{asin}\left(cx\right) + \frac{bex^3\,\mathrm{asin}\left(cx\right)}{3} + \frac{bd\sqrt{-c^2x^2+1}}{c} + \frac{bex^2\sqrt{-c^2x^2+1}}{9c} + \frac{2be\sqrt{-c^2x^2+1}}{9c^3} & \text{for } c \neq 0 \\ a\left(dx + \frac{ex^3}{3}\right) & \text{otherwise} \end{cases}$$

input
```
integrate((e*x**2+d)*(a+b*asin(c*x)),x)
```

output
```
Piecewise((a*d*x + a*e*x**3/3 + b*d*x*asin(c*x) + b*e*x**3*asin(c*x)/3 + b
*d*sqrt(-c**2*x**2 + 1)/c + b*e*x**2*sqrt(-c**2*x**2 + 1)/(9*c) + 2*b*e*sq
rt(-c**2*x**2 + 1)/(9*c**3), Ne(c, 0)), (a*(d*x + e*x**3/3), True))
```

Maxima [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 91, normalized size of antiderivative = 1.12

$$\begin{aligned} &\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)dx \\ &= \frac{1}{3}aex^3 + \frac{1}{9}\left(3\,x^3\arcsin\left(cx\right) + c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right)be \\ &\quad + adx + \frac{\left(cx\arcsin\left(cx\right) + \sqrt{-c^2x^2+1}\right)bd}{c} \end{aligned}$$

input
```
integrate((e*x^2+d)*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
1/3*a*e*x^3 + 1/9*(3*x^3*arcsin(c*x) + c*(sqrt(-c^2*x^2 + 1)*x^2/c^2 + 2*s
qrt(-c^2*x^2 + 1)/c^4))*b*e + a*d*x + (c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1
))*b*d/c
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.35

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)dx = \frac{1}{3}aex^3 + bdx\arcsin\left(cx\right) + adx + \frac{(c^2x^2-1)bex\arcsin\left(cx\right)}{3\,c^2} + \frac{bex\arcsin\left(cx\right)}{3\,c^2} + \frac{\sqrt{-c^2x^2+1}bd}{c} - \frac{(-c^2x^2+1)^{\frac{3}{2}}be}{9\,c^3} + \frac{\sqrt{-c^2x^2+1}be}{3\,c^3}$$

input
```
integrate((e*x^2+d)*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
1/3*a*e*x^3 + b*d*x*arcsin(c*x) + a*d*x + 1/3*(c^2*x^2 - 1)*b*e*x*arcsin(c
*x)/c^2 + 1/3*b*e*x*arcsin(c*x)/c^2 + sqrt(-c^2*x^2 + 1)*b*d/c - 1/9*(-c^2
*x^2 + 1)^(3/2)*b*e/c^3 + 1/3*sqrt(-c^2*x^2 + 1)*b*e/c^3
```

Mupad [F(-1)]

Timed out.

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)dx = \begin{cases} be\left(\frac{\sqrt{\frac{1}{c^2}-x^2}\left(\frac{2}{c^2}+x^2\right)}{9} + \frac{x^3\,\mathrm{asin}(c\,x)}{3}\right) + \frac{a\,x\,(e\,x^2+3\,d)}{3} + \frac{b\,d\left(\sqrt{1-c^2\,x^2}+c\,x\,\mathrm{asin}(c\,x)\right)}{c} & \text{if } 0<c \\ \int \left(a+b\,\mathrm{asin}(c\,x)\right)\,\left(e\,x^2+d\right)\,dx & \text{if } \neg(0<c) \end{cases}$$

input
```
int((a + b*asin(c*x))*(d + e*x^2),x)
```

output
```
piecewise(0 < c, b*e*(((1/c^2 - x^2)^(1/2)*(2/c^2 + x^2))/9 + (x^3*asin(c*
x))/3) + (a*x*(3*d + e*x^2))/3 + (b*d*((- c^2*x^2 + 1)^(1/2) + c*x*asin(c*
x)))/c, ~0 < c, int((a + b*asin(c*x))*(d + e*x^2), x))
```

Reduce [B] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.27

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)dx$$
$$=\frac{9asin(cx)\,bc^3dx+3asin(cx)\,bc^3ex^3+9\sqrt{-c^2x^2+1}\,bc^2d+\sqrt{-c^2x^2+1}\,bc^2ex^2+2\sqrt{-c^2x^2+1}\,be+9}{9c^3}$$

input
```
int((e*x^2+d)*(a+b*asin(c*x)),x)
```

output
```
(9*asin(c*x)*b*c**3*d*x + 3*asin(c*x)*b*c**3*e*x**3 + 9*sqrt( - c**2*x**2
+ 1)*b*c**2*d + sqrt( - c**2*x**2 + 1)*b*c**2*e*x**2 + 2*sqrt( - c**2*x**2
 + 1)*b*e + 9*a*c**3*d*x + 3*a*c**3*e*x**3)/(9*c**3)
```

3.148 $\int (a + b \arcsin(cx))\, dx$

Optimal result 1137
Mathematica [A] (verified) 1137
Rubi [A] (verified) 1138
Maple [A] (verified) 1138
Fricas [A] (verification not implemented) 1139
Sympy [A] (verification not implemented) 1139
Maxima [A] (verification not implemented) 1140
Giac [A] (verification not implemented) 1140
Mupad [B] (verification not implemented) 1140
Reduce [B] (verification not implemented) 1141

Optimal result

Integrand size = 8, antiderivative size = 30

$$\int (a + b \arcsin(cx))\, dx = ax + \frac{b\sqrt{1 - c^2x^2}}{c} + bx \arcsin(cx)$$

output
```
a*x+b*(-c^2*x^2+1)^(1/2)/c+b*x*arcsin(c*x)
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int (a + b \arcsin(cx))\, dx = ax + \frac{b\sqrt{1 - c^2x^2}}{c} + bx \arcsin(cx)$$

input
```
Integrate[a + b*ArcSin[c*x],x]
```

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

Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (a + b \arcsin(cx))\, dx$$

$$\downarrow \text{2009}$$

$$ax + bx \arcsin(cx) + \frac{b\sqrt{1 - c^2x^2}}{c}$$

input
```
Int[a + b*ArcSin[c*x],x]
```

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

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

method	result	size
default	$ax + \frac{b\left(cx \arcsin(cx) + \sqrt{-c^2x^2+1}\right)}{c}$	30
parts	$ax + \frac{b\left(cx \arcsin(cx) + \sqrt{-c^2x^2+1}\right)}{c}$	30
derivativedivides	$\frac{cxa + b\left(cx \arcsin(cx) + \sqrt{-c^2x^2+1}\right)}{c}$	32
orering	$x(a + b \arcsin(cx)) - \frac{(cx-1)(cx+1)b}{c\sqrt{-c^2x^2+1}}$	40

input
```
int(a+b*arcsin(c*x),x,method=_RETURNVERBOSE)
```

output
```
a*x+b/c*(c*x*arcsin(c*x)+(-c^2*x^2+1)^(1/2))
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.03

$$\int (a + b \arcsin(cx))\, dx = \frac{bcx \arcsin(cx) + acx + \sqrt{-c^2x^2 + 1}b}{c}$$

input
```
integrate(a+b*arcsin(c*x),x, algorithm="fricas")
```

output
```
(b*c*x*arcsin(c*x) + a*c*x + sqrt(-c^2*x^2 + 1)*b)/c
```

Sympy [A] (verification not implemented)

Time = 0.07 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.87

$$\int (a + b \arcsin(cx))\, dx = ax + b\left(\begin{cases} x \operatorname{asin}(cx) + \frac{\sqrt{-c^2x^2+1}}{c} & \text{for } c \neq 0 \\ 0 & \text{otherwise} \end{cases}\right)$$

input
```
integrate(a+b*asin(c*x),x)
```

output
```
a*x + b*Piecewise((x*asin(c*x) + sqrt(-c**2*x**2 + 1)/c, Ne(c, 0)), (0, Tr
ue))
```

Maxima [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int (a + b \arcsin(cx))\, dx = ax + \frac{\left(cx \arcsin(cx) + \sqrt{-c^2x^2 + 1}\right) b}{c}$$

input
```
integrate(a+b*arcsin(c*x),x, algorithm="maxima")
```

output
```
a*x + (c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))*b/c
```

Giac [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.97

$$\int (a + b \arcsin(cx))\, dx = ax + \frac{\left(cx \arcsin(cx) + \sqrt{-c^2x^2 + 1}\right) b}{c}$$

input
```
integrate(a+b*arcsin(c*x),x, algorithm="giac")
```

output
```
a*x + (c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))*b/c
```

Mupad [B] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.93

$$\int (a + b \arcsin(cx))\, dx = a\, x + \frac{b \sqrt{1 - c^2\, x^2}}{c} + b\, x \operatorname{asin}(c\, x)$$

input
```
int(a + b*asin(c*x),x)
```

output
```
a*x + (b*(1 - c^2*x^2)^(1/2))/c + b*x*asin(c*x)
```

Reduce [B] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.00

$$\int (a + b \arcsin(cx))\, dx = \frac{asin(cx)\, bcx + \sqrt{-c^2x^2 + 1}\, b + acx}{c}$$

input
```
int(a+b*asin(c*x),x)
```

output
```
(asin(c*x)*b*c*x + sqrt( - c**2*x**2 + 1)*b + a*c*x)/c
```

3.149 $\int \frac{a+b\arcsin(cx)}{d+ex^2}\,dx$

Optimal result . . . 1142
Mathematica [A] (verified) . . . 1143
Rubi [A] (verified) . . . 1144
Maple [C] (verified) . . . 1145
Fricas [F] . . . 1146
Sympy [F] . . . 1147
Maxima [F(-2)] . . . 1147
Giac [F(-2)] . . . 1148
Mupad [F(-1)] . . . 1148
Reduce [F] . . . 1148

Optimal result

Integrand size = 18, antiderivative size = 541

$$\begin{aligned}\int \frac{a+b\arcsin(cx)}{d+ex^2}\,dx = &\frac{(a+b\arcsin(cx))\log\left(1-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{c^2d+e}}\right)}{2\sqrt{-d}\sqrt{e}}\\ &-\frac{(a+b\arcsin(cx))\log\left(1+\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{c^2d+e}}\right)}{2\sqrt{-d}\sqrt{e}}\\ &+\frac{(a+b\arcsin(cx))\log\left(1-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}+\sqrt{c^2d+e}}\right)}{2\sqrt{-d}\sqrt{e}}\\ &-\frac{(a+b\arcsin(cx))\log\left(1+\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}+\sqrt{c^2d+e}}\right)}{2\sqrt{-d}\sqrt{e}}\\ &+\frac{ib\,\mathrm{PolyLog}\left(2,-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{c^2d+e}}\right)}{2\sqrt{-d}\sqrt{e}}\\ &-\frac{ib\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{c^2d+e}}\right)}{2\sqrt{-d}\sqrt{e}}\\ &+\frac{ib\,\mathrm{PolyLog}\left(2,-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}+\sqrt{c^2d+e}}\right)}{2\sqrt{-d}\sqrt{e}}\\ &-\frac{ib\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}+\sqrt{c^2d+e}}\right)}{2\sqrt{-d}\sqrt{e}}\end{aligned}$$

output

```
1/2*(a+b*arcsin(c*x))*ln(1-e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^(1
/2)-(c^2*d+e)^(1/2)))/(-d)^(1/2)/e^(1/2)-1/2*(a+b*arcsin(c*x))*ln(1+e^(1/2
)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^(1/2)-(c^2*d+e)^(1/2)))/(-d)^(1/2)/
e^(1/2)+1/2*(a+b*arcsin(c*x))*ln(1-e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c
*(-d)^(1/2)+(c^2*d+e)^(1/2)))/(-d)^(1/2)/e^(1/2)-1/2*(a+b*arcsin(c*x))*ln(
1+e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^(1/2)+(c^2*d+e)^(1/2)))/(-d
)^(1/2)/e^(1/2)+1/2*I*b*polylog(2,-e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c
*(-d)^(1/2)-(c^2*d+e)^(1/2)))/(-d)^(1/2)/e^(1/2)-1/2*I*b*polylog(2,e^(1/2)
*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^(1/2)-(c^2*d+e)^(1/2)))/(-d)^(1/2)/e
^(1/2)+1/2*I*b*polylog(2,-e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^(1/
2)+(c^2*d+e)^(1/2)))/(-d)^(1/2)/e^(1/2)-1/2*I*b*polylog(2,e^(1/2)*(I*c*x+(
-c^2*x^2+1)^(1/2))/(I*c*(-d)^(1/2)+(c^2*d+e)^(1/2)))/(-d)^(1/2)/e^(1/2)
```

Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 490, normalized size of antiderivative = 0.91

$$\int \frac{a+b\arcsin(cx)}{d+ex^2}\,dx$$
$$= \frac{2a\sqrt{-d}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right) - b\sqrt{d}\arcsin(cx)\log\left(1+\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{c^2d+e}}\right) + b\sqrt{d}\arcsin(cx)\log\left(1+\frac{\sqrt{e}e^{i\arcsin(cx)}}{-ic\sqrt{-d}+\sqrt{c^2d+e}}\right)}{}$$

input

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

output

```
(2*a*Sqrt[-d]*ArcTan[(Sqrt[e]*x)/Sqrt[d]] - b*Sqrt[d]*ArcSin[c*x]*Log[1 +
(Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] - Sqrt[c^2*d + e])] + b*Sqrt[d]*
ArcSin[c*x]*Log[1 + (Sqrt[e]*E^(I*ArcSin[c*x]))/((-I)*c*Sqrt[-d] + Sqrt[c^
2*d + e])] + b*Sqrt[d]*ArcSin[c*x]*Log[1 - (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*
c*Sqrt[-d] + Sqrt[c^2*d + e])] - b*Sqrt[d]*ArcSin[c*x]*Log[1 + (Sqrt[e]*E^
(I*ArcSin[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d + e])] - I*b*Sqrt[d]*PolyLog[2
, (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] - Sqrt[c^2*d + e])] + I*b*Sqrt
[d]*PolyLog[2, (Sqrt[e]*E^(I*ArcSin[c*x]))/((-I)*c*Sqrt[-d] + Sqrt[c^2*d +
 e])] + I*b*Sqrt[d]*PolyLog[2, -((Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d]
 + Sqrt[c^2*d + e]))] - I*b*Sqrt[d]*PolyLog[2, (Sqrt[e]*E^(I*ArcSin[c*x]))
/(I*c*Sqrt[-d] + Sqrt[c^2*d + e])])/(2*Sqrt[-d^2]*Sqrt[e])
```

Rubi [A] (verified)

Time = 1.39 (sec) , antiderivative size = 541, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a + b\arcsin(cx)}{d + ex^2}\,dx$$

$$\downarrow 5172$$

$$\int \left(\frac{\sqrt{-d}(a + b\arcsin(cx))}{2d\left(\sqrt{-d} - \sqrt{e}x\right)} + \frac{\sqrt{-d}(a + b\arcsin(cx))}{2d\left(\sqrt{-d} + \sqrt{e}x\right)}\right)dx$$

$$\downarrow 2009$$

$$\frac{(a + b\arcsin(cx))\log\left(1 - \frac{\sqrt{e}e^{i\arcsin(cx)}}{-\sqrt{c^2d+e}+ic\sqrt{-d}}\right)}{2\sqrt{-d}\sqrt{e}} - \frac{(a + b\arcsin(cx))\log\left(1 + \frac{\sqrt{e}e^{i\arcsin(cx)}}{-\sqrt{c^2d+e}+ic\sqrt{-d}}\right)}{2\sqrt{-d}\sqrt{e}} +$$
$$\frac{(a + b\arcsin(cx))\log\left(1 - \frac{\sqrt{e}e^{i\arcsin(cx)}}{\sqrt{c^2d+e}+ic\sqrt{-d}}\right)}{2\sqrt{-d}\sqrt{e}} - \frac{(a + b\arcsin(cx))\log\left(1 + \frac{\sqrt{e}e^{i\arcsin(cx)}}{\sqrt{c^2d+e}+ic\sqrt{-d}}\right)}{2\sqrt{-d}\sqrt{e}} +$$
$$\frac{ib\,\mathrm{PolyLog}\left(2, -\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{dc^2+e}}\right)}{2\sqrt{-d}\sqrt{e}} - \frac{ib\,\mathrm{PolyLog}\left(2, \frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{dc^2+e}}\right)}{2\sqrt{-d}\sqrt{e}} +$$
$$\frac{ib\,\mathrm{PolyLog}\left(2, -\frac{\sqrt{e}e^{i\arcsin(cx)}}{i\sqrt{-d}c+\sqrt{dc^2+e}}\right)}{2\sqrt{-d}\sqrt{e}} - \frac{ib\,\mathrm{PolyLog}\left(2, \frac{\sqrt{e}e^{i\arcsin(cx)}}{i\sqrt{-d}c+\sqrt{dc^2+e}}\right)}{2\sqrt{-d}\sqrt{e}}$$

input
```
Int[(a + b*ArcSin[c*x])/(d + e*x^2),x]
```

output
```
((a + b*ArcSin[c*x])*Log[1 - (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] - S
qrt[c^2*d + e])])/(2*Sqrt[-d]*Sqrt[e]) - ((a + b*ArcSin[c*x])*Log[1 + (Sqr
t[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] - Sqrt[c^2*d + e])])/(2*Sqrt[-d]*Sqr
t[e]) + ((a + b*ArcSin[c*x])*Log[1 - (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt
[-d] + Sqrt[c^2*d + e])])/(2*Sqrt[-d]*Sqrt[e]) - ((a + b*ArcSin[c*x])*Log[
1 + (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d + e])])/(2*Sqrt
[-d]*Sqrt[e]) + ((I/2)*b*PolyLog[2, -((Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqr
t[-d] - Sqrt[c^2*d + e]))])/(Sqrt[-d]*Sqrt[e]) - ((I/2)*b*PolyLog[2, (Sqrt
[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] - Sqrt[c^2*d + e])])/(Sqrt[-d]*Sqrt[e
]) + ((I/2)*b*PolyLog[2, -((Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] + Sqr
t[c^2*d + e]))])/(Sqrt[-d]*Sqrt[e]) - ((I/2)*b*PolyLog[2, (Sqrt[e]*E^(I*Ar
cSin[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d + e])])/(Sqrt[-d]*Sqrt[e])
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [C] (verified)

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

Time = 8.68 (sec) , antiderivative size = 236, normalized size of antiderivative = 0.44

method	result
parts	$\frac{a\arctan\left(\frac{ex}{\sqrt{de}}\right)}{\sqrt{de}}+\frac{bc\left(\sum_{_R1=\mathrm{RootOf}\left(e_Z^4+\left(-4c^2d-2e\right)_Z^2+e\right)}\frac{i\arcsin(cx)\ln\left(\frac{_R1-icx-\sqrt{-c^2x^2+1}}{_R1}\right)+\mathrm{dilog}\left(\frac{_R1-icx-\sqrt{-c^2x^2+1}}{_R1}\right)}{_R1\left(_R1^2e-2c^2d-e\right)}\right.}{2}$
derivativedivides	$\frac{ac\arctan\left(\frac{ex}{\sqrt{de}}\right)}{\sqrt{de}}+bc^2\left(-\frac{\left(\sum_{_R1=\mathrm{RootOf}\left(e_Z^4+\left(-4c^2d-2e\right)_Z^2+e\right)}\frac{i\arcsin(cx)\ln\left(\frac{_R1-icx-\sqrt{-c^2x^2+1}}{_R1}\right)+\mathrm{dilog}\left(\frac{_R1-icx-\sqrt{-c^2x^2+1}}{_R1}\right)}{_R1\left(-_R1^2e+2c^2d+e\right.}\right.}{2}\right.$
default	$\frac{ac\arctan\left(\frac{ex}{\sqrt{de}}\right)}{\sqrt{de}}+bc^2\left(-\frac{\left(\sum_{_R1=\mathrm{RootOf}\left(e_Z^4+\left(-4c^2d-2e\right)_Z^2+e\right)}\frac{i\arcsin(cx)\ln\left(\frac{_R1-icx-\sqrt{-c^2x^2+1}}{_R1}\right)+\mathrm{dilog}\left(\frac{_R1-icx-\sqrt{-c^2x^2+1}}{_R1}\right)}{_R1\left(-_R1^2e+2c^2d+e\right.}\right.}{2}\right.$

input
```
int((a+b*arcsin(c*x))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
a/(d*e)^(1/2)*arctan(e*x/(d*e)^(1/2))+1/2*b*c*sum(1/_R1/(_R1^2*e-2*c^2*d-e
)*(I*arcsin(c*x)*ln((_R1-I*c*x-(-c^2*x^2+1)^(1/2))/_R1)+dilog((_R1-I*c*x-(
-c^2*x^2+1)^(1/2))/_R1)),_R1=RootOf(e*_Z^4+(-4*c^2*d-2*e)*_Z^2+e))+1/2*b*c
*sum(_R1/(_R1^2*e-2*c^2*d-e)*(I*arcsin(c*x)*ln((_R1-I*c*x-(-c^2*x^2+1)^(1/
2))/_R1)+dilog((_R1-I*c*x-(-c^2*x^2+1)^(1/2))/_R1)),_R1=RootOf(e*_Z^4+(-4*
c^2*d-2*e)*_Z^2+e))
```

Fricas [F]

$$\int \frac{a+b\arcsin(cx)}{d+ex^2}\,dx = \int \frac{b\arcsin(cx)+a}{ex^2+d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*arcsin(c*x) + a)/(e*x^2 + d), x)
```

Sympy [F]

$$\int \frac{a + b \arcsin(cx)}{d + ex^2}\, dx = \int \frac{a + b \operatorname{asin}(cx)}{d + ex^2}\, dx$$

input
```
integrate((a+b*asin(c*x))/(e*x**2+d),x)
```

output
```
Integral((a + b*asin(c*x))/(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b \arcsin(cx)}{d + ex^2}\, dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a+b\arcsin(cx)}{d+ex^2}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\arcsin(cx)}{d+ex^2}\,dx = \int \frac{a+b\,\text{asin}(c\,x)}{e\,x^2+d}\,dx$$

input
```
int((a + b*asin(c*x))/(d + e*x^2),x)
```

output
```
int((a + b*asin(c*x))/(d + e*x^2), x)
```

Reduce [F]

$$\int \frac{a+b\arcsin(cx)}{d+ex^2}\,dx = \frac{\sqrt{e}\,\sqrt{d}\;atan\left(\frac{ex}{\sqrt{e}\,\sqrt{d}}\right)a+\left(\int \frac{asin(cx)}{e\,x^2+d}dx\right)bde}{de}$$

input
```
int((a+b*asin(c*x))/(e*x^2+d),x)
```

output
```
(sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a + int(asin(c*x)/(d + e*x*
*2),x)*b*d*e)/(d*e)
```

3.150 $\int (d+ex^2)^3 (a+b\arcsin(cx))^2\,dx$

Optimal result 1150
Mathematica [A] (verified) 1151
Rubi [A] (verified) 1152
Maple [A] (verified) 1154
Fricas [A] (verification not implemented) 1155
Sympy [A] (verification not implemented) 1156
Maxima [A] (verification not implemented) 1157
Giac [B] (verification not implemented) 1158
Mupad [F(-1)] 1159
Reduce [F] 1160

Optimal result

Integrand size = 20, antiderivative size = 569

$$\begin{aligned}\int \left(d+ex^2\right)^3 (a+b\arcsin(cx))^2\,dx = &-2b^2d^3x-\frac{4b^2d^2ex}{3c^2}-\frac{16b^2de^2x}{25c^4}-\frac{32b^2e^3x}{245c^6}\\&-\frac{2}{9}b^2d^2ex^3-\frac{8b^2de^2x^3}{75c^2}-\frac{16b^2e^3x^3}{735c^4}\\&-\frac{6}{125}b^2de^2x^5-\frac{12b^2e^3x^5}{1225c^2}-\frac{2}{343}b^2e^3x^7\\&+\frac{2bd^3\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c}\\&+\frac{4bd^2e\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{3c^3}\\&+\frac{16bde^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{25c^5}\\&+\frac{32be^3\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{245c^7}\\&+\frac{2bd^2ex^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{3c}\\&+\frac{8bde^2x^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{25c^3}\\&+\frac{16be^3x^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{245c^5}\\&+\frac{6bde^2x^4\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{25c}\\&+\frac{12be^3x^4\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{245c^3}\\&+\frac{2be^3x^6\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{49c}\\&+d^3x(a+b\arcsin(cx))^2+d^2ex^3(a+b\arcsin(cx))^2\\&+\frac{3}{5}de^2x^5(a+b\arcsin(cx))^2\\&+\frac{1}{7}e^3x^7(a+b\arcsin(cx))^2\end{aligned}$$

output

```
-2*b^2*d^3*x-4/3*b^2*d^2*e*x/c^2-16/25*b^2*d*e^2*x/c^4-32/245*b^2*e^3*x/c^
6-2/9*b^2*d^2*e*x^3-8/75*b^2*d*e^2*x^3/c^2-16/735*b^2*e^3*x^3/c^4-6/125*b^
2*d*e^2*x^5-12/1225*b^2*e^3*x^5/c^2-2/343*b^2*e^3*x^7+2*b*d^3*(-c^2*x^2+1)
^(1/2)*(a+b*arcsin(c*x))/c+4/3*b*d^2*e*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x)
)/c^3+16/25*b*d*e^2*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c^5+32/245*b*e^3*
(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c^7+2/3*b*d^2*e*x^2*(-c^2*x^2+1)^(1/2
)*(a+b*arcsin(c*x))/c+8/25*b*d*e^2*x^2*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x)
)/c^3+16/245*b*e^3*x^2*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c^5+6/25*b*d*e
^2*x^4*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c+12/245*b*e^3*x^4*(-c^2*x^2+1
)^(1/2)*(a+b*arcsin(c*x))/c^3+2/49*b*e^3*x^6*(-c^2*x^2+1)^(1/2)*(a+b*arcsi
n(c*x))/c+d^3*x*(a+b*arcsin(c*x))^2+d^2*e*x^3*(a+b*arcsin(c*x))^2+3/5*d*e^
2*x^5*(a+b*arcsin(c*x))^2+1/7*e^3*x^7*(a+b*arcsin(c*x))^2
```

Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 435, normalized size of antiderivative = 0.76

$$\int \left(d+ex^2\right)^3 (a+b\arcsin(cx))^2\,dx = d^3x(a+b\arcsin(cx))^2$$
$$+ d^2ex^3(a+b\arcsin(cx))^2 + \frac{3}{5}de^2x^5(a+b\arcsin(cx))^2 + \frac{1}{7}e^3x^7(a+b\arcsin(cx))^2$$
$$- \frac{2bd^2e\left(-3a\sqrt{1-c^2x^2}(2+c^2x^2)+bcx(6+c^2x^2)-3b\sqrt{1-c^2x^2}(2+c^2x^2)\arcsin(cx)\right)}{9c^3}$$
$$- \frac{2bde^2\left(-15a\sqrt{1-c^2x^2}(8+4c^2x^2+3c^4x^4)+bcx(120+20c^2x^2+9c^4x^4)-15b\sqrt{1-c^2x^2}(8+4c^2x^2+$$
$$- \frac{2be^3\left(-105a\sqrt{1-c^2x^2}(16+8c^2x^2+6c^4x^4+5c^6x^6)+bcx(1680+280c^2x^2+126c^4x^4+75c^6x^6)-105\right.}{25725c^7}$$
$$- 2bd^3\left(bx-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c}\right)$$

input

```
Integrate[(d + e*x^2)^3*(a + b*ArcSin[c*x])^2,x]
```

output

```
d^3*x*(a + b*ArcSin[c*x])^2 + d^2*e*x^3*(a + b*ArcSin[c*x])^2 + (3*d*e^2*x
^5*(a + b*ArcSin[c*x])^2)/5 + (e^3*x^7*(a + b*ArcSin[c*x])^2)/7 - (2*b*d^2
*e*(-3*a*Sqrt[1 - c^2*x^2]*(2 + c^2*x^2) + b*c*x*(6 + c^2*x^2) - 3*b*Sqrt[
1 - c^2*x^2]*(2 + c^2*x^2)*ArcSin[c*x]))/(9*c^3) - (2*b*d*e^2*(-15*a*Sqrt[
1 - c^2*x^2]*(8 + 4*c^2*x^2 + 3*c^4*x^4) + b*c*x*(120 + 20*c^2*x^2 + 9*c^4
*x^4) - 15*b*Sqrt[1 - c^2*x^2]*(8 + 4*c^2*x^2 + 3*c^4*x^4)*ArcSin[c*x]))/(
375*c^5) - (2*b*e^3*(-105*a*Sqrt[1 - c^2*x^2]*(16 + 8*c^2*x^2 + 6*c^4*x^4
+ 5*c^6*x^6) + b*c*x*(1680 + 280*c^2*x^2 + 126*c^4*x^4 + 75*c^6*x^6) - 105
*b*Sqrt[1 - c^2*x^2]*(16 + 8*c^2*x^2 + 6*c^4*x^4 + 5*c^6*x^6)*ArcSin[c*x])
)/(25725*c^7) - 2*b*d^3*(b*x - (Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/c)
```

Rubi [A] (verified)

Time = 1.26 (sec) , antiderivative size = 569, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)^3 \left(a+b\arcsin(cx)\right)^2 dx$$

$$\downarrow 5172$$

$$\int \left(d^3(a+b\arcsin(cx))^2+3d^2ex^2(a+b\arcsin(cx))^2+3de^2x^4(a+b\arcsin(cx))^2+e^3x^6(a+b\arcsin(cx))^2\right) dx$$

$$\downarrow 2009$$

$$\frac{2bd^3\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c}+\frac{2bd^2ex^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{3c}+\frac{6bde^2x^4\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{25c}+\frac{2be^3x^6\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{49c}+\frac{32be^3\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{245c^7}+\frac{16bde^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{25c^5}+\frac{16be^3x^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{245c^5}+\frac{4bd^2e\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{3c^3}+\frac{8bde^2x^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{25c^3}+\frac{12be^3x^4\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{245c^3}+d^3x(a+b\arcsin(cx))^2+d^2ex^3(a+b\arcsin(cx))^2+\frac{3}{5}de^2x^5(a+b\arcsin(cx))^2+\frac{1}{7}e^3x^7(a+b\arcsin(cx))^2-\frac{32b^2e^3x}{245c^6}-\frac{16b^2de^2x}{25c^4}-\frac{16b^2e^3x^3}{735c^4}-\frac{4b^2d^2ex}{3c^2}-\frac{8b^2de^2x^3}{75c^2}-\frac{12b^2e^3x^5}{1225c^2}-2b^2d^3x-\frac{2}{9}b^2d^2ex^3-\frac{6}{125}b^2de^2x^5-\frac{2}{343}b^2e^3x^7$$

input

```
Int[(d + e*x^2)^3*(a + b*ArcSin[c*x])^2,x]
```

output

```
-2*b^2*d^3*x - (4*b^2*d^2*e*x)/(3*c^2) - (16*b^2*d*e^2*x)/(25*c^4) - (32*b
^2*e^3*x)/(245*c^6) - (2*b^2*d^2*e*x^3)/9 - (8*b^2*d*e^2*x^3)/(75*c^2) - (
16*b^2*e^3*x^3)/(735*c^4) - (6*b^2*d*e^2*x^5)/125 - (12*b^2*e^3*x^5)/(1225
*c^2) - (2*b^2*e^3*x^7)/343 + (2*b*d^3*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x
]))/c + (4*b*d^2*e*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(3*c^3) + (16*b*
d*e^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(25*c^5) + (32*b*e^3*Sqrt[1 -
 c^2*x^2]*(a + b*ArcSin[c*x]))/(245*c^7) + (2*b*d^2*e*x^2*Sqrt[1 - c^2*x^2
]*(a + b*ArcSin[c*x]))/(3*c) + (8*b*d*e^2*x^2*Sqrt[1 - c^2*x^2]*(a + b*Arc
Sin[c*x]))/(25*c^3) + (16*b*e^3*x^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))
/(245*c^5) + (6*b*d*e^2*x^4*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(25*c)
+ (12*b*e^3*x^4*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(245*c^3) + (2*b*e^
3*x^6*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(49*c) + d^3*x*(a + b*ArcSin[
c*x])^2 + d^2*e*x^3*(a + b*ArcSin[c*x])^2 + (3*d*e^2*x^5*(a + b*ArcSin[c*x
])^2)/5 + (e^3*x^7*(a + b*ArcSin[c*x])^2)/7
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [A] (verified)

Time = 0.62 (sec) , antiderivative size = 702, normalized size of antiderivative = 1.23

method	result
derivativedivides	$\frac{a^2\left(d^3c^7x+d^2c^7e\,x^3+\frac{3}{5}d\,c^7e^2x^5+\frac{1}{7}e^3c^7x^7\right)}{c^6}+\frac{b^2\left(c^6d^3\left(\arcsin(cx)^2cx-2cx+2\arcsin(cx)\sqrt{-c^2x^2+1}\right)+\frac{c^4d^2e\left(9\arcsin(cx)^2c^3x^3\right.}{}\right.}{}$
default	$\frac{a^2\left(d^3c^7x+d^2c^7e\,x^3+\frac{3}{5}d\,c^7e^2x^5+\frac{1}{7}e^3c^7x^7\right)}{c^6}+\frac{b^2\left(c^6d^3\left(\arcsin(cx)^2cx-2cx+2\arcsin(cx)\sqrt{-c^2x^2+1}\right)+\frac{c^4d^2e\left(9\arcsin(cx)^2c^3x^3\right.}{}\right.}{}$
parts	$a^2\left(\frac{1}{7}e^3x^7+\frac{3}{5}d\,e^2x^5+d^2e\,x^3+d^3x\right)+\frac{b^2\left(55125\arcsin(cx)^2c^7x^7e^3+231525\arcsin(cx)^2c^7x^5de^2+3858\right.}{}$
orering	$\frac{x\left(47625c^8e^5x^{10}+328917c^8de^4x^8+1128666c^8d^2e^3x^6+10080c^6e^5x^8+5951050c^8d^3e^2x^4+146016c^6de^4x^6-385875c^8d^\right.}{}$

input
```
int((e*x^2+d)^3*(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output

```
1/c*(a^2/c^6*(d^3*c^7*x+d^2*c^7*e*x^3+3/5*d*c^7*e^2*x^5+1/7*e^3*c^7*x^7)+b
^2/c^6*(c^6*d^3*(arcsin(c*x)^2*c*x-2*c*x+2*arcsin(c*x)*(-c^2*x^2+1)^(1/2))
+1/9*c^4*d^2*e*(9*arcsin(c*x)^2*c^3*x^3+6*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c
^2*x^2-2*c^3*x^3+12*arcsin(c*x)*(-c^2*x^2+1)^(1/2)-12*c*x)+1/375*c^2*d*e^2
*(225*arcsin(c*x)^2*c^5*x^5+90*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c^4*x^4-18*c
^5*x^5+120*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c^2*x^2-40*c^3*x^3+240*arcsin(c*
x)*(-c^2*x^2+1)^(1/2)-240*c*x)+1/25725*e^3*(3675*arcsin(c*x)^2*c^7*x^7+105
0*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c^6*x^6-150*c^7*x^7+1260*arcsin(c*x)*(-c^
2*x^2+1)^(1/2)*c^4*x^4-252*c^5*x^5+1680*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c^2
*x^2-560*c^3*x^3+3360*arcsin(c*x)*(-c^2*x^2+1)^(1/2)-3360*c*x))+2*a*b/c^6*
(arcsin(c*x)*d^3*c^7*x+arcsin(c*x)*d^2*c^7*e*x^3+3/5*arcsin(c*x)*d*c^7*e^2
*x^5+1/7*arcsin(c*x)*e^3*c^7*x^7-1/7*e^3*(-1/7*c^6*x^6*(-c^2*x^2+1)^(1/2)-
6/35*c^4*x^4*(-c^2*x^2+1)^(1/2)-8/35*c^2*x^2*(-c^2*x^2+1)^(1/2)-16/35*(-c^
2*x^2+1)^(1/2))+d^3*c^6*(-c^2*x^2+1)^(1/2)-3/5*d*c^2*e^2*(-1/5*c^4*x^4*(-c
^2*x^2+1)^(1/2)-4/15*c^2*x^2*(-c^2*x^2+1)^(1/2)-8/15*(-c^2*x^2+1)^(1/2))-d
^2*c^4*e*(-1/3*c^2*x^2*(-c^2*x^2+1)^(1/2)-2/3*(-c^2*x^2+1)^(1/2))))
```

Fricas [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 555, normalized size of antiderivative = 0.98

$$\int \left(d+ex^2\right)^3 \left(a+b\arcsin(cx)\right)^2 dx$$

$$= \frac{1125\left(49\,a^2-2\,b^2\right)c^7e^3x^7+189\left(49\left(25\,a^2-2\,b^2\right)c^7de^2-20\,b^2c^5e^3\right)x^5+35\left(1225\left(9\,a^2-2\,b^2\right)c^7d^2e-11\right.}{}$$

input

```
integrate((e*x^2+d)^3*(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output

```
1/385875*(1125*(49*a^2 - 2*b^2)*c^7*e^3*x^7 + 189*(49*(25*a^2 - 2*b^2)*c^7
*d*e^2 - 20*b^2*c^5*e^3)*x^5 + 35*(1225*(9*a^2 - 2*b^2)*c^7*d^2*e - 1176*b
^2*c^5*d*e^2 - 240*b^2*c^3*e^3)*x^3 + 11025*(5*b^2*c^7*e^3*x^7 + 21*b^2*c^
7*d*e^2*x^5 + 35*b^2*c^7*d^2*e*x^3 + 35*b^2*c^7*d^3*x)*arcsin(c*x)^2 + 105
*(3675*(a^2 - 2*b^2)*c^7*d^3 - 4900*b^2*c^5*d^2*e - 2352*b^2*c^3*d*e^2 - 4
80*b^2*c*e^3)*x + 22050*(5*a*b*c^7*e^3*x^7 + 21*a*b*c^7*d*e^2*x^5 + 35*a*b
*c^7*d^2*e*x^3 + 35*a*b*c^7*d^3*x)*arcsin(c*x) + 210*(75*a*b*c^6*e^3*x^6 +
 3675*a*b*c^6*d^3 + 2450*a*b*c^4*d^2*e + 1176*a*b*c^2*d*e^2 + 240*a*b*e^3
+ 9*(49*a*b*c^6*d*e^2 + 10*a*b*c^4*e^3)*x^4 + (1225*a*b*c^6*d^2*e + 588*a*
b*c^4*d*e^2 + 120*a*b*c^2*e^3)*x^2 + (75*b^2*c^6*e^3*x^6 + 3675*b^2*c^6*d^
3 + 2450*b^2*c^4*d^2*e + 1176*b^2*c^2*d*e^2 + 240*b^2*e^3 + 9*(49*b^2*c^6*
d*e^2 + 10*b^2*c^4*e^3)*x^4 + (1225*b^2*c^6*d^2*e + 588*b^2*c^4*d*e^2 + 12
0*b^2*c^2*e^3)*x^2)*arcsin(c*x))*sqrt(-c^2*x^2 + 1))/c^7
```

Sympy [A] (verification not implemented)

Time = 1.08 (sec) , antiderivative size = 989, normalized size of antiderivative = 1.74

$$\int \left(d+ex^2\right)^3 \left(a+b\arcsin(cx)\right)^2 dx = \text{Too large to display}$$

input

```
integrate((e*x**2+d)**3*(a+b*asin(c*x))**2,x)
```

output

```
Piecewise((a**2*d**3*x + a**2*d**2*e*x**3 + 3*a**2*d*e**2*x**5/5 + a**2*e*
*3*x**7/7 + 2*a*b*d**3*x*asin(c*x) + 2*a*b*d**2*e*x**3*asin(c*x) + 6*a*b*d
*e**2*x**5*asin(c*x)/5 + 2*a*b*e**3*x**7*asin(c*x)/7 + 2*a*b*d**3*sqrt(-c*
*2*x**2 + 1)/c + 2*a*b*d**2*e*x**2*sqrt(-c**2*x**2 + 1)/(3*c) + 6*a*b*d*e*
*2*x**4*sqrt(-c**2*x**2 + 1)/(25*c) + 2*a*b*e**3*x**6*sqrt(-c**2*x**2 + 1)
/(49*c) + 4*a*b*d**2*e*sqrt(-c**2*x**2 + 1)/(3*c**3) + 8*a*b*d*e**2*x**2*s
qrt(-c**2*x**2 + 1)/(25*c**3) + 12*a*b*e**3*x**4*sqrt(-c**2*x**2 + 1)/(245
*c**3) + 16*a*b*d*e**2*sqrt(-c**2*x**2 + 1)/(25*c**5) + 16*a*b*e**3*x**2*s
qrt(-c**2*x**2 + 1)/(245*c**5) + 32*a*b*e**3*sqrt(-c**2*x**2 + 1)/(245*c**
7) + b**2*d**3*x*asin(c*x)**2 - 2*b**2*d**3*x + b**2*d**2*e*x**3*asin(c*x)
**2 - 2*b**2*d**2*e*x**3/9 + 3*b**2*d*e**2*x**5*asin(c*x)**2/5 - 6*b**2*d*
e**2*x**5/125 + b**2*e**3*x**7*asin(c*x)**2/7 - 2*b**2*e**3*x**7/343 + 2*b
**2*d**3*sqrt(-c**2*x**2 + 1)*asin(c*x)/c + 2*b**2*d**2*e*x**2*sqrt(-c**2*
x**2 + 1)*asin(c*x)/(3*c) + 6*b**2*d*e**2*x**4*sqrt(-c**2*x**2 + 1)*asin(c
*x)/(25*c) + 2*b**2*e**3*x**6*sqrt(-c**2*x**2 + 1)*asin(c*x)/(49*c) - 4*b*
*2*d**2*e*x/(3*c**2) - 8*b**2*d*e**2*x**3/(75*c**2) - 12*b**2*e**3*x**5/(1
225*c**2) + 4*b**2*d**2*e*sqrt(-c**2*x**2 + 1)*asin(c*x)/(3*c**3) + 8*b**2
*d*e**2*x**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/(25*c**3) + 12*b**2*e**3*x**4*
sqrt(-c**2*x**2 + 1)*asin(c*x)/(245*c**3) - 16*b**2*d*e**2*x/(25*c**4) - 1
6*b**2*e**3*x**3/(735*c**4) + 16*b**2*d*e**2*sqrt(-c**2*x**2 + 1)*asin(...
```

Maxima [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 699, normalized size of antiderivative = 1.23

$$\int \left(d+ex^2\right)^3 \left(a+b\arcsin(cx)\right)^2 dx = \text{Too large to display}$$

input

```
integrate((e*x^2+d)^3*(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output

```
1/7*b^2*e^3*x^7*arcsin(c*x)^2 + 1/7*a^2*e^3*x^7 + 3/5*b^2*d*e^2*x^5*arcsin
(c*x)^2 + 3/5*a^2*d*e^2*x^5 + b^2*d^2*e*x^3*arcsin(c*x)^2 + a^2*d^2*e*x^3
+ b^2*d^3*x*arcsin(c*x)^2 + 2/3*(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*b*d^2*e + 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
)*b^2*d^2*e + 2/25*(15*x^5*arcsin(c*x) + (3*sqrt(-c^2*x^2 + 1)*x^4/c^2 + 4
*sqrt(-c^2*x^2 + 1)*x^2/c^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c)*a*b*d*e^2 + 2/3
75*(15*(3*sqrt(-c^2*x^2 + 1)*x^4/c^2 + 4*sqrt(-c^2*x^2 + 1)*x^2/c^4 + 8*sq
rt(-c^2*x^2 + 1)/c^6)*c*arcsin(c*x) - (9*c^4*x^5 + 20*c^2*x^3 + 120*x)/c^4
)*b^2*d*e^2 + 2/245*(35*x^7*arcsin(c*x) + (5*sqrt(-c^2*x^2 + 1)*x^6/c^2 +
6*sqrt(-c^2*x^2 + 1)*x^4/c^4 + 8*sqrt(-c^2*x^2 + 1)*x^2/c^6 + 16*sqrt(-c^2
*x^2 + 1)/c^8)*c)*a*b*e^3 + 2/25725*(105*(5*sqrt(-c^2*x^2 + 1)*x^6/c^2 + 6
*sqrt(-c^2*x^2 + 1)*x^4/c^4 + 8*sqrt(-c^2*x^2 + 1)*x^2/c^6 + 16*sqrt(-c^2*
x^2 + 1)/c^8)*c*arcsin(c*x) - (75*c^6*x^7 + 126*c^4*x^5 + 280*c^2*x^3 + 16
80*x)/c^6)*b^2*e^3 - 2*b^2*d^3*(x - sqrt(-c^2*x^2 + 1)*arcsin(c*x)/c) + a^
2*d^3*x + 2*(c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))*a*b*d^3/c
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1242 vs. $2(509) = 1018$.

Time $= 0.16$ (sec) , antiderivative size $= 1242$, normalized size of antiderivative $= 2.18$

$$\int \left(d + ex^2\right)^3 \left(a + b \arcsin(cx)\right)^2 dx = \text{Too large to display}$$

input

```
integrate((e*x^2+d)^3*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output

```
1/7*a^2*e^3*x^7 + 3/5*a^2*d*e^2*x^5 + a^2*d^2*e*x^3 + b^2*d^3*x*arcsin(c*x
)^2 + 2*a*b*d^3*x*arcsin(c*x) + (c^2*x^2 - 1)*b^2*d^2*e*x*arcsin(c*x)^2/c^
2 + a^2*d^3*x - 2*b^2*d^3*x + 2*(c^2*x^2 - 1)*a*b*d^2*e*x*arcsin(c*x)/c^2
+ b^2*d^2*e*x*arcsin(c*x)^2/c^2 + 3/5*(c^2*x^2 - 1)^2*b^2*d*e^2*x*arcsin(c
*x)^2/c^4 + 2*sqrt(-c^2*x^2 + 1)*b^2*d^3*arcsin(c*x)/c - 2/9*(c^2*x^2 - 1)
*b^2*d^2*e*x/c^2 + 2*a*b*d^2*e*x*arcsin(c*x)/c^2 + 6/5*(c^2*x^2 - 1)^2*a*b
*d*e^2*x*arcsin(c*x)/c^4 + 6/5*(c^2*x^2 - 1)*b^2*d*e^2*x*arcsin(c*x)^2/c^4
 + 1/7*(c^2*x^2 - 1)^3*b^2*e^3*x*arcsin(c*x)^2/c^6 + 2*sqrt(-c^2*x^2 + 1)*
a*b*d^3/c - 2/3*(-c^2*x^2 + 1)^(3/2)*b^2*d^2*e*arcsin(c*x)/c^3 - 14/9*b^2*
d^2*e*x/c^2 - 6/125*(c^2*x^2 - 1)^2*b^2*d*e^2*x/c^4 + 12/5*(c^2*x^2 - 1)*a
*b*d*e^2*x*arcsin(c*x)/c^4 + 2/7*(c^2*x^2 - 1)^3*a*b*e^3*x*arcsin(c*x)/c^6
 + 3/5*b^2*d*e^2*x*arcsin(c*x)^2/c^4 + 3/7*(c^2*x^2 - 1)^2*b^2*e^3*x*arcsi
n(c*x)^2/c^6 - 2/3*(-c^2*x^2 + 1)^(3/2)*a*b*d^2*e/c^3 + 2*sqrt(-c^2*x^2 +
1)*b^2*d^2*e*arcsin(c*x)/c^3 + 6/25*(c^2*x^2 - 1)^2*sqrt(-c^2*x^2 + 1)*b^2
*d*e^2*arcsin(c*x)/c^5 - 76/375*(c^2*x^2 - 1)*b^2*d*e^2*x/c^4 - 2/343*(c^2
*x^2 - 1)^3*b^2*e^3*x/c^6 + 6/5*a*b*d*e^2*x*arcsin(c*x)/c^4 + 6/7*(c^2*x^2
 - 1)^2*a*b*e^3*x*arcsin(c*x)/c^6 + 3/7*(c^2*x^2 - 1)*b^2*e^3*x*arcsin(c*x
)^2/c^6 + 2*sqrt(-c^2*x^2 + 1)*a*b*d^2*e/c^3 + 6/25*(c^2*x^2 - 1)^2*sqrt(-
c^2*x^2 + 1)*a*b*d*e^2/c^5 - 4/5*(-c^2*x^2 + 1)^(3/2)*b^2*d*e^2*arcsin(c*x
)/c^5 + 2/49*(c^2*x^2 - 1)^3*sqrt(-c^2*x^2 + 1)*b^2*e^3*arcsin(c*x)/c^7...
```

Mupad [F(-1)]

Timed out.

$$\int (d+ex^2)^3\,(a+b\arcsin(cx))^2\,dx = \int (a+b\,\mathrm{asin}(c\,x))^2\,(e\,x^2+d)^3\,dx$$

input

```
int((a + b*asin(c*x))^2*(d + e*x^2)^3,x)
```

output

```
int((a + b*asin(c*x))^2*(d + e*x^2)^3, x)
```

Reduce [F]

$$\int \left(d+ex^2\right)^3 \left(a+b\arcsin(cx)\right)^2 dx$$
$$= \frac{3675 asin(cx)^2 b^2 c^7 d^3 x + 7350\sqrt{-c^2x^2+1}\, asin(cx)\, b^2 c^6 d^3 + 7350 asin(cx)\, ab\, c^7 d^3 x + 7350 asin(cx)\, ab\, c^7$$

input
```
int((e*x^2+d)^3*(a+b*asin(c*x))^2,x)
```

output
```
(3675*asin(c*x)**2*b**2*c**7*d**3*x + 7350*sqrt( - c**2*x**2 + 1)*asin(c*x
)*b**2*c**6*d**3 + 7350*asin(c*x)*a*b*c**7*d**3*x + 7350*asin(c*x)*a*b*c**
7*d**2*e*x**3 + 4410*asin(c*x)*a*b*c**7*d*e**2*x**5 + 1050*asin(c*x)*a*b*c
**7*e**3*x**7 + 7350*sqrt( - c**2*x**2 + 1)*a*b*c**6*d**3 + 2450*sqrt( - c
**2*x**2 + 1)*a*b*c**6*d**2*e*x**2 + 882*sqrt( - c**2*x**2 + 1)*a*b*c**6*d
*e**2*x**4 + 150*sqrt( - c**2*x**2 + 1)*a*b*c**6*e**3*x**6 + 4900*sqrt( -
c**2*x**2 + 1)*a*b*c**4*d**2*e + 1176*sqrt( - c**2*x**2 + 1)*a*b*c**4*d*e*
*2*x**2 + 180*sqrt( - c**2*x**2 + 1)*a*b*c**4*e**3*x**4 + 2352*sqrt( - c**
2*x**2 + 1)*a*b*c**2*d*e**2 + 240*sqrt( - c**2*x**2 + 1)*a*b*c**2*e**3*x**
2 + 480*sqrt( - c**2*x**2 + 1)*a*b*e**3 + 3675*int(asin(c*x)**2*x**6,x)*b*
*2*c**7*e**3 + 11025*int(asin(c*x)**2*x**4,x)*b**2*c**7*d*e**2 + 11025*int
(asin(c*x)**2*x**2,x)*b**2*c**7*d**2*e + 3675*a**2*c**7*d**3*x + 3675*a**2
*c**7*d**2*e*x**3 + 2205*a**2*c**7*d*e**2*x**5 + 525*a**2*c**7*e**3*x**7 -
 7350*b**2*c**7*d**3*x)/(3675*c**7)
```

3.151 $\int (d+ex^2)^2 (a+b\arcsin(cx))^2\,dx$

Optimal result 1161
Mathematica [A] (verified) 1162
Rubi [A] (verified) 1162
Maple [A] (verified) 1164
Fricas [A] (verification not implemented) 1165
Sympy [A] (verification not implemented) 1165
Maxima [A] (verification not implemented) 1166
Giac [B] (verification not implemented) 1167
Mupad [F(-1)] 1168
Reduce [F] 1168

Optimal result

Integrand size = 20, antiderivative size = 335

$$\begin{aligned}\int (d+ex^2)^2 (a+b\arcsin(cx))^2\,dx = &-2b^2d^2x-\frac{8b^2dex}{9c^2}-\frac{16b^2e^2x}{75c^4}-\frac{4}{27}b^2dex^3-\frac{8b^2e^2x^3}{225c^2}\\&-\frac{2}{125}b^2e^2x^5+\frac{2bd^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c}\\&+\frac{8bde\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{9c^3}\\&+\frac{16be^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{75c^5}\\&+\frac{4bdex^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{9c}\\&+\frac{8be^2x^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{75c^3}\\&+\frac{2be^2x^4\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{25c}\\&+d^2x(a+b\arcsin(cx))^2+\frac{2}{3}dex^3(a+b\arcsin(cx))^2\\&+\frac{1}{5}e^2x^5(a+b\arcsin(cx))^2\end{aligned}$$

output
```
-2*b^2*d^2*x-8/9*b^2*d*e*x/c^2-16/75*b^2*e^2*x/c^4-4/27*b^2*d*e*x^3-8/225*
b^2*e^2*x^3/c^2-2/125*b^2*e^2*x^5+2*b*d^2*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c
*x))/c+8/9*b*d*e*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c^3+16/75*b*e^2*(-c^
2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c^5+4/9*b*d*e*x^2*(-c^2*x^2+1)^(1/2)*(a+b
*arcsin(c*x))/c+8/75*b*e^2*x^2*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c^3+2/
25*b*e^2*x^4*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c+d^2*x*(a+b*arcsin(c*x)
)^2+2/3*d*e*x^3*(a+b*arcsin(c*x))^2+1/5*e^2*x^5*(a+b*arcsin(c*x))^2
```

Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 291, normalized size of antiderivative = 0.87

$$\int \left(d+ex^2\right)^2 (a+b\arcsin(cx))^2\,dx$$
$$= \frac{225a^2c^5x(15d^2+10dex^2+3e^2x^4)+30ab\sqrt{1-c^2x^2}(24e^2+4c^2e(25d+3ex^2)+c^4(225d^2+50dex^2+9e$$

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

output
```
(225*a^2*c^5*x*(15*d^2 + 10*d*e*x^2 + 3*e^2*x^4) + 30*a*b*Sqrt[1 - c^2*x^2
]*(24*e^2 + 4*c^2*e*(25*d + 3*e*x^2) + c^4*(225*d^2 + 50*d*e*x^2 + 9*e^2*x
^4)) - 2*b^2*c*x*(360*e^2 + 60*c^2*e*(25*d + e*x^2) + c^4*(3375*d^2 + 250*
d*e*x^2 + 27*e^2*x^4)) + 30*b*(15*a*c^5*x*(15*d^2 + 10*d*e*x^2 + 3*e^2*x^4
) + b*Sqrt[1 - c^2*x^2]*(24*e^2 + 4*c^2*e*(25*d + 3*e*x^2) + c^4*(225*d^2
+ 50*d*e*x^2 + 9*e^2*x^4)))*ArcSin[c*x] + 225*b^2*c^5*x*(15*d^2 + 10*d*e*x
^2 + 3*e^2*x^4)*ArcSin[c*x]^2)/(3375*c^5)
```

Rubi [A] (verified)

Time = 0.87 (sec) , antiderivative size = 335, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)^2 (a+b\arcsin(cx))^2\,dx$$

$$\downarrow 5172$$

$$\int \left(d^2(a+b\arcsin(cx))^2+2dex^2(a+b\arcsin(cx))^2+e^2x^4(a+b\arcsin(cx))^2\right)dx$$

$$\downarrow 2009$$

$$\frac{2bd^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c}+\frac{4bdex^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{9c}+\frac{2be^2x^4\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{25c}+\frac{16be^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{75c^5}+\frac{8bde\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{9c^3}+\frac{8be^2x^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{75c^3}+d^2x(a+b\arcsin(cx))^2+\frac{2}{3}dex^3(a+b\arcsin(cx))^2+\frac{1}{5}e^2x^5(a+b\arcsin(cx))^2-\frac{16b^2e^2x}{75c^4}-\frac{8b^2dex}{9c^2}-\frac{8b^2e^2x^3}{225c^2}-2b^2d^2x-\frac{4}{27}b^2dex^3-\frac{2}{125}b^2e^2x^5$$

input

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

output

```
-2*b^2*d^2*x - (8*b^2*d*e*x)/(9*c^2) - (16*b^2*e^2*x)/(75*c^4) - (4*b^2*d*
e*x^3)/27 - (8*b^2*e^2*x^3)/(225*c^2) - (2*b^2*e^2*x^5)/125 + (2*b*d^2*Sqr
t[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/c + (8*b*d*e*Sqrt[1 - c^2*x^2]*(a + b*
ArcSin[c*x]))/(9*c^3) + (16*b*e^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(
75*c^5) + (4*b*d*e*x^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(9*c) + (8*b
*e^2*x^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(75*c^3) + (2*b*e^2*x^4*Sq
rt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(25*c) + d^2*x*(a + b*ArcSin[c*x])^2
+ (2*d*e*x^3*(a + b*ArcSin[c*x])^2)/3 + (e^2*x^5*(a + b*ArcSin[c*x])^2)/5
```

Defintions of rubi rules used

rule 2009

```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [A] (verified)

Time = 0.35 (sec) , antiderivative size = 442, normalized size of antiderivative = 1.32

method	result
derivativedivides	$\frac{a^2\left(d^2c^5x+\frac{2}{3}dc^5ex^3+\frac{1}{5}e^2c^5x^5\right)}{c^4}+\frac{b^2\left(c^4d^2\left(\arcsin(cx)^2cx-2cx+2\arcsin(cx)\sqrt{-c^2x^2+1}\right)+\frac{2c^2de\left(9\arcsin(cx)^2c^3x^3+6\arcsin(c$
default	$\frac{a^2\left(d^2c^5x+\frac{2}{3}dc^5ex^3+\frac{1}{5}e^2c^5x^5\right)}{c^4}+\frac{b^2\left(c^4d^2\left(\arcsin(cx)^2cx-2cx+2\arcsin(cx)\sqrt{-c^2x^2+1}\right)+\frac{2c^2de\left(9\arcsin(cx)^2c^3x^3+6\arcsin(c$
parts	$a^2\left(\frac{1}{5}e^2x^5+\frac{2}{3}dex^3+d^2x\right)+\frac{b^2\left(675\arcsin(cx)^2c^5x^5e^2+2250\arcsin(cx)^2c^5x^3de+3375\arcsin(cx)^2c^5x\,d^2+\right.}{}$
orering	$\frac{x\left(1647c^6e^4x^8+10924c^6de^3x^6+77050c^6d^2e^2x^4+600c^4e^4x^6-4500c^6d^3ex^2+21808c^4de^3x^4+3375c^6d^4-89000c^4d^2e^2x\right.}{3375(ex^2+d)^2c^6}$

input
```
int((e*x^2+d)^2*(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
1/c*(a^2/c^4*(d^2*c^5*x+2/3*d*c^5*e*x^3+1/5*e^2*c^5*x^5)+b^2/c^4*(c^4*d^2*
(arcsin(c*x)^2*c*x-2*c*x+2*arcsin(c*x)*(-c^2*x^2+1)^(1/2))+2/27*c^2*d*e*(9
*arcsin(c*x)^2*c^3*x^3+6*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c^2*x^2-2*c^3*x^3+
12*arcsin(c*x)*(-c^2*x^2+1)^(1/2)-12*c*x)+1/1125*e^2*(225*arcsin(c*x)^2*c^
5*x^5+90*arcsin(c*x)*(-c^2*x^2+1)^(1/2)*c^4*x^4-18*c^5*x^5+120*arcsin(c*x)
*(-c^2*x^2+1)^(1/2)*c^2*x^2-40*c^3*x^3+240*arcsin(c*x)*(-c^2*x^2+1)^(1/2)-
240*c*x))+2*a*b/c^4*(arcsin(c*x)*d^2*c^5*x+2/3*arcsin(c*x)*d*c^5*e*x^3+1/5
*arcsin(c*x)*e^2*c^5*x^5-1/5*e^2*(-1/5*c^4*x^4*(-c^2*x^2+1)^(1/2)-4/15*c^2
*x^2*(-c^2*x^2+1)^(1/2)-8/15*(-c^2*x^2+1)^(1/2))+d^2*c^4*(-c^2*x^2+1)^(1/2
)-2/3*d*c^2*e*(-1/3*c^2*x^2*(-c^2*x^2+1)^(1/2)-2/3*(-c^2*x^2+1)^(1/2))))
```

Fricas [A] (verification not implemented)

Time = 0.11 (sec) , antiderivative size = 349, normalized size of antiderivative = 1.04

$$\int \left(d+ex^2\right)^2 (a+b\arcsin(cx))^2\,dx$$
$$= \frac{27\,(25\,a^2-2\,b^2)c^5e^2x^5+10\,(25\,(9\,a^2-2\,b^2)c^5de-12\,b^2c^3e^2)x^3+225\,(3\,b^2c^5e^2x^5+10\,b^2c^5dex^3+15\,b^2c$$

input
```
integrate((e*x^2+d)^2*(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
1/3375*(27*(25*a^2 - 2*b^2)*c^5*e^2*x^5 + 10*(25*(9*a^2 - 2*b^2)*c^5*d*e -
 12*b^2*c^3*e^2)*x^3 + 225*(3*b^2*c^5*e^2*x^5 + 10*b^2*c^5*d*e*x^3 + 15*b^
2*c^5*d^2*x)*arcsin(c*x)^2 + 15*(225*(a^2 - 2*b^2)*c^5*d^2 - 200*b^2*c^3*d
*e - 48*b^2*c*e^2)*x + 450*(3*a*b*c^5*e^2*x^5 + 10*a*b*c^5*d*e*x^3 + 15*a*
b*c^5*d^2*x)*arcsin(c*x) + 30*(9*a*b*c^4*e^2*x^4 + 225*a*b*c^4*d^2 + 100*a
*b*c^2*d*e + 24*a*b*e^2 + 2*(25*a*b*c^4*d*e + 6*a*b*c^2*e^2)*x^2 + (9*b^2*
c^4*e^2*x^4 + 225*b^2*c^4*d^2 + 100*b^2*c^2*d*e + 24*b^2*e^2 + 2*(25*b^2*c
^4*d*e + 6*b^2*c^2*e^2)*x^2)*arcsin(c*x))*sqrt(-c^2*x^2 + 1))/c^5
```

Sympy [A] (verification not implemented)

Time = 0.67 (sec) , antiderivative size = 595, normalized size of antiderivative = 1.78

$$\int \left(d+ex^2\right)^2 (a+b\arcsin(cx))^2\,dx$$
$$= \begin{cases} a^2d^2x+\frac{2a^2dex^3}{3}+\frac{a^2e^2x^5}{5}+2abd^2x\operatorname{asin}(cx)+\frac{4abdex^3\operatorname{asin}(cx)}{3}+\frac{2abe^2x^5\operatorname{asin}(cx)}{5}+\frac{2abd^2\sqrt{-c^2x^2+1}}{c}+\frac{4abdex^2\sqrt{-}}{9c} \\ a^2\left(d^2x+\frac{2dex^3}{3}+\frac{e^2x^5}{5}\right) \end{cases}$$

input
```
integrate((e*x**2+d)**2*(a+b*asin(c*x))**2,x)
```

output

```
Piecewise((a**2*d**2*x + 2*a**2*d*e*x**3/3 + a**2*e**2*x**5/5 + 2*a*b*d**2
*x*asin(c*x) + 4*a*b*d*e*x**3*asin(c*x)/3 + 2*a*b*e**2*x**5*asin(c*x)/5 +
2*a*b*d**2*sqrt(-c**2*x**2 + 1)/c + 4*a*b*d*e*x**2*sqrt(-c**2*x**2 + 1)/(9
*c) + 2*a*b*e**2*x**4*sqrt(-c**2*x**2 + 1)/(25*c) + 8*a*b*d*e*sqrt(-c**2*x
**2 + 1)/(9*c**3) + 8*a*b*e**2*x**2*sqrt(-c**2*x**2 + 1)/(75*c**3) + 16*a*
b*e**2*sqrt(-c**2*x**2 + 1)/(75*c**5) + b**2*d**2*x*asin(c*x)**2 - 2*b**2*
d**2*x + 2*b**2*d*e*x**3*asin(c*x)**2/3 - 4*b**2*d*e*x**3/27 + b**2*e**2*x
**5*asin(c*x)**2/5 - 2*b**2*e**2*x**5/125 + 2*b**2*d**2*sqrt(-c**2*x**2 +
1)*asin(c*x)/c + 4*b**2*d*e*x**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/(9*c) + 2*
b**2*e**2*x**4*sqrt(-c**2*x**2 + 1)*asin(c*x)/(25*c) - 8*b**2*d*e*x/(9*c**
2) - 8*b**2*e**2*x**3/(225*c**2) + 8*b**2*d*e*sqrt(-c**2*x**2 + 1)*asin(c*
x)/(9*c**3) + 8*b**2*e**2*x**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/(75*c**3) -
16*b**2*e**2*x/(75*c**4) + 16*b**2*e**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/(75
*c**5), Ne(c, 0)), (a**2*(d**2*x + 2*d*e*x**3/3 + e**2*x**5/5), True))
```

Maxima [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 437, normalized size of antiderivative = 1.30

$$
\begin{aligned}
&\int \left(d+ex^2\right)^2 \left(a+b\arcsin(cx)\right)^2 dx \\
&= \frac{1}{5}b^2e^2x^5\arcsin\left(cx\right)^2 + \frac{1}{5}a^2e^2x^5 + \frac{2}{3}b^2dex^3\arcsin\left(cx\right)^2 + \frac{2}{3}a^2dex^3 + b^2d^2x\arcsin\left(cx\right)^2 \\
&\quad + \frac{4}{9}\left(3x^3\arcsin\left(cx\right) + c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right)abde \\
&\quad + \frac{4}{27}\left(3c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2} + \frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\arcsin\left(cx\right) - \frac{c^2x^3+6x}{c^2}\right)b^2de \\
&\quad + \frac{2}{75}\left(15x^5\arcsin\left(cx\right) + \left(\frac{3\sqrt{-c^2x^2+1}x^4}{c^2} + \frac{4\sqrt{-c^2x^2+1}x^2}{c^4} + \frac{8\sqrt{-c^2x^2+1}}{c^6}\right)c\right)abe^2 \\
&\quad + \frac{2}{1125}\left(15\left(\frac{3\sqrt{-c^2x^2+1}x^4}{c^2} + \frac{4\sqrt{-c^2x^2+1}x^2}{c^4} + \frac{8\sqrt{-c^2x^2+1}}{c^6}\right)c\arcsin\left(cx\right) - \frac{9c^4x^5+20c^2x^3+}{c^4}\right. \\
&\quad - 2b^2d^2\left(x - \frac{\sqrt{-c^2x^2+1}\arcsin\left(cx\right)}{c}\right) \\
&\quad + a^2d^2x + \frac{2\left(cx\arcsin\left(cx\right) + \sqrt{-c^2x^2+1}\right)abd^2}{c}
\end{aligned}
$$

input
```
integrate((e*x^2+d)^2*(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
1/5*b^2*e^2*x^5*arcsin(c*x)^2 + 1/5*a^2*e^2*x^5 + 2/3*b^2*d*e*x^3*arcsin(c
*x)^2 + 2/3*a^2*d*e*x^3 + b^2*d^2*x*arcsin(c*x)^2 + 4/9*(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*d*e + 4/
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*d*e + 2/75*(15*x^5*arcsin(c*x) + (3*sqrt(-c^2
*x^2 + 1)*x^4/c^2 + 4*sqrt(-c^2*x^2 + 1)*x^2/c^4 + 8*sqrt(-c^2*x^2 + 1)/c^
6)*c)*a*b*e^2 + 2/1125*(15*(3*sqrt(-c^2*x^2 + 1)*x^4/c^2 + 4*sqrt(-c^2*x^2
 + 1)*x^2/c^4 + 8*sqrt(-c^2*x^2 + 1)/c^6)*c*arcsin(c*x) - (9*c^4*x^5 + 20*
c^2*x^3 + 120*x)/c^4)*b^2*e^2 - 2*b^2*d^2*(x - sqrt(-c^2*x^2 + 1)*arcsin(c
*x)/c) + a^2*d^2*x + 2*(c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))*a*b*d^2/c
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 683 vs. $2(299) = 598$.

Time $= 0.15$ (sec) , antiderivative size $= 683$, normalized size of antiderivative $= 2.04$

$$\int \left(d + ex^2\right)^2 \left(a + b \arcsin(cx)\right)^2 dx = \text{Too large to display}$$

input
```
integrate((e*x^2+d)^2*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output

```
1/5*a^2*e^2*x^5 + 2/3*a^2*d*e*x^3 + b^2*d^2*x*arcsin(c*x)^2 + 2*a*b*d^2*x*
arcsin(c*x) + 2/3*(c^2*x^2 - 1)*b^2*d*e*x*arcsin(c*x)^2/c^2 + a^2*d^2*x -
2*b^2*d^2*x + 4/3*(c^2*x^2 - 1)*a*b*d*e*x*arcsin(c*x)/c^2 + 2/3*b^2*d*e*x*
arcsin(c*x)^2/c^2 + 1/5*(c^2*x^2 - 1)^2*b^2*e^2*x*arcsin(c*x)^2/c^4 + 2*sq
rt(-c^2*x^2 + 1)*b^2*d^2*arcsin(c*x)/c - 4/27*(c^2*x^2 - 1)*b^2*d*e*x/c^2
+ 4/3*a*b*d*e*x*arcsin(c*x)/c^2 + 2/5*(c^2*x^2 - 1)^2*a*b*e^2*x*arcsin(c*x
)/c^4 + 2/5*(c^2*x^2 - 1)*b^2*e^2*x*arcsin(c*x)^2/c^4 + 2*sqrt(-c^2*x^2 +
1)*a*b*d^2/c - 4/9*(-c^2*x^2 + 1)^(3/2)*b^2*d*e*arcsin(c*x)/c^3 - 28/27*b^
2*d*e*x/c^2 - 2/125*(c^2*x^2 - 1)^2*b^2*e^2*x/c^4 + 4/5*(c^2*x^2 - 1)*a*b*
e^2*x*arcsin(c*x)/c^4 + 1/5*b^2*e^2*x*arcsin(c*x)^2/c^4 - 4/9*(-c^2*x^2 +
1)^(3/2)*a*b*d*e/c^3 + 4/3*sqrt(-c^2*x^2 + 1)*b^2*d*e*arcsin(c*x)/c^3 + 2/
25*(c^2*x^2 - 1)^2*sqrt(-c^2*x^2 + 1)*b^2*e^2*arcsin(c*x)/c^5 - 76/1125*(c
^2*x^2 - 1)*b^2*e^2*x/c^4 + 2/5*a*b*e^2*x*arcsin(c*x)/c^4 + 4/3*sqrt(-c^2*
x^2 + 1)*a*b*d*e/c^3 + 2/25*(c^2*x^2 - 1)^2*sqrt(-c^2*x^2 + 1)*a*b*e^2/c^5
 - 4/15*(-c^2*x^2 + 1)^(3/2)*b^2*e^2*arcsin(c*x)/c^5 - 298/1125*b^2*e^2*x/
c^4 - 4/15*(-c^2*x^2 + 1)^(3/2)*a*b*e^2/c^5 + 2/5*sqrt(-c^2*x^2 + 1)*b^2*e
^2*arcsin(c*x)/c^5 + 2/5*sqrt(-c^2*x^2 + 1)*a*b*e^2/c^5
```

Mupad [F(-1)]

Timed out.

$$\int (d+ex^2)^2\,(a+b\arcsin(cx))^2\,dx = \int (a+b\,\mathrm{asin}(c\,x))^2\,(e\,x^2+d)^2\,dx$$

input

```
int((a + b*asin(c*x))^2*(d + e*x^2)^2,x)
```

output

```
int((a + b*asin(c*x))^2*(d + e*x^2)^2, x)
```

Reduce [F]

$$\int (d+ex^2)^2\,(a+b\arcsin(cx))^2\,dx$$

$$= \frac{225\,asin(cx)^2\,b^2c^5d^2x + 450\sqrt{-c^2x^2+1}\,asin(cx)\,b^2c^4d^2 + 450\,asin(cx)\,ab\,c^5d^2x + 300\,asin(cx)\,ab\,c^5de\,x^3}$$

input
```
int((e*x^2+d)^2*(a+b*asin(c*x))^2,x)
```

output
```
(225*asin(c*x)**2*b**2*c**5*d**2*x + 450*sqrt( - c**2*x**2 + 1)*asin(c*x)*
b**2*c**4*d**2 + 450*asin(c*x)*a*b*c**5*d**2*x + 300*asin(c*x)*a*b*c**5*d*
e*x**3 + 90*asin(c*x)*a*b*c**5*e**2*x**5 + 450*sqrt( - c**2*x**2 + 1)*a*b*
c**4*d**2 + 100*sqrt( - c**2*x**2 + 1)*a*b*c**4*d*e*x**2 + 18*sqrt( - c**2
*x**2 + 1)*a*b*c**4*e**2*x**4 + 200*sqrt( - c**2*x**2 + 1)*a*b*c**2*d*e +
24*sqrt( - c**2*x**2 + 1)*a*b*c**2*e**2*x**2 + 48*sqrt( - c**2*x**2 + 1)*a
*b*e**2 + 225*int(asin(c*x)**2*x**4,x)*b**2*c**5*e**2 + 450*int(asin(c*x)*
*2*x**2,x)*b**2*c**5*d*e + 225*a**2*c**5*d**2*x + 150*a**2*c**5*d*e*x**3 +
 45*a**2*c**5*e**2*x**5 - 450*b**2*c**5*d**2*x)/(225*c**5)
```

3.152 $\int (d+ex^2)\,(a+b\arcsin(cx))^2\,dx$

Optimal result 1170
Mathematica [A] (verified) 1171
Rubi [A] (verified) 1171
Maple [A] (verified) 1173
Fricas [A] (verification not implemented) 1173
Sympy [A] (verification not implemented) 1174
Maxima [A] (verification not implemented) 1175
Giac [B] (verification not implemented) 1176
Mupad [F(-1)] 1177
Reduce [F] 1177

Optimal result

Integrand size = 18, antiderivative size = 156

$$\begin{aligned}\int (d+ex^2)\,(a+b\arcsin(cx))^2\,dx = {} & -2b^2dx - \frac{4b^2ex}{9c^2} - \frac{2}{27}b^2ex^3 \\ & + \frac{2bd\sqrt{1-c^2x^2}\,(a+b\arcsin(cx))}{c} \\ & + \frac{4be\sqrt{1-c^2x^2}\,(a+b\arcsin(cx))}{9c^3} \\ & + \frac{2bex^2\sqrt{1-c^2x^2}\,(a+b\arcsin(cx))}{9c} \\ & + dx(a+b\arcsin(cx))^2 + \frac{1}{3}ex^3(a+b\arcsin(cx))^2\end{aligned}$$

output

```
-2*b^2*d*x-4/9*b^2*e*x/c^2-2/27*b^2*e*x^3+2*b*d*(-c^2*x^2+1)^(1/2)*(a+b*ar
csin(c*x))/c+4/9*b*e*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c^3+2/9*b*e*x^2*
(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c+d*x*(a+b*arcsin(c*x))^2+1/3*e*x^3*(
a+b*arcsin(c*x))^2
```

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 148, normalized size of antiderivative = 0.95

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)^2\,dx = dx(a+b\arcsin(cx))^2+\frac{1}{3}ex^3(a+b\arcsin(cx))^2 - 2bd\left(bx-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c}\right) - \frac{2}{27}be\left(bx^3-\frac{3x^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c} + \frac{6\left(\frac{bx}{c}-\frac{\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c^2}\right)}{c}\right)$$

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

output
```
d*x*(a + b*ArcSin[c*x])^2 + (e*x^3*(a + b*ArcSin[c*x])^2)/3 - 2*b*d*(b*x -
 (Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/c) - (2*b*e*(b*x^3 - (3*x^2*Sqrt[
1 - c^2*x^2]*(a + b*ArcSin[c*x]))/c + (6*((b*x)/c - (Sqrt[1 - c^2*x^2]*(a
+ b*ArcSin[c*x]))/c^2))/c))/27
```

Rubi [A] (verified)

Time = 0.50 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)^2\,dx$$

$$\downarrow 5172$$

$$\int \left(d(a+b\arcsin(cx))^2+ex^2(a+b\arcsin(cx))^2\right)\,dx$$

$$\downarrow 2009$$

$$\frac{2bd\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{c}+\frac{2bex^2\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{9c}+\frac{4be\sqrt{1-c^2x^2}(a+b\arcsin(cx))}{9c^3}+dx(a+b\arcsin(cx))^2+\frac{1}{3}ex^3(a+b\arcsin(cx))^2-\frac{4b^2ex}{9c^2}-2b^2dx-\frac{2}{27}b^2ex^3$$

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

output
```
-2*b^2*d*x - (4*b^2*e*x)/(9*c^2) - (2*b^2*e*x^3)/27 + (2*b*d*Sqrt[1 - c^2*
x^2]*(a + b*ArcSin[c*x]))/c + (4*b*e*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])
)/(9*c^3) + (2*b*e*x^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(9*c) + d*x*
(a + b*ArcSin[c*x])^2 + (e*x^3*(a + b*ArcSin[c*x])^2)/3
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 221, normalized size of antiderivative = 1.42

method	result
parts	$a^2\left(\frac{1}{3}e\,x^3+dx\right)+\frac{b^2\left(\frac{e\left(9\arcsin(cx)^2c^3x^3+6\arcsin(cx)\sqrt{-c^2x^2+1}\,c^2x^2-2c^3x^3+12\arcsin(cx)\sqrt{-c^2x^2+1}-12cx\right)}{27c^2}+d\left(a\right.\right.}{c}$
derivativedivides	$\frac{a^2\left(c^3dx+\frac{1}{3}e\,c^3x^3\right)}{c^2}+\frac{b^2\left(d\,c^2\left(\arcsin(cx)^2cx-2cx+2\arcsin(cx)\sqrt{-c^2x^2+1}\right)+\frac{e\left(9\arcsin(cx)^2c^3x^3+6\arcsin(cx)\sqrt{-c^2x^2+1}\,c^2x^2-\right.}{27}\right.}{c^2}$
default	$\frac{a^2\left(c^3dx+\frac{1}{3}e\,c^3x^3\right)}{c^2}+\frac{b^2\left(d\,c^2\left(\arcsin(cx)^2cx-2cx+2\arcsin(cx)\sqrt{-c^2x^2+1}\right)+\frac{e\left(9\arcsin(cx)^2c^3x^3+6\arcsin(cx)\sqrt{-c^2x^2+1}\,c^2x^2-\right.}{27}\right.}{c^2}$
orering	$\frac{x\left(19c^4e^3x^6+209c^4de^2x^4+9c^4d^2ex^2+24c^2e^3x^4+27c^4d^3-232c^2de^2x^2-48e^3x^2\right)(a+b\arcsin(cx))^2}{27(ex^2+d)^2c^4}-\frac{(6c^4e^2x^6+110}{}$

input
```
int((e*x^2+d)*(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
a^2*(1/3*e*x^3+d*x)+b^2/c*(1/27*e*(9*arcsin(c*x)^2*c^3*x^3+6*arcsin(c*x)*(
-c^2*x^2+1)^(1/2)*c^2*x^2-2*c^3*x^3+12*arcsin(c*x)*(-c^2*x^2+1)^(1/2)-12*c
*x)/c^2+d*(arcsin(c*x)^2*c*x-2*c*x+2*arcsin(c*x)*(-c^2*x^2+1)^(1/2)))+2*a*
b/c*(1/3*c*arcsin(c*x)*e*x^3+arcsin(c*x)*c*x*d-1/3/c^2*(e*(-1/3*c^2*x^2*(-
c^2*x^2+1)^(1/2)-2/3*(-c^2*x^2+1)^(1/2))-3*d*c^2*(-c^2*x^2+1)^(1/2)))
```

Fricas [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.13

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)^2\,dx$$
$$=\frac{\left(9\,a^2-2\,b^2\right)c^3ex^3+9\left(b^2c^3ex^3+3\,b^2c^3dx\right)\arcsin\left(cx\right)^2+3\left(9\left(a^2-2\,b^2\right)c^3d-4\,b^2ce\right)x+18\left(abc^3ex^3+3\right.}{27}$$

input
```
integrate((e*x^2+d)*(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
1/27*((9*a^2 - 2*b^2)*c^3*e*x^3 + 9*(b^2*c^3*e*x^3 + 3*b^2*c^3*d*x)*arcsin
(c*x)^2 + 3*(9*(a^2 - 2*b^2)*c^3*d - 4*b^2*c*e)*x + 18*(a*b*c^3*e*x^3 + 3*
a*b*c^3*d*x)*arcsin(c*x) + 6*(a*b*c^2*e*x^2 + 9*a*b*c^2*d + 2*a*b*e + (b^2
*c^2*e*x^2 + 9*b^2*c^2*d + 2*b^2*e)*arcsin(c*x))*sqrt(-c^2*x^2 + 1))/c^3
```

Sympy [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 279, normalized size of antiderivative = 1.79

$$\int \left(d+ex^2\right)\left(a+b\operatorname{arcsin}(cx)\right)^2 dx$$
$$= \begin{cases} a^2dx + \frac{a^2ex^3}{3} + 2abdx\operatorname{asin}(cx) + \frac{2abex^3\operatorname{asin}(cx)}{3} + \frac{2abd\sqrt{-c^2x^2+1}}{c} + \frac{2abex^2\sqrt{-c^2x^2+1}}{9c} + \frac{4abe\sqrt{-c^2x^2+1}}{9c^3} + b^2dx\,\mathrm{as} \\ a^2\left(dx+\frac{ex^3}{3}\right) \end{cases}$$

input
```
integrate((e*x**2+d)*(a+b*asin(c*x))**2,x)
```

output
```
Piecewise((a**2*d*x + a**2*e*x**3/3 + 2*a*b*d*x*asin(c*x) + 2*a*b*e*x**3*a
sin(c*x)/3 + 2*a*b*d*sqrt(-c**2*x**2 + 1)/c + 2*a*b*e*x**2*sqrt(-c**2*x**2
 + 1)/(9*c) + 4*a*b*e*sqrt(-c**2*x**2 + 1)/(9*c**3) + b**2*d*x*asin(c*x)**
2 - 2*b**2*d*x + b**2*e*x**3*asin(c*x)**2/3 - 2*b**2*e*x**3/27 + 2*b**2*d*
sqrt(-c**2*x**2 + 1)*asin(c*x)/c + 2*b**2*e*x**2*sqrt(-c**2*x**2 + 1)*asin
(c*x)/(9*c) - 4*b**2*e*x/(9*c**2) + 4*b**2*e*sqrt(-c**2*x**2 + 1)*asin(c*x
)/(9*c**3), Ne(c, 0)), (a**2*(d*x + e*x**3/3), True))
```

Maxima [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 221, normalized size of antiderivative = 1.42

$$\begin{aligned}
&\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)^2\,dx \\
&= \frac{1}{3}\,b^2ex^3\arcsin\left(cx\right)^2+\frac{1}{3}\,a^2ex^3+b^2dx\arcsin\left(cx\right)^2 \\
&\quad+\frac{2}{9}\left(3\,x^3\arcsin\left(cx\right)+c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2}+\frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right)abe \\
&\quad+\frac{2}{27}\left(3\,c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2}+\frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\arcsin\left(cx\right)-\frac{c^2x^3+6\,x}{c^2}\right)b^2e \\
&\quad-2\,b^2d\left(x-\frac{\sqrt{-c^2x^2+1}\arcsin\left(cx\right)}{c}\right)+a^2dx+\frac{2\left(cx\arcsin\left(cx\right)+\sqrt{-c^2x^2+1}\right)abd}{c}
\end{aligned}$$

input

```
integrate((e*x^2+d)*(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output

```
1/3*b^2*e*x^3*arcsin(c*x)^2 + 1/3*a^2*e*x^3 + b^2*d*x*arcsin(c*x)^2 + 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*e + 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*e - 2*b^2*d*(x - sqrt(-c^2*x^
2 + 1)*arcsin(c*x)/c) + a^2*d*x + 2*(c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))
*a*b*d/c
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 285 vs. 2(140) = 280.

Time = 0.14 (sec) , antiderivative size = 285, normalized size of antiderivative = 1.83

$$\begin{aligned}\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)^2 dx = {} & \frac{1}{3}a^2ex^3 + b^2dx\arcsin\left(cx\right)^2 + 2\,abdx\arcsin\left(cx\right) \\ & + \frac{(c^2x^2-1)b^2ex\arcsin\left(cx\right)^2}{3\,c^2} + a^2dx - 2\,b^2dx \\ & + \frac{2\,(c^2x^2-1)abex\arcsin\left(cx\right)}{3\,c^2} + \frac{b^2ex\arcsin\left(cx\right)^2}{3\,c^2} \\ & + \frac{2\sqrt{-c^2x^2+1}b^2d\arcsin\left(cx\right)}{c} - \frac{2\,(c^2x^2-1)b^2ex}{27\,c^2} \\ & + \frac{2\,abex\arcsin\left(cx\right)}{3\,c^2} + \frac{2\sqrt{-c^2x^2+1}abd}{c} \\ & - \frac{2\,(-c^2x^2+1)^{\frac{3}{2}}b^2e\arcsin\left(cx\right)}{9\,c^3} \\ & - \frac{14\,b^2ex}{27\,c^2} - \frac{2\,(-c^2x^2+1)^{\frac{3}{2}}abe}{9\,c^3} \\ & + \frac{2\sqrt{-c^2x^2+1}b^2e\arcsin\left(cx\right)}{3\,c^3} + \frac{2\sqrt{-c^2x^2+1}abe}{3\,c^3}\end{aligned}$$

input

```
integrate((e*x^2+d)*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output

```
1/3*a^2*e*x^3 + b^2*d*x*arcsin(c*x)^2 + 2*a*b*d*x*arcsin(c*x) + 1/3*(c^2*x
^2 - 1)*b^2*e*x*arcsin(c*x)^2/c^2 + a^2*d*x - 2*b^2*d*x + 2/3*(c^2*x^2 - 1
)*a*b*e*x*arcsin(c*x)/c^2 + 1/3*b^2*e*x*arcsin(c*x)^2/c^2 + 2*sqrt(-c^2*x^
2 + 1)*b^2*d*arcsin(c*x)/c - 2/27*(c^2*x^2 - 1)*b^2*e*x/c^2 + 2/3*a*b*e*x*
arcsin(c*x)/c^2 + 2*sqrt(-c^2*x^2 + 1)*a*b*d/c - 2/9*(-c^2*x^2 + 1)^(3/2)*
b^2*e*arcsin(c*x)/c^3 - 14/27*b^2*e*x/c^2 - 2/9*(-c^2*x^2 + 1)^(3/2)*a*b*e
/c^3 + 2/3*sqrt(-c^2*x^2 + 1)*b^2*e*arcsin(c*x)/c^3 + 2/3*sqrt(-c^2*x^2 +
1)*a*b*e/c^3
```

Mupad [F(-1)]

Timed out.

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)^2\,dx = \int \left(a+b\,\mathrm{asin}(c\,x)\right)^2\left(e\,x^2+d\right)\,dx$$

input
```
int((a + b*asin(c*x))^2*(d + e*x^2),x)
```

output
```
int((a + b*asin(c*x))^2*(d + e*x^2), x)
```

Reduce [F]

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)^2\,dx$$
$$= \frac{9asin(cx)^2\,b^2c^3dx + 18\sqrt{-c^2x^2+1}\,asin(cx)\,b^2c^2d + 18asin(cx)\,ab\,c^3dx + 6asin(cx)\,ab\,c^3e\,x^3 + 18\sqrt{-c^2}}{}$$

input
```
int((e*x^2+d)*(a+b*asin(c*x))^2,x)
```

output
```
(9*asin(c*x)**2*b**2*c**3*d*x + 18*sqrt( - c**2*x**2 + 1)*asin(c*x)*b**2*c
**2*d + 18*asin(c*x)*a*b*c**3*d*x + 6*asin(c*x)*a*b*c**3*e*x**3 + 18*sqrt(
 - c**2*x**2 + 1)*a*b*c**2*d + 2*sqrt( - c**2*x**2 + 1)*a*b*c**2*e*x**2 +
4*sqrt( - c**2*x**2 + 1)*a*b*e + 9*int(asin(c*x)**2*x**2,x)*b**2*c**3*e +
9*a**2*c**3*d*x + 3*a**2*c**3*e*x**3 - 18*b**2*c**3*d*x)/(9*c**3)
```

3.153 $\int (a + b \arcsin(cx))^2 \, dx$

Optimal result 1178
Mathematica [A] (verified) 1178
Rubi [A] (verified) 1179
Maple [A] (verified) 1180
Fricas [A] (verification not implemented) 1180
Sympy [A] (verification not implemented) 1181
Maxima [A] (verification not implemented) 1181
Giac [A] (verification not implemented) 1182
Mupad [B] (verification not implemented) 1182
Reduce [B] (verification not implemented) 1183

Optimal result

Integrand size = 10, antiderivative size = 47

$$\int (a + b \arcsin(cx))^2 \, dx = -2b^2 x + \frac{2b\sqrt{1 - c^2x^2}(a + b \arcsin(cx))}{c} + x(a + b \arcsin(cx))^2$$

output
```
-2*b^2*x+2*b*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))/c+x*(a+b*arcsin(c*x))^2
```

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.00

$$\int (a + b \arcsin(cx))^2 \, dx = -2b^2 x + \frac{2b\sqrt{1 - c^2x^2}(a + b \arcsin(cx))}{c} + x(a + b \arcsin(cx))^2$$

input
```
Integrate[(a + b*ArcSin[c*x])^2,x]
```

output
```
-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] (verified)

Time = 0.29 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.09, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {5130, 5182, 24}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (a + b \arcsin(cx))^2 \, dx$$

$$\downarrow 5130$$

$$x(a + b \arcsin(cx))^2 - 2bc \int \frac{x(a + b \arcsin(cx))}{\sqrt{1 - c^2 x^2}} dx$$

$$\downarrow 5182$$

$$x(a + b \arcsin(cx))^2 - 2bc \left(\frac{b \int 1 dx}{c} - \frac{\sqrt{1 - c^2 x^2}(a + b \arcsin(cx))}{c^2} \right)$$

$$\downarrow 24$$

$$x(a + b \arcsin(cx))^2 - 2bc \left(\frac{bx}{c} - \frac{\sqrt{1 - c^2 x^2}(a + b \arcsin(cx))}{c^2} \right)$$

input
```
Int[(a + b*ArcSin[c*x])^2,x]
```

output
```
x*(a + b*ArcSin[c*x])^2 - 2*b*c*((b*x)/c - (Sqrt[1 - c^2*x^2]*(a + b*ArcSi
n[c*x]))/c^2)
```

Defintions of rubi rules used

rule 24
```
Int[a_, x_Symbol] :> Simp[a*x, x] /; FreeQ[a, x]
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5182

```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.53

method	result	size
derivativedivides	$\frac{cx\,a^2+b^2\left(\arcsin(cx)^2cx-2cx+2\arcsin(cx)\sqrt{-c^2x^2+1}\right)+2ab\left(cx\arcsin(cx)+\sqrt{-c^2x^2+1}\right)}{c}$	72
default	$\frac{cx\,a^2+b^2\left(\arcsin(cx)^2cx-2cx+2\arcsin(cx)\sqrt{-c^2x^2+1}\right)+2ab\left(cx\arcsin(cx)+\sqrt{-c^2x^2+1}\right)}{c}$	72
parts	$x\,a^2+\frac{b^2\left(\arcsin(cx)^2cx-2cx+2\arcsin(cx)\sqrt{-c^2x^2+1}\right)}{c}+\frac{2ab\left(cx\arcsin(cx)+\sqrt{-c^2x^2+1}\right)}{c}$	73
orering	$x(a+b\arcsin(cx))^2+\frac{2(a+b\arcsin(cx))b}{c\sqrt{-c^2x^2+1}}+\frac{x(cx-1)(cx+1)\left(\frac{2b^2c^2}{-c^2x^2+1}+\frac{2(a+b\arcsin(cx))bc^3x}{\left(-c^2x^2+1\right)^{\frac{3}{2}}}\right)}{c^2}$	103

input

```
int((a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output

```
1/c*(c*x*a^2+b^2*(arcsin(c*x)^2*c*x-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)))
```

Fricas [A] (verification not implemented)

Time = 0.10 (sec) , antiderivative size = 65, normalized size of antiderivative = 1.38

$$\int (a+b\arcsin(cx))^2\,dx$$
$$=\frac{b^2cx\arcsin(cx)^2+2\,abcx\arcsin(cx)+(a^2-2\,b^2)cx+2\sqrt{-c^2x^2+1}(b^2\arcsin(cx)+ab)}{c}$$

input

```
integrate((a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
(b^2*c*x*arcsin(c*x)^2 + 2*a*b*c*x*arcsin(c*x) + (a^2 - 2*b^2)*c*x + 2*sqr
t(-c^2*x^2 + 1)*(b^2*arcsin(c*x) + a*b))/c
```

Sympy [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.74

$$\int (a + b \arcsin(cx))^2 \, dx$$
$$= \begin{cases} a^2 x + 2abx \operatorname{asin}(cx) + \frac{2ab\sqrt{-c^2x^2+1}}{c} + b^2 x \operatorname{asin}^2(cx) - 2b^2 x + \frac{2b^2\sqrt{-c^2x^2+1}\operatorname{asin}(cx)}{c} & \text{for } c \neq 0 \\ a^2 x & \text{otherwise} \end{cases}$$

input
```
integrate((a+b*asin(c*x))**2,x)
```

output
```
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))
```

Maxima [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.53

$$\int (a + b \arcsin(cx))^2 \, dx = b^2 x \arcsin(cx)^2 - 2b^2 \left(x - \frac{\sqrt{-c^2x^2+1}\arcsin(cx)}{c} \right) + a^2 x + \frac{2\left(cx \arcsin(cx) + \sqrt{-c^2x^2+1}\right)ab}{c}$$

input
```
integrate((a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
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
```

Giac [A] (verification not implemented)

Time = 0.12 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.60

$$\int (a + b \arcsin(cx))^2 \, dx = b^2 x \arcsin(cx)^2 + 2abx \arcsin(cx) + a^2 x - 2b^2 x + \frac{2\sqrt{-c^2x^2+1}b^2 \arcsin(cx)}{c} + \frac{2\sqrt{-c^2x^2+1}ab}{c}$$

input
```
integrate((a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
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
```

Mupad [B] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 142, normalized size of antiderivative = 3.02

$$\int (a + b \arcsin(cx))^2 \, dx$$

$$= \begin{cases} b^2 \left(x \left(\operatorname{asin}(c\,x)^2 - 2 \right) + 2 \operatorname{asin}(c\,x) \sqrt{\frac{1}{c^2} - x^2} \right) + a^2 x + \frac{2\,a\,b \left(\sqrt{1-c^2\,x^2} + c\,x \operatorname{asin}(c\,x) \right)}{c} & \text{if } 0 < c \\ a^2 x + b^2 x \left(\operatorname{asin}(c\,x)^2 - 2 \right) + \frac{2\,b^2 \operatorname{asin}(c\,x) \sqrt{1-c^2\,x^2}}{c} + \frac{2\,a\,b \left(\sqrt{1-c^2\,x^2} + c\,x \operatorname{asin}(c\,x) \right)}{c} & \text{if } \neg(0 < c) \end{cases}$$

input
```
int((a + b*asin(c*x))^2,x)
```

output
```
piecewise(0 < c, b^2*(x*(asin(c*x)^2 - 2) + 2*asin(c*x)*(1/c^2 - x^2)^(1/2
)) + a^2*x + (2*a*b*((- c^2*x^2 + 1)^(1/2) + c*x*asin(c*x)))/c, ~0 < c, a^
2*x + b^2*x*(asin(c*x)^2 - 2) + (2*b^2*asin(c*x)*(- c^2*x^2 + 1)^(1/2))/c
+ (2*a*b*((- c^2*x^2 + 1)^(1/2) + c*x*asin(c*x)))/c)
```

Reduce [B] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.60

$$\int (a + b \arcsin(cx))^2 \, dx$$
$$= \frac{asin(cx)^2 b^2 cx + 2\sqrt{-c^2x^2+1}\, asin(cx)\, b^2 + 2asin(cx)\, abcx + 2\sqrt{-c^2x^2+1}\, ab + a^2cx - 2b^2cx}{c}$$

input
```
int((a+b*asin(c*x))^2,x)
```

output
```
(asin(c*x)**2*b**2*c*x + 2*sqrt( - c**2*x**2 + 1)*asin(c*x)*b**2 + 2*asin(
c*x)*a*b*c*x + 2*sqrt( - c**2*x**2 + 1)*a*b + a**2*c*x - 2*b**2*c*x)/c
```

3.154 $\int \frac{(a+b\arcsin(cx))^2}{d+ex^2}\,dx$

Optimal result 1185
Mathematica [A] (verified) 1186
Rubi [A] (verified) 1187
Maple [F] 1189
Fricas [F] 1190
Sympy [F] 1190
Maxima [F(-2)] 1190
Giac [F(-2)] 1191
Mupad [F(-1)] 1191
Reduce [F] 1192

Optimal result

Integrand size = 20, antiderivative size = 821

$$\begin{aligned}\int \frac{(a+b\arcsin(cx))^2}{d+ex^2}\,dx = {} & \frac{(a+b\arcsin(cx))^2\log\left(1-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{c^2d+e}}\right)}{2\sqrt{-d}\sqrt{e}} \\ & - \frac{(a+b\arcsin(cx))^2\log\left(1+\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{c^2d+e}}\right)}{2\sqrt{-d}\sqrt{e}} \\ & + \frac{(a+b\arcsin(cx))^2\log\left(1-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}+\sqrt{c^2d+e}}\right)}{2\sqrt{-d}\sqrt{e}} \\ & - \frac{(a+b\arcsin(cx))^2\log\left(1+\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}+\sqrt{c^2d+e}}\right)}{2\sqrt{-d}\sqrt{e}} \\ & + \frac{ib(a+b\arcsin(cx))\,\mathrm{PolyLog}\left(2,-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{c^2d+e}}\right)}{\sqrt{-d}\sqrt{e}} \\ & - \frac{ib(a+b\arcsin(cx))\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{c^2d+e}}\right)}{\sqrt{-d}\sqrt{e}} \\ & + \frac{ib(a+b\arcsin(cx))\,\mathrm{PolyLog}\left(2,-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}+\sqrt{c^2d+e}}\right)}{\sqrt{-d}\sqrt{e}} \\ & - \frac{ib(a+b\arcsin(cx))\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}+\sqrt{c^2d+e}}\right)}{\sqrt{-d}\sqrt{e}} \\ & - \frac{b^2\,\mathrm{PolyLog}\left(3,-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{c^2d+e}}\right)}{\sqrt{-d}\sqrt{e}} \\ & + \frac{b^2\,\mathrm{PolyLog}\left(3,\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{c^2d+e}}\right)}{\sqrt{-d}\sqrt{e}} \\ & - \frac{b^2\,\mathrm{PolyLog}\left(3,-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}+\sqrt{c^2d+e}}\right)}{\sqrt{-d}\sqrt{e}} \\ & + \frac{b^2\,\mathrm{PolyLog}\left(3,\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}+\sqrt{c^2d+e}}\right)}{\sqrt{-d}\sqrt{e}}\end{aligned}$$

output

```
1/2*(a+b*arcsin(c*x))^2*ln(1-e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^
(1/2)-(c^2*d+e)^(1/2)))/(-d)^(1/2)/e^(1/2)-1/2*(a+b*arcsin(c*x))^2*ln(1+e^
(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^(1/2)-(c^2*d+e)^(1/2)))/(-d)^(1
/2)/e^(1/2)+1/2*(a+b*arcsin(c*x))^2*ln(1-e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2)
)/(I*c*(-d)^(1/2)+(c^2*d+e)^(1/2)))/(-d)^(1/2)/e^(1/2)-1/2*(a+b*arcsin(c*x
))^2*ln(1+e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^(1/2)+(c^2*d+e)^(1/
2)))/(-d)^(1/2)/e^(1/2)+I*b*(a+b*arcsin(c*x))*polylog(2,-e^(1/2)*(I*c*x+(-
c^2*x^2+1)^(1/2))/(I*c*(-d)^(1/2)-(c^2*d+e)^(1/2)))/(-d)^(1/2)/e^(1/2)-I*b
*(a+b*arcsin(c*x))*polylog(2,e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^
(1/2)-(c^2*d+e)^(1/2)))/(-d)^(1/2)/e^(1/2)+I*b*(a+b*arcsin(c*x))*polylog(2
,-e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^(1/2)+(c^2*d+e)^(1/2)))/(-d
)^(1/2)/e^(1/2)-I*b*(a+b*arcsin(c*x))*polylog(2,e^(1/2)*(I*c*x+(-c^2*x^2+1
)^(1/2))/(I*c*(-d)^(1/2)+(c^2*d+e)^(1/2)))/(-d)^(1/2)/e^(1/2)-b^2*polylog(
3,-e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^(1/2)-(c^2*d+e)^(1/2)))/(-
d)^(1/2)/e^(1/2)+b^2*polylog(3,e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d
)^(1/2)-(c^2*d+e)^(1/2)))/(-d)^(1/2)/e^(1/2)-b^2*polylog(3,-e^(1/2)*(I*c*x
+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^(1/2)+(c^2*d+e)^(1/2)))/(-d)^(1/2)/e^(1/2)+
b^2*polylog(3,e^(1/2)*(I*c*x+(-c^2*x^2+1)^(1/2))/(I*c*(-d)^(1/2)+(c^2*d+e)
^(1/2)))/(-d)^(1/2)/e^(1/2)
```

Mathematica [A] (verified)

Time = 0.50 (sec) , antiderivative size = 1101, normalized size of antiderivative = 1.34

$$\int \frac{(a+b\arcsin(cx))^2}{d+ex^2}\,dx = \text{Too large to display}$$

input

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

output

```
(2*a^2*Sqrt[-d]*ArcTan[(Sqrt[e]*x)/Sqrt[d]] - 2*a*b*Sqrt[d]*ArcSin[c*x]*Lo
g[1 + (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] - Sqrt[c^2*d + e])] - b^2*
Sqrt[d]*ArcSin[c*x]^2*Log[1 + (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] -
Sqrt[c^2*d + e])] + 2*a*b*Sqrt[d]*ArcSin[c*x]*Log[1 + (Sqrt[e]*E^(I*ArcSin
[c*x]))/((-I)*c*Sqrt[-d] + Sqrt[c^2*d + e])] + b^2*Sqrt[d]*ArcSin[c*x]^2*L
og[1 + (Sqrt[e]*E^(I*ArcSin[c*x]))/((-I)*c*Sqrt[-d] + Sqrt[c^2*d + e])] +
2*a*b*Sqrt[d]*ArcSin[c*x]*Log[1 - (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d
] + Sqrt[c^2*d + e])] + b^2*Sqrt[d]*ArcSin[c*x]^2*Log[1 - (Sqrt[e]*E^(I*Ar
cSin[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d + e])] - 2*a*b*Sqrt[d]*ArcSin[c*x]*
Log[1 + (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d + e])] - b^
2*Sqrt[d]*ArcSin[c*x]^2*Log[1 + (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d]
+ Sqrt[c^2*d + e])] - (2*I)*b*Sqrt[d]*(a + b*ArcSin[c*x])*PolyLog[2, (Sqrt
[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] - Sqrt[c^2*d + e])] + (2*I)*b*Sqrt[d]
*(a + b*ArcSin[c*x])*PolyLog[2, (Sqrt[e]*E^(I*ArcSin[c*x]))/((-I)*c*Sqrt[-
d] + Sqrt[c^2*d + e])] + (2*I)*a*b*Sqrt[d]*PolyLog[2, -((Sqrt[e]*E^(I*ArcS
in[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d + e]))] + (2*I)*b^2*Sqrt[d]*ArcSin[c*
x]*PolyLog[2, -((Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d + e
]))] - (2*I)*a*b*Sqrt[d]*PolyLog[2, (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[
-d] + Sqrt[c^2*d + e])] - (2*I)*b^2*Sqrt[d]*ArcSin[c*x]*PolyLog[2, (Sqrt[e
]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d + e])] + 2*b^2*Sqrt[d]*...
```

Rubi [A] (verified)

Time = 1.90 (sec) , antiderivative size = 821, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a + b \arcsin(cx))^2}{d + ex^2}\, dx$$

$$\downarrow 5172$$

$$\int \left(\frac{\sqrt{-d}(a + b \arcsin(cx))^2}{2d\left(\sqrt{-d} - \sqrt{e}x\right)} + \frac{\sqrt{-d}(a + b \arcsin(cx))^2}{2d\left(\sqrt{-d} + \sqrt{e}x\right)} \right) dx$$

$$\downarrow 2009$$

$$-\frac{\operatorname{PolyLog}\left(3,-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{dc^2+e}}\right)b^2}{\sqrt{-d}\sqrt{e}}+\frac{\operatorname{PolyLog}\left(3,\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{dc^2+e}}\right)b^2}{\sqrt{-d}\sqrt{e}}-$$
$$\frac{\operatorname{PolyLog}\left(3,-\frac{\sqrt{e}e^{i\arcsin(cx)}}{i\sqrt{-d}c+\sqrt{dc^2+e}}\right)b^2}{\sqrt{-d}\sqrt{e}}+\frac{\operatorname{PolyLog}\left(3,\frac{\sqrt{e}e^{i\arcsin(cx)}}{i\sqrt{-d}c+\sqrt{dc^2+e}}\right)b^2}{\sqrt{-d}\sqrt{e}}+$$
$$\frac{i(a+b\arcsin(cx))\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{dc^2+e}}\right)b}{\sqrt{-d}\sqrt{e}}-$$
$$\frac{i(a+b\arcsin(cx))\operatorname{PolyLog}\left(2,\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{dc^2+e}}\right)b}{\sqrt{-d}\sqrt{e}}+$$
$$\frac{i(a+b\arcsin(cx))\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}e^{i\arcsin(cx)}}{i\sqrt{-d}c+\sqrt{dc^2+e}}\right)b}{\sqrt{-d}\sqrt{e}}-$$
$$\frac{i(a+b\arcsin(cx))\operatorname{PolyLog}\left(2,\frac{\sqrt{e}e^{i\arcsin(cx)}}{i\sqrt{-d}c+\sqrt{dc^2+e}}\right)b}{\sqrt{-d}\sqrt{e}}+$$
$$\frac{(a+b\arcsin(cx))^2\log\left(1-\frac{\sqrt{e}e^{i\arcsin(cx)}}{ic\sqrt{-d}-\sqrt{dc^2+e}}\right)}{2\sqrt{-d}\sqrt{e}}-\frac{(a+b\arcsin(cx))^2\log\left(\frac{e^{i\arcsin(cx)}\sqrt{e}}{ic\sqrt{-d}-\sqrt{dc^2+e}}+1\right)}{2\sqrt{-d}\sqrt{e}}+$$
$$\frac{(a+b\arcsin(cx))^2\log\left(1-\frac{\sqrt{e}e^{i\arcsin(cx)}}{i\sqrt{-d}c+\sqrt{dc^2+e}}\right)}{2\sqrt{-d}\sqrt{e}}-\frac{(a+b\arcsin(cx))^2\log\left(\frac{e^{i\arcsin(cx)}\sqrt{e}}{i\sqrt{-d}c+\sqrt{dc^2+e}}+1\right)}{2\sqrt{-d}\sqrt{e}}$$

input
```
Int[(a + b*ArcSin[c*x])^2/(d + e*x^2),x]
```

output

```
((a + b*ArcSin[c*x])^2*Log[1 - (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] -
 Sqrt[c^2*d + e])])/(2*Sqrt[-d]*Sqrt[e]) - ((a + b*ArcSin[c*x])^2*Log[1 +
(Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] - Sqrt[c^2*d + e])])/(2*Sqrt[-d]
*Sqrt[e]) + ((a + b*ArcSin[c*x])^2*Log[1 - (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*
c*Sqrt[-d] + Sqrt[c^2*d + e])])/(2*Sqrt[-d]*Sqrt[e]) - ((a + b*ArcSin[c*x]
)^2*Log[1 + (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d + e])])
/(2*Sqrt[-d]*Sqrt[e]) + (I*b*(a + b*ArcSin[c*x])*PolyLog[2, -((Sqrt[e]*E^(
I*ArcSin[c*x]))/(I*c*Sqrt[-d] - Sqrt[c^2*d + e]))])/(Sqrt[-d]*Sqrt[e]) - (
I*b*(a + b*ArcSin[c*x])*PolyLog[2, (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-
d] - Sqrt[c^2*d + e])])/(Sqrt[-d]*Sqrt[e]) + (I*b*(a + b*ArcSin[c*x])*Poly
Log[2, -((Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d + e]))])/(
Sqrt[-d]*Sqrt[e]) - (I*b*(a + b*ArcSin[c*x])*PolyLog[2, (Sqrt[e]*E^(I*ArcS
in[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d + e])])/(Sqrt[-d]*Sqrt[e]) - (b^2*Pol
yLog[3, -((Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] - Sqrt[c^2*d + e]))])/
(Sqrt[-d]*Sqrt[e]) + (b^2*PolyLog[3, (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt
[-d] - Sqrt[c^2*d + e])])/(Sqrt[-d]*Sqrt[e]) - (b^2*PolyLog[3, -((Sqrt[e]*
E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d + e]))])/(Sqrt[-d]*Sqrt[e])
+ (b^2*PolyLog[3, (Sqrt[e]*E^(I*ArcSin[c*x]))/(I*c*Sqrt[-d] + Sqrt[c^2*d +
 e])])/(Sqrt[-d]*Sqrt[e])
```

Defintions of rubi rules used

rule 2009

```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [F]

$$\int \frac{(a + b \arcsin(cx))^2}{e x^2 + d} dx$$

input

```
int((a+b*arcsin(c*x))^2/(e*x^2+d),x)
```

output
```
int((a+b*arcsin(c*x))^2/(e*x^2+d),x)
```

Fricas [F]

$$\int \frac{(a+b\arcsin(cx))^2}{d+ex^2}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{ex^2+d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)/(e*x^2 + d), x)
```

Sympy [F]

$$\int \frac{(a+b\arcsin(cx))^2}{d+ex^2}\,dx = \int \frac{(a+b\operatorname{asin}(cx))^2}{d+ex^2}\,dx$$

input
```
integrate((a+b*asin(c*x))**2/(e*x**2+d),x)
```

output
```
Integral((a + b*asin(c*x))**2/(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{d+ex^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{d+ex^2}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(e*x^2+d),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\arcsin(cx))^2}{d+ex^2}\,dx = \int \frac{(a+b\operatorname{asin}(c\,x))^2}{e\,x^2+d}\,dx$$

input
```
int((a + b*asin(c*x))^2/(d + e*x^2),x)
```

output
```
int((a + b*asin(c*x))^2/(d + e*x^2), x)
```

Reduce [F]

$$\int \frac{(a+b\arcsin(cx))^2}{d+ex^2}\,dx = \frac{\sqrt{e}\sqrt{d}\,atan\left(\frac{ex}{\sqrt{e}\sqrt{d}}\right)a^2+2\left(\int \frac{asin(cx)}{ex^2+d}dx\right)abde+\left(\int \frac{asin(cx)^2}{ex^2+d}dx\right)b^2de}{de}$$

input
```
int((a+b*asin(c*x))^2/(e*x^2+d),x)
```

output
```
(sqrt(e)*sqrt(d)*atan((e*x)/(sqrt(e)*sqrt(d)))*a**2 + 2*int(asin(c*x)/(d +
 e*x**2),x)*a*b*d*e + int(asin(c*x)**2/(d + e*x**2),x)*b**2*d*e)/(d*e)
```

3.155 $\int \frac{(d+ex^2)^2}{a+b\arcsin(cx)}\,dx$

Optimal result . . . 1194
Mathematica [A] (verified) . . . 1195
Rubi [A] (verified) . . . 1195
Maple [A] (verified) . . . 1197
Fricas [F] . . . 1197
Sympy [F] . . . 1198
Maxima [F] . . . 1198
Giac [A] (verification not implemented) . . . 1198
Mupad [F(-1)] . . . 1199
Reduce [F] . . . 1200

Optimal result

Integrand size = 20, antiderivative size = 387

$$\int \frac{(d+ex^2)^2}{a+b\arcsin(cx)}\,dx = \frac{d^2\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{bc} + \frac{de\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{2bc^3} + \frac{e^2\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{8bc^5} - \frac{de\cos\left(\frac{3a}{b}\right)\operatorname{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{2bc^3} - \frac{3e^2\cos\left(\frac{3a}{b}\right)\operatorname{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{16bc^5} + \frac{e^2\cos\left(\frac{5a}{b}\right)\operatorname{CosIntegral}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{16bc^5} + \frac{d^2\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{bc} + \frac{de\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{2bc^3} + \frac{e^2\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{8bc^5} - \frac{de\sin\left(\frac{3a}{b}\right)\operatorname{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{2bc^3} - \frac{3e^2\sin\left(\frac{3a}{b}\right)\operatorname{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{16bc^5} + \frac{e^2\sin\left(\frac{5a}{b}\right)\operatorname{Si}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{16bc^5}$$

output

```
d^2*cos(a/b)*Ci((a+b*arcsin(c*x))/b)/b/c+1/2*d*e*cos(a/b)*Ci((a+b*arcsin(c
*x))/b)/b/c^3+1/8*e^2*cos(a/b)*Ci((a+b*arcsin(c*x))/b)/b/c^5-1/2*d*e*cos(3
*a/b)*Ci(3*(a+b*arcsin(c*x))/b)/b/c^3-3/16*e^2*cos(3*a/b)*Ci(3*(a+b*arcsin
(c*x))/b)/b/c^5+1/16*e^2*cos(5*a/b)*Ci(5*(a+b*arcsin(c*x))/b)/b/c^5+d^2*si
n(a/b)*Si((a+b*arcsin(c*x))/b)/b/c+1/2*d*e*sin(a/b)*Si((a+b*arcsin(c*x))/b
)/b/c^3+1/8*e^2*sin(a/b)*Si((a+b*arcsin(c*x))/b)/b/c^5-1/2*d*e*sin(3*a/b)*
Si(3*(a+b*arcsin(c*x))/b)/b/c^3-3/16*e^2*sin(3*a/b)*Si(3*(a+b*arcsin(c*x))
/b)/b/c^5+1/16*e^2*sin(5*a/b)*Si(5*(a+b*arcsin(c*x))/b)/b/c^5
```

Mathematica [A] (verified)

Time = 0.39 (sec) , antiderivative size = 253, normalized size of antiderivative = 0.65

$$\int \frac{(d+ex^2)^2}{a+b\arcsin(cx)}\,dx$$
$$= \frac{2(8c^4d^2+4c^2de+e^2)\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a}{b}+\arcsin(cx)\right) - e(8c^2d+3e)\cos\left(\frac{3a}{b}\right)\text{CosIntegral}\left(3\left(\frac{a}{b}+a\right.\right.}{}$$

input
```
Integrate[(d + e*x^2)^2/(a + b*ArcSin[c*x]),x]
```

output
```
(2*(8*c^4*d^2 + 4*c^2*d*e + e^2)*Cos[a/b]*CosIntegral[a/b + ArcSin[c*x]] -
 e*(8*c^2*d + 3*e)*Cos[(3*a)/b]*CosIntegral[3*(a/b + ArcSin[c*x])] + e^2*C
os[(5*a)/b]*CosIntegral[5*(a/b + ArcSin[c*x])] + 16*c^4*d^2*Sin[a/b]*SinIn
tegral[a/b + ArcSin[c*x]] + 8*c^2*d*e*Sin[a/b]*SinIntegral[a/b + ArcSin[c*
x]] + 2*e^2*Sin[a/b]*SinIntegral[a/b + ArcSin[c*x]] - 8*c^2*d*e*Sin[(3*a)/
b]*SinIntegral[3*(a/b + ArcSin[c*x])] - 3*e^2*Sin[(3*a)/b]*SinIntegral[3*(
a/b + ArcSin[c*x])] + e^2*Sin[(5*a)/b]*SinIntegral[5*(a/b + ArcSin[c*x])])
/(16*b*c^5)
```

Rubi [A] (verified)

Time = 1.10 (sec) , antiderivative size = 387, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2}{a+b\arcsin(cx)}\,dx$$
$$\downarrow 5172$$
$$\int \left(\frac{d^2}{a+b\arcsin(cx)} + \frac{2dex^2}{a+b\arcsin(cx)} + \frac{e^2x^4}{a+b\arcsin(cx)}\right)dx$$
$$\downarrow 2009$$

$$\frac{e^2 \cos\left(\frac{a}{b}\right) \text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{8bc^5} - \frac{3e^2 \cos\left(\frac{3a}{b}\right) \text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{16bc^5} + \frac{e^2 \cos\left(\frac{5a}{b}\right) \text{CosIntegral}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{16bc^5} + \frac{e^2 \sin\left(\frac{a}{b}\right) \text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{8bc^5} - \frac{3e^2 \sin\left(\frac{3a}{b}\right) \text{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{16bc^5} + \frac{e^2 \sin\left(\frac{5a}{b}\right) \text{Si}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{16bc^5} + \frac{de \cos\left(\frac{a}{b}\right) \text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{2bc^3} - \frac{de \cos\left(\frac{3a}{b}\right) \text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{2bc^3} + \frac{de \sin\left(\frac{a}{b}\right) \text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{2bc^3} - \frac{de \sin\left(\frac{3a}{b}\right) \text{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{2bc^3} + \frac{d^2 \cos\left(\frac{a}{b}\right) \text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{bc} + \frac{d^2 \sin\left(\frac{a}{b}\right) \text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{bc}$$

input

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

output

```
(d^2*Cos[a/b]*CosIntegral[(a + b*ArcSin[c*x])/b])/(b*c) + (d*e*Cos[a/b]*Co
sIntegral[(a + b*ArcSin[c*x])/b])/(2*b*c^3) + (e^2*Cos[a/b]*CosIntegral[(a
 + b*ArcSin[c*x])/b])/(8*b*c^5) - (d*e*Cos[(3*a)/b]*CosIntegral[(3*(a + b*
ArcSin[c*x]))/b])/(2*b*c^3) - (3*e^2*Cos[(3*a)/b]*CosIntegral[(3*(a + b*Ar
cSin[c*x]))/b])/(16*b*c^5) + (e^2*Cos[(5*a)/b]*CosIntegral[(5*(a + b*ArcSi
n[c*x]))/b])/(16*b*c^5) + (d^2*Sin[a/b]*SinIntegral[(a + b*ArcSin[c*x])/b]
)/(b*c) + (d*e*Sin[a/b]*SinIntegral[(a + b*ArcSin[c*x])/b])/(2*b*c^3) + (e
^2*Sin[a/b]*SinIntegral[(a + b*ArcSin[c*x])/b])/(8*b*c^5) - (d*e*Sin[(3*a)
/b]*SinIntegral[(3*(a + b*ArcSin[c*x]))/b])/(2*b*c^3) - (3*e^2*Sin[(3*a)/b
]*SinIntegral[(3*(a + b*ArcSin[c*x]))/b])/(16*b*c^5) + (e^2*Sin[(5*a)/b]*S
inIntegral[(5*(a + b*ArcSin[c*x]))/b])/(16*b*c^5)
```

Defintions of rubi rules used

rule 2009

```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 310, normalized size of antiderivative = 0.80

method	result
derivativedivides	$\frac{16\,\mathrm{Si}(\arcsin(cx)+\frac{a}{b})\sin(\frac{a}{b})c^4d^2+16\,\mathrm{Ci}(\arcsin(cx)+\frac{a}{b})\cos(\frac{a}{b})c^4d^2+8\,\mathrm{Si}(\arcsin(cx)+\frac{a}{b})\sin(\frac{a}{b})c^2de+8\,\mathrm{Ci}(\arcsin(c}{}$
default	$\frac{16\,\mathrm{Si}(\arcsin(cx)+\frac{a}{b})\sin(\frac{a}{b})c^4d^2+16\,\mathrm{Ci}(\arcsin(cx)+\frac{a}{b})\cos(\frac{a}{b})c^4d^2+8\,\mathrm{Si}(\arcsin(cx)+\frac{a}{b})\sin(\frac{a}{b})c^2de+8\,\mathrm{Ci}(\arcsin(c}{}$

input
```
int((e*x^2+d)^2/(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
1/16/c^5*(16*Si(arcsin(c*x)+a/b)*sin(a/b)*c^4*d^2+16*Ci(arcsin(c*x)+a/b)*c
os(a/b)*c^4*d^2+8*Si(arcsin(c*x)+a/b)*sin(a/b)*c^2*d*e+8*Ci(arcsin(c*x)+a/
b)*cos(a/b)*c^2*d*e-8*Si(3*arcsin(c*x)+3*a/b)*sin(3*a/b)*c^2*d*e-8*Ci(3*ar
csin(c*x)+3*a/b)*cos(3*a/b)*c^2*d*e+2*Si(arcsin(c*x)+a/b)*sin(a/b)*e^2+2*C
i(arcsin(c*x)+a/b)*cos(a/b)*e^2-3*Si(3*arcsin(c*x)+3*a/b)*sin(3*a/b)*e^2-3
*Ci(3*arcsin(c*x)+3*a/b)*cos(3*a/b)*e^2+Si(5*arcsin(c*x)+5*a/b)*sin(5*a/b)
*e^2+Ci(5*arcsin(c*x)+5*a/b)*cos(5*a/b)*e^2)/b
```

Fricas [F]

$$\int \frac{(d+ex^2)^2}{a+b\arcsin(cx)}\,dx = \int \frac{(ex^2+d)^2}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((e*x^2+d)^2/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral((e^2*x^4 + 2*d*e*x^2 + d^2)/(b*arcsin(c*x) + a), x)
```

Sympy [F]

$$\int \frac{(d+ex^2)^2}{a+b\arcsin(cx)}\,dx = \int \frac{(d+ex^2)^2}{a+b\operatorname{asin}(cx)}\,dx$$

input
```
integrate((e*x**2+d)**2/(a+b*asin(c*x)),x)
```

output
```
Integral((d + e*x**2)**2/(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \frac{(d+ex^2)^2}{a+b\arcsin(cx)}\,dx = \int \frac{(ex^2+d)^2}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((e*x^2+d)^2/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate((e*x^2 + d)^2/(b*arcsin(c*x) + a), x)
```

Giac [A] (verification not implemented)

Time = 0.15 (sec) , antiderivative size = 633, normalized size of antiderivative = 1.64

$$\int \frac{(d+ex^2)^2}{a+b\arcsin(cx)}\,dx = \text{Too large to display}$$

input
```
integrate((e*x^2+d)^2/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
e^2*cos(a/b)^5*cos_integral(5*a/b + 5*arcsin(c*x))/(b*c^5) - 2*d*e*cos(a/b
)^3*cos_integral(3*a/b + 3*arcsin(c*x))/(b*c^3) + d^2*cos(a/b)*cos_integra
l(a/b + arcsin(c*x))/(b*c) + e^2*cos(a/b)^4*sin(a/b)*sin_integral(5*a/b +
5*arcsin(c*x))/(b*c^5) - 2*d*e*cos(a/b)^2*sin(a/b)*sin_integral(3*a/b + 3*
arcsin(c*x))/(b*c^3) + d^2*sin(a/b)*sin_integral(a/b + arcsin(c*x))/(b*c)
- 5/4*e^2*cos(a/b)^3*cos_integral(5*a/b + 5*arcsin(c*x))/(b*c^5) + 3/2*d*e
*cos(a/b)*cos_integral(3*a/b + 3*arcsin(c*x))/(b*c^3) - 3/4*e^2*cos(a/b)^3
*cos_integral(3*a/b + 3*arcsin(c*x))/(b*c^5) + 1/2*d*e*cos(a/b)*cos_integr
al(a/b + arcsin(c*x))/(b*c^3) - 3/4*e^2*cos(a/b)^2*sin(a/b)*sin_integral(5
*a/b + 5*arcsin(c*x))/(b*c^5) + 1/2*d*e*sin(a/b)*sin_integral(3*a/b + 3*ar
csin(c*x))/(b*c^3) - 3/4*e^2*cos(a/b)^2*sin(a/b)*sin_integral(3*a/b + 3*ar
csin(c*x))/(b*c^5) + 1/2*d*e*sin(a/b)*sin_integral(a/b + arcsin(c*x))/(b*c
^3) + 5/16*e^2*cos(a/b)*cos_integral(5*a/b + 5*arcsin(c*x))/(b*c^5) + 9/16
*e^2*cos(a/b)*cos_integral(3*a/b + 3*arcsin(c*x))/(b*c^5) + 1/8*e^2*cos(a/
b)*cos_integral(a/b + arcsin(c*x))/(b*c^5) + 1/16*e^2*sin(a/b)*sin_integra
l(5*a/b + 5*arcsin(c*x))/(b*c^5) + 3/16*e^2*sin(a/b)*sin_integral(3*a/b +
3*arcsin(c*x))/(b*c^5) + 1/8*e^2*sin(a/b)*sin_integral(a/b + arcsin(c*x))/
(b*c^5)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^2}{a+b\arcsin(cx)}\,dx = \int \frac{(e\,x^2+d)^2}{a+b\,\mathrm{asin}\,(c\,x)}\,dx$$

input
```
int((d + e*x^2)^2/(a + b*asin(c*x)),x)
```

output
```
int((d + e*x^2)^2/(a + b*asin(c*x)), x)
```

Reduce [F]

$$\int \frac{(d+ex^2)^2}{a+b\arcsin(cx)}\,dx = \left(\int \frac{x^4}{asin\,(cx)\,b+a}dx\right)e^2 + 2\left(\int \frac{x^2}{asin\,(cx)\,b+a}dx\right)de + \left(\int \frac{1}{asin\,(cx)\,b+a}dx\right)d^2$$

input

```
int((e*x^2+d)^2/(a+b*asin(c*x)),x)
```

output

```
int(x**4/(asin(c*x)*b + a),x)*e**2 + 2*int(x**2/(asin(c*x)*b + a),x)*d*e +
 int(1/(asin(c*x)*b + a),x)*d**2
```

3.156 $\int \frac{d+ex^2}{a+b\arcsin(cx)}\,dx$

Optimal result . . . 1201
Mathematica [A] (verified) . . . 1202
Rubi [A] (verified) . . . 1202
Maple [A] (verified) . . . 1203
Fricas [F] . . . 1204
Sympy [F] . . . 1204
Maxima [F] . . . 1205
Giac [A] (verification not implemented) . . . 1205
Mupad [F(-1)] . . . 1206
Reduce [F] . . . 1206

Optimal result

Integrand size = 18, antiderivative size = 179

$$\begin{aligned}\int \frac{d+ex^2}{a+b\arcsin(cx)}\,dx = &\frac{d\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{bc}\\ &+\frac{e\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{4bc^3}\\ &-\frac{e\cos\left(\frac{3a}{b}\right)\operatorname{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{4bc^3}\\ &+\frac{d\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{bc}+\frac{e\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{4bc^3}\\ &-\frac{e\sin\left(\frac{3a}{b}\right)\operatorname{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{4bc^3}\end{aligned}$$

output

```
d*cos(a/b)*Ci((a+b*arcsin(c*x))/b)/b/c+1/4*e*cos(a/b)*Ci((a+b*arcsin(c*x))
/b)/b/c^3-1/4*e*cos(3*a/b)*Ci(3*(a+b*arcsin(c*x))/b)/b/c^3+d*sin(a/b)*Si((
a+b*arcsin(c*x))/b)/b/c+1/4*e*sin(a/b)*Si((a+b*arcsin(c*x))/b)/b/c^3-1/4*e
*sin(3*a/b)*Si(3*(a+b*arcsin(c*x))/b)/b/c^3
```

Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.70

$$\int \frac{d+ex^2}{a+b\arcsin(cx)}\,dx$$
$$= \frac{(4c^2d+e)\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a}{b}+\arcsin(cx)\right) - e\cos\left(\frac{3a}{b}\right)\text{CosIntegral}\left(3\left(\frac{a}{b}+\arcsin(cx)\right)\right) + 4c^2d\sin}{4bc^3}$$

input
```
Integrate[(d + e*x^2)/(a + b*ArcSin[c*x]),x]
```

output
```
((4*c^2*d + e)*Cos[a/b]*CosIntegral[a/b + ArcSin[c*x]] - e*Cos[(3*a)/b]*Co
sIntegral[3*(a/b + ArcSin[c*x])] + 4*c^2*d*Sin[a/b]*SinIntegral[a/b + ArcS
in[c*x]] + e*Sin[a/b]*SinIntegral[a/b + ArcSin[c*x]] - e*Sin[(3*a)/b]*SinI
ntegral[3*(a/b + ArcSin[c*x])])/(4*b*c^3)
```

Rubi [A] (verified)

Time = 0.61 (sec) , antiderivative size = 179, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{d+ex^2}{a+b\arcsin(cx)}\,dx$$
$$\downarrow 5172$$
$$\int \left(\frac{d}{a+b\arcsin(cx)} + \frac{ex^2}{a+b\arcsin(cx)}\right)dx$$
$$\downarrow 2009$$

$$\frac{e\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{4bc^3}-\frac{e\cos\left(\frac{3a}{b}\right)\operatorname{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{4bc^3}+\frac{e\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{4bc^3}-\frac{e\sin\left(\frac{3a}{b}\right)\operatorname{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{4bc^3}+\frac{d\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{bc}+\frac{d\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{bc}$$

input
```
Int[(d + e*x^2)/(a + b*ArcSin[c*x]),x]
```

output
```
(d*Cos[a/b]*CosIntegral[(a + b*ArcSin[c*x])/b])/(b*c) + (e*Cos[a/b]*CosInt
egral[(a + b*ArcSin[c*x])/b])/(4*b*c^3) - (e*Cos[(3*a)/b]*CosIntegral[(3*(
a + b*ArcSin[c*x]))/b])/(4*b*c^3) + (d*Sin[a/b]*SinIntegral[(a + b*ArcSin[
c*x])/b])/(b*c) + (e*Sin[a/b]*SinIntegral[(a + b*ArcSin[c*x])/b])/(4*b*c^3
) - (e*Sin[(3*a)/b]*SinIntegral[(3*(a + b*ArcSin[c*x]))/b])/(4*b*c^3)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 148, normalized size of antiderivative = 0.83

method	result
derivativedivides	$\frac{d\left(\operatorname{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)+\operatorname{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)\right)}{b}+\frac{e\left(\operatorname{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)+\operatorname{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)\right)}{4c^2b}-\frac{e\left(\operatorname{Si}\left(3\,\mathrm{ar}\right.\right.}{c}$
default	$\frac{d\left(\operatorname{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)+\operatorname{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)\right)}{b}+\frac{e\left(\operatorname{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)+\operatorname{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)\right)}{4c^2b}-\frac{e\left(\operatorname{Si}\left(3\,\mathrm{ar}\right.\right.}{c}$

input
```
int((e*x^2+d)/(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
1/c*(d*(Si(arcsin(c*x)+a/b)*sin(a/b)+Ci(arcsin(c*x)+a/b)*cos(a/b))/b+1/4*e
/c^2*(Si(arcsin(c*x)+a/b)*sin(a/b)+Ci(arcsin(c*x)+a/b)*cos(a/b))/b-1/4*e/c
^2*(Si(3*arcsin(c*x)+3*a/b)*sin(3*a/b)+Ci(3*arcsin(c*x)+3*a/b)*cos(3*a/b))
/b)
```

Fricas [F]

$$\int \frac{d+ex^2}{a+b\arcsin(cx)}\,dx = \int \frac{ex^2+d}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((e*x^2+d)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral((e*x^2 + d)/(b*arcsin(c*x) + a), x)
```

Sympy [F]

$$\int \frac{d+ex^2}{a+b\arcsin(cx)}\,dx = \int \frac{d+ex^2}{a+b\operatorname{asin}(cx)}\,dx$$

input
```
integrate((e*x**2+d)/(a+b*asin(c*x)),x)
```

output
```
Integral((d + e*x**2)/(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \frac{d+ex^2}{a+b\arcsin(cx)}\,dx = \int \frac{ex^2+d}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((e*x^2+d)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate((e*x^2 + d)/(b*arcsin(c*x) + a), x)
```

Giac [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 229, normalized size of antiderivative = 1.28

$$\begin{aligned}\int \frac{d+ex^2}{a+b\arcsin(cx)}\,dx = &-\frac{e\cos\left(\frac{a}{b}\right)^3 \operatorname{Ci}\left(\frac{3a}{b}+3\arcsin(cx)\right)}{bc^3}\\ &+\frac{d\cos\left(\frac{a}{b}\right)\operatorname{Ci}\left(\frac{a}{b}+\arcsin(cx)\right)}{bc}\\ &-\frac{e\cos\left(\frac{a}{b}\right)^2\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{3a}{b}+3\arcsin(cx)\right)}{bc^3}\\ &+\frac{d\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a}{b}+\arcsin(cx)\right)}{bc}\\ &+\frac{3e\cos\left(\frac{a}{b}\right)\operatorname{Ci}\left(\frac{3a}{b}+3\arcsin(cx)\right)}{4bc^3}\\ &+\frac{e\cos\left(\frac{a}{b}\right)\operatorname{Ci}\left(\frac{a}{b}+\arcsin(cx)\right)}{4bc^3}\\ &+\frac{e\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{3a}{b}+3\arcsin(cx)\right)}{4bc^3}\\ &+\frac{e\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a}{b}+\arcsin(cx)\right)}{4bc^3}\end{aligned}$$

input
```
integrate((e*x^2+d)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
-e*cos(a/b)^3*cos_integral(3*a/b + 3*arcsin(c*x))/(b*c^3) + d*cos(a/b)*cos
_integral(a/b + arcsin(c*x))/(b*c) - e*cos(a/b)^2*sin(a/b)*sin_integral(3*
a/b + 3*arcsin(c*x))/(b*c^3) + d*sin(a/b)*sin_integral(a/b + arcsin(c*x))/
(b*c) + 3/4*e*cos(a/b)*cos_integral(3*a/b + 3*arcsin(c*x))/(b*c^3) + 1/4*e
*cos(a/b)*cos_integral(a/b + arcsin(c*x))/(b*c^3) + 1/4*e*sin(a/b)*sin_int
egral(3*a/b + 3*arcsin(c*x))/(b*c^3) + 1/4*e*sin(a/b)*sin_integral(a/b + a
rcsin(c*x))/(b*c^3)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{d+ex^2}{a+b\arcsin(cx)}\,dx = \int \frac{e\,x^2+d}{a+b\,\mathrm{asin}\,(c\,x)}\,dx$$

input
```
int((d + e*x^2)/(a + b*asin(c*x)),x)
```

output
```
int((d + e*x^2)/(a + b*asin(c*x)), x)
```

Reduce [F]

$$\int \frac{d+ex^2}{a+b\arcsin(cx)}\,dx = \left(\int \frac{x^2}{asin\,(cx)\,b+a}dx\right)e + \left(\int \frac{1}{asin\,(cx)\,b+a}dx\right)d$$

input
```
int((e*x^2+d)/(a+b*asin(c*x)),x)
```

output
```
int(x**2/(asin(c*x)*b + a),x)*e + int(1/(asin(c*x)*b + a),x)*d
```

3.157 $\int \frac{1}{a+b\arcsin(cx)}\,dx$

Optimal result . . . 1207
Mathematica [A] (verified) . . . 1207
Rubi [A] (verified) . . . 1208
Maple [A] (verified) . . . 1210
Fricas [F] . . . 1210
Sympy [F] . . . 1210
Maxima [F] . . . 1211
Giac [A] (verification not implemented) . . . 1211
Mupad [F(-1)] . . . 1211
Reduce [F] . . . 1212

Optimal result

Integrand size = 10, antiderivative size = 53

$$\int \frac{1}{a+b\arcsin(cx)}\,dx = \frac{\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{bc} + \frac{\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{bc}$$

output

```
cos(a/b)*Ci((a+b*arcsin(c*x))/b)/b/c+sin(a/b)*Si((a+b*arcsin(c*x))/b)/b/c
```

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.83

$$\int \frac{1}{a+b\arcsin(cx)}\,dx = \frac{\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a}{b}+\arcsin(cx)\right)+\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a}{b}+\arcsin(cx)\right)}{bc}$$

input

```
Integrate[(a + b*ArcSin[c*x])^(-1),x]
```

output

```
(Cos[a/b]*CosIntegral[a/b + ArcSin[c*x]] + Sin[a/b]*SinIntegral[a/b + ArcS
in[c*x]])/(b*c)
```

Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 48, normalized size of antiderivative = 0.91, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.700$, Rules used = {5134, 3042, 3784, 25, 3042, 3780, 3783}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{a+b\arcsin(cx)}\,dx$$

$$\downarrow 5134$$

$$\frac{\int \frac{\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}\,d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 3042$$

$$\frac{\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{a+b\arcsin(cx)}\,d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 3784$$

$$\frac{\cos\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}\,d(a+b\arcsin(cx)) - \sin\left(\frac{a}{b}\right)\int -\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}\,d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 25$$

$$\frac{\sin\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}\,d(a+b\arcsin(cx)) + \cos\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}\,d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 3042$$

$$\frac{\sin\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}\,d(a+b\arcsin(cx)) + \cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{a+b\arcsin(cx)}\,d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 3780$$

$$\frac{\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{a+b\arcsin(cx)}\,d(a+b\arcsin(cx)) + \sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{bc}$$

$$\downarrow 3783$$

$$\frac{\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)+\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{bc}$$

input
```
Int[(a + b*ArcSin[c*x])^(-1),x]
```

output
```
(Cos[a/b]*CosIntegral[(a + b*ArcSin[c*x])/b] + Sin[a/b]*SinIntegral[(a + b
*ArcSin[c*x])/b])/(b*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3780
```
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 3783
```
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 3784
```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[Cos[(d*
e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Simp[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 5134
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[1/(b*c)   Su
bst[Int[x^n*Cos[-a/b + x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b,
c, n}, x]
```

Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 48, normalized size of antiderivative = 0.91

method	result	size
derivativedivides	$\frac{\frac{\mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)}{b}+\frac{\mathrm{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)}{b}}{c}$	48
default	$\frac{\frac{\mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)}{b}+\frac{\mathrm{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)}{b}}{c}$	48

input
```
int(1/(a+b*arcsin(c*x)),x,method=_RETURNVERBOSE)
```

output
```
1/c*(Si(arcsin(c*x)+a/b)*sin(a/b)/b+Ci(arcsin(c*x)+a/b)*cos(a/b)/b)
```

Fricas [F]

$$\int \frac{1}{a+b\arcsin(cx)}\,dx = \int \frac{1}{b\arcsin\left(cx\right)+a}\,dx$$

input
```
integrate(1/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(1/(b*arcsin(c*x) + a), x)
```

Sympy [F]

$$\int \frac{1}{a+b\arcsin(cx)}\,dx = \int \frac{1}{a+b\operatorname{asin}\left(cx\right)}\,dx$$

input
```
integrate(1/(a+b*asin(c*x)),x)
```

output
```
Integral(1/(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \frac{1}{a+b\arcsin(cx)}\,dx = \int \frac{1}{b\arcsin(cx)+a}\,dx$$

input
```
integrate(1/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate(1/(b*arcsin(c*x) + a), x)
```

Giac [A] (verification not implemented)

Time = 0.13 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.92

$$\int \frac{1}{a+b\arcsin(cx)}\,dx = \frac{\cos\left(\frac{a}{b}\right)\operatorname{Ci}\left(\frac{a}{b}+\arcsin(cx)\right)}{bc} + \frac{\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a}{b}+\arcsin(cx)\right)}{bc}$$

input
```
integrate(1/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
cos(a/b)*cos_integral(a/b + arcsin(c*x))/(b*c) + sin(a/b)*sin_integral(a/b
 + arcsin(c*x))/(b*c)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{1}{a+b\arcsin(cx)}\,dx = \int \frac{1}{a+b\operatorname{asin}(c\,x)}\,dx$$

input
```
int(1/(a + b*asin(c*x)),x)
```

output
```
int(1/(a + b*asin(c*x)), x)
```

Reduce [F]

$$\int \frac{1}{a+b\arcsin(cx)}\,dx = \int \frac{1}{asin\,(cx)\,b+a}dx$$

input
```
int(1/(a+b*asin(c*x)),x)
```

output
```
int(1/(asin(c*x)*b + a),x)
```

3.158 $\int \frac{1}{(d+ex^2)(a+b\arcsin(cx))}\,dx$

Optimal result 1213
Mathematica [N/A] 1213
Rubi [N/A] 1214
Maple [N/A] 1214
Fricas [N/A] 1215
Sympy [N/A] 1215
Maxima [N/A] 1215
Giac [N/A] 1216
Mupad [N/A] 1216
Reduce [N/A] 1217

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))}\,dx = \text{Int}\left(\frac{1}{(d+ex^2)\,(a+b\arcsin(cx))}, x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)/(a+b*arcsin(c*x)),x)
```

Mathematica [N/A]

Not integrable

Time = 0.60 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))}\,dx$$

input
```
Integrate[1/((d + e*x^2)*(a + b*ArcSin[c*x])),x]
```

output
```
Integrate[1/((d + e*x^2)*(a + b*ArcSin[c*x])), x]
```

Rubi [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))}dx$$

input
```
Int[1/((d + e*x^2)*(a + b*ArcSin[c*x])),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.72 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{1}{(e\,x^2+d)\,(a+b\arcsin\,(cx))}dx$$

input
```
int(1/(e*x^2+d)/(a+b*arcsin(c*x)),x)
```

output
```
int(1/(e*x^2+d)/(a+b*arcsin(c*x)),x)
```

Fricas [N/A]

Not integrable

Time = 0.10 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.45

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(ex^2+d)(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(1/(a*e*x^2 + a*d + (b*e*x^2 + b*d)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 3.58 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(a+b\operatorname{asin}(cx))\,(d+ex^2)}\,dx$$

input
```
integrate(1/(e*x**2+d)/(a+b*asin(c*x)),x)
```

output
```
Integral(1/((a + b*asin(c*x))*(d + e*x**2)), x)
```

Maxima [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(ex^2+d)(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x^2 + d)*(b*arcsin(c*x) + a)), x)
```

Giac [N/A]

Not integrable

Time = 0.38 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(ex^2+d)(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)*(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}(c\,x))\,\,(e\,x^2+d)}\,dx$$

input
```
int(1/((a + b*asin(c*x))*(d + e*x^2)),x)
```

output
```
int(1/((a + b*asin(c*x))*(d + e*x^2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.55

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{asin\,(cx)\,bd + asin\,(cx)\,be\,x^2 + ad + ae\,x^2}\,dx$$

input
```
int(1/(e*x^2+d)/(a+b*asin(c*x)),x)
```

output
```
int(1/(asin(c*x)*b*d + asin(c*x)*b*e*x**2 + a*d + a*e*x**2),x)
```

3.159 $\int \frac{1}{(d+ex^2)^2(a+b\arcsin(cx))}\,dx$

Optimal result 1218
Mathematica [N/A] 1218
Rubi [N/A] 1219
Maple [N/A] 1219
Fricas [N/A] 1220
Sympy [N/A] 1220
Maxima [N/A] 1220
Giac [N/A] 1221
Mupad [N/A] 1221
Reduce [N/A] 1222

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))}\,dx = \text{Int}\left(\frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))},x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)^2/(a+b*arcsin(c*x)),x)
```

Mathematica [N/A]

Not integrable

Time = 2.69 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))}\,dx$$

input
```
Integrate[1/((d + e*x^2)^2*(a + b*ArcSin[c*x])),x]
```

output
```
Integrate[1/((d + e*x^2)^2*(a + b*ArcSin[c*x])), x]
```

Rubi [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))}dx$$

input
```
Int[1/((d + e*x^2)^2*(a + b*ArcSin[c*x])),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 2.44 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{1}{(e\,x^2+d)^2\,(a+b\arcsin\,(cx))}dx$$

input
```
int(1/(e*x^2+d)^2/(a+b*arcsin(c*x)),x)
```

output
```
int(1/(e*x^2+d)^2/(a+b*arcsin(c*x)),x)
```

Fricas [N/A]

Not integrable

Time = 0.10 (sec) , antiderivative size = 53, normalized size of antiderivative = 2.65

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(ex^2+d)^2(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(1/(a*e^2*x^4 + 2*a*d*e*x^2 + a*d^2 + (b*e^2*x^4 + 2*b*d*e*x^2 + b
*d^2)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 109.45 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(a+b\operatorname{asin}(cx))\,(d+ex^2)^2}\,dx$$

input
```
integrate(1/(e*x**2+d)**2/(a+b*asin(c*x)),x)
```

output
```
Integral(1/((a + b*asin(c*x))*(d + e*x**2)**2), x)
```

Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(ex^2+d)^2(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x^2 + d)^2*(b*arcsin(c*x) + a)), x)
```

Giac [N/A]

Not integrable

Time = 6.46 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{\left(d+ex^2\right)^2\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(ex^2+d\right)^2\left(b\arcsin\left(cx\right)+a\right)}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)^2*(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{\left(d+ex^2\right)^2\left(a+b\arcsin(cx)\right)}\,dx = \int \frac{1}{\left(a+b\,\mathrm{asin}\left(c\,x\right)\right)\,\left(e\,x^2+d\right)^2}\,dx$$

input
```
int(1/((a + b*asin(c*x))*(d + e*x^2)^2),x)
```

output
```
int(1/((a + b*asin(c*x))*(d + e*x^2)^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 59, normalized size of antiderivative = 2.95

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{asin\,(cx)\,b\,d^2+2asin\,(cx)\,bde\,x^2+asin\,(cx)\,b\,e^2x^4+a\,d^2+2ade\,x^2+a\,e^2x^4}\,dx$$

input
```
int(1/(e*x^2+d)^2/(a+b*asin(c*x)),x)
```

output
```
int(1/(asin(c*x)*b*d**2 + 2*asin(c*x)*b*d*e*x**2 + asin(c*x)*b*e**2*x**4 +
 a*d**2 + 2*a*d*e*x**2 + a*e**2*x**4),x)
```

3.160 $\int \frac{(d+ex^2)^2}{(a+b\arcsin(cx))^2}\,dx$

Optimal result 1224
Mathematica [A] (verified) 1225
Rubi [A] (verified) 1226
Maple [A] (verified) 1227
Fricas [F] 1228
Sympy [F] 1229
Maxima [F] 1229
Giac [B] (verification not implemented) 1229
Mupad [F(-1)] 1230
Reduce [F] 1231

Optimal result

Integrand size = 20, antiderivative size = 498

$$\begin{aligned}\int \frac{(d+ex^2)^2}{(a+b\arcsin(cx))^2}\,dx = &-\frac{d^2\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}-\frac{2dex^2\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}\\ &-\frac{e^2x^4\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}\\ &+\frac{d^2\,\mathrm{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}\right)}{b^2c}\\ &+\frac{de\,\mathrm{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}\right)}{2b^2c^3}\\ &+\frac{e^2\,\mathrm{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}\right)}{8b^2c^5}\\ &-\frac{3de\,\mathrm{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{3a}{b}\right)}{2b^2c^3}\\ &-\frac{9e^2\,\mathrm{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{3a}{b}\right)}{16b^2c^5}\\ &+\frac{5e^2\,\mathrm{CosIntegral}\left(\frac{5(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{5a}{b}\right)}{16b^2c^5}\\ &-\frac{d^2\cos\left(\frac{a}{b}\right)\mathrm{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{b^2c}\\ &-\frac{de\cos\left(\frac{a}{b}\right)\mathrm{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{2b^2c^3}-\frac{e^2\cos\left(\frac{a}{b}\right)\mathrm{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{8b^2c^5}\\ &+\frac{3de\cos\left(\frac{3a}{b}\right)\mathrm{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{2b^2c^3}\\ &+\frac{9e^2\cos\left(\frac{3a}{b}\right)\mathrm{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{16b^2c^5}\\ &-\frac{5e^2\cos\left(\frac{5a}{b}\right)\mathrm{Si}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{16b^2c^5}\end{aligned}$$

output

```
-d^2*(-c^2*x^2+1)^(1/2)/b/c/(a+b*arcsin(c*x))-2*d*e*x^2*(-c^2*x^2+1)^(1/2)
/b/c/(a+b*arcsin(c*x))-e^2*x^4*(-c^2*x^2+1)^(1/2)/b/c/(a+b*arcsin(c*x))+d^
2*Ci((a+b*arcsin(c*x))/b)*sin(a/b)/b^2/c+1/2*d*e*Ci((a+b*arcsin(c*x))/b)*s
in(a/b)/b^2/c^3+1/8*e^2*Ci((a+b*arcsin(c*x))/b)*sin(a/b)/b^2/c^5-3/2*d*e*C
i(3*(a+b*arcsin(c*x))/b)*sin(3*a/b)/b^2/c^3-9/16*e^2*Ci(3*(a+b*arcsin(c*x)
)/b)*sin(3*a/b)/b^2/c^5+5/16*e^2*Ci(5*(a+b*arcsin(c*x))/b)*sin(5*a/b)/b^2/
c^5-d^2*cos(a/b)*Si((a+b*arcsin(c*x))/b)/b^2/c-1/2*d*e*cos(a/b)*Si((a+b*ar
csin(c*x))/b)/b^2/c^3-1/8*e^2*cos(a/b)*Si((a+b*arcsin(c*x))/b)/b^2/c^5+3/2
*d*e*cos(3*a/b)*Si(3*(a+b*arcsin(c*x))/b)/b^2/c^3+9/16*e^2*cos(3*a/b)*Si(3
*(a+b*arcsin(c*x))/b)/b^2/c^5-5/16*e^2*cos(5*a/b)*Si(5*(a+b*arcsin(c*x))/b
)/b^2/c^5
```

Mathematica [A] (verified)

Time = 1.67 (sec) , antiderivative size = 359, normalized size of antiderivative = 0.72

$$\int \frac{(d+ex^2)^2}{(a+b\arcsin(cx))^2}\,dx =$$
$$-\frac{\frac{16bc^4d^2\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}+\frac{32bc^4dex^2\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}+\frac{16bc^4e^2x^4\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}-2(8c^4d^2+4c^2de+e^2)\,\text{CosIntegral}\left(\frac{a}{b}+\arcsin(cx\right.}{}$$

input

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

output

```
-1/16*((16*b*c^4*d^2*Sqrt[1 - c^2*x^2])/(a + b*ArcSin[c*x]) + (32*b*c^4*d*
e*x^2*Sqrt[1 - c^2*x^2])/(a + b*ArcSin[c*x]) + (16*b*c^4*e^2*x^4*Sqrt[1 -
c^2*x^2])/(a + b*ArcSin[c*x]) - 2*(8*c^4*d^2 + 4*c^2*d*e + e^2)*CosIntegra
l[a/b + ArcSin[c*x]]*Sin[a/b] + 3*e*(8*c^2*d + 3*e)*CosIntegral[3*(a/b + A
rcSin[c*x])]*Sin[(3*a)/b] - 5*e^2*CosIntegral[5*(a/b + ArcSin[c*x])]*Sin[(
5*a)/b] + 16*c^4*d^2*Cos[a/b]*SinIntegral[a/b + ArcSin[c*x]] + 8*c^2*d*e*C
os[a/b]*SinIntegral[a/b + ArcSin[c*x]] + 2*e^2*Cos[a/b]*SinIntegral[a/b +
ArcSin[c*x]] - 24*c^2*d*e*Cos[(3*a)/b]*SinIntegral[3*(a/b + ArcSin[c*x])]
- 9*e^2*Cos[(3*a)/b]*SinIntegral[3*(a/b + ArcSin[c*x])] + 5*e^2*Cos[(5*a)/
b]*SinIntegral[5*(a/b + ArcSin[c*x])])/(b^2*c^5)
```

Rubi [A] (verified)

Time = 1.17 (sec) , antiderivative size = 498, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2}{(a+b\arcsin(cx))^2}\,dx$$

$$\downarrow 5172$$

$$\int \left(\frac{d^2}{(a+b\arcsin(cx))^2}+\frac{2dex^2}{(a+b\arcsin(cx))^2}+\frac{e^2x^4}{(a+b\arcsin(cx))^2}\right)dx$$

$$\downarrow 2009$$

$$\frac{e^2\sin\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{8b^2c^5}-\frac{9e^2\sin\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{16b^2c^5}+$$
$$\frac{5e^2\sin\left(\frac{5a}{b}\right)\text{CosIntegral}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{16b^2c^5}-\frac{e^2\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{8b^2c^5}+$$
$$\frac{9e^2\cos\left(\frac{3a}{b}\right)\text{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{16b^2c^5}-\frac{5e^2\cos\left(\frac{5a}{b}\right)\text{Si}\left(\frac{5(a+b\arcsin(cx))}{b}\right)}{16b^2c^5}+$$
$$\frac{de\sin\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{2b^2c^3}-\frac{3de\sin\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{2b^2c^3}-$$
$$\frac{de\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{2b^2c^3}+\frac{3de\cos\left(\frac{3a}{b}\right)\text{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{2b^2c^3}+$$
$$\frac{d^2\sin\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{b^2c}-\frac{d^2\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{b^2c}-\frac{d^2\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}-$$
$$\frac{2dex^2\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}-\frac{e^2x^4\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}$$

input
```
Int[(d + e*x^2)^2/(a + b*ArcSin[c*x])^2,x]
```

output
```
-((d^2*Sqrt[1 - c^2*x^2])/(b*c*(a + b*ArcSin[c*x]))) - (2*d*e*x^2*Sqrt[1 -
 c^2*x^2])/(b*c*(a + b*ArcSin[c*x])) - (e^2*x^4*Sqrt[1 - c^2*x^2])/(b*c*(a
 + b*ArcSin[c*x])) + (d^2*CosIntegral[(a + b*ArcSin[c*x])/b]*Sin[a/b])/(b^
2*c) + (d*e*CosIntegral[(a + b*ArcSin[c*x])/b]*Sin[a/b])/(2*b^2*c^3) + (e^
2*CosIntegral[(a + b*ArcSin[c*x])/b]*Sin[a/b])/(8*b^2*c^5) - (3*d*e*CosInt
egral[(3*(a + b*ArcSin[c*x]))/b]*Sin[(3*a)/b])/(2*b^2*c^3) - (9*e^2*CosInt
egral[(3*(a + b*ArcSin[c*x]))/b]*Sin[(3*a)/b])/(16*b^2*c^5) + (5*e^2*CosIn
tegral[(5*(a + b*ArcSin[c*x]))/b]*Sin[(5*a)/b])/(16*b^2*c^5) - (d^2*Cos[a/
b]*SinIntegral[(a + b*ArcSin[c*x])/b])/(b^2*c) - (d*e*Cos[a/b]*SinIntegral
[(a + b*ArcSin[c*x])/b])/(2*b^2*c^3) - (e^2*Cos[a/b]*SinIntegral[(a + b*Ar
cSin[c*x])/b])/(8*b^2*c^5) + (3*d*e*Cos[(3*a)/b]*SinIntegral[(3*(a + b*Arc
Sin[c*x]))/b])/(2*b^2*c^3) + (9*e^2*Cos[(3*a)/b]*SinIntegral[(3*(a + b*Arc
Sin[c*x]))/b])/(16*b^2*c^5) - (5*e^2*Cos[(5*a)/b]*SinIntegral[(5*(a + b*Ar
cSin[c*x]))/b])/(16*b^2*c^5)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [A] (verified)

Time = 0.27 (sec) , antiderivative size = 795, normalized size of antiderivative = 1.60

method	result	size
derivativedivides	Expression too large to display	795
default	Expression too large to display	795

input
```
int((e*x^2+d)^2/(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output

```
-1/16/c^5*(2*(-c^2*x^2+1)^(1/2)*b*e^2+16*arcsin(c*x)*Si(arcsin(c*x)+a/b)*c
os(a/b)*b*c^4*d^2-16*arcsin(c*x)*Ci(arcsin(c*x)+a/b)*sin(a/b)*b*c^4*d^2+8*
Si(arcsin(c*x)+a/b)*cos(a/b)*a*c^2*d*e+16*Si(arcsin(c*x)+a/b)*cos(a/b)*a*c
^4*d^2-16*Ci(arcsin(c*x)+a/b)*sin(a/b)*a*c^4*d^2-8*cos(3*arcsin(c*x))*b*c^
2*d*e-9*arcsin(c*x)*Si(3*arcsin(c*x)+3*a/b)*cos(3*a/b)*b*e^2+9*arcsin(c*x)
*Ci(3*arcsin(c*x)+3*a/b)*sin(3*a/b)*b*e^2+5*arcsin(c*x)*Si(5*arcsin(c*x)+5
*a/b)*cos(5*a/b)*b*e^2-5*arcsin(c*x)*Ci(5*arcsin(c*x)+5*a/b)*sin(5*a/b)*b*
e^2+2*arcsin(c*x)*Si(arcsin(c*x)+a/b)*cos(a/b)*b*e^2-2*arcsin(c*x)*Ci(arcs
in(c*x)+a/b)*sin(a/b)*b*e^2+8*(-c^2*x^2+1)^(1/2)*b*c^2*d*e-3*cos(3*arcsin(
c*x))*b*e^2+cos(5*arcsin(c*x))*b*e^2+8*arcsin(c*x)*Si(arcsin(c*x)+a/b)*cos
(a/b)*b*c^2*d*e-8*arcsin(c*x)*Ci(arcsin(c*x)+a/b)*sin(a/b)*b*c^2*d*e-24*ar
csin(c*x)*Si(3*arcsin(c*x)+3*a/b)*cos(3*a/b)*b*c^2*d*e+24*arcsin(c*x)*Ci(3
*arcsin(c*x)+3*a/b)*sin(3*a/b)*b*c^2*d*e-9*Si(3*arcsin(c*x)+3*a/b)*cos(3*a
/b)*a*e^2+9*Ci(3*arcsin(c*x)+3*a/b)*sin(3*a/b)*a*e^2+5*Si(5*arcsin(c*x)+5*
a/b)*cos(5*a/b)*a*e^2-5*Ci(5*arcsin(c*x)+5*a/b)*sin(5*a/b)*a*e^2+2*Si(arcs
in(c*x)+a/b)*cos(a/b)*a*e^2-2*Ci(arcsin(c*x)+a/b)*sin(a/b)*a*e^2+16*(-c^2*
x^2+1)^(1/2)*b*c^4*d^2-8*Ci(arcsin(c*x)+a/b)*sin(a/b)*a*c^2*d*e-24*Si(3*ar
csin(c*x)+3*a/b)*cos(3*a/b)*a*c^2*d*e+24*Ci(3*arcsin(c*x)+3*a/b)*sin(3*a/b
)*a*c^2*d*e)/(a+b*arcsin(c*x))/b^2
```

Fricas [F]

$$\int \frac{(d+ex^2)^2}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(ex^2+d)^2}{(b\arcsin(cx)+a)^2}\,dx$$

input

```
integrate((e*x^2+d)^2/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output

```
integral((e^2*x^4 + 2*d*e*x^2 + d^2)/(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x
) + a^2), x)
```

Sympy [F]

$$\int \frac{(d+ex^2)^2}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(d+ex^2)^2}{(a+b\operatorname{asin}(cx))^2}\,dx$$

input
```
integrate((e*x**2+d)**2/(a+b*asin(c*x))**2,x)
```

output
```
Integral((d + e*x**2)**2/(a + b*asin(c*x))**2, x)
```

Maxima [F]

$$\int \frac{(d+ex^2)^2}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(ex^2+d)^2}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((e*x^2+d)^2/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
-((e^2*x^4 + 2*d*e*x^2 + d^2)*sqrt(c*x + 1)*sqrt(-c*x + 1) - (b^2*c*arctan
2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)*integrate((5*c^2*e^2*x^5 + 2
*(3*c^2*d*e - 2*e^2)*x^3 + (c^2*d^2 - 4*d*e)*x)*sqrt(c*x + 1)*sqrt(-c*x +
1)/(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)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 2337 vs. $2(472) = 944$.

Time $= 0.21$ (sec) , antiderivative size $= 2337$, normalized size of antiderivative $= 4.69$

$$\int \frac{(d+ex^2)^2}{(a+b\arcsin(cx))^2}\,dx = \text{Too large to display}$$

input
```
integrate((e*x^2+d)^2/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output

```
5*b*e^2*arcsin(c*x)*cos(a/b)^4*cos_integral(5*a/b + 5*arcsin(c*x))*sin(a/b
)/(b^3*c^5*arcsin(c*x) + a*b^2*c^5) - 6*b*c^2*d*e*arcsin(c*x)*cos(a/b)^2*c
os_integral(3*a/b + 3*arcsin(c*x))*sin(a/b)/(b^3*c^5*arcsin(c*x) + a*b^2*c
^5) + b*c^4*d^2*arcsin(c*x)*cos_integral(a/b + arcsin(c*x))*sin(a/b)/(b^3*
c^5*arcsin(c*x) + a*b^2*c^5) - 5*b*e^2*arcsin(c*x)*cos(a/b)^5*sin_integral
(5*a/b + 5*arcsin(c*x))/(b^3*c^5*arcsin(c*x) + a*b^2*c^5) + 6*b*c^2*d*e*ar
csin(c*x)*cos(a/b)^3*sin_integral(3*a/b + 3*arcsin(c*x))/(b^3*c^5*arcsin(c
*x) + a*b^2*c^5) - b*c^4*d^2*arcsin(c*x)*cos(a/b)*sin_integral(a/b + arcsi
n(c*x))/(b^3*c^5*arcsin(c*x) + a*b^2*c^5) + 5*a*e^2*cos(a/b)^4*cos_integra
l(5*a/b + 5*arcsin(c*x))*sin(a/b)/(b^3*c^5*arcsin(c*x) + a*b^2*c^5) - 6*a*
c^2*d*e*cos(a/b)^2*cos_integral(3*a/b + 3*arcsin(c*x))*sin(a/b)/(b^3*c^5*a
rcsin(c*x) + a*b^2*c^5) + a*c^4*d^2*cos_integral(a/b + arcsin(c*x))*sin(a/
b)/(b^3*c^5*arcsin(c*x) + a*b^2*c^5) - 5*a*e^2*cos(a/b)^5*sin_integral(5*a
/b + 5*arcsin(c*x))/(b^3*c^5*arcsin(c*x) + a*b^2*c^5) + 6*a*c^2*d*e*cos(a/
b)^3*sin_integral(3*a/b + 3*arcsin(c*x))/(b^3*c^5*arcsin(c*x) + a*b^2*c^5)
 - a*c^4*d^2*cos(a/b)*sin_integral(a/b + arcsin(c*x))/(b^3*c^5*arcsin(c*x)
 + a*b^2*c^5) - 15/4*b*e^2*arcsin(c*x)*cos(a/b)^2*cos_integral(5*a/b + 5*a
rcsin(c*x))*sin(a/b)/(b^3*c^5*arcsin(c*x) + a*b^2*c^5) + 3/2*b*c^2*d*e*arc
sin(c*x)*cos_integral(3*a/b + 3*arcsin(c*x))*sin(a/b)/(b^3*c^5*arcsin(c*x)
 + a*b^2*c^5) - 9/4*b*e^2*arcsin(c*x)*cos(a/b)^2*cos_integral(3*a/b + 3...
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^2}{(a+b\arcsin(cx))^2}\,dx = \int \frac{(e\,x^2+d)^2}{(a+b\,\mathrm{asin}\,(c\,x))^2}\,dx$$

input

```
int((d + e*x^2)^2/(a + b*asin(c*x))^2,x)
```

output

```
int((d + e*x^2)^2/(a + b*asin(c*x))^2, x)
```

Reduce [F]

$$\int \frac{(d+ex^2)^2}{(a+b\arcsin(cx))^2}\,dx = \left(\int \frac{x^4}{asin(cx)^2 b^2 + 2asin(cx)ab + a^2}dx\right)e^2 + 2\left(\int \frac{x^2}{asin(cx)^2 b^2 + 2asin(cx)ab + a^2}dx\right)de + \left(\int \frac{1}{asin(cx)^2 b^2 + 2asin(cx)ab + a^2}dx\right)d^2$$

input

```
int((e*x^2+d)^2/(a+b*asin(c*x))^2,x)
```

output

```
int(x**4/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x)*e**2 + 2*int(x**2
/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x)*d*e + int(1/(asin(c*x)**2
*b**2 + 2*asin(c*x)*a*b + a**2),x)*d**2
```

3.161 $\int \frac{d+ex^2}{(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 1232
Mathematica [A] (verified) . . . 1233
Rubi [A] (verified) . . . 1233
Maple [A] (verified) . . . 1235
Fricas [F] . . . 1235
Sympy [F] . . . 1236
Maxima [F] . . . 1236
Giac [B] (verification not implemented) . . . 1236
Mupad [F(-1)] . . . 1237
Reduce [F] . . . 1238

Optimal result

Integrand size = 18, antiderivative size = 249

$$\begin{aligned}\int \frac{d+ex^2}{(a+b\arcsin(cx))^2}\,dx = &-\frac{d\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}-\frac{ex^2\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}\\ &+\frac{d\,\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}\right)}{b^2c}\\ &+\frac{e\,\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}\right)}{4b^2c^3}\\ &-\frac{3e\,\text{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)\sin\left(\frac{3a}{b}\right)}{4b^2c^3}\\ &-\frac{d\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{b^2c}-\frac{e\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{4b^2c^3}\\ &+\frac{3e\cos\left(\frac{3a}{b}\right)\text{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{4b^2c^3}\end{aligned}$$

output

```
-d*(-c^2*x^2+1)^(1/2)/b/c/(a+b*arcsin(c*x))-e*x^2*(-c^2*x^2+1)^(1/2)/b/c/(
a+b*arcsin(c*x))+d*Ci((a+b*arcsin(c*x))/b)*sin(a/b)/b^2/c+1/4*e*Ci((a+b*ar
csin(c*x))/b)*sin(a/b)/b^2/c^3-3/4*e*Ci(3*(a+b*arcsin(c*x))/b)*sin(3*a/b)/
b^2/c^3-d*cos(a/b)*Si((a+b*arcsin(c*x))/b)/b^2/c-1/4*e*cos(a/b)*Si((a+b*ar
csin(c*x))/b)/b^2/c^3+3/4*e*cos(3*a/b)*Si(3*(a+b*arcsin(c*x))/b)/b^2/c^3
```

Mathematica [A] (verified)

Time = 0.74 (sec) , antiderivative size = 191, normalized size of antiderivative = 0.77

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^2}\,dx =$$

$$-\frac{\frac{4bc^2d\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}+\frac{4bc^2ex^2\sqrt{1-c^2x^2}}{a+b\arcsin(cx)}-(4c^2d+e)\,\text{CosIntegral}\left(\frac{a}{b}+\arcsin(cx)\right)\sin\left(\frac{a}{b}\right)+3e\,\text{CosIntegral}\left(3\left(\frac{a}{b}+\right.\right.}{}$$

input

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

output

```
-1/4*((4*b*c^2*d*Sqrt[1 - c^2*x^2])/(a + b*ArcSin[c*x]) + (4*b*c^2*e*x^2*S
qrt[1 - c^2*x^2])/(a + b*ArcSin[c*x]) - (4*c^2*d + e)*CosIntegral[a/b + Ar
cSin[c*x]]*Sin[a/b] + 3*e*CosIntegral[3*(a/b + ArcSin[c*x])]*Sin[(3*a)/b]
+ 4*c^2*d*Cos[a/b]*SinIntegral[a/b + ArcSin[c*x]] + e*Cos[a/b]*SinIntegral
[a/b + ArcSin[c*x]] - 3*e*Cos[(3*a)/b]*SinIntegral[3*(a/b + ArcSin[c*x])])
/(b^2*c^3)
```

Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 249, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^2}\,dx$$

$$\downarrow 5172$$

$$\int \left(\frac{d}{(a+b\arcsin(cx))^2}+\frac{ex^2}{(a+b\arcsin(cx))^2}\right)dx$$

$$\downarrow 2009$$

$$\frac{e\sin\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{4b^2c^3}-\frac{3e\sin\left(\frac{3a}{b}\right)\operatorname{CosIntegral}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{4b^2c^3}-\frac{e\cos\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{4b^2c^3}+\frac{3e\cos\left(\frac{3a}{b}\right)\operatorname{Si}\left(\frac{3(a+b\arcsin(cx))}{b}\right)}{4b^2c^3}+\frac{d\sin\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{b^2c}-\frac{d\cos\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{b^2c}-\frac{d\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}-\frac{ex^2\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}$$

input
```
Int[(d + e*x^2)/(a + b*ArcSin[c*x])^2,x]
```

output
```
-((d*Sqrt[1 - c^2*x^2])/(b*c*(a + b*ArcSin[c*x]))) - (e*x^2*Sqrt[1 - c^2*x
^2])/(b*c*(a + b*ArcSin[c*x])) + (d*CosIntegral[(a + b*ArcSin[c*x])/b]*Sin
[a/b])/(b^2*c) + (e*CosIntegral[(a + b*ArcSin[c*x])/b]*Sin[a/b])/(4*b^2*c^
3) - (3*e*CosIntegral[(3*(a + b*ArcSin[c*x]))/b]*Sin[(3*a)/b])/(4*b^2*c^3)
 - (d*Cos[a/b]*SinIntegral[(a + b*ArcSin[c*x])/b])/(b^2*c) - (e*Cos[a/b]*S
inIntegral[(a + b*ArcSin[c*x])/b])/(4*b^2*c^3) + (3*e*Cos[(3*a)/b]*SinInte
gral[(3*(a + b*ArcSin[c*x]))/b])/(4*b^2*c^3)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 376, normalized size of antiderivative = 1.51

method	result
derivativedivides	$-\frac{d\left(\arcsin(cx)\,\mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)b-\arcsin(cx)\,\mathrm{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)b+\mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)a-\mathrm{Ci}\left(\arcsin(cx)+\frac{a}{b}\right.\right.}{(a+b\arcsin(cx))b^2}$
default	$-\frac{d\left(\arcsin(cx)\,\mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)b-\arcsin(cx)\,\mathrm{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)b+\mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)a-\mathrm{Ci}\left(\arcsin(cx)+\frac{a}{b}\right.\right.}{(a+b\arcsin(cx))b^2}$

input
```
int((e*x^2+d)/(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
1/c*(-d*(arcsin(c*x)*Si(arcsin(c*x)+a/b)*cos(a/b)*b-arcsin(c*x)*Ci(arcsin(
c*x)+a/b)*sin(a/b)*b+Si(arcsin(c*x)+a/b)*cos(a/b)*a-Ci(arcsin(c*x)+a/b)*si
n(a/b)*a+(-c^2*x^2+1)^(1/2)*b)/(a+b*arcsin(c*x))/b^2-1/4*e/c^2*(arcsin(c*x
)*Si(arcsin(c*x)+a/b)*cos(a/b)*b-arcsin(c*x)*Ci(arcsin(c*x)+a/b)*sin(a/b)*
b+Si(arcsin(c*x)+a/b)*cos(a/b)*a-Ci(arcsin(c*x)+a/b)*sin(a/b)*a+(-c^2*x^2+
1)^(1/2)*b)/(a+b*arcsin(c*x))/b^2+1/4*e/c^2*(3*arcsin(c*x)*Si(3*arcsin(c*x
)+3*a/b)*cos(3*a/b)*b-3*arcsin(c*x)*Ci(3*arcsin(c*x)+3*a/b)*sin(3*a/b)*b+3
*Si(3*arcsin(c*x)+3*a/b)*cos(3*a/b)*a-3*Ci(3*arcsin(c*x)+3*a/b)*sin(3*a/b)
*a+cos(3*arcsin(c*x))*b)/(a+b*arcsin(c*x))/b^2)
```

Fricas [F]

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^2}\,dx = \int \frac{ex^2+d}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((e*x^2+d)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral((e*x^2 + d)/(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2), x)
```

Sympy [F]

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^2}\,dx = \int \frac{d+ex^2}{(a+b\operatorname{asin}(cx))^2}\,dx$$

input
```
integrate((e*x**2+d)/(a+b*asin(c*x))**2,x)
```

output
```
Integral((d + e*x**2)/(a + b*asin(c*x))**2, x)
```

Maxima [F]

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^2}\,dx = \int \frac{ex^2+d}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((e*x^2+d)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
-((e*x^2 + d)*sqrt(c*x + 1)*sqrt(-c*x + 1) - (b^2*c*arctan2(c*x, sqrt(c*x
+ 1)*sqrt(-c*x + 1)) + a*b*c)*integrate((3*c^2*e*x^3 + (c^2*d - 2*e)*x)*sq
rt(c*x + 1)*sqrt(-c*x + 1)/(a*b*c^3*x^2 - a*b*c + (b^2*c^3*x^2 - b^2*c)*ar
ctan2(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)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 891 vs. $2(237) = 474$.

Time $= 0.19$ (sec) , antiderivative size $= 891$, normalized size of antiderivative $= 3.58$

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^2}\,dx = \text{Too large to display}$$

input
```
integrate((e*x^2+d)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output

```
-3*b*e*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) + b*c^2*d*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) + 3*b*e*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) - b*c^2*d*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*a*e*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) + a*c^2*d*cos_in
tegral(a/b + arcsin(c*x))*sin(a/b)/(b^3*c^3*arcsin(c*x) + a*b^2*c^3) + 3*a
*e*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) - a*c^2*d*cos(a/b)*sin_integral(a/b + arcsin(c*x))/(b^3*c^3*arcs
in(c*x) + a*b^2*c^3) + 3/4*b*e*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*e*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*e*arcsin(c*x)*cos(a/b)*sin_integral(3*a/b + 3*arcsin(c*x))/(b^3*c^3*a
rcsin(c*x) + a*b^2*c^3) - 1/4*b*e*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) - sqrt(-c^2*x^2 + 1)*b*c^2*
d/(b^3*c^3*arcsin(c*x) + a*b^2*c^3) + 3/4*a*e*cos_integral(3*a/b + 3*arcsi
n(c*x))*sin(a/b)/(b^3*c^3*arcsin(c*x) + a*b^2*c^3) + 1/4*a*e*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*e*co
s(a/b)*sin_integral(3*a/b + 3*arcsin(c*x))/(b^3*c^3*arcsin(c*x) + a*b^2...
```

Mupad [F(-1)]

Timed out.

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^2}\,dx = \int \frac{e\,x^2+d}{(a+b\,\mathrm{asin}\,(c\,x))^2}\,dx$$

input

```
int((d + e*x^2)/(a + b*asin(c*x))^2,x)
```

output

```
int((d + e*x^2)/(a + b*asin(c*x))^2, x)
```

Reduce [F]

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^2}\,dx = \left(\int \frac{x^2}{asin\left(cx\right)^2 b^2+2asin\left(cx\right)ab+a^2}dx\right)e + \left(\int \frac{1}{asin\left(cx\right)^2 b^2+2asin\left(cx\right)ab+a^2}dx\right)d$$

input
```
int((e*x^2+d)/(a+b*asin(c*x))^2,x)
```

output
```
int(x**2/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x)*e + int(1/(asin(c
*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x)*d
```

3.162 $\int \frac{1}{(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 1239
Mathematica [A] (verified) . . . 1239
Rubi [A] (verified) . . . 1240
Maple [A] (verified) . . . 1243
Fricas [F] . . . 1243
Sympy [F] . . . 1243
Maxima [F] . . . 1244
Giac [B] (verification not implemented) . . . 1244
Mupad [F(-1)] . . . 1245
Reduce [F] . . . 1245

Optimal result

Integrand size = 10, antiderivative size = 86

$$\int \frac{1}{(a+b\arcsin(cx))^2}\,dx = -\frac{\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))} + \frac{\text{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)\sin\left(\frac{a}{b}\right)}{b^2c} - \frac{\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)}{b^2c}$$

output

```
-(-c^2*x^2+1)^(1/2)/b/c/(a+b*arcsin(c*x))+Ci((a+b*arcsin(c*x))/b)*sin(a/b)
/b^2/c-cos(a/b)*Si((a+b*arcsin(c*x))/b)/b^2/c
```

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 72, normalized size of antiderivative = 0.84

$$\int \frac{1}{(a+b\arcsin(cx))^2}\,dx = \frac{-\frac{b\sqrt{1-c^2x^2}}{a+b\arcsin(cx)} + \text{CosIntegral}\left(\frac{a}{b}+\arcsin(cx)\right)\sin\left(\frac{a}{b}\right) - \cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a}{b}+\arcsin(cx)\right)}{b^2c}$$

input

```
Integrate[(a + b*ArcSin[c*x])^(-2),x]
```

output
```
(-((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)
```

Rubi [A] (verified)

Time = 0.60 (sec) , antiderivative size = 83, normalized size of antiderivative = 0.97, number of steps used = 10, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.900$, Rules used = {5132, 5224, 25, 3042, 3784, 25, 3042, 3780, 3783}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(a+b\arcsin(cx))^2}\,dx$$

$$\downarrow 5132$$

$$-\frac{c\int \frac{x}{\sqrt{1-c^2x^2}(a+b\arcsin(cx))}dx}{b} - \frac{\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 5224$$

$$-\frac{\int -\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c} - \frac{\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 25$$

$$\frac{\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c} - \frac{\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 3042$$

$$\frac{\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{b^2c} - \frac{\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}$$

$$\downarrow 3784$$

$$-\frac{-\sin\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx)) - \cos\left(\frac{a}{b}\right)\int -\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{\frac{b^2c}{\sqrt{1-c^2x^2}}} - \frac{}{bc(a+b\arcsin(cx))}$$

$$\downarrow 25$$

$$-\frac{\cos\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int\frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{\frac{b^2c}{\sqrt{1-c^2x^2}}}-\frac{}{bc(a+b\arcsin(cx))}$$

$$\downarrow 3042$$

$$-\frac{\cos\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{\frac{b^2c}{\sqrt{1-c^2x^2}}}-\frac{}{bc(a+b\arcsin(cx))}$$

$$\downarrow 3780$$

$$-\frac{\cos\left(\frac{a}{b}\right)\mathrm{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)-\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{a+b\arcsin(cx)}d(a+b\arcsin(cx))}{\frac{b^2c}{\sqrt{1-c^2x^2}}}-\frac{}{bc(a+b\arcsin(cx))}$$

$$\downarrow 3783$$

$$-\frac{\cos\left(\frac{a}{b}\right)\mathrm{Si}\left(\frac{a+b\arcsin(cx)}{b}\right)-\sin\left(\frac{a}{b}\right)\mathrm{CosIntegral}\left(\frac{a+b\arcsin(cx)}{b}\right)}{b^2c}-\frac{\sqrt{1-c^2x^2}}{bc(a+b\arcsin(cx))}$$

input
```
Int[(a + b*ArcSin[c*x])^(-2),x]
```

output
```
-(Sqrt[1 - c^2*x^2]/(b*c*(a + b*ArcSin[c*x]))) - (-(CosIntegral[(a + b*Arc
Sin[c*x])/b]*Sin[a/b]) + Cos[a/b]*SinIntegral[(a + b*ArcSin[c*x])/b])/(b^2
*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3780
```
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 3783
```
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 3784
```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[Cos[(d*
e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Simp[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 5132
```
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] + Simp[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 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 76, normalized size of antiderivative = 0.88

method	result	size
derivativedivides	$-\frac{\sqrt{-c^2x^2+1}}{(a+b\arcsin(cx))b}-\frac{\mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)-\mathrm{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)}{b^2}}{c}$	76
default	$-\frac{\sqrt{-c^2x^2+1}}{(a+b\arcsin(cx))b}-\frac{\mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)-\mathrm{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)}{b^2}}{c}$	76

input
```
int(1/(a+b*arcsin(c*x))^2,x,method=_RETURNVERBOSE)
```

output
```
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)
```

Fricas [F]

$$\int \frac{1}{(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(1/(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2), x)
```

Sympy [F]

$$\int \frac{1}{(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\operatorname{asin}(cx))^2}\,dx$$

input
```
integrate(1/(a+b*asin(c*x))**2,x)
```

output
```
Integral((a + b*asin(c*x))**(-2), x)
```

Maxima [F]

$$\int \frac{1}{(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
((b^2*c^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c^2)*integrate(
sqrt(c*x + 1)*sqrt(-c*x + 1)*x/(a*b*c^2*x^2 - a*b + (b^2*c^2*x^2 - b^2)*ar
ctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))), x) - sqrt(c*x + 1)*sqrt(-c*x +
1))/(b^2*c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 192 vs. $2(84) = 168$.

Time $= 0.12$ (sec) , antiderivative size $= 192$, normalized size of antiderivative $= 2.23$

$$\begin{aligned}\int \frac{1}{(a+b\arcsin(cx))^2}\,dx = {} & \frac{b\arcsin(cx)\,\mathrm{Ci}\left(\frac{a}{b}+\arcsin(cx)\right)\sin\left(\frac{a}{b}\right)}{b^3c\arcsin(cx)+ab^2c} \\ & - \frac{b\arcsin(cx)\cos\left(\frac{a}{b}\right)\mathrm{Si}\left(\frac{a}{b}+\arcsin(cx)\right)}{b^3c\arcsin(cx)+ab^2c} \\ & + \frac{a\,\mathrm{Ci}\left(\frac{a}{b}+\arcsin(cx)\right)\sin\left(\frac{a}{b}\right)}{b^3c\arcsin(cx)+ab^2c} \\ & - \frac{a\cos\left(\frac{a}{b}\right)\mathrm{Si}\left(\frac{a}{b}+\arcsin(cx)\right)}{b^3c\arcsin(cx)+ab^2c} - \frac{\sqrt{-c^2x^2+1}b}{b^3c\arcsin(cx)+ab^2c}\end{aligned}$$

input
```
integrate(1/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
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
*arcsin(c*x) + a*b^2*c) + a*cos_integral(a/b + arcsin(c*x))*sin(a/b)/(b^3*
c*arcsin(c*x) + a*b^2*c) - a*cos(a/b)*sin_integral(a/b + arcsin(c*x))/(b^3
*c*arcsin(c*x) + a*b^2*c) - sqrt(-c^2*x^2 + 1)*b/(b^3*c*arcsin(c*x) + a*b^
2*c)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{1}{(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\,\text{asin}\,(c\,x))^2}\,dx$$

input
```
int(1/(a + b*asin(c*x))^2,x)
```

output
```
int(1/(a + b*asin(c*x))^2, x)
```

Reduce [F]

$$\int \frac{1}{(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{asin\,(cx)^2\,b^2 + 2asin\,(cx)\,ab + a^2}dx$$

input
```
int(1/(a+b*asin(c*x))^2,x)
```

output
```
int(1/(asin(c*x)**2*b**2 + 2*asin(c*x)*a*b + a**2),x)
```

3.163 $\int \frac{1}{(d+ex^2)(a+b\arcsin(cx))^2}\,dx$

Optimal result 1246
Mathematica [N/A] 1246
Rubi [N/A] 1247
Maple [N/A] 1247
Fricas [N/A] 1248
Sympy [N/A] 1248
Maxima [N/A] 1248
Giac [N/A] 1249
Mupad [N/A] 1249
Reduce [N/A] 1250

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^2}\,dx = \text{Int}\left(\frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^2}, x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)/(a+b*arcsin(c*x))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 26.82 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^2}\,dx$$

input
```
Integrate[1/((d + e*x^2)*(a + b*ArcSin[c*x])^2),x]
```

output
```
Integrate[1/((d + e*x^2)*(a + b*ArcSin[c*x])^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^2}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^2}dx$$

input
```
Int[1/((d + e*x^2)*(a + b*ArcSin[c*x])^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.85 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{1}{(e\,x^2+d)\,(a+b\arcsin(cx))^2}dx$$

input
```
int(1/(e*x^2+d)/(a+b*arcsin(c*x))^2,x)
```

output
```
int(1/(e*x^2+d)/(a+b*arcsin(c*x))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 57, normalized size of antiderivative = 2.85

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(ex^2+d)(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(1/(a^2*e*x^2 + a^2*d + (b^2*e*x^2 + b^2*d)*arcsin(c*x)^2 + 2*(a*b
*e*x^2 + a*b*d)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 46.37 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\operatorname{asin}(cx))^2\,(d+ex^2)}\,dx$$

input
```
integrate(1/(e*x**2+d)/(a+b*asin(c*x))**2,x)
```

output
```
Integral(1/((a + b*asin(c*x))**2*(d + e*x**2)), x)
```

Maxima [N/A]

Not integrable

Time = 1.95 (sec) , antiderivative size = 320, normalized size of antiderivative = 16.00

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(ex^2+d)(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
-((a*b*c*e*x^2 + a*b*c*d + (b^2*c*e*x^2 + b^2*c*d)*arctan2(c*x, sqrt(c*x +
 1)*sqrt(-c*x + 1)))*integrate((c^2*e*x^3 - (c^2*d + 2*e)*x)*sqrt(c*x + 1)
*sqrt(-c*x + 1)/(a*b*c^3*e^2*x^6 - a*b*c*d^2 + (2*a*b*c^3*d*e - a*b*c*e^2)
*x^4 + (a*b*c^3*d^2 - 2*a*b*c*d*e)*x^2 + (b^2*c^3*e^2*x^6 - b^2*c*d^2 + (2
*b^2*c^3*d*e - b^2*c*e^2)*x^4 + (b^2*c^3*d^2 - 2*b^2*c*d*e)*x^2)*arctan2(c
*x, sqrt(c*x + 1)*sqrt(-c*x + 1))), x) + sqrt(c*x + 1)*sqrt(-c*x + 1))/(a*
b*c*e*x^2 + a*b*c*d + (b^2*c*e*x^2 + b^2*c*d)*arctan2(c*x, sqrt(c*x + 1)*s
qrt(-c*x + 1)))
```

Giac [N/A]

Not integrable

Time = 0.77 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(ex^2+d)(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)*(b*arcsin(c*x) + a)^2), x)
```

Mupad [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}\,(c\,x))^2\,(e\,x^2+d)}\,dx$$

input
```
int(1/((a + b*asin(c*x))^2*(d + e*x^2)),x)
```

output
```
int(1/((a + b*asin(c*x))^2*(d + e*x^2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 64, normalized size of antiderivative = 3.20

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^2}\,dx$$
$$= \int \frac{1}{asin\,(cx)^2\,b^2d + asin\,(cx)^2\,b^2e\,x^2 + 2asin\,(cx)\,abd + 2asin\,(cx)\,abe\,x^2 + a^2d + a^2e\,x^2}dx$$

input
```
int(1/(e*x^2+d)/(a+b*asin(c*x))^2,x)
```

output
```
int(1/(asin(c*x)**2*b**2*d + asin(c*x)**2*b**2*e*x**2 + 2*asin(c*x)*a*b*d
+ 2*asin(c*x)*a*b*e*x**2 + a**2*d + a**2*e*x**2),x)
```

3.164 $\int \frac{1}{(d+ex^2)^2(a+b\arcsin(cx))^2}\,dx$

Optimal result . . . 1251
Mathematica [N/A] . . . 1251
Rubi [N/A] . . . 1252
Maple [N/A] . . . 1252
Fricas [N/A] . . . 1253
Sympy [F(-1)] . . . 1253
Maxima [N/A] . . . 1253
Giac [N/A] . . . 1254
Mupad [N/A] . . . 1254
Reduce [N/A] . . . 1255

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^2}\,dx = \text{Int}\left(\frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^2},x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 46.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^2}\,dx$$

input
```
Integrate[1/((d + e*x^2)^2*(a + b*ArcSin[c*x])^2),x]
```

output
```
Integrate[1/((d + e*x^2)^2*(a + b*ArcSin[c*x])^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^2}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^2}dx$$

input
```
Int[1/((d + e*x^2)^2*(a + b*ArcSin[c*x])^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 2.69 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{1}{(e\,x^2+d)^2\,(a+b\arcsin(cx))^2}dx$$

input
```
int(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^2,x)
```

output
```
int(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.10 (sec) , antiderivative size = 98, normalized size of antiderivative = 4.90

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(ex^2+d)^2(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(1/(a^2*e^2*x^4 + 2*a^2*d*e*x^2 + a^2*d^2 + (b^2*e^2*x^4 + 2*b^2*d
*e*x^2 + b^2*d^2)*arcsin(c*x)^2 + 2*(a*b*e^2*x^4 + 2*a*b*d*e*x^2 + a*b*d^2
)*arcsin(c*x)), x)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^2}\,dx = \text{Timed out}$$

input
```
integrate(1/(e*x**2+d)**2/(a+b*asin(c*x))**2,x)
```

output
```
Timed out
```

Maxima [N/A]

Not integrable

Time = 2.78 (sec) , antiderivative size = 439, normalized size of antiderivative = 21.95

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(ex^2+d)^2(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
-((a*b*c*e^2*x^4 + 2*a*b*c*d*e*x^2 + a*b*c*d^2 + (b^2*c*e^2*x^4 + 2*b^2*c*
d*e*x^2 + b^2*c*d^2)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)))*integrate
((3*c^2*e*x^3 - (c^2*d + 4*e)*x)*sqrt(c*x + 1)*sqrt(-c*x + 1)/(a*b*c^3*e^3
*x^8 + (3*a*b*c^3*d*e^2 - a*b*c*e^3)*x^6 - a*b*c*d^3 + 3*(a*b*c^3*d^2*e -
a*b*c*d*e^2)*x^4 + (a*b*c^3*d^3 - 3*a*b*c*d^2*e)*x^2 + (b^2*c^3*e^3*x^8 +
(3*b^2*c^3*d*e^2 - b^2*c*e^3)*x^6 - b^2*c*d^3 + 3*(b^2*c^3*d^2*e - b^2*c*d
*e^2)*x^4 + (b^2*c^3*d^3 - 3*b^2*c*d^2*e)*x^2)*arctan2(c*x, sqrt(c*x + 1)*
sqrt(-c*x + 1))), x) + sqrt(c*x + 1)*sqrt(-c*x + 1))/(a*b*c*e^2*x^4 + 2*a*
b*c*d*e*x^2 + a*b*c*d^2 + (b^2*c*e^2*x^4 + 2*b^2*c*d*e*x^2 + b^2*c*d^2)*ar
ctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)))
```

Giac [N/A]

Not integrable

Time = 11.68 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{\left(d+ex^2\right)^2 \left(a+b\arcsin(cx)\right)^2}\,dx = \int \frac{1}{\left(ex^2+d\right)^2 \left(b\arcsin\left(cx\right)+a\right)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)^2*(b*arcsin(c*x) + a)^2), x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{\left(d+ex^2\right)^2 \left(a+b\arcsin(cx)\right)^2}\,dx = \int \frac{1}{\left(a+b\,\mathrm{asin}\left(c\,x\right)\right)^2 \left(e\,x^2+d\right)^2}\,dx$$

input
```
int(1/((a + b*asin(c*x))^2*(d + e*x^2)^2),x)
```

output
```
int(1/((a + b*asin(c*x))^2*(d + e*x^2)^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.33 (sec) , antiderivative size = 115, normalized size of antiderivative = 5.75

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^2}\,dx$$
$$= \int \frac{1}{asin\,(cx)^2\,b^2d^2 + 2asin\,(cx)^2\,b^2de\,x^2 + asin\,(cx)^2\,b^2e^2x^4 + 2asin\,(cx)\,ab\,d^2 + 4asin\,(cx)\,abde\,x^2 + 2as}$$

input
```
int(1/(e*x^2+d)^2/(a+b*asin(c*x))^2,x)
```

output
```
int(1/(asin(c*x)**2*b**2*d**2 + 2*asin(c*x)**2*b**2*d*e*x**2 + asin(c*x)**
2*b**2*e**2*x**4 + 2*asin(c*x)*a*b*d**2 + 4*asin(c*x)*a*b*d*e*x**2 + 2*asi
n(c*x)*a*b*e**2*x**4 + a**2*d**2 + 2*a**2*d*e*x**2 + a**2*e**2*x**4),x)
```

3.165 $\int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx$

Optimal result 1256
Mathematica [N/A] 1256
Rubi [N/A] 1257
Maple [N/A] 1257
Fricas [N/A] 1258
Sympy [N/A] 1258
Maxima [F(-2)] 1258
Giac [N/A] 1259
Mupad [N/A] 1259
Reduce [N/A] 1260

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx = \text{Int}\left(\sqrt{d+ex^2}(a+b\arcsin(cx)),x\right)$$

output
```
Defer(Int)((e*x^2+d)^(1/2)*(a+b*arcsin(c*x)),x)
```

Mathematica [N/A]

Not integrable

Time = 6.03 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx = \int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx$$

input
```
Integrate[Sqrt[d + e*x^2]*(a + b*ArcSin[c*x]),x]
```

output
```
Integrate[Sqrt[d + e*x^2]*(a + b*ArcSin[c*x]), x]
```

Rubi [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx$$

$$\downarrow 5174$$

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))dx$$

input
```
Int[Sqrt[d + e*x^2]*(a + b*ArcSin[c*x]),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 2.48 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \sqrt{e\,x^2+d}\,(a+b\arcsin(cx))\,dx$$

input
```
int((e*x^2+d)^(1/2)*(a+b*arcsin(c*x)),x)
```

output
```
int((e*x^2+d)^(1/2)*(a+b*arcsin(c*x)),x)
```

Fricas [N/A]

Not integrable

Time = 0.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx = \int \sqrt{ex^2+d}(b\arcsin(cx)+a)\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)*(b*arcsin(c*x) + a), x)
```

Sympy [N/A]

Not integrable

Time = 10.36 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx = \int (a+b\operatorname{asin}(cx))\sqrt{d+ex^2}\,dx$$

input
```
integrate((e*x**2+d)**(1/2)*(a+b*asin(c*x)),x)
```

output
```
Integral((a + b*asin(c*x))*sqrt(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx = \int \sqrt{ex^2+d}(b\arcsin(cx)+a)\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*arcsin(c*x) + a), x)
```

Mupad [N/A]

Not integrable

Time = 0.38 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx = \int (a+b\,\mathrm{asin}(c\,x))\,\sqrt{e\,x^2+d}\,dx$$

input
```
int((a + b*asin(c*x))*(d + e*x^2)^(1/2),x)
```

output
```
int((a + b*asin(c*x))*(d + e*x^2)^(1/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 61, normalized size of antiderivative = 3.05

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))\,dx$$
$$= \frac{\sqrt{e\,x^2+d}\,aex+\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)ad+2\left(\int \sqrt{e\,x^2+d}\,asin(cx)\,dx\right)be}{2e}$$

input
```
int((e*x^2+d)^(1/2)*(a+b*asin(c*x)),x)
```

output
```
(sqrt(d + e*x**2)*a*e*x + sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(
d))*a*d + 2*int(sqrt(d + e*x**2)*asin(c*x),x)*b*e)/(2*e)
```

3.166 $\int \frac{a+b\arcsin(cx)}{\sqrt{d+ex^2}}\,dx$

Optimal result 1261
Mathematica [N/A] 1261
Rubi [N/A] 1262
Maple [N/A] 1262
Fricas [N/A] 1263
Sympy [N/A] 1263
Maxima [F(-2)] 1263
Giac [F(-2)] 1264
Mupad [N/A] 1264
Reduce [N/A] 1265

Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{a+b\arcsin(cx)}{\sqrt{d+ex^2}}\,dx = \text{Int}\left(\frac{a+b\arcsin(cx)}{\sqrt{d+ex^2}}, x\right)$$

output
```
Defer(Int)((a+b*arcsin(c*x))/(e*x^2+d)^(1/2),x)
```

Mathematica [N/A]

Not integrable

Time = 2.91 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\arcsin(cx)}{\sqrt{d+ex^2}}\,dx = \int \frac{a+b\arcsin(cx)}{\sqrt{d+ex^2}}\,dx$$

input
```
Integrate[(a + b*ArcSin[c*x])/Sqrt[d + e*x^2],x]
```

output
```
Integrate[(a + b*ArcSin[c*x])/Sqrt[d + e*x^2], x]
```

Rubi [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a + b \arcsin(cx)}{\sqrt{d + ex^2}}\, dx$$
$$\downarrow 5174$$
$$\int \frac{a + b \arcsin(cx)}{\sqrt{d + ex^2}} dx$$

input
```
Int[(a + b*ArcSin[c*x])/Sqrt[d + e*x^2],x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.59 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{a + b \arcsin(cx)}{\sqrt{e\, x^2 + d}} dx$$

input
```
int((a+b*arcsin(c*x))/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*arcsin(c*x))/(e*x^2+d)^(1/2),x)
```

Fricas [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{a + b \arcsin(cx)}{\sqrt{d + ex^2}}\, dx = \int \frac{b \arcsin(cx) + a}{\sqrt{ex^2 + d}}\, dx$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((b*arcsin(c*x) + a)/sqrt(e*x^2 + d), x)
```

Sympy [N/A]

Not integrable

Time = 5.32 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{a + b \arcsin(cx)}{\sqrt{d + ex^2}}\, dx = \int \frac{a + b \operatorname{asin}(cx)}{\sqrt{d + ex^2}}\, dx$$

input
```
integrate((a+b*asin(c*x))/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*asin(c*x))/sqrt(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b \arcsin(cx)}{\sqrt{d + ex^2}}\, dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a + b \arcsin(cx)}{\sqrt{d + ex^2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{a + b \arcsin(cx)}{\sqrt{d + ex^2}}\,dx = \int \frac{a + b \operatorname{asin}(c\,x)}{\sqrt{e\,x^2 + d}}\,dx$$

input
```
int((a + b*asin(c*x))/(d + e*x^2)^(1/2),x)
```

output
```
int((a + b*asin(c*x))/(d + e*x^2)^(1/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.40

$$\int \frac{a+b\arcsin(cx)}{\sqrt{d+ex^2}}\,dx = \frac{\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)a+\left(\int \frac{asin(cx)}{\sqrt{e\,x^2+d}}dx\right)be}{e}$$

input
```
int((a+b*asin(c*x))/(e*x^2+d)^(1/2),x)
```

output
```
(sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(d))*a + int(asin(c*x)/sqr
t(d + e*x**2),x)*b*e)/e
```

3.167 $\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{3/2}}\,dx$

Optimal result . . . 1266
Mathematica [C] (verified) . . . 1266
Rubi [A] (verified) . . . 1267
Maple [F] . . . 1268
Fricas [B] (verification not implemented) . . . 1269
Sympy [F] . . . 1269
Maxima [F(-2)] . . . 1270
Giac [F(-2)] . . . 1270
Mupad [F(-1)] . . . 1270
Reduce [F] . . . 1271

Optimal result

Integrand size = 20, antiderivative size = 70

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{3/2}}\,dx = \frac{x(a+b\arcsin(cx))}{d\sqrt{d+ex^2}} + \frac{b\arctan\left(\frac{\sqrt{e}\sqrt{1-c^2x^2}}{c\sqrt{d+ex^2}}\right)}{d\sqrt{e}}$$

output
```
x*(a+b*arcsin(c*x))/d/(e*x^2+d)^(1/2)+b*arctan(e^(1/2)*(-c^2*x^2+1)^(1/2)/
c/(e*x^2+d)^(1/2))/d/e^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 6 vs. order 3 in optimal.

Time = 0.08 (sec) , antiderivative size = 74, normalized size of antiderivative = 1.06

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{3/2}}\,dx = \frac{x\left(-bcx\sqrt{1+\frac{ex^2}{d}}\,\text{AppellF1}\left(1,\frac{1}{2},\frac{1}{2},2,c^2x^2,-\frac{ex^2}{d}\right)+2(a+b\arcsin(cx))\right)}{2d\sqrt{d+ex^2}}$$

input
```
Integrate[(a + b*ArcSin[c*x])/(d + e*x^2)^(3/2),x]
```

output
```
(x*(-(b*c*x*Sqrt[1 + (e*x^2)/d]*AppellF1[1, 1/2, 1/2, 2, c^2*x^2, -((e*x^2
)/d)]) + 2*(a + b*ArcSin[c*x])))/(2*d*Sqrt[d + e*x^2])
```

Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 70, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {5170, 27, 353, 66, 218}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a + b\arcsin(cx)}{(d+ex^2)^{3/2}}\,dx$$

$$\downarrow 5170$$

$$\frac{x(a+b\arcsin(cx))}{d\sqrt{d+ex^2}} - bc\int \frac{x}{d\sqrt{1-c^2x^2}\sqrt{ex^2+d}}dx$$

$$\downarrow 27$$

$$\frac{x(a+b\arcsin(cx))}{d\sqrt{d+ex^2}} - \frac{bc\int \frac{x}{\sqrt{1-c^2x^2}\sqrt{ex^2+d}}dx}{d}$$

$$\downarrow 353$$

$$\frac{x(a+b\arcsin(cx))}{d\sqrt{d+ex^2}} - \frac{bc\int \frac{1}{\sqrt{1-c^2x^2}\sqrt{ex^2+d}}dx^2}{2d}$$

$$\downarrow 66$$

$$\frac{x(a+b\arcsin(cx))}{d\sqrt{d+ex^2}} - \frac{bc\int \frac{1}{-ex^4-c^2}d\frac{\sqrt{1-c^2x^2}}{\sqrt{ex^2+d}}}{d}$$

$$\downarrow 218$$

$$\frac{x(a+b\arcsin(cx))}{d\sqrt{d+ex^2}} + \frac{b\arctan\left(\frac{\sqrt{e}\sqrt{1-c^2x^2}}{c\sqrt{d+ex^2}}\right)}{d\sqrt{e}}$$

input
```
Int[(a + b*ArcSin[c*x])/(d + e*x^2)^(3/2),x]
```

output
```
(x*(a + b*ArcSin[c*x]))/(d*Sqrt[d + e*x^2]) + (b*ArcTan[(Sqrt[e]*Sqrt[1 -
c^2*x^2])/(c*Sqrt[d + e*x^2])])/(d*Sqrt[e])
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 66
```
Int[1/(Sqrt[(a_) + (b_.)*(x_)]*Sqrt[(c_) + (d_.)*(x_)]), x_Symbol] :> Simp[
2   Subst[Int[1/(b - d*x^2), x], x, Sqrt[a + b*x]/Sqrt[c + d*x]], x] /; Fre
eQ[{a, b, c, d}, x] &&  !GtQ[c - a*(d/b), 0]
```

rule 218
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

rule 353
```
Int[(x_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_Symbol]
 :> Simp[1/2   Subst[Int[(a + b*x)^p*(c + d*x)^q, x], x, x^2], x] /; FreeQ[
{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0]
```

rule 5170
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])   u, x
] - Simp[b*c   Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && NeQ[c^2*d + e, 0] && (IGtQ[p, 0] || ILtQ[p + 1/2
, 0])
```

Maple [F]

$$\int \frac{a+b\arcsin(cx)}{(e\,x^2+d)^{\frac{3}{2}}}dx$$

input
```
int((a+b*arcsin(c*x))/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*arcsin(c*x))/(e*x^2+d)^(3/2),x)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 137 vs. $2(60) = 120$.

Time = 0.14 (sec) , antiderivative size = 294, normalized size of antiderivative = 4.20

$$\int \frac{a + b\arcsin(cx)}{(d + ex^2)^{3/2}}\,dx = \left[-\frac{(bex^2 + bd)\sqrt{-e}\log\left(8\,c^4e^2x^4 + c^4d^2 - 6\,c^2de + 8\,(c^4de - c^2e^2)x^2 + 4\,(2\,c^3ex^2\right.\right.}{4\,(de^2}$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[-1/4*((b*e*x^2 + b*d)*sqrt(-e)*log(8*c^4*e^2*x^4 + c^4*d^2 - 6*c^2*d*e +
8*(c^4*d*e - c^2*e^2)*x^2 + 4*(2*c^3*e*x^2 + c^3*d - c*e)*sqrt(-c^2*x^2 +
1)*sqrt(e*x^2 + d)*sqrt(-e) + e^2) - 4*(b*e*x*arcsin(c*x) + a*e*x)*sqrt(e*
x^2 + d))/(d*e^2*x^2 + d^2*e), 1/2*((b*e*x^2 + b*d)*sqrt(e)*arctan(1/2*(2*
c^2*e*x^2 + c^2*d - e)*sqrt(-c^2*x^2 + 1)*sqrt(e*x^2 + d)*sqrt(e)/(c^3*e^2
*x^4 - c*d*e + (c^3*d*e - c*e^2)*x^2)) + 2*(b*e*x*arcsin(c*x) + a*e*x)*sqr
t(e*x^2 + d))/(d*e^2*x^2 + d^2*e)]
```

Sympy [F]

$$\int \frac{a + b\arcsin(cx)}{(d + ex^2)^{3/2}}\,dx = \int \frac{a + b\operatorname{asin}(cx)}{(d + ex^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*asin(c*x))/(e*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*asin(c*x))/(d + e*x**2)**(3/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e+c^2*d>0)', see `assume?` for m
ore detail
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\,\mathrm{asin}(c\,x)}{(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((a + b*asin(c*x))/(d + e*x^2)^(3/2),x)
```

output
```
int((a + b*asin(c*x))/(d + e*x^2)^(3/2), x)
```

Reduce [F]

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{3/2}}\,dx = \frac{\sqrt{e\,x^2+d}\,aex+\sqrt{e}\,ad+\sqrt{e}\,ae\,x^2+\left(\int \frac{asin(cx)}{\sqrt{e\,x^2+d}\,d+\sqrt{e\,x^2+d}\,e\,x^2}dx\right)b\,d^2e+\left(\int \frac{}{\sqrt{e\,x^2+}\right.}}{de\,(e\,x^2+d)}$$

input
```
int((a+b*asin(c*x))/(e*x^2+d)^(3/2),x)
```

output
```
(sqrt(d + e*x**2)*a*e*x + sqrt(e)*a*d + sqrt(e)*a*e*x**2 + int(asin(c*x)/(
sqrt(d + e*x**2)*d + sqrt(d + e*x**2)*e*x**2),x)*b*d**2*e + int(asin(c*x)/
(sqrt(d + e*x**2)*d + sqrt(d + e*x**2)*e*x**2),x)*b*d*e**2*x**2)/(d*e*(d +
 e*x**2))
```

3.168 $\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{5/2}}\,dx$

Optimal result . . . 1272
Mathematica [C] (verified) . . . 1272
Rubi [A] (verified) . . . 1273
Maple [F] . . . 1276
Fricas [B] (verification not implemented) . . . 1276
Sympy [F] . . . 1277
Maxima [F] . . . 1277
Giac [F(-2)] . . . 1277
Mupad [F(-1)] . . . 1278
Reduce [F] . . . 1278

Optimal result

Integrand size = 20, antiderivative size = 146

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{5/2}}\,dx = \frac{bc\sqrt{1-c^2x^2}}{3d\left(c^2d+e\right)\sqrt{d+ex^2}} + \frac{x(a+b\arcsin(cx))}{3d\left(d+ex^2\right)^{3/2}} + \frac{2x(a+b\arcsin(cx))}{3d^2\sqrt{d+ex^2}} + \frac{2b\arctan\left(\frac{\sqrt{e}\sqrt{1-c^2x^2}}{c\sqrt{d+ex^2}}\right)}{3d^2\sqrt{e}}$$

output

```
1/3*b*c*(-c^2*x^2+1)^(1/2)/d/(c^2*d+e)/(e*x^2+d)^(1/2)+1/3*x*(a+b*arcsin(c
*x))/d/(e*x^2+d)^(3/2)+2/3*x*(a+b*arcsin(c*x))/d^2/(e*x^2+d)^(1/2)+2/3*b*a
rctan(e^(1/2)*(-c^2*x^2+1)^(1/2)/c/(e*x^2+d)^(1/2))/d^2/e^(1/2)
```

Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 6 vs. order 3 in optimal.

Time = 0.16 (sec) , antiderivative size = 190, normalized size of antiderivative = 1.30

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{5/2}}\,dx = \frac{bc\sqrt{1-c^2x^2}}{3d\left(c^2d+e\right)\sqrt{d+ex^2}} + \sqrt{d+ex^2}\left(\frac{ax}{3d\left(d+ex^2\right)^2}+\frac{2ax}{3d^2\left(d+ex^2\right)}\right) - \frac{bcx^2\sqrt{\frac{d+ex^2}{d}}\,\text{AppellF1}\left(1,\frac{1}{2},\frac{1}{2},2,c^2x^2,-\frac{ex^2}{d}\right)}{3d^2\sqrt{d+ex^2}} + \frac{bx(3d+2ex^2)\arcsin(cx)}{3d^2\left(d+ex^2\right)^{3/2}}$$

input

```
Integrate[(a + b*ArcSin[c*x])/(d + e*x^2)^(5/2),x]
```

output

```
(b*c*Sqrt[1 - c^2*x^2])/(3*d*(c^2*d + e)*Sqrt[d + e*x^2]) + Sqrt[d + e*x^2
]*((a*x)/(3*d*(d + e*x^2)^2) + (2*a*x)/(3*d^2*(d + e*x^2))) - (b*c*x^2*Sqr
t[(d + e*x^2)/d]*AppellF1[1, 1/2, 1/2, 2, c^2*x^2, -((e*x^2)/d)])/(3*d^2*S
qrt[d + e*x^2]) + (b*x*(3*d + 2*e*x^2)*ArcSin[c*x])/(3*d^2*(d + e*x^2)^(3/
2))
```

Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 147, normalized size of antiderivative = 1.01, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {5170, 27, 435, 87, 66, 218}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{5/2}}\,dx$$

$$\downarrow 5170$$

$$-bc\int \frac{x\left(2ex^2+3d\right)}{3d^2\sqrt{1-c^2x^2}\left(ex^2+d\right)^{3/2}}dx + \frac{2x(a+b\arcsin(cx))}{3d^2\sqrt{d+ex^2}} + \frac{x(a+b\arcsin(cx))}{3d\left(d+ex^2\right)^{3/2}}$$

$$\downarrow 27$$

$$-\frac{bc\int\frac{x\left(2ex^2+3d\right)}{\sqrt{1-c^2x^2}\left(ex^2+d\right)^{3/2}}dx}{3d^2}+\frac{2x(a+b\arcsin(cx))}{3d^2\sqrt{d+ex^2}}+\frac{x(a+b\arcsin(cx))}{3d\left(d+ex^2\right)^{3/2}}$$

$$\downarrow 435$$

$$-\frac{bc\int\frac{2ex^2+3d}{\sqrt{1-c^2x^2}\left(ex^2+d\right)^{3/2}}dx^2}{6d^2}+\frac{2x(a+b\arcsin(cx))}{3d^2\sqrt{d+ex^2}}+\frac{x(a+b\arcsin(cx))}{3d\left(d+ex^2\right)^{3/2}}$$

$$\downarrow 87$$

$$-\frac{bc\left(2\int\frac{1}{\sqrt{1-c^2x^2}\sqrt{ex^2+d}}dx^2-\frac{2d\sqrt{1-c^2x^2}}{\left(c^2d+e\right)\sqrt{d+ex^2}}\right)}{6d^2}+\frac{2x(a+b\arcsin(cx))}{3d^2\sqrt{d+ex^2}}+\frac{x(a+b\arcsin(cx))}{3d\left(d+ex^2\right)^{3/2}}$$

$$\downarrow 66$$

$$-\frac{bc\left(4\int\frac{1}{-ex^4-c^2}d\frac{\sqrt{1-c^2x^2}}{\sqrt{ex^2+d}}-\frac{2d\sqrt{1-c^2x^2}}{\left(c^2d+e\right)\sqrt{d+ex^2}}\right)}{6d^2}+\frac{2x(a+b\arcsin(cx))}{3d^2\sqrt{d+ex^2}}+\frac{x(a+b\arcsin(cx))}{3d\left(d+ex^2\right)^{3/2}}$$

$$\downarrow 218$$

$$\frac{2x(a+b\arcsin(cx))}{3d^2\sqrt{d+ex^2}}+\frac{x(a+b\arcsin(cx))}{3d\left(d+ex^2\right)^{3/2}}-\frac{bc\left(-\frac{4\arctan\left(\frac{\sqrt{e}\sqrt{1-c^2x^2}}{c\sqrt{d+ex^2}}\right)}{c\sqrt{e}}-\frac{2d\sqrt{1-c^2x^2}}{\left(c^2d+e\right)\sqrt{d+ex^2}}\right)}{6d^2}$$

input
```
Int[(a + b*ArcSin[c*x])/(d + e*x^2)^(5/2),x]
```

output
```
(x*(a + b*ArcSin[c*x]))/(3*d*(d + e*x^2)^(3/2)) + (2*x*(a + b*ArcSin[c*x])
)/(3*d^2*Sqrt[d + e*x^2]) - (b*c*((-2*d*Sqrt[1 - c^2*x^2])/((c^2*d + e)*Sq
rt[d + e*x^2]) - (4*ArcTan[(Sqrt[e]*Sqrt[1 - c^2*x^2])/(c*Sqrt[d + e*x^2])
])/(c*Sqrt[e])))/(6*d^2)
```

Defintions of rubi rules used

rule 27

```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 66

```
Int[1/(Sqrt[(a_) + (b_.)*(x_)]*Sqrt[(c_) + (d_.)*(x_)]), x_Symbol] :> Simp[
2   Subst[Int[1/(b - d*x^2), x], x, Sqrt[a + b*x]/Sqrt[c + d*x]], x] /; Fre
eQ[{a, b, c, d}, x] &&  !GtQ[c - a*(d/b), 0]
```

rule 87

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[(-(b*e - a*f))*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(f*(p
+ 1)*(c*f - d*e))), x] - Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p
+ 1)))/(f*(p + 1)*(c*f - d*e))   Int[(c + d*x)^n*(e + f*x)^(p + 1), x], x]
/; FreeQ[{a, b, c, d, e, f, n}, x] && LtQ[p, -1] && ( !LtQ[n, -1] || Intege
rQ[p] ||  !(IntegerQ[n] ||  !(EqQ[e, 0] ||  !(EqQ[c, 0] || LtQ[p, n]))))
```

rule 218

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

rule 435

```
Int[(x_)^(m_.)*((a_.) + (b_.)*(x_)^2)^(p_.)*((c_.) + (d_.)*(x_)^2)^(q_.)*((
e_.) + (f_.)*(x_)^2)^(r_.), x_Symbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)
*(a + b*x)^p*(c + d*x)^q*(e + f*x)^r, x], x, x^2], x] /; FreeQ[{a, b, c, d,
 e, f, p, q, r}, x] && IntegerQ[(m - 1)/2]
```

rule 5170

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])   u, x
] - Simp[b*c   Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && NeQ[c^2*d + e, 0] && (IGtQ[p, 0] || ILtQ[p + 1/2
, 0])
```

Maple [F]

$$\int \frac{a + b \arcsin(cx)}{(e\,x^2 + d)^{\frac{5}{2}}} dx$$

input
```
int((a+b*arcsin(c*x))/(e*x^2+d)^(5/2),x)
```

output
```
int((a+b*arcsin(c*x))/(e*x^2+d)^(5/2),x)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 331 vs. $2(122) = 244$.

Time = 0.19 (sec) , antiderivative size = 683, normalized size of antiderivative = 4.68

$$\int \frac{a + b \arcsin(cx)}{(d + ex^2)^{5/2}}\, dx = \left[-\frac{(bc^2d^3 + (bc^2de^2 + be^3)x^4 + bd^2e + 2\,(bc^2d^2e + bde^2)x^2)\sqrt{-e}\log\left(8\,c^4e^2x^4 + c^{4}\right.\right.$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[-1/6*((b*c^2*d^3 + (b*c^2*d*e^2 + b*e^3)*x^4 + b*d^2*e + 2*(b*c^2*d^2*e +
 b*d*e^2)*x^2)*sqrt(-e)*log(8*c^4*e^2*x^4 + c^4*d^2 - 6*c^2*d*e + 8*(c^4*d
*e - c^2*e^2)*x^2 + 4*(2*c^3*e*x^2 + c^3*d - c*e)*sqrt(-c^2*x^2 + 1)*sqrt(
e*x^2 + d)*sqrt(-e) + e^2) - 2*(2*(a*c^2*d*e^2 + a*e^3)*x^3 + 3*(a*c^2*d^2
*e + a*d*e^2)*x + (2*(b*c^2*d*e^2 + b*e^3)*x^3 + 3*(b*c^2*d^2*e + b*d*e^2)
*x)*arcsin(c*x) + (b*c*d*e^2*x^2 + b*c*d^2*e)*sqrt(-c^2*x^2 + 1))*sqrt(e*x
^2 + d))/(c^2*d^5*e + d^4*e^2 + (c^2*d^3*e^3 + d^2*e^4)*x^4 + 2*(c^2*d^4*e
^2 + d^3*e^3)*x^2), 1/3*((b*c^2*d^3 + (b*c^2*d*e^2 + b*e^3)*x^4 + b*d^2*e
+ 2*(b*c^2*d^2*e + b*d*e^2)*x^2)*sqrt(e)*arctan(1/2*(2*c^2*e*x^2 + c^2*d -
 e)*sqrt(-c^2*x^2 + 1)*sqrt(e*x^2 + d)*sqrt(e)/(c^3*e^2*x^4 - c*d*e + (c^3
*d*e - c*e^2)*x^2)) + (2*(a*c^2*d*e^2 + a*e^3)*x^3 + 3*(a*c^2*d^2*e + a*d*
e^2)*x + (2*(b*c^2*d*e^2 + b*e^3)*x^3 + 3*(b*c^2*d^2*e + b*d*e^2)*x)*arcsi
n(c*x) + (b*c*d*e^2*x^2 + b*c*d^2*e)*sqrt(-c^2*x^2 + 1))*sqrt(e*x^2 + d))/
(c^2*d^5*e + d^4*e^2 + (c^2*d^3*e^3 + d^2*e^4)*x^4 + 2*(c^2*d^4*e^2 + d^3*
e^3)*x^2)]
```

Sympy [F]

$$\int \frac{a + b \arcsin(cx)}{(d + ex^2)^{5/2}}\, dx = \int \frac{a + b \operatorname{asin}(cx)}{(d + ex^2)^{\frac{5}{2}}}\, dx$$

input
```
integrate((a+b*asin(c*x))/(e*x**2+d)**(5/2),x)
```

output
```
Integral((a + b*asin(c*x))/(d + e*x**2)**(5/2), x)
```

Maxima [F]

$$\int \frac{a + b \arcsin(cx)}{(d + ex^2)^{5/2}}\, dx = \int \frac{b \arcsin(cx) + a}{(ex^2 + d)^{\frac{5}{2}}}\, dx$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
1/3*a*(2*x/(sqrt(e*x^2 + d)*d^2) + x/((e*x^2 + d)^(3/2)*d)) + b*integrate(
arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))/((e^2*x^4 + 2*d*e*x^2 + d^2)*sq
rt(e*x^2 + d)), x)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a + b \arcsin(cx)}{(d + ex^2)^{5/2}}\, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{5/2}}\,dx = \int \frac{a+b\,\mathrm{asin}(c\,x)}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((a + b*asin(c*x))/(d + e*x^2)^(5/2),x)
```

output
```
int((a + b*asin(c*x))/(d + e*x^2)^(5/2), x)
```

Reduce [F]

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{5/2}}\,dx = \frac{3\sqrt{e\,x^2+d}\,adex + 2\sqrt{e\,x^2+d}\,a\,e^2x^3 - 2\sqrt{e}\,a\,d^2 - 4\sqrt{e}\,ade\,x^2 - 2\sqrt{e}\,a\,e^2x^4 + 3\left(\right.}{}$$

input
```
int((a+b*asin(c*x))/(e*x^2+d)^(5/2),x)
```

output
```
(3*sqrt(d + e*x**2)*a*d*e*x + 2*sqrt(d + e*x**2)*a*e**2*x**3 - 2*sqrt(e)*a
*d**2 - 4*sqrt(e)*a*d*e*x**2 - 2*sqrt(e)*a*e**2*x**4 + 3*int(asin(c*x)/(sq
rt(d + e*x**2)*d**2 + 2*sqrt(d + e*x**2)*d*e*x**2 + sqrt(d + e*x**2)*e**2*
x**4),x)*b*d**4*e + 6*int(asin(c*x)/(sqrt(d + e*x**2)*d**2 + 2*sqrt(d + e*
x**2)*d*e*x**2 + sqrt(d + e*x**2)*e**2*x**4),x)*b*d**3*e**2*x**2 + 3*int(a
sin(c*x)/(sqrt(d + e*x**2)*d**2 + 2*sqrt(d + e*x**2)*d*e*x**2 + sqrt(d + e
*x**2)*e**2*x**4),x)*b*d**2*e**3*x**4)/(3*d**2*e*(d**2 + 2*d*e*x**2 + e**2
*x**4))
```

3.169 $\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{7/2}}\,dx$

Optimal result . . . 1279
Mathematica [C] (warning: unable to verify) . . . 1280
Rubi [A] (verified) . . . 1280
Maple [F] . . . 1284
Fricas [B] (verification not implemented) . . . 1284
Sympy [F(-1)] . . . 1285
Maxima [F] . . . 1286
Giac [F(-2)] . . . 1286
Mupad [F(-1)] . . . 1286
Reduce [F] . . . 1287

Optimal result

Integrand size = 20, antiderivative size = 226

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{7/2}}\,dx = \frac{bc\sqrt{1-c^2x^2}}{15d\left(c^2d+e\right)(d+ex^2)^{3/2}} + \frac{2bc(3c^2d+2e)\sqrt{1-c^2x^2}}{15d^2\left(c^2d+e\right)^2\sqrt{d+ex^2}} + \frac{x(a+b\arcsin(cx))}{5d\left(d+ex^2\right)^{5/2}} + \frac{4x(a+b\arcsin(cx))}{15d^2\left(d+ex^2\right)^{3/2}} + \frac{8x(a+b\arcsin(cx))}{15d^3\sqrt{d+ex^2}} + \frac{8b\arctan\left(\frac{\sqrt{e}\sqrt{1-c^2x^2}}{c\sqrt{d+ex^2}}\right)}{15d^3\sqrt{e}}$$

output

```
1/15*b*c*(-c^2*x^2+1)^(1/2)/d/(c^2*d+e)/(e*x^2+d)^(3/2)+2/15*b*c*(3*c^2*d+
2*e)*(-c^2*x^2+1)^(1/2)/d^2/(c^2*d+e)^2/(e*x^2+d)^(1/2)+1/5*x*(a+b*arcsin(
c*x))/d/(e*x^2+d)^(5/2)+4/15*x*(a+b*arcsin(c*x))/d^2/(e*x^2+d)^(3/2)+8/15*
x*(a+b*arcsin(c*x))/d^3/(e*x^2+d)^(1/2)+8/15*b*arctan(e^(1/2)*(-c^2*x^2+1)
^(1/2)/c/(e*x^2+d)^(1/2))/d^3/e^(1/2)
```

Mathematica [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 6 vs. order 3 in optimal.

Time = 0.27 (sec) , antiderivative size = 188, normalized size of antiderivative = 0.83

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{7/2}}\,dx = \frac{ax(15d^2+20dex^2+8e^2x^4)+\frac{bcd\sqrt{1-c^2x^2}(d+ex^2)(e(5d+4ex^2)+c^2d(7d+6ex^2))}{(c^2d+e)^2}-4bcx^2(d+$$
$$15d^3$$

input
```
Integrate[(a + b*ArcSin[c*x])/(d + e*x^2)^(7/2),x]
```

output
```
(a*x*(15*d^2 + 20*d*e*x^2 + 8*e^2*x^4) + (b*c*d*Sqrt[1 - c^2*x^2]*(d + e*x
^2)*(e*(5*d + 4*e*x^2) + c^2*d*(7*d + 6*e*x^2)))/(c^2*d + e)^2 - 4*b*c*x^2
*(d + e*x^2)^2*Sqrt[1 + (e*x^2)/d]*AppellF1[1, 1/2, 1/2, 2, c^2*x^2, -((e*
x^2)/d)] + b*x*(15*d^2 + 20*d*e*x^2 + 8*e^2*x^4)*ArcSin[c*x])/(15*d^3*(d +
 e*x^2)^(5/2))
```

Rubi [A] (verified)

Time = 1.07 (sec) , antiderivative size = 242, normalized size of antiderivative = 1.07, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {5170, 27, 7266, 1193, 27, 87, 66, 218}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{7/2}}\,dx$$
$$\downarrow 5170$$
$$-bc\int \frac{x\left(8e^2x^4+20dex^2+15d^2\right)}{15d^3\sqrt{1-c^2x^2}\,(ex^2+d)^{5/2}}\,dx+\frac{8x(a+b\arcsin(cx))}{15d^3\sqrt{d+ex^2}}+\frac{4x(a+b\arcsin(cx))}{15d^2\,(d+ex^2)^{3/2}}+\frac{x(a+b\arcsin(cx))}{5d\,(d+ex^2)^{5/2}}$$
$$\downarrow 27$$

$$-\frac{bc\int\frac{x\left(8e^2x^4+20dex^2+15d^2\right)}{\sqrt{1-c^2x^2}\left(ex^2+d\right)^{5/2}}dx}{15d^3}+\frac{8x(a+b\arcsin(cx))}{15d^3\sqrt{d+ex^2}}+\frac{4x(a+b\arcsin(cx))}{15d^2\left(d+ex^2\right)^{3/2}}+\frac{x(a+b\arcsin(cx))}{5d\left(d+ex^2\right)^{5/2}}$$

$$\downarrow 7266$$

$$-\frac{bc\int\frac{8e^2x^4+20dex^2+15d^2}{\sqrt{1-c^2x^2}\left(ex^2+d\right)^{5/2}}dx^2}{30d^3}+\frac{8x(a+b\arcsin(cx))}{15d^3\sqrt{d+ex^2}}+\frac{4x(a+b\arcsin(cx))}{15d^2\left(d+ex^2\right)^{3/2}}+\frac{x(a+b\arcsin(cx))}{5d\left(d+ex^2\right)^{5/2}}$$

$$\downarrow 1193$$

$$-\frac{bc\left(-\frac{2\int-\frac{3\left(4e\left(dc^2+e\right)x^2+d\left(7dc^2+6e\right)\right)}{\sqrt{1-c^2x^2}\left(ex^2+d\right)^{3/2}}dx^2}{3\left(c^2d+e\right)}-\frac{2d^2\sqrt{1-c^2x^2}}{\left(c^2d+e\right)\left(d+ex^2\right)^{3/2}}\right)}{30d^3}+\frac{8x(a+b\arcsin(cx))}{15d^3\sqrt{d+ex^2}}+\frac{4x(a+b\arcsin(cx))}{15d^2\left(d+ex^2\right)^{3/2}}+\frac{x(a+b\arcsin(cx))}{5d\left(d+ex^2\right)^{5/2}}$$

$$\downarrow 27$$

$$-\frac{bc\left(\frac{2\int\frac{4e\left(dc^2+e\right)x^2+d\left(7dc^2+6e\right)}{\sqrt{1-c^2x^2}\left(ex^2+d\right)^{3/2}}dx^2}{c^2d+e}-\frac{2d^2\sqrt{1-c^2x^2}}{\left(c^2d+e\right)\left(d+ex^2\right)^{3/2}}\right)}{30d^3}+\frac{8x(a+b\arcsin(cx))}{15d^3\sqrt{d+ex^2}}+\frac{4x(a+b\arcsin(cx))}{15d^2\left(d+ex^2\right)^{3/2}}+\frac{x(a+b\arcsin(cx))}{5d\left(d+ex^2\right)^{5/2}}$$

$$\downarrow 87$$

$$-\frac{bc\left(\frac{2\left(4\left(c^2d+e\right)\int\frac{1}{\sqrt{1-c^2x^2}\sqrt{ex^2+d}}dx^2-\frac{2d\sqrt{1-c^2x^2}\left(3c^2d+2e\right)}{\left(c^2d+e\right)\sqrt{d+ex^2}}\right)}{c^2d+e}-\frac{2d^2\sqrt{1-c^2x^2}}{\left(c^2d+e\right)\left(d+ex^2\right)^{3/2}}\right)}{30d^3}+\frac{8x(a+b\arcsin(cx))}{15d^3\sqrt{d+ex^2}}+\frac{4x(a+b\arcsin(cx))}{15d^2\left(d+ex^2\right)^{3/2}}+\frac{x(a+b\arcsin(cx))}{5d\left(d+ex^2\right)^{5/2}}$$

$$\downarrow 66$$

$$-\frac{bc\left(\frac{2\left(8\left(c^2d+e\right)\int\frac{1}{-ex^4-c^2}d\frac{\sqrt{1-c^2x^2}}{\sqrt{ex^2+d}}-\frac{2d\sqrt{1-c^2x^2}\left(3c^2d+2e\right)}{\left(c^2d+e\right)\sqrt{d+ex^2}}\right)}{c^2d+e}-\frac{2d^2\sqrt{1-c^2x^2}}{(c^2d+e)(d+ex^2)^{3/2}}\right)}{30d^3}+$$
$$\frac{8x(a+b\arcsin(cx))}{15d^3\sqrt{d+ex^2}}+\frac{4x(a+b\arcsin(cx))}{15d^2\left(d+ex^2\right)^{3/2}}+\frac{x(a+b\arcsin(cx))}{5d\left(d+ex^2\right)^{5/2}}$$
$$\downarrow 218$$
$$\frac{8x(a+b\arcsin(cx))}{15d^3\sqrt{d+ex^2}}+\frac{4x(a+b\arcsin(cx))}{15d^2\left(d+ex^2\right)^{3/2}}+\frac{x(a+b\arcsin(cx))}{5d\left(d+ex^2\right)^{5/2}}-$$
$$\frac{bc\left(\frac{2\left(-\frac{8\left(c^2d+e\right)\arctan\left(\frac{\sqrt{e}\sqrt{1-c^2x^2}}{c\sqrt{d+ex^2}}\right)}{c\sqrt{e}}-\frac{2d\sqrt{1-c^2x^2}\left(3c^2d+2e\right)}{\left(c^2d+e\right)\sqrt{d+ex^2}}\right)}{c^2d+e}-\frac{2d^2\sqrt{1-c^2x^2}}{(c^2d+e)(d+ex^2)^{3/2}}\right)}{30d^3}$$

input
```
Int[(a + b*ArcSin[c*x])/(d + e*x^2)^(7/2),x]
```

output
```
(x*(a + b*ArcSin[c*x]))/(5*d*(d + e*x^2)^(5/2)) + (4*x*(a + b*ArcSin[c*x])
)/(15*d^2*(d + e*x^2)^(3/2)) + (8*x*(a + b*ArcSin[c*x]))/(15*d^3*Sqrt[d +
e*x^2]) - (b*c*((-2*d^2*Sqrt[1 - c^2*x^2])/((c^2*d + e)*(d + e*x^2)^(3/2))
 + (2*((-2*d*(3*c^2*d + 2*e)*Sqrt[1 - c^2*x^2])/((c^2*d + e)*Sqrt[d + e*x^
2]) - (8*(c^2*d + e)*ArcTan[(Sqrt[e]*Sqrt[1 - c^2*x^2])/(c*Sqrt[d + e*x^2]
)])/(c*Sqrt[e])))/(c^2*d + e)))/(30*d^3)
```

Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 66
```
Int[1/(Sqrt[(a_) + (b_.)*(x_)]*Sqrt[(c_) + (d_.)*(x_)]), x_Symbol] :> Simp[
2   Subst[Int[1/(b - d*x^2), x], x, Sqrt[a + b*x]/Sqrt[c + d*x]], x] /; Fre
eQ[{a, b, c, d}, x] &&  !GtQ[c - a*(d/b), 0]
```

rule 87

```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[(-(b*e - a*f))*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(f*(p
+ 1)*(c*f - d*e))), x] - Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p
+ 1)))/(f*(p + 1)*(c*f - d*e))  Int[(c + d*x)^n*(e + f*x)^(p + 1), x], x]
/; FreeQ[{a, b, c, d, e, f, n}, x] && LtQ[p, -1] && ( !LtQ[n, -1] || Intege
rQ[p] ||  !(IntegerQ[n] ||  !(EqQ[e, 0] ||  !(EqQ[c, 0] || LtQ[p, n]))))
```

rule 218

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

rule 1193

```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x
 + c*x^2)^p, d + e*x, x], R = PolynomialRemainder[(a + b*x + c*x^2)^p, d +
e*x, x]}, Simp[R*(d + e*x)^(m + 1)*((f + g*x)^(n + 1)/((m + 1)*(e*f - d*g))
), x] + Simp[1/((m + 1)*(e*f - d*g))  Int[(d + e*x)^(m + 1)*(f + g*x)^n*Ex
pandToSum[(m + 1)*(e*f - d*g)*Qx - g*R*(m + n + 2), x], x], x]] /; FreeQ[{a
, b, c, d, e, f, g, n}, x] && IGtQ[p, 0] && ILtQ[2*m, -2] &&  !IntegerQ[n]
&&  !(EqQ[m, -2] && EqQ[p, 1] && EqQ[2*c*d - b*e, 0])
```

rule 5170

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((d_) + (e_.)*(x_)^2)^(p_.), x_Symbo
l] :> With[{u = IntHide[(d + e*x^2)^p, x]}, Simp[(a + b*ArcSin[c*x])  u, x
] - Simp[b*c  Int[SimplifyIntegrand[u/Sqrt[1 - c^2*x^2], x], x], x]] /; Fr
eeQ[{a, b, c, d, e}, x] && NeQ[c^2*d + e, 0] && (IGtQ[p, 0] || ILtQ[p + 1/2
, 0])
```

rule 7266

```
Int[(u_)*(x_)^(m_.), x_Symbol] :> Simp[1/(m + 1)  Subst[Int[SubstFor[x^(m
+ 1), u, x], x], x, x^(m + 1)], x] /; FreeQ[m, x] && NeQ[m, -1] && Function
OfQ[x^(m + 1), u, x]
```

Maple [F]

$$\int \frac{a + b \arcsin(cx)}{(e\,x^2 + d)^{\frac{7}{2}}} dx$$

input
```
int((a+b*arcsin(c*x))/(e*x^2+d)^(7/2),x)
```

output
```
int((a+b*arcsin(c*x))/(e*x^2+d)^(7/2),x)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 650 vs. $2(192) = 384$.

Time $= 0.24$ (sec) , antiderivative size $= 1321$, normalized size of antiderivative $= 5.85$

$$\int \frac{a + b \arcsin(cx)}{(d + ex^2)^{7/2}} dx = \text{Too large to display}$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d)^(7/2),x, algorithm="fricas")
```

output

```
[-1/15*(2*(b*c^4*d^5 + 2*b*c^2*d^4*e + (b*c^4*d^2*e^3 + 2*b*c^2*d*e^4 + b*
e^5)*x^6 + b*d^3*e^2 + 3*(b*c^4*d^3*e^2 + 2*b*c^2*d^2*e^3 + b*d*e^4)*x^4 +
 3*(b*c^4*d^4*e + 2*b*c^2*d^3*e^2 + b*d^2*e^3)*x^2)*sqrt(-e)*log(8*c^4*e^2
*x^4 + c^4*d^2 - 6*c^2*d*e + 8*(c^4*d*e - c^2*e^2)*x^2 + 4*(2*c^3*e*x^2 +
c^3*d - c*e)*sqrt(-c^2*x^2 + 1)*sqrt(e*x^2 + d)*sqrt(-e) + e^2) - (8*(a*c^
4*d^2*e^3 + 2*a*c^2*d*e^4 + a*e^5)*x^5 + 20*(a*c^4*d^3*e^2 + 2*a*c^2*d^2*e
^3 + a*d*e^4)*x^3 + 15*(a*c^4*d^4*e + 2*a*c^2*d^3*e^2 + a*d^2*e^3)*x + (8*
(b*c^4*d^2*e^3 + 2*b*c^2*d*e^4 + b*e^5)*x^5 + 20*(b*c^4*d^3*e^2 + 2*b*c^2*
d^2*e^3 + b*d*e^4)*x^3 + 15*(b*c^4*d^4*e + 2*b*c^2*d^3*e^2 + b*d^2*e^3)*x)
*arcsin(c*x) + (7*b*c^3*d^4*e + 5*b*c*d^3*e^2 + 2*(3*b*c^3*d^2*e^3 + 2*b*c
*d*e^4)*x^4 + (13*b*c^3*d^3*e^2 + 9*b*c*d^2*e^3)*x^2)*sqrt(-c^2*x^2 + 1))*
sqrt(e*x^2 + d))/(c^4*d^8*e + 2*c^2*d^7*e^2 + d^6*e^3 + (c^4*d^5*e^4 + 2*c
^2*d^4*e^5 + d^3*e^6)*x^6 + 3*(c^4*d^6*e^3 + 2*c^2*d^5*e^4 + d^4*e^5)*x^4
+ 3*(c^4*d^7*e^2 + 2*c^2*d^6*e^3 + d^5*e^4)*x^2), 1/15*(4*(b*c^4*d^5 + 2*b
*c^2*d^4*e + (b*c^4*d^2*e^3 + 2*b*c^2*d*e^4 + b*e^5)*x^6 + b*d^3*e^2 + 3*(
b*c^4*d^3*e^2 + 2*b*c^2*d^2*e^3 + b*d*e^4)*x^4 + 3*(b*c^4*d^4*e + 2*b*c^2*
d^3*e^2 + b*d^2*e^3)*x^2)*sqrt(e)*arctan(1/2*(2*c^2*e*x^2 + c^2*d - e)*sqr
t(-c^2*x^2 + 1)*sqrt(e*x^2 + d)*sqrt(e)/(c^3*e^2*x^4 - c*d*e + (c^3*d*e -
c*e^2)*x^2)) + (8*(a*c^4*d^2*e^3 + 2*a*c^2*d*e^4 + a*e^5)*x^5 + 20*(a*c^4*
d^3*e^2 + 2*a*c^2*d^2*e^3 + a*d*e^4)*x^3 + 15*(a*c^4*d^4*e + 2*a*c^2*d^...
```

Sympy [F(-1)]

Timed out.

$$\int \frac{a + b \arcsin(cx)}{(d + ex^2)^{7/2}}\, dx = \text{Timed out}$$

input

```
integrate((a+b*asin(c*x))/(e*x**2+d)**(7/2),x)
```

output

```
Timed out
```

Maxima [F]

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{7/2}}\,dx = \int \frac{b\arcsin(cx)+a}{(ex^2+d)^{\frac{7}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d)^(7/2),x, algorithm="maxima")
```

output
```
1/15*a*(8*x/(sqrt(e*x^2 + d)*d^3) + 4*x/((e*x^2 + d)^(3/2)*d^2) + 3*x/((e*
x^2 + d)^(5/2)*d)) + b*integrate(arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)
)/((e^3*x^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 + d^3)*sqrt(e*x^2 + d)), x)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{7/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))/(e*x^2+d)^(7/2),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{7/2}}\,dx = \int \frac{a+b\operatorname{asin}(c\,x)}{(e\,x^2+d)^{7/2}}\,dx$$

input
```
int((a + b*asin(c*x))/(d + e*x^2)^(7/2),x)
```

output
```
int((a + b*asin(c*x))/(d + e*x^2)^(7/2), x)
```

Reduce [F]

$$\int \frac{a+b\arcsin(cx)}{(d+ex^2)^{7/2}}\,dx = \frac{15\sqrt{e\,x^2+d}\,a\,d^2ex + 20\sqrt{e\,x^2+d}\,ad\,e^2x^3 + 8\sqrt{e\,x^2+d}\,a\,e^3x^5 - 8\sqrt{e}\,a\,d^3 - 24\sqrt{}$$

input

```
int((a+b*asin(c*x))/(e*x^2+d)^(7/2),x)
```

output

```
(15*sqrt(d + e*x**2)*a*d**2*e*x + 20*sqrt(d + e*x**2)*a*d*e**2*x**3 + 8*sq
rt(d + e*x**2)*a*e**3*x**5 - 8*sqrt(e)*a*d**3 - 24*sqrt(e)*a*d**2*e*x**2 -
 24*sqrt(e)*a*d*e**2*x**4 - 8*sqrt(e)*a*e**3*x**6 + 15*int(asin(c*x)/(sqrt
(d + e*x**2)*d**3 + 3*sqrt(d + e*x**2)*d**2*e*x**2 + 3*sqrt(d + e*x**2)*d*
e**2*x**4 + sqrt(d + e*x**2)*e**3*x**6),x)*b*d**6*e + 45*int(asin(c*x)/(sq
rt(d + e*x**2)*d**3 + 3*sqrt(d + e*x**2)*d**2*e*x**2 + 3*sqrt(d + e*x**2)*
d*e**2*x**4 + sqrt(d + e*x**2)*e**3*x**6),x)*b*d**5*e**2*x**2 + 45*int(asi
n(c*x)/(sqrt(d + e*x**2)*d**3 + 3*sqrt(d + e*x**2)*d**2*e*x**2 + 3*sqrt(d
+ e*x**2)*d*e**2*x**4 + sqrt(d + e*x**2)*e**3*x**6),x)*b*d**4*e**3*x**4 +
15*int(asin(c*x)/(sqrt(d + e*x**2)*d**3 + 3*sqrt(d + e*x**2)*d**2*e*x**2 +
 3*sqrt(d + e*x**2)*d*e**2*x**4 + sqrt(d + e*x**2)*e**3*x**6),x)*b*d**3*e*
*4*x**6)/(15*d**3*e*(d**3 + 3*d**2*e*x**2 + 3*d*e**2*x**4 + e**3*x**6))
```

3.170 $\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx$

Optimal result 1288
Mathematica [N/A] 1288
Rubi [N/A] 1289
Maple [N/A] 1289
Fricas [N/A] 1290
Sympy [N/A] 1290
Maxima [F(-2)] 1290
Giac [N/A] 1291
Mupad [N/A] 1291
Reduce [N/A] 1292

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx = \text{Int}\left(\sqrt{d+ex^2}(a+b\arcsin(cx))^2, x\right)$$

output
```
Defer(Int)((e*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 17.94 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx = \int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx$$

input
```
Integrate[Sqrt[d + e*x^2]*(a + b*ArcSin[c*x])^2,x]
```

output
```
Integrate[Sqrt[d + e*x^2]*(a + b*ArcSin[c*x])^2, x]
```

Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx$$

$$\downarrow 5174$$

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2 dx$$

input
```
Int[Sqrt[d + e*x^2]*(a + b*ArcSin[c*x])^2,x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.61 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \sqrt{e\,x^2+d}\,(a+b\arcsin(cx))^2\,dx$$

input
```
int((e*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2,x)
```

output
```
int((e*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.55

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx = \int \sqrt{ex^2+d}(b\arcsin(cx)+a)^2\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)*sqrt(e*x^2 + d), x)
```

Sympy [N/A]

Not integrable

Time = 9.56 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx = \int (a+b\operatorname{asin}(cx))^2\sqrt{d+ex^2}\,dx$$

input
```
integrate((e*x**2+d)**(1/2)*(a+b*asin(c*x))**2,x)
```

output
```
Integral((a + b*asin(c*x))**2*sqrt(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx = \int \sqrt{ex^2+d}(b\arcsin(cx)+a)^2\,dx$$

input
```
integrate((e*x^2+d)^(1/2)*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*arcsin(c*x) + a)^2, x)
```

Mupad [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx = \int (a+b\,\mathrm{asin}(c\,x))^2\,\sqrt{e\,x^2+d}\,dx$$

input
```
int((a + b*asin(c*x))^2*(d + e*x^2)^(1/2),x)
```

output
```
int((a + b*asin(c*x))^2*(d + e*x^2)^(1/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 89, normalized size of antiderivative = 4.05

$$\int \sqrt{d+ex^2}(a+b\arcsin(cx))^2\,dx$$
$$= \frac{\sqrt{e\,x^2+d}\,a^2ex+\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)a^2d+4\left(\int\sqrt{e\,x^2+d}\,asin(cx)\,dx\right)abe+2\left(\int\sqrt{e\,x^2+d}\,asin(cx)^2\right.}{2e}$$

input
```
int((e*x^2+d)^(1/2)*(a+b*asin(c*x))^2,x)
```

output
```
(sqrt(d + e*x**2)*a**2*e*x + sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sq
rt(d))*a**2*d + 4*int(sqrt(d + e*x**2)*asin(c*x),x)*a*b*e + 2*int(sqrt(d +
 e*x**2)*asin(c*x)**2,x)*b**2*e)/(2*e)
```

3.171 $\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}\,dx$

Optimal result . . . 1293
Mathematica [N/A] . . . 1293
Rubi [N/A] . . . 1294
Maple [N/A] . . . 1294
Fricas [N/A] . . . 1295
Sympy [N/A] . . . 1295
Maxima [F(-2)] . . . 1295
Giac [F(-2)] . . . 1296
Mupad [N/A] . . . 1296
Reduce [N/A] . . . 1297

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}\,dx = \text{Int}\left(\frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}, x\right)$$

output
```
Defer(Int)((a+b*arcsin(c*x))^2/(e*x^2+d)^(1/2),x)
```

Mathematica [N/A]

Not integrable

Time = 8.08 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}\,dx = \int \frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}\,dx$$

input
```
Integrate[(a + b*ArcSin[c*x])^2/Sqrt[d + e*x^2],x]
```

output
```
Integrate[(a + b*ArcSin[c*x])^2/Sqrt[d + e*x^2], x]
```

Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a + b \arcsin(cx))^2}{\sqrt{d + ex^2}}\, dx$$
$$\downarrow 5174$$
$$\int \frac{(a + b \arcsin(cx))^2}{\sqrt{d + ex^2}} dx$$

input
```
Int[(a + b*ArcSin[c*x])^2/Sqrt[d + e*x^2],x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.12 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{(a + b \arcsin(cx))^2}{\sqrt{e\, x^2 + d}} dx$$

input
```
int((a+b*arcsin(c*x))^2/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*arcsin(c*x))^2/(e*x^2+d)^(1/2),x)
```

Fricas [N/A]

Not integrable

Time = 0.10 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.55

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{\sqrt{ex^2+d}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)/sqrt(e*x^2 + d), x)
```

Sympy [N/A]

Not integrable

Time = 5.61 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}\,dx = \int \frac{(a+b\operatorname{asin}(cx))^2}{\sqrt{d+ex^2}}\,dx$$

input
```
integrate((a+b*asin(c*x))**2/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*asin(c*x))**2/sqrt(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}\,dx = \int \frac{(a+b\,\text{asin}(c\,x))^2}{\sqrt{e\,x^2+d}}\,dx$$

input
```
int((a + b*asin(c*x))^2/(d + e*x^2)^(1/2),x)
```

output
```
int((a + b*asin(c*x))^2/(d + e*x^2)^(1/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 76, normalized size of antiderivative = 3.45

$$\int \frac{(a+b\arcsin(cx))^2}{\sqrt{d+ex^2}}\,dx = \frac{\sqrt{e}\log\left(\frac{\sqrt{e\,x^2+d}+\sqrt{e}\,x}{\sqrt{d}}\right)a^2+2\left(\int \frac{asin(cx)}{\sqrt{e\,x^2+d}}dx\right)abe+\left(\int \frac{asin(cx)^2}{\sqrt{e\,x^2+d}}dx\right)b^2e}{e}$$

input
```
int((a+b*asin(c*x))^2/(e*x^2+d)^(1/2),x)
```

output
```
(sqrt(e)*log((sqrt(d + e*x**2) + sqrt(e)*x)/sqrt(d))*a**2 + 2*int(asin(c*x
)/sqrt(d + e*x**2),x)*a*b*e + int(asin(c*x)**2/sqrt(d + e*x**2),x)*b**2*e)
/e
```

3.172 $\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}\,dx$

Optimal result 1298
Mathematica [N/A] 1298
Rubi [N/A] 1299
Maple [N/A] 1299
Fricas [N/A] 1300
Sympy [N/A] 1300
Maxima [F(-2)] 1300
Giac [F(-2)] 1301
Mupad [N/A] 1301
Reduce [N/A] 1302

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}\,dx = \text{Int}\left(\frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}, x\right)$$

output
```
Defer(Int)((a+b*arcsin(c*x))^2/(e*x^2+d)^(3/2),x)
```

Mathematica [N/A]

Not integrable

Time = 3.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}\,dx = \int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}\,dx$$

input
```
Integrate[(a + b*ArcSin[c*x])^2/(d + e*x^2)^(3/2),x]
```

output
```
Integrate[(a + b*ArcSin[c*x])^2/(d + e*x^2)^(3/2), x]
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a + b \arcsin(cx))^2}{(d + ex^2)^{3/2}}\, dx$$
$$\downarrow 5174$$
$$\int \frac{(a + b \arcsin(cx))^2}{(d + ex^2)^{3/2}} dx$$

input
```
Int[(a + b*ArcSin[c*x])^2/(d + e*x^2)^(3/2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.62 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{(a + b \arcsin(cx))^2}{(e x^2 + d)^{\frac{3}{2}}} dx$$

input
```
int((a+b*arcsin(c*x))^2/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*arcsin(c*x))^2/(e*x^2+d)^(3/2),x)
```

Fricas [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 54, normalized size of antiderivative = 2.45

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(ex^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)*sqrt(e*x^2 + d)/(e^
2*x^4 + 2*d*e*x^2 + d^2), x)
```

Sympy [N/A]

Not integrable

Time = 5.48 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}\,dx = \int \frac{(a+b\operatorname{asin}(cx))^2}{(d+ex^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*asin(c*x))**2/(e*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*asin(c*x))**2/(d + e*x**2)**(3/2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e+c^2*d>0)', see `assume?` for m
ore detail
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}\,dx = \int \frac{(a+b\operatorname{asin}(c\,x))^2}{(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((a + b*asin(c*x))^2/(d + e*x^2)^(3/2),x)
```

output
```
int((a + b*asin(c*x))^2/(d + e*x^2)^(3/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 222, normalized size of antiderivative = 10.09

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{3/2}}\,dx = \frac{\sqrt{e\,x^2+d}\,a^2ex+\sqrt{e}\,a^2d+\sqrt{e}\,a^2e\,x^2+2\left(\int \frac{asin(cx)}{\sqrt{e\,x^2+d}\,d+\sqrt{e\,x^2+d}\,e\,x^2}dx\right)ab\,d^2e+2$$

input
```
int((a+b*asin(c*x))^2/(e*x^2+d)^(3/2),x)
```

output
```
(sqrt(d + e*x**2)*a**2*e*x + sqrt(e)*a**2*d + sqrt(e)*a**2*e*x**2 + 2*int(
asin(c*x)/(sqrt(d + e*x**2)*d + sqrt(d + e*x**2)*e*x**2),x)*a*b*d**2*e + 2
*int(asin(c*x)/(sqrt(d + e*x**2)*d + sqrt(d + e*x**2)*e*x**2),x)*a*b*d*e**
2*x**2 + int(asin(c*x)**2/(sqrt(d + e*x**2)*d + sqrt(d + e*x**2)*e*x**2),x
)*b**2*d**2*e + int(asin(c*x)**2/(sqrt(d + e*x**2)*d + sqrt(d + e*x**2)*e*
x**2),x)*b**2*d*e**2*x**2)/(d*e*(d + e*x**2))
```

3.173 $\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}\,dx$

Optimal result 1303
Mathematica [N/A] 1303
Rubi [N/A] 1304
Maple [N/A] 1304
Fricas [N/A] 1305
Sympy [N/A] 1305
Maxima [N/A] 1305
Giac [F(-2)] 1306
Mupad [N/A] 1306
Reduce [N/A] 1307

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}\,dx = \text{Int}\left(\frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}, x\right)$$

output
```
Defer(Int)((a+b*arcsin(c*x))^2/(e*x^2+d)^(5/2),x)
```

Mathematica [N/A]

Not integrable

Time = 7.38 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}\,dx = \int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}\,dx$$

input
```
Integrate[(a + b*ArcSin[c*x])^2/(d + e*x^2)^(5/2),x]
```

output
```
Integrate[(a + b*ArcSin[c*x])^2/(d + e*x^2)^(5/2), x]
```

Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a + b \arcsin(cx))^2}{(d + ex^2)^{5/2}}\, dx$$
$$\downarrow 5174$$
$$\int \frac{(a + b \arcsin(cx))^2}{(d + ex^2)^{5/2}} dx$$

input
```
Int[(a + b*ArcSin[c*x])^2/(d + e*x^2)^(5/2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.80 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{(a + b \arcsin(cx))^2}{(e\,x^2 + d)^{\frac{5}{2}}} dx$$

input
```
int((a+b*arcsin(c*x))^2/(e*x^2+d)^(5/2),x)
```

output
```
int((a+b*arcsin(c*x))^2/(e*x^2+d)^(5/2),x)
```

Fricas [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.95

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)*sqrt(e*x^2 + d)/(e^
3*x^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 + d^3), x)
```

Sympy [N/A]

Not integrable

Time = 64.22 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}\,dx = \int \frac{(a+b\operatorname{asin}(cx))^2}{(d+ex^2)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*asin(c*x))**2/(e*x**2+d)**(5/2),x)
```

output
```
Integral((a + b*asin(c*x))**2/(d + e*x**2)**(5/2), x)
```

Maxima [N/A]

Not integrable

Time = 0.40 (sec) , antiderivative size = 130, normalized size of antiderivative = 5.91

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\arcsin(cx)+a)^2}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^2/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
1/3*a^2*(2*x/(sqrt(e*x^2 + d)*d^2) + x/((e*x^2 + d)^(3/2)*d)) + integrate(
(b^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 + 2*a*b*arctan2(c*x, sqr
t(c*x + 1)*sqrt(-c*x + 1)))*sqrt(e*x^2 + d)/(e^3*x^6 + 3*d*e^2*x^4 + 3*d^2
*e*x^2 + d^3), x)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))^2/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:sym2poly/r2sym(const gen & e,const index_m & i,const ve
cteur & l) Error: Bad Argument Value
```

Mupad [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}\,dx = \int \frac{(a+b\,\mathrm{asin}(c\,x))^2}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((a + b*asin(c*x))^2/(d + e*x^2)^(5/2),x)
```

output
```
int((a + b*asin(c*x))^2/(d + e*x^2)^(5/2), x)
```

Reduce [N/A]

Not integrable

Time = 0.36 (sec) , antiderivative size = 488, normalized size of antiderivative = 22.18

$$\int \frac{(a+b\arcsin(cx))^2}{(d+ex^2)^{5/2}}\,dx = \frac{3\sqrt{e\,x^2+d}\,a^2dex + 2\sqrt{e\,x^2+d}\,a^2e^2x^3 - 2\sqrt{e}\,a^2d^2 - 4\sqrt{e}\,a^2de\,x^2 - 2\sqrt{e}\,a^2e^2x$$

input
```
int((a+b*asin(c*x))^2/(e*x^2+d)^(5/2),x)
```

output
```
(3*sqrt(d + e*x**2)*a**2*d*e*x + 2*sqrt(d + e*x**2)*a**2*e**2*x**3 - 2*sqr
t(e)*a**2*d**2 - 4*sqrt(e)*a**2*d*e*x**2 - 2*sqrt(e)*a**2*e**2*x**4 + 6*in
t(asin(c*x)/(sqrt(d + e*x**2)*d**2 + 2*sqrt(d + e*x**2)*d*e*x**2 + sqrt(d
 + e*x**2)*e**2*x**4),x)*a*b*d**4*e + 12*int(asin(c*x)/(sqrt(d + e*x**2)*d*
*2 + 2*sqrt(d + e*x**2)*d*e*x**2 + sqrt(d + e*x**2)*e**2*x**4),x)*a*b*d**3
*e**2*x**2 + 6*int(asin(c*x)/(sqrt(d + e*x**2)*d**2 + 2*sqrt(d + e*x**2)*d
*e*x**2 + sqrt(d + e*x**2)*e**2*x**4),x)*a*b*d**2*e**3*x**4 + 3*int(asin(c
*x)**2/(sqrt(d + e*x**2)*d**2 + 2*sqrt(d + e*x**2)*d*e*x**2 + sqrt(d + e*x
**2)*e**2*x**4),x)*b**2*d**4*e + 6*int(asin(c*x)**2/(sqrt(d + e*x**2)*d**2
 + 2*sqrt(d + e*x**2)*d*e*x**2 + sqrt(d + e*x**2)*e**2*x**4),x)*b**2*d**3*
e**2*x**2 + 3*int(asin(c*x)**2/(sqrt(d + e*x**2)*d**2 + 2*sqrt(d + e*x**2)
*d*e*x**2 + sqrt(d + e*x**2)*e**2*x**4),x)*b**2*d**2*e**3*x**4)/(3*d**2*e*
(d**2 + 2*d*e*x**2 + e**2*x**4))
```

3.174 $\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx$

Optimal result 1308
Mathematica [N/A] 1308
Rubi [N/A] 1309
Maple [N/A] 1309
Fricas [N/A] 1310
Sympy [N/A] 1310
Maxima [N/A] 1310
Giac [N/A] 1311
Mupad [N/A] 1311
Reduce [N/A] 1312

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx = \text{Int}\left(\frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}, x\right)$$

output
```
Defer(Int)((e*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x)
```

Mathematica [N/A]

Not integrable

Time = 0.90 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx = \int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx$$

input
```
Integrate[Sqrt[d + e*x^2]/(a + b*ArcSin[c*x]),x]
```

output
```
Integrate[Sqrt[d + e*x^2]/(a + b*ArcSin[c*x]), x]
```

Rubi [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx$$
$$\downarrow 5174$$
$$\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}dx$$

input
```
Int[Sqrt[d + e*x^2]/(a + b*ArcSin[c*x]),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.27 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{e\,x^2+d}}{a+b\arcsin\left(cx\right)}dx$$

input
```
int((e*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x)
```

output
```
int((e*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x)
```

Fricas [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx = \int \frac{\sqrt{ex^2+d}}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)/(b*arcsin(c*x) + a), x)
```

Sympy [N/A]

Not integrable

Time = 0.41 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx = \int \frac{\sqrt{d+ex^2}}{a+b\operatorname{asin}(cx)}\,dx$$

input
```
integrate((e*x**2+d)**(1/2)/(a+b*asin(c*x)),x)
```

output
```
Integral(sqrt(d + e*x**2)/(a + b*asin(c*x)), x)
```

Maxima [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx = \int \frac{\sqrt{ex^2+d}}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate(sqrt(e*x^2 + d)/(b*arcsin(c*x) + a), x)
```

Giac [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx = \int \frac{\sqrt{ex^2+d}}{b\arcsin(cx)+a}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)/(b*arcsin(c*x) + a), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx = \int \frac{\sqrt{e\,x^2+d}}{a+b\,\mathrm{asin}\,(c\,x)}\,dx$$

input
```
int((d + e*x^2)^(1/2)/(a + b*asin(c*x)),x)
```

output
```
int((d + e*x^2)^(1/2)/(a + b*asin(c*x)), x)
```

Reduce [N/A]

Not integrable

Time = 200.03 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{d+ex^2}}{a+b\arcsin(cx)}\,dx = \int \frac{\sqrt{e\,x^2+d}}{asin\,(cx)\,b+a}dx$$

input
```
int((e*x^2+d)^(1/2)/(a+b*asin(c*x)),x)
```

output
```
int((e*x^2+d)^(1/2)/(a+b*asin(c*x)),x)
```

3.175 $\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx$

Optimal result 1313
Mathematica [N/A] 1313
Rubi [N/A] 1314
Maple [N/A] 1314
Fricas [N/A] 1315
Sympy [N/A] 1315
Maxima [N/A] 1315
Giac [N/A] 1316
Mupad [N/A] 1316
Reduce [N/A] 1317

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx = \text{Int}\left(\frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}, x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x)
```

Mathematica [N/A]

Not integrable

Time = 0.75 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx = \int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx$$

input
```
Integrate[1/(Sqrt[d + e*x^2]*(a + b*ArcSin[c*x])),x]
```

output
```
Integrate[1/(Sqrt[d + e*x^2]*(a + b*ArcSin[c*x])), x]
```

Rubi [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}dx$$

input
```
Int[1/(Sqrt[d + e*x^2]*(a + b*ArcSin[c*x])),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.10 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{\sqrt{e\,x^2+d}\,\left(a+b\arcsin\left(cx\right)\right)}dx$$

input
```
int(1/(e*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x)
```

output
```
int(1/(e*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x)
```

Fricas [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.77

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx = \int \frac{1}{\sqrt{ex^2+d}(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)/(a*e*x^2 + a*d + (b*e*x^2 + b*d)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 0.66 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx = \int \frac{1}{(a+b\operatorname{asin}(cx))\sqrt{d+ex^2}}\,dx$$

input
```
integrate(1/(e*x**2+d)**(1/2)/(a+b*asin(c*x)),x)
```

output
```
Integral(1/((a + b*asin(c*x))*sqrt(d + e*x**2)), x)
```

Maxima [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx = \int \frac{1}{\sqrt{ex^2+d}(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate(1/(sqrt(e*x^2 + d)*(b*arcsin(c*x) + a)), x)
```

Giac [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx = \int \frac{1}{\sqrt{ex^2+d}(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
integrate(1/(sqrt(e*x^2 + d)*(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}(c\,x))\,\sqrt{e\,x^2+d}}\,dx$$

input
```
int(1/((a + b*asin(c*x))*(d + e*x^2)^(1/2)),x)
```

output
```
int(1/((a + b*asin(c*x))*(d + e*x^2)^(1/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.63 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.32

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))}\,dx = \int \frac{1}{\sqrt{e\,x^2+d}\,asin\,(cx)\,b+\sqrt{e\,x^2+d}\,a}\,dx$$

input
```
int(1/(e*x^2+d)^(1/2)/(a+b*asin(c*x)),x)
```

output
```
int(1/(sqrt(d + e*x**2)*asin(c*x)*b + sqrt(d + e*x**2)*a),x)
```

3.176 $\int \frac{1}{(d+ex^2)^{3/2}(a+b\arcsin(cx))}\,dx$

Optimal result 1318
Mathematica [N/A] 1318
Rubi [N/A] 1319
Maple [N/A] 1319
Fricas [N/A] 1320
Sympy [N/A] 1320
Maxima [N/A] 1320
Giac [N/A] 1321
Mupad [N/A] 1321
Reduce [N/A] 1322

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))}\,dx = \text{Int}\left(\frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))}, x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x)
```

Mathematica [N/A]

Not integrable

Time = 1.27 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))}\,dx$$

input
```
Integrate[1/((d + e*x^2)^(3/2)*(a + b*ArcSin[c*x])),x]
```

output
```
Integrate[1/((d + e*x^2)^(3/2)*(a + b*ArcSin[c*x])), x]
```

Rubi [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))}dx$$

input
```
Int[1/((d + e*x^2)^(3/2)*(a + b*ArcSin[c*x])),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.32 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(e\,x^2+d)^{\frac{3}{2}}\,(a+b\arcsin(cx))}dx$$

input
```
int(1/(e*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x)
```

output
```
int(1/(e*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x)
```

Fricas [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.86

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(ex^2+d)^{\frac{3}{2}}(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)/(a*e^2*x^4 + 2*a*d*e*x^2 + a*d^2 + (b*e^2*x^4 + 2
*b*d*e*x^2 + b*d^2)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 1.89 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(a+b\operatorname{asin}(cx))\,(d+ex^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(e*x**2+d)**(3/2)/(a+b*asin(c*x)),x)
```

output
```
Integral(1/((a + b*asin(c*x))*(d + e*x**2)**(3/2)), x)
```

Maxima [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(ex^2+d)^{\frac{3}{2}}(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x^2 + d)^(3/2)*(b*arcsin(c*x) + a)), x)
```

Giac [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(ex^2+d)^{\frac{3}{2}}(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)^(3/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)^(3/2)*(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}\,(c\,x))\,\left(e\,x^2+d\right)^{3/2}}\,dx$$

input
```
int(1/((a + b*asin(c*x))*(d + e*x^2)^(3/2)),x)
```

output
```
int(1/((a + b*asin(c*x))*(d + e*x^2)^(3/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.70 (sec) , antiderivative size = 63, normalized size of antiderivative = 2.86

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{\sqrt{e\,x^2+d}\,asin\,(cx)\,bd+\sqrt{e\,x^2+d}\,asin\,(cx)\,be\,x^2+\sqrt{e\,x^2+d}\,a}$$

input
```
int(1/(e*x^2+d)^(3/2)/(a+b*asin(c*x)),x)
```

output
```
int(1/(sqrt(d + e*x**2)*asin(c*x)*b*d + sqrt(d + e*x**2)*asin(c*x)*b*e*x**
2 + sqrt(d + e*x**2)*a*d + sqrt(d + e*x**2)*a*e*x**2),x)
```

3.177 $\int \frac{1}{(d+ex^2)^{5/2}(a+b\arcsin(cx))}\,dx$

Optimal result . . . 1323
Mathematica [N/A] . . . 1323
Rubi [N/A] . . . 1324
Maple [N/A] . . . 1324
Fricas [N/A] . . . 1325
Sympy [N/A] . . . 1325
Maxima [N/A] . . . 1325
Giac [N/A] . . . 1326
Mupad [N/A] . . . 1326
Reduce [N/A] . . . 1327

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))}\,dx = \text{Int}\left(\frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))},x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x)
```

Mathematica [N/A]

Not integrable

Time = 2.57 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))}\,dx$$

input
```
Integrate[1/((d + e*x^2)^(5/2)*(a + b*ArcSin[c*x])),x]
```

output
```
Integrate[1/((d + e*x^2)^(5/2)*(a + b*ArcSin[c*x])), x]
```

Rubi [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))}dx$$

input
```
Int[1/((d + e*x^2)^(5/2)*(a + b*ArcSin[c*x])),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.34 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(e\,x^2+d)^{\frac{5}{2}}\,(a+b\arcsin(cx))}dx$$

input
```
int(1/(e*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x)
```

output
```
int(1/(e*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x)
```

Fricas [N/A]

Not integrable

Time = 0.10 (sec) , antiderivative size = 87, normalized size of antiderivative = 3.95

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(ex^2+d)^{\frac{5}{2}}(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)/(a*e^3*x^6 + 3*a*d*e^2*x^4 + 3*a*d^2*e*x^2 + a*d^
3 + (b*e^3*x^6 + 3*b*d*e^2*x^4 + 3*b*d^2*e*x^2 + b*d^3)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 8.21 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(a+b\operatorname{asin}(cx))\,(d+ex^2)^{\frac{5}{2}}}\,dx$$

input
```
integrate(1/(e*x**2+d)**(5/2)/(a+b*asin(c*x)),x)
```

output
```
Integral(1/((a + b*asin(c*x))*(d + e*x**2)**(5/2)), x)
```

Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(ex^2+d)^{\frac{5}{2}}(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x^2 + d)^(5/2)*(b*arcsin(c*x) + a)), x)
```

Giac [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(ex^2+d)^{\frac{5}{2}}(b\arcsin(cx)+a)}\,dx$$

input
```
integrate(1/(e*x^2+d)^(5/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)^(5/2)*(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}\,(c\,x))\,\left(e\,x^2+d\right)^{5/2}}\,dx$$

input
```
int(1/((a + b*asin(c*x))*(d + e*x^2)^(5/2)),x)
```

output
```
int(1/((a + b*asin(c*x))*(d + e*x^2)^(5/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.99 (sec) , antiderivative size = 107, normalized size of antiderivative = 4.86

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))}\,dx = \int \frac{}{\sqrt{e\,x^2+d}\,asin\,(cx)\,b\,d^2+2\sqrt{e\,x^2+d}\,asin\,(cx)\,bde\,x^2+\sqrt{e\,x^2+}}$$

input
```
int(1/(e*x^2+d)^(5/2)/(a+b*asin(c*x)),x)
```

output
```
int(1/(sqrt(d + e*x**2)*asin(c*x)*b*d**2 + 2*sqrt(d + e*x**2)*asin(c*x)*b*
d*e*x**2 + sqrt(d + e*x**2)*asin(c*x)*b*e**2*x**4 + sqrt(d + e*x**2)*a*d**
2 + 2*sqrt(d + e*x**2)*a*d*e*x**2 + sqrt(d + e*x**2)*a*e**2*x**4),x)
```

3.178 $\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx$

Optimal result 1328
Mathematica [N/A] 1328
Rubi [N/A] 1329
Maple [N/A] 1329
Fricas [N/A] 1330
Sympy [N/A] 1330
Maxima [N/A] 1330
Giac [N/A] 1331
Mupad [N/A] 1331
Reduce [N/A] 1332

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx = \text{Int}\left(\frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}, x\right)$$

output
```
Defer(Int)((e*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 5.91 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx$$

input
```
Integrate[Sqrt[d + e*x^2]/(a + b*ArcSin[c*x])^2,x]
```

output
```
Integrate[Sqrt[d + e*x^2]/(a + b*ArcSin[c*x])^2, x]
```

Rubi [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx$$
$$\downarrow 5174$$
$$\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}dx$$

input
```
Int[Sqrt[d + e*x^2]/(a + b*ArcSin[c*x])^2,x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.45 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{e\,x^2+d}}{(a+b\arcsin(cx))^2}dx$$

input
```
int((e*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x)
```

output
```
int((e*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.64

$$\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{\sqrt{ex^2+d}}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)/(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2), x)
```

Sympy [N/A]

Not integrable

Time = 0.73 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{\sqrt{d+ex^2}}{(a+b\operatorname{asin}(cx))^2}\,dx$$

input
```
integrate((e*x**2+d)**(1/2)/(a+b*asin(c*x))**2,x)
```

output
```
Integral(sqrt(d + e*x**2)/(a + b*asin(c*x))**2, x)
```

Maxima [N/A]

Not integrable

Time = 1.15 (sec) , antiderivative size = 236, normalized size of antiderivative = 10.73

$$\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{\sqrt{ex^2+d}}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
((b^2*c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)*integrate((2*c
^2*e*x^3 + (c^2*d - e)*x)*sqrt(e*x^2 + d)*sqrt(c*x + 1)*sqrt(-c*x + 1)/(a*
b*c^3*e*x^4 - a*b*c*d + (a*b*c^3*d - a*b*c*e)*x^2 + (b^2*c^3*e*x^4 - b^2*c
*d + (b^2*c^3*d - b^2*c*e)*x^2)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))
), x) - sqrt(e*x^2 + d)*sqrt(c*x + 1)*sqrt(-c*x + 1))/(b^2*c*arctan2(c*x,
sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)
```

Giac [N/A]

Not integrable

Time = 0.37 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{\sqrt{ex^2+d}}{(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate((e*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)/(b*arcsin(c*x) + a)^2, x)
```

Mupad [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{\sqrt{e\,x^2+d}}{(a+b\,\mathrm{asin}\,(c\,x))^2}\,dx$$

input
```
int((d + e*x^2)^(1/2)/(a + b*asin(c*x))^2,x)
```

output
```
int((d + e*x^2)^(1/2)/(a + b*asin(c*x))^2, x)
```

Reduce [N/A]

Not integrable

Time = 200.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{d+ex^2}}{(a+b\arcsin(cx))^2}\,dx = \int \frac{\sqrt{e\,x^2+d}}{(asin\,(cx)\,b+a)^2}dx$$

input
```
int((e*x^2+d)^(1/2)/(a+b*asin(c*x))^2,x)
```

output
```
int((e*x^2+d)^(1/2)/(a+b*asin(c*x))^2,x)
```

3.179 $\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx$

Optimal result 1333
Mathematica [N/A] 1333
Rubi [N/A] 1334
Maple [N/A] 1334
Fricas [N/A] 1335
Sympy [N/A] 1335
Maxima [N/A] 1335
Giac [N/A] 1336
Mupad [N/A] 1336
Reduce [N/A] 1337

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx = \text{Int}\left(\frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}, x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 13.05 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx$$

input
```
Integrate[1/(Sqrt[d + e*x^2]*(a + b*ArcSin[c*x])^2),x]
```

output
```
Integrate[1/(Sqrt[d + e*x^2]*(a + b*ArcSin[c*x])^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}dx$$

input
```
Int[1/(Sqrt[d + e*x^2]*(a + b*ArcSin[c*x])^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.17 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{\sqrt{e\,x^2+d}\,\left(a+b\arcsin\left(cx\right)\right)^2}dx$$

input
```
int(1/(e*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x)
```

output
```
int(1/(e*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 67, normalized size of antiderivative = 3.05

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{\sqrt{ex^2+d}(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)/(a^2*e*x^2 + a^2*d + (b^2*e*x^2 + b^2*d)*arcsin(c
*x)^2 + 2*(a*b*e*x^2 + a*b*d)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 1.31 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\operatorname{asin}(cx))^2\sqrt{d+ex^2}}\,dx$$

input
```
integrate(1/(e*x**2+d)**(1/2)/(a+b*asin(c*x))**2,x)
```

output
```
Integral(1/((a + b*asin(c*x))**2*sqrt(d + e*x**2)), x)
```

Maxima [N/A]

Not integrable

Time = 1.43 (sec) , antiderivative size = 364, normalized size of antiderivative = 16.55

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{\sqrt{ex^2+d}(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
((a*b*c^3*d^2 + a*b*c*d*e + (a*b*c^3*d*e + a*b*c*e^2)*x^2 + (b^2*c^3*d^2 +
 b^2*c*d*e + (b^2*c^3*d*e + b^2*c*e^2)*x^2)*arctan2(c*x, sqrt(c*x + 1)*sqr
t(-c*x + 1)))*integrate(sqrt(e*x^2 + d)*sqrt(c*x + 1)*sqrt(-c*x + 1)*x/(a*
b*c^3*e^2*x^6 - a*b*c*d^2 + (2*a*b*c^3*d*e - a*b*c*e^2)*x^4 + (a*b*c^3*d^2
 - 2*a*b*c*d*e)*x^2 + (b^2*c^3*e^2*x^6 - b^2*c*d^2 + (2*b^2*c^3*d*e - b^2*
c*e^2)*x^4 + (b^2*c^3*d^2 - 2*b^2*c*d*e)*x^2)*arctan2(c*x, sqrt(c*x + 1)*s
qrt(-c*x + 1))), x) - sqrt(e*x^2 + d)*sqrt(c*x + 1)*sqrt(-c*x + 1))/(a*b*c
*e*x^2 + a*b*c*d + (b^2*c*e*x^2 + b^2*c*d)*arctan2(c*x, sqrt(c*x + 1)*sqrt
(-c*x + 1)))
```

Giac [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{\sqrt{ex^2+d}(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
integrate(1/(sqrt(e*x^2 + d)*(b*arcsin(c*x) + a)^2), x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\operatorname{asin}(c\,x))^2\,\sqrt{e\,x^2+d}}\,dx$$

input
```
int(1/((a + b*asin(c*x))^2*(d + e*x^2)^(1/2)),x)
```

output
```
int(1/((a + b*asin(c*x))^2*(d + e*x^2)^(1/2)), x)
```

Reduce [N/A]

Not integrable

Time = 200.03 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{\sqrt{d+ex^2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{\sqrt{e\,x^2+d}\,(asin\,(cx)\,b+a)^2}dx$$

input
```
int(1/(e*x^2+d)^(1/2)/(a+b*asin(c*x))^2,x)
```

output
```
int(1/(e*x^2+d)^(1/2)/(a+b*asin(c*x))^2,x)
```

3.180 $\int \frac{1}{\left(d+ex^2\right)^{3/2}(a+b\arcsin(cx))^2}\,dx$

Optimal result 1338
Mathematica [N/A] 1338
Rubi [N/A] 1339
Maple [N/A] 1339
Fricas [N/A] 1340
Sympy [N/A] 1340
Maxima [N/A] 1341
Giac [N/A] 1341
Mupad [N/A] 1342
Reduce [N/A] 1342

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{\left(d+ex^2\right)^{3/2}(a+b\arcsin(cx))^2}\,dx = \text{Int}\left(\frac{1}{\left(d+ex^2\right)^{3/2}(a+b\arcsin(cx))^2},x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 21.32 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{\left(d+ex^2\right)^{3/2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{\left(d+ex^2\right)^{3/2}(a+b\arcsin(cx))^2}\,dx$$

input
```
Integrate[1/((d + e*x^2)^(3/2)*(a + b*ArcSin[c*x])^2),x]
```

output
```
Integrate[1/((d + e*x^2)^(3/2)*(a + b*ArcSin[c*x])^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))^2}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))^2}dx$$

input
```
Int[1/((d + e*x^2)^(3/2)*(a + b*ArcSin[c*x])^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.42 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(e\,x^2+d)^{\frac{3}{2}}\,(a+b\arcsin(cx))^2}dx$$

input
```
int(1/(e*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x)
```

output
```
int(1/(e*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.13 (sec) , antiderivative size = 108, normalized size of antiderivative = 4.91

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(ex^2+d)^{\frac{3}{2}}\,(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)/(a^2*e^2*x^4 + 2*a^2*d*e*x^2 + a^2*d^2 + (b^2*e^2
*x^4 + 2*b^2*d*e*x^2 + b^2*d^2)*arcsin(c*x)^2 + 2*(a*b*e^2*x^4 + 2*a*b*d*e
*x^2 + a*b*d^2)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 5.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\operatorname{asin}(cx))^2\,(d+ex^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(e*x**2+d)**(3/2)/(a+b*asin(c*x))**2,x)
```

output
```
Integral(1/((a + b*asin(c*x))**2*(d + e*x**2)**(3/2)), x)
```

Maxima [N/A]

Not integrable

Time = 2.83 (sec) , antiderivative size = 457, normalized size of antiderivative = 20.77

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(ex^2+d)^{\frac{3}{2}}\,(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
-((a*b*c*e^2*x^4 + 2*a*b*c*d*e*x^2 + a*b*c*d^2 + (b^2*c*e^2*x^4 + 2*b^2*c*
d*e*x^2 + b^2*c*d^2)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)))*integrate
((2*c^2*e*x^3 - (c^2*d + 3*e)*x)*sqrt(e*x^2 + d)*sqrt(c*x + 1)*sqrt(-c*x +
 1)/(a*b*c^3*e^3*x^8 + (3*a*b*c^3*d*e^2 - a*b*c*e^3)*x^6 - a*b*c*d^3 + 3*(
a*b*c^3*d^2*e - a*b*c*d*e^2)*x^4 + (a*b*c^3*d^3 - 3*a*b*c*d^2*e)*x^2 + (b^
2*c^3*e^3*x^8 + (3*b^2*c^3*d*e^2 - b^2*c*e^3)*x^6 - b^2*c*d^3 + 3*(b^2*c^3
*d^2*e - b^2*c*d*e^2)*x^4 + (b^2*c^3*d^3 - 3*b^2*c*d^2*e)*x^2)*arctan2(c*x
, sqrt(c*x + 1)*sqrt(-c*x + 1))), x) + sqrt(e*x^2 + d)*sqrt(c*x + 1)*sqrt(
-c*x + 1))/(a*b*c*e^2*x^4 + 2*a*b*c*d*e*x^2 + a*b*c*d^2 + (b^2*c*e^2*x^4 +
 2*b^2*c*d*e*x^2 + b^2*c*d^2)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)))
```

Giac [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(ex^2+d)^{\frac{3}{2}}\,(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^(3/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)^(3/2)*(b*arcsin(c*x) + a)^2), x)
```

Mupad [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}\,(c\,x))^2\,(e\,x^2+d)^{3/2}}\,dx$$

input
```
int(1/((a + b*asin(c*x))^2*(d + e*x^2)^(3/2)),x)
```

output
```
int(1/((a + b*asin(c*x))^2*(d + e*x^2)^(3/2)), x)
```

Reduce [N/A]

Not integrable

Time = 200.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{3/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(e\,x^2+d)^{\frac{3}{2}}\,(asin\,(cx)\,b+a)^2}dx$$

input
```
int(1/(e*x^2+d)^(3/2)/(a+b*asin(c*x))^2,x)
```

output
```
int(1/(e*x^2+d)^(3/2)/(a+b*asin(c*x))^2,x)
```

3.181 $\int \frac{1}{\left(d+ex^2\right)^{5/2}(a+b\arcsin(cx))^2}\,dx$

Optimal result 1343
Mathematica [N/A] 1343
Rubi [N/A] 1344
Maple [N/A] 1344
Fricas [N/A] 1345
Sympy [N/A] 1345
Maxima [N/A] 1346
Giac [N/A] 1346
Mupad [N/A] 1347
Reduce [N/A] 1347

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{\left(d+ex^2\right)^{5/2}(a+b\arcsin(cx))^2}\,dx = \text{Int}\left(\frac{1}{\left(d+ex^2\right)^{5/2}(a+b\arcsin(cx))^2},x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x)
```

Mathematica [N/A]

Not integrable

Time = 39.74 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{\left(d+ex^2\right)^{5/2}(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{\left(d+ex^2\right)^{5/2}(a+b\arcsin(cx))^2}\,dx$$

input
```
Integrate[1/((d + e*x^2)^(5/2)*(a + b*ArcSin[c*x])^2),x]
```

output
```
Integrate[1/((d + e*x^2)^(5/2)*(a + b*ArcSin[c*x])^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))^2}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))^2}dx$$

input
```
Int[1/((d + e*x^2)^(5/2)*(a + b*ArcSin[c*x])^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 1.36 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(e\,x^2+d)^{\frac{5}{2}}\,(a+b\arcsin(cx))^2}dx$$

input
```
int(1/(e*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x)
```

output
```
int(1/(e*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 149, normalized size of antiderivative = 6.77

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(ex^2+d)^{\frac{5}{2}}\,(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)/(a^2*e^3*x^6 + 3*a^2*d*e^2*x^4 + 3*a^2*d^2*e*x^2
+ a^2*d^3 + (b^2*e^3*x^6 + 3*b^2*d*e^2*x^4 + 3*b^2*d^2*e*x^2 + b^2*d^3)*ar
csin(c*x)^2 + 2*(a*b*e^3*x^6 + 3*a*b*d*e^2*x^4 + 3*a*b*d^2*e*x^2 + a*b*d^3
)*arcsin(c*x)), x)
```

Sympy [N/A]

Not integrable

Time = 29.05 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}\,(cx))^2\,(d+ex^2)^{\frac{5}{2}}}\,dx$$

input
```
integrate(1/(e*x**2+d)**(5/2)/(a+b*asin(c*x))**2,x)
```

output
```
Integral(1/((a + b*asin(c*x))**2*(d + e*x**2)**(5/2)), x)
```

Maxima [N/A]

Not integrable

Time = 4.31 (sec) , antiderivative size = 579, normalized size of antiderivative = 26.32

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(ex^2+d)^{\frac{5}{2}}\,(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

output
```
-((a*b*c*e^3*x^6 + 3*a*b*c*d*e^2*x^4 + 3*a*b*c*d^2*e*x^2 + a*b*c*d^3 + (b^
2*c*e^3*x^6 + 3*b^2*c*d*e^2*x^4 + 3*b^2*c*d^2*e*x^2 + b^2*c*d^3)*arctan2(c
*x, sqrt(c*x + 1)*sqrt(-c*x + 1)))*integrate((4*c^2*e*x^3 - (c^2*d + 5*e)*
x)*sqrt(e*x^2 + d)*sqrt(c*x + 1)*sqrt(-c*x + 1)/(a*b*c^3*e^4*x^10 + (4*a*b
*c^3*d*e^3 - a*b*c*e^4)*x^8 - a*b*c*d^4 + 2*(3*a*b*c^3*d^2*e^2 - 2*a*b*c*d
*e^3)*x^6 + 2*(2*a*b*c^3*d^3*e - 3*a*b*c*d^2*e^2)*x^4 + (a*b*c^3*d^4 - 4*a
*b*c*d^3*e)*x^2 + (b^2*c^3*e^4*x^10 + (4*b^2*c^3*d*e^3 - b^2*c*e^4)*x^8 -
b^2*c*d^4 + 2*(3*b^2*c^3*d^2*e^2 - 2*b^2*c*d*e^3)*x^6 + 2*(2*b^2*c^3*d^3*e
 - 3*b^2*c*d^2*e^2)*x^4 + (b^2*c^3*d^4 - 4*b^2*c*d^3*e)*x^2)*arctan2(c*x,
sqrt(c*x + 1)*sqrt(-c*x + 1))), x) + sqrt(e*x^2 + d)*sqrt(c*x + 1)*sqrt(-c
*x + 1))/(a*b*c*e^3*x^6 + 3*a*b*c*d*e^2*x^4 + 3*a*b*c*d^2*e*x^2 + a*b*c*d^
3 + (b^2*c*e^3*x^6 + 3*b^2*c*d*e^2*x^4 + 3*b^2*c*d^2*e*x^2 + b^2*c*d^3)*ar
ctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)))
```

Giac [N/A]

Not integrable

Time = 0.41 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(ex^2+d)^{\frac{5}{2}}\,(b\arcsin(cx)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^(5/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)^(5/2)*(b*arcsin(c*x) + a)^2), x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}\,(c\,x))^2\,(e\,x^2+d)^{5/2}}\,dx$$

input
```
int(1/((a + b*asin(c*x))^2*(d + e*x^2)^(5/2)),x)
```

output
```
int(1/((a + b*asin(c*x))^2*(d + e*x^2)^(5/2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.76 (sec) , antiderivative size = 187, normalized size of antiderivative = 8.50

$$\int \frac{1}{(d+ex^2)^{5/2}\,(a+b\arcsin(cx))^2}\,dx = \int \frac{}{\sqrt{e\,x^2+d}\,asin\,(cx)^2\,b^2d^2+2\sqrt{e\,x^2+d}\,asin\,(cx)^2\,b^2de\,x^2+\sqrt{e}}$$

input
```
int(1/(e*x^2+d)^(5/2)/(a+b*asin(c*x))^2,x)
```

output
```
int(1/(sqrt(d + e*x**2)*asin(c*x)**2*b**2*d**2 + 2*sqrt(d + e*x**2)*asin(c
*x)**2*b**2*d*e*x**2 + sqrt(d + e*x**2)*asin(c*x)**2*b**2*e**2*x**4 + 2*sq
rt(d + e*x**2)*asin(c*x)*a*b*d**2 + 4*sqrt(d + e*x**2)*asin(c*x)*a*b*d*e*x
**2 + 2*sqrt(d + e*x**2)*asin(c*x)*a*b*e**2*x**4 + sqrt(d + e*x**2)*a**2*d
**2 + 2*sqrt(d + e*x**2)*a**2*d*e*x**2 + sqrt(d + e*x**2)*a**2*e**2*x**4),
x)
```

3.182 $\int (d+ex^2)^2 \sqrt{a+b\arcsin(cx)}\,dx$

Optimal result . . . 1348
Mathematica [C] (verified) . . . 1349
Rubi [A] (verified) . . . 1349
Maple [A] (verified) . . . 1353
Fricas [F(-2)] . . . 1353
Sympy [F] . . . 1354
Maxima [F] . . . 1354
Giac [C] (verification not implemented) . . . 1354
Mupad [F(-1)] . . . 1355
Reduce [F] . . . 1356

Optimal result

Integrand size = 22, antiderivative size = 754

$$\int (d+ex^2)^2 \sqrt{a+b\arcsin(cx)}\,dx = \text{Too large to display}$$

output

```
d^2*x*(a+b*arcsin(c*x))^(1/2)+2/3*d*e*x^3*(a+b*arcsin(c*x))^(1/2)+1/5*e^2*
x^5*(a+b*arcsin(c*x))^(1/2)-1/2*b^(1/2)*d^2*2^(1/2)*Pi^(1/2)*cos(a/b)*Fres
nelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c-1/4*b^(1/2)*d*e*2
^(1/2)*Pi^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)
/b^(1/2))/c^3-1/16*b^(1/2)*e^2*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelS(2^(1/2)/
Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c^5+1/36*b^(1/2)*d*e*6^(1/2)*Pi^
(1/2)*cos(3*a/b)*FresnelS(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2)
)/c^3+1/96*b^(1/2)*e^2*6^(1/2)*Pi^(1/2)*cos(3*a/b)*FresnelS(6^(1/2)/Pi^(1/
2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c^5-1/800*b^(1/2)*e^2*10^(1/2)*Pi^(1/2
)*cos(5*a/b)*FresnelS(10^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c
^5+1/2*b^(1/2)*d^2*2^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(
c*x))^(1/2)/b^(1/2))*sin(a/b)/c+1/4*b^(1/2)*d*e*2^(1/2)*Pi^(1/2)*FresnelC(
2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/c^3+1/16*b^(1/2
)*e^2*2^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b
^(1/2))*sin(a/b)/c^5-1/36*b^(1/2)*d*e*6^(1/2)*Pi^(1/2)*FresnelC(6^(1/2)/Pi
^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(3*a/b)/c^3-1/96*b^(1/2)*e^2*6^
(1/2)*Pi^(1/2)*FresnelC(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*
sin(3*a/b)/c^5+1/800*b^(1/2)*e^2*10^(1/2)*Pi^(1/2)*FresnelC(10^(1/2)/Pi^(1
/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(5*a/b)/c^5
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.89 (sec) , antiderivative size = 400, normalized size of antiderivative = 0.53

$$\int \left(d+ex^2\right)^2 \sqrt{a+b\arcsin(cx)}\,dx$$

$$= \frac{be^{-\frac{5ia}{b}}\left(450(8c^4d^2+4c^2de+e^2)\,e^{\frac{4ia}{b}}\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+450(8c^4d^2+4c^2de+e^2)\,e\right.}{}$$

input
```
Integrate[(d + e*x^2)^2*Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
(b*(450*(8*c^4*d^2 + 4*c^2*d*e + e^2)*E^(((4*I)*a)/b)*Sqrt[((-I)*(a + b*Ar
cSin[c*x]))/b]*Gamma[3/2, ((-I)*(a + b*ArcSin[c*x]))/b] + 450*(8*c^4*d^2 +
 4*c^2*d*e + e^2)*E^(((6*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3/
2, (I*(a + b*ArcSin[c*x]))/b] - e*(25*Sqrt[3]*(8*c^2*d + 3*e)*E^(((2*I)*a)
/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((-3*I)*(a + b*ArcSin[c*
x]))/b] + 25*Sqrt[3]*(8*c^2*d + 3*e)*E^(((8*I)*a)/b)*Sqrt[(I*(a + b*ArcSin
[c*x]))/b]*Gamma[3/2, ((3*I)*(a + b*ArcSin[c*x]))/b] - 9*Sqrt[5]*e*(Sqrt[(
(-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((-5*I)*(a + b*ArcSin[c*x]))/b] +
E^(((10*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((5*I)*(a + b*
ArcSin[c*x]))/b])))/(7200*c^5*E^(((5*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Rubi [A] (verified)

Time = 2.45 (sec) , antiderivative size = 754, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)^2 \sqrt{a+b\arcsin(cx)}\,dx$$

$$\downarrow 5172$$

$$\int \left(d^2\sqrt{a+b\arcsin(cx)}+2dex^2\sqrt{a+b\arcsin(cx)}+e^2x^4\sqrt{a+b\arcsin(cx)}\right)dx$$

$$\downarrow 2009$$

$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}e^2\sin\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{8c^5}-$$
$$\frac{\sqrt{\frac{\pi}{6}}\sqrt{b}e^2\sin\left(\frac{3a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{16c^5}+$$
$$\frac{\sqrt{\frac{\pi}{10}}\sqrt{b}e^2\sin\left(\frac{5a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{80c^5}-$$
$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}e^2\cos\left(\frac{a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{8c^5}+$$
$$\frac{\sqrt{\frac{\pi}{6}}\sqrt{b}e^2\cos\left(\frac{3a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{16c^5}-$$
$$\frac{\sqrt{\frac{\pi}{10}}\sqrt{b}e^2\cos\left(\frac{5a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{80c^5}+$$
$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}de\sin\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2c^3}-$$
$$\frac{\sqrt{\frac{\pi}{6}}\sqrt{b}de\sin\left(\frac{3a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{6c^3}-$$
$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}de\cos\left(\frac{a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2c^3}+$$
$$\frac{\sqrt{\frac{\pi}{6}}\sqrt{b}de\cos\left(\frac{3a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{6c^3}+$$
$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}d^2\sin\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{c}-$$
$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}d^2\cos\left(\frac{a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{c}+d^2x\sqrt{a+b\arcsin(cx)}+$$
$$\frac{2}{3}dex^3\sqrt{a+b\arcsin(cx)}+\frac{1}{5}e^2x^5\sqrt{a+b\arcsin(cx)}$$

input
```
Int[(d + e*x^2)^2*Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
d^2*x*Sqrt[a + b*ArcSin[c*x]] + (2*d*e*x^3*Sqrt[a + b*ArcSin[c*x]])/3 + (e
^2*x^5*Sqrt[a + b*ArcSin[c*x]])/5 - (Sqrt[b]*d^2*Sqrt[Pi/2]*Cos[a/b]*Fresn
elS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/c - (Sqrt[b]*d*e*Sqrt[P
i/2]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(2*c
^3) - (Sqrt[b]*e^2*Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*Arc
Sin[c*x]])/Sqrt[b]])/(8*c^5) + (Sqrt[b]*d*e*Sqrt[Pi/6]*Cos[(3*a)/b]*Fresne
lS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(6*c^3) + (Sqrt[b]*e^2*S
qrt[Pi/6]*Cos[(3*a)/b]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[
b]])/(16*c^5) - (Sqrt[b]*e^2*Sqrt[Pi/10]*Cos[(5*a)/b]*FresnelS[(Sqrt[10/Pi
]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(80*c^5) + (Sqrt[b]*d^2*Sqrt[Pi/2]*Fr
esnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/c + (Sqrt[b
]*d*e*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Si
n[a/b])/(2*c^3) + (Sqrt[b]*e^2*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*
ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(8*c^5) - (Sqrt[b]*d*e*Sqrt[Pi/6]*Fresnel
C[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(6*c^3) - (S
qrt[b]*e^2*Sqrt[Pi/6]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b
]]*Sin[(3*a)/b])/(16*c^5) + (Sqrt[b]*e^2*Sqrt[Pi/10]*FresnelC[(Sqrt[10/Pi]
*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(5*a)/b])/(80*c^5)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [A] (verified)

Time = 0.64 (sec) , antiderivative size = 1155, normalized size of antiderivative = 1.53

method	result	size
default	Expression too large to display	1155

input
```
int((e*x^2+d)^2*(a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output
```
-1/7200/c^5*(-9*2^(1/2)*Pi^(1/2)*cos(5*a/b)*FresnelS(5*2^(1/2)/Pi^(1/2)/(-
5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(a+b*arcsin(c*x))^(1/2)*(-5/b)^(1/2)
*b*e^2-9*2^(1/2)*Pi^(1/2)*sin(5*a/b)*FresnelC(5*2^(1/2)/Pi^(1/2)/(-5/b)^(1
/2)*(a+b*arcsin(c*x))^(1/2)/b)*(a+b*arcsin(c*x))^(1/2)*(-5/b)^(1/2)*b*e^2+
90*arcsin(c*x)*sin(-5*(a+b*arcsin(c*x))/b+5*a/b)*b*e^2+90*sin(-5*(a+b*arcs
in(c*x))/b+5*a/b)*a*e^2-3600*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi
^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(a+b*arcsin(c*x))^(1/2)*(-1
/b)^(1/2)*b*c^4*d^2-3600*2^(1/2)*Pi^(1/2)*sin(a/b)*FresnelC(2^(1/2)/Pi^(1/
2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(a+b*arcsin(c*x))^(1/2)*(-1/b)^
(1/2)*b*c^4*d^2-1800*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(
-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(a+b*arcsin(c*x))^(1/2)*(-1/b)^(1/2
)*b*c^2*d*e-1800*2^(1/2)*Pi^(1/2)*sin(a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(-1/b
)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(a+b*arcsin(c*x))^(1/2)*(-1/b)^(1/2)*b*
c^2*d*e+7200*arcsin(c*x)*sin(-(a+b*arcsin(c*x))/b+a/b)*b*c^4*d^2-450*2^(1/
2)*Pi^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*
x))^(1/2)/b)*(a+b*arcsin(c*x))^(1/2)*(-1/b)^(1/2)*b*e^2-450*2^(1/2)*Pi^(1/
2)*sin(a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)
/b)*(a+b*arcsin(c*x))^(1/2)*(-1/b)^(1/2)*b*e^2+7200*sin(-(a+b*arcsin(c*x))
/b+a/b)*a*c^4*d^2+3600*arcsin(c*x)*sin(-(a+b*arcsin(c*x))/b+a/b)*b*c^2*d*e
+3600*sin(-(a+b*arcsin(c*x))/b+a/b)*a*c^2*d*e+900*arcsin(c*x)*sin(-(a+b...
```

Fricas [F(-2)]

Exception generated.

$$\int \left(d+ex^2\right)^2 \sqrt{a+b\arcsin(cx)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((e*x^2+d)^2*(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \left(d+ex^2\right)^2 \sqrt{a+b\arcsin(cx)}\,dx = \int \sqrt{a+b\operatorname{asin}(cx)}\left(d+ex^2\right)^2\,dx$$

input
```
integrate((e*x**2+d)**2*(a+b*asin(c*x))**(1/2),x)
```

output
```
Integral(sqrt(a + b*asin(c*x))*(d + e*x**2)**2, x)
```

Maxima [F]

$$\int \left(d+ex^2\right)^2 \sqrt{a+b\arcsin(cx)}\,dx = \int \left(ex^2+d\right)^2 \sqrt{b\arcsin(cx)+a}\,dx$$

input
```
integrate((e*x^2+d)^2*(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
integrate((e*x^2 + d)^2*sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 1.54 (sec) , antiderivative size = 3222, normalized size of antiderivative = 4.27

$$\int \left(d+ex^2\right)^2 \sqrt{a+b\arcsin(cx)}\,dx = \text{Too large to display}$$

input
```
integrate((e*x^2+d)^2*(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output

```
1/480*(240*sqrt(2)*sqrt(pi)*a*b*c^4*d^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))) + 120*I*sqrt(2)*sqrt(pi)
*b^2*c^4*d^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))) + 240*sqrt(2)*sqrt(pi)*a*b*c^4*d^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))) - 120
*I*sqrt(2)*sqrt(pi)*b^2*c^4*d^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))) - 480*sqrt(pi)*a*c^4*d^2*erf(-1
/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arc
sin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/(I*sqrt(2)*b/sqrt(abs(b)) + sqrt(2
)*sqrt(abs(b))) - 480*sqrt(pi)*a*c^4*d^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*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b))) + 120*sqrt
(2)*sqrt(pi)*a*b*c^2*d*e*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)/(I*
b^2/sqrt(abs(b)) + b*sqrt(abs(b))) + 60*I*sqrt(2)*sqrt(pi)*b^2*c^2*d*e*erf
(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt...
```

Mupad [F(-1)]

Timed out.

$$\int \left(d+ex^2\right)^2 \sqrt{a+b\arcsin(cx)}\,dx = \int \sqrt{a+b\,\mathrm{asin}\left(c\,x\right)}\,\left(e\,x^2+d\right)^2\,dx$$

input

```
int((a + b*asin(c*x))^(1/2)*(d + e*x^2)^2,x)
```

output

```
int((a + b*asin(c*x))^(1/2)*(d + e*x^2)^2, x)
```

Reduce [F]

$$\int (d+ex^2)^2 \sqrt{a+b\arcsin(cx)}\,dx = \left(\int \sqrt{asin\,(cx)\,b+a}dx\right) d^2 + \left(\int \sqrt{asin\,(cx)\,b+a}\,x^4 dx\right) e^2 + 2\left(\int \sqrt{asin\,(cx)\,b+a}\,x^2 dx\right) de$$

input
```
int((e*x^2+d)^2*(a+b*asin(c*x))^(1/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a),x)*d**2 + int(sqrt(asin(c*x)*b + a)*x**4,x)*e**2
 + 2*int(sqrt(asin(c*x)*b + a)*x**2,x)*d*e
```

3.183 $\int (d+ex^2)\sqrt{a+b\arcsin(cx)}\,dx$

Optimal result . . . 1357
Mathematica [C] (verified) . . . 1358
Rubi [A] (verified) . . . 1359
Maple [A] (verified) . . . 1360
Fricas [F(-2)] . . . 1361
Sympy [F] . . . 1361
Maxima [F] . . . 1362
Giac [C] (verification not implemented) . . . 1362
Mupad [F(-1)] . . . 1363
Reduce [F] . . . 1364

Optimal result

Integrand size = 20, antiderivative size = 369

$$\begin{aligned}\int (d+ex^2)\sqrt{a+b\arcsin(cx)}\,dx &= dx\sqrt{a+b\arcsin(cx)}+\frac{1}{3}ex^3\sqrt{a+b\arcsin(cx)}\\ &-\frac{\sqrt{b}d\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{c}\\ &-\frac{\sqrt{b}e\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{4c^3}\\ &+\frac{\sqrt{b}e\sqrt{\frac{\pi}{6}}\cos\left(\frac{3a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{12c^3}\\ &+\frac{\sqrt{b}d\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{c}\\ &+\frac{\sqrt{b}e\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{4c^3}\\ &-\frac{\sqrt{b}e\sqrt{\frac{\pi}{6}}\,\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{3a}{b}\right)}{12c^3}\end{aligned}$$

output

```
d*x*(a+b*arcsin(c*x))^(1/2)+1/3*e*x^3*(a+b*arcsin(c*x))^(1/2)-1/2*b^(1/2)*
d*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1
/2)/b^(1/2))/c-1/8*b^(1/2)*e*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi
^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c^3+1/72*b^(1/2)*e*6^(1/2)*Pi^(1/2
)*cos(3*a/b)*FresnelS(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c^
3+1/2*b^(1/2)*d*2^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x
))^(1/2)/b^(1/2))*sin(a/b)/c+1/8*b^(1/2)*e*2^(1/2)*Pi^(1/2)*FresnelC(2^(1/
2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/c^3-1/72*b^(1/2)*e*6
^(1/2)*Pi^(1/2)*FresnelC(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))
*sin(3*a/b)/c^3
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.33 (sec) , antiderivative size = 244, normalized size of antiderivative = 0.66

$$\int (d+ex^2)\sqrt{a+b\arcsin(cx)}\,dx$$

$$= \frac{be^{-\frac{3ia}{b}}\left(9(4c^2d+e)\,e^{\frac{2ia}{b}}\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+9(4c^2d+e)\,e^{\frac{4ia}{b}}\sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},\frac{i(a+b\arcsin(cx))}{b}\right)-\sqrt{3}e\left(\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},-\frac{3i(a+b\arcsin(cx))}{b}\right)+e^{\frac{6ia}{b}}\sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},\frac{3i(a+b\arcsin(cx))}{b}\right)\right)\right)}{72c^3\sqrt{a+b\arcsin(cx)}}$$

input

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

output

```
(b*(9*(4*c^2*d + e)*E^(((2*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gam
ma[3/2, ((-I)*(a + b*ArcSin[c*x]))/b] + 9*(4*c^2*d + e)*E^(((4*I)*a)/b)*Sq
rt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, (I*(a + b*ArcSin[c*x]))/b] - Sqrt
[3]*e*(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])))/(72*c^3*E^(((3*I)*a)/b)*Sqrt[a + b*ArcSin[
c*x]])
```

Rubi [A] (verified)

Time = 1.13 (sec) , antiderivative size = 369, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^2)\sqrt{a+b\arcsin(cx)}\,dx$$

$$\downarrow 5172$$

$$\int \left(d\sqrt{a+b\arcsin(cx)}+ex^2\sqrt{a+b\arcsin(cx)}\right)dx$$

$$\downarrow 2009$$

$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}e\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{4c^3}-$$
$$\frac{\sqrt{\frac{\pi}{6}}\sqrt{b}e\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{12c^3}-$$
$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}e\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{4c^3}+$$
$$\frac{\sqrt{\frac{\pi}{6}}\sqrt{b}e\cos\left(\frac{3a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{12c^3}+$$
$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}d\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{c}-$$
$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}d\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{c}+dx\sqrt{a+b\arcsin(cx)}+\frac{1}{3}ex^3\sqrt{a+b\arcsin(cx)}$$

input
```
Int[(d + e*x^2)*Sqrt[a + b*ArcSin[c*x]],x]
```

output

```
d*x*Sqrt[a + b*ArcSin[c*x]] + (e*x^3*Sqrt[a + b*ArcSin[c*x]])/3 - (Sqrt[b]
*d*Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[
b]])/c - (Sqrt[b]*e*Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*Ar
cSin[c*x]])/Sqrt[b]])/(4*c^3) + (Sqrt[b]*e*Sqrt[Pi/6]*Cos[(3*a)/b]*Fresnel
S[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(12*c^3) + (Sqrt[b]*d*Sqr
t[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/c
 + (Sqrt[b]*e*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqr
t[b]]*Sin[a/b])/(4*c^3) - (Sqrt[b]*e*Sqrt[Pi/6]*FresnelC[(Sqrt[6/Pi]*Sqrt[
a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(12*c^3)
```

Defintions of rubi rules used

rule 2009

```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 557, normalized size of antiderivative = 1.51

method	result
default	$\frac{36\sqrt{a+b\arcsin(cx)}\,\cos\left(\frac{a}{b}\right)\mathrm{FresnelS}\left(\frac{\sqrt{2}\,\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\,\sqrt{-\frac{1}{b}}\,b}\right)\sqrt{-\frac{1}{b}}\,\sqrt{\pi}\,\sqrt{2}\,b\,c^2d+36\sqrt{a+b\arcsin(cx)}\,\sin\left(\frac{a}{b}\right)\mathrm{FresnelC}\left(\frac{\sqrt{2}\,\sqrt{a+b\arcsin}}{\sqrt{\pi}\,\sqrt{-\frac{1}{b}}}\right.$

input

```
int((e*x^2+d)*(a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output
```
1/72/c^3*(36*(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)*b*c^2*
d+36*(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)*(-1/b)^(1/2)*Pi^(1/2)*2^(1/2)*b*c^2*d-(a+b*a
rcsin(c*x))^(1/2)*cos(3*a/b)*FresnelS(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b
*arcsin(c*x))^(1/2)/b)*(-3/b)^(1/2)*Pi^(1/2)*2^(1/2)*b*e-(a+b*arcsin(c*x))
^(1/2)*sin(3*a/b)*FresnelC(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x
))^(1/2)/b)*(-3/b)^(1/2)*Pi^(1/2)*2^(1/2)*b*e+9*(a+b*arcsin(c*x))^(1/2)*co
s(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)*b*e+9*(a+b*arcsin(c*x))^(1/2)*sin(a/b)*Fresne
lC(2^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(-1/b)^(1/2)*P
i^(1/2)*2^(1/2)*b*e-72*arcsin(c*x)*sin(-(a+b*arcsin(c*x))/b+a/b)*b*c^2*d-7
2*sin(-(a+b*arcsin(c*x))/b+a/b)*a*c^2*d+6*arcsin(c*x)*sin(-3*(a+b*arcsin(c
*x))/b+3*a/b)*b*e-18*arcsin(c*x)*sin(-(a+b*arcsin(c*x))/b+a/b)*b*e+6*sin(-
3*(a+b*arcsin(c*x))/b+3*a/b)*a*e-18*sin(-(a+b*arcsin(c*x))/b+a/b)*a*e)/(a+
b*arcsin(c*x))^(1/2)
```

Fricas [F(-2)]

Exception generated.

$$\int \left(d+ex^2\right)\sqrt{a+b\arcsin(cx)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((e*x^2+d)*(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \left(d+ex^2\right)\sqrt{a+b\arcsin(cx)}\,dx = \int \sqrt{a+b\operatorname{asin}(cx)}\left(d+ex^2\right)\,dx$$

input
```
integrate((e*x**2+d)*(a+b*asin(c*x))**(1/2),x)
```

output
```
Integral(sqrt(a + b*asin(c*x))*(d + e*x**2), x)
```

Maxima [F]

$$\int (d+ex^2)\sqrt{a+b\arcsin(cx)}\,dx = \int (ex^2+d)\sqrt{b\arcsin(cx)+a}\,dx$$

input
```
integrate((e*x^2+d)*(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
integrate((e*x^2 + d)*sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 1.12 (sec) , antiderivative size = 1661, normalized size of antiderivative = 4.50

$$\int (d+ex^2)\sqrt{a+b\arcsin(cx)}\,dx = \text{Too large to display}$$

input
```
integrate((e*x^2+d)*(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output

```
1/2*sqrt(2)*sqrt(pi)*a*b^2*d*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) + 1/4*I*sqrt(2)*sqrt(pi)*b^3*
d*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) + 1/2*sqrt(2)*sqrt(pi)*a*b^2*d*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(a
bs(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)*b^3*d*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) - sqrt(pi)*a*b*d*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*sqrt(2)*b^2/sqrt(abs(b)) + sqrt(2)*b*sqrt
(abs(b)))*c) - sqrt(pi)*a*b*d*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*sqrt(2)*b^2/sqrt(abs(b)) + sqrt(2)*b*sqrt(abs(b)))*c) + 1/8*sqrt(2)
*sqrt(pi)*a*b^2*e*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/sq
rt(abs(b)) + b^2*sqrt(abs(b)))*c^3) + 1/16*I*sqrt(2)*sqrt(pi)*b^3*e*erf(-1
/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*...
```

Mupad [F(-1)]

Timed out.

$$\int \left(d+ex^2\right)\sqrt{a+b\arcsin(cx)}\,dx = \int \sqrt{a+b\,\mathrm{asin}\left(c\,x\right)}\left(e\,x^2+d\right)\,dx$$

input

```
int((a + b*asin(c*x))^(1/2)*(d + e*x^2),x)
```

output

```
int((a + b*asin(c*x))^(1/2)*(d + e*x^2), x)
```

Reduce [F]

$$\int \left(d+ex^2\right)\sqrt{a+b\arcsin(cx)}\,dx = \left(\int \sqrt{asin\left(cx\right)b+a}dx\right)d + \left(\int \sqrt{asin\left(cx\right)b+a}\,x^2dx\right)e$$

input
```
int((e*x^2+d)*(a+b*asin(c*x))^(1/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a),x)*d + int(sqrt(asin(c*x)*b + a)*x**2,x)*e
```

3.184 $\int \sqrt{a+b\arcsin(cx)}\,dx$

Optimal result . . . 1365
Mathematica [C] (verified) . . . 1366
Rubi [A] (verified) . . . 1366
Maple [A] (verified) . . . 1369
Fricas [F(-2)] . . . 1370
Sympy [F] . . . 1370
Maxima [F] . . . 1371
Giac [C] (verification not implemented) . . . 1371
Mupad [F(-1)] . . . 1372
Reduce [F] . . . 1372

Optimal result

Integrand size = 12, antiderivative size = 120

$$\int \sqrt{a+b\arcsin(cx)}\,dx = x\sqrt{a+b\arcsin(cx)} - \frac{\sqrt{b}\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{c} + \frac{\sqrt{b}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{c}$$

output

```
x*(a+b*arcsin(c*x))^(1/2)-1/2*b^(1/2)*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelS(2
^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c+1/2*b^(1/2)*2^(1/2)*Pi^
(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/
c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.02 (sec) , antiderivative size = 119, normalized size of antiderivative = 0.99

$$\int \sqrt{a+b\arcsin(cx)}\,dx$$
$$= \frac{be^{-\frac{ia}{b}}\left(\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+e^{\frac{2ia}{b}}\sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},\frac{i(a+b\arcsin(cx))}{b}\right)\right)}{2c\sqrt{a+b\arcsin(cx)}}$$

input
```
Integrate[Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
(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]])
```

Rubi [A] (verified)

Time = 0.69 (sec) , antiderivative size = 118, normalized size of antiderivative = 0.98, number of steps used = 12, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.917$, Rules used = {5130, 5224, 25, 3042, 3787, 25, 3042, 3785, 3786, 3832, 3833}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{a+b\arcsin(cx)}\,dx$$
$$\downarrow 5130$$
$$x\sqrt{a+b\arcsin(cx)} - \frac{1}{2}bc\int \frac{x}{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}dx$$
$$\downarrow 5224$$
$$x\sqrt{a+b\arcsin(cx)} - \frac{\int -\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}$$

$$\downarrow 25$$

$$\frac{\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}+x\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3042$$

$$\frac{\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}+x\sqrt{a+b\arcsin(cx)}$$

$$\downarrow 3787$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-}{\frac{-\sin\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\cos\left(\frac{a}{b}\right)\int -\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}}$$

$$\downarrow 25$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-}{\frac{\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}}$$

$$\downarrow 3042$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-}{\frac{\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c}}$$

$$\downarrow 3785$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-}{\frac{\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-2\sin\left(\frac{a}{b}\right)\int \cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{2c}}$$

$$\downarrow 3786$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-}{\frac{2\cos\left(\frac{a}{b}\right)\int \sin\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}-2\sin\left(\frac{a}{b}\right)\int \cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{2c}}$$

$$\downarrow 3832$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-2\sin\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{2c}$$

$$\downarrow 3833$$

$$\frac{x\sqrt{a+b\arcsin(cx)}-\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2c}$$

input
```
Int[Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
x*Sqrt[a + b*ArcSin[c*x]] - (Sqrt[b]*Sqrt[2*Pi]*Cos[a/b]*FresnelS[(Sqrt[2/
Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]] - Sqrt[b]*Sqrt[2*Pi]*FresnelC[(Sqrt[
2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(2*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3787
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Cos
[(d*e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/Sqrt[c + d*x], x], x] + Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5224
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 187, normalized size of antiderivative = 1.56

method	result
default	$-\frac{-\sqrt{2}\sqrt{\pi}\sqrt{-\frac{1}{b}}\sqrt{a+b\arcsin(cx)}\cos\left(\frac{a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}b}\right)b-\sqrt{2}\sqrt{\pi}\sqrt{-\frac{1}{b}}\sqrt{a+b\arcsin(cx)}\sin\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{2}}{2c\sqrt{a+b\arcsin(cx)}}\right.$

input
```
int((a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output
```
-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)*FresnelC(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)
```

Fricas [F(-2)]

Exception generated.

$$\int \sqrt{a + b \arcsin(cx)}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \sqrt{a + b \arcsin(cx)}\, dx = \int \sqrt{a + b \operatorname{asin}(cx)}\, dx$$

input
```
integrate((a+b*asin(c*x))**(1/2),x)
```

output
```
Integral(sqrt(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \sqrt{a + b \arcsin(cx)}\, dx = \int \sqrt{b \arcsin(cx) + a}\, dx$$

input
```
integrate((a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
integrate(sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.38 (sec) , antiderivative size = 531, normalized size of antiderivative = 4.42

$$\int \sqrt{a + b \arcsin(cx)}\, dx = \text{Too large to display}$$

input
```
integrate((a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output
```
1/2*sqrt(2)*sqrt(pi)*a*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)/((I
*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c) + 1/4*I*sqrt(2)*sqrt(pi)*b^2*erf(-1
/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arc
sin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/((I*b^2/sqrt(abs(b)) + b*sqrt(abs(
b)))*c) + 1/2*sqrt(2)*sqrt(pi)*a*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)/((-I*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c) - 1/4*I*sqrt(2)*sqrt(pi)
*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) - sqrt(pi)*a*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*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b)))) - sqrt(pi)*a*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)/(c*(-I*sqrt(2)*b/sqrt(abs(b))
+ sqrt(2)*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
```

Mupad [F(-1)]

Timed out.

$$\int \sqrt{a+b\arcsin(cx)}\,dx = \int \sqrt{a+b\,\mathrm{asin}\,(c\,x)}\,dx$$

input
```
int((a + b*asin(c*x))^(1/2),x)
```

output
```
int((a + b*asin(c*x))^(1/2), x)
```

Reduce [F]

$$\int \sqrt{a+b\arcsin(cx)}\,dx = \int \sqrt{asin\,(cx)\,b+a}dx$$

input
```
int((a+b*asin(c*x))^(1/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a),x)
```

3.185 $\int \frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}\,dx$

Optimal result . . . 1373
Mathematica [N/A] . . . 1373
Rubi [N/A] . . . 1374
Maple [N/A] . . . 1374
Fricas [F(-2)] . . . 1375
Sympy [N/A] . . . 1375
Maxima [F(-2)] . . . 1375
Giac [N/A] . . . 1376
Mupad [N/A] . . . 1376
Reduce [N/A] . . . 1377

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}\,dx = \text{Int}\left(\frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}, x\right)$$

output
```
Defer(Int)((a+b*arcsin(c*x))^(1/2)/(e*x^2+d),x)
```

Mathematica [N/A]

Not integrable

Time = 2.83 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}\,dx = \int \frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}\,dx$$

input
```
Integrate[Sqrt[a + b*ArcSin[c*x]]/(d + e*x^2),x]
```

output
```
Integrate[Sqrt[a + b*ArcSin[c*x]]/(d + e*x^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{a + b \arcsin(cx)}}{d + ex^2}\, dx$$
$$\downarrow 5174$$
$$\int \frac{\sqrt{a + b \arcsin(cx)}}{d + ex^2} dx$$

input
```
Int[Sqrt[a + b*ArcSin[c*x]]/(d + e*x^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a + b \arcsin(cx)}}{e\, x^2 + d} dx$$

input
```
int((a+b*arcsin(c*x))^(1/2)/(e*x^2+d),x)
```

output
```
int((a+b*arcsin(c*x))^(1/2)/(e*x^2+d),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^(1/2)/(e*x^2+d),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 0.90 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}\,dx = \int \frac{\sqrt{a+b\operatorname{asin}(cx)}}{d+ex^2}\,dx$$

input
```
integrate((a+b*asin(c*x))**(1/2)/(e*x**2+d),x)
```

output
```
Integral(sqrt(a + b*asin(c*x))/(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*arcsin(c*x))^(1/2)/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [N/A]

Not integrable

Time = 0.89 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}\,dx = \int \frac{\sqrt{b\arcsin(cx)+a}}{ex^2+d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(1/2)/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate(sqrt(b*arcsin(c*x) + a)/(e*x^2 + d), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}\,dx = \int \frac{\sqrt{a+b\operatorname{asin}(c\,x)}}{e\,x^2+d}\,dx$$

input
```
int((a + b*asin(c*x))^(1/2)/(d + e*x^2),x)
```

output
```
int((a + b*asin(c*x))^(1/2)/(d + e*x^2), x)
```

Reduce [N/A]

Not integrable

Time = 12.25 (sec) , antiderivative size = 21, normalized size of antiderivative = 0.95

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{d+ex^2}\,dx = \int \frac{\sqrt{asin\,(cx)\,b+a}}{e\,x^2+d}dx$$

input
```
int((a+b*asin(c*x))^(1/2)/(e*x^2+d),x)
```

output
```
int(sqrt(asin(c*x)*b + a)/(d + e*x**2),x)
```

3.186 $\int \frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}\,dx$

Optimal result 1378
Mathematica [N/A] 1378
Rubi [N/A] 1379
Maple [N/A] 1379
Fricas [F(-2)] 1380
Sympy [N/A] 1380
Maxima [N/A] 1380
Giac [N/A] 1381
Mupad [N/A] 1381
Reduce [N/A] 1382

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}\,dx = \text{Int}\left(\frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}, x\right)$$

output
```
Defer(Int)((a+b*arcsin(c*x))^(1/2)/(e*x^2+d)^2,x)
```

Mathematica [N/A]

Not integrable

Time = 15.95 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}\,dx = \int \frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}\,dx$$

input
```
Integrate[Sqrt[a + b*ArcSin[c*x]]/(d + e*x^2)^2,x]
```

output
```
Integrate[Sqrt[a + b*ArcSin[c*x]]/(d + e*x^2)^2, x]
```

Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{a + b \arcsin(cx)}}{(d + ex^2)^2} dx$$

$$\downarrow 5174$$

$$\int \frac{\sqrt{a + b \arcsin(cx)}}{(d + ex^2)^2} dx$$

input
```
Int[Sqrt[a + b*ArcSin[c*x]]/(d + e*x^2)^2,x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.56 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a + b \arcsin(cx)}}{(e x^2 + d)^2} dx$$

input
```
int((a+b*arcsin(c*x))^(1/2)/(e*x^2+d)^2,x)
```

output
```
int((a+b*arcsin(c*x))^(1/2)/(e*x^2+d)^2,x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^(1/2)/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 17.37 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}\,dx = \int \frac{\sqrt{a+b\operatorname{asin}(cx)}}{(d+ex^2)^2}\,dx$$

input
```
integrate((a+b*asin(c*x))**(1/2)/(e*x**2+d)**2,x)
```

output
```
Integral(sqrt(a + b*asin(c*x))/(d + e*x**2)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.46 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}\,dx = \int \frac{\sqrt{b\arcsin(cx)+a}}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(1/2)/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
integrate(sqrt(b*arcsin(c*x) + a)/(e*x^2 + d)^2, x)
```

Giac [N/A]

Not integrable

Time = 1.13 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}\,dx = \int \frac{\sqrt{b\arcsin(cx)+a}}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(1/2)/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate(sqrt(b*arcsin(c*x) + a)/(e*x^2 + d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}\,dx = \int \frac{\sqrt{a+b\operatorname{asin}(c\,x)}}{(e\,x^2+d)^2}\,dx$$

input
```
int((a + b*asin(c*x))^(1/2)/(d + e*x^2)^2,x)
```

output
```
int((a + b*asin(c*x))^(1/2)/(d + e*x^2)^2, x)
```

Reduce [N/A]

Not integrable

Time = 200.03 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\arcsin(cx)}}{(d+ex^2)^2}\,dx = \int \frac{\sqrt{asin\,(cx)\,b+a}}{(e\,x^2+d)^2}dx$$

input
```
int((a+b*asin(c*x))^(1/2)/(e*x^2+d)^2,x)
```

output
```
int((a+b*asin(c*x))^(1/2)/(e*x^2+d)^2,x)
```

3.187 $\int (d+ex^2)\,(a+b\arcsin(cx))^{3/2}\,dx$

Optimal result . . . 1384
Mathematica [C] (verified) . . . 1385
Rubi [A] (verified) . . . 1386
Maple [B] (verified) . . . 1388
Fricas [F(-2)] . . . 1389
Sympy [F] . . . 1390
Maxima [F] . . . 1390
Giac [C] (verification not implemented) . . . 1390
Mupad [F(-1)] . . . 1391
Reduce [F] . . . 1392

Optimal result

Integrand size = 20, antiderivative size = 482

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)^{3/2}\,dx = \frac{3bd\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{2c}$$
$$+\frac{be\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{3c^3}$$
$$+\frac{bex^2\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{6c}+dx(a+b\arcsin(cx))^{3/2}$$
$$+\frac{1}{3}ex^3(a+b\arcsin(cx))^{3/2}-\frac{3b^{3/2}d\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2c}$$
$$-\frac{3b^{3/2}e\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{8c^3}$$
$$+\frac{b^{3/2}e\sqrt{\frac{\pi}{6}}\cos\left(\frac{3a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{24c^3}$$
$$-\frac{3b^{3/2}d\sqrt{\frac{\pi}{2}}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{2c}$$
$$-\frac{3b^{3/2}e\sqrt{\frac{\pi}{2}}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{8c^3}$$
$$+\frac{b^{3/2}e\sqrt{\frac{\pi}{6}}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{3a}{b}\right)}{24c^3}$$

output

```
3/2*b*d*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))^(1/2)/c+1/3*b*e*(-c^2*x^2+1)^
(1/2)*(a+b*arcsin(c*x))^(1/2)/c^3+1/6*b*e*x^2*(-c^2*x^2+1)^(1/2)*(a+b*arcs
in(c*x))^(1/2)/c+d*x*(a+b*arcsin(c*x))^(3/2)+1/3*e*x^3*(a+b*arcsin(c*x))^(
3/2)-3/4*b^(3/2)*d*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)*(a+
b*arcsin(c*x))^(1/2)/b^(1/2))/c-3/16*b^(3/2)*e*2^(1/2)*Pi^(1/2)*cos(a/b)*F
resnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/c^3+1/144*b^(3/2
)*e*6^(1/2)*Pi^(1/2)*cos(3*a/b)*FresnelC(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x)
)^(1/2)/b^(1/2))/c^3-3/4*b^(3/2)*d*2^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1
/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/c-3/16*b^(3/2)*e*2^(1/2)*Pi^
(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/
c^3+1/144*b^(3/2)*e*6^(1/2)*Pi^(1/2)*FresnelS(6^(1/2)/Pi^(1/2)*(a+b*arcsin
(c*x))^(1/2)/b^(1/2))*sin(3*a/b)/c^3
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 7.23 (sec) , antiderivative size = 844, normalized size of antiderivative = 1.75

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)^{3/2}\,dx = \text{Too large to display}$$

input

```
Integrate[(d + e*x^2)*(a + b*ArcSin[c*x])^(3/2),x]
```

output

```
(a*b*d*(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]]) + (a*b
*e*(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*ArcSi
n[c*x]))/b]*Gamma[3/2, ((-3*I)*(a + b*ArcSin[c*x]))/b] + E^(((6*I)*a)/b)*S
qrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((3*I)*(a + b*ArcSin[c*x]))/b]))
)/(72*c^3*E^(((3*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]]) + (Sqrt[b]*d*(2*Sqrt[b]
*Sqrt[a + b*ArcSin[c*x]]*(3*Sqrt[1 - c^2*x^2] + 2*c*x*ArcSin[c*x]) - Sqrt[
2*Pi]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*(3*b*Cos[a/b]
 + 2*a*Sin[a/b]) + Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]]
)/Sqrt[b]]*(2*a*Cos[a/b] - 3*b*Sin[a/b])))/(4*c) + (Sqrt[b]*e*(18*Sqrt[b]*
Sqrt[a + b*ArcSin[c*x]]*(3*Sqrt[1 - c^2*x^2] + 2*c*x*ArcSin[c*x]) - 9*Sqrt
[2*Pi]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*(3*b*Cos[a/b
] + 2*a*Sin[a/b]) + 9*Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*
x]])/Sqrt[b]]*(2*a*Cos[a/b] - 3*b*Sin[a/b]) + Sqrt[6*Pi]*FresnelC[(Sqrt[6/
Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*(b*Cos[(3*a)/b] + 2*a*Sin[(3*a)/b])
 - Sqrt[6*Pi]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*(2*a*C
os[(3*a)/b] - b*Sin[(3*a)/b]) - 6*Sqrt[b]*Sqrt[a + b*ArcSin[c*x]]*(Cos[...
```

Rubi [A] (verified)

Time = 1.58 (sec) , antiderivative size = 482, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)^{3/2}dx$$

$$\downarrow 5172$$

$$\int \left(d(a+b\arcsin(cx))^{3/2}+ex^2(a+b\arcsin(cx))^{3/2}\right)dx$$

$$\downarrow 2009$$

$$-\frac{3\sqrt{\frac{\pi}{2}}b^{3/2}e\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{8c^3}+\frac{\sqrt{\frac{\pi}{6}}b^{3/2}e\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{24c^3}-\frac{3\sqrt{\frac{\pi}{2}}b^{3/2}e\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{8c^3}+\frac{\sqrt{\frac{\pi}{6}}b^{3/2}e\sin\left(\frac{3a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{24c^3}-\frac{3\sqrt{\frac{\pi}{2}}b^{3/2}d\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2c}-\frac{3\sqrt{\frac{\pi}{2}}b^{3/2}d\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2c}+\frac{3bd\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{2c}+\frac{bex^2\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{6c}+\frac{be\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{3c^3}+dx(a+b\arcsin(cx))^{3/2}+\frac{1}{3}ex^3(a+b\arcsin(cx))^{3/2}$$

input

```
Int[(d + e*x^2)*(a + b*ArcSin[c*x])^(3/2),x]
```

output

```
(3*b*d*Sqrt[1 - c^2*x^2]*Sqrt[a + b*ArcSin[c*x]])/(2*c) + (b*e*Sqrt[1 - c^
2*x^2]*Sqrt[a + b*ArcSin[c*x]])/(3*c^3) + (b*e*x^2*Sqrt[1 - c^2*x^2]*Sqrt[
a + b*ArcSin[c*x]])/(6*c) + d*x*(a + b*ArcSin[c*x])^(3/2) + (e*x^3*(a + b*
ArcSin[c*x])^(3/2))/3 - (3*b^(3/2)*d*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/
Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(2*c) - (3*b^(3/2)*e*Sqrt[Pi/2]*Cos
[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(8*c^3) + (b
^(3/2)*e*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)*d*Sqrt[Pi/2]*FresnelS[(Sqrt[2/Pi]*Sqr
t[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(2*c) - (3*b^(3/2)*e*Sqrt[Pi/2]*F
resnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(8*c^3) +
(b^(3/2)*e*Sqrt[Pi/6]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b
]]*Sin[(3*a)/b])/(24*c^3)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 849 vs. $2(374) = 748$.

Time = 0.42 (sec) , antiderivative size = 850, normalized size of antiderivative = 1.76

method	result	size
default	Expression too large to display	850

input
```
int((e*x^2+d)*(a+b*arcsin(c*x))^(3/2),x,method=_RETURNVERBOSE)
```

output

```
1/144/c^3*(-108*(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)*Pi^(1/2)*(-1/b)^(1/2)*b^2
*c^2*d+108*(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)*2^(1/2)*Pi^(1/2)*(-1/b)^(1/2)*b^2*c^2*
d+(a+b*arcsin(c*x))^(1/2)*cos(3*a/b)*FresnelC(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1
/2)*(a+b*arcsin(c*x))^(1/2)/b)*2^(1/2)*(-3/b)^(1/2)*Pi^(1/2)*b^2*e-(a+b*ar
csin(c*x))^(1/2)*sin(3*a/b)*FresnelS(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*
arcsin(c*x))^(1/2)/b)*2^(1/2)*(-3/b)^(1/2)*Pi^(1/2)*b^2*e-27*(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)*Pi^(1/2)*(-1/b)^(1/2)*b^2*e+27*(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
)*2^(1/2)*Pi^(1/2)*(-1/b)^(1/2)*b^2*e-144*arcsin(c*x)^2*sin(-(a+b*arcsin(c
*x))/b+a/b)*b^2*c^2*d-288*arcsin(c*x)*sin(-(a+b*arcsin(c*x))/b+a/b)*a*b*c^
2*d+216*arcsin(c*x)*cos(-(a+b*arcsin(c*x))/b+a/b)*b^2*c^2*d+12*arcsin(c*x)
^2*sin(-3*(a+b*arcsin(c*x))/b+3*a/b)*b^2*e-36*arcsin(c*x)^2*sin(-(a+b*arcs
in(c*x))/b+a/b)*b^2*e-144*sin(-(a+b*arcsin(c*x))/b+a/b)*a^2*c^2*d+216*cos(
-(a+b*arcsin(c*x))/b+a/b)*a*b*c^2*d+24*arcsin(c*x)*sin(-3*(a+b*arcsin(c*x)
)/b+3*a/b)*a*b*e-6*arcsin(c*x)*cos(-3*(a+b*arcsin(c*x))/b+3*a/b)*b^2*e-72*
arcsin(c*x)*sin(-(a+b*arcsin(c*x))/b+a/b)*a*b*e+54*arcsin(c*x)*cos(-(a+b*a
rcsin(c*x))/b+a/b)*b^2*e+12*sin(-3*(a+b*arcsin(c*x))/b+3*a/b)*a^2*e-6*c...
```

Fricas [F(-2)]

Exception generated.

$$\int (d+ex^2)\,(a+b\arcsin(cx))^{3/2}\,dx = \text{Exception raised: TypeError}$$

input

```
integrate((e*x^2+d)*(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int (d+ex^2)\,(a+b\arcsin(cx))^{3/2}\,dx = \int (a+b\operatorname{asin}(cx))^{\frac{3}{2}}\,(d+ex^2)\,dx$$

input
```
integrate((e*x**2+d)*(a+b*asin(c*x))**(3/2),x)
```

output
```
Integral((a + b*asin(c*x))**(3/2)*(d + e*x**2), x)
```

Maxima [F]

$$\int (d+ex^2)\,(a+b\arcsin(cx))^{3/2}\,dx = \int (ex^2+d)\,(b\arcsin(cx)+a)^{\frac{3}{2}}\,dx$$

input
```
integrate((e*x^2+d)*(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
integrate((e*x^2 + d)*(b*arcsin(c*x) + a)^(3/2), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 1.84 (sec) , antiderivative size = 3270, normalized size of antiderivative = 6.78

$$\int (d+ex^2)\,(a+b\arcsin(cx))^{3/2}\,dx = \text{Too large to display}$$

input
```
integrate((e*x^2+d)*(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output

```
1/96*(96*sqrt(2)*sqrt(pi)*a^2*b*c^2*d*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))) + 48*I*sqrt(2)*sqrt(pi)*a*
b^2*c^2*d*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)/(I*b^2/sqrt(abs(b)
) + b*sqrt(abs(b))) + 96*sqrt(2)*sqrt(pi)*a^2*b*c^2*d*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)*s
qrt(abs(b))/b)*e^(-I*a/b)/(-I*b^2/sqrt(abs(b)) + b*sqrt(abs(b))) - 48*I*sq
rt(2)*sqrt(pi)*a*b^2*c^2*d*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))) - 48*sqrt(2)*sqrt(pi)*a^2*c^2*d*erf(
-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*a
rcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/(I*b/sqrt(abs(b)) + sqrt(abs(b))
) - 48*I*sqrt(2)*sqrt(pi)*a*b*c^2*d*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/sqrt(abs(b)) + sqrt(abs(b))) + 36*sqrt(2)*sqrt(pi)*b^2*c^2*d*
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/sqrt(abs(b)) + sqrt(abs
(b))) - 48*sqrt(2)*sqrt(pi)*a^2*c^2*d*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...
```

Mupad [F(-1)]

Timed out.

$$\int (d+ex^2)\,(a+b\arcsin(cx))^{3/2}\,dx = \int (a+b\,\mathrm{asin}(c\,x))^{3/2}\,\left(e\,x^2+d\right)\,dx$$

input

```
int((a + b*asin(c*x))^(3/2)*(d + e*x^2),x)
```

output

```
int((a + b*asin(c*x))^(3/2)*(d + e*x^2), x)
```

Reduce [F]

$$\int \left(d+ex^2\right)\left(a+b\arcsin(cx)\right)^{3/2}dx = \left(\int \sqrt{asin\left(cx\right)b+a}dx\right)ad$$
$$+\left(\int \sqrt{asin\left(cx\right)b+a}\,asin(cx)\,x^2dx\right)be$$
$$+\left(\int \sqrt{asin\left(cx\right)b+a}\,asin(cx)\,dx\right)bd+\left(\int \sqrt{asin\left(cx\right)b+a}\,x^2dx\right)ae$$

input
```
int((e*x^2+d)*(a+b*asin(c*x))^(3/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a),x)*a*d + int(sqrt(asin(c*x)*b + a)*asin(c*x)*x**
2,x)*b*e + int(sqrt(asin(c*x)*b + a)*asin(c*x),x)*b*d + int(sqrt(asin(c*x)
*b + a)*x**2,x)*a*e
```

3.188 $\int (a + b \arcsin(cx))^{3/2}\, dx$

Optimal result . . . 1393
Mathematica [C] (verified) . . . 1394
Rubi [A] (verified) . . . 1394
Maple [B] (verified) . . . 1398
Fricas [F(-2)] . . . 1399
Sympy [F] . . . 1399
Maxima [F] . . . 1399
Giac [C] (verification not implemented) . . . 1400
Mupad [F(-1)] . . . 1401
Reduce [F] . . . 1401

Optimal result

Integrand size = 12, antiderivative size = 159

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \frac{3b\sqrt{1-c^2x^2}\sqrt{a + b\arcsin(cx)}}{2c} + x(a + b\arcsin(cx))^{3/2} - \frac{3b^{3/2}\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2c} - \frac{3b^{3/2}\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{2c}$$

output

```
3/2*b*(-c^2*x^2+1)^(1/2)*(a+b*arcsin(c*x))^(1/2)/c+x*(a+b*arcsin(c*x))^(3/
2)-3/4*b^(3/2)*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*ar
csin(c*x))^(1/2)/b^(1/2))/c-3/4*b^(3/2)*2^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/
Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.97 (sec) , antiderivative size = 289, normalized size of antiderivative = 1.82

$$\int (a + b\arcsin(cx))^{3/2}\,dx = \frac{abe^{-\frac{ia}{b}}\left(\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+e^{\frac{2ia}{b}}\sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{3}{2},\frac{i(a+b\arcsin(cx))}{b}\right)\right)}{2c\sqrt{a+b\arcsin(cx)}} + \frac{\sqrt{b}\left(2\sqrt{b}\sqrt{a+b\arcsin(cx)}\left(3\sqrt{1-c^2x^2}+2cx\arcsin(cx)\right)-\sqrt{2\pi}\,\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\left(3b\cos\left(\frac{a}{b}\right)+2a\sin\left(\frac{a}{b}\right)\right)\right.}{4c}$$

input
```
Integrate[(a + b*ArcSin[c*x])^(3/2),x]
```

output
```
(a*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]]) + (Sqrt[
b]*(2*Sqrt[b]*Sqrt[a + b*ArcSin[c*x]]*(3*Sqrt[1 - c^2*x^2] + 2*c*x*ArcSin[
c*x]) - Sqrt[2*Pi]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*
(3*b*Cos[a/b] + 2*a*Sin[a/b]) + Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b
*ArcSin[c*x]])/Sqrt[b]]*(2*a*Cos[a/b] - 3*b*Sin[a/b])))/(4*c)
```

Rubi [A] (verified)

Time = 0.82 (sec) , antiderivative size = 155, normalized size of antiderivative = 0.97, number of steps used = 12, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.917$, Rules used = {5130, 5182, 5134, 3042, 3787, 25, 3042, 3785, 3786, 3832, 3833}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (a + b\arcsin(cx))^{3/2}\,dx$$

$$\downarrow \text{5130}$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\int\frac{x\sqrt{a+b\arcsin(cx)}}{\sqrt{1-c^2x^2}}dx$$

$$\downarrow 5182$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{b\int\frac{1}{\sqrt{a+b\arcsin(cx)}}dx}{2c}-\frac{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{c^2}\right)$$

$$\downarrow 5134$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\int\frac{\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c^2}-\frac{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{c^2}\right)$$

$$\downarrow 3042$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\int\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c^2}-\frac{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}{c^2}\right)$$

$$\downarrow 3787$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\cos\left(\frac{a}{b}\right)\int\frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int-\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c^2}-\frac{\sqrt{1-c^2x^2}}{}\right.$$

$$\downarrow 25$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))+\cos\left(\frac{a}{b}\right)\int\frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c^2}-\frac{\sqrt{1-c^2x^2}\sqrt{}}{}\right.$$

$$\downarrow 3042$$

$$x(a+b\arcsin(cx))^{3/2}-\frac{3}{2}bc\left(\frac{\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))+\cos\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{2c^2}-\frac{\sqrt{1-c^2x}}{}\right.$$

$$\downarrow 3785$$

$$x(a+b\arcsin(cx))^{3/2} -$$

$$\frac{3}{2}bc\left(\frac{\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))+2\cos\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{2c^2} - \frac{\sqrt{1-c}}{}\right.$$

$$\downarrow 3786$$

$$x(a+b\arcsin(cx))^{3/2} -$$

$$\frac{3}{2}bc\left(\frac{2\sin\left(\frac{a}{b}\right)\int\sin\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}+2\cos\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{2c^2} - \frac{\sqrt{}}{}\right.$$

$$\downarrow 3832$$

$$x(a+b\arcsin(cx))^{3/2} -$$

$$\frac{3}{2}bc\left(\frac{2\cos\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}+\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2c^2} - \frac{\sqrt{1-}}{}\right.$$

$$\downarrow 3833$$

$$x(a+b\arcsin(cx))^{3/2} -$$

$$\frac{3}{2}bc\left(\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2c^2} - \frac{\sqrt{1-c^2x}}{}\right.$$

input

```
Int[(a + b*ArcSin[c*x])^(3/2),x]
```

output

```
x*(a + b*ArcSin[c*x])^(3/2) - (3*b*c*(-((Sqrt[1 - c^2*x^2]*Sqrt[a + b*ArcS
in[c*x]])/c^2) + (Sqrt[b]*Sqrt[2*Pi]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a
+ b*ArcSin[c*x]])/Sqrt[b]] + Sqrt[b]*Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[
a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(2*c^2)))/2
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3787
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Cos
[(d*e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/Sqrt[c + d*x], x], x] + Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 5130
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Simp[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 5134

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[1/(b*c)   Su
bst[Int[x^n*Cos[-a/b + x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b,
c, n}, x]
```

rule 5182

```
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] + Simp[b*(n/(2*c*(p + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x^2)^p]   I
nt[(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]
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 277 vs. $2(123) = 246$.

Time = 0.00 (sec) , antiderivative size = 278, normalized size of antiderivative = 1.75

method	result
default	$-\frac{3\sqrt{-\frac{1}{b}}\sqrt{\pi}\sqrt{2}\sqrt{a+b\arcsin(cx)}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}\,b}\right)b^2-3\sqrt{-\frac{1}{b}}\sqrt{\pi}\sqrt{2}\sqrt{a+b\arcsin(cx)}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\sqrt{}\right.$

input

```
int((a+b*arcsin(c*x))^(3/2),x,method=_RETURNVERBOSE)
```

output

```
-1/4/c*(3*(-1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*cos(a/b)*F
resnelC(2^(1/2)/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)*2^(1/2)*(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)*b^2+4*arcsin(c*x)^2*si
n(-(a+b*arcsin(c*x))/b+a/b)*b^2+8*arcsin(c*x)*sin(-(a+b*arcsin(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)/(a+b*arcsin(c*x))^(1/
2)
```

Fricas [F(-2)]

Exception generated.

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \int (a + b \operatorname{asin}(cx))^{\frac{3}{2}}\, dx$$

input
```
integrate((a+b*asin(c*x))**(3/2),x)
```

output
```
Integral((a + b*asin(c*x))**(3/2), x)
```

Maxima [F]

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \int (b \arcsin(cx) + a)^{\frac{3}{2}}\, dx$$

input
```
integrate((a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
integrate((b*arcsin(c*x) + a)^(3/2), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 1.01 (sec) , antiderivative size = 1157, normalized size of antiderivative = 7.28

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \text{Too large to display}$$

input
```
integrate((a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output
```
sqrt(2)*sqrt(pi)*a^2*b^2*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)/((I
*b^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c) + 1/2*I*sqrt(2)*sqrt(pi)*a*b^3*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^3/sqrt(abs(b)) + b^2*sqr
t(abs(b)))*c) + 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^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c) - 1/2*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) - 1/2*sqrt(2)*sqrt(pi)*a^2*b*erf(-1/2*I*sq
rt(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(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) + 3/8*sqrt(2)*sqrt(pi)*b^3*e
rf(-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*sqrt(2)*sqrt(pi)*a^2*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...
```

Mupad [F(-1)]

Timed out.

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \int (a + b\, \text{asin}(c\, x))^{3/2}\, dx$$

input
```
int((a + b*asin(c*x))^(3/2),x)
```

output
```
int((a + b*asin(c*x))^(3/2), x)
```

Reduce [F]

$$\int (a + b \arcsin(cx))^{3/2}\, dx = \left(\int \sqrt{asin\,(cx)\, b + a}\, dx \right) a + \left(\int \sqrt{asin\,(cx)\, b + a}\, asin(cx)\, dx \right) b$$

input
```
int((a+b*asin(c*x))^(3/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a),x)*a + int(sqrt(asin(c*x)*b + a)*asin(c*x),x)*b
```

3.189 $\int \frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}\,dx$

Optimal result . . . 1402
Mathematica [N/A] . . . 1402
Rubi [N/A] . . . 1403
Maple [N/A] . . . 1403
Fricas [F(-2)] . . . 1404
Sympy [N/A] . . . 1404
Maxima [F(-2)] . . . 1404
Giac [N/A] . . . 1405
Mupad [N/A] . . . 1405
Reduce [N/A] . . . 1405

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}\,dx = \text{Int}\left(\frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}, x\right)$$

output
```
Defer(Int)((a+b*arcsin(c*x))^(3/2)/(e*x^2+d),x)
```

Mathematica [N/A]

Not integrable

Time = 0.49 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}\,dx = \int \frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}\,dx$$

input
```
Integrate[(a + b*ArcSin[c*x])^(3/2)/(d + e*x^2),x]
```

output
```
Integrate[(a + b*ArcSin[c*x])^(3/2)/(d + e*x^2), x]
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a + b \arcsin(cx))^{3/2}}{d + ex^2}\, dx$$
$$\downarrow 5174$$
$$\int \frac{(a + b \arcsin(cx))^{3/2}}{d + ex^2} dx$$

input
```
Int[(a + b*ArcSin[c*x])^(3/2)/(d + e*x^2),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{(a + b \arcsin(cx))^{\frac{3}{2}}}{e\, x^2 + d} dx$$

input
```
int((a+b*arcsin(c*x))^(3/2)/(e*x^2+d),x)
```

output
```
int((a+b*arcsin(c*x))^(3/2)/(e*x^2+d),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^(3/2)/(e*x^2+d),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 10.32 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}\,dx = \int \frac{(a+b\operatorname{asin}(cx))^{\frac{3}{2}}}{d+ex^2}\,dx$$

input
```
integrate((a+b*asin(c*x))**(3/2)/(e*x**2+d),x)
```

output
```
Integral((a + b*asin(c*x))**(3/2)/(d + e*x**2), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((a+b*arcsin(c*x))^(3/2)/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: sign: argument cannot be imagi
nary; found %i
```

Giac [N/A]

Not integrable

Time = 0.96 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}\,dx = \int \frac{(b\arcsin(cx)+a)^{\frac{3}{2}}}{ex^2+d}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(3/2)/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*arcsin(c*x) + a)^(3/2)/(e*x^2 + d), x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}\,dx = \int \frac{(a+b\,\mathrm{asin}(c\,x))^{3/2}}{e\,x^2+d}\,dx$$

input
```
int((a + b*asin(c*x))^(3/2)/(d + e*x^2),x)
```

output
```
int((a + b*asin(c*x))^(3/2)/(d + e*x^2), x)
```

Reduce [N/A]

Not integrable

Time = 200.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{d+ex^2}\,dx = \int \frac{(asin(cx)\,b+a)^{\frac{3}{2}}}{e\,x^2+d}dx$$

input
```
int((a+b*asin(c*x))^(3/2)/(e*x^2+d),x)
```

output

```
int((a+b*asin(c*x))^(3/2)/(e*x^2+d),x)
```

3.190 $\int \frac{(a+b\arcsin(cx))^{3/2}}{\left(d+ex^2\right)^2}\,dx$

Optimal result 1407
Mathematica [N/A] 1407
Rubi [N/A] 1408
Maple [N/A] 1408
Fricas [F(-2)] 1409
Sympy [N/A] 1409
Maxima [N/A] 1409
Giac [N/A] 1410
Mupad [N/A] 1410
Reduce [N/A] 1411

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{\left(d+ex^2\right)^2}\,dx = \text{Int}\left(\frac{(a+b\arcsin(cx))^{3/2}}{\left(d+ex^2\right)^2}, x\right)$$

output

```
Defer(Int)((a+b*arcsin(c*x))^(3/2)/(e*x^2+d)^2,x)
```

Mathematica [N/A]

Not integrable

Time = 9.39 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{\left(d+ex^2\right)^2}\,dx = \int \frac{(a+b\arcsin(cx))^{3/2}}{\left(d+ex^2\right)^2}\,dx$$

input

```
Integrate[(a + b*ArcSin[c*x])^(3/2)/(d + e*x^2)^2,x]
```

output

```
Integrate[(a + b*ArcSin[c*x])^(3/2)/(d + e*x^2)^2, x]
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a + b \arcsin(cx))^{3/2}}{(d + ex^2)^2} dx$$
$$\downarrow 5174$$
$$\int \frac{(a + b \arcsin(cx))^{3/2}}{(d + ex^2)^2} dx$$

input
```
Int[(a + b*ArcSin[c*x])^(3/2)/(d + e*x^2)^2,x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.62 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{(a + b \arcsin(cx))^{\frac{3}{2}}}{(e x^2 + d)^2} dx$$

input
```
int((a+b*arcsin(c*x))^(3/2)/(e*x^2+d)^2,x)
```

output
```
int((a+b*arcsin(c*x))^(3/2)/(e*x^2+d)^2,x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d+ex^2)^2}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*arcsin(c*x))^(3/2)/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 87.32 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d+ex^2)^2}\,dx = \int \frac{(a+b\operatorname{asin}(cx))^{\frac{3}{2}}}{(d+ex^2)^2}\,dx$$

input
```
integrate((a+b*asin(c*x))**(3/2)/(e*x**2+d)**2,x)
```

output
```
Integral((a + b*asin(c*x))**(3/2)/(d + e*x**2)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.56 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d+ex^2)^2}\,dx = \int \frac{(b\arcsin(cx)+a)^{\frac{3}{2}}}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(3/2)/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
integrate((b*arcsin(c*x) + a)^(3/2)/(e*x^2 + d)^2, x)
```

Giac [N/A]

Not integrable

Time = 1.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d+ex^2)^2}\,dx = \int \frac{(b\arcsin(cx)+a)^{\frac{3}{2}}}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*arcsin(c*x))^(3/2)/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*arcsin(c*x) + a)^(3/2)/(e*x^2 + d)^2, x)
```

Mupad [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d+ex^2)^2}\,dx = \int \frac{(a+b\,\mathrm{asin}(c\,x))^{3/2}}{(e\,x^2+d)^2}\,dx$$

input
```
int((a + b*asin(c*x))^(3/2)/(d + e*x^2)^2,x)
```

output
```
int((a + b*asin(c*x))^(3/2)/(d + e*x^2)^2, x)
```

Reduce [N/A]

Not integrable

Time = 200.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{(a+b\arcsin(cx))^{3/2}}{(d+ex^2)^2}\,dx = \int \frac{(asin(cx)\,b+a)^{\frac{3}{2}}}{(e\,x^2+d)^2}dx$$

input
```
int((a+b*asin(c*x))^(3/2)/(e*x^2+d)^2,x)
```

output
```
int((a+b*asin(c*x))^(3/2)/(e*x^2+d)^2,x)
```

3.191 $\int \frac{\left(d+ex^2\right)^2}{\sqrt{a+b\arcsin(cx)}}\,dx$

Optimal result 1412
Mathematica [C] (verified) 1413
Rubi [A] (verified) 1414
Maple [A] (verified) 1416
Fricas [F(-2)] 1417
Sympy [F] 1418
Maxima [F] 1418
Giac [C] (verification not implemented) 1418
Mupad [F(-1)] 1419
Reduce [F] 1420

Optimal result

Integrand size = 22, antiderivative size = 679

$$\int \frac{\left(d+ex^2\right)^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \text{Too large to display}$$

output

```
1/2*d*e*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*
x))^(1/2)/b^(1/2))/b^(1/2)/c^3+1/8*e^2*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelC(
2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(1/2)/c^5+d^2*2^(1/2)*
Pi^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2
))/b^(1/2)/c-1/6*d*e*6^(1/2)*Pi^(1/2)*cos(3*a/b)*FresnelC(6^(1/2)/Pi^(1/2)
*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(1/2)/c^3-1/16*e^2*6^(1/2)*Pi^(1/2)*co
s(3*a/b)*FresnelC(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(1/2
)/c^5+1/80*e^2*10^(1/2)*Pi^(1/2)*cos(5*a/b)*FresnelC(10^(1/2)/Pi^(1/2)*(a+
b*arcsin(c*x))^(1/2)/b^(1/2))/b^(1/2)/c^5+1/2*d*e*2^(1/2)*Pi^(1/2)*Fresnel
S(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/b^(1/2)/c^3+1
/8*e^2*2^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/
b^(1/2))*sin(a/b)/b^(1/2)/c^5+d^2*2^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/
2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/b^(1/2)/c-1/6*d*e*6^(1/2)*Pi^
(1/2)*FresnelS(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(3*a/b
)/b^(1/2)/c^3-1/16*e^2*6^(1/2)*Pi^(1/2)*FresnelS(6^(1/2)/Pi^(1/2)*(a+b*arc
sin(c*x))^(1/2)/b^(1/2))*sin(3*a/b)/b^(1/2)/c^5+1/80*e^2*10^(1/2)*Pi^(1/2)
*FresnelS(10^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(5*a/b)/b^
(1/2)/c^5
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.95 (sec) , antiderivative size = 401, normalized size of antiderivative = 0.59

$$\int \frac{(d+ex^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx$$

$$= \frac{ie^{-\frac{5ia}{b}}\left(-30(8c^4d^2+4c^2de+e^2)\,e^{\frac{4ia}{b}}\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+30(8c^4d^2+4c^2de+e^2)\,e^{6}\right.}{}$$

input

```
Integrate[(d + e*x^2)^2/Sqrt[a + b*ArcSin[c*x]],x]
```

output

```
((I/480)*(-30*(8*c^4*d^2 + 4*c^2*d*e + e^2)*E^(((4*I)*a)/b)*Sqrt[((-I)*(a
+ b*ArcSin[c*x]))/b]*Gamma[1/2, ((-I)*(a + b*ArcSin[c*x]))/b] + 30*(8*c^4*
d^2 + 4*c^2*d*e + e^2)*E^(((6*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gam
ma[1/2, (I*(a + b*ArcSin[c*x]))/b] + e*(5*Sqrt[3]*(8*c^2*d + 3*e)*E^(((2*I
)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-3*I)*(a + b*ArcSi
n[c*x]))/b] - 5*Sqrt[3]*(8*c^2*d + 3*e)*E^(((8*I)*a)/b)*Sqrt[(I*(a + b*Arc
Sin[c*x]))/b]*Gamma[1/2, ((3*I)*(a + b*ArcSin[c*x]))/b] - 3*Sqrt[5]*e*(Sqr
t[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-5*I)*(a + b*ArcSin[c*x]))/b]
 - E^(((10*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((5*I)*(a +
 b*ArcSin[c*x]))/b])))/(c^5*E^(((5*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Rubi [A] (verified)

Time = 1.68 (sec) , antiderivative size = 679, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d+ex^2\right)^2}{\sqrt{a+b\arcsin(cx)}}\,dx$$

$$\downarrow 5172$$

$$\int \left(\frac{d^2}{\sqrt{a+b\arcsin(cx)}}+\frac{2dex^2}{\sqrt{a+b\arcsin(cx)}}+\frac{e^2x^4}{\sqrt{a+b\arcsin(cx)}}\right)dx$$

$$\downarrow 2009$$

$$\frac{\sqrt{\frac{\pi}{2}}e^2\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{4\sqrt{b}c^5}-\frac{\sqrt{\frac{3\pi}{2}}e^2\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{8\sqrt{b}c^5}+$$
$$\frac{\sqrt{\frac{\pi}{10}}e^2\cos\left(\frac{5a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{8\sqrt{b}c^5}+$$
$$\frac{\sqrt{\frac{\pi}{2}}e^2\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{4\sqrt{b}c^5}-\frac{\sqrt{\frac{3\pi}{2}}e^2\sin\left(\frac{3a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{8\sqrt{b}c^5}+$$
$$\frac{\sqrt{\frac{\pi}{10}}e^2\sin\left(\frac{5a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{10}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{8\sqrt{b}c^5}+$$
$$\frac{\sqrt{\frac{\pi}{2}}de\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c^3}-\frac{\sqrt{\frac{\pi}{6}}de\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c^3}+$$
$$\frac{\sqrt{\frac{\pi}{2}}de\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c^3}-\frac{\sqrt{\frac{\pi}{6}}de\sin\left(\frac{3a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c^3}+$$
$$\frac{\sqrt{2\pi}d^2\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c}+\frac{\sqrt{2\pi}d^2\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c}$$

input
```
Int[(d + e*x^2)^2/Sqrt[a + b*ArcSin[c*x]],x]
```

output

```
(d*e*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqr
t[b]])/(Sqrt[b]*c^3) + (e^2*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[
a + b*ArcSin[c*x]])/Sqrt[b]])/(4*Sqrt[b]*c^5) + (d^2*Sqrt[2*Pi]*Cos[a/b]*F
resnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(Sqrt[b]*c) - (d*e*
Sqrt[Pi/6]*Cos[(3*a)/b]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt
[b]])/(Sqrt[b]*c^3) - (e^2*Sqrt[(3*Pi)/2]*Cos[(3*a)/b]*FresnelC[(Sqrt[6/Pi
]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(8*Sqrt[b]*c^5) + (e^2*Sqrt[Pi/10]*Co
s[(5*a)/b]*FresnelC[(Sqrt[10/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(8*Sqr
t[b]*c^5) + (d*e*Sqrt[Pi/2]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/
Sqrt[b]]*Sin[a/b])/(Sqrt[b]*c^3) + (e^2*Sqrt[Pi/2]*FresnelS[(Sqrt[2/Pi]*Sq
rt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(4*Sqrt[b]*c^5) + (d^2*Sqrt[2*Pi
]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(Sqrt[b
]*c) - (d*e*Sqrt[Pi/6]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[
b]]*Sin[(3*a)/b])/(Sqrt[b]*c^3) - (e^2*Sqrt[(3*Pi)/2]*FresnelS[(Sqrt[6/Pi]
*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(8*Sqrt[b]*c^5) + (e^2*Sq
rt[Pi/10]*FresnelS[(Sqrt[10/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(5*a
)/b])/(8*Sqrt[b]*c^5)
```

Defintions of rubi rules used

rule 2009

```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [A] (verified)

Time = 0.47 (sec) , antiderivative size = 664, normalized size of antiderivative = 0.98

method	result
default	$\frac{\sqrt{2}\sqrt{\pi}\sqrt{-\frac{5}{b}}\left(-48\sqrt{-\frac{1}{b}}\sqrt{-\frac{5}{b}}\cos\left(\frac{a}{b}\right)\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}b}}\right)bc^4d^2+48\sqrt{-\frac{1}{b}}\sqrt{-\frac{5}{b}}\sin\left(\frac{a}{b}\right)\mathrm{FresnelS}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}b}}\right.\right.$

input

```
int((e*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output
```
1/240/c^5*2^(1/2)*Pi^(1/2)*(-5/b)^(1/2)*(-48*(-1/b)^(1/2)*(-5/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)*b*
c^4*d^2+48*(-1/b)^(1/2)*(-5/b)^(1/2)*sin(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(-
1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b*c^4*d^2+8*(-3/b)^(1/2)*(-5/b)^(1/2
)*cos(3*a/b)*FresnelC(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1
/2)/b)*b*c^2*d*e-8*(-3/b)^(1/2)*(-5/b)^(1/2)*sin(3*a/b)*FresnelS(3*2^(1/2)
/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b*c^2*d*e-24*(-1/b)^(1/2
)*(-5/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)*b*c^2*d*e+24*(-1/b)^(1/2)*(-5/b)^(1/2)*sin(a/b)*FresnelS(2
^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b*c^2*d*e+3*(-3/b)
^(1/2)*(-5/b)^(1/2)*cos(3*a/b)*FresnelC(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a
+b*arcsin(c*x))^(1/2)/b)*b*e^2-3*(-3/b)^(1/2)*(-5/b)^(1/2)*sin(3*a/b)*Fres
nelS(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b*e^2-6*(-
1/b)^(1/2)*(-5/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)*b*e^2+6*(-1/b)^(1/2)*(-5/b)^(1/2)*sin(a/b)*Fresne
lS(2^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b*e^2+3*cos(5*
a/b)*FresnelC(5*2^(1/2)/Pi^(1/2)/(-5/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*e
^2-3*sin(5*a/b)*FresnelS(5*2^(1/2)/Pi^(1/2)/(-5/b)^(1/2)*(a+b*arcsin(c*x))
^(1/2)/b)*e^2)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{\left(d+ex^2\right)^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((e*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{(d+ex^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{(d+ex^2)^2}{\sqrt{a+b\,\mathrm{asin}\,(cx)}}\,dx$$

input
```
integrate((e*x**2+d)**2/(a+b*asin(c*x))**(1/2),x)
```

output
```
Integral((d + e*x**2)**2/sqrt(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \frac{(d+ex^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{(ex^2+d)^2}{\sqrt{b\arcsin\,(cx)+a}}\,dx$$

input
```
integrate((e*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
integrate((e*x^2 + d)^2/sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.67 (sec) , antiderivative size = 981, normalized size of antiderivative = 1.44

$$\int \frac{(d+ex^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \text{Too large to display}$$

input
```
integrate((e*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output

```
-sqrt(pi)*d^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)/(c*(I*sqrt(2)*
b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b)))) - sqrt(pi)*d^2*erf(1/2*I*sqrt(2)*s
qrt(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*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(ab
s(b)))) + 1/2*sqrt(pi)*d*e*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)/((sq
rt(6)*sqrt(b) + I*sqrt(6)*b^(3/2)/abs(b))*c^3) - 1/2*sqrt(pi)*d*e*erf(-1/2
*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsi
n(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/(c^3*(I*sqrt(2)*b/sqrt(abs(b)) + sqr
t(2)*sqrt(abs(b)))) - 1/2*sqrt(pi)*d*e*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^3*(-I*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b)))) + 1/2*
sqrt(pi)*d*e*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) - 1/16*sqrt(pi)*e^2*erf(-1/2*sqrt(10)*sq
rt(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I*sqrt(10)*sqrt(b*arcsin(c*x) + a)*sqr
t(b)/abs(b))*e^(5*I*a/b)/((sqrt(10)*sqrt(b) + I*sqrt(10)*b^(3/2)/abs(b))*c
^5) + 3/16*sqrt(pi)*e^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)/((sq...
```

Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{(e\,x^2+d)^2}{\sqrt{a+b\,\mathrm{asin}\,(c\,x)}}\,dx$$

input

```
int((d + e*x^2)^2/(a + b*asin(c*x))^(1/2),x)
```

output

```
int((d + e*x^2)^2/(a + b*asin(c*x))^(1/2), x)
```

Reduce [F]

$$\int \frac{(d+ex^2)^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \left(\int \frac{\sqrt{asin\,(cx)\,b+a}}{asin\,(cx)\,b+a}dx\right)d^2 + \left(\int \frac{\sqrt{asin\,(cx)\,b+a}\,x^4}{asin\,(cx)\,b+a}dx\right)e^2 + 2\left(\int \frac{\sqrt{asin\,(cx)\,b+a}\,x^2}{asin\,(cx)\,b+a}dx\right)de$$

input
```
int((e*x^2+d)^2/(a+b*asin(c*x))^(1/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a)/(asin(c*x)*b + a),x)*d**2 + int((sqrt(asin(c*x)*
b + a)*x**4)/(asin(c*x)*b + a),x)*e**2 + 2*int((sqrt(asin(c*x)*b + a)*x**2
)/(asin(c*x)*b + a),x)*d*e
```

3.192 $\int \frac{d+ex^2}{\sqrt{a+b\arcsin(cx)}}\,dx$

Optimal result . . . 1421
Mathematica [C] (verified) . . . 1422
Rubi [A] (verified) . . . 1423
Maple [A] (verified) . . . 1424
Fricas [F(-2)] . . . 1425
Sympy [F] . . . 1425
Maxima [F] . . . 1425
Giac [C] (verification not implemented) . . . 1426
Mupad [F(-1)] . . . 1426
Reduce [F] . . . 1427

Optimal result

Integrand size = 20, antiderivative size = 329

$$\begin{aligned}\int \frac{d+ex^2}{\sqrt{a+b\arcsin(cx)}}\,dx = &\frac{e\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}\\ &+\frac{d\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c}\\ &-\frac{e\sqrt{\frac{\pi}{6}}\cos\left(\frac{3a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}\\ &+\frac{e\sqrt{\frac{\pi}{2}}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{2\sqrt{b}c^3}\\ &+\frac{d\sqrt{2\pi}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{\sqrt{b}c}\\ &-\frac{e\sqrt{\frac{\pi}{6}}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{3a}{b}\right)}{2\sqrt{b}c^3}\end{aligned}$$

output

```
1/4*e*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x)
)^(1/2)/b^(1/2))/b^(1/2)/c^3+d*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelC(2^(1/2)/
Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(1/2)/c-1/12*e*6^(1/2)*Pi^(1/2
)*cos(3*a/b)*FresnelC(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^
(1/2)/c^3+1/4*e*2^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x
))^(1/2)/b^(1/2))*sin(a/b)/b^(1/2)/c^3+d*2^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)
/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/b^(1/2)/c-1/12*e*6^(1/
2)*Pi^(1/2)*FresnelS(6^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin
(3*a/b)/b^(1/2)/c^3
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.33 (sec) , antiderivative size = 246, normalized size of antiderivative = 0.75

$$\int \frac{d+ex^2}{\sqrt{a+b\arcsin(cx)}}\,dx = -\frac{ie^{-\frac{3ia}{b}}\left(3(4c^2d+e)\,e^{\frac{2ia}{b}}\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)-3(4c^2d+e)\,e^{\frac{4ia}{b}}\sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},\right.\right.}{24c^3\sqrt{}}$$

input

```
Integrate[(d + e*x^2)/Sqrt[a + b*ArcSin[c*x]],x]
```

output

```
((-1/24*I)*(3*(4*c^2*d + e)*E^(((2*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x])
)/b]*Gamma[1/2, ((-I)*(a + b*ArcSin[c*x]))/b] - 3*(4*c^2*d + e)*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]*e*(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*Ar
cSin[c*x]])
```

Rubi [A] (verified)

Time = 0.88 (sec) , antiderivative size = 329, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{d+ex^2}{\sqrt{a+b\arcsin(cx)}}\,dx$$

$$\downarrow 5172$$

$$\int \left(\frac{d}{\sqrt{a+b\arcsin(cx)}}+\frac{ex^2}{\sqrt{a+b\arcsin(cx)}}\right)dx$$

$$\downarrow 2009$$

$$\frac{\sqrt{\frac{\pi}{2}}e\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}-\frac{\sqrt{\frac{\pi}{6}}e\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}+$$
$$\frac{\sqrt{\frac{\pi}{2}}e\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}-\frac{\sqrt{\frac{\pi}{6}}e\sin\left(\frac{3a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}+$$
$$\frac{\sqrt{2\pi}d\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c}+\frac{\sqrt{2\pi}d\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c}$$

input

```
Int[(d + e*x^2)/Sqrt[a + b*ArcSin[c*x]],x]
```

output

```
(e*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[
b]])/(2*Sqrt[b]*c^3) + (d*Sqrt[2*Pi]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a
+ b*ArcSin[c*x]])/Sqrt[b]])/(Sqrt[b]*c) - (e*Sqrt[Pi/6]*Cos[(3*a)/b]*Fresn
elC[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(2*Sqrt[b]*c^3) + (e*Sq
rt[Pi/2]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/
(2*Sqrt[b]*c^3) + (d*Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x
]])/Sqrt[b]]*Sin[a/b])/(Sqrt[b]*c) - (e*Sqrt[Pi/6]*FresnelS[(Sqrt[6/Pi]*Sq
rt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(2*Sqrt[b]*c^3)
```

Defintions of rubi rules used

rule 2009

```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [A] (verified)

Time = 0.25 (sec) , antiderivative size = 310, normalized size of antiderivative = 0.94

method	result
default	$-\frac{\sqrt{\pi}\sqrt{2}\sqrt{-\frac{3}{b}}\left(4\sqrt{-\frac{1}{b}}\sqrt{-\frac{3}{b}}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}b}}\right)bc^2d-4\sqrt{-\frac{1}{b}}\sqrt{-\frac{3}{b}}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}b}}\right)$

input

```
int((e*x^2+d)/(a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output

```
-1/12/c^3*Pi^(1/2)*2^(1/2)*(-3/b)^(1/2)*(4*(-1/b)^(1/2)*(-3/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)*b*c^
2*d-4*(-1/b)^(1/2)*(-3/b)^(1/2)*sin(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(-1/b)^
(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b*c^2*d+(-1/b)^(1/2)*(-3/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)*b*e-(-
1/b)^(1/2)*(-3/b)^(1/2)*sin(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a
+b*arcsin(c*x))^(1/2)/b)*b*e+cos(3*a/b)*FresnelC(3*2^(1/2)/Pi^(1/2)/(-3/b)
^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*e-sin(3*a/b)*FresnelS(3*2^(1/2)/Pi^(1/2)
/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*e)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{d+ex^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((e*x^2+d)/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{d+ex^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{d+ex^2}{\sqrt{a+b\operatorname{asin}(cx)}}\,dx$$

input
```
integrate((e*x**2+d)/(a+b*asin(c*x))**(1/2),x)
```

output
```
Integral((d + e*x**2)/sqrt(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \frac{d+ex^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{ex^2+d}{\sqrt{b\arcsin(cx)+a}}\,dx$$

input
```
integrate((e*x^2+d)/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
integrate((e*x^2 + d)/sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.50 (sec) , antiderivative size = 481, normalized size of antiderivative = 1.46

$$\int \frac{d+ex^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \text{Too large to display}$$

input
```
integrate((e*x^2+d)/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output
```
-sqrt(pi)*d*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*sqrt(2)*b/
sqrt(abs(b)) + sqrt(2)*sqrt(abs(b)))) - sqrt(pi)*d*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*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b)
))) + 1/4*sqrt(pi)*e*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)*e*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^3*(I*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqr
t(abs(b)))) - 1/4*sqrt(pi)*e*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqr
t(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)*e
*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)*sqrt(b) - I*sqrt(6)
*b^(3/2)/abs(b))*c^3)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{d+ex^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{e\,x^2+d}{\sqrt{a+b\,\mathrm{asin}\,(c\,x)}}\,dx$$

input
```
int((d + e*x^2)/(a + b*asin(c*x))^(1/2),x)
```

output
```
int((d + e*x^2)/(a + b*asin(c*x))^(1/2), x)
```

Reduce [F]

$$\int \frac{d+ex^2}{\sqrt{a+b\arcsin(cx)}}\,dx = \left(\int \frac{\sqrt{asin\,(cx)\,b+a}}{asin\,(cx)\,b+a}dx\right)d + \left(\int \frac{\sqrt{asin\,(cx)\,b+a}\,x^2}{asin\,(cx)\,b+a}dx\right)e$$

input
```
int((e*x^2+d)/(a+b*asin(c*x))^(1/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a)/(asin(c*x)*b + a),x)*d + int((sqrt(asin(c*x)*b +
 a)*x**2)/(asin(c*x)*b + a),x)*e
```

3.193 $\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx$

Optimal result . . . 1428
Mathematica [C] (verified) . . . 1428
Rubi [A] (verified) . . . 1429
Maple [A] (verified) . . . 1432
Fricas [F(-2)] . . . 1432
Sympy [F] . . . 1433
Maxima [F] . . . 1433
Giac [C] (verification not implemented) . . . 1433
Mupad [F(-1)] . . . 1434
Reduce [F] . . . 1434

Optimal result

Integrand size = 12, antiderivative size = 101

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \frac{\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c} + \frac{\sqrt{2\pi}\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{\sqrt{b}c}$$

output

```
2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2
)/b^(1/2))/b^(1/2)/c+2^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsi
n(c*x))^(1/2)/b^(1/2))*sin(a/b)/b^(1/2)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.02 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.20

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \frac{ie^{-\frac{ia}{b}}\left(-\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+e^{\frac{2ia}{b}}\sqrt{\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},\frac{i(a+b\arcsin(cx))}{b}\right)\right)}{2c\sqrt{a+b\arcsin(cx)}}$$

input
```
Integrate[1/Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
((I/2)*(-(Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-I)*(a + b*ArcSi
n[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]])
```

Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 102, normalized size of antiderivative = 1.01, number of steps used = 10, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.750$, Rules used = {5134, 3042, 3787, 25, 3042, 3785, 3786, 3832, 3833}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx$$
$$\downarrow 5134$$
$$\frac{\int \frac{\cos\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}\,d(a+b\arcsin(cx))}{bc}$$
$$\downarrow 3042$$
$$\frac{\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}\,d(a+b\arcsin(cx))}{bc}$$
$$\downarrow 3787$$

$$\frac{\cos\left(\frac{a}{b}\right)\int\frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int-\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 25$$

$$\frac{\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))+\cos\left(\frac{a}{b}\right)\int\frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 3042$$

$$\frac{\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))+\cos\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{bc}$$

$$\downarrow 3785$$

$$\frac{\sin\left(\frac{a}{b}\right)\int\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))+2\cos\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{bc}$$

$$\downarrow 3786$$

$$\frac{2\sin\left(\frac{a}{b}\right)\int\sin\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}+2\cos\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}}{bc}$$

$$\downarrow 3832$$

$$\frac{2\cos\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}+\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{bc}$$

$$\downarrow 3833$$

$$\frac{\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)+\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{bc}$$

input

```
Int[1/Sqrt[a + b*ArcSin[c*x]],x]
```

output
```
(Sqrt[b]*Sqrt[2*Pi]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])
/Sqrt[b]] + Sqrt[b]*Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]
])/Sqrt[b]]*Sin[a/b])/(b*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3787
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Cos
[(d*e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/Sqrt[c + d*x], x], x] + Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 5134

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[1/(b*c)   Su
bst[Int[x^n*Cos[-a/b + x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b,
c, n}, x]
```

Maple [A] (verified)

Time = 0.00 (sec) , antiderivative size = 90, normalized size of antiderivative = 0.89

method	result	size
default	$\frac{\sqrt{2}\sqrt{\pi}\sqrt{-\frac{1}{b}}\left(\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}b}\right)-\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}b}\right)\right)}{c}$	90

input

```
int(1/(a+b*arcsin(c*x))^(1/2),x,method=_RETURNVERBOSE)
```

output

```
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
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \text{Exception raised: TypeError}$$

input

```
integrate(1/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\sqrt{a+b\operatorname{asin}(cx)}}\,dx$$

input
```
integrate(1/(a+b*asin(c*x))**(1/2),x)
```

output
```
Integral(1/sqrt(a + b*asin(c*x)), x)
```

Maxima [F]

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\sqrt{b\arcsin(cx)+a}}\,dx$$

input
```
integrate(1/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
integrate(1/sqrt(b*arcsin(c*x) + a), x)
```

Giac [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.19 (sec) , antiderivative size = 159, normalized size of antiderivative = 1.57

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = -\frac{\sqrt{\pi}\operatorname{erf}\left(-\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}} - \frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(\frac{ia}{b}\right)}}{c\left(\frac{i\sqrt{2}b}{\sqrt{|b|}}+\sqrt{2}\sqrt{|b|}\right)} - \frac{\sqrt{\pi}\operatorname{erf}\left(\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}} - \frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(-\frac{ia}{b}\right)}}{c\left(-\frac{i\sqrt{2}b}{\sqrt{|b|}}+\sqrt{2}\sqrt{|b|}\right)}$$

input
```
integrate(1/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output
```
-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*(I*sqrt(2)*b/sq
rt(abs(b)) + sqrt(2)*sqrt(abs(b)))) - sqrt(pi)*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)/(c*(-I*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b))))
```

Mupad [F(-1)]

Timed out.

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\sqrt{a+b\,\mathrm{asin}\,(c\,x)}}\,dx$$

input
```
int(1/(a + b*asin(c*x))^(1/2),x)
```

output
```
int(1/(a + b*asin(c*x))^(1/2), x)
```

Reduce [F]

$$\int \frac{1}{\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{\sqrt{asin\,(cx)\,b+a}}{asin\,(cx)\,b+a}dx$$

input
```
int(1/(a+b*asin(c*x))^(1/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a)/(asin(c*x)*b + a),x)
```

3.194 $\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx$

Optimal result . . . 1435
Mathematica [N/A] . . . 1435
Rubi [N/A] . . . 1436
Maple [N/A] . . . 1436
Fricas [F(-2)] . . . 1437
Sympy [N/A] . . . 1437
Maxima [F(-2)] . . . 1437
Giac [N/A] . . . 1438
Mupad [N/A] . . . 1438
Reduce [N/A] . . . 1439

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx = \text{Int}\left(\frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}},x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)/(a+b*arcsin(c*x))^(1/2),x)
```

Mathematica [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx$$

input
```
Integrate[1/((d + e*x^2)*Sqrt[a + b*ArcSin[c*x]]),x]
```

output
```
Integrate[1/((d + e*x^2)*Sqrt[a + b*ArcSin[c*x]]), x]
```

Rubi [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}dx$$

input
```
Int[1/((d + e*x^2)*Sqrt[a + b*ArcSin[c*x]]),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(e\,x^2+d)\sqrt{a+b\arcsin(cx)}}dx$$

input
```
int(1/(e*x^2+d)/(a+b*arcsin(c*x))^(1/2),x)
```

output
```
int(1/(e*x^2+d)/(a+b*arcsin(c*x))^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(e*x^2+d)/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 2.17 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\sqrt{a+b\operatorname{asin}(cx)}\,(d+ex^2)}\,dx$$

input
```
integrate(1/(e*x**2+d)/(a+b*asin(c*x))**(1/2),x)
```

output
```
Integral(1/(sqrt(a + b*asin(c*x))*(d + e*x**2)), x)
```

Maxima [F(-2)]

Exception generated.

$$\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(1/(e*x^2+d)/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

Giac [N/A]

Not integrable

Time = 0.53 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{(ex^2+d)\sqrt{b\arcsin(cx)+a}}\,dx$$

input
```
integrate(1/(e*x^2+d)/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)*sqrt(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\sqrt{a+b\,\mathrm{asin}\,(c\,x)}\,(e\,x^2+d)}\,dx$$

input
```
int(1/((a + b*asin(c*x))^(1/2)*(d + e*x^2)),x)
```

output
```
int(1/((a + b*asin(c*x))^(1/2)*(d + e*x^2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.86

$$\int \frac{1}{(d+ex^2)\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{\sqrt{asin\,(cx)\,b+a}}{asin\,(cx)\,bd+asin\,(cx)\,be\,x^2+ad+ae\,x^2}dx$$

input
```
int(1/(e*x^2+d)/(a+b*asin(c*x))^(1/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a)/(asin(c*x)*b*d + asin(c*x)*b*e*x**2 + a*d + a*e*
x**2),x)
```

3.195 $\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx$

Optimal result 1440
Mathematica [N/A] 1440
Rubi [N/A] 1441
Maple [N/A] 1441
Fricas [F(-2)] 1442
Sympy [N/A] 1442
Maxima [N/A] 1442
Giac [N/A] 1443
Mupad [N/A] 1443
Reduce [N/A] 1444

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx = \text{Int}\left(\frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}},x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x)
```

Mathematica [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx$$

input
```
Integrate[1/((d + e*x^2)^2*Sqrt[a + b*ArcSin[c*x]]),x]
```

output
```
Integrate[1/((d + e*x^2)^2*Sqrt[a + b*ArcSin[c*x]]), x]
```

Rubi [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}dx$$

input
```
Int[1/((d + e*x^2)^2*Sqrt[a + b*ArcSin[c*x]]),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.56 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(e\,x^2+d)^2\sqrt{a+b\arcsin(cx)}}dx$$

input
```
int(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x)
```

output
```
int(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 38.41 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\sqrt{a+b\operatorname{asin}(cx)}\,(d+ex^2)^2}\,dx$$

input
```
integrate(1/(e*x**2+d)**2/(a+b*asin(c*x))**(1/2),x)
```

output
```
Integral(1/(sqrt(a + b*asin(c*x))*(d + e*x**2)**2), x)
```

Maxima [N/A]

Not integrable

Time = 0.48 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{(ex^2+d)^2\sqrt{b\arcsin(cx)+a}}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

output
```
integrate(1/((e*x^2 + d)^2*sqrt(b*arcsin(c*x) + a)), x)
```

Giac [N/A]

Not integrable

Time = 0.76 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{(ex^2+d)^2\sqrt{b\arcsin(cx)+a}}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)^2*sqrt(b*arcsin(c*x) + a)), x)
```

Mupad [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx = \int \frac{1}{\sqrt{a+b\,\mathrm{asin}\,(c\,x)}\,(e\,x^2+d)^2}\,dx$$

input
```
int(1/((a + b*asin(c*x))^(1/2)*(d + e*x^2)^2),x)
```

output
```
int(1/((a + b*asin(c*x))^(1/2)*(d + e*x^2)^2), x)
```

Reduce [N/A]

Not integrable

Time = 0.41 (sec) , antiderivative size = 69, normalized size of antiderivative = 3.14

$$\int \frac{1}{(d+ex^2)^2\sqrt{a+b\arcsin(cx)}}\,dx$$
$$= \int \frac{\sqrt{asin\,(cx)\,b+a}}{asin\,(cx)\,b\,d^2+2asin\,(cx)\,bde\,x^2+asin\,(cx)\,b\,e^2x^4+a\,d^2+2ade\,x^2+a\,e^2x^4}\,dx$$

input
```
int(1/(e*x^2+d)^2/(a+b*asin(c*x))^(1/2),x)
```

output
```
int(sqrt(asin(c*x)*b + a)/(asin(c*x)*b*d**2 + 2*asin(c*x)*b*d*e*x**2 + asi
n(c*x)*b*e**2*x**4 + a*d**2 + 2*a*d*e*x**2 + a*e**2*x**4),x)
```

3.196 $\int \frac{d+ex^2}{(a+b\arcsin(cx))^{3/2}}\,dx$

Optimal result . . . 1445
Mathematica [C] (verified) . . . 1446
Rubi [A] (verified) . . . 1447
Maple [A] (verified) . . . 1448
Fricas [F(-2)] . . . 1449
Sympy [F] . . . 1449
Maxima [F] . . . 1450
Giac [F] . . . 1450
Mupad [F(-1)] . . . 1450
Reduce [F] . . . 1451

Optimal result

Integrand size = 20, antiderivative size = 394

$$\begin{aligned}\int \frac{d+ex^2}{(a+b\arcsin(cx))^{3/2}}\,dx &= -\frac{2d\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}} \\ &- \frac{2ex^2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}} - \frac{e\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3} \\ &- \frac{2d\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c} \\ &+ \frac{e\sqrt{\frac{3\pi}{2}}\cos\left(\frac{3a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3} \\ &+ \frac{e\sqrt{\frac{\pi}{2}}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{b^{3/2}c^3} \\ &+ \frac{2d\sqrt{2\pi}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{b^{3/2}c} \\ &- \frac{e\sqrt{\frac{3\pi}{2}}\operatorname{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{3a}{b}\right)}{b^{3/2}c^3}\end{aligned}$$

output
```
-2*d*(-c^2*x^2+1)^(1/2)/b/c/(a+b*arcsin(c*x))^(1/2)-2*e*x^2*(-c^2*x^2+1)^(
1/2)/b/c/(a+b*arcsin(c*x))^(1/2)-1/2*e*2^(1/2)*Pi^(1/2)*cos(a/b)*FresnelS(
2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(3/2)/c^3-2*d*2^(1/2)*
Pi^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2
))/b^(3/2)/c+1/2*e*6^(1/2)*Pi^(1/2)*cos(3*a/b)*FresnelS(6^(1/2)/Pi^(1/2)*(
a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(3/2)/c^3+1/2*e*2^(1/2)*Pi^(1/2)*Fresnel
C(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(a/b)/b^(3/2)/c^3+2
*d*2^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1
/2))*sin(a/b)/b^(3/2)/c-1/2*e*6^(1/2)*Pi^(1/2)*FresnelC(6^(1/2)/Pi^(1/2)*(
a+b*arcsin(c*x))^(1/2)/b^(1/2))*sin(3*a/b)/b^(3/2)/c^3
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.66 (sec) , antiderivative size = 417, normalized size of antiderivative = 1.06

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^{3/2}}\,dx = \frac{e^{-\frac{3i(a+b\arcsin(cx))}{b}}\left(ee^{\frac{3ia}{b}} - 4c^2de^{\frac{3ia}{b}+2i\arcsin(cx)} - ee^{\frac{3ia}{b}+2i\arcsin(cx)} - 4c^2de^{\frac{3ia}{b}+4i\,\mathrm{ar}}\right.}{}$$

input
```
Integrate[(d + e*x^2)/(a + b*ArcSin[c*x])^(3/2),x]
```

output
```
(e*E^(((3*I)*a)/b) - 4*c^2*d*E^(((3*I)*a)/b + (2*I)*ArcSin[c*x]) - e*E^(((
3*I)*a)/b + (2*I)*ArcSin[c*x]) - 4*c^2*d*E^(((3*I)*a)/b + (4*I)*ArcSin[c*x
]) - e*E^(((3*I)*a)/b + (4*I)*ArcSin[c*x]) + e*E^(((3*I)*(a + 2*b*ArcSin[c
*x]))/b) + (4*c^2*d + e)*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] + (4*c^2*d
+ e)*E^(((4*I)*a)/b + (3*I)*ArcSin[c*x])*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*G
amma[1/2, (I*(a + b*ArcSin[c*x]))/b] - Sqrt[3]*e*E^((3*I)*ArcSin[c*x])*Sqr
t[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-3*I)*(a + b*ArcSin[c*x]))/b]
 - Sqrt[3]*e*E^((3*I)*((2*a)/b + ArcSin[c*x]))*Sqrt[(I*(a + b*ArcSin[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]])
```

Rubi [A] (verified)

Time = 1.10 (sec) , antiderivative size = 394, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {5172, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^{3/2}}\,dx$$

$$\downarrow 5172$$

$$\int \left(\frac{d}{(a+b\arcsin(cx))^{3/2}}+\frac{ex^2}{(a+b\arcsin(cx))^{3/2}}\right)dx$$

$$\downarrow 2009$$

$$\frac{\sqrt{\frac{\pi}{2}}e\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3}-\frac{\sqrt{\frac{3\pi}{2}}e\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3}-$$
$$\frac{\sqrt{\frac{\pi}{2}}e\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3}+\frac{\sqrt{\frac{3\pi}{2}}e\cos\left(\frac{3a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3}+$$
$$\frac{2\sqrt{2\pi}d\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c}-$$
$$\frac{2\sqrt{2\pi}d\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c}-\frac{2d\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}-\frac{2ex^2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}$$

input
```
Int[(d + e*x^2)/(a + b*ArcSin[c*x])^(3/2),x]
```

output
```
(-2*d*Sqrt[1 - c^2*x^2])/(b*c*Sqrt[a + b*ArcSin[c*x]]) - (2*e*x^2*Sqrt[1 -
 c^2*x^2])/(b*c*Sqrt[a + b*ArcSin[c*x]]) - (e*Sqrt[Pi/2]*Cos[a/b]*FresnelS
[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(b^(3/2)*c^3) - (2*d*Sqrt[
2*Pi]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(b^
(3/2)*c) + (e*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) + (e*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]
*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(b^(3/2)*c^3) + (2*d*Sqrt[2*P
i]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(b^(3/
2)*c) - (e*Sqrt[(3*Pi)/2]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sq
rt[b]]*Sin[(3*a)/b])/(b^(3/2)*c^3)
```

Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 5172
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((d_) + (e_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(a + b*ArcSin[c*x])^n, (d + e*x^2)^p, x], x
] /; FreeQ[{a, b, c, d, e, n}, x] && NeQ[c^2*d + e, 0] && IntegerQ[p] && (G
tQ[p, 0] || IGtQ[n, 0])
```

Maple [A] (verified)

Time = 0.38 (sec) , antiderivative size = 460, normalized size of antiderivative = 1.17

method	result
default	$\frac{4\cos\left(\frac{a}{b}\right)\operatorname{FresnelS}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}b}\right)\sqrt{\pi}\sqrt{2}\sqrt{a+b\arcsin(cx)}\sqrt{-\frac{1}{b}}c^2d+4\sin\left(\frac{a}{b}\right)\operatorname{FresnelC}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{-\frac{1}{b}}b}\right)\sqrt{\pi}\sqrt{2}\sqrt{a+b}$

input
```
int((e*x^2+d)/(a+b*arcsin(c*x))^(3/2),x,method=_RETURNVERBOSE)
```

output
```
1/2/c^3/b*(4*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c
*x))^(1/2)/b)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*(-1/b)^(1/2)*c^2*d+
4*sin(a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/
b)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*(-1/b)^(1/2)*c^2*d-cos(3*a/b)*
FresnelS(3*2^(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*Pi^(1/
2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*(-3/b)^(1/2)*e-sin(3*a/b)*FresnelC(3*2^
(1/2)/Pi^(1/2)/(-3/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*Pi^(1/2)*2^(1/2)*(a
+b*arcsin(c*x))^(1/2)*(-3/b)^(1/2)*e+cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(-
1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(
1/2)*(-1/b)^(1/2)*e+sin(a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(-1/b)^(1/2)*(a+b*a
rcsin(c*x))^(1/2)/b)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*(-1/b)^(1/2)
*e-4*cos(-(a+b*arcsin(c*x))/b+a/b)*c^2*d+cos(-3*(a+b*arcsin(c*x))/b+3*a/b)
*e-cos(-(a+b*arcsin(c*x))/b+a/b)*e)/(a+b*arcsin(c*x))^(1/2)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((e*x^2+d)/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{d+ex^2}{(a+b\operatorname{asin}(cx))^{\frac{3}{2}}}\,dx$$

input
```
integrate((e*x**2+d)/(a+b*asin(c*x))**(3/2),x)
```

output
```
Integral((d + e*x**2)/(a + b*asin(c*x))**(3/2), x)
```

Maxima [F]

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{ex^2+d}{(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate((e*x^2+d)/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
integrate((e*x^2 + d)/(b*arcsin(c*x) + a)^(3/2), x)
```

Giac [F]

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{ex^2+d}{(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate((e*x^2+d)/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)/(b*arcsin(c*x) + a)^(3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{e\,x^2+d}{(a+b\,\mathrm{asin}\,(c\,x))^{3/2}}\,dx$$

input
```
int((d + e*x^2)/(a + b*asin(c*x))^(3/2),x)
```

output
```
int((d + e*x^2)/(a + b*asin(c*x))^(3/2), x)
```

Reduce [F]

$$\int \frac{d+ex^2}{(a+b\arcsin(cx))^{3/2}}\,dx = \text{too large to display}$$

input
```
int((e*x^2+d)/(a+b*asin(c*x))^(3/2),x)
```

output
```
(4*sqrt(asin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*asin(c*x)*b*c**2*d - 8*sqr
t(asin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*asin(c*x)*b*e + 4*asin(c*x)*int(
sqrt(asin(c*x)*b + a)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2*b**2 + 2
*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a**2),x)*a*b
**2*c**3*d - 8*asin(c*x)*int(sqrt(asin(c*x)*b + a)/(asin(c*x)**2*b**2*c**2
*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b +
a**2*c**2*x**2 - a**2),x)*a*b**2*c*e - 4*asin(c*x)*int((sqrt(asin(c*x)*b +
 a)*x**4)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2*b**2 + 2*asin(c*x)*a
*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a**2),x)*a*b**2*c**7*d +
 8*asin(c*x)*int((sqrt(asin(c*x)*b + a)*x**4)/(asin(c*x)**2*b**2*c**2*x**2
 - asin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*
c**2*x**2 - a**2),x)*a*b**2*c**5*e + 24*asin(c*x)*int((sqrt(asin(c*x)*b +
a)*sqrt( - c**2*x**2 + 1)*asin(c*x)*x**3)/(asin(c*x)**2*b**2*c**2*x**2 - a
sin(c*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2
*x**2 - a**2),x)*a*b**2*c**6*d - 4*asin(c*x)*int((sqrt(asin(c*x)*b + a)*sq
rt( - c**2*x**2 + 1)*asin(c*x)**2*x)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c
*x)**2*b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2
 - a**2),x)*b**3*c**4*d + 8*asin(c*x)*int((sqrt(asin(c*x)*b + a)*sqrt( - c
**2*x**2 + 1)*asin(c*x)**2*x)/(asin(c*x)**2*b**2*c**2*x**2 - asin(c*x)**2*
b**2 + 2*asin(c*x)*a*b*c**2*x**2 - 2*asin(c*x)*a*b + a**2*c**2*x**2 - a...
```

3.197 $\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx$

Optimal result . . . 1452
Mathematica [C] (verified) . . . 1453
Rubi [A] (verified) . . . 1453
Maple [A] (verified) . . . 1457
Fricas [F(-2)] . . . 1457
Sympy [F] . . . 1458
Maxima [F] . . . 1458
Giac [F] . . . 1458
Mupad [F(-1)] . . . 1459
Reduce [F] . . . 1459

Optimal result

Integrand size = 12, antiderivative size = 137

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = -\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}} - \frac{2\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)}{b^{3/2}c} + \frac{2\sqrt{2\pi}\,\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{b^{3/2}c}$$

output

```
-2*(-c^2*x^2+1)^(1/2)/b/c/(a+b*arcsin(c*x))^(1/2)-2*2^(1/2)*Pi^(1/2)*cos(a
/b)*FresnelS(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2))/b^(3/2)/c+2
*2^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)/b^(1/2
))*sin(a/b)/b^(3/2)/c
```

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.09 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.22

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \frac{e^{-\frac{i(a+b\arcsin(cx))}{b}}\left(e^{i\arcsin(cx)}\sqrt{-\frac{i(a+b\arcsin(cx))}{b}}\Gamma\left(\frac{1}{2},-\frac{i(a+b\arcsin(cx))}{b}\right)+e^{\frac{ia}{b}}\left(-1-\right.\right.}{bc\sqrt{a+b\arcsin}}$$

input
```
Integrate[(a + b*ArcSin[c*x])^(-3/2),x]
```

output
```
(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*
ArcSin[c*x]))/b]))/(b*c*E^((I*(a + b*ArcSin[c*x]))/b)*Sqrt[a + b*ArcSin[c*
x]])
```

Rubi [A] (verified)

Time = 0.78 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.01, number of steps used = 12, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.917$, Rules used = {5132, 5224, 25, 3042, 3787, 25, 3042, 3785, 3786, 3832, 3833}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx$$

$$\downarrow 5132$$

$$-\frac{2c\int \frac{x}{\sqrt{1-c^2x^2}\sqrt{a+b\arcsin(cx)}}dx}{b}-\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 5224$$

$$-\frac{2\int -\frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{b^2c}-\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 25$$

$$\frac{2\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{b^2c}-\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 3042$$

$$\frac{2\int \frac{\sin\left(\frac{a}{b}-\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))}{b^2c}-\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}$$

$$\downarrow 3787$$

$$-\frac{2\left(-\sin\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\cos\left(\frac{a}{b}\right)\int -\frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))\right)}{\frac{b^2c}{2\sqrt{1-c^2x^2}}}-$$

$$\downarrow 25$$

$$-\frac{2\left(\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int \frac{\cos\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))\right)}{\frac{b^2c}{2\sqrt{1-c^2x^2}}}-$$

$$\downarrow 3042$$

$$-\frac{2\left(\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-\sin\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}+\frac{\pi}{2}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))\right)}{\frac{b^2c}{2\sqrt{1-c^2x^2}}}-$$

$$\downarrow 3785$$

$$-\frac{2\left(\cos\left(\frac{a}{b}\right)\int \frac{\sin\left(\frac{a+b\arcsin(cx)}{b}\right)}{\sqrt{a+b\arcsin(cx)}}d(a+b\arcsin(cx))-2\sin\left(\frac{a}{b}\right)\int \cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}\right)}{\frac{b^2c}{2\sqrt{1-c^2x^2}}}-$$

$$\downarrow 3786$$

$$-\frac{2\left(2\cos\left(\frac{a}{b}\right)\int\sin\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}-2\sin\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}\right)}{\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}}-\frac{b^2c}{}$$

$$\downarrow 3832$$

$$-\frac{2\left(\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-2\sin\left(\frac{a}{b}\right)\int\cos\left(\frac{a+b\arcsin(cx)}{b}\right)d\sqrt{a+b\arcsin(cx)}\right)}{\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}}-\frac{b^2c}{}$$

$$\downarrow 3833$$

$$-\frac{2\left(\sqrt{2\pi}\sqrt{b}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)-\sqrt{2\pi}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\arcsin(cx)}}{\sqrt{b}}\right)\right)}{\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\arcsin(cx)}}}-\frac{b^2c}{}$$

input

```
Int[(a + b*ArcSin[c*x])^(-3/2),x]
```

output

```
(-2*Sqrt[1 - c^2*x^2])/(b*c*Sqrt[a + b*ArcSin[c*x]]) - (2*(Sqrt[b]*Sqrt[2*
Pi]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]] - Sqrt
[b]*Sqrt[2*Pi]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[
a/b]))/(b^2*c)
```

Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 3785
```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[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 3786
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[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 3787
```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Cos
[(d*e - c*f)/d]   Int[Sin[c*(f/d) + f*x]/Sqrt[c + d*x], x], x] + Simp[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 3832
```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 3833
```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]/(f*Rt[
d, 2]))*FresnelC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)], x] /; FreeQ[{d, e, f}, x]
```

rule 5132
```
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] + Simp[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 5224

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Simp[(1/(b*c^(m + 1)))*Simp[(d + e*x^2)^p/(1 - c^2*x
^2)^p]   Subst[Int[x^n*Sin[-a/b + x/b]^m*Cos[-a/b + x/b]^(2*p + 1), x], x,
a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0]
 && IGtQ[2*p + 2, 0] && IGtQ[m, 0]
```

Maple [A] (verified)

Time = 0.00 (sec) , antiderivative size = 158, normalized size of antiderivative = 1.15

method	result
default	$-\frac{2\left(-\sqrt{-\frac{1}{b}}\,\sqrt{\pi}\,\sqrt{2}\,\sqrt{a+b\arcsin(cx)}\,\cos\left(\frac{a}{b}\right)\mathrm{FresnelS}\left(\frac{\sqrt{2}\,\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\,\sqrt{-\frac{1}{b}}\,b}\right)-\sqrt{-\frac{1}{b}}\,\sqrt{\pi}\,\sqrt{2}\,\sqrt{a+b\arcsin(cx)}\,\sin\left(\frac{a}{b}\right)\mathrm{FresnelC}\left(\sqrt{}\right.\right.}{cb\sqrt{a+b\arcsin(cx)}}$

input

```
int(1/(a+b*arcsin(c*x))^(3/2),x,method=_RETURNVERBOSE)
```

output

```
-2/c/b/(a+b*arcsin(c*x))^(1/2)*(-(-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))
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input

```
integrate(1/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output

```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F]

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(a+b\operatorname{asin}(cx))^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(a+b*asin(c*x))**(3/2),x)
```

output
```
Integral((a + b*asin(c*x))**(-3/2), x)
```

Maxima [F]

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
integrate((b*arcsin(c*x) + a)^(-3/2), x)
```

Giac [F]

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output
```
integrate((b*arcsin(c*x) + a)^(-3/2), x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(a+b\operatorname{asin}(c\,x))^{3/2}}\,dx$$

input
```
int(1/(a + b*asin(c*x))^(3/2),x)
```

output
```
int(1/(a + b*asin(c*x))^(3/2), x)
```

Reduce [F]

$$\int \frac{1}{(a+b\arcsin(cx))^{3/2}}\,dx = \frac{2asin(cx)\left(\int \frac{\sqrt{asin(cx)b+a}\,\sqrt{-c^2x^2+1}\,x}{asin(cx)b\,c^2x^2-asin(cx)b+a\,c^2x^2-a}dx\right)b\,c^2-2\sqrt{asin\,(cx)\,b+a}\,\sqrt{-c^2}}{bc\,(asin\,(cx)\,b+a)}$$

input
```
int(1/(a+b*asin(c*x))^(3/2),x)
```

output
```
(2*(asin(c*x)*int((sqrt(asin(c*x)*b + a)*sqrt( - c**2*x**2 + 1)*x)/(asin(c
*x)*b*c**2*x**2 - asin(c*x)*b + a*c**2*x**2 - a),x)*b*c**2 - sqrt(asin(c*x
)*b + a)*sqrt( - c**2*x**2 + 1) + int((sqrt(asin(c*x)*b + a)*sqrt( - c**2*
x**2 + 1)*x)/(asin(c*x)*b*c**2*x**2 - asin(c*x)*b + a*c**2*x**2 - a),x)*a*
c**2))/(b*c*(asin(c*x)*b + a))
```

3.198 $\int \frac{1}{(d+ex^2)(a+b\arcsin(cx))^{3/2}}\,dx$

Optimal result . . . 1460
Mathematica [N/A] . . . 1460
Rubi [N/A] . . . 1461
Maple [N/A] . . . 1461
Fricas [F(-2)] . . . 1462
Sympy [N/A] . . . 1462
Maxima [N/A] . . . 1462
Giac [N/A] . . . 1463
Mupad [N/A] . . . 1463
Reduce [N/A] . . . 1464

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \text{Int}\left(\frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^{3/2}},x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)/(a+b*arcsin(c*x))^(3/2),x)
```

Mathematica [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^{3/2}}\,dx$$

input
```
Integrate[1/((d + e*x^2)*(a + b*ArcSin[c*x])^(3/2)),x]
```

output
```
Integrate[1/((d + e*x^2)*(a + b*ArcSin[c*x])^(3/2)), x]
```

Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^{3/2}}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^{3/2}}dx$$

input
```
Int[1/((d + e*x^2)*(a + b*ArcSin[c*x])^(3/2)),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(e\,x^2+d)\,(a+b\arcsin(cx))^{\frac{3}{2}}}dx$$

input
```
int(1/(e*x^2+d)/(a+b*arcsin(c*x))^(3/2),x)
```

output
```
int(1/(e*x^2+d)/(a+b*arcsin(c*x))^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(e*x^2+d)/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [N/A]

Not integrable

Time = 9.37 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(a+b\operatorname{asin}(cx))^{\frac{3}{2}}\,(d+ex^2)}\,dx$$

input
```
integrate(1/(e*x**2+d)/(a+b*asin(c*x))**(3/2),x)
```

output
```
Integral(1/((a + b*asin(c*x))**(3/2)*(d + e*x**2)), x)
```

Maxima [N/A]

Not integrable

Time = 0.48 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(ex^2+d)(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(e*x^2+d)/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
integrate(1/((e*x^2 + d)*(b*arcsin(c*x) + a)^(3/2)), x)
```

Giac [N/A]

Not integrable

Time = 0.68 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(ex^2+d)(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(e*x^2+d)/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)*(b*arcsin(c*x) + a)^(3/2)), x)
```

Mupad [N/A]

Not integrable

Time = 0.15 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(a+b\,\mathrm{asin}\,(c\,x))^{3/2}\,(e\,x^2+d)}\,dx$$

input
```
int(1/((a + b*asin(c*x))^(3/2)*(d + e*x^2)),x)
```

output
```
int(1/((a + b*asin(c*x))^(3/2)*(d + e*x^2)), x)
```

Reduce [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 74, normalized size of antiderivative = 3.36

$$\int \frac{1}{(d+ex^2)\,(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{\sqrt{asin\,(cx)\,b+a}}{asin\,(cx)^2\,b^2d+asin\,(cx)^2\,b^2e\,x^2+2asin\,(cx)\,abd+2asin\,(cx)\,a}$$

input

```
int(1/(e*x^2+d)/(a+b*asin(c*x))^(3/2),x)
```

output

```
int(sqrt(asin(c*x)*b + a)/(asin(c*x)**2*b**2*d + asin(c*x)**2*b**2*e*x**2
+ 2*asin(c*x)*a*b*d + 2*asin(c*x)*a*b*e*x**2 + a**2*d + a**2*e*x**2),x)
```

3.199 $\int \frac{1}{(d+ex^2)^2(a+b\arcsin(cx))^{3/2}}\,dx$

Optimal result . . . 1465
Mathematica [N/A] . . . 1465
Rubi [N/A] . . . 1466
Maple [N/A] . . . 1466
Fricas [F(-2)] . . . 1467
Sympy [F(-1)] . . . 1467
Maxima [N/A] . . . 1467
Giac [F(-2)] . . . 1468
Mupad [N/A] . . . 1468
Reduce [N/A] . . . 1468

Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^{3/2}}\,dx = \text{Int}\left(\frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^{3/2}},x\right)$$

output
```
Defer(Int)(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x)
```

Mathematica [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^{3/2}}\,dx = \int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^{3/2}}\,dx$$

input
```
Integrate[1/((d + e*x^2)^2*(a + b*ArcSin[c*x])^(3/2)),x]
```

output
```
Integrate[1/((d + e*x^2)^2*(a + b*ArcSin[c*x])^(3/2)), x]
```

Rubi [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^{3/2}}\,dx$$
$$\downarrow 5174$$
$$\int \frac{1}{(d+ex^2)^2\,(a+b\arcsin(cx))^{3/2}}dx$$

input
```
Int[1/((d + e*x^2)^2*(a + b*ArcSin[c*x])^(3/2)),x]
```

output
```
$Aborted
```

Maple [N/A]

Not integrable

Time = 0.57 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(e\,x^2+d)^2\,(a+b\arcsin(cx))^{\frac{3}{2}}}dx$$

input
```
int(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x)
```

output
```
int(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x)
```

Fricas [F(-2)]

Exception generated.

$$\int \frac{1}{\left(d+ex^2\right)^2 \left(a+b\arcsin(cx)\right)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

Sympy [F(-1)]

Timed out.

$$\int \frac{1}{\left(d+ex^2\right)^2 \left(a+b\arcsin(cx)\right)^{3/2}}\,dx = \text{Timed out}$$

input
```
integrate(1/(e*x**2+d)**2/(a+b*asin(c*x))**(3/2),x)
```

output
```
Timed out
```

Maxima [N/A]

Not integrable

Time = 0.51 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(d+ex^2\right)^2 \left(a+b\arcsin(cx)\right)^{3/2}}\,dx = \int \frac{1}{\left(ex^2+d\right)^2 \left(b\arcsin\left(cx\right)+a\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

output
```
integrate(1/((e*x^2 + d)^2*(b*arcsin(c*x) + a)^(3/2)), x)
```

Giac [F(-2)]

Exception generated.

$$\int \frac{1}{\left(d+ex^2\right)^2 \left(a+b\arcsin(cx)\right)^{3/2}}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:Not invertible Error: Bad Argument Value
```

Mupad [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{\left(d+ex^2\right)^2 \left(a+b\arcsin(cx)\right)^{3/2}}\,dx = \int \frac{1}{\left(a+b\,\mathrm{asin}\left(c\,x\right)\right)^{3/2}\left(e\,x^2+d\right)^2}\,dx$$

input
```
int(1/((a + b*asin(c*x))^(3/2)*(d + e*x^2)^2),x)
```

output
```
int(1/((a + b*asin(c*x))^(3/2)*(d + e*x^2)^2), x)
```

Reduce [N/A]

Not integrable

Time = 1.77 (sec) , antiderivative size = 125, normalized size of antiderivative = 5.68

$$\int \frac{1}{\left(d+ex^2\right)^2 \left(a+b\arcsin(cx)\right)^{3/2}}\,dx = \int \frac{}{asin\left(cx\right)^2 b^2 d^2 + 2asin\left(cx\right)^2 b^2 de\,x^2 + asin\left(cx\right)^2 b^2 e^2 x^4 + 2asi}$$

input
```
int(1/(e*x^2+d)^2/(a+b*asin(c*x))^(3/2),x)
```

output

```
int(sqrt(asin(c*x)*b + a)/(asin(c*x)**2*b**2*d**2 + 2*asin(c*x)**2*b**2*d*
e*x**2 + asin(c*x)**2*b**2*e**2*x**4 + 2*asin(c*x)*a*b*d**2 + 4*asin(c*x)*
a*b*d*e*x**2 + 2*asin(c*x)*a*b*e**2*x**4 + a**2*d**2 + 2*a**2*d*e*x**2 + a
**2*e**2*x**4),x)
```

CHAPTER 4

Appendix

4.1 Listing of Grading functions 1470
4.2 Links to plain text integration problems used in this report for each CAS . 1488

4.1 Listing of Grading functions

The following are the current version of the grading functions used for grading the quality of the antiderivative with reference to the optimal antiderivative included in the test suite.

There is a version for Maple and for Mathematica/Rubi. There is a version for grading Sympy and version for use with Sagemath.

The following are links to the current source code.

The following are the listings of source code of the grading functions.

Mathematica and Rubi grading function

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)

(* Nasser: April 7,2022. add second output which gives reason for the grade *)
(*                       Small rewrite of logic in main function to make it*)
(*                       match Maple's logic. No change in functionality otherwise*)

(* ::Subsection:: *)
(*GradeAntiderivative[result,optimal]*)
```

```
(* ::Text:: *)
(*If result and optimal are mathematical expressions, *)
(*          GradeAntiderivative[result,optimal] returns*)
(*  "F" if the result fails to integrate an expression that*)
(*      is integrable*)
(*  "C" if result involves higher level functions than necessary*)
(*  "B" if result is more than twice the size of the optimal*)
(*      antiderivative*)
(*  "A" if result can be considered optimal*)


GradeAntiderivative[result_,optimal_] := Module[{expnResult,expnOptimal,leafCountResult,leaf
    expnResult  = ExpnType[result];
    expnOptimal = ExpnType[optimal];
    leafCountResult = LeafCount[result];
    leafCountOptimal = LeafCount[optimal];

    (*Print["expnResult=",expnResult," expnOptimal=",expnOptimal];*)
    If[expnResult<=expnOptimal,
        If[Not[FreeQ[result,Complex]], (*result contains complex*)
            If[Not[FreeQ[optimal,Complex]], (*optimal contains complex*)
                If[leafCountResult<=2*leafCountOptimal,
                    finalresult={"A",""}
                    ,(*ELSE*)
                    finalresult={"B","Both result and optimal contain complex but leaf count
                  ]
            ,(*ELSE*)
                finalresult={"C","Result contains complex when optimal does not."}
            ]
        ,(*ELSE*)(*result does not contains complex*)
            If[leafCountResult<=2*leafCountOptimal,
               finalresult={"A",""}
            ,(*ELSE*)
               finalresult={"B","Leaf count is larger than twice the leaf count of optimal.
              ]
        ]
    ,(*ELSE*) (*expnResult>expnOptimal*)
        If[FreeQ[result,Integrate] && FreeQ[result,Int],
            finalresult={"C","Result contains higher order function than in optimal. Order "
            ,
```

```
            finalresult={"F","Contains unresolved integral."}
        ]
    ];

    finalresult
]

(* ::Text:: *)
(*The following summarizes the type number assigned an *)
(*expression based on the functions it involves*)
(*1 = rational function*)
(*2 = algebraic function*)
(*3 = elementary function*)
(*4 = special function*)
(*5 = hyperpergeometric function*)
(*6 = appell function*)
(*7 = rootsum function*)
(*8 = integrate function*)
(*9 = unknown function*)


ExpnType[expn_] :=
  If[AtomQ[expn],
    1,
  If[ListQ[expn],
    Max[Map[ExpnType,expn]],
  If[Head[expn]===Power,
    If[IntegerQ[expn[[2]]],
      ExpnType[expn[[1]]],
    If[Head[expn[[2]]]===Rational,
      If[IntegerQ[expn[[1]]] || Head[expn[[1]]]===Rational,
        1,
      Max[ExpnType[expn[[1]]],2]],
    Max[ExpnType[expn[[1]]],ExpnType[expn[[2]]],3]]],
  If[Head[expn]===Plus || Head[expn]===Times,
    Max[ExpnType[First[expn]],ExpnType[Rest[expn]]],
  If[ElementaryFunctionQ[Head[expn]],
    Max[3,ExpnType[expn[[1]]]],
  If[SpecialFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],4]],
  If[HypergeometricFunctionQ[Head[expn]],
```

```
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],5]],
  If[AppellFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],6]],
  If[Head[expn]===RootSum,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
  If[Head[expn]===Integrate || Head[expn]===Int,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],8]],
  9]]]]]]]]]


ElementaryFunctionQ[func_] :=
  MemberQ[{
  Exp,Log,
  Sin,Cos,Tan,Cot,Sec,Csc,
  ArcSin,ArcCos,ArcTan,ArcCot,ArcSec,ArcCsc,
  Sinh,Cosh,Tanh,Coth,Sech,Csch,
  ArcSinh,ArcCosh,ArcTanh,ArcCoth,ArcSech,ArcCsch
},func]


SpecialFunctionQ[func_] :=
  MemberQ[{
  Erf, Erfc, Erfi,
  FresnelS, FresnelC,
  ExpIntegralE, ExpIntegralEi, LogIntegral,
  SinIntegral, CosIntegral, SinhIntegral, CoshIntegral,
  Gamma, LogGamma, PolyGamma,
  Zeta, PolyLog, ProductLog,
  EllipticF, EllipticE, EllipticPi
},func]


HypergeometricFunctionQ[func_] :=
  MemberQ[{Hypergeometric1F1,Hypergeometric2F1,HypergeometricPFQ},func]


AppellFunctionQ[func_] :=
  MemberQ[{AppellF1},func]
```

Maple grading function

```
# File: GradeAntiderivative.mpl
# Original version thanks to Albert Rich emailed on 03/21/2017

#Nasser 03/22/2017  Use Maple leaf count instead since buildin
#Nasser 03/23/2017  missing 'ln' for ElementaryFunctionQ added
#Nasser 03/24/2017  corrected the check for complex result
#Nasser 10/27/2017  check for leafsize and do not call ExpnType()
#                   if leaf size is "too large". Set at 500,000
#Nasser 12/22/2019  Added debug flag, added 'dilog' to special functions
#                   see problem 156, file Apostol_Problems
#Nasser 4/07/2022   add second output which gives reason for the grade

GradeAntiderivative := proc(result,optimal)
local leaf_count_result,
        leaf_count_optimal,
        ExpnType_result,
        ExpnType_optimal,
        debug:=false;

        leaf_count_result:=leafcount(result);
        #do NOT call ExpnType() if leaf size is too large. Recursion problem
        if leaf_count_result > 500000 then
            return "B","result has leaf size over 500,000. Avoiding possible recursion issue
        fi;

        leaf_count_optimal := leafcount(optimal);
        ExpnType_result  := ExpnType(result);
        ExpnType_optimal := ExpnType(optimal);

        if debug then
            print("ExpnType_result",ExpnType_result," ExpnType_optimal=",ExpnType_optimal);
        fi;

# If result and optimal are mathematical expressions,
#  GradeAntiderivative[result,optimal] returns
#   "F" if the result fails to integrate an expression that
#       is integrable
#   "C" if result involves higher level functions than necessary
#   "B" if result is more than twice the size of the optimal
```

```
#       antiderivative
#   "A" if result can be considered optimal

    #This check below actually is not needed, since I only
    #call this grading only for passed integrals. i.e. I check
    #for "F" before calling this. But no harm of keeping it here.
    #just in case.


    if not type(result,freeof('int')) then
        return "F","Result contains unresolved integral";
    fi;


    if ExpnType_result<=ExpnType_optimal then
        if debug then
             print("ExpnType_result<=ExpnType_optimal");
        fi;
        if is_contains_complex(result) then
            if is_contains_complex(optimal) then
                if debug then
                        print("both result and optimal complex");
                fi;
                if leaf_count_result<=2*leaf_count_optimal then
                    return "A"," ";
                else
                   return "B",cat("Both result and optimal contain complex but leaf count of
                                   convert(leaf_count_result,string)," vs. $2 (",
                                   convert(leaf_count_optimal,string)," ) = ",convert(2*leaf
                end if
            else #result contains complex but optimal is not
                if debug then
                        print("result contains complex but optimal is not");
                fi;
                return "C","Result contains complex when optimal does not.";
            fi;
        else # result do not contain complex
             # this assumes optimal do not as well. No check is needed here.
            if debug then
                   print("result do not contain complex, this assumes optimal do not as well
            fi;
```

```
            if leaf_count_result<=2*leaf_count_optimal then
                if debug then
                    print("leaf_count_result<=2*leaf_count_optimal");
                fi;
                return "A"," ";
            else
                if debug then
                    print("leaf_count_result>2*leaf_count_optimal");
                fi;
                return "B",cat("Leaf count of result is larger than twice the leaf count of
                                convert(leaf_count_result,string),"$ vs. $2(",
                                convert(leaf_count_optimal,string),")=",convert(2*leaf_co
            fi;
        fi;
    else #ExpnType(result) > ExpnType(optimal)
        if debug then
            print("ExpnType(result) > ExpnType(optimal)");
        fi;
        return "C",cat("Result contains higher order function than in optimal. Order ",
                    convert(ExpnType_result,string)," vs. order ",
                    convert(ExpnType_optimal,string),".");
    fi;

end proc:

#
# is_contains_complex(result)
# takes expressions and returns true if it contains "I" else false
#
#Nasser 032417
is_contains_complex:= proc(expression)
  return (has(expression,I));
end proc:

# The following summarizes the type number assigned an expression
# based on the functions it involves
# 1 = rational function
# 2 = algebraic function
# 3 = elementary function
# 4 = special function
# 5 = hyperpergeometric function
```

```
# 6 = appell function
# 7 = rootsum function
# 8 = integrate function
# 9 = unknown function

ExpnType := proc(expn)
  if type(expn,'atomic') then
    1
  elif type(expn,'list') then
    apply(max,map(ExpnType,expn))
  elif type(expn,'sqrt') then
    if type(op(1,expn),'rational') then
       1
    else
       max(2,ExpnType(op(1,expn)))
    end if
  elif type(expn,'`^`') then
    if type(op(2,expn),'integer') then
      ExpnType(op(1,expn))
    elif type(op(2,expn),'rational') then
      if type(op(1,expn),'rational') then
         1
      else
         max(2,ExpnType(op(1,expn)))
      end if
    else
         max(3,ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    end if
  elif type(expn,'`+`') or type(expn,'`*`') then
    max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
  elif ElementaryFunctionQ(op(0,expn)) then
    max(3,ExpnType(op(1,expn)))
  elif SpecialFunctionQ(op(0,expn)) then
    max(4,apply(max,map(ExpnType,[op(expn)])))
  elif HypergeometricFunctionQ(op(0,expn)) then
    max(5,apply(max,map(ExpnType,[op(expn)])))
  elif AppellFunctionQ(op(0,expn)) then
    max(6,apply(max,map(ExpnType,[op(expn)])))
  elif op(0,expn)='int' then
    max(8,apply(max,map(ExpnType,[op(expn)]))) else
  9
```

```
  end if
end proc:


ElementaryFunctionQ := proc(func)
  member(func,[
        exp,log,ln,
        sin,cos,tan,cot,sec,csc,
        arcsin,arccos,arctan,arccot,arcsec,arccsc,
        sinh,cosh,tanh,coth,sech,csch,
        arcsinh,arccosh,arctanh,arccoth,arcsech,arccsch])
end proc:

SpecialFunctionQ := proc(func)
  member(func,[
        erf,erfc,erfi,
        FresnelS,FresnelC,
        Ei,Ei,Li,Si,Ci,Shi,Chi,
        GAMMA,lnGAMMA,Psi,Zeta,polylog,dilog,LambertW,
        EllipticF,EllipticE,EllipticPi])
end proc:

HypergeometricFunctionQ := proc(func)
  member(func,[Hypergeometric1F1,hypergeom,HypergeometricPFQ])
end proc:

AppellFunctionQ := proc(func)
  member(func,[AppellF1])
end proc:

# u is a sum or product.  rest(u) returns all but the
# first term or factor of u.
rest := proc(u) local v;
  if nops(u)=2 then
     op(2,u)
  else
     apply(op(0,u),op(2..nops(u),u))
  end if
end proc:

#leafcount(u) returns the number of nodes in u.
```

```
#Nasser 3/23/17  Replaced by build-in leafCount from package in Maple
leafcount := proc(u)
   MmaTranslator[Mma][LeafCount](u);
end proc:
```

Sympy grading function

```
#Dec 24, 2019. Nasser M. Abbasi:
#            Port of original Maple grading function by
#            Albert Rich to use with Sympy/Python
#Dec 27, 2019  Nasser. Added `RootSum`. See problem 177, Timofeev file
#            added 'exp_polar'
from sympy import *

def leaf_count(expr):
   #sympy do not have leaf count function. This is approximation
   return round(1.7*count_ops(expr))

def is_sqrt(expr):
   if isinstance(expr,Pow):
      if expr.args[1] == Rational(1,2):
         return True
      else:
         return False
   else:
      return False

def is_elementary_function(func):
   return func in [exp,log,ln,sin,cos,tan,cot,sec,csc,
         asin,acos,atan,acot,asec,acsc,sinh,cosh,tanh,coth,sech,csch,
         asinh,acosh,atanh,acoth,asech,acsch
      ]

def is_special_function(func):
   return func in [ erf,erfc,erfi,
          fresnels,fresnelc,Ei,Ei,Li,Si,Ci,Shi,Chi,
          gamma,loggamma,digamma,zeta,polylog,LambertW,
          elliptic_f,elliptic_e,elliptic_pi,exp_polar
       ]
```

```
def is_hypergeometric_function(func):
   return func in [hyper]

def is_appell_function(func):
   return func in [appellf1]

def is_atom(expn):
   try:
      if expn.isAtom or isinstance(expn,int) or isinstance(expn,float):
        return True
      else:
        return False

   except AttributeError as error:
      return False

def expnType(expn):
   debug=False
   if debug:
      print("expn=",expn,"type(expn)=",type(expn))

   if is_atom(expn):
     return 1
   elif isinstance(expn,list):
      return max(map(expnType, expn))   #apply(max,map(ExpnType,expn))
   elif  is_sqrt(expn):
      if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
         return 1
      else:
         return max(2,expnType(expn.args[0]))  #max(2,ExpnType(op(1,expn)))
   elif isinstance(expn,Pow):   #type(expn,'`^`')
      if isinstance(expn.args[1],Integer):  #type(op(2,expn),'integer')
         return expnType(expn.args[0])   #ExpnType(op(1,expn))
      elif isinstance(expn.args[1],Rational):  #type(op(2,expn),'rational')
         if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
            return 1
         else:
            return max(2,expnType(expn.args[0]))  #max(2,ExpnType(op(1,expn)))
      else:
         return max(3,expnType(expn.args[0]),expnType(expn.args[1])) #max(3,ExpnType(op(1,expn)),Expr
   elif isinstance(expn,Add) or isinstance(expn,Mul): #type(expn,'`+`') or type(expn,'`*`')
```

```
        m1 = expnType(expn.args[0])
        m2 = expnType(list(expn.args[1:]))
        return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.func):  #ElementaryFunctionQ(op(0,expn))
        return max(3,expnType(expn.args[0]))  #max(3,ExpnType(op(1,expn)))
    elif is_special_function(expn.func): #SpecialFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(4,m1)  #max(4,apply(max,map(ExpnType,[op(expn)])))
    elif is_hypergeometric_function(expn.func): #HypergeometricFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(5,m1)  #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif is_appell_function(expn.func):
        m1 = max(map(expnType, list(expn.args)))
        return max(6,m1)  #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif isinstance(expn,RootSum):
        m1 = max(map(expnType, list(expn.args))) #Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
        return max(7,m1)
    elif str(expn).find("Integral") != -1:
        m1 = max(map(expnType, list(expn.args)))
        return max(8,m1)  #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
def grade_antiderivative(result,optimal):

    #print ("Enter grade_antiderivative for sagemath")
    #print("Enter grade_antiderivative, result=",result," optimal=",optimal)

    leaf_count_result  = leaf_count(result)
    leaf_count_optimal = leaf_count(optimal)

    #print("leaf_count_result=",leaf_count_result)
    #print("leaf_count_optimal=",leaf_count_optimal)

    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if str(result).find("Integral") != -1:
        grade = "F"
        grade_annotation =""
```

```
    else:
        if expnType_result <= expnType_optimal:
            if result.has(I):
                if optimal.has(I): #both result and optimal complex
                    if leaf_count_result <= 2*leaf_count_optimal:
                        grade = "A"
                        grade_annotation =""
                    else:
                        grade = "B"
                        grade_annotation ="Both result and optimal contain complex but leaf count of result is lar
                else: #result contains complex but optimal is not
                    grade = "C"
                    grade_annotation ="Result contains complex when optimal does not."
            else: # result do not contain complex, this assumes optimal do not as well
                if leaf_count_result <= 2*leaf_count_optimal:
                    grade = "A"
                    grade_annotation =""
                else:
                    grade = "B"
                    grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(
        else:
            grade = "C"
            grade_annotation ="Result contains higher order function than in optimal. Order "+str(ExpnType


    #print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)

    return grade, grade_annotation
```

SageMath grading function

```
#Dec 24, 2019. Nasser: Ported original Maple grading function by
#             Albert Rich to use with Sagemath. This is used to
#             grade Fricas, Giac and Maxima results.
#Dec 24, 2019. Nasser: Added 'exp_integral_e' and 'sng', 'sin_integral'
#             'arctan2','floor','abs','log_integral'
#June 4, 2022  Made default grade_annotation "none" instead of "" due
#             issue later when reading the file.
#July 14, 2022. Added ellipticF. This is until they fix sagemath, then remove it.
```

```
from sage.all import *
from sage.symbolic.operators import add_vararg, mul_vararg

debug=False;

def tree_size(expr):
    r"""
    Return the tree size of this expression.
    """
    #print("Enter tree_size, expr is ",expr)

    if expr not in SR:
        # deal with lists, tuples, vectors
        return 1 + sum(tree_size(a) for a in expr)
    expr = SR(expr)
    x, aa = expr.operator(), expr.operands()
    if x is None:
        return 1
    else:
        return 1 + sum(tree_size(a) for a in aa)

def is_sqrt(expr):
    if expr.operator() == operator.pow:    #isinstance(expr,Pow):
        if expr.operands()[1]==1/2: #expr.args[1] == Rational(1,2):
            if debug: print ("expr is sqrt")
            return True
        else:
            return False
    else:
        return False

def is_elementary_function(func):
    #debug=False
    m = func.name() in ['exp','log','ln',
            'sin','cos','tan','cot','sec','csc',
            'arcsin','arccos','arctan','arccot','arcsec','arccsc',
            'sinh','cosh','tanh','coth','sech','csch',
            'arcsinh','arccosh','arctanh','arccoth','arcsech','arccsch','sgn',
        'arctan2','floor','abs'
        ]
    if debug:
```

```
      if m:
         print ("func ", func , " is elementary_function")
      else:
         print ("func ", func , " is NOT elementary_function")


   return m

def is_special_function(func):
   #debug=False
   if debug:
      print ("type(func)=", type(func))

   m= func.name() in ['erf','erfc','erfi','fresnel_sin','fresnel_cos','Ei',
         'Ei','Li','Si','sin_integral','Ci','cos_integral','Shi','sinh_integral'
         'Chi','cosh_integral','gamma','log_gamma','psi','zeta',
         'polylog','lambert_w','elliptic_f','elliptic_e','ellipticF',
         'elliptic_pi','exp_integral_e','log_integral',
         'weierstrassPInverse','weierstrass','weierstrassP','weierstrassZeta',
         'weierstrassPPrime','weierstrassSigma']

   if debug:
      print ("m=",m)
      if m:
         print ("func ", func ," is special_function")
      else:
         print ("func ", func ," is NOT special_function")


   return m


def is_hypergeometric_function(func):
   return func.name() in ['hypergeometric','hypergeometric_M','hypergeometric_U']

def is_appell_function(func):
   return func.name() in ['hypergeometric']   #[appellf1] can't find this in sagemath

def is_atom(expn):

   #debug=False
```

```
    if debug:
        print ("Enter is_atom, expn=",expn)

    if  not hasattr(expn, 'parent'):
        return False


    #thanks to answer at https://ask.sagemath.org/question/49179/what-is-sagemath-equivalent-to-atomic
    try:
        if expn.parent() is SR:
            return expn.operator() is None
        if expn.parent() in (ZZ, QQ, AA, QQbar):
            return expn in expn.parent() # Should always return True
        if hasattr(expn.parent(),"base_ring") and hasattr(expn.parent(),"gens"):
            return expn in expn.parent().base_ring() or expn in expn.parent().gens()

        return False

    except AttributeError as error:
        print("Exception,AttributeError in  is_atom")
        print ("cought exception" , type(error).__name__ )
        return False


def expnType(expn):

    if debug:
        print (">>>>>Enter expnType, expn=", expn)
        print (">>>>>is_atom(expn)=", is_atom(expn))

    if is_atom(expn):
        return 1
    elif type(expn)==list:   #isinstance(expn,list):
        return max(map(expnType, expn))   #apply(max,map(ExpnType,expn))
    elif  is_sqrt(expn):
        if  type(expn.operands()[0])==Rational: #type(isinstance(expn.args[0],Rational):
            return 1
        else:
            return max(2,expnType(expn.operands()[0]))  #max(2,expnType(expn.args[0]))
    elif expn.operator() == operator.pow:   #isinstance(expn,Pow)
        if type(expn.operands()[1])==Integer:  #isinstance(expn.args[1],Integer)
```

```
        return expnType(expn.operands()[0])   #expnType(expn.args[0])
      elif type(expn.operands()[1])==Rational:  #isinstance(expn.args[1],Rational)
        if type(expn.operands()[0])==Rational: #isinstance(expn.args[0],Rational)
          return 1
        else:
          return max(2,expnType(expn.operands()[0]))  #max(2,expnType(expn.args[0]))
      else:
        return max(3,expnType(expn.operands()[0]),expnType(expn.operands()[1])) #max(3,expnType(expr
    elif expn.operator() == add_vararg or expn.operator() == mul_vararg: #isinstance(expn,Add) or isins
      m1 = expnType(expn.operands()[0]) #expnType(expn.args[0])
      m2 = expnType(expn.operands()[1:]) #expnType(list(expn.args[1:]))
      return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.operator()):  #is_elementary_function(expn.func)
      return max(3,expnType(expn.operands()[0]))
    elif is_special_function(expn.operator()): #is_special_function(expn.func)
      m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
      return max(4,m1)   #max(4,m1)
    elif is_hypergeometric_function(expn.operator()): #is_hypergeometric_function(expn.func)
      m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
      return max(5,m1)   #max(5,m1)
    elif is_appell_function(expn.operator()):
      m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
      return max(6,m1)   #max(6,m1)
    elif str(expn).find("Integral") != -1: #this will never happen, since it
          #is checked before calling the grading function that is passed.
          #but kept it here.
      m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
      return max(8,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
      return 9

#main function
def grade_antiderivative(result,optimal):


    if debug:
      print ("Enter grade_antiderivative for sagemath")
      print("Enter grade_antiderivative, result=",result)
      print("Enter grade_antiderivative, optimal=",optimal)
      print("type(anti)=",type(result))
      print("type(optimal)=",type(optimal))
```

```
leaf_count_result  = tree_size(result) #leaf_count(result)
leaf_count_optimal = tree_size(optimal) #leaf_count(optimal)

#if debug: print ("leaf_count_result=", leaf_count_result, "leaf_count_optimal=",leaf_count_optimal)


expnType_result  = expnType(result)
expnType_optimal = expnType(optimal)

if debug: print ("expnType_result=", expnType_result, "expnType_optimal=",expnType_optimal)

if expnType_result <= expnType_optimal:
   if result.has(I):
      if optimal.has(I): #both result and optimal complex
         if leaf_count_result <= 2*leaf_count_optimal:
            grade = "A"
            grade_annotation ="none"
         else:
            grade = "B"
            grade_annotation ="Both result and optimal contain complex but leaf count of result is larger
      else: #result contains complex but optimal is not
         grade = "C"
         grade_annotation ="Result contains complex when optimal does not."
   else: # result do not contain complex, this assumes optimal do not as well
      if leaf_count_result <= 2*leaf_count_optimal:
         grade = "A"
         grade_annotation ="none"
      else:
         grade = "B"
         grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(lea
else:
   grade = "C"
   grade_annotation ="Result contains higher order function than in optimal. Order "+str(expnType_re


print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)

return grade, grade_annotation
```

4.2 Links to plain text integration problems used in this report for each CAS

1. Mathematica integration problems as .m file
2. Maple integration problems as .txt file
3. Sagemath integration problems as .sage file
4. Reduce integration problems as .txt file
5. Mupad integration problems as .txt file
6. Sympy integration problems as .py file