Mathematica 11.3 Integration Test Results

Test results for the 1378 problems in "7.3.6 Exponentials of inverse hyperbolic tangent functions.m"

Problem 15: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{2\,\text{ArcTanh}[a\,x]}}{x}\,dx$$

Optimal (type 3, 12 leaves, 3 steps):

$$\text{Log}[x]-2\,\text{Log}[1-a\,x]$$

Result (type 3, 25 leaves):

$$\text{Log}\left[1-e^{2\,\text{ArcTanh}[a\,x]}\right]+\text{Log}\left[1+e^{2\,\text{ArcTanh}[a\,x]}\right]$$

Problem 47: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{-2\,\text{ArcTanh}[a\,x]}}{x}\,dx$$

Optimal (type 3, 11 leaves, 3 steps):

$$\text{Log}[x]-2\,\text{Log}[1+a\,x]$$

Result (type 3, 25 leaves):

$$\text{Log}\left[1-e^{-2\,\text{ArcTanh}[a\,x]}\right]+\text{Log}\left[1+e^{-2\,\text{ArcTanh}[a\,x]}\right]$$

Problem 60: Unable to integrate problem.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\frac{1}{4},-\frac{1}{4},2+m,a\,x,-a\,x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Problem 61: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a x]} x^2 \, dx$$

Optimal (type 3, 282 leaves, 15 steps):

$$-\frac{3 (1-a x)^{3/4} (1+a x)^{1/4}}{8 a^3}-\frac{(1-a x)^{3/4} (1+a x)^{5/4}}{12 a^3}-\frac{x (1-a x)^{3/4} (1+a x)^{5/4}}{3 a^2}+\frac{3 \text{ArcTan}\left[1-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^3}-\frac{3 \text{ArcTan}\left[1+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^3}-\frac{3 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16 \sqrt{2} a^3}+\frac{3 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16 \sqrt{2} a^3}$$

Result (type 7, 93 leaves):

$$\frac{1}{96 a^3}\left(-\frac{8 e^{\frac{1}{2}\text{ArcTanh}[a x]} \left(9+6 e^{2 \text{ArcTanh}[a x]}+29 e^{4 \text{ArcTanh}[a x]}\right)}{\left(1+e^{2 \text{ArcTanh}[a x]}\right)^3}-9 \text{RootSum}\left[1+\#1^4 \&, \frac{\text{ArcTanh}[a x]-2 \text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3} \&\right]\right)$$

Problem 62: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a x]} x \, dx$$

Optimal (type 3, 255 leaves, 14 steps):

$$-\frac{(1-a x)^{3/4} (1+a x)^{1/4}}{4 a^2}-\frac{(1-a x)^{3/4} (1+a x)^{5/4}}{2 a^2}+\frac{\text{ArcTan}\left[1-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{4 \sqrt{2} a^2}-\frac{\text{ArcTan}\left[1+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{4 \sqrt{2} a^2}-\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^2}+\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^2}$$

Result (type 7, 83 leaves):

$$\frac{1}{16 a^2}\left(-\frac{8 e^{\frac{1}{2}\text{ArcTanh}[a x]} \left(1+5 e^{2 \text{ArcTanh}[a x]}\right)}{\left(1+e^{2 \text{ArcTanh}[a x]}\right)^2}+\text{RootSum}\left[1+\#1^4 \&, \frac{-\text{ArcTanh}[a x]+2 \text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3} \&\right]\right)$$

Problem 63: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\,dx$$

Optimal (type 3, 222 leaves, 13 steps):

$$-\frac{(1-a\,x)^{3/4}\,(1+a\,x)^{1/4}}{a}+\frac{\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}\,a}-\frac{\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}\,a}-\frac{\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{2\,\sqrt{2}\,a}+\frac{\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{2\,\sqrt{2}\,a}$$

Result (type 7, 71 leaves):

$$\frac{-\frac{8\,e^{\frac{1}{2}\text{ArcTanh}[a\,x]}}{1+e^{2\,\text{ArcTanh}[a\,x]}}+\text{RootSum}\left[1+\#1^4\,\&,\,\frac{-\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]}{4\,a}$$

Problem 64: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{2}\text{ArcTanh}[a\,x]}}{x}\,dx$$

Optimal (type 3, 227 leaves, 17 steps):

$$-2\,\text{ArcTan}\left[\frac{(1+a\,x)^{1/4}}{(1-a\,x)^{1/4}}\right]+\sqrt{2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]-\sqrt{2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]-2\,\text{ArcTanh}\left[\frac{(1+a\,x)^{1/4}}{(1-a\,x)^{1/4}}\right]-\frac{\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}}+\frac{\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 87 leaves):

$$-2\,\text{ArcTan}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\right]+\text{Log}\left[1-e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\right]-\text{Log}\left[1+e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\right]+\frac{1}{2}\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{-\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]$$

Problem 70: Unable to integrate problem.

$$\int e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\,\frac{3}{4},\,-\frac{3}{4},\,2+m,\,a\,x,\,-a\,x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Problem 71: Result is not expressed in closed-form.

$$\int e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,x^3\,dx$$

Optimal (type 3, 290 leaves, 15 steps):

$$-\frac{41\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{64\,a^4}-\frac{x^2\,(1-a\,x)^{1/4}\,(1+a\,x)^{7/4}}{4\,a^2}-\frac{(1-a\,x)^{1/4}\,(1+a\,x)^{7/4}\,(11+4\,a\,x)}{32\,a^4}+\frac{123\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}-\frac{123\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}+\frac{123\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}-\frac{123\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}$$

Result (type 7, 103 leaves):

$$\frac{1}{256\,a^4}\left(-\left(\left(8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,\left(41+183\,e^{2\,\text{ArcTanh}[a\,x]}+147\,e^{4\,\text{ArcTanh}[a\,x]}+133\,e^{6\,\text{ArcTanh}[a\,x]}\right)\right)\Big/\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4\right)-123\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]\right)$$

Problem 72: Result is not expressed in closed-form.

$$\int e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,x^2\,dx$$

Optimal (type 3, 282 leaves, 15 steps):

$$-\frac{17\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{24\,a^3}-\frac{(1-a\,x)^{1/4}\,(1+a\,x)^{7/4}}{4\,a^3}-\frac{x\,(1-a\,x)^{1/4}\,(1+a\,x)^{7/4}}{3\,a^2}+\frac{17\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}-\frac{17\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}+\frac{17\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}-\frac{17\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}$$

Result (type 7, 93 leaves):

$$\frac{1}{96\,a^3}\left(-\frac{8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(17+30\,e^{2\,\text{ArcTanh}[a\,x]}+45\,e^{4\,\text{ArcTanh}[a\,x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^3}-51\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]\right)$$

Problem 73: Result is not expressed in closed-form.

$$\int e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,x\,dx$$

Optimal (type 3, 255 leaves, 14 steps):

$$-\frac{3\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{4\,a^2}-\frac{(1-a\,x)^{1/4}\,(1+a\,x)^{7/4}}{2\,a^2}+\frac{9\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{4\,\sqrt{2}\,a^2}-\frac{9\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{4\,\sqrt{2}\,a^2}+\frac{9\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^2}-\frac{9\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^2}$$

Result (type 7, 84 leaves):

$$\frac{1}{a^2}\left(-\frac{e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(3+7\,e^{2\,\text{ArcTanh}[a\,x]}\right)}{2\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2}-\frac{9}{16}\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]\right)$$

Problem 74: Result is not expressed in closed-form.

$$\int e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,dx$$

Optimal (type 3, 223 leaves, 13 steps):

$$-\frac{(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{a}+\frac{3\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}\,a}-\frac{3\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}\,a}+\frac{3\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{2\,\sqrt{2}\,a}-\frac{3\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{2\,\sqrt{2}\,a}$$

Result (type 7, 72 leaves):

$$-\frac{2\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}}{a\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)}-\frac{3\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{4\,a}$$

Problem 75: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{3}{2}\text{ArcTanh}[a\,x]}}{x}\,dx$$

Optimal (type 3, 227 leaves, 17 steps):

$$2\,\text{ArcTan}\left[\frac{(1+a\,x)^{1/4}}{(1-a\,x)^{1/4}}\right]+\sqrt{2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]-\sqrt{2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]-$$
$$2\,\text{ArcTanh}\left[\frac{(1+a\,x)^{1/4}}{(1-a\,x)^{1/4}}\right]+\frac{\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}}-\frac{\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 87 leaves):

$$2\,\text{ArcTan}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\right]+\text{Log}\left[1-e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\right]-\text{Log}\left[1+e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\right]+$$
$$\frac{1}{2}\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{-\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]$$

Problem 80: Unable to integrate problem.

$$\int e^{\frac{5}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\ \frac{5}{4},\ -\frac{5}{4},\ 2+m,\ a\,x,\ -a\,x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{\frac{5}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Problem 81: Result is not expressed in closed-form.

$$\int e^{\frac{5}{2}\text{ArcTanh}[a\,x]}\,x^3\,dx$$

Optimal (type 3, 317 leaves, 16 steps):

$$\frac{475\,(1-a x)^{3/4}\,(1+a x)^{1/4}}{64\,a^4}+\frac{4\,x^3\,(1+a x)^{5/4}}{a\,(1-a x)^{1/4}}+\frac{17\,x^2\,(1-a x)^{3/4}\,(1+a x)^{5/4}}{4\,a^2}+\frac{(1-a x)^{3/4}\,(1+a x)^{5/4}\,(521+452\,a x)}{96\,a^4}-\frac{475\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}+\frac{475\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}+\frac{475\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}-\frac{475\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}$$

Result (type 7, 114 leaves):

$$\frac{1}{a^4}\left(\left(e^{\frac{1}{2}\text{ArcTanh}[a x]}\left(1425+5415\,e^{2\,\text{ArcTanh}[a x]}+7483\,e^{4\,\text{ArcTanh}[a x]}+4645\,e^{6\,\text{ArcTanh}[a x]}+768\,e^{8\,\text{ArcTanh}[a x]}\right)\right)\Big/\left(96\,\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^4\right)+\frac{475}{256}\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 82: Result is not expressed in closed-form.

$$\int e^{\frac{5}{2}\text{ArcTanh}[a x]}\,x^2\,dx$$

Optimal (type 3, 305 leaves, 16 steps):

$$\frac{55\,(1-a x)^{3/4}\,(1+a x)^{1/4}}{8\,a^3}+\frac{11\,(1-a x)^{3/4}\,(1+a x)^{5/4}}{4\,a^3}+\frac{2\,(1+a x)^{9/4}}{a^3\,(1-a x)^{1/4}}+\frac{(1-a x)^{3/4}\,(1+a x)^{9/4}}{3\,a^3}-\frac{55\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}+\frac{55\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}+\frac{55\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}-\frac{55\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}$$

Result (type 7, 104 leaves):

$$\frac{1}{a^3}\left(\left(e^{\frac{1}{2}\text{ArcTanh}[a x]}\left(165+462\,e^{2\,\text{ArcTanh}[a x]}+425\,e^{4\,\text{ArcTanh}[a x]}+96\,e^{6\,\text{ArcTanh}[a x]}\right)\right)\Big/\left(12\,\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^3\right)+\frac{55}{32}\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 83: Result is not expressed in closed-form.

$$\int e^{\frac{5}{2}\text{ArcTanh}[a\,x]}\,x\,dx$$

Optimal (type 3, 279 leaves, 15 steps):

$$\frac{25\,(1-a\,x)^{3/4}\,(1+a\,x)^{1/4}}{4\,a^2}+\frac{5\,(1-a\,x)^{3/4}\,(1+a\,x)^{5/4}}{2\,a^2}+\frac{2\,(1+a\,x)^{9/4}}{a^2\,(1-a\,x)^{1/4}}-\frac{25\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{4\,\sqrt{2}\,a^2}+$$
$$\frac{25\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{4\,\sqrt{2}\,a^2}+\frac{25\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^2}-\frac{25\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^2}$$

Result (type 7, 94 leaves):

$$\frac{1}{a^2}\left(\frac{e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\left(25+45\,e^{2\,\text{ArcTanh}[a\,x]}+16\,e^{4\,\text{ArcTanh}[a\,x]}\right)}{2\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2}+\right.$$
$$\left.\frac{25}{16}\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 84: Result is not expressed in closed-form.

$$\int e^{\frac{5}{2}\text{ArcTanh}[a\,x]}\,dx$$

Optimal (type 3, 247 leaves, 14 steps):

$$\frac{5\,(1-a\,x)^{3/4}\,(1+a\,x)^{1/4}}{a}+\frac{4\,(1+a\,x)^{5/4}}{a\,(1-a\,x)^{1/4}}-\frac{5\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}\,a}+$$
$$\frac{5\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}\,a}+\frac{5\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{2\,\sqrt{2}\,a}-\frac{5\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{2\,\sqrt{2}\,a}$$

Result (type 7, 83 leaves):

$$\frac{1}{4\,a}\left(\frac{8\,e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\left(5+4\,e^{2\,\text{ArcTanh}[a\,x]}\right)}{1+e^{2\,\text{ArcTanh}[a\,x]}}+\right.$$
$$\left.5\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 85: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{5}{2}\text{ArcTanh}[a x]}}{x}\, dx$$

Optimal (type 3, 248 leaves, 19 steps):

$$\frac{8\left(1+a x\right)^{1/4}}{\left(1-a x\right)^{1/4}}-2\,\text{ArcTan}\left[\frac{\left(1+a x\right)^{1/4}}{\left(1-a x\right)^{1/4}}\right]-\sqrt{2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\left(1-a x\right)^{1/4}}{\left(1+a x\right)^{1/4}}\right]+$$
$$\sqrt{2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\left(1-a x\right)^{1/4}}{\left(1+a x\right)^{1/4}}\right]-2\,\text{ArcTanh}\left[\frac{\left(1+a x\right)^{1/4}}{\left(1-a x\right)^{1/4}}\right]+$$
$$\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}}-\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 97 leaves):

$$8\,e^{\frac{1}{2}\text{ArcTanh}[a x]}-2\,\text{ArcTan}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}\right]+\text{Log}\left[1-e^{\frac{1}{2}\text{ArcTanh}[a x]}\right]-$$
$$\text{Log}\left[1+e^{\frac{1}{2}\text{ArcTanh}[a x]}\right]+\frac{1}{2}\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]$$

Problem 90: Unable to integrate problem.

$$\int e^{-\frac{1}{2}\text{ArcTanh}[a x]}\, x^m\, dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\ -\frac{1}{4},\ \frac{1}{4},\ 2+m,\ a x,\ -a x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{-\frac{1}{2}\text{ArcTanh}[a x]}\, x^m\, dx$$

Problem 91: Result is not expressed in closed-form.

$$\int e^{-\frac{1}{2}\text{ArcTanh}[a x]}\, x^3\, dx$$

Optimal (type 3, 290 leaves, 15 steps):

$$-\frac{11\,(1-a x)^{1/4}\,(1+a x)^{3/4}}{64\,a^4}-\frac{x^2\,(1-a x)^{5/4}\,(1+a x)^{3/4}}{4\,a^2}-\frac{(25-4 a x)\,(1-a x)^{5/4}\,(1+a x)^{3/4}}{96\,a^4}-\frac{11\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{64\sqrt{2}\,a^4}+\frac{11\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{64\sqrt{2}\,a^4}-\frac{11\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{128\sqrt{2}\,a^4}+\frac{11\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{128\sqrt{2}\,a^4}$$

Result (type 7, 103 leaves):

$$\frac{1}{768\,a^4}\left(-\left(\left(8\,e^{\frac{3}{2}\text{ArcTanh}[a x]}\left(245+107\,e^{2\,\text{ArcTanh}[a x]}+279\,e^{4\,\text{ArcTanh}[a x]}+33\,e^{6\,\text{ArcTanh}[a x]}\right)\right)\Big/\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^4\right)+33\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 92: Result is not expressed in closed-form.

$$\int e^{-\frac{1}{2}\text{ArcTanh}[a x]}\,x^2\,dx$$

Optimal (type 3, 282 leaves, 15 steps):

$$\frac{3\,(1-a x)^{1/4}\,(1+a x)^{3/4}}{8\,a^3}+\frac{(1-a x)^{5/4}\,(1+a x)^{3/4}}{12\,a^3}-\frac{x\,(1-a x)^{5/4}\,(1+a x)^{3/4}}{3\,a^2}+\frac{3\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8\sqrt{2}\,a^3}-\frac{3\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8\sqrt{2}\,a^3}+\frac{3\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16\sqrt{2}\,a^3}-\frac{3\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16\sqrt{2}\,a^3}$$

Result (type 7, 93 leaves):

$$\frac{1}{96\,a^3}\left(\frac{8\,e^{\frac{3}{2}\text{ArcTanh}[a x]}\left(29+6\,e^{2\,\text{ArcTanh}[a x]}+9\,e^{4\,\text{ArcTanh}[a x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^3}-9\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 93: Result is not expressed in closed-form.

$$\int e^{-\frac{1}{2}\text{ArcTanh}[a x]}\,x\,dx$$

Optimal (type 3, 255 leaves, 14 steps):

$$-\frac{(1-a x)^{1/4}(1+a x)^{3/4}}{4 a^2}-\frac{(1-a x)^{5/4}(1+a x)^{3/4}}{2 a^2}-\frac{\text{ArcTan}\left[1-\frac{\sqrt{2}(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{4\sqrt{2}a^2}+\frac{\text{ArcTan}\left[1+\frac{\sqrt{2}(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{4\sqrt{2}a^2}-\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8\sqrt{2}a^2}+\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8\sqrt{2}a^2}$$

Result (type 7, 79 leaves):

$$\frac{1}{16 a^2}\left(-\frac{8 e^{\frac{3}{2}\text{ArcTanh}[a x]}\left(5+e^{2\text{ArcTanh}[a x]}\right)}{\left(1+e^{2\text{ArcTanh}[a x]}\right)^2}+\text{RootSum}\left[1+\#1^4\&,\frac{\text{ArcTanh}[a x]+2\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\&\right]\right)$$

Problem 94: Result is not expressed in closed-form.

$$\int e^{-\frac{1}{2}\text{ArcTanh}[a x]}\,dx$$

Optimal (type 3, 221 leaves, 13 steps):

$$\frac{(1-a x)^{1/4}(1+a x)^{3/4}}{a}+\frac{\text{ArcTan}\left[1-\frac{\sqrt{2}(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}a}-\frac{\text{ArcTan}\left[1+\frac{\sqrt{2}(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}a}+\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{2\sqrt{2}a}-\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{2\sqrt{2}a}$$

Result (type 7, 69 leaves):

$$-\frac{1}{4 a}\left(-\frac{8 e^{\frac{3}{2}\text{ArcTanh}[a x]}}{1+e^{2\text{ArcTanh}[a x]}}+\text{RootSum}\left[1+\#1^4\&,\frac{\text{ArcTanh}[a x]+2\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\&\right]\right)$$

Problem 95: Result is not expressed in closed-form.

$$\int \frac{e^{-\frac{1}{2}\text{ArcTanh}[a x]}}{x}\,dx$$

Optimal (type 3, 227 leaves, 17 steps):

$$2\,\text{ArcTan}\left[\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]-\sqrt{2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]+\sqrt{2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]-2\,\text{ArcTanh}\left[\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]-\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}}+\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 85 leaves):

$$-2\,\text{ArcTan}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\right]+\text{Log}\left[1-e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\right]-\text{Log}\left[1+e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\right]+\frac{1}{2}\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]$$

Problem 100: Unable to integrate problem.

$$\int e^{-\frac{3}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\,-\frac{3}{4},\,\frac{3}{4},\,2+m,\,a\,x,\,-a\,x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{-\frac{3}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Problem 101: Result is not expressed in closed-form.

$$\int e^{-\frac{3}{2}\text{ArcTanh}[a\,x]}\,x^3\,dx$$

Optimal (type 3, 290 leaves, 15 steps):

$$-\frac{41\,(1-a\,x)^{3/4}\,(1+a\,x)^{1/4}}{64\,a^4}-\frac{x^2\,(1-a\,x)^{7/4}\,(1+a\,x)^{1/4}}{4\,a^2}-\frac{(11-4\,a\,x)\,(1-a\,x)^{7/4}\,(1+a\,x)^{1/4}}{32\,a^4}-\frac{123\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}+\frac{123\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}+\frac{123\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}-\frac{123\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}$$

Result (type 7, 103 leaves):

$$\frac{1}{256\,a^4}\left(-\left(\left(8\,e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\left(133+147\,e^{2\,\text{ArcTanh}[a\,x]}+183\,e^{4\,\text{ArcTanh}[a\,x]}+41\,e^{6\,\text{ArcTanh}[a\,x]}\right)\right)\Big/\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4\right)+123\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]\right)$$

Problem 102: Result is not expressed in closed-form.

$$\int e^{-\frac{3}{2}\text{ArcTanh}[a\,x]}\,x^2\,dx$$

Optimal (type 3, 282 leaves, 15 steps):

$$\frac{17\left(1-a x\right)^{3/4}\left(1+a x\right)^{1/4}}{24 a^3}+\frac{\left(1-a x\right)^{7/4}\left(1+a x\right)^{1/4}}{4 a^3}-\frac{x\left(1-a x\right)^{7/4}\left(1+a x\right)^{1/4}}{3 a^2}+\frac{17\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8\sqrt{2}\,a^3}-\frac{17\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8\sqrt{2}\,a^3}-\frac{17\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16\sqrt{2}\,a^3}+\frac{17\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16\sqrt{2}\,a^3}$$

Result (type 7, 93 leaves):

$$\frac{1}{96 a^3}\left(\frac{8\,e^{\frac{1}{2}\text{ArcTanh}[a x]}\left(45+30\,e^{2\,\text{ArcTanh}[a x]}+17\,e^{4\,\text{ArcTanh}[a x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^3}-51\,\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1}\,\&\right]\right)$$

Problem 103: Result is not expressed in closed-form.

$$\int e^{-\frac{3}{2}\text{ArcTanh}[a x]}\,x\,dx$$

Optimal (type 3, 255 leaves, 14 steps):

$$-\frac{3\left(1-a x\right)^{3/4}\left(1+a x\right)^{1/4}}{4 a^2}-\frac{\left(1-a x\right)^{7/4}\left(1+a x\right)^{1/4}}{2 a^2}-\frac{9\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{4\sqrt{2}\,a^2}+\frac{9\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{4\sqrt{2}\,a^2}+\frac{9\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8\sqrt{2}\,a^2}-\frac{9\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8\sqrt{2}\,a^2}$$

Result (type 7, 84 leaves):

$$\frac{1}{a^2}\left(-\frac{e^{\frac{1}{2}\text{ArcTanh}[a x]}\left(7+3\,e^{2\,\text{ArcTanh}[a x]}\right)}{2\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^2}+\frac{9}{16}\,\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1}\,\&\right]\right)$$

Problem 104: Result is not expressed in closed-form.

$$\int e^{-\frac{3}{2}\text{ArcTanh}[a x]}\,dx$$

Optimal (type 3, 222 leaves, 13 steps):

$$\frac{(1-a x)^{3/4}(1+a x)^{1/4}}{a}+\frac{3\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}\,a}-\frac{3\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}\,a}-\frac{3\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{2\sqrt{2}\,a}+\frac{3\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{2\sqrt{2}\,a}$$

Result (type 7, 72 leaves):

$$\frac{2\,e^{-\frac{3}{2}\text{ArcTanh}[a x]}}{a\left(1+e^{-2\,\text{ArcTanh}[a x]}\right)}-\frac{3\,\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1}\,\&\right]}{4\,a}$$

Problem 105: Result is not expressed in closed-form.

$$\int\frac{e^{-\frac{3}{2}\text{ArcTanh}[a x]}}{x}\,dx$$

Optimal (type 3, 227 leaves, 17 steps):

$$-2\,\text{ArcTan}\left[\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]-\sqrt{2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]+\sqrt{2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]-2\,\text{ArcTanh}\left[\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]+\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}}-\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 85 leaves):

$$2\,\text{ArcTan}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}\right]+\text{Log}\left[1-e^{-\frac{1}{2}\text{ArcTanh}[a x]}\right]-\text{Log}\left[1+e^{-\frac{1}{2}\text{ArcTanh}[a x]}\right]+\frac{1}{2}\,\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1}\,\&\right]$$

Problem 110: Unable to integrate problem.

$$\int e^{-\frac{5}{2}\text{ArcTanh}[a x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,-\frac{5}{4},\frac{5}{4},2+m,a x,-a x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{-\frac{5}{2}\text{ArcTanh}[a x]}\,x^m\,dx$$

Problem 111: Result is not expressed in closed-form.

$$\int e^{-\frac{5}{2}\text{ArcTanh}[a x]} x^3 \, dx$$

Optimal (type 3, 317 leaves, 16 steps):

$$-\frac{4 x^3 (1-a x)^{5/4}}{a (1+a x)^{1/4}}+\frac{475 (1-a x)^{1/4} (1+a x)^{3/4}}{64 a^4}+\frac{17 x^2 (1-a x)^{5/4} (1+a x)^{3/4}}{4 a^2}+\frac{(521-452 a x) (1-a x)^{5/4} (1+a x)^{3/4}}{96 a^4}+\frac{475 \text{ArcTan}\left[1-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{64 \sqrt{2} a^4}-\frac{475 \text{ArcTan}\left[1+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{64 \sqrt{2} a^4}+\frac{475 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{128 \sqrt{2} a^4}-\frac{475 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{128 \sqrt{2} a^4}$$

Result (type 7, 114 leaves):

$$\frac{1}{a^4}\left(\left(e^{-\frac{1}{2}\text{ArcTanh}[a x]} \left(768+4645 e^{2 \text{ArcTanh}[a x]}+7483 e^{4 \text{ArcTanh}[a x]}+5415 e^{6 \text{ArcTanh}[a x]}+1425 e^{8 \text{ArcTanh}[a x]}\right)\right)\Big/\left(96 \left(1+e^{2 \text{ArcTanh}[a x]}\right)^4\right)-\frac{475}{256} \text{RootSum}\left[1+\#1^4\&,\frac{\text{ArcTanh}[a x]+2 \text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\&\right]\right)$$

Problem 112: Result is not expressed in closed-form.

$$\int e^{-\frac{5}{2}\text{ArcTanh}[a x]} x^2 \, dx$$

Optimal (type 3, 305 leaves, 16 steps):

$$-\frac{2 (1-a x)^{9/4}}{a^3 (1+a x)^{1/4}}-\frac{55 (1-a x)^{1/4} (1+a x)^{3/4}}{8 a^3}-\frac{11 (1-a x)^{5/4} (1+a x)^{3/4}}{4 a^3}-\frac{(1-a x)^{9/4} (1+a x)^{3/4}}{3 a^3}-\frac{55 \text{ArcTan}\left[1-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^3}+\frac{55 \text{ArcTan}\left[1+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^3}-\frac{55 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16 \sqrt{2} a^3}+\frac{55 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16 \sqrt{2} a^3}$$

Result (type 7, 104 leaves):

$$\frac{1}{a^3}\left(-\left(\left(e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\left(96+425\,e^{2\,\text{ArcTanh}[a\,x]}+462\,e^{4\,\text{ArcTanh}[a\,x]}+165\,e^{6\,\text{ArcTanh}[a\,x]}\right)\right)\Big/\left(12\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^3\right)\right)+\frac{55}{32}\,\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 113: Result is not expressed in closed-form.

$$\int e^{-\frac{5}{2}\text{ArcTanh}[a\,x]}\,x\,dx$$

Optimal (type 3, 279 leaves, 15 steps):

$$\frac{2\,(1-a\,x)^{9/4}}{a^2\,(1+a\,x)^{1/4}}+\frac{25\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{4\,a^2}+\frac{5\,(1-a\,x)^{5/4}\,(1+a\,x)^{3/4}}{2\,a^2}+\frac{25\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{4\sqrt{2}\,a^2}-\frac{25\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{4\sqrt{2}\,a^2}+\frac{25\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\sqrt{2}\,a^2}-\frac{25\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\sqrt{2}\,a^2}$$

Result (type 7, 94 leaves):

$$\frac{1}{a^2}\left(\frac{e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\left(16+45\,e^{2\,\text{ArcTanh}[a\,x]}+25\,e^{4\,\text{ArcTanh}[a\,x]}\right)}{2\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2}-\frac{25}{16}\,\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 114: Result is not expressed in closed-form.

$$\int e^{-\frac{5}{2}\text{ArcTanh}[a\,x]}\,dx$$

Optimal (type 3, 247 leaves, 14 steps):

$$-\frac{4\,(1-a\,x)^{5/4}}{a\,(1+a\,x)^{1/4}}-\frac{5\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{a}-\frac{5\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}\,a}+\frac{5\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}\,a}-\frac{5\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{2\sqrt{2}\,a}+\frac{5\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{2\sqrt{2}\,a}$$

Result (type 7, 83 leaves):

$$\frac{1}{4a}\left(-\frac{8\,e^{-\frac{1}{2}\text{ArcTanh}[a x]}\left(4+5\,e^{2\,\text{ArcTanh}[a x]}\right)}{1+e^{2\,\text{ArcTanh}[a x]}}+5\,\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 115: Result is not expressed in closed-form.

$$\int \frac{e^{-\frac{5}{2}\text{ArcTanh}[a x]}}{x}\,dx$$

Optimal (type 3, 248 leaves, 19 steps):

$$\frac{8\,(1-a x)^{1/4}}{(1+a x)^{1/4}}+2\,\text{ArcTan}\left[\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]+\sqrt{2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]-\sqrt{2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]-2\,\text{ArcTanh}\left[\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]+\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}}-\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 99 leaves):

$$8\,e^{-\frac{1}{2}\text{ArcTanh}[a x]}-2\,\text{ArcTan}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}\right]+\text{Log}\left[1-e^{-\frac{1}{2}\text{ArcTanh}[a x]}\right]-\text{Log}\left[1+e^{-\frac{1}{2}\text{ArcTanh}[a x]}\right]+\frac{1}{2}\,\text{RootSum}\left[1+\#1^4\,\&,\frac{-\text{ArcTanh}[a x]-2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]$$

Problem 120: Unable to integrate problem.

$$\int e^{\frac{\text{ArcTanh}[x]}{3}}\,x^m\,dx$$

Optimal (type 6, 28 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\frac{1}{6},-\frac{1}{6},2+m,x,-x\right]}{1+m}$$

Result (type 8, 14 leaves):

$$\int e^{\frac{\text{ArcTanh}[x]}{3}}\,x^m\,dx$$

Problem 121: Result is not expressed in closed-form.

$$\int e^{\frac{\text{ArcTanh}[x]}{3}}\,x^2\,dx$$

Optimal (type 3, 245 leaves, 16 steps):

$$-\frac{19}{54}(1-x)^{5/6}(1+x)^{1/6}-\frac{1}{18}(1-x)^{5/6}(1+x)^{7/6}-\frac{1}{3}(1-x)^{5/6}x(1+x)^{7/6}-\frac{19}{81}\text{ArcTan}\left[\frac{(1-x)^{1/6}}{(1+x)^{1/6}}\right]+\frac{19}{162}\text{ArcTan}\left[\sqrt{3}-\frac{2(1-x)^{1/6}}{(1+x)^{1/6}}\right]-\frac{19}{162}\text{ArcTan}\left[\sqrt{3}+\frac{2(1-x)^{1/6}}{(1+x)^{1/6}}\right]-\frac{19\,\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}-\frac{\sqrt{3}(1-x)^{1/6}}{(1+x)^{1/6}}\right]}{108\sqrt{3}}+\frac{19\,\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}+\frac{\sqrt{3}(1-x)^{1/6}}{(1+x)^{1/6}}\right]}{108\sqrt{3}}$$

Result (type 7, 133 leaves):

$$\frac{1}{486}\left(-\frac{18\,e^{\frac{\text{ArcTanh}[x]}{3}}\left(19+8\,e^{2\,\text{ArcTanh}[x]}+61\,e^{4\,\text{ArcTanh}[x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[x]}\right)^3}+114\,\text{ArcTan}\left[e^{\frac{\text{ArcTanh}[x]}{3}}\right]+19\,\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\frac{1}{-\#1+2\,\#1^3}\left(-2\,\text{ArcTanh}[x]+6\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]+\text{ArcTanh}[x]\,\#1^2-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2\right)\&\right]\right)$$

Problem 122: Result is not expressed in closed-form.

$$\int e^{\frac{\text{ArcTanh}[x]}{3}}\,x\,dx$$

Optimal (type 3, 224 leaves, 15 steps):

$$-\frac{1}{6}(1-x)^{5/6}(1+x)^{1/6}-\frac{1}{2}(1-x)^{5/6}(1+x)^{7/6}-\frac{1}{9}\text{ArcTan}\left[\frac{(1-x)^{1/6}}{(1+x)^{1/6}}\right]+\frac{1}{18}\text{ArcTan}\left[\sqrt{3}-\frac{2(1-x)^{1/6}}{(1+x)^{1/6}}\right]-\frac{1}{18}\text{ArcTan}\left[\sqrt{3}+\frac{2(1-x)^{1/6}}{(1+x)^{1/6}}\right]-\frac{\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}-\frac{\sqrt{3}(1-x)^{1/6}}{(1+x)^{1/6}}\right]}{12\sqrt{3}}+\frac{\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}+\frac{\sqrt{3}(1-x)^{1/6}}{(1+x)^{1/6}}\right]}{12\sqrt{3}}$$

Result (type 7, 127 leaves):

$$\frac{1}{9}\left(-\frac{3\,e^{\frac{\text{ArcTanh}[x]}{3}}\left(1+7\,e^{2\,\text{ArcTanh}[x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[x]}\right)^2}+\text{ArcTan}\left[e^{\frac{\text{ArcTanh}[x]}{3}}\right]\right)-\frac{1}{54}\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\frac{1}{-\#1+2\,\#1^3}\left(2\,\text{ArcTanh}[x]-6\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]-\text{ArcTanh}[x]\,\#1^2+3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2\right)\&\right]$$

Problem 123: Result is not expressed in closed-form.

$$\int e^{\frac{\text{ArcTanh}[x]}{3}}\,dx$$

Optimal (type 3, 202 leaves, 14 steps):

$$-(1-x)^{5/6}(1+x)^{1/6}-\frac{2}{3}\text{ArcTan}\left[\frac{(1-x)^{1/6}}{(1+x)^{1/6}}\right]+\frac{1}{3}\text{ArcTan}\left[\sqrt{3}-\frac{2(1-x)^{1/6}}{(1+x)^{1/6}}\right]-\frac{1}{3}\text{ArcTan}\left[\sqrt{3}+\frac{2(1-x)^{1/6}}{(1+x)^{1/6}}\right]-\frac{\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}-\frac{\sqrt{3}(1-x)^{1/6}}{(1+x)^{1/6}}\right]}{2\sqrt{3}}+\frac{\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}+\frac{\sqrt{3}(1-x)^{1/6}}{(1+x)^{1/6}}\right]}{2\sqrt{3}}$$

Result (type 7, 116 leaves):

$$-\frac{2e^{\frac{\text{ArcTanh}[x]}{3}}}{1+e^{2\,\text{ArcTanh}[x]}}+\frac{2}{3}\text{ArcTan}\left[e^{\frac{\text{ArcTanh}[x]}{3}}\right]-\frac{1}{9}\text{RootSum}\Big[1-\#1^2+\#1^4\,\&,\ \frac{1}{-\#1+2\#1^3}\left(2\,\text{ArcTanh}[x]-6\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]-\text{ArcTanh}[x]\,\#1^2+3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2\right)\&\Big]$$

Problem 124: Result is not expressed in closed-form.

$$\int\frac{e^{\frac{\text{ArcTanh}[x]}{3}}}{x}\,dx$$

Optimal (type 3, 346 leaves, 25 steps):

$$-2\,\text{ArcTan}\left[\frac{(1-x)^{1/6}}{(1+x)^{1/6}}\right]+\text{ArcTan}\left[\sqrt{3}-\frac{2(1-x)^{1/6}}{(1+x)^{1/6}}\right]-\text{ArcTan}\left[\sqrt{3}+\frac{2(1-x)^{1/6}}{(1+x)^{1/6}}\right]+\sqrt{3}\,\text{ArcTan}\left[\frac{1-\frac{2(1+x)^{1/6}}{(1-x)^{1/6}}}{\sqrt{3}}\right]-\sqrt{3}\,\text{ArcTan}\left[\frac{1+\frac{2(1+x)^{1/6}}{(1-x)^{1/6}}}{\sqrt{3}}\right]-2\,\text{ArcTanh}\left[\frac{(1+x)^{1/6}}{(1-x)^{1/6}}\right]-\frac{1}{2}\sqrt{3}\,\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}-\frac{\sqrt{3}(1-x)^{1/6}}{(1+x)^{1/6}}\right]+\frac{1}{2}\sqrt{3}\,\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}+\frac{\sqrt{3}(1-x)^{1/6}}{(1+x)^{1/6}}\right]+\frac{1}{2}\text{Log}\left[1-\frac{(1+x)^{1/6}}{(1-x)^{1/6}}+\frac{(1+x)^{1/3}}{(1-x)^{1/3}}\right]-\frac{1}{2}\text{Log}\left[1+\frac{(1+x)^{1/6}}{(1-x)^{1/6}}+\frac{(1+x)^{1/3}}{(1-x)^{1/3}}\right]$$

Result (type 7, 220 leaves):

$$2\,\text{ArcTan}\left[e^{\frac{\text{ArcTanh}[x]}{3}}\right]-\sqrt{3}\,\text{ArcTan}\left[\frac{-1+2e^{\frac{\text{ArcTanh}[x]}{3}}}{\sqrt{3}}\right]-\sqrt{3}\,\text{ArcTan}\left[\frac{1+2e^{\frac{\text{ArcTanh}[x]}{3}}}{\sqrt{3}}\right]+\text{Log}\left[1-e^{\frac{\text{ArcTanh}[x]}{3}}\right]-\text{Log}\left[1+e^{\frac{\text{ArcTanh}[x]}{3}}\right]+\frac{1}{2}\text{Log}\left[1-e^{\frac{\text{ArcTanh}[x]}{3}}+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-\frac{1}{2}\text{Log}\left[1+e^{\frac{\text{ArcTanh}[x]}{3}}+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-\frac{1}{3}\text{RootSum}\Big[1-\#1^2+\#1^4\,\&,\ \frac{1}{-\#1+2\#1^3}\left(2\,\text{ArcTanh}[x]-6\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]-\text{ArcTanh}[x]\,\#1^2+3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2\right)\&\Big]$$

Problem 127: Unable to integrate problem.

$$\int e^{\frac{2\,\text{ArcTanh}[x]}{3}}\,x^m\,dx$$

Optimal (type 6, 28 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\frac{1}{3},-\frac{1}{3},2+m,x,-x\right]}{1+m}$$

Result (type 8, 14 leaves):

$$\int e^{\frac{2\,\text{ArcTanh}[x]}{3}}\,x^m\,dx$$

Problem 128: Result is not expressed in closed-form.

$$\int e^{\frac{2\,\text{ArcTanh}[x]}{3}}\,x^2\,dx$$

Optimal (type 3, 133 leaves, 5 steps):

$$-\frac{11}{27}(1-x)^{2/3}(1+x)^{1/3}-\frac{1}{9}(1-x)^{2/3}(1+x)^{4/3}-\frac{1}{3}(1-x)^{2/3}x(1+x)^{4/3}+\frac{22\,\text{ArcTan}\left[\frac{1}{\sqrt{3}}-\frac{2(1-x)^{1/3}}{\sqrt{3}(1+x)^{1/3}}\right]}{27\sqrt{3}}+\frac{11}{81}\text{Log}[1+x]+\frac{11}{27}\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}\right]$$

Result (type 7, 154 leaves):

$$\frac{2}{243}\left(-\frac{324\,e^{\frac{2\,\text{ArcTanh}[x]}{3}}}{\left(1+e^{2\,\text{ArcTanh}[x]}\right)^3}+\frac{540\,e^{\frac{2\,\text{ArcTanh}[x]}{3}}}{\left(1+e^{2\,\text{ArcTanh}[x]}\right)^2}-\frac{315\,e^{\frac{2\,\text{ArcTanh}[x]}{3}}}{1+e^{2\,\text{ArcTanh}[x]}}-22\,\text{ArcTanh}[x]+33\,\text{Log}\left[1+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-11\,\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\frac{1}{-2+\#1^2}\left(\text{ArcTanh}[x]-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]+\text{ArcTanh}[x]\,\#1^2-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2\right)\&\right]\right)$$

Problem 129: Result is not expressed in closed-form.

$$\int e^{\frac{2\,\text{ArcTanh}[x]}{3}}\,x\,dx$$

Optimal (type 3, 112 leaves, 4 steps):

$$-\frac{1}{3}(1-x)^{2/3}(1+x)^{1/3}-\frac{1}{2}(1-x)^{2/3}(1+x)^{4/3}+\frac{2\,\text{ArcTan}\left[\frac{1}{\sqrt{3}}-\frac{2(1-x)^{1/3}}{\sqrt{3}(1+x)^{1/3}}\right]}{3\sqrt{3}}+\frac{1}{9}\text{Log}[1+x]+\frac{1}{3}\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}\right]$$

Result (type 7, 124 leaves):

$$\frac{2}{27}\left(-\frac{9\,e^{\frac{2\,\text{ArcTanh}[x]}{3}}\left(1+4\,e^{2\,\text{ArcTanh}[x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[x]}\right)^2}-2\,\text{ArcTanh}[x]+3\,\text{Log}\left[1+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\right.\right.$$
$$\left.\left.\frac{1}{-2+\#1^2}\left(\text{ArcTanh}[x]-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]+\text{ArcTanh}[x]\,\#1^2-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2\right)\&\right]\right)$$

Problem 130: Result is not expressed in closed-form.

$$\int e^{\frac{2\,\text{ArcTanh}[x]}{3}}\,dx$$

Optimal (type 3, 84 leaves, 3 steps):

$$-(1-x)^{2/3}\,(1+x)^{1/3}+\frac{2\,\text{ArcTan}\left[\frac{1}{\sqrt{3}}-\frac{2\,(1-x)^{1/3}}{\sqrt{3}\,(1+x)^{1/3}}\right]}{\sqrt{3}}+\frac{1}{3}\,\text{Log}[1+x]+\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}\right]$$

Result (type 7, 116 leaves):

$$-\frac{2\,e^{\frac{2\,\text{ArcTanh}[x]}{3}}}{1+e^{2\,\text{ArcTanh}[x]}}-\frac{4\,\text{ArcTanh}[x]}{9}+\frac{2}{3}\,\text{Log}\left[1+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-\frac{2}{9}\,\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\right.$$
$$\left.\frac{1}{-2+\#1^2}\left(\text{ArcTanh}[x]-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]+\text{ArcTanh}[x]\,\#1^2-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2\right)\&\right]$$

Problem 131: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{2\,\text{ArcTanh}[x]}{3}}}{x}\,dx$$

Optimal (type 3, 135 leaves, 4 steps):

$$\sqrt{3}\,\text{ArcTan}\left[\frac{1}{\sqrt{3}}-\frac{2\,(1-x)^{1/3}}{\sqrt{3}\,(1+x)^{1/3}}\right]+\sqrt{3}\,\text{ArcTan}\left[\frac{1}{\sqrt{3}}+\frac{2\,(1-x)^{1/3}}{\sqrt{3}\,(1+x)^{1/3}}\right]-$$
$$\frac{\text{Log}[x]}{2}+\frac{1}{2}\,\text{Log}[1+x]+\frac{3}{2}\,\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}\right]+\frac{3}{2}\,\text{Log}\left[(1-x)^{1/3}-(1+x)^{1/3}\right]$$

Result (type 7, 215 leaves):

$$-\sqrt{3}\,\text{ArcTan}\left[\frac{-1+2\,e^{\frac{\text{ArcTanh}[x]}{3}}}{\sqrt{3}}\right]+\sqrt{3}\,\text{ArcTan}\left[\frac{1+2\,e^{\frac{\text{ArcTanh}[x]}{3}}}{\sqrt{3}}\right]-$$
$$\frac{2\,\text{ArcTanh}[x]}{3}+\text{Log}\left[1-e^{\frac{\text{ArcTanh}[x]}{3}}\right]+\text{Log}\left[1+e^{\frac{\text{ArcTanh}[x]}{3}}\right]+\text{Log}\left[1+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-$$
$$\frac{1}{2}\,\text{Log}\left[1-e^{\frac{\text{ArcTanh}[x]}{3}}+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-\frac{1}{2}\,\text{Log}\left[1+e^{\frac{\text{ArcTanh}[x]}{3}}+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-\frac{1}{3}\,\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\right.$$
$$\left.\frac{1}{-2+\#1^2}\left(\text{ArcTanh}[x]-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]+\text{ArcTanh}[x]\,\#1^2-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2\right)\&\right]$$

Problem 134: Unable to integrate problem.

$$\int e^{\frac{1}{4}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\frac{1}{8},-\frac{1}{8},2+m,a\,x,-a\,x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{\frac{1}{4}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Problem 135: Result is not expressed in closed-form.

$$\int e^{\frac{1}{4}\text{ArcTanh}[a\,x]}\,x^2\,dx$$

Optimal (type 3, 646 leaves, 27 steps):

$$-\frac{11\,(1-a\,x)^{7/8}\,(1+a\,x)^{1/8}}{32\,a^3}-\frac{(1-a\,x)^{7/8}\,(1+a\,x)^{9/8}}{24\,a^3}-\frac{x\,(1-a\,x)^{7/8}\,(1+a\,x)^{9/8}}{3\,a^2}+$$
$$\frac{11\sqrt{2+\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}-\frac{2\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{128\,a^3}+\frac{11\sqrt{2-\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}-\frac{2\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{128\,a^3}-$$
$$\frac{11\sqrt{2+\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}+\frac{2\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{128\,a^3}-\frac{11\sqrt{2-\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}+\frac{2\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{128\,a^3}-$$
$$\frac{11\sqrt{2-\sqrt{2}}\,\text{Log}\left[1+\frac{(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}-\frac{\sqrt{2-\sqrt{2}}\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}\right]}{256\,a^3}+\frac{11\sqrt{2-\sqrt{2}}\,\text{Log}\left[1+\frac{(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}+\frac{\sqrt{2-\sqrt{2}}\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}\right]}{256\,a^3}-$$
$$\frac{11\sqrt{2+\sqrt{2}}\,\text{Log}\left[1+\frac{(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}-\frac{\sqrt{2+\sqrt{2}}\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}\right]}{256\,a^3}+\frac{11\sqrt{2+\sqrt{2}}\,\text{Log}\left[1+\frac{(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}+\frac{\sqrt{2+\sqrt{2}}\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}\right]}{256\,a^3}$$

Result (type 7, 94 leaves):

$$\frac{1}{a^3}\left(-\frac{e^{\frac{1}{4}\text{ArcTanh}[a\,x]}\left(33+10\,e^{2\,\text{ArcTanh}[a\,x]}+105\,e^{4\,\text{ArcTanh}[a\,x]}\right)}{48\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^3}-\right.$$
$$\left.\frac{11}{512}\,\text{RootSum}\left[1+\#1^8\,\&,\frac{\text{ArcTanh}[a\,x]-4\,\text{Log}\left[e^{\frac{1}{4}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^7}\,\&\right]\right)$$

Problem 136: Result is not expressed in closed-form.

$$\int e^{\frac{1}{4}\text{ArcTanh}[a\,x]}\,x\,dx$$

Optimal (type 3, 619 leaves, 26 steps):

$$-\frac{(1-a\,x)^{7/8}\,(1+a\,x)^{1/8}}{8\,a^2}-\frac{(1-a\,x)^{7/8}\,(1+a\,x)^{9/8}}{2\,a^2}+\frac{\sqrt{2+\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}-\frac{2\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{32\,a^2}+\frac{\sqrt{2-\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}-\frac{2\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{32\,a^2}-\frac{\sqrt{2+\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}+\frac{2\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{32\,a^2}-\frac{\sqrt{2-\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}+\frac{2\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{32\,a^2}-\frac{\sqrt{2-\sqrt{2}}\,\text{Log}\left[1+\frac{(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}-\frac{\sqrt{2-\sqrt{2}}\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}\right]}{64\,a^2}+\frac{\sqrt{2-\sqrt{2}}\,\text{Log}\left[1+\frac{(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}+\frac{\sqrt{2-\sqrt{2}}\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}\right]}{64\,a^2}-\frac{\sqrt{2+\sqrt{2}}\,\text{Log}\left[1+\frac{(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}-\frac{\sqrt{2+\sqrt{2}}\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}\right]}{64\,a^2}+\frac{\sqrt{2+\sqrt{2}}\,\text{Log}\left[1+\frac{(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}+\frac{\sqrt{2+\sqrt{2}}\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}\right]}{64\,a^2}$$

Result (type 7, 83 leaves):

$$\frac{1}{128\,a^2}\left(-\frac{32\,e^{\frac{1}{4}\text{ArcTanh}[a\,x]}\left(1+9\,e^{2\,\text{ArcTanh}[a\,x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2}+\text{RootSum}\left[1+\#1^8\,\&,\ \frac{-\text{ArcTanh}[a\,x]+4\,\text{Log}\left[e^{\frac{1}{4}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^7}\,\&\right]\right)$$

Problem 137: Result is not expressed in closed-form.

$$\int e^{\frac{1}{4}\text{ArcTanh}[a\,x]}\,dx$$

Optimal (type 3, 591 leaves, 25 steps):

$$-\frac{(1-a x)^{7/8} (1+a x)^{1/8}}{a}+\frac{\sqrt{2+\sqrt{2}}\ \text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}-\frac{2 (1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{4 a}+\frac{\sqrt{2-\sqrt{2}}\ \text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}-\frac{2 (1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{4 a}-$$

$$\frac{\sqrt{2+\sqrt{2}}\ \text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}+\frac{2 (1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{4 a}-\frac{\sqrt{2-\sqrt{2}}\ \text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}+\frac{2 (1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{4 a}-$$

$$\frac{\sqrt{2-\sqrt{2}}\ \text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}-\frac{\sqrt{2-\sqrt{2}}\ (1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{8 a}+\frac{\sqrt{2-\sqrt{2}}\ \text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}+\frac{\sqrt{2-\sqrt{2}}\ (1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{8 a}-$$

$$\frac{\sqrt{2+\sqrt{2}}\ \text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}-\frac{\sqrt{2+\sqrt{2}}\ (1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{8 a}+\frac{\sqrt{2+\sqrt{2}}\ \text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}+\frac{\sqrt{2+\sqrt{2}}\ (1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{8 a}$$

Result (type 7, 71 leaves):

$$\frac{-\frac{32\, e^{\frac{1}{4}\text{ArcTanh}[a x]}}{1+e^{2\,\text{ArcTanh}[a x]}}+\text{RootSum}\left[1+\#1^8\ \&,\ \frac{-\text{ArcTanh}[a x]+4\,\text{Log}\left[e^{\frac{1}{4}\text{ArcTanh}[a x]}-\#1\right]}{\#1^7}\ \&\right]}{16 a}$$

Problem 138: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{4}\text{ArcTanh}[a x]}}{x}\, dx$$

Optimal (type 3, 759 leaves, 39 steps):

$$-2\,\text{ArcTan}\left[\frac{(1+a\,x)^{1/8}}{(1-a\,x)^{1/8}}\right]+\sqrt{2+\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}-\frac{2\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]+$$

$$\sqrt{2-\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}-\frac{2\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]-\sqrt{2+\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}+\frac{2\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]-$$

$$\sqrt{2-\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}+\frac{2\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]+\sqrt{2}\;\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1+a\,x)^{1/8}}{(1-a\,x)^{1/8}}\right]-$$

$$\sqrt{2}\;\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1+a\,x)^{1/8}}{(1-a\,x)^{1/8}}\right]-2\,\text{ArcTanh}\left[\frac{(1+a\,x)^{1/8}}{(1-a\,x)^{1/8}}\right]-$$

$$\frac{1}{2}\sqrt{2-\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}-\frac{\sqrt{2-\sqrt{2}}\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}\right]+$$

$$\frac{1}{2}\sqrt{2-\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}+\frac{\sqrt{2-\sqrt{2}}\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}\right]-$$

$$\frac{1}{2}\sqrt{2+\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}-\frac{\sqrt{2+\sqrt{2}}\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}\right]+$$

$$\frac{1}{2}\sqrt{2+\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}+\frac{\sqrt{2+\sqrt{2}}\,(1-a\,x)^{1/8}}{(1+a\,x)^{1/8}}\right]+$$

$$\frac{\text{Log}\left[1-\frac{\sqrt{2}\,(1+a\,x)^{1/8}}{(1-a\,x)^{1/8}}+\frac{(1+a\,x)^{1/4}}{(1-a\,x)^{1/4}}\right]}{\sqrt{2}}-\frac{\text{Log}\left[1+\frac{\sqrt{2}\,(1+a\,x)^{1/8}}{(1-a\,x)^{1/8}}+\frac{(1+a\,x)^{1/4}}{(1-a\,x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 128 leaves):

$$-2\,\text{ArcTan}\left[e^{\frac{1}{4}\text{ArcTanh}[a\,x]}\right]+\text{Log}\left[1-e^{\frac{1}{4}\text{ArcTanh}[a\,x]}\right]-\text{Log}\left[1+e^{\frac{1}{4}\text{ArcTanh}[a\,x]}\right]+$$

$$\frac{1}{4}\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a\,x]-4\,\text{Log}\left[e^{\frac{1}{4}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]+$$

$$\frac{1}{4}\,\text{RootSum}\left[1+\#1^8\,\&,\ \frac{-\text{ArcTanh}[a\,x]+4\,\text{Log}\left[e^{\frac{1}{4}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^7}\,\&\right]$$

Problem 139: Result is not expressed in closed-form.

$$\int\frac{e^{\frac{1}{4}\text{ArcTanh}[a\,x]}}{x^2}\,dx$$

Optimal (type 3, 271 leaves, 16 steps):

$$-\frac{(1-a x)^{7/8} (1+a x)^{1/8}}{x}-\frac{1}{2} a \text{ArcTan}\left[\frac{(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]+$$
$$\frac{a \text{ArcTan}\left[1-\frac{\sqrt{2} (1+a x)^{1/8}}{(1-a x)^{1/8}}\right]}{2 \sqrt{2}}-\frac{a \text{ArcTan}\left[1+\frac{\sqrt{2} (1+a x)^{1/8}}{(1-a x)^{1/8}}\right]}{2 \sqrt{2}}-\frac{1}{2} a \text{ArcTanh}\left[\frac{(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]+$$
$$\frac{a \text{Log}\left[1-\frac{\sqrt{2} (1+a x)^{1/8}}{(1-a x)^{1/8}}+\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]}{4 \sqrt{2}}-\frac{a \text{Log}\left[1+\frac{\sqrt{2} (1+a x)^{1/8}}{(1-a x)^{1/8}}+\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]}{4 \sqrt{2}}$$

Result (type 7, 113 leaves):

$$\frac{1}{16} a \left(4 \left(-\frac{8 e^{\frac{1}{4} \text{ArcTanh}[a x]}}{-1+e^{2 \text{ArcTanh}[a x]}}-2 \text{ArcTan}\left[e^{\frac{1}{4} \text{ArcTanh}[a x]}\right]+\text{Log}\left[1-e^{\frac{1}{4} \text{ArcTanh}[a x]}\right]-\text{Log}\left[1+e^{\frac{1}{4} \text{ArcTanh}[a x]}\right]\right)+\right.$$
$$\left.\text{RootSum}\left[1+\text{#1}^4\&,\frac{\text{ArcTanh}[a x]-4 \text{Log}\left[e^{\frac{1}{4} \text{ArcTanh}[a x]}-\text{#1}\right]}{\text{#1}^3}\&\right]\right)$$

Problem 140: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{4} \text{ArcTanh}[a x]}}{x^3} \, dx$$

Optimal (type 3, 312 leaves, 17 steps):

$$-\frac{a (1-a x)^{7/8} (1+a x)^{1/8}}{8 x}-\frac{(1-a x)^{7/8} (1+a x)^{9/8}}{2 x^2}-\frac{1}{16} a^2 \text{ArcTan}\left[\frac{(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]+$$
$$\frac{a^2 \text{ArcTan}\left[1-\frac{\sqrt{2} (1+a x)^{1/8}}{(1-a x)^{1/8}}\right]}{16 \sqrt{2}}-\frac{a^2 \text{ArcTan}\left[1+\frac{\sqrt{2} (1+a x)^{1/8}}{(1-a x)^{1/8}}\right]}{16 \sqrt{2}}-\frac{1}{16} a^2 \text{ArcTanh}\left[\frac{(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]+$$
$$\frac{a^2 \text{Log}\left[1-\frac{\sqrt{2} (1+a x)^{1/8}}{(1-a x)^{1/8}}+\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]}{32 \sqrt{2}}-\frac{a^2 \text{Log}\left[1+\frac{\sqrt{2} (1+a x)^{1/8}}{(1-a x)^{1/8}}+\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]}{32 \sqrt{2}}$$

Result (type 7, 139 leaves):

$$\frac{1}{128} a^2 \left(4 \left(-\frac{64 e^{\frac{1}{4} \text{ArcTanh}[a x]}}{\left(-1+e^{2 \text{ArcTanh}[a x]}\right)^2}-\frac{72 e^{\frac{1}{4} \text{ArcTanh}[a x]}}{-1+e^{2 \text{ArcTanh}[a x]}}-2 \text{ArcTan}\left[e^{\frac{1}{4} \text{ArcTanh}[a x]}\right]+\text{Log}\left[1-e^{\frac{1}{4} \text{ArcTanh}[a x]}\right]-\right.\right.$$
$$\left.\left.\text{Log}\left[1+e^{\frac{1}{4} \text{ArcTanh}[a x]}\right]\right)+\text{RootSum}\left[1+\text{#1}^4\&,\frac{\text{ArcTanh}[a x]-4 \text{Log}\left[e^{\frac{1}{4} \text{ArcTanh}[a x]}-\text{#1}\right]}{\text{#1}^3}\&\right]\right)$$

Problem 142: Result unnecessarily involves higher level functions.

$$\int e^{3\,\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 5, 151 leaves, 9 steps):

$$-\frac{3\,x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{1+m}-\frac{a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{2+m}+\frac{4\,x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{1+m}+\frac{4\,a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{2+m}$$

Result (type 6, 265 leaves):

$$\left(2\,(2+m)\,x^{1+m}\,\sqrt{-1-a\,x}\,\left(\left(2\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,-a\,x,a\,x\right]\right)\Big/\left(2\,(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,-a\,x,a\,x\right]+a\,x\left(3\,\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{5}{2},3+m,-a\,x,a\,x\right]+\text{AppellF1}\left[2+m,\frac{1}{2},\frac{3}{2},3+m,-a\,x,a\,x\right]\right)\right)-\left(\sqrt{1-a\,x}\,\sqrt{1-a^2\,x^2}\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,-a\,x,a\,x\right]\right)\Big/\left(\sqrt{1+a\,x}\,\left(2\,(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,-a\,x,a\,x\right]+a\,x\left(\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{3}{2},3+m,-a\,x,a\,x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2\,x^2\right]\right)\right)\right)\right)\right)\Big/\left((1+m)\,(-1+a\,x)^{3/2}\right)$$

Problem 144: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int e^{\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 5, 74 leaves, 4 steps):

$$\frac{x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{1+m}+\frac{a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{2+m}$$

Result (type 6, 166 leaves):

$$\left(2\,(2+m)\,x^{1+m}\,\sqrt{-1-a\,x}\,\sqrt{1-a\,x}\,\sqrt{1-a^2\,x^2}\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,-a\,x,a\,x\right]\right)\Big/\left((1+m)\,(-1+a\,x)^{3/2}\,\sqrt{1+a\,x}\left(2\,(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,-a\,x,a\,x\right]+a\,x\left(\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{3}{2},3+m,-a\,x,a\,x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2\,x^2\right]\right)\right)\right)$$

Problem 145: Result unnecessarily involves higher level functions.

$$\int e^{-\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 5, 75 leaves, 4 steps):

$$\frac{x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{1+m}-\frac{a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{2+m}$$

Result (type 6, 134 leaves):

$$\left(2\,(2+m)\,x^{1+m}\,\sqrt{1-a\,x}\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,a\,x,-a\,x\right]\right)\Big/\left((1+m)\,\sqrt{1+a\,x}\left(2\,(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,a\,x,-a\,x\right]-a\,x\left(\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{3}{2},3+m,a\,x,-a\,x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2\,x^2\right]\right)\right)\right)$$

Problem 147: Result unnecessarily involves higher level functions.

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 5, 150 leaves, 9 steps):

$$-\frac{3\,x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{1+m}+\frac{a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{2+m}+\frac{4\,x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{1+m}-\frac{4\,a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{2+m}$$

Result (type 6, 237 leaves):

$$\left(2\,(2+m)\,x^{1+m}\sqrt{1-a\,x}\,\left(\left(2\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,a\,x,-a\,x\right]\right)\Big/\left(2\,(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,a\,x,-a\,x\right]-a\,x\left(3\,\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{5}{2},3+m,a\,x,-a\,x\right]+\text{AppellF1}\left[2+m,\frac{1}{2},\frac{3}{2},3+m,a\,x,-a\,x\right]\right)\right)+\left((1+a\,x)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,a\,x,-a\,x\right]\right)\Big/\left(-2\,(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,a\,x,-a\,x\right]+a\,x\left(\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{3}{2},3+m,a\,x,-a\,x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2x^2\right]\right)\right)\right)\right)\Big/\left((1+m)\,(1+a\,x)^{3/2}\right)$$

Problem 148: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 6, 35 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\frac{n}{2},-\frac{n}{2},2+m,a\,x,-a\,x\right]}{1+m}$$

Result (type 8, 14 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Problem 211: Unable to integrate problem.

$$\int \frac{e^{-2\,\text{ArcTanh}[a\,x]}}{c-a\,c\,x}\,dx$$

Optimal (type 3, 13 leaves, 2 steps):

$$\frac{\text{Log}[1+a\,x]}{a\,c}$$

Result (type 8, 20 leaves):

$$\int \frac{e^{-2\,\text{ArcTanh}[a\,x]}}{c-a\,c\,x}\,dx$$

Problem 212: Unable to integrate problem.

$$\int \frac{e^{-2\,\text{ArcTanh}[a\,x]}}{(c-a\,c\,x)^2}\,dx$$

Optimal (type 3, 11 leaves, 3 steps):

$$\frac{\text{ArcTanh}[a\,x]}{a\,c^2}$$

Result (type 8, 20 leaves):

$$\int \frac{e^{-2\,\text{ArcTanh}[a\,x]}}{(c-a\,c\,x)^2}\,dx$$

Problem 278: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^{7/2}\,dx$$

Optimal (type 5, 81 leaves, 3 steps):

$$-\frac{1}{a\,c\,(9-n)}2^{1+\frac{n}{2}}\,(1-a\,x)^{-n/2}\,(c-a\,c\,x)^{9/2}\,\text{Hypergeometric2F1}\left[\frac{9-n}{2},-\frac{n}{2},\frac{11-n}{2},\frac{1}{2}\,(1-a\,x)\right]$$

Result (type 8, 22 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^{7/2}\,dx$$

Problem 279: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^{5/2}\,dx$$

Optimal (type 5, 81 leaves, 3 steps):

$$-\frac{1}{a\,c\,(7-n)}2^{1+\frac{n}{2}}\,(1-a\,x)^{-n/2}\,(c-a\,c\,x)^{7/2}\,\text{Hypergeometric2F1}\left[\frac{7-n}{2},-\frac{n}{2},\frac{9-n}{2},\frac{1}{2}\,(1-a\,x)\right]$$

Result (type 8, 22 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^{5/2}\,dx$$

Problem 280: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^{3/2}\,dx$$

Optimal (type 5, 81 leaves, 3 steps):

$$-\frac{1}{a\,c\,(5-n)}2^{1+\frac{n}{2}}\,(1-a\,x)^{-n/2}\,(c-a\,c\,x)^{5/2}\,\text{Hypergeometric2F1}\left[\frac{5-n}{2},-\frac{n}{2},\frac{7-n}{2},\frac{1}{2}\,(1-a\,x)\right]$$

Result (type 8, 22 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^{3/2}\,dx$$

Problem 281: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,\sqrt{c-a\,c\,x}\,dx$$

Optimal (type 5, 81 leaves, 3 steps):

$$-\frac{1}{a\,c\,(3-n)}2^{1+\frac{n}{2}}\,(1-a\,x)^{-n/2}\,(c-a\,c\,x)^{3/2}\,\text{Hypergeometric2F1}\left[\frac{3-n}{2},\,-\frac{n}{2},\,\frac{5-n}{2},\,\frac{1}{2}\,(1-a\,x)\right]$$

Result (type 8, 22 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,\sqrt{c-a\,c\,x}\,dx$$

Problem 282: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}}{\sqrt{c-a\,c\,x}}\,dx$$

Optimal (type 5, 81 leaves, 3 steps):

$$-\frac{1}{a\,c\,(1-n)}2^{1+\frac{n}{2}}\,(1-a\,x)^{-n/2}\,\sqrt{c-a\,c\,x}\,\text{Hypergeometric2F1}\left[\frac{1-n}{2},\,-\frac{n}{2},\,\frac{3-n}{2},\,\frac{1}{2}\,(1-a\,x)\right]$$

Result (type 8, 22 leaves):

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}}{\sqrt{c-a\,c\,x}}\,dx$$

Problem 283: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}}{(c-a\,c\,x)^{3/2}}\,dx$$

Optimal (type 5, 78 leaves, 3 steps):

$$\left(2^{1+\frac{n}{2}}\,(1-a\,x)^{-n/2}\,\text{Hypergeometric2F1}\left[\frac{1}{2}\,(-1-n),\,-\frac{n}{2},\,\frac{1-n}{2},\,\frac{1}{2}\,(1-a\,x)\right]\right)\Big/\left(a\,c\,(1+n)\,\sqrt{c-a\,c\,x}\right)$$

Result (type 8, 22 leaves):

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}}{(c-a\,c\,x)^{3/2}}\,dx$$

Problem 284: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}}{(c-a\,c\,x)^{5/2}}\,dx$$

Optimal (type 5, 78 leaves, 3 steps):

$$\left(2^{1+\frac{n}{2}} (1-a x)^{-n/2} \text{Hypergeometric2F1}\left[\frac{1}{2} (-3-n), -\frac{n}{2}, \frac{1}{2} (-1-n), \frac{1}{2} (1-a x)\right]\right) \Big/ \left(a c (3+n) (c-a c x)^{3/2}\right)$$

Result (type 8, 22 leaves):

$$\int \frac{e^{n \text{ArcTanh}[a x]}}{(c-a c x)^{5/2}} \, dx$$

Problem 285: Unable to integrate problem.

$$\int \frac{e^{n \text{ArcTanh}[a x]}}{(c-a c x)^{7/2}} \, dx$$

Optimal (type 5, 78 leaves, 3 steps):

$$\left(2^{1+\frac{n}{2}} (1-a x)^{-n/2} \text{Hypergeometric2F1}\left[\frac{1}{2} (-5-n), -\frac{n}{2}, \frac{1}{2} (-3-n), \frac{1}{2} (1-a x)\right]\right) \Big/ \left(a c (5+n) (c-a c x)^{5/2}\right)$$

Result (type 8, 22 leaves):

$$\int \frac{e^{n \text{ArcTanh}[a x]}}{(c-a c x)^{7/2}} \, dx$$

Problem 378: Result more than twice size of optimal antiderivative.

$$\int e^{\text{ArcTanh}[x]} \sqrt{1-x} \, dx$$

Optimal (type 2, 11 leaves, 3 steps):

$$\frac{2}{3} (1+x)^{3/2}$$

Result (type 2, 27 leaves):

$$\frac{2 (1+x) \sqrt{1-x^2}}{3 \sqrt{1-x}}$$

Problem 387: Unable to integrate problem.

$$\int e^{\text{ArcTanh}[a x]} x^m \sqrt{c-a c x} \, dx$$

Optimal (type 5, 64 leaves, 4 steps):

$$\frac{1}{3 a \sqrt{c-a c x}} 2 c x^m (-a x)^{-m} (1+a x) \sqrt{1-a^2 x^2} \text{Hypergeometric2F1}\left[\frac{3}{2}, -m, \frac{5}{2}, 1+a x\right]$$

Result (type 8, 23 leaves):

$$\int e^{\text{ArcTanh}[a x]} x^m \sqrt{c-a c x} \, dx$$

Problem 411: Unable to integrate problem.

$$\int e^{-\text{ArcTanh}[a x]}\, x^m \sqrt{c - a c x}\, dx$$

Optimal (type 5, 114 leaves, 5 steps):

$$-\frac{2 c x^{1+m} \sqrt{1 - a^2 x^2}}{(3 + 2 m) \sqrt{c - a c x}} + \left(2 (5 + 4 m) x^m (-a x)^{-m} (1 + a x) \sqrt{c - a c x}\, \text{Hypergeometric2F1}\left[\frac{1}{2}, -m, \frac{3}{2}, 1 + a x\right]\right) \Big/ \left(a (3 + 2 m) \sqrt{1 - a^2 x^2}\right)$$

Result (type 8, 25 leaves):

$$\int e^{-\text{ArcTanh}[a x]}\, x^m \sqrt{c - a c x}\, dx$$

Problem 437: Unable to integrate problem.

$$\int e^{-2 p\, \text{ArcTanh}[a x]}\, (c - a c x)^p\, dx$$

Optimal (type 5, 61 leaves, 3 steps):

$$-\frac{1}{a c (1 + 2 p)} 2^{-p} (1 - a x)^p (c - a c x)^{1+p}\, \text{Hypergeometric2F1}\left[p, 1 + 2 p, 2 (1 + p), \frac{1}{2} (1 - a x)\right]$$

Result (type 8, 21 leaves):

$$\int e^{-2 p\, \text{ArcTanh}[a x]}\, (c - a c x)^p\, dx$$

Problem 439: Unable to integrate problem.

$$\int e^{n\, \text{ArcTanh}[a x]}\, (c - a c x)^p\, dx$$

Optimal (type 5, 82 leaves, 3 steps):

$$-\frac{1}{a c (2 - n + 2 p)} 2^{1+\frac{n}{2}} (1 - a x)^{-n/2} (c - a c x)^{1+p}\, \text{Hypergeometric2F1}\left[-\frac{n}{2}, 1 - \frac{n}{2} + p, 2 - \frac{n}{2} + p, \frac{1}{2} (1 - a x)\right]$$

Result (type 8, 20 leaves):

$$\int e^{n\, \text{ArcTanh}[a x]}\, (c - a c x)^p\, dx$$

Problem 440: Result more than twice size of optimal antiderivative.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^3\,dx$$

Optimal (type 5, 68 leaves, 2 steps):

$$-\frac{2^{1+\frac{n}{2}}\,c^3\,(1-a\,x)^{4-\frac{n}{2}}\,\text{Hypergeometric2F1}\left[4-\frac{n}{2},-\frac{n}{2},5-\frac{n}{2},\frac{1}{2}\,(1-a\,x)\right]}{a\,(8-n)}$$

Result (type 5, 195 leaves):

$$-\frac{1}{24\,a\,(2+n)}c^3\,e^{n\,\text{ArcTanh}[a\,x]}\left(-e^{2\,\text{ArcTanh}[a\,x]}\,n\,\left(-48+44\,n-12\,n^2+n^3\right)\,\text{Hypergeometric2F1}\left[1,1+\frac{n}{2},2+\frac{n}{2},-e^{2\,\text{ArcTanh}[a\,x]}\right]+(2+n)\,\left(a\,n^3\,x+n^2\,\left(-1-12\,a\,x+a^2\,x^2\right)+2\,n\,\left(6+21\,a\,x-6\,a^2\,x^2+a^3\,x^3\right)+6\,\left(-7-4\,a\,x+6\,a^2\,x^2-4\,a^3\,x^3+a^4\,x^4\right)+\left(-48+44\,n-12\,n^2+n^3\right)\,\text{Hypergeometric2F1}\left[1,\frac{n}{2},1+\frac{n}{2},-e^{2\,\text{ArcTanh}[a\,x]}\right]\right)\right)$$

Problem 441: Result more than twice size of optimal antiderivative.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^2\,dx$$

Optimal (type 5, 68 leaves, 2 steps):

$$-\frac{2^{1+\frac{n}{2}}\,c^2\,(1-a\,x)^{3-\frac{n}{2}}\,\text{Hypergeometric2F1}\left[3-\frac{n}{2},-\frac{n}{2},4-\frac{n}{2},\frac{1}{2}\,(1-a\,x)\right]}{a\,(6-n)}$$

Result (type 5, 149 leaves):

$$\frac{1}{6\,a\,(2+n)}c^2\,e^{n\,\text{ArcTanh}[a\,x]}\left(-e^{2\,\text{ArcTanh}[a\,x]}\,n\,\left(8-6\,n+n^2\right)\,\text{Hypergeometric2F1}\left[1,1+\frac{n}{2},2+\frac{n}{2},-e^{2\,\text{ArcTanh}[a\,x]}\right]+(2+n)\,\left(6+6\,a\,x+a\,n^2\,x-6\,a^2\,x^2+2\,a^3\,x^3+n\,\left(-1-6\,a\,x+a^2\,x^2\right)+\left(8-6\,n+n^2\right)\,\text{Hypergeometric2F1}\left[1,\frac{n}{2},1+\frac{n}{2},-e^{2\,\text{ArcTanh}[a\,x]}\right]\right)\right)$$

Problem 447: Unable to integrate problem.

$$\int e^{\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^p\,dx$$

Optimal (type 6, 60 leaves, 3 steps):

$$\frac{\left(c-\frac{c}{a x}\right)^p x (1-a x)^{-p} \text{AppellF1}\left[1-p,\frac{1}{2}-p,-\frac{1}{2},2-p,a x,-a x\right]}{1-p}$$

Result (type 8, 22 leaves) :

$$\int e^{\text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^p \, dx$$

Problem 456: Unable to integrate problem.

$$\int e^{2 \text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^p \, dx$$

Optimal (type 5, 59 leaves, 6 steps) :

$$-\left(c-\frac{c}{a x}\right)^p x-\frac{(2-p) \left(c-\frac{c}{a x}\right)^p \text{Hypergeometric2F1}\left[1,p,1+p,1-\frac{1}{a x}\right]}{a p}$$

Result (type 8, 24 leaves) :

$$\int e^{2 \text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^p \, dx$$

Problem 474: Unable to integrate problem.

$$\int e^{4 \text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^p \, dx$$

Optimal (type 5, 93 leaves, 7 steps) :

$$-\frac{c (5-p) \left(c-\frac{c}{a x}\right)^{-1+p}}{a (1-p)}+c \left(c-\frac{c}{a x}\right)^{-1+p} x+\frac{(4-p) \left(c-\frac{c}{a x}\right)^p \text{Hypergeometric2F1}\left[1,p,1+p,1-\frac{1}{a x}\right]}{a p}$$

Result (type 8, 24 leaves) :

$$\int e^{4 \text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^p \, dx$$

Problem 484: Unable to integrate problem.

$$\int e^{-\text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^p \, dx$$

Optimal (type 6, 60 leaves, 3 steps) :

$$\frac{\left(c-\frac{c}{a x}\right)^p x (1-a x)^{-p} \text{AppellF1}\left[1-p,-\frac{1}{2}-p,\frac{1}{2},2-p,a x,-a x\right]}{1-p}$$

Result (type 8, 24 leaves) :

$$\int e^{-\text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^p \, dx$$

Problem 493: Unable to integrate problem.

$$\int e^{-2\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^p\,dx$$

Optimal (type 5, 114 leaves, 8 steps):

$$-\frac{\left(c-\frac{c}{a\,x}\right)^{2+p}x}{c^2}-\frac{\left(c-\frac{c}{a\,x}\right)^{2+p}\text{Hypergeometric2F1}\left[1,\,2+p,\,3+p,\,\frac{a-\frac{1}{x}}{2\,a}\right]}{2\,a\,c^2\,(2+p)}+\frac{\left(c-\frac{c}{a\,x}\right)^{2+p}\text{Hypergeometric2F1}\left[1,\,2+p,\,3+p,\,1-\frac{1}{a\,x}\right]}{a\,c^2}$$

Result (type 8, 24 leaves):

$$\int e^{-2\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^p\,dx$$

Problem 499: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{-2\,\text{ArcTanh}[a\,x]}}{\left(c-\frac{c}{a\,x}\right)^2}\,dx$$

Optimal (type 3, 18 leaves, 5 steps):

$$-\frac{x}{c^2}+\frac{\text{ArcTanh}[a\,x]}{a\,c^2}$$

Result (type 3, 40 leaves):

$$-\frac{x}{c^2}-\frac{\text{Log}[1-a\,x]}{2\,a\,c^2}+\frac{\text{Log}[1+a\,x]}{2\,a\,c^2}$$

Problem 510: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^{9/2}\,dx$$

Optimal (type 3, 225 leaves, 8 steps):

$$-\frac{a^3\left(c-\frac{c}{a\,x}\right)^{9/2}x^4\,(54-227\,a\,x)\,\sqrt{1+a\,x}}{105\,(1-a\,x)^{9/2}}-\frac{10\,a^2\left(c-\frac{c}{a\,x}\right)^{9/2}x^3\,\sqrt{1+a\,x}}{21\,(1-a\,x)^{5/2}}+\frac{2\,a\left(c-\frac{c}{a\,x}\right)^{9/2}x^2\,\sqrt{1+a\,x}}{5\,(1-a\,x)^{3/2}}-\frac{2\left(c-\frac{c}{a\,x}\right)^{9/2}x\,\sqrt{1+a\,x}}{7\,\sqrt{1-a\,x}}-\frac{7\,a^{7/2}\left(c-\frac{c}{a\,x}\right)^{9/2}x^{9/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{(1-a\,x)^{9/2}}$$

Result (type 3, 151 leaves):

$$-\left(\left(c^4 \sqrt{c-\frac{c}{a x}} \sqrt{1-a^2 x^2} \left(-30+162 a x-356 a^2 x^2+292 a^3 x^3+105 a^4 x^4\right)\right) \Big/ \left(105 a^4 x^3 \left(-1+a x\right)\right)\right)-\frac{7 i c^{9/2} \text{Log}\left[-i \sqrt{c} \left(1+2 a x\right)+\frac{2 a \sqrt{c-\frac{c}{a x}} x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 511: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^{7/2} dx$$

Optimal (type 3, 181 leaves, 7 steps):

$$\frac{2 a \left(c-\frac{c}{a x}\right)^{7/2} x^2 \sqrt{1+a x}}{3 \left(1-a x\right)^{3/2}}-\frac{2 \left(c-\frac{c}{a x}\right)^{7/2} x \sqrt{1+a x}}{5 \sqrt{1-a x}}-\frac{a^2 \left(c-\frac{c}{a x}\right)^{7/2} x^3 \sqrt{1+a x} \left(18+31 a x\right)}{15 \left(1-a x\right)^{7/2}}+\frac{5 a^{5/2} \left(c-\frac{c}{a x}\right)^{7/2} x^{7/2} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{\left(1-a x\right)^{7/2}}$$

Result (type 3, 143 leaves):

$$-\frac{c^3 \sqrt{c-\frac{c}{a x}} \sqrt{1-a^2 x^2} \left(6-28 a x+56 a^2 x^2+15 a^3 x^3\right)}{15 a^3 x^2 \left(-1+a x\right)}-\frac{5 i c^{7/2} \text{Log}\left[-i \sqrt{c} \left(1+2 a x\right)+\frac{2 a \sqrt{c-\frac{c}{a x}} x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 512: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^{5/2} dx$$

Optimal (type 3, 171 leaves, 7 steps):

$$-\frac{3 a^2 \left(c-\frac{c}{a x}\right)^{5/2} x^3 \sqrt{1+a x}}{\left(1-a x\right)^{5/2}}-\frac{2 \left(c-\frac{c}{a x}\right)^{5/2} x \left(1+a x\right)^{3/2}}{3 \left(1-a x\right)^{5/2}}+\frac{4 a \left(c-\frac{c}{a x}\right)^{5/2} x^2 \left(1+a x\right)^{3/2}}{\left(1-a x\right)^{5/2}}-\frac{3 a^{3/2} \left(c-\frac{c}{a x}\right)^{5/2} x^{5/2} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{\left(1-a x\right)^{5/2}}$$

Result (type 3, 133 leaves):

$$\frac{1}{6 a^2}c^2 \left(-\frac{2 \sqrt{c-\frac{c}{a x}} \sqrt{1-a^2 x^2} \left(-2+10 a x+3 a^2 x^2\right)}{x (-1+a x)}-9 \, i \, a \sqrt{c} \, \text{Log}\left[-i \sqrt{c} \, (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}} \, x \sqrt{1-a^2 x^2}}{-1+a x}\right]\right)$$

Problem 513: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^{3/2} dx$$

Optimal (type 3, 128 leaves, 7 steps):

$$\frac{a \left(c-\frac{c}{a x}\right)^{3/2} x^2 \sqrt{1+a x}}{(1-a x)^{3/2}}-\frac{2 \left(c-\frac{c}{a x}\right)^{3/2} x \left(1-a^2 x^2\right)^{3/2}}{(1-a x)^3}+\frac{\sqrt{a} \left(c-\frac{c}{a x}\right)^{3/2} x^{3/2} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{(1-a x)^{3/2}}$$

Result (type 3, 119 leaves):

$$-\frac{c \sqrt{c-\frac{c}{a x}} \, (2+a x) \sqrt{1-a^2 x^2}}{a (-1+a x)}-\frac{i \, c^{3/2} \, \text{Log}\left[-i \sqrt{c} \, (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}} \, x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 514: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a x]} \sqrt{c-\frac{c}{a x}} \, dx$$

Optimal (type 3, 84 leaves, 6 steps):

$$-\frac{c \sqrt{1-a^2 x^2}}{a \sqrt{c-\frac{c}{a x}}}+\frac{\sqrt{c-\frac{c}{a x}} \sqrt{x} \, \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{\sqrt{a} \sqrt{1-a x}}$$

Result (type 3, 111 leaves):

$$-\frac{\sqrt{c-\frac{c}{a x}} \, x \sqrt{1-a^2 x^2}}{-1+a x}+\frac{i \sqrt{c} \, \text{Log}\left[-i \sqrt{c} \, (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}} \, x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 515: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{\text{ArcTanh}[a x]}}{\sqrt{c-\frac{c}{a x}}}\,dx$$

Optimal (type 3, 157 leaves, 8 steps):

$$-\frac{\sqrt{1-a x}\,\sqrt{1+a x}}{a\sqrt{c-\frac{c}{a x}}}-\frac{3\sqrt{1-a x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{3/2}\sqrt{c-\frac{c}{a x}}\,\sqrt{x}}+\frac{2\sqrt{2}\,\sqrt{1-a x}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a x}}\right]}{a^{3/2}\sqrt{c-\frac{c}{a x}}\,\sqrt{x}}$$

Result (type 3, 203 leaves):

$$\frac{\sqrt{c-\frac{c}{a x}}\,x\sqrt{1-a^2 x^2}}{c-a c x}+\frac{3\,i\,\text{Log}\left[-i\sqrt{c}\,(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\,x\sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a\sqrt{c}}-\frac{i\sqrt{2}\,\text{Log}\left[\frac{4 a\sqrt{c-\frac{c}{a x}}\,x\sqrt{1-a^2 x^2}-i\sqrt{2}\,\sqrt{c}\,\left(-1-2 a x+3 a^2 x^2\right)}{4\,(-1+a x)^2}\right]}{a\sqrt{c}}$$

Problem 516: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{\text{ArcTanh}[a x]}}{\left(c-\frac{c}{a x}\right)^{3/2}}\,dx$$

Optimal (type 3, 198 leaves, 9 steps):

$$\frac{\sqrt{1-a x}\,\sqrt{1+a x}}{a\left(c-\frac{c}{a x}\right)^{3/2}}+\frac{2\,(1-a x)^{3/2}\sqrt{1+a x}}{a^2\left(c-\frac{c}{a x}\right)^{3/2}x}+\frac{5\,(1-a x)^{3/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{5/2}\left(c-\frac{c}{a x}\right)^{3/2}x^{3/2}}-\frac{7\,(1-a x)^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a x}}\right]}{\sqrt{2}\,a^{5/2}\left(c-\frac{c}{a x}\right)^{3/2}x^{3/2}}$$

Result (type 3, 211 leaves):

$$\frac{1}{4a}\left(-\frac{4a\sqrt{c-\frac{c}{ax}}\,x\,(-2+ax)\sqrt{1-a^2x^2}}{c^2(-1+ax)^2}+\frac{10\,i\,\text{Log}\left[-i\sqrt{c}\,(1+2ax)+\frac{2a\sqrt{c-\frac{c}{ax}}\,x\sqrt{1-a^2x^2}}{-1+ax}\right]}{c^{3/2}}-\frac{7\,i\sqrt{2}\,\text{Log}\left[\frac{4ac\sqrt{c-\frac{c}{ax}}\,x\sqrt{1-a^2x^2}-i\sqrt{2}\,c^{3/2}(-1-2ax+3a^2x^2)}{7(-1+ax)^2}\right]}{c^{3/2}}\right)$$

Problem 517: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{\text{ArcTanh}[a x]}}{\left(c-\frac{c}{a x}\right)^{5/2}}\,dx$$

Optimal (type 3, 249 leaves, 10 steps):

$$\frac{\sqrt{1-ax}\,\sqrt{1+ax}}{2a\left(c-\frac{c}{ax}\right)^{5/2}}-\frac{11(1-ax)^{3/2}\sqrt{1+ax}}{8a^2\left(c-\frac{c}{ax}\right)^{5/2}x}-\frac{23(1-ax)^{5/2}\sqrt{1+ax}}{8a^3\left(c-\frac{c}{ax}\right)^{5/2}x^2}-\frac{7(1-ax)^{5/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{7/2}\left(c-\frac{c}{ax}\right)^{5/2}x^{5/2}}+\frac{79(1-ax)^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+ax}}\right]}{8\sqrt{2}\,a^{7/2}\left(c-\frac{c}{ax}\right)^{5/2}x^{5/2}}$$

Result (type 3, 222 leaves):

$$\frac{1}{32a}\left(-\frac{4a\sqrt{c-\frac{c}{ax}}\,x\sqrt{1-a^2x^2}\,(23-35ax+8a^2x^2)}{c^3(-1+ax)^3}+\frac{112\,i\,\text{Log}\left[-i\sqrt{c}\,(1+2ax)+\frac{2a\sqrt{c-\frac{c}{ax}}\,x\sqrt{1-a^2x^2}}{-1+ax}\right]}{c^{5/2}}-\frac{79\,i\sqrt{2}\,\text{Log}\left[\frac{32ac^2\sqrt{c-\frac{c}{ax}}\,x\sqrt{1-a^2x^2}-8\,i\sqrt{2}\,c^{5/2}(-1-2ax+3a^2x^2)}{79(-1+ax)^2}\right]}{c^{5/2}}\right)$$

Problem 527: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3\,\text{ArcTanh}[a x]}\left(c-\frac{c}{a x}\right)^{9/2}dx$$

Optimal (type 3, 223 leaves, 8 steps):

$$-\frac{3 a^3 \left(c-\frac{c}{a x}\right)^{9/2} x^4 \sqrt{1+a x}}{(1-a x)^{9/2}}+\frac{3 a^2 \left(c-\frac{c}{a x}\right)^{9/2} x^3 (6-17 a x) (1+a x)^{3/2}}{35 (1-a x)^{9/2}}+\frac{6 a \left(c-\frac{c}{a x}\right)^{9/2} x^2 (1+a x)^{3/2}}{35 (1-a x)^{5/2}}-\frac{2 \left(c-\frac{c}{a x}\right)^{9/2} x (1+a x)^{3/2}}{7 (1-a x)^{3/2}}+\frac{3 a^{7/2} \left(c-\frac{c}{a x}\right)^{9/2} x^{9/2} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{(1-a x)^{9/2}}$$

Result (type 3, 151 leaves):

$$\frac{c^4 \sqrt{c-\frac{c}{a x}} \sqrt{1-a^2 x^2} \left(10-26 a x-12 a^2 x^2+164 a^3 x^3+35 a^4 x^4\right)}{35 a^4 x^3 (-1+a x)}+\frac{3 i c^{9/2} \text{Log}\left[-i \sqrt{c} (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}} x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 528: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3 \text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^{7/2} dx$$

Optimal (type 3, 217 leaves, 8 steps):

$$-\frac{a^3 \left(c-\frac{c}{a x}\right)^{7/2} x^4 \sqrt{1+a x}}{(1-a x)^{7/2}}+\frac{2 a^2 \left(c-\frac{c}{a x}\right)^{7/2} x^3 (1+a x)^{3/2}}{3 (1-a x)^{7/2}}-\frac{2 \left(c-\frac{c}{a x}\right)^{7/2} x (1+a x)^{5/2}}{5 (1-a x)^{7/2}}+\frac{4 a \left(c-\frac{c}{a x}\right)^{7/2} x^2 (1+a x)^{5/2}}{3 (1-a x)^{7/2}}-\frac{a^{5/2} \left(c-\frac{c}{a x}\right)^{7/2} x^{7/2} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{(1-a x)^{7/2}}$$

Result (type 3, 143 leaves):

$$\frac{c^3 \sqrt{c-\frac{c}{a x}} \sqrt{1-a^2 x^2} \left(-6+8 a x+44 a^2 x^2+15 a^3 x^3\right)}{15 a^3 x^2 (-1+a x)}+\frac{i c^{7/2} \text{Log}\left[-i \sqrt{c} (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}} x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 529: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3 \text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^{5/2} dx$$

Optimal (type 3, 176 leaves, 8 steps):

$$-\frac{a^2\left(c-\frac{c}{a x}\right)^{5/2} x^3\sqrt{1+a x}}{(1-a x)^{5/2}}+\frac{2 a\left(c-\frac{c}{a x}\right)^{5/2} x^2 (1+a x)^{3/2}}{3 (1-a x)^{5/2}}-\frac{2\left(c-\frac{c}{a x}\right)^{5/2} x \left(1-a^2 x^2\right)^{5/2}}{3 (1-a x)^5}-\frac{a^{3/2}\left(c-\frac{c}{a x}\right)^{5/2} x^{5/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{(1-a x)^{5/2}}$$

Result (type 3, 133 leaves):

$$\frac{1}{6 a^2}c^2\left(\frac{2\sqrt{c-\frac{c}{a x}}\,\sqrt{1-a^2 x^2}\,\left(2+2 a x+3 a^2 x^2\right)}{x(-1+a x)}-3\,i\,a\sqrt{c}\,\text{Log}\left[-i\sqrt{c}\,(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\,x\sqrt{1-a^2 x^2}}{-1+a x}\right]\right)$$

Problem 530: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3\,\text{ArcTanh}[a x]}\left(c-\frac{c}{a x}\right)^{3/2}dx$$

Optimal (type 3, 127 leaves, 7 steps):

$$\frac{3 a\left(c-\frac{c}{a x}\right)^{3/2} x^2\sqrt{1+a x}}{(1-a x)^{3/2}}-\frac{2\left(c-\frac{c}{a x}\right)^{3/2} x (1+a x)^{3/2}}{(1-a x)^{3/2}}+\frac{3\sqrt{a}\left(c-\frac{c}{a x}\right)^{3/2} x^{3/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{(1-a x)^{3/2}}$$

Result (type 3, 118 leaves):

$$\frac{1}{2 a}\left(\frac{2 c\sqrt{c-\frac{c}{a x}}\,(-2+a x)\sqrt{1-a^2 x^2}}{-1+a x}-3\,i\,c^{3/2}\,\text{Log}\left[-i\sqrt{c}\,(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\,x\sqrt{1-a^2 x^2}}{-1+a x}\right]\right)$$

Problem 531: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3\,\text{ArcTanh}[a x]}\sqrt{c-\frac{c}{a x}}\,dx$$

Optimal (type 3, 155 leaves, 8 steps):

$$-\frac{\sqrt{c-\frac{c}{a x}}\,x\sqrt{1+a x}}{\sqrt{1-a x}}-\frac{5\sqrt{c-\frac{c}{a x}}\,\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{\sqrt{a}\,\sqrt{1-a x}}+\frac{4\sqrt{2}\sqrt{c-\frac{c}{a x}}\,\sqrt{x}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a x}}\right]}{\sqrt{a}\,\sqrt{1-a x}}$$

Result (type 3, 204 leaves):

$$\frac{\sqrt{c-\frac{c}{a x}}\; x \sqrt{1-a^2 x^2}}{-1+a x}-\frac{5 \mathbb{i} \sqrt{c}\; \text{Log}\left[-\mathbb{i} \sqrt{c}\; (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\; x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}+$$

$$\frac{2 \mathbb{i} \sqrt{2} \sqrt{c}\; \text{Log}\left[\frac{-4 a \sqrt{c-\frac{c}{a x}}\; x \sqrt{1-a^2 x^2}+\mathbb{i} \sqrt{2} \sqrt{c}\; \left(-1-2 a x+3 a^2 x^2\right)}{8 c\, (-1+a x)^2}\right]}{a}$$

Problem 532: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{3 \text{ArcTanh}[a x]}}{\sqrt{c-\frac{c}{a x}}} \, dx$$

Optimal (type 3, 195 leaves, 9 steps):

$$\frac{2 \sqrt{1-a x} \sqrt{1+a x}}{a \sqrt{c-\frac{c}{a x}}}+\frac{(1+a x)^{3/2}}{a \sqrt{c-\frac{c}{a x}} \sqrt{1-a x}}+$$

$$\frac{7 \sqrt{1-a x}\; \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{a^{3/2} \sqrt{c-\frac{c}{a x}} \sqrt{x}}-\frac{5 \sqrt{2} \sqrt{1-a x}\; \text{ArcTanh}\left[\frac{\sqrt{2} \sqrt{a} \sqrt{x}}{\sqrt{1+a x}}\right]}{a^{3/2} \sqrt{c-\frac{c}{a x}} \sqrt{x}}$$

Result (type 3, 210 leaves):

$$\frac{1}{2 a}\left(\frac{2 a \sqrt{c-\frac{c}{a x}}\; x\, (-3+a x) \sqrt{1-a^2 x^2}}{c\, (-1+a x)^2}-\frac{7 \mathbb{i}\, \text{Log}\left[-\mathbb{i} \sqrt{c}\; (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\; x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{\sqrt{c}}+\right.$$

$$\left.\frac{5 \mathbb{i} \sqrt{2}\; \text{Log}\left[\frac{-4 a \sqrt{c-\frac{c}{a x}}\; x \sqrt{1-a^2 x^2}+\mathbb{i} \sqrt{2} \sqrt{c}\; \left(-1-2 a x+3 a^2 x^2\right)}{10\, (-1+a x)^2}\right]}{\sqrt{c}}\right)$$

Problem 533: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{3 \text{ArcTanh}[a x]}}{\left(c-\frac{c}{a x}\right)^{3/2}} \, dx$$

Optimal (type 3, 249 leaves, 10 steps):

$$-\frac{21\left(1-a x\right)^{3/2}\sqrt{1+a x}}{8 a^2\left(c-\frac{c}{a x}\right)^{3/2} x}+\frac{\left(1+a x\right)^{3/2}}{2 a\left(c-\frac{c}{a x}\right)^{3/2}\sqrt{1-a x}}-\frac{9\sqrt{1-a x}\left(1+a x\right)^{3/2}}{8 a^2\left(c-\frac{c}{a x}\right)^{3/2} x}-\frac{9\left(1-a x\right)^{3/2}\text{ArcSinh}\left[\sqrt{a}\sqrt{x}\right]}{a^{5/2}\left(c-\frac{c}{a x}\right)^{3/2} x^{3/2}}+\frac{51\left(1-a x\right)^{3/2}\text{ArcTanh}\left[\frac{\sqrt{2}\sqrt{a}\sqrt{x}}{\sqrt{1+a x}}\right]}{4\sqrt{2}\, a^{5/2}\left(c-\frac{c}{a x}\right)^{3/2} x^{3/2}}$$

Result (type 3, 220 leaves):

$$\frac{1}{16 a}\left(\frac{4 a\sqrt{c-\frac{c}{a x}}\, x\sqrt{1-a^2 x^2}\left(15-23 a x+4 a^2 x^2\right)}{c^2\left(-1+a x\right)^3}-\frac{72\, i\,\text{Log}\left[-i\sqrt{c}\left(1+2 a x\right)+\frac{2 a\sqrt{c-\frac{c}{a x}}\, x\sqrt{1-a^2 x^2}}{-1+a x}\right]}{c^{3/2}}+\frac{51\, i\sqrt{2}\,\text{Log}\left[\frac{-16 a c\sqrt{c-\frac{c}{a x}}\, x\sqrt{1-a^2 x^2}+4 i\sqrt{2}\, c^{3/2}\left(-1-2 a x+3 a^2 x^2\right)}{51\left(-1+a x\right)^2}\right]}{c^{3/2}}\right)$$

Problem 534: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{e^{3\,\text{ArcTanh}[a x]}}{\left(c-\frac{c}{a x}\right)^{5/2}}\,dx$$

Optimal (type 3, 293 leaves, 11 steps):

$$\frac{103\left(1-a x\right)^{5/2}\sqrt{1+a x}}{32 a^3\left(c-\frac{c}{a x}\right)^{5/2} x^2}+\frac{\left(1+a x\right)^{3/2}}{3 a\left(c-\frac{c}{a x}\right)^{5/2}\sqrt{1-a x}}-\frac{13\sqrt{1-a x}\left(1+a x\right)^{3/2}}{24 a^2\left(c-\frac{c}{a x}\right)^{5/2} x}+\frac{43\left(1-a x\right)^{3/2}\left(1+a x\right)^{3/2}}{32 a^3\left(c-\frac{c}{a x}\right)^{5/2} x^2}+\frac{11\left(1-a x\right)^{5/2}\text{ArcSinh}\left[\sqrt{a}\sqrt{x}\right]}{a^{7/2}\left(c-\frac{c}{a x}\right)^{5/2} x^{5/2}}-\frac{249\left(1-a x\right)^{5/2}\text{ArcTanh}\left[\frac{\sqrt{2}\sqrt{a}\sqrt{x}}{\sqrt{1+a x}}\right]}{16\sqrt{2}\, a^{7/2}\left(c-\frac{c}{a x}\right)^{5/2} x^{5/2}}$$

Result (type 3, 232 leaves):

$$\frac{1}{64 a}\left(\frac{4 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}\, \left(-219+554 a x-415 a^2 x^2+48 a^3 x^3\right)}{3 c^3 (-1+a x)^4}-\frac{352\, i \,\text{Log}\left[-i \sqrt{c}\, (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{c^{5/2}}+\frac{249\, i \sqrt{2}\, \text{Log}\left[\frac{-64 a c^2 \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}+16 i \sqrt{2}\, c^{5/2} \left(-1-2 a x+3 a^2 x^2\right)}{249 (-1+a x)^2}\right]}{c^{5/2}}\right)$$

Problem 535: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^{9/2} dx$$

Optimal (type 3, 225 leaves, 8 steps):

$$-\frac{94 a^2 \left(c-\frac{c}{a x}\right)^{9/2} x^3 \sqrt{1+a x}}{21 (1-a x)^{5/2}}+\frac{6 a \left(c-\frac{c}{a x}\right)^{9/2} x^2 \sqrt{1+a x}}{5 (1-a x)^{3/2}}-\frac{2 \left(c-\frac{c}{a x}\right)^{9/2} x \sqrt{1+a x}}{7 \sqrt{1-a x}}+\frac{a^3 \left(c-\frac{c}{a x}\right)^{9/2} x^4 \sqrt{1+a x}\, (2718+521 a x)}{105 (1-a x)^{9/2}}+\frac{11 a^{7/2} \left(c-\frac{c}{a x}\right)^{9/2} x^{9/2}\, \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{(1-a x)^{9/2}}$$

Result (type 3, 151 leaves):

$$\left(c^4 \sqrt{c-\frac{c}{a x}} \sqrt{1-a^2 x^2}\, \left(30-246 a x+1028 a^2 x^2-4156 a^3 x^3+105 a^4 x^4\right)\right) \Big/ \left(105 a^4 x^3 (-1+a x)\right)+\frac{11\, i\, c^{9/2}\, \text{Log}\left[-i \sqrt{c}\, (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 536: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^{7/2} dx$$

Optimal (type 3, 179 leaves, 7 steps):

$$\frac{2 a \left(c-\frac{c}{a x}\right)^{7/2} x^2 \sqrt{1+a x}}{(1-a x)^{3/2}}-\frac{2 \left(c-\frac{c}{a x}\right)^{7/2} x \sqrt{1+a x}}{5 \sqrt{1-a x}}-$$
$$\frac{a^2 \left(c-\frac{c}{a x}\right)^{7/2} x^3 \sqrt{1+a x}\ (66+7 a x)}{5 (1-a x)^{7/2}}-\frac{9 a^{5/2} \left(c-\frac{c}{a x}\right)^{7/2} x^{7/2} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{(1-a x)^{7/2}}$$

Result (type 3, 143 leaves):

$$\frac{c^3 \sqrt{c-\frac{c}{a x}} \sqrt{1-a^2 x^2} \left(-2+16 a x-92 a^2 x^2+5 a^3 x^3\right)}{5 a^3 x^2 (-1+a x)}+$$
$$\frac{9 i c^{7/2} \text{Log}\left[-i \sqrt{c} (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}} x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 537: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^{5/2} dx$$

Optimal (type 3, 137 leaves, 6 steps):

$$-\frac{2 \left(c-\frac{c}{a x}\right)^{5/2} x \sqrt{1+a x}}{3 \sqrt{1-a x}}+\frac{a \left(c-\frac{c}{a x}\right)^{5/2} x^2 (18-a x) \sqrt{1+a x}}{3 (1-a x)^{5/2}}+$$
$$\frac{7 a^{3/2} \left(c-\frac{c}{a x}\right)^{5/2} x^{5/2} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{(1-a x)^{5/2}}$$

Result (type 3, 135 leaves):

$$\frac{c^2 \sqrt{c-\frac{c}{a x}} \sqrt{1-a^2 x^2} \left(2-22 a x+3 a^2 x^2\right)}{3 a^2 x (-1+a x)}+\frac{7 i c^{5/2} \text{Log}\left[-i \sqrt{c} (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}} x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 538: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\text{ArcTanh}[a x]} \left(c-\frac{c}{a x}\right)^{3/2} dx$$

Optimal (type 3, 126 leaves, 6 steps):

$$-\frac{2 \left(c-\frac{c}{a x}\right)^{3/2} x \sqrt{1+a x}}{(1-a x)^{3/2}}+\frac{a \left(c-\frac{c}{a x}\right)^{3/2} x^2 \sqrt{1+a x}}{(1-a x)^{3/2}}-\frac{5 \sqrt{a} \left(c-\frac{c}{a x}\right)^{3/2} x^{3/2} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{(1-a x)^{3/2}}$$

Result (type 3, 118 leaves):

$$\frac{1}{2a}\left(\frac{2c\sqrt{c-\frac{c}{ax}}\,(-2+ax)\sqrt{1-a^2x^2}}{-1+ax}+5\,i\,c^{3/2}\,\text{Log}\left[-i\sqrt{c}\,(1+2ax)+\frac{2a\sqrt{c-\frac{c}{ax}}\,x\sqrt{1-a^2x^2}}{-1+ax}\right]\right)$$

Problem 539: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\text{ArcTanh}[a x]}\sqrt{c-\frac{c}{a x}}\,dx$$

Optimal (type 3, 90 leaves, 6 steps):

$$-\frac{\sqrt{c-\frac{c}{ax}}\,x\sqrt{1-a^2x^2}}{1-ax}+\frac{3\sqrt{c-\frac{c}{ax}}\,\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{\sqrt{a}\,\sqrt{1-ax}}$$

Result (type 3, 110 leaves):

$$\frac{\sqrt{c-\frac{c}{ax}}\,x\sqrt{1-a^2x^2}}{-1+ax}+\frac{3\,i\,\sqrt{c}\,\text{Log}\left[-i\sqrt{c}\,(1+2ax)+\frac{2a\sqrt{c-\frac{c}{ax}}\,x\sqrt{1-a^2x^2}}{-1+ax}\right]}{2a}$$

Problem 540: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-\text{ArcTanh}[a x]}}{\sqrt{c-\frac{c}{a x}}}\,dx$$

Optimal (type 3, 88 leaves, 6 steps):

$$\frac{\sqrt{1-ax}\,\sqrt{1+ax}}{a\sqrt{c-\frac{c}{ax}}}-\frac{\sqrt{1-ax}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{3/2}\sqrt{c-\frac{c}{ax}}\,\sqrt{x}}$$

Result (type 3, 113 leaves):

$$\frac{\sqrt{c-\frac{c}{ax}}\,x\sqrt{1-a^2x^2}}{c\,(-1+ax)}+\frac{i\,\text{Log}\left[-i\sqrt{c}\,(1+2ax)+\frac{2a\sqrt{c-\frac{c}{ax}}\,x\sqrt{1-a^2x^2}}{-1+ax}\right]}{2a\sqrt{c}}$$

Problem 541: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-\text{ArcTanh}[a x]}}{\left(c-\frac{c}{a x}\right)^{3/2}}\,dx$$

Optimal (type 3, 159 leaves, 9 steps):

$$-\frac{(1-a x)^{3/2} \sqrt{1+a x}}{a^2 \left(c-\frac{c}{a x}\right)^{3/2} x}-\frac{(1-a x)^{3/2} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{a^{5/2} \left(c-\frac{c}{a x}\right)^{3/2} x^{3/2}}+\frac{\sqrt{2} (1-a x)^{3/2} \text{ArcTanh}\left[\frac{\sqrt{2} \sqrt{a} \sqrt{x}}{\sqrt{1+a x}}\right]}{a^{5/2} \left(c-\frac{c}{a x}\right)^{3/2} x^{3/2}}$$

Result (type 3, 205 leaves):

$$\frac{\sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}}{c^2 (-1+a x)}-\frac{i \text{Log}\left[-i \sqrt{c} (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a c^{3/2}}+\frac{i \text{Log}\left[\frac{-4 a c \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}+i \sqrt{2} c^{3/2} \left(-1-2 a x+3 a^2 x^2\right)}{2 (-1+a x)^2}\right]}{\sqrt{2} a c^{3/2}}$$

Problem 542: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-\text{ArcTanh}[a x]}}{\left(c-\frac{c}{a x}\right)^{5/2}} \, dx$$

Optimal (type 3, 208 leaves, 9 steps):

$$\frac{(1-a x)^{3/2} \sqrt{1+a x}}{2 a^2 \left(c-\frac{c}{a x}\right)^{5/2} x}+\frac{3 (1-a x)^{5/2} \sqrt{1+a x}}{2 a^3 \left(c-\frac{c}{a x}\right)^{5/2} x^2}+\frac{3 (1-a x)^{5/2} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{a^{7/2} \left(c-\frac{c}{a x}\right)^{5/2} x^{5/2}}-\frac{9 (1-a x)^{5/2} \text{ArcTanh}\left[\frac{\sqrt{2} \sqrt{a} \sqrt{x}}{\sqrt{1+a x}}\right]}{2 \sqrt{2} a^{7/2} \left(c-\frac{c}{a x}\right)^{5/2} x^{5/2}}$$

Result (type 3, 214 leaves):

$$\frac{1}{8 a}\left(\frac{4 a \sqrt{c-\frac{c}{a x}}\, x (-3+2 a x) \sqrt{1-a^2 x^2}}{c^3 (-1+a x)^2}-\frac{12 i \text{Log}\left[-i \sqrt{c} (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{c^{5/2}}+\frac{9 i \sqrt{2} \text{Log}\left[\frac{-8 a c^2 \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}+2 i \sqrt{2} c^{5/2} \left(-1-2 a x+3 a^2 x^2\right)}{9 (-1+a x)^2}\right]}{c^{5/2}}\right)$$

Problem 543: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-\text{ArcTanh}[a x]}}{\left(c-\frac{c}{a x}\right)^{7/2}} \, dx$$

Optimal (type 3, 252 leaves, 10 steps):

$$\frac{(1-a x)^{3/2}\sqrt{1+a x}}{4 a^2\left(c-\frac{c}{a x}\right)^{7/2} x}-\frac{15 (1-a x)^{5/2}\sqrt{1+a x}}{16 a^3\left(c-\frac{c}{a x}\right)^{7/2} x^2}-\frac{35 (1-a x)^{7/2}\sqrt{1+a x}}{16 a^4\left(c-\frac{c}{a x}\right)^{7/2} x^3}-\frac{5 (1-a x)^{7/2}\,\text{ArcSinh}\left[\sqrt{a}\sqrt{x}\right]}{a^{9/2}\left(c-\frac{c}{a x}\right)^{7/2} x^{7/2}}+\frac{115 (1-a x)^{7/2}\,\text{ArcTanh}\left[\frac{\sqrt{2}\sqrt{a}\sqrt{x}}{\sqrt{1+a x}}\right]}{16\sqrt{2}\, a^{9/2}\left(c-\frac{c}{a x}\right)^{7/2} x^{7/2}}$$

Result (type 3, 222 leaves):

$$\frac{1}{64 a}\left(\frac{4 a\sqrt{c-\frac{c}{a x}}\, x\sqrt{1-a^2 x^2}\left(35-55 a x+16 a^2 x^2\right)}{c^4(-1+a x)^3}-\frac{160\, i\, \text{Log}\left[-i\sqrt{c}(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\, x\sqrt{1-a^2 x^2}}{-1+a x}\right]}{c^{7/2}}+\frac{115\, i\sqrt{2}\,\text{Log}\left[\frac{-64 a c^3\sqrt{c-\frac{c}{a x}}\, x\sqrt{1-a^2 x^2}+16\, i\sqrt{2}\, c^{7/2}\left(-1-2 a x+3 a^2 x^2\right)}{115 (-1+a x)^2}\right]}{c^{7/2}}\right)$$

Problem 554: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a x]}\left(c-\frac{c}{a x}\right)^{9/2} dx$$

Optimal (type 3, 267 leaves, 9 steps):

$$\frac{5 a^4\left(c-\frac{c}{a x}\right)^{9/2} x^5 (587-109 a x)}{7 (1-a x)^{9/2}\sqrt{1+a x}}+\frac{70 a^3\left(c-\frac{c}{a x}\right)^{9/2} x^4}{(1-a x)^{5/2}\sqrt{1+a x}}-\frac{50 a^2\left(c-\frac{c}{a x}\right)^{9/2} x^3}{7 (1-a x)^{3/2}\sqrt{1+a x}}+\frac{10 a\left(c-\frac{c}{a x}\right)^{9/2} x^2}{7\sqrt{1-a x}\sqrt{1+a x}}-\frac{2\left(c-\frac{c}{a x}\right)^{9/2} x\sqrt{1-a x}}{7\sqrt{1+a x}}-\frac{15 a^{7/2}\left(c-\frac{c}{a x}\right)^{9/2} x^{9/2}\,\text{ArcSinh}\left[\sqrt{a}\sqrt{x}\right]}{(1-a x)^{9/2}}$$

Result (type 3, 152 leaves):

$$\frac{c^4\sqrt{c-\frac{c}{a x}}\left(-2+20 a x-110 a^2 x^2+720 a^3 x^3+1755 a^4 x^4+7 a^5 x^5\right)}{7 a^4 x^3\sqrt{1-a^2 x^2}}-\frac{15\, i\, c^{9/2}\,\text{Log}\left[-i\sqrt{c}(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\, x\sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 555: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^{7/2}dx$$

Optimal (type 3, 225 leaves, 8 steps):

$$-\frac{a^3\left(c-\frac{c}{a\,x}\right)^{7/2}x^4\,(2525-427\,a\,x)}{15\,(1-a\,x)^{7/2}\sqrt{1+a\,x}}-\frac{398\,a^2\left(c-\frac{c}{a\,x}\right)^{7/2}x^3}{15\,(1-a\,x)^{3/2}\sqrt{1+a\,x}}+\frac{38\,a\left(c-\frac{c}{a\,x}\right)^{7/2}x^2}{15\,\sqrt{1-a\,x}\,\sqrt{1+a\,x}}-\frac{2\left(c-\frac{c}{a\,x}\right)^{7/2}x\,\sqrt{1-a\,x}}{5\,\sqrt{1+a\,x}}+\frac{13\,a^{5/2}\left(c-\frac{c}{a\,x}\right)^{7/2}x^{7/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{(1-a\,x)^{7/2}}$$

Result (type 3, 144 leaves):

$$\frac{c^3\sqrt{c-\frac{c}{a\,x}}\,\left(6-62\,a\,x+548\,a^2\,x^2+1591\,a^3\,x^3+15\,a^4\,x^4\right)}{15\,a^3\,x^2\,\sqrt{1-a^2\,x^2}}-\frac{13\,i\,c^{7/2}\,\text{Log}\left[-i\,\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a}$$

Problem 556: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^{5/2}dx$$

Optimal (type 3, 181 leaves, 7 steps):

$$\frac{a^2\left(c-\frac{c}{a\,x}\right)^{5/2}x^3\,(191-25\,a\,x)}{3\,(1-a\,x)^{5/2}\sqrt{1+a\,x}}+\frac{26\,a\left(c-\frac{c}{a\,x}\right)^{5/2}x^2}{3\,\sqrt{1-a\,x}\,\sqrt{1+a\,x}}-\frac{2\left(c-\frac{c}{a\,x}\right)^{5/2}x\,\sqrt{1-a\,x}}{3\,\sqrt{1+a\,x}}-\frac{11\,a^{3/2}\left(c-\frac{c}{a\,x}\right)^{5/2}x^{5/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{(1-a\,x)^{5/2}}$$

Result (type 3, 134 leaves):

$$\frac{1}{6\,a^2}c^2\left(\frac{2\,\sqrt{c-\frac{c}{a\,x}}\,\left(-2+32\,a\,x+133\,a^2\,x^2+3\,a^3\,x^3\right)}{x\,\sqrt{1-a^2\,x^2}}-33\,i\,a\,\sqrt{c}\,\text{Log}\left[-i\,\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]\right)$$

Problem 557: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^{3/2}dx$$

Optimal (type 3, 133 leaves, 6 steps):

$$-\frac{2\left(c-\frac{c}{a\,x}\right)^{3/2}x\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{a\left(c-\frac{c}{a\,x}\right)^{3/2}x^2\,(23-a\,x)}{(1-a\,x)^{3/2}\sqrt{1+a\,x}}+\frac{9\sqrt{a}\left(c-\frac{c}{a\,x}\right)^{3/2}x^{3/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{(1-a\,x)^{3/2}}$$

Result (type 3, 119 leaves):

$$\frac{1}{2\,a}\left(\frac{2\,c\,\sqrt{c-\frac{c}{a\,x}}\,\left(2+19\,a\,x+a^2\,x^2\right)}{\sqrt{1-a^2\,x^2}}-9\,i\,c^{3/2}\,\text{Log}\left[-i\,\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]\right)$$

Problem 558: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\sqrt{c-\frac{c}{a\,x}}\,dx$$

Optimal (type 3, 123 leaves, 6 steps):

$$\frac{8\sqrt{c-\frac{c}{a\,x}}\,x}{\sqrt{1-a\,x}\,\sqrt{1+a\,x}}+\frac{\sqrt{c-\frac{c}{a\,x}}\,x\sqrt{1+a\,x}}{\sqrt{1-a\,x}}-\frac{7\sqrt{c-\frac{c}{a\,x}}\,\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{\sqrt{a}\,\sqrt{1-a\,x}}$$

Result (type 3, 108 leaves):

$$\frac{\sqrt{c-\frac{c}{a\,x}}\,x\,(9+a\,x)}{\sqrt{1-a^2\,x^2}}-\frac{7\,i\,\sqrt{c}\,\text{Log}\left[-i\,\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a}$$

Problem 559: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-3\,\text{ArcTanh}[a\,x]}}{\sqrt{c-\frac{c}{a\,x}}}\,dx$$

Optimal (type 3, 127 leaves, 7 steps):

$$-\frac{5\sqrt{1-a\,x}}{a\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1+a\,x}}-\frac{x\,(1-a\,x)}{\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1-a^2\,x^2}}+\frac{5\sqrt{1-a\,x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{3/2}\sqrt{c-\frac{c}{a\,x}}\,\sqrt{x}}$$

Result (type 3, 140 leaves):

$$\frac{\sqrt{\frac{c\,(-1+a\,x)}{a\,x}}\,\sqrt{1-a^2\,x^2}\,\left(-\frac{1}{c}-\frac{3}{c\,(-1+a\,x)}-\frac{2}{c\,(1+a\,x)}\right)}{a}-\frac{5\,\mathrm{i}\,\mathrm{Log}\left[-\frac{\mathrm{i}\,(c+2\,a\,c\,x)}{\sqrt{c}}+\frac{2\,a\,x\,\sqrt{\frac{c\,(-1+a\,x)}{a\,x}}\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a\,\sqrt{c}}$$

Problem 560: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-3\,\mathrm{ArcTanh}[a\,x]}}{\left(c-\frac{c}{a\,x}\right)^{3/2}}\,dx$$

Optimal (type 3, 131 leaves, 7 steps):

$$-\frac{2\,(1-a\,x)^{3/2}}{a\,\left(c-\frac{c}{a\,x}\right)^{3/2}\,\sqrt{1+a\,x}}+\frac{3\,(1-a\,x)^{3/2}\,\sqrt{1+a\,x}}{a^2\,\left(c-\frac{c}{a\,x}\right)^{3/2}\,x}-\frac{3\,(1-a\,x)^{3/2}\,\mathrm{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{5/2}\,\left(c-\frac{c}{a\,x}\right)^{3/2}\,x^{3/2}}$$

Result (type 3, 111 leaves):

$$\frac{\sqrt{c-\frac{c}{a\,x}}\,x\,(3+a\,x)}{c^2\,\sqrt{1-a^2\,x^2}}-\frac{3\,\mathrm{i}\,\mathrm{Log}\left[-\mathrm{i}\,\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a\,c^{3/2}}$$

Problem 561: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-3\,\mathrm{ArcTanh}[a\,x]}}{\left(c-\frac{c}{a\,x}\right)^{5/2}}\,dx$$

Optimal (type 3, 199 leaves, 9 steps):

$$\frac{(1-a\,x)^{5/2}}{a^2\,\left(c-\frac{c}{a\,x}\right)^{5/2}\,x\,\sqrt{1+a\,x}}-\frac{2\,(1-a\,x)^{5/2}\,\sqrt{1+a\,x}}{a^3\,\left(c-\frac{c}{a\,x}\right)^{5/2}\,x^2}+\frac{(1-a\,x)^{5/2}\,\mathrm{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{7/2}\,\left(c-\frac{c}{a\,x}\right)^{5/2}\,x^{5/2}}+\frac{(1-a\,x)^{5/2}\,\mathrm{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{\sqrt{2}\,a^{7/2}\,\left(c-\frac{c}{a\,x}\right)^{5/2}\,x^{5/2}}$$

Result (type 3, 205 leaves):

$$\frac{1}{4\,c^3}\left(\frac{4\,\sqrt{c-\frac{c}{a\,x}}\,x\,(2+a\,x)}{\sqrt{1-a^2\,x^2}}-\frac{2\,\mathrm{i}\,\sqrt{c}\,\mathrm{Log}\left[-\mathrm{i}\,\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{a}-\frac{\mathrm{i}\,\sqrt{2}\,\sqrt{c}\,\mathrm{Log}\left[\frac{4\,a\,c^2\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}-\mathrm{i}\,\sqrt{2}\,c^{5/2}\,(-1-2\,a\,x+3\,a^2\,x^2)}{(-1+a\,x)^2}\right]}{a}\right)$$

Problem 562: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-3\,\text{ArcTanh}[a\,x]}}{\left(c-\frac{c}{a\,x}\right)^{7/2}}\,dx$$

Optimal (type 3, 251 leaves, 10 steps):

$$\frac{(1-a\,x)^{5/2}}{2\,a^2\left(c-\frac{c}{a\,x}\right)^{7/2}x\sqrt{1+a\,x}}-\frac{(1-a\,x)^{7/2}}{4\,a^3\left(c-\frac{c}{a\,x}\right)^{7/2}x^2\sqrt{1+a\,x}}+\frac{7\,(1-a\,x)^{7/2}\sqrt{1+a\,x}}{4\,a^4\left(c-\frac{c}{a\,x}\right)^{7/2}x^3}+\frac{(1-a\,x)^{7/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{9/2}\left(c-\frac{c}{a\,x}\right)^{7/2}x^{7/2}}-\frac{11\,(1-a\,x)^{7/2}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{4\sqrt{2}\,a^{9/2}\left(c-\frac{c}{a\,x}\right)^{7/2}x^{7/2}}$$

Result (type 3, 228 leaves):

$$\frac{1}{16\,a}\left(-\frac{4\,a\sqrt{c-\frac{c}{a\,x}}\,x\sqrt{1-a^2x^2}\,\left(-7+a\,x+4\,a^2x^2\right)}{c^4\,(-1+a\,x)^2\,(1+a\,x)}+\frac{8\,i\,\text{Log}\left[-i\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\sqrt{c-\frac{c}{a\,x}}\,x\sqrt{1-a^2x^2}}{-1+a\,x}\right]}{c^{7/2}}-\frac{11\,i\sqrt{2}\,\text{Log}\left[\frac{16\,a\,c^3\sqrt{c-\frac{c}{a\,x}}\,x\sqrt{1-a^2x^2}-4\,i\sqrt{2}\,c^{7/2}\left(-1-2\,a\,x+3\,a^2x^2\right)}{11\,(-1+a\,x)^2}\right]}{c^{7/2}}\right)$$

Problem 565: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a\,x]}\sqrt{c-\frac{c}{a\,x}}\,x^2\,dx$$

Optimal (type 3, 179 leaves, 8 steps):

$$-\frac{\sqrt{c-\frac{c}{a\,x}}\,x\sqrt{1+a\,x}}{8\,a^2\sqrt{1-a\,x}}+\frac{\sqrt{c-\frac{c}{a\,x}}\,x^2\sqrt{1+a\,x}}{12\,a\sqrt{1-a\,x}}+\frac{\sqrt{c-\frac{c}{a\,x}}\,x^3\sqrt{1+a\,x}}{3\sqrt{1-a\,x}}+\frac{\sqrt{c-\frac{c}{a\,x}}\,\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{8\,a^{5/2}\sqrt{1-a\,x}}$$

Result (type 3, 128 leaves):

$$\frac{1}{48 a^3}\left(-\frac{2 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}\, \left(-3+2 a x+8 a^2 x^2\right)}{-1+a x}+3\, i \sqrt{c}\, \text{Log}\left[-i \sqrt{c}\, (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}}{-1+a x}\right]\right)$$

Problem 566: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a x]} \sqrt{c-\frac{c}{a x}}\, x \, dx$$

Optimal (type 3, 135 leaves, 7 steps):

$$\frac{\sqrt{c-\frac{c}{a x}}\, x \sqrt{1+a x}}{4 a \sqrt{1-a x}}+\frac{\sqrt{c-\frac{c}{a x}}\, x^2 \sqrt{1+a x}}{2 \sqrt{1-a x}}-\frac{\sqrt{c-\frac{c}{a x}}\, \sqrt{x}\, \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{4 a^{3/2} \sqrt{1-a x}}$$

Result (type 3, 120 leaves):

$$-\frac{1}{8 a^2}\left(\frac{2 a \sqrt{c-\frac{c}{a x}}\, x\, (1+2 a x) \sqrt{1-a^2 x^2}}{-1+a x}+i \sqrt{c}\, \text{Log}\left[-i \sqrt{c}\, (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}}{-1+a x}\right]\right)$$

Problem 567: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a x]} \sqrt{c-\frac{c}{a x}}\, dx$$

Optimal (type 3, 85 leaves, 6 steps):

$$\frac{\sqrt{c-\frac{c}{a x}}\, x \sqrt{1+a x}}{\sqrt{1-a x}}+\frac{\sqrt{c-\frac{c}{a x}}\, \sqrt{x}\, \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{\sqrt{a} \sqrt{1-a x}}$$

Result (type 3, 111 leaves):

$$-\frac{\sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}}{-1+a x}+\frac{i \sqrt{c}\, \text{Log}\left[-i \sqrt{c}\, (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 568: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{\text{ArcTanh}[a x]} \sqrt{c - \frac{c}{a x}}}{x} \, dx$$

Optimal (type 3, 86 leaves, 6 steps):

$$-\frac{2 \sqrt{c - \frac{c}{a x}} \sqrt{1 + a x}}{\sqrt{1 - a x}} + \frac{2 \sqrt{a} \sqrt{c - \frac{c}{a x}} \sqrt{x} \, \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{\sqrt{1 - a x}}$$

Result (type 3, 105 leaves):

$$\frac{2 \sqrt{c - \frac{c}{a x}} \sqrt{1 - a^2 x^2}}{-1 + a x} + i \sqrt{c} \, \text{Log}\left[-i \sqrt{c} \, (1 + 2 a x) + \frac{2 a \sqrt{c - \frac{c}{a x}} \, x \sqrt{1 - a^2 x^2}}{-1 + a x}\right]$$

Problem 582: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3 \text{ArcTanh}[a x]} \sqrt{c - \frac{c}{a x}} \, x^3 \, dx$$

Optimal (type 3, 292 leaves, 11 steps):

$$-\frac{107 \sqrt{c - \frac{c}{a x}} \, x \sqrt{1 + a x}}{64 a^3 \sqrt{1 - a x}} - \frac{21 \sqrt{c - \frac{c}{a x}} \, x \, (1 + a x)^{3/2}}{32 a^3 \sqrt{1 - a x}} - \frac{11 \sqrt{c - \frac{c}{a x}} \, x^2 \, (1 + a x)^{3/2}}{24 a^2 \sqrt{1 - a x}} - \frac{\sqrt{c - \frac{c}{a x}} \, x^3 \, (1 + a x)^{3/2}}{4 a \sqrt{1 - a x}} - \frac{363 \sqrt{c - \frac{c}{a x}} \sqrt{x} \, \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{64 a^{7/2} \sqrt{1 - a x}} + \frac{4 \sqrt{2} \sqrt{c - \frac{c}{a x}} \sqrt{x} \, \text{ArcTanh}\left[\frac{\sqrt{2} \sqrt{a} \sqrt{x}}{\sqrt{1 + a x}}\right]}{a^{7/2} \sqrt{1 - a x}}$$

Result (type 3, 231 leaves):

$$\frac{1}{384\,a^4}\left(\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}\;\left(447+214\,a\,x+136\,a^2\,x^2+48\,a^3\,x^3\right)}{-1+a\,x}-1089\,i\,\sqrt{c}\;\text{Log}\left[-i\,\sqrt{c}\;(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]+768\,i\,\sqrt{2}\;\sqrt{c}\;\text{Log}\left[\frac{i\,a^4\left(4\,i\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}+\sqrt{2}\;\sqrt{c}\;\left(-1-2\,a\,x+3\,a^2\,x^2\right)\right)}{8\,c\,(-1+a\,x)^2}\right]\right)$$

Problem 583: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3\,\text{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}\;x^2\,dx$$

Optimal (type 3, 248 leaves, 10 steps):

$$-\frac{13\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1+a\,x}}{8\,a^2\,\sqrt{1-a\,x}}-\frac{3\,\sqrt{c-\frac{c}{a\,x}}\;x\,(1+a\,x)^{3/2}}{4\,a^2\,\sqrt{1-a\,x}}-\frac{\sqrt{c-\frac{c}{a\,x}}\;x^2\,(1+a\,x)^{3/2}}{3\,a\,\sqrt{1-a\,x}}-\frac{45\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\text{ArcSinh}\left[\sqrt{a}\;\sqrt{x}\right]}{8\,a^{5/2}\,\sqrt{1-a\,x}}+\frac{4\,\sqrt{2}\;\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\text{ArcTanh}\left[\frac{\sqrt{2}\;\sqrt{a}\;\sqrt{x}}{\sqrt{1+a\,x}}\right]}{a^{5/2}\,\sqrt{1-a\,x}}$$

Result (type 3, 223 leaves):

$$\frac{1}{48\,a^3}\left(\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}\;\left(57+26\,a\,x+8\,a^2\,x^2\right)}{-1+a\,x}-135\,i\,\sqrt{c}\;\text{Log}\left[-i\,\sqrt{c}\;(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]+96\,i\,\sqrt{2}\;\sqrt{c}\;\text{Log}\left[\frac{i\,a^3\left(4\,i\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}+\sqrt{2}\;\sqrt{c}\;\left(-1-2\,a\,x+3\,a^2\,x^2\right)\right)}{8\,c\,(-1+a\,x)^2}\right]\right)$$

Problem 584: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3\,\text{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}\;x\,dx$$

Optimal (type 3, 204 leaves, 9 steps):

$$-\frac{7\sqrt{c-\frac{c}{a x}}\;x\sqrt{1+a x}}{4 a\sqrt{1-a x}}-\frac{\sqrt{c-\frac{c}{a x}}\;x\,(1+a x)^{3/2}}{2 a\sqrt{1-a x}}-\frac{23\sqrt{c-\frac{c}{a x}}\;\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{4 a^{3/2}\sqrt{1-a x}}+\frac{4\sqrt{2}\sqrt{c-\frac{c}{a x}}\;\sqrt{x}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a x}}\right]}{a^{3/2}\sqrt{1-a x}}$$

Result (type 3, 211 leaves):

$$\frac{1}{8 a^2}\left(\frac{2 a\sqrt{c-\frac{c}{a x}}\;x\,(9+2 a x)\sqrt{1-a^2 x^2}}{-1+a x}-23\,i\sqrt{c}\,\text{Log}\left[-i\sqrt{c}\,(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\;x\sqrt{1-a^2 x^2}}{-1+a x}\right]+16\,i\sqrt{2}\sqrt{c}\,\text{Log}\left[\frac{-4 a\sqrt{c-\frac{c}{a x}}\;x\sqrt{1-a^2 x^2}+i\sqrt{2}\sqrt{c}\,\left(-1-2 a x+3 a^2 x^2\right)}{8 c\,(-1+a x)^2}\right]\right)$$

Problem 585: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3\,\text{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}\;dx$$

Optimal (type 3, 155 leaves, 8 steps):

$$-\frac{\sqrt{c-\frac{c}{a x}}\;x\sqrt{1+a x}}{\sqrt{1-a x}}-\frac{5\sqrt{c-\frac{c}{a x}}\;\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{\sqrt{a}\,\sqrt{1-a x}}+\frac{4\sqrt{2}\sqrt{c-\frac{c}{a x}}\;\sqrt{x}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a x}}\right]}{\sqrt{a}\,\sqrt{1-a x}}$$

Result (type 3, 204 leaves):

$$\frac{\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}-\frac{5\,\mathrm{i}\,\sqrt{c}\;\mathrm{Log}\left[-\mathrm{i}\,\sqrt{c}\;\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a}+$$

$$\frac{2\,\mathrm{i}\,\sqrt{2}\;\sqrt{c}\;\mathrm{Log}\left[\frac{-4\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}\,+\mathrm{i}\,\sqrt{2}\;\sqrt{c}\;\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{8\,c\,\left(-1+a\,x\right)^2}\right]}{a}$$

Problem 586: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{e^{3\,\mathrm{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}}{x}\,dx$$

Optimal (type 3, 154 leaves, 8 steps):

$$-\frac{2\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1+a\,x}}{\sqrt{1-a\,x}}-\frac{2\,\sqrt{a}\;\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\mathrm{ArcSinh}\left[\sqrt{a}\;\sqrt{x}\right]}{\sqrt{1-a\,x}}+$$

$$\frac{4\,\sqrt{2}\;\sqrt{a}\;\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\mathrm{ArcTanh}\left[\frac{\sqrt{2}\;\sqrt{a}\;\sqrt{x}}{\sqrt{1+a\,x}}\right]}{\sqrt{1-a\,x}}$$

Result (type 3, 196 leaves):

$$\frac{2\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1-a^2\,x^2}}{-1+a\,x}-\mathrm{i}\,\sqrt{c}\;\mathrm{Log}\left[-\mathrm{i}\,\sqrt{c}\;\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]+$$

$$2\,\mathrm{i}\,\sqrt{2}\;\sqrt{c}\;\mathrm{Log}\left[\frac{-4\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}\,+\mathrm{i}\,\sqrt{2}\;\sqrt{c}\;\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{8\,c\,\left(-1+a\,x\right)^2}\right]$$

Problem 587: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{e^{3\,\mathrm{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}}{x^2}\,dx$$

Optimal (type 3, 147 leaves, 6 steps):

$$-\frac{4\,a\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1+a\,x}}{\sqrt{1-a\,x}}-\frac{2\,\sqrt{c-\frac{c}{a\,x}}\;\left(1+a\,x\right)^{3/2}}{3\,x\,\sqrt{1-a\,x}}+\frac{4\,\sqrt{2}\;a^{3/2}\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\mathrm{ArcTanh}\left[\frac{\sqrt{2}\;\sqrt{a}\;\sqrt{x}}{\sqrt{1+a\,x}}\right]}{\sqrt{1-a\,x}}$$

Result (type 3, 145 leaves):

$$\frac{2\sqrt{c-\frac{c}{a\,x}}\,(1+7\,a\,x)\,\sqrt{1-a^2\,x^2}}{3\,x\,(-1+a\,x)}+$$

$$2\,\mathrm{i}\,\sqrt{2}\,a\,\sqrt{c}\,\mathrm{Log}\left[\frac{-4\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}+\mathrm{i}\,\sqrt{2}\,\sqrt{c}\,\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{8\,a\,c\,(-1+a\,x)^2}\right]$$

Problem 588: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{3\,\mathrm{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}}{x^3}\,dx$$

Optimal (type 3, 191 leaves, 7 steps):

$$-\frac{4\,a^2\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1+a\,x}}{\sqrt{1-a\,x}}-\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,(1+a\,x)^{3/2}}{3\,x\,\sqrt{1-a\,x}}-$$

$$\frac{2\,\sqrt{c-\frac{c}{a\,x}}\,(1+a\,x)^{5/2}}{5\,x^2\,\sqrt{1-a\,x}}+\frac{4\,\sqrt{2}\,a^{5/2}\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{x}\,\mathrm{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{\sqrt{1-a\,x}}$$

Result (type 3, 155 leaves):

$$\frac{2\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1-a^2\,x^2}\,\left(3+11\,a\,x+38\,a^2\,x^2\right)}{15\,x^2\,(-1+a\,x)}+$$

$$2\,\mathrm{i}\,\sqrt{2}\,a^2\,\sqrt{c}\,\mathrm{Log}\left[\frac{-4\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}+\mathrm{i}\,\sqrt{2}\,\sqrt{c}\,\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{8\,a^2\,c\,(-1+a\,x)^2}\right]$$

Problem 589: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{3\,\mathrm{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}}{x^4}\,dx$$

Optimal (type 3, 237 leaves, 9 steps):

$$-\frac{104\,a^3\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1+a\,x}}{21\,\sqrt{1-a\,x}}-\frac{2\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1+a\,x}}{7\,x^3\,\sqrt{1-a\,x}}-\frac{6\,a\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1+a\,x}}{7\,x^2\,\sqrt{1-a\,x}}-\frac{32\,a^2\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1+a\,x}}{21\,x\,\sqrt{1-a\,x}}+\frac{4\,\sqrt{2}\,a^{7/2}\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{x}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{\sqrt{1-a\,x}}$$

Result (type 3, 163 leaves):

$$\frac{2\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1-a^2\,x^2}\,\left(3+9\,a\,x+16\,a^2\,x^2+52\,a^3\,x^3\right)}{21\,x^3\,\left(-1+a\,x\right)}+2\,\mathrm{i}\,\sqrt{2}\,a^3\,\sqrt{c}\,\text{Log}\left[\frac{-4\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}+\mathrm{i}\,\sqrt{2}\,\sqrt{c}\,\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{8\,a^3\,c\,\left(-1+a\,x\right)^2}\right]$$

Problem 590: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{e^{3\,\text{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}}{x^5}\,dx$$

Optimal (type 3, 281 leaves, 10 steps):

$$-\frac{1576\,a^4\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1+a\,x}}{315\,\sqrt{1-a\,x}}-\frac{2\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1+a\,x}}{9\,x^4\,\sqrt{1-a\,x}}-\frac{38\,a\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1+a\,x}}{63\,x^3\,\sqrt{1-a\,x}}-\frac{92\,a^2\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1+a\,x}}{105\,x^2\,\sqrt{1-a\,x}}-\frac{472\,a^3\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1+a\,x}}{315\,x\,\sqrt{1-a\,x}}+\frac{4\,\sqrt{2}\,a^{9/2}\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{x}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{\sqrt{1-a\,x}}$$

Result (type 3, 171 leaves):

$$\frac{2\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1-a^2\,x^2}\,\left(35+95\,a\,x+138\,a^2\,x^2+236\,a^3\,x^3+788\,a^4\,x^4\right)}{315\,x^4\,\left(-1+a\,x\right)}+2\,\mathrm{i}\,\sqrt{2}\,a^4\,\sqrt{c}\,\text{Log}\left[\frac{-4\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}+\mathrm{i}\,\sqrt{2}\,\sqrt{c}\,\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{8\,a^4\,c\,\left(-1+a\,x\right)^2}\right]$$

Problem 592: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\text{ArcTanh}[a\,x]} \sqrt{c-\frac{c}{a\,x}}\; x^2\, dx$$

Optimal (type 3, 182 leaves, 8 steps):

$$-\frac{11\sqrt{c-\frac{c}{a\,x}}\; x\,\sqrt{1+a\,x}}{8\,a^2\,\sqrt{1-a\,x}}+\frac{11\sqrt{c-\frac{c}{a\,x}}\; x^2\,\sqrt{1+a\,x}}{12\,a\,\sqrt{1-a\,x}}-\frac{\sqrt{c-\frac{c}{a\,x}}\; x^3\,\sqrt{1-a^2\,x^2}}{3\,(1-a\,x)}+\frac{11\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{8\,a^{5/2}\,\sqrt{1-a\,x}}$$

Result (type 3, 128 leaves):

$$\frac{1}{48\,a^3}\left(\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\; x\,\sqrt{1-a^2\,x^2}\,\left(33-22\,a\,x+8\,a^2\,x^2\right)}{-1+a\,x}+33\,i\,\sqrt{c}\;\text{Log}\left[-i\,\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\; x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]\right)$$

Problem 593: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\text{ArcTanh}[a\,x]} \sqrt{c-\frac{c}{a\,x}}\; x\, dx$$

Optimal (type 3, 138 leaves, 7 steps):

$$\frac{7\sqrt{c-\frac{c}{a\,x}}\; x\,\sqrt{1+a\,x}}{4\,a\,\sqrt{1-a\,x}}-\frac{\sqrt{c-\frac{c}{a\,x}}\; x^2\,\sqrt{1-a^2\,x^2}}{2\,(1-a\,x)}-\frac{7\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{4\,a^{3/2}\,\sqrt{1-a\,x}}$$

Result (type 3, 120 leaves):

$$\frac{1}{8\,a^2}\left(\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\; x\,(-7+2\,a\,x)\,\sqrt{1-a^2\,x^2}}{-1+a\,x}-7\,i\,\sqrt{c}\;\text{Log}\left[-i\,\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\; x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]\right)$$

Problem 594: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\text{ArcTanh}[a x]} \sqrt{c-\frac{c}{a x}}\, dx$$

Optimal (type 3, 90 leaves, 6 steps):

$$-\frac{\sqrt{c-\frac{c}{a x}}\; x \sqrt{1-a^2 x^2}}{1-a x}+\frac{3 \sqrt{c-\frac{c}{a x}}\; \sqrt{x}\; \text{ArcSinh}\left[\sqrt{a}\; \sqrt{x}\right]}{\sqrt{a}\; \sqrt{1-a x}}$$

Result (type 3, 110 leaves):

$$\frac{\sqrt{c-\frac{c}{a x}}\; x \sqrt{1-a^2 x^2}}{-1+a x}+\frac{3\, i \sqrt{c}\; \text{Log}\left[-i \sqrt{c}\; (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\; x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 595: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-\text{ArcTanh}[a x]} \sqrt{c-\frac{c}{a x}}}{x}\, dx$$

Optimal (type 3, 89 leaves, 6 steps):

$$-\frac{2 \sqrt{c-\frac{c}{a x}}\; \sqrt{1-a^2 x^2}}{1-a x}-\frac{2 \sqrt{a}\; \sqrt{c-\frac{c}{a x}}\; \sqrt{x}\; \text{ArcSinh}\left[\sqrt{a}\; \sqrt{x}\right]}{\sqrt{1-a x}}$$

Result (type 3, 105 leaves):

$$\frac{2 \sqrt{c-\frac{c}{a x}}\; \sqrt{1-a^2 x^2}}{-1+a x}-i \sqrt{c}\; \text{Log}\left[-i \sqrt{c}\; (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\; x \sqrt{1-a^2 x^2}}{-1+a x}\right]$$

Problem 608: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\, \text{ArcTanh}[a x]} \sqrt{c-\frac{c}{a x}}\; x^3\, dx$$

Optimal (type 3, 262 leaves, 9 steps):

$$\frac{8\sqrt{c-\frac{c}{a x}}\ x^4}{\sqrt{1-a x}\ \sqrt{1+a x}}-\frac{1115\sqrt{c-\frac{c}{a x}}\ x\sqrt{1+a x}}{64 a^3\sqrt{1-a x}}+\frac{1115\sqrt{c-\frac{c}{a x}}\ x^2\sqrt{1+a x}}{96 a^2\sqrt{1-a x}}-\frac{223\sqrt{c-\frac{c}{a x}}\ x^3\sqrt{1+a x}}{24 a\sqrt{1-a x}}+\frac{\sqrt{c-\frac{c}{a x}}\ x^4\sqrt{1+a x}}{4\sqrt{1-a x}}+\frac{1115\sqrt{c-\frac{c}{a x}}\ \sqrt{x}\ \text{ArcSinh}\left[\sqrt{a}\ \sqrt{x}\right]}{64 a^{7/2}\sqrt{1-a x}}$$

Result (type 3, 137 leaves):

$$\frac{1}{384 a^4}\left(\frac{2 a\sqrt{c-\frac{c}{a x}}\ x\left(-3345-1115 a x+446 a^2 x^2-200 a^3 x^3+48 a^4 x^4\right)}{\sqrt{1-a^2 x^2}}+3345\, i\sqrt{c}\ \text{Log}\left[-i\sqrt{c}\ (1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\ x\sqrt{1-a^2 x^2}}{-1+a x}\right]\right)$$

Problem 609: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a x]}\sqrt{c-\frac{c}{a x}}\ x^2\, dx$$

Optimal (type 3, 218 leaves, 8 steps):

$$\frac{8\sqrt{c-\frac{c}{a x}}\ x^3}{\sqrt{1-a x}\ \sqrt{1+a x}}+\frac{119\sqrt{c-\frac{c}{a x}}\ x\sqrt{1+a x}}{8 a^2\sqrt{1-a x}}-\frac{119\sqrt{c-\frac{c}{a x}}\ x^2\sqrt{1+a x}}{12 a\sqrt{1-a x}}+\frac{\sqrt{c-\frac{c}{a x}}\ x^3\sqrt{1+a x}}{3\sqrt{1-a x}}-\frac{119\sqrt{c-\frac{c}{a x}}\ \sqrt{x}\ \text{ArcSinh}\left[\sqrt{a}\ \sqrt{x}\right]}{8 a^{5/2}\sqrt{1-a x}}$$

Result (type 3, 129 leaves):

$$\frac{1}{48 a^3}\left(\frac{2 a\sqrt{c-\frac{c}{a x}}\ x\left(357+119 a x-38 a^2 x^2+8 a^3 x^3\right)}{\sqrt{1-a^2 x^2}}-357\, i\sqrt{c}\ \text{Log}\left[-i\sqrt{c}\ (1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\ x\sqrt{1-a^2 x^2}}{-1+a x}\right]\right)$$

Problem 610: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}\;x\,dx$$

Optimal (type 3, 174 leaves, 7 steps):

$$\frac{8\sqrt{c-\frac{c}{a\,x}}\;x^2}{\sqrt{1-a\,x}\;\sqrt{1+a\,x}}-\frac{47\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1+a\,x}}{4\,a\,\sqrt{1-a\,x}}+\frac{\sqrt{c-\frac{c}{a\,x}}\;x^2\,\sqrt{1+a\,x}}{2\,\sqrt{1-a\,x}}+\frac{47\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\text{ArcSinh}\left[\sqrt{a}\;\sqrt{x}\right]}{4\,a^{3/2}\,\sqrt{1-a\,x}}$$

Result (type 3, 121 leaves):

$$\frac{1}{8\,a^2}\left(\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\left(-47-13\,a\,x+2\,a^2\,x^2\right)}{\sqrt{1-a^2\,x^2}}+47\,i\,\sqrt{c}\;\text{Log}\left[-i\,\sqrt{c}\;\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]\right)$$

Problem 611: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}\;dx$$

Optimal (type 3, 123 leaves, 6 steps):

$$\frac{8\sqrt{c-\frac{c}{a\,x}}\;x}{\sqrt{1-a\,x}\;\sqrt{1+a\,x}}+\frac{\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1+a\,x}}{\sqrt{1-a\,x}}-\frac{7\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\text{ArcSinh}\left[\sqrt{a}\;\sqrt{x}\right]}{\sqrt{a}\;\sqrt{1-a\,x}}$$

Result (type 3, 108 leaves):

$$\frac{\sqrt{c-\frac{c}{a\,x}}\;x\,\left(9+a\,x\right)}{\sqrt{1-a^2\,x^2}}-\frac{7\,i\,\sqrt{c}\;\text{Log}\left[-i\,\sqrt{c}\;\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a}$$

Problem 612: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-3\,\text{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}}{x}\,dx$$

Optimal (type 3, 124 leaves, 6 steps):

$$-\frac{2\sqrt{c-\frac{c}{a x}}}{\sqrt{1-a x}\sqrt{1+a x}}-\frac{10 a\sqrt{c-\frac{c}{a x}}\, x}{\sqrt{1-a x}\sqrt{1+a x}}+\frac{2\sqrt{a}\sqrt{c-\frac{c}{a x}}\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\sqrt{x}\right]}{\sqrt{1-a x}}$$

Result (type 3, 104 leaves):

$$-\frac{2\sqrt{c-\frac{c}{a x}}\,(1+5 a x)}{\sqrt{1-a^2 x^2}}+i\sqrt{c}\,\text{Log}\left[-i\sqrt{c}\,(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\, x\sqrt{1-a^2 x^2}}{-1+a x}\right]$$

Problem 617: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a x]}\left(c-\frac{c}{a x}\right)^p dx$$

Optimal (type 6, 64 leaves, 3 steps):

$$\frac{1}{1-p}\left(c-\frac{c}{a x}\right)^p x\,(1-a x)^{-p}\,\text{AppellF1}\left[1-p,\frac{1}{2}(n-2p),-\frac{n}{2},2-p,a x,-a x\right]$$

Result (type 8, 24 leaves):

$$\int e^{n\,\text{ArcTanh}[a x]}\left(c-\frac{c}{a x}\right)^p dx$$

Problem 618: Unable to integrate problem.

$$\int e^{-2 p\,\text{ArcTanh}[a x]}\left(c-\frac{c}{a x}\right)^p dx$$

Optimal (type 6, 54 leaves, 3 steps):

$$\frac{\left(c-\frac{c}{a x}\right)^p x\,(1-a x)^{-p}\,\text{AppellF1}[1-p,-2p,p,2-p,a x,-a x]}{1-p}$$

Result (type 8, 25 leaves):

$$\int e^{-2 p\,\text{ArcTanh}[a x]}\left(c-\frac{c}{a x}\right)^p dx$$

Problem 619: Unable to integrate problem.

$$\int e^{2 p\,\text{ArcTanh}[a x]}\left(c-\frac{c}{a x}\right)^p dx$$

Optimal (type 5, 50 leaves, 3 steps):

$$\frac{\left(c-\frac{c}{a x}\right)^p x\,(1-a x)^{-p}\,\text{Hypergeometric2F1}[1-p,-p,2-p,-a x]}{1-p}$$

Result (type 8, 25 leaves):

$$\int e^{2\,p\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^p dx$$

Problem 624: Attempted integration timed out after 120 seconds.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^{3/2} dx$$

Optimal (type 6, 54 leaves, 3 steps):

$$-\frac{2\left(c-\frac{c}{a\,x}\right)^{3/2}x\,\text{AppellF1}\left[-\frac{1}{2},\frac{1}{2}(-3+n),-\frac{n}{2},\frac{1}{2},a\,x,-a\,x\right]}{(1-a\,x)^{3/2}}$$

Result (type 1, 1 leaves):

???

Problem 625: Attempted integration timed out after 120 seconds.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\sqrt{c-\frac{c}{a\,x}}\,dx$$

Optimal (type 6, 54 leaves, 3 steps):

$$\frac{2\sqrt{c-\frac{c}{a\,x}}\,x\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+n),-\frac{n}{2},\frac{3}{2},a\,x,-a\,x\right]}{\sqrt{1-a\,x}}$$

Result (type 1, 1 leaves):

???

Problem 626: Attempted integration timed out after 120 seconds.

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}}{\sqrt{c-\frac{c}{a\,x}}}\,dx$$

Optimal (type 6, 56 leaves, 3 steps):

$$\frac{2\,x\sqrt{1-a\,x}\;\text{AppellF1}\left[\frac{3}{2},\frac{1+n}{2},-\frac{n}{2},\frac{5}{2},a\,x,-a\,x\right]}{3\sqrt{c-\frac{c}{a\,x}}}$$

Result (type 1, 1 leaves):

???

Problem 627: Attempted integration timed out after 120 seconds.

$$\int \frac{e^{n \operatorname{ArcTanh}[a x]}}{\left(c-\frac{c}{a x}\right)^{3/2}} \, dx$$

Optimal (type 6, 56 leaves, 3 steps):

$$\frac{2 x (1-a x)^{3/2} \operatorname{AppellF1}\left[\frac{5}{2}, \frac{3+n}{2}, -\frac{n}{2}, \frac{7}{2}, a x, -a x\right]}{5 \left(c-\frac{c}{a x}\right)^{3/2}}$$

Result (type 1, 1 leaves):

???

Problem 789: Unable to integrate problem.

$$\int e^{-2 p \operatorname{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p \, dx$$

Optimal (type 5, 53 leaves, 3 steps):

$$\frac{1}{1-2 p} \left(c-\frac{c}{a^2 x^2}\right)^p x \left(1-a^2 x^2\right)^{-p} \operatorname{Hypergeometric2F1}[1-2 p, -2 p, 2-2 p, a x]$$

Result (type 8, 25 leaves):

$$\int e^{-2 p \operatorname{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p \, dx$$

Problem 790: Unable to integrate problem.

$$\int e^{2 p \operatorname{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p \, dx$$

Optimal (type 5, 54 leaves, 3 steps):

$$\frac{1}{1-2 p} \left(c-\frac{c}{a^2 x^2}\right)^p x \left(1-a^2 x^2\right)^{-p} \operatorname{Hypergeometric2F1}[1-2 p, -2 p, 2-2 p, -a x]$$

Result (type 8, 25 leaves):

$$\int e^{2 p \operatorname{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p \, dx$$

Problem 800: Unable to integrate problem.

$$\int e^{n \operatorname{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p \, dx$$

Optimal (type 6, 72 leaves, 3 steps):

$$\frac{1}{1-2p}\left(c-\frac{c}{a^2 x^2}\right)^p x \left(1-a^2 x^2\right)^{-p} \text{AppellF1}\left[1-2p, \frac{1}{2}(n-2p), -\frac{n}{2}-p, 2-2p, a x, -a x\right]$$

Result (type 8, 24 leaves):

$$\int e^{n \,\text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Problem 801: Result unnecessarily involves higher level functions.

$$\int e^{4 \,\text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 5, 339 leaves, 13 steps):

$$\frac{2 a \left(c-\frac{c}{a^2 x^2}\right)^p x^2}{(1-p)(1-a x)(1+a x)}+\frac{1}{1-2p}\left(c-\frac{c}{a^2 x^2}\right)^p x (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(1-2p), 2-p, \frac{1}{2}(3-2p), a^2 x^2\right]+\frac{1}{3-2p} 6 a^2 \left(c-\frac{c}{a^2 x^2}\right)^p x^3 (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(3-2p), 2-p, \frac{1}{2}(5-2p), a^2 x^2\right]+\frac{1}{5-2p} a^4 \left(c-\frac{c}{a^2 x^2}\right)^p x^5 (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(5-2p), 2-p, \frac{1}{2}(7-2p), a^2 x^2\right]+\frac{1}{2-p} 2 a^3 \left(c-\frac{c}{a^2 x^2}\right)^p x^4 (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[2-p, 2-p, 3-p, a^2 x^2\right]$$

Result (type 6, 319 leaves):

$$\left(c-\frac{c}{a^2 x^2}\right)^p x \left(\frac{1}{1-2p}\left(4 (-1+a x)^p \left(\frac{1-a x}{1+a x}\right)^{-p} (1+a x)^{-1+p} \left(-1+a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[1-2p, 2-p, 2-2p, \frac{2 a x}{1+a x}\right]+\left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}-p, -p, \frac{3}{2}-p, a^2 x^2\right]\right)-\left(8 (-1+p) (1-a x)^{-p} (-1+a x)^{-1+p} \left(1-a^2 x^2\right)^p \left(-1+a^2 x^2\right)^{-p} \text{AppellF1}[1-2p, 1-p, -p, 2-2p, a x, -a x]\right) \Big/ \left((-1+2p)\left(2(-1+p) \text{AppellF1}[1-2p, 1-p, -p, 2-2p, a x, -a x]+a x \left((-1+p) \text{AppellF1}[2-2p, 2-p, -p, 3-2p, a x, -a x]-p \,\text{HypergeometricPFQ}\left[\{1-p, 1-p\}, \{2-p\}, a^2 x^2\right]\right)\right)\right)\right)$$

Problem 802: Unable to integrate problem.

$$\int e^{3 \,\text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 5, 217 leaves, 7 steps):

$$\frac{\left(c-\frac{c}{a^2 x^2}\right)^p x}{(1-2 p) \sqrt{1-a^2 x^2}}-\frac{a \left(c-\frac{c}{a^2 x^2}\right)^p x^2}{\sqrt{1-a^2 x^2}}+\frac{1}{3-2 p}$$
$$3 a^2 \left(c-\frac{c}{a^2 x^2}\right)^p x^3 \left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2} (3-2 p), \frac{3}{2}-p, \frac{1}{2} (5-2 p), a^2 x^2\right]+$$
$$\frac{1}{2 (1-p)} a (5-2 p) \left(c-\frac{c}{a^2 x^2}\right)^p x^2 \left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[1-p, \frac{3}{2}-p, 2-p, a^2 x^2\right]$$

Result (type 8, 24 leaves):

$$\int e^{3 \text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Problem 803: Result unnecessarily involves higher level functions.

$$\int e^{2 \text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 5, 217 leaves, 10 steps):

$$\frac{1}{1-2 p} \left(c-\frac{c}{a^2 x^2}\right)^p x (1-a x)^{-p} (1+a x)^{-p}$$
$$\text{Hypergeometric2F1}\left[\frac{1}{2} (1-2 p), 1-p, \frac{1}{2} (3-2 p), a^2 x^2\right]+\frac{1}{3-2 p}$$
$$a^2 \left(c-\frac{c}{a^2 x^2}\right)^p x^3 (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2} (3-2 p), 1-p, \frac{1}{2} (5-2 p), a^2 x^2\right]+$$
$$\frac{1}{1-p} a \left(c-\frac{c}{a^2 x^2}\right)^p x^2 (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[1-p, 1-p, 2-p, a^2 x^2\right]$$

Result (type 6, 235 leaves):

$$\frac{1}{-1+2 p} \left(c-\frac{c}{a^2 x^2}\right)^p x \left(1-a^2 x^2\right)^{-p}$$
$$\left(\text{Hypergeometric2F1}\left[\frac{1}{2}-p, -p, \frac{3}{2}-p, a^2 x^2\right]+\left(4 (-1+p) (1-a x)^{-p} (-1+a x)^{-1+p}\right.\right.$$
$$\left(1-a^2 x^2\right)^{2 p} \left(-1+a^2 x^2\right)^{-p} \text{AppellF1}[1-2 p, 1-p, -p, 2-2 p, a x, -a x]\Big) \Big/$$
$$\Big(2 (-1+p) \text{AppellF1}[1-2 p, 1-p, -p, 2-2 p, a x, -a x]+a x \Big((-1+p) \text{AppellF1}[2-2 p,$$
$$2-p, -p, 3-2 p, a x, -a x]-p \text{HypergeometricPFQ}\left[\{1-p, 1-p\}, \{2-p\}, a^2 x^2\right]\Big)\Big)\Big)$$

Problem 804: Unable to integrate problem.

$$\int e^{\text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 5, 137 leaves, 5 steps):

$$\frac{1}{1-2p}\left(c-\frac{c}{a^2 x^2}\right)^p x\left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(1-2p),\frac{1}{2}-p,\frac{1}{2}(3-2p),a^2 x^2\right]+\frac{1}{2(1-p)}a\left(c-\frac{c}{a^2 x^2}\right)^p x^2\left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}-p,1-p,2-p,a^2 x^2\right]$$

Result (type 8, 22 leaves):

$$\int e^{\text{ArcTanh}[a x]}\left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Problem 805: Unable to integrate problem.

$$\int e^{-\text{ArcTanh}[a x]}\left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 5, 137 leaves, 5 steps):

$$\frac{1}{1-2p}\left(c-\frac{c}{a^2 x^2}\right)^p x\left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(1-2p),\frac{1}{2}-p,\frac{1}{2}(3-2p),a^2 x^2\right]-\frac{1}{2(1-p)}a\left(c-\frac{c}{a^2 x^2}\right)^p x^2\left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}-p,1-p,2-p,a^2 x^2\right]$$

Result (type 8, 24 leaves):

$$\int e^{-\text{ArcTanh}[a x]}\left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Problem 806: Result unnecessarily involves higher level functions.

$$\int e^{-2\,\text{ArcTanh}[a x]}\left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 5, 218 leaves, 10 steps):

$$\frac{1}{1-2p}\left(c-\frac{c}{a^2 x^2}\right)^p x(1-a x)^{-p}(1+a x)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(1-2p),1-p,\frac{1}{2}(3-2p),a^2 x^2\right]+\frac{1}{3-2p}a^2\left(c-\frac{c}{a^2 x^2}\right)^p x^3(1-a x)^{-p}(1+a x)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(3-2p),1-p,\frac{1}{2}(5-2p),a^2 x^2\right]-\frac{1}{1-p}a\left(c-\frac{c}{a^2 x^2}\right)^p x^2(1-a x)^{-p}(1+a x)^{-p} \text{Hypergeometric2F1}\left[1-p,1-p,2-p,a^2 x^2\right]$$

Result (type 6, 226 leaves):

$$\left(c-\frac{c}{a^2 x^2}\right)^p x \left(\frac{\left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}-p,-p,\frac{3}{2}-p,a^2 x^2\right]}{-1+2 p}+\left(4 (-1+p) (-1+a x)^p (1+a x)^{-1+p} \left(-1+a^2 x^2\right)^{-p} \text{AppellF1}[1-2 p,-p,1-p,2-2 p,a x,-a x]\right)\Big/\left((1-2 p) \left(2 (-1+p) \text{AppellF1}[1-2 p,-p,1-p,2-2 p,a x,-a x]+a x \left(-(-1+p) \text{AppellF1}[2-2 p,-p,2-p,3-2 p,a x,-a x]+p \text{HypergeometricPFQ}\left[\{1-p,1-p\},\{2-p\},a^2 x^2\right]\right)\right)\right)\right)$$

Problem 807: Unable to integrate problem.

$$\int e^{-3 \text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 5, 216 leaves, 7 steps):

$$\frac{\left(c-\frac{c}{a^2 x^2}\right)^p x}{(1-2 p) \sqrt{1-a^2 x^2}}+\frac{a \left(c-\frac{c}{a^2 x^2}\right)^p x^2}{\sqrt{1-a^2 x^2}}+\frac{1}{3-2 p} 3 a^2 \left(c-\frac{c}{a^2 x^2}\right)^p x^3 \left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2} (3-2 p),\frac{3}{2}-p,\frac{1}{2} (5-2 p),a^2 x^2\right]-\frac{1}{2 (1-p)} a (5-2 p) \left(c-\frac{c}{a^2 x^2}\right)^p x^2 \left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[1-p,\frac{3}{2}-p,2-p,a^2 x^2\right]$$

Result (type 8, 24 leaves):

$$\int e^{-3 \text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Problem 808: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]} x \sqrt{1+x} \,\text{Sin}[x] \, dx$$

Optimal (type 4, 240 leaves, 16 steps):

$$3\sqrt{1-x}\,\text{Cos}[x]-(1-x)^{3/2}\,\text{Cos}[x]-3\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]-\frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]+2\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]+\frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-2\sqrt{2\pi}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-3\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-\frac{3}{2}\sqrt{1-x}\,\text{Sin}[x]$$

Result (type 4, 185 leaves):

$$\frac{1}{8\sqrt{1-x^2}}\,i\sqrt{1+x}\left((-11-i)\sqrt{\frac{\pi}{2}}\,\sqrt{-1+x}\,\text{Erfi}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](\text{Cos}[1]+i\,\text{Sin}[1])+\left((-4-3i)+(2+3i)\,x+2x^2\right)(2i\,\text{Cos}[x]-2\,\text{Sin}[x])+\left(2\left((-3-4i)+(3+2i)\,x+2i\,x^2\right)(\text{Cos}[1]+i\,\text{Sin}[1])-(1+11i)\sqrt{\frac{\pi}{2}}\,\sqrt{-1+x}\,\text{Erf}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](\text{Cos}[x]+i\,\text{Sin}[x])\right)(\text{Cos}[1+x]-i\,\text{Sin}[1+x])\right)$$

Problem 809: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\sqrt{1+x}\,\text{Sin}[x]\,dx$$

Optimal (type 4, 141 leaves, 11 steps):

$$\sqrt{1-x}\,\text{Cos}[x]-\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]+2\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]-2\sqrt{2\pi}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]$$

Result (type 4, 129 leaves):

$$\frac{1}{4}\left((1+4i)(-1)^{3/4}e^{-i}\sqrt{\pi}\,\text{Erfi}\left[(-1)^{1/4}\sqrt{1-x}\right]+\frac{1}{\sqrt{-1+x}\,\sqrt{1+x}}e^{-ix}\sqrt{1-x^2}\left(2\left(1+e^{2ix}\right)\sqrt{-1+x}+(1-4i)(-1)^{3/4}e^{i(1+x)}\sqrt{\pi}\,\text{Erfi}\left[(-1)^{1/4}\sqrt{-1+x}\right]\right)\right)$$

Problem 810: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]} \sqrt{1-x}\, x \,\text{Sin}[x]\, dx$$

Optimal (type 4, 163 leaves, 13 steps):

$$\sqrt{1+x}\,\text{Cos}[x] - (1+x)^{3/2}\,\text{Cos}[x] - \sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right] - \frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right] + \frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]\text{Sin}[1] - \sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]\text{Sin}[1] + \frac{3}{2}\sqrt{1+x}\,\text{Sin}[x]$$

Result (type 4, 168 leaves):

$$\frac{1}{\sqrt{1-x^2}}\left(\frac{1}{16}+\frac{i}{16}\right)e^{-i(1+x)}\sqrt{1-x}\left((-3-2i)\,e^{ix}\sqrt{2\pi}\sqrt{-1-x}\,\text{Erf}\left[\frac{(1+i)\sqrt{-1-x}}{\sqrt{2}}\right] + e^{i}\left((2+2i)\left(3+e^{2ix}(-3+2ix)+2ix\right)(1+x) + (3-2i)\,e^{i(1+x)}\sqrt{2\pi}\sqrt{-1-x}\,\text{Erfi}\left[\frac{(1+i)\sqrt{-1-x}}{\sqrt{2}}\right]\right)\right)$$

Problem 811: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]} \sqrt{1-x}\,\text{Sin}[x]\, dx$$

Optimal (type 4, 72 leaves, 7 steps):

$$-\sqrt{1+x}\,\text{Cos}[x] + \sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right] + \sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]\text{Sin}[1]$$

Result (type 4, 138 leaves):

$$-\left(\left(e^{-i(1+x)}\sqrt{1-x^2}\left(2e^{i}\left(1+e^{2ix}\right)\sqrt{-1-x} + (-1)^{3/4}e^{i(2+x)}\sqrt{\pi}\,\text{Erfi}\left[(-1)^{1/4}\sqrt{-1-x}\right] + (-1)^{1/4}e^{ix}\sqrt{\pi}\,\text{Erfi}\left[(-1)^{3/4}\sqrt{-1-x}\right]\right)\right)\Big/\left(4\sqrt{-1-x}\,\sqrt{1-x}\right)\right)$$

Problem 812: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\, x\,(1+x)^{3/2}\,\text{Sin}[x]\, dx$$

Optimal (type 4, 335 leaves, 22 steps):

$$\frac{17}{4}\sqrt{1-x}\,\text{Cos}[x]-5\,(1-x)^{3/2}\,\text{Cos}[x]+(1-x)^{5/2}\,\text{Cos}[x]+\frac{15}{4}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelC}\Big[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\Big]-4\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelC}\Big[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\Big]-\frac{15}{2}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelS}\Big[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\Big]+4\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelS}\Big[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\Big]+\frac{15}{2}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\Big[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\Big]\,\text{Sin}[1]-4\sqrt{2\pi}\,\text{FresnelC}\Big[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\Big]\,\text{Sin}[1]+\frac{15}{4}\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\Big[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\Big]\,\text{Sin}[1]-4\sqrt{2\pi}\,\text{FresnelS}\Big[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\Big]\,\text{Sin}[1]-\frac{15}{2}\sqrt{1-x}\,\text{Sin}[x]+\frac{5}{2}\,(1-x)^{3/2}\,\text{Sin}[x]$$

Result (type 4, 201 leaves):

$$\frac{1}{\sqrt{1-x^2}}\left(\frac{1}{32}+\frac{i}{32}\right)\sqrt{1+x}\,\Bigg((-2-17\,i)\,\sqrt{2\pi}\,\sqrt{-1+x}\,\text{Erfi}\Big[\frac{(1+i)\,\sqrt{-1+x}}{\sqrt{2}}\Big]\,(\text{Cos}[1]+i\,\text{Sin}[1])-(2-2\,i)\,\big((-1-20\,i)-(11-10\,i)\,x+(8+10\,i)\,x^2+4\,x^3\big)\,(\text{Cos}[x]+i\,\text{Sin}[x])-(1+i)\,\Bigg(2\,\big((-1+20\,i)-(11+10\,i)\,x+(8-10\,i)\,x^2+4\,x^3\big)\,(-i\,\text{Cos}[1]+\text{Sin}[1])+(15+19\,i)\,\sqrt{\frac{\pi}{2}}\,\sqrt{-1+x}\,\text{Erf}\Big[\frac{(1+i)\,\sqrt{-1+x}}{\sqrt{2}}\Big]\,(\text{Cos}[x]+i\,\text{Sin}[x])\Bigg)\,(\text{Cos}[1+x]-i\,\text{Sin}[1+x])\Bigg)$$

Problem 813: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\,(1+x)^{3/2}\,\text{Sin}[x]\,dx$$

Optimal (type 4, 236 leaves, 16 steps):

$$4\sqrt{1-x}\,\text{Cos}[x]-(1-x)^{3/2}\,\text{Cos}[x]-2\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]-$$
$$\frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]+4\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]+$$
$$\frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-4\sqrt{2\pi}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-$$
$$2\sqrt{2\pi}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-\frac{3}{2}\sqrt{1-x}\,\text{Sin}[x]$$

Result (type 4, 178 leaves):

$$\frac{1}{8\sqrt{-1+x}\,\sqrt{1+x}}$$
$$\sqrt{1-x^2}\,\left((5+21\,i)\sqrt{\frac{\pi}{2}}\,\text{Erfi}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](\text{Cos}[1]+i\,\text{Sin}[1])+2\sqrt{-1+x}\,((6+3\,i)+2\,x)\right.$$
$$(\text{Cos}[x]+i\,\text{Sin}[x])-i\left(2\,((3+6\,i)+2\,i\,x)\sqrt{-1+x}\,(\text{Cos}[1]+i\,\text{Sin}[1])+\right.$$
$$\left.\left.(21+5\,i)\sqrt{\frac{\pi}{2}}\,\text{Erf}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](-i\,\text{Cos}[x]+\text{Sin}[x])\right)(\text{Cos}[1+x]-i\,\text{Sin}[1+x])\right)$$

Problem 814: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\,(1-x)^{3/2}\,x\,\text{Sin}[x]\,dx$$

Optimal (type 4, 193 leaves, 19 steps):

$$-\frac{7}{4}\sqrt{1+x}\,\text{Cos}[x]-3\,(1+x)^{3/2}\,\text{Cos}[x]+(1+x)^{5/2}\,\text{Cos}[x]+\frac{7}{4}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]-$$
$$\frac{9}{2}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]+\frac{9}{2}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]\text{Sin}[1]+$$
$$\frac{7}{4}\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]\text{Sin}[1]+\frac{9}{2}\sqrt{1+x}\,\text{Sin}[x]-\frac{5}{2}\,(1+x)^{3/2}\,\text{Sin}[x]$$

Result (type 4, 215 leaves):

$$\frac{1}{16\sqrt{1-x^2}}\sqrt{1-x}\left(e^{-i}\left((18-7\,i)\sqrt{\pi}\sqrt{-i\,(1+x)}+2\,e^{i\,(1+x)}\left((-15-8\,i)-(19-2\,i)\,x+10\,i\,x^2+4\,x^3\right)-(18-7\,i)\sqrt{\pi}\sqrt{-i\,(1+x)}\,\text{Erf}\left[\sqrt{-i\,(1+x)}\right]\right)+e^{-i\,x}\left((-30+16\,i)-(38+4\,i)\,x-20\,i\,x^2+8\,x^3+(18+7\,i)\,e^{i\,(1+x)}\sqrt{\pi}\sqrt{i\,(1+x)}-(18+7\,i)\,e^{i\,(1+x)}\sqrt{\pi}\sqrt{i\,(1+x)}\,\text{Erf}\left[\sqrt{i\,(1+x)}\right]\right)\right)$$

Problem 815: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\,(1-x)^{3/2}\,\text{Sin}[x]\,dx$$

Optimal (type 4, 157 leaves, 13 steps):

$$-2\sqrt{1+x}\,\text{Cos}[x]+(1+x)^{3/2}\,\text{Cos}[x]+\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\sqrt{1+x}\right]+\frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\sqrt{1+x}\right]-\frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\sqrt{1+x}\right]\text{Sin}[1]+\sqrt{2\pi}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\sqrt{1+x}\right]\text{Sin}[1]-\frac{3}{2}\sqrt{1+x}\,\text{Sin}[x]$$

Result (type 4, 176 leaves):

$$\frac{1}{\sqrt{-1-x}\,\sqrt{1-x}}\left(\frac{1}{16}+\frac{i}{16}\right)e^{-i\,x}\sqrt{1-x^2}\left((2+2\,i)\sqrt{-1-x}\left((-3+2\,i)+e^{2\,i\,x}\left((3+2\,i)-2\,i\,x\right)-2\,i\,x\right)-(3+4\,i)\,e^{i\,x}\sqrt{2\pi}\,\text{Erf}\left[\frac{(1+i)\sqrt{-1-x}}{\sqrt{2}}\right](\text{Cos}[1]-i\,\text{Sin}[1])+(4+3\,i)\,e^{i\,x}\sqrt{2\pi}\,\text{Erfi}\left[\frac{(1+i)\sqrt{-1-x}}{\sqrt{2}}\right](-i\,\text{Cos}[1]+\text{Sin}[1])\right)$$

Problem 816: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{\text{ArcTanh}[x]}\,x\,\text{Sin}[x]}{\sqrt{1+x}}\,dx$$

Optimal (type 4, 140 leaves, 11 steps):

$$\sqrt{1-x}\,\text{Cos}[x]-\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]+\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]-\sqrt{2\pi}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]$$

Result (type 4, 165 leaves):

$$\frac{1}{\sqrt{1-x^2}}\left(\frac{1}{8}+\frac{i}{8}\right)\sqrt{1+x}\left(\left(-2-i\right)\sqrt{2\pi}\,\sqrt{-1+x}\,\text{Erfi}\left[\frac{\left(1+i\right)\sqrt{-1+x}}{\sqrt{2}}\right]\left(\text{Cos}[1]+i\,\text{Sin}[1]\right)-\left(2-2\,i\right)\left(-1+x\right)\left(\text{Cos}[x]+i\,\text{Sin}[x]\right)-\left(1-i\right)\left(2\left(-1+x\right)\left(\text{Cos}[1]+i\,\text{Sin}[1]\right)-\left(3+i\right)\sqrt{\frac{\pi}{2}}\,\sqrt{-1+x}\,\text{Erf}\left[\frac{\left(1+i\right)\sqrt{-1+x}}{\sqrt{2}}\right]\left(\text{Cos}[x]+i\,\text{Sin}[x]\right)\right)\left(\text{Cos}[1+x]-i\,\text{Sin}[1+x]\right)\right)$$

Problem 817: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{e^{\text{ArcTanh}[x]}\,\text{Sin}[x]}{\sqrt{1+x}}\,dx$$

Optimal (type 4, 62 leaves, 6 steps):

$$\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]-\sqrt{2\pi}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]$$

Result (type 4, 98 leaves):

$$\frac{1}{\sqrt{1-x^2}}\left(\frac{1}{2}+\frac{i}{2}\right)\sqrt{\frac{\pi}{2}}\,\sqrt{-1+x}\,\sqrt{1+x}\left(\text{Erf}\left[\frac{\left(1+i\right)\sqrt{-1+x}}{\sqrt{2}}\right]\left(\text{Cos}[1]-i\,\text{Sin}[1]\right)-\text{Erfi}\left[\frac{\left(1+i\right)\sqrt{-1+x}}{\sqrt{2}}\right]\left(\text{Cos}[1]+i\,\text{Sin}[1]\right)\right)$$

Problem 872: Result unnecessarily involves higher level functions.

$$\int\frac{e^{\text{ArcTanh}[a+b\,x]}}{1-a^2-2\,a\,b\,x-b^2\,x^2}\,dx$$

Optimal (type 2, 27 leaves, 2 steps):

$$\frac{\sqrt{1+a+b\,x}}{b\,\sqrt{1-a-b\,x}}$$

Result (type 3, 12 leaves):

$$\frac{e^{\text{ArcTanh}[a+b\,x]}}{b}$$

Problem 875: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a+b\,x]}\,x^m\,dx$$

Optimal (type 6, 109 leaves, 4 steps):

$$\frac{1}{1+m}x^{1+m}\,(1-a-b\,x)^{-n/2}\,(1+a+b\,x)^{n/2}\,\left(1-\frac{b\,x}{1-a}\right)^{n/2}$$
$$\left(1+\frac{b\,x}{1+a}\right)^{-n/2}\,\text{AppellF1}\left[1+m,\,\frac{n}{2},\,-\frac{n}{2},\,2+m,\,\frac{b\,x}{1-a},\,-\frac{b\,x}{1+a}\right]$$

Result (type 8, 16 leaves):

$$\int e^{n\,\text{ArcTanh}[a+b\,x]}\,x^m\,dx$$

Problem 880: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTanh}[a+b\,x]}}{x}\,dx$$

Optimal (type 5, 135 leaves, 5 steps):

$$\frac{1}{n}2\,(1-a-b\,x)^{-n/2}\,(1+a+b\,x)^{n/2}\,\text{Hypergeometric2F1}\left[1,\,-\frac{n}{2},\,1-\frac{n}{2},\,\frac{(1+a)\,(1-a-b\,x)}{(1-a)\,(1+a+b\,x)}\right]-$$
$$\frac{1}{n}2^{1+\frac{n}{2}}\,(1-a-b\,x)^{-n/2}\,\text{Hypergeometric2F1}\left[-\frac{n}{2},\,-\frac{n}{2},\,1-\frac{n}{2},\,\frac{1}{2}\,(1-a-b\,x)\right]$$

Result (type 8, 16 leaves):

$$\int \frac{e^{n\,\text{ArcTanh}[a+b\,x]}}{x}\,dx$$

Problem 881: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTanh}[a+b\,x]}}{x^2}\,dx$$

Optimal (type 5, 92 leaves, 2 steps):

$$-\frac{1}{(1-a)^2\,(2-n)}$$
$$4\,b\,(1-a-b\,x)^{1-\frac{n}{2}}\,(1+a+b\,x)^{\frac{1}{2}(-2+n)}\,\text{Hypergeometric2F1}\left[2,\,1-\frac{n}{2},\,2-\frac{n}{2},\,\frac{(1+a)\,(1-a-b\,x)}{(1-a)\,(1+a+b\,x)}\right]$$

Result (type 8, 16 leaves):

$$\int \frac{e^{n \operatorname{ArcTanh}[a+b x]}}{x^2} \, dx$$

Problem 882: Unable to integrate problem.

$$\int \frac{e^{n \operatorname{ArcTanh}[a+b x]}}{x^3} \, dx$$

Optimal (type 5, 152 leaves, 3 steps):

$$-\frac{(1-a-b x)^{1-\frac{n}{2}} (1+a+b x)^{\frac{2+n}{2}}}{2 \left(1-a^2\right) x^2} - \left(2 b^2 (2 a+n) (1-a-b x)^{1-\frac{n}{2}} (1+a+b x)^{\frac{1}{2} (-2+n)} \text{Hypergeometric2F1}\left[2, 1-\frac{n}{2}, 2-\frac{n}{2}, \frac{(1+a) (1-a-b x)}{(1-a) (1+a+b x)}\right]\right) \Big/ \left((1-a)^3 (1+a) (2-n)\right)$$

Result (type 8, 16 leaves):

$$\int \frac{e^{n \operatorname{ArcTanh}[a+b x]}}{x^3} \, dx$$

Problem 924: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{e^{\operatorname{ArcTanh}[a x]}}{\sqrt{1-a^2 x^2}} \, dx$$

Optimal (type 3, 12 leaves, 2 steps):

$$-\frac{\text{Log}[1-a x]}{a}$$

Result (type 4, 52 leaves):

$$\frac{2 i \sqrt{-a^2} \, \text{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-a^2} \, x\right], 1\right] - a \, \text{Log}\left[-1+a^2 x^2\right]}{2 a^2}$$

Problem 961: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{e^{\operatorname{ArcTanh}[a x]}}{\sqrt{c-a^2 c x^2}} \, dx$$

Optimal (type 3, 41 leaves, 3 steps):

$$-\frac{\sqrt{1-a^2 x^2} \, \text{Log}[1-a x]}{a \sqrt{c-a^2 c x^2}}$$

Result (type 4, 87 leaves):

$$\left(a\sqrt{1-a^2x^2}\left(2\,i\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]+\sqrt{-a^2}\,\text{Log}\left[-1+a^2x^2\right]\right)\right)\Big/\left(2\left(-a^2\right)^{3/2}\sqrt{c-a^2cx^2}\right)$$

Problem 970: Result unnecessarily involves higher level functions.

$$\int\frac{e^{\text{ArcTanh}[a\,x]}\,x}{\left(c-a^2cx^2\right)^{3/2}}\,dx$$

Optimal (type 3, 91 leaves, 5 steps):

$$\frac{\sqrt{1-a^2x^2}}{2a^2c\,(1-a\,x)\sqrt{c-a^2cx^2}}-\frac{\sqrt{1-a^2x^2}\,\text{ArcTanh}[a\,x]}{2a^2c\sqrt{c-a^2cx^2}}$$

Result (type 4, 93 leaves):

$$-\left(\left(i\sqrt{1-a^2x^2}\left(i\sqrt{-a^2}+a\,(-1+a\,x)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]\right)\right)\Big/\left(2\left(-a^2\right)^{3/2}c\,(-1+a\,x)\sqrt{c-a^2cx^2}\right)\right)$$

Problem 971: Result unnecessarily involves higher level functions.

$$\int\frac{e^{\text{ArcTanh}[a\,x]}}{\left(c-a^2cx^2\right)^{3/2}}\,dx$$

Optimal (type 3, 91 leaves, 5 steps):

$$\frac{\sqrt{1-a^2x^2}}{2a\,c\,(1-a\,x)\sqrt{c-a^2cx^2}}+\frac{\sqrt{1-a^2x^2}\,\text{ArcTanh}[a\,x]}{2a\,c\sqrt{c-a^2cx^2}}$$

Result (type 4, 91 leaves):

$$\left(a\sqrt{1-a^2x^2}\left(\sqrt{-a^2}+i\,a\,(-1+a\,x)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]\right)\right)\Big/\left(2\left(-a^2\right)^{3/2}c\,(-1+a\,x)\sqrt{c-a^2cx^2}\right)$$

Problem 972: Result unnecessarily involves higher level functions.

$$\int\frac{e^{\text{ArcTanh}[a\,x]}}{x\left(c-a^2cx^2\right)^{3/2}}\,dx$$

Optimal (type 3, 165 leaves, 4 steps):

$$\frac{\sqrt{1-a^2x^2}}{2c\,(1-a\,x)\sqrt{c-a^2cx^2}}+\frac{\sqrt{1-a^2x^2}\,\text{Log}[x]}{c\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}\,\text{Log}[1-a\,x]}{4c\sqrt{c-a^2cx^2}}-\frac{\sqrt{1-a^2x^2}\,\text{Log}[1+a\,x]}{4c\sqrt{c-a^2cx^2}}$$

Result (type 4, 121 leaves):

$$\left(\sqrt{c-a^2 c x^2}\left(-i a (-1+a x) \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2} x\right],1\right]+\sqrt{-a^2}\left(-1+(-1+a x) \text{Log}\left[x^2\right]+(1-a x) \text{Log}\left[1-a^2 x^2\right]\right)\right)\right)\Big/\left(2\sqrt{-a^2}\, c^2 (-1+a x)\sqrt{1-a^2 x^2}\right)$$

Problem 973: Result unnecessarily involves higher level functions.

$$\int \frac{e^{\text{ArcTanh}[a x]}}{x^2\left(c-a^2 c x^2\right)^{3/2}}\,dx$$

Optimal (type 3, 206 leaves, 4 steps):

$$-\frac{\sqrt{1-a^2 x^2}}{c x\sqrt{c-a^2 c x^2}}+\frac{a\sqrt{1-a^2 x^2}}{2 c (1-a x)\sqrt{c-a^2 c x^2}}+\frac{a\sqrt{1-a^2 x^2}\,\text{Log}[x]}{c\sqrt{c-a^2 c x^2}}-\frac{5 a\sqrt{1-a^2 x^2}\,\text{Log}[1-a x]}{4 c\sqrt{c-a^2 c x^2}}+\frac{a\sqrt{1-a^2 x^2}\,\text{Log}[1+a x]}{4 c\sqrt{c-a^2 c x^2}}$$

Result (type 4, 135 leaves):

$$\left(\sqrt{c-a^2 c x^2}\left(-3 i a^2 x (-1+a x) \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2} x\right],1\right]+\sqrt{-a^2}\left(2-3 a x+a x (-1+a x) \text{Log}\left[x^2\right]+a x (1-a x) \text{Log}\left[1-a^2 x^2\right]\right)\right)\right)\Big/\left(2\sqrt{-a^2}\, c^2 x (-1+a x)\sqrt{1-a^2 x^2}\right)$$

Problem 974: Result unnecessarily involves higher level functions.

$$\int \frac{e^{\text{ArcTanh}[a x]}}{x^3\left(c-a^2 c x^2\right)^{3/2}}\,dx$$

Optimal (type 3, 255 leaves, 4 steps):

$$-\frac{\sqrt{1-a^2 x^2}}{2 c x^2\sqrt{c-a^2 c x^2}}-\frac{a\sqrt{1-a^2 x^2}}{c x\sqrt{c-a^2 c x^2}}+\frac{a^2\sqrt{1-a^2 x^2}}{2 c (1-a x)\sqrt{c-a^2 c x^2}}+\frac{2 a^2\sqrt{1-a^2 x^2}\,\text{Log}[x]}{c\sqrt{c-a^2 c x^2}}-\frac{7 a^2\sqrt{1-a^2 x^2}\,\text{Log}[1-a x]}{4 c\sqrt{c-a^2 c x^2}}-\frac{a^2\sqrt{1-a^2 x^2}\,\text{Log}[1+a x]}{4 c\sqrt{c-a^2 c x^2}}$$

Result (type 4, 153 leaves):

$$\left(\sqrt{c-a^2 c x^2}\left(-3 i a^3 x^2 (-1+a x) \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2} x\right],1\right]+\sqrt{-a^2}\left(1+a x-3 a^2 x^2+2 a^2 x^2 (-1+a x) \text{Log}\left[x^2\right]-2 a^2 x^2 (-1+a x) \text{Log}\left[1-a^2 x^2\right]\right)\right)\right)\Big/\left(2\sqrt{-a^2}\, c^2 x^2 (-1+a x)\sqrt{1-a^2 x^2}\right)$$

Problem 975: Result unnecessarily involves higher level functions.

$$\int \frac{e^{\text{ArcTanh}[a x]}}{x^4 \left(c - a^2 c x^2\right)^{3/2}} \, dx$$

Optimal (type 3, 297 leaves, 4 steps):

$$-\frac{\sqrt{1-a^2 x^2}}{3 c x^3 \sqrt{c-a^2 c x^2}}-\frac{a \sqrt{1-a^2 x^2}}{2 c x^2 \sqrt{c-a^2 c x^2}}-\frac{2 a^2 \sqrt{1-a^2 x^2}}{c x \sqrt{c-a^2 c x^2}}+\frac{a^3 \sqrt{1-a^2 x^2}}{2 c (1-a x) \sqrt{c-a^2 c x^2}}+\frac{2 a^3 \sqrt{1-a^2 x^2} \, \text{Log}[x]}{c \sqrt{c-a^2 c x^2}}-\frac{9 a^3 \sqrt{1-a^2 x^2} \, \text{Log}[1-a x]}{4 c \sqrt{c-a^2 c x^2}}+\frac{a^3 \sqrt{1-a^2 x^2} \, \text{Log}[1+a x]}{4 c \sqrt{c-a^2 c x^2}}$$

Result (type 4, 161 leaves):

$$\left(\sqrt{c-a^2 c x^2} \left(-15 i a^4 x^3 (-1+a x) \, \text{EllipticF}\left[i \, \text{ArcSinh}\left[\sqrt{-a^2} \, x\right], 1\right]+\sqrt{-a^2} \left(2+a x+9 a^2 x^2-15 a^3 x^3+6 a^3 x^3 (-1+a x) \, \text{Log}\left[x^2\right]-6 a^3 x^3 (-1+a x) \, \text{Log}\left[1-a^2 x^2\right]\right)\right)\right) \Big/ \left(6 \sqrt{-a^2} \, c^2 x^3 (-1+a x) \sqrt{1-a^2 x^2}\right)$$

Problem 979: Result unnecessarily involves higher level functions.

$$\int \frac{e^{\text{ArcTanh}[a x]} x^3}{\left(c - a^2 c x^2\right)^{5/2}} \, dx$$

Optimal (type 3, 184 leaves, 5 steps):

$$\frac{\sqrt{1-a^2 x^2}}{8 a^4 c^2 (1-a x)^2 \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{2 a^4 c^2 (1-a x) \sqrt{c-a^2 c x^2}}+\frac{\sqrt{1-a^2 x^2}}{8 a^4 c^2 (1+a x) \sqrt{c-a^2 c x^2}}+\frac{3 \sqrt{1-a^2 x^2} \, \text{ArcTanh}[a x]}{8 a^4 c^2 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 122 leaves):

$$\left(\sqrt{1-a^2 x^2} \left(\sqrt{-a^2} \left(-2-a x+5 a^2 x^2\right)-3 i a (-1+a x)^2 (1+a x) \, \text{EllipticF}\left[i \, \text{ArcSinh}\left[\sqrt{-a^2} \, x\right], 1\right]\right)\right) \Big/ \left(8 a^4 \sqrt{-a^2} \, c^2 (-1+a x)^2 (1+a x) \sqrt{c-a^2 c x^2}\right)$$

Problem 980: Result unnecessarily involves higher level functions.

$$\int \frac{e^{\text{ArcTanh}[a x]} x^2}{\left(c - a^2 c x^2\right)^{5/2}} \, dx$$

Optimal (type 3, 184 leaves, 5 steps):

$$\frac{\sqrt{1-a^2 x^2}}{8 a^3 c^2 (1-a x)^2 \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{4 a^3 c^2 (1-a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{8 a^3 c^2 (1+a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}\ \text{ArcTanh}[a x]}{8 a^3 c^2 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 119 leaves):

$$\left(a \sqrt{1-a^2 x^2} \left(\sqrt{-a^2} \left(-2+3 a x+a^2 x^2\right)+i a (-1+a x)^2 (1+a x) \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2}\ x\right],1\right]\right)\right) \Big/ \left(8 \left(-a^2\right)^{5/2} c^2 (-1+a x)^2 (1+a x) \sqrt{c-a^2 c x^2}\right)$$

Problem 981: Result unnecessarily involves higher level functions.

$$\int \frac{e^{\text{ArcTanh}[a x]}\ x}{\left(c-a^2 c x^2\right)^{5/2}}\, dx$$

Optimal (type 3, 137 leaves, 5 steps):

$$\frac{\sqrt{1-a^2 x^2}}{8 a^2 c^2 (1-a x)^2 \sqrt{c-a^2 c x^2}}+\frac{\sqrt{1-a^2 x^2}}{8 a^2 c^2 (1+a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}\ \text{ArcTanh}[a x]}{8 a^2 c^2 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 118 leaves):

$$-\left(\left(\sqrt{1-a^2 x^2} \left(\sqrt{-a^2} \left(2-a x+a^2 x^2\right)+i a (-1+a x)^2 (1+a x) \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2}\ x\right],1\right]\right)\right) \Big/ \left(8 \left(-a^2\right)^{3/2} c^2 (-1+a x)^2 (1+a x) \sqrt{c-a^2 c x^2}\right)\right)$$

Problem 982: Result unnecessarily involves higher level functions.

$$\int \frac{e^{\text{ArcTanh}[a x]}}{\left(c-a^2 c x^2\right)^{5/2}}\, dx$$

Optimal (type 3, 184 leaves, 5 steps):

$$\frac{\sqrt{1-a^2 x^2}}{8 a c^2 (1-a x)^2 \sqrt{c-a^2 c x^2}}+\frac{\sqrt{1-a^2 x^2}}{4 a c^2 (1-a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{8 a c^2 (1+a x) \sqrt{c-a^2 c x^2}}+\frac{3 \sqrt{1-a^2 x^2}\ \text{ArcTanh}[a x]}{8 a c^2 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 120 leaves):

$$-\left(\left(a\sqrt{1-a^2x^2}\left(\sqrt{-a^2}\,\left(2+3ax-3a^2x^2\right)-3\,i\,a\,(-1+ax)^2\,(1+ax)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]\right)\right)\Big/\left(8\,\left(-a^2\right)^{3/2}c^2\,(-1+ax)^2\,(1+ax)\,\sqrt{c-a^2cx^2}\right)\right)$$

Problem 983: Result unnecessarily involves higher level functions.

$$\int\frac{e^{\text{ArcTanh}[a x]}}{x\left(c-a^2cx^2\right)^{5/2}}\,dx$$

Optimal (type 3, 252 leaves, 4 steps):

$$\frac{\sqrt{1-a^2x^2}}{8c^2(1-ax)^2\sqrt{c-a^2cx^2}}+\frac{\sqrt{1-a^2x^2}}{2c^2(1-ax)\sqrt{c-a^2cx^2}}+\frac{\sqrt{1-a^2x^2}}{8c^2(1+ax)\sqrt{c-a^2cx^2}}+\frac{\sqrt{1-a^2x^2}\,\text{Log}[x]}{c^2\sqrt{c-a^2cx^2}}-\frac{11\sqrt{1-a^2x^2}\,\text{Log}[1-ax]}{16c^2\sqrt{c-a^2cx^2}}-\frac{5\sqrt{1-a^2x^2}\,\text{Log}[1+ax]}{16c^2\sqrt{c-a^2cx^2}}$$

Result (type 4, 162 leaves):

$$\left(\sqrt{c-a^2cx^2}\left(-3\,i\,a\,(-1+ax)^2\,(1+ax)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]+\sqrt{-a^2}\left(6-ax-3a^2x^2+4\,(-1+ax)^2\,(1+ax)\,\text{Log}\left[x^2\right]-4\,(-1+ax)^2\,(1+ax)\,\text{Log}\left[1-a^2x^2\right]\right)\right)\right)\Big/\left(8\sqrt{-a^2}\,c^3\,(-1+ax)^2\,(1+ax)\,\sqrt{1-a^2x^2}\right)$$

Problem 984: Result unnecessarily involves higher level functions.

$$\int\frac{e^{\text{ArcTanh}[a x]}}{x^2\left(c-a^2cx^2\right)^{5/2}}\,dx$$

Optimal (type 3, 295 leaves, 4 steps):

$$-\frac{\sqrt{1-a^2x^2}}{c^2x\sqrt{c-a^2cx^2}}+\frac{a\sqrt{1-a^2x^2}}{8c^2(1-ax)^2\sqrt{c-a^2cx^2}}+\frac{3a\sqrt{1-a^2x^2}}{4c^2(1-ax)\sqrt{c-a^2cx^2}}-\frac{a\sqrt{1-a^2x^2}}{8c^2(1+ax)\sqrt{c-a^2cx^2}}+\frac{a\sqrt{1-a^2x^2}\,\text{Log}[x]}{c^2\sqrt{c-a^2cx^2}}-\frac{23a\sqrt{1-a^2x^2}\,\text{Log}[1-ax]}{16c^2\sqrt{c-a^2cx^2}}+\frac{7a\sqrt{1-a^2x^2}\,\text{Log}[1+ax]}{16c^2\sqrt{c-a^2cx^2}}$$

Result (type 4, 180 leaves):

$$\left(\sqrt{c-a^2 c x^2}\left(-15 i a^2 x(-1+a x)^2(1+a x) \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2}\, x\right], 1\right]+\sqrt{-a^2}\left(-8+14 a x+11 a^2 x^2-15 a^3 x^3+4 a x(-1+a x)^2(1+a x) \text{Log}\left[x^2\right]-4 a x(-1+a x)^2(1+a x) \text{Log}\left[1-a^2 x^2\right]\right)\right)\right) \Big/ \left(8 \sqrt{-a^2}\, c^3 x(-1+a x)^2(1+a x) \sqrt{1-a^2 x^2}\right)$$

Problem 985: Result unnecessarily involves higher level functions.

$$\int \frac{e^{\text{ArcTanh}[a x]}}{x^3\left(c-a^2 c x^2\right)^{5/2}}\, dx$$

Optimal (type 3, 345 leaves, 4 steps):

$$-\frac{\sqrt{1-a^2 x^2}}{2 c^2 x^2 \sqrt{c-a^2 c x^2}}-\frac{a \sqrt{1-a^2 x^2}}{c^2 x \sqrt{c-a^2 c x^2}}+\frac{a^2 \sqrt{1-a^2 x^2}}{8 c^2(1-a x)^2 \sqrt{c-a^2 c x^2}}+\frac{a^2 \sqrt{1-a^2 x^2}}{c^2(1-a x) \sqrt{c-a^2 c x^2}}+\frac{a^2 \sqrt{1-a^2 x^2}}{8 c^2(1+a x) \sqrt{c-a^2 c x^2}}+\frac{3 a^2 \sqrt{1-a^2 x^2}\, \text{Log}[x]}{c^2 \sqrt{c-a^2 c x^2}}-\frac{39 a^2 \sqrt{1-a^2 x^2}\, \text{Log}[1-a x]}{16 c^2 \sqrt{c-a^2 c x^2}}-\frac{9 a^2 \sqrt{1-a^2 x^2}\, \text{Log}[1+a x]}{16 c^2 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 198 leaves):

$$\left(\sqrt{c-a^2 c x^2}\left(-15 i a^3 x^2(-1+a x)^2(1+a x) \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2}\, x\right], 1\right]+\sqrt{-a^2}\left(-4-4 a x+22 a^2 x^2+3 a^3 x^3-15 a^4 x^4+12 a^2 x^2(-1+a x)^2(1+a x) \text{Log}\left[x^2\right]-12 a^2 x^2(-1+a x)^2(1+a x) \text{Log}\left[1-a^2 x^2\right]\right)\right)\right) \Big/ \left(8 \sqrt{-a^2}\, c^3 x^2(-1+a x)^2(1+a x) \sqrt{1-a^2 x^2}\right)$$

Problem 986: Result unnecessarily involves higher level functions.

$$\int \frac{e^{\text{ArcTanh}[a x]}}{\left(c-a^2 c x^2\right)^{7/2}}\, dx$$

Optimal (type 3, 277 leaves, 5 steps):

$$\frac{\sqrt{1-a^2 x^2}}{24 a c^3(1-a x)^3 \sqrt{c-a^2 c x^2}}+\frac{3 \sqrt{1-a^2 x^2}}{32 a c^3(1-a x)^2 \sqrt{c-a^2 c x^2}}+\frac{3 \sqrt{1-a^2 x^2}}{16 a c^3(1-a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{32 a c^3(1+a x)^2 \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{8 a c^3(1+a x) \sqrt{c-a^2 c x^2}}+\frac{5 \sqrt{1-a^2 x^2}\, \text{ArcTanh}[a x]}{16 a c^3 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 138 leaves):

$$-\left(\left(a\sqrt{1-a^2x^2}\left(\sqrt{-a^2}\left(-8-25ax+25a^2x^2+15a^3x^3-15a^4x^4\right)-15\,i\,a\,(-1+ax)^3(1+ax)^2\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]\right)\right)\Big/\left(48\left(-a^2\right)^{3/2}c^3(-1+ax)^3(1+ax)^2\sqrt{c-a^2cx^2}\right)\right)$$

Problem 989: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{e^{\text{ArcTanh}[a\,x]}\,x^m}{c-a^2cx^2}\,dx$$

Optimal (type 5, 80 leaves, 4 steps):

$$\frac{x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{1+m}{2},\frac{3+m}{2},a^2x^2\right]}{c\,(1+m)}+\frac{a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{2+m}{2},\frac{4+m}{2},a^2x^2\right]}{c\,(2+m)}$$

Result (type 6, 391 leaves):

$$\frac{1}{2c(1+m)}(2+m)\,x^{1+m}\left(\left(2\sqrt{-1-ax}\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,-ax,ax\right]\right)\Big/\left((-1+ax)^{3/2}\left(2(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,-ax,ax\right]+ax\left(3\,\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{5}{2},3+m,-ax,ax\right]+\text{AppellF1}\left[2+m,\frac{1}{2},\frac{3}{2},3+m,-ax,ax\right]\right)\right)\right)+\frac{1}{\sqrt{1+ax}}\sqrt{1-ax}\left(\left(\sqrt{-1-ax}\sqrt{1-a^2x^2}\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,-ax,ax\right]\right)\Big/\left((-1+ax)^{3/2}\left(2(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,-ax,ax\right]+ax\left(\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{3}{2},3+m,-ax,ax\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2x^2\right]\right)\right)\right)+\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,ax,-ax\right]\Big/\left(2(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,ax,-ax\right]-ax\left(\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{3}{2},3+m,ax,-ax\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2x^2\right]\right)\right)\right)\right)$$

Problem 990: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{e^{\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2cx^2\right)^2}\,dx$$

Optimal (type 5, 80 leaves, 4 steps):

$$\frac{x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{5}{2},\frac{1+m}{2},\frac{3+m}{2},a^2 x^2\right]}{c^2\,(1+m)}+\frac{a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{5}{2},\frac{2+m}{2},\frac{4+m}{2},a^2 x^2\right]}{c^2\,(2+m)}$$

Result (type 6, 711 leaves):

$$\left((2+m)\,x^{1+m}\sqrt{-1-a x}\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,-a x,a x\right]\right)\Big/\left(2 c^2\,(1+m)\,(-1+a x)^{3/2}\left(2\,(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,-a x,a x\right]+a x\left(3\,\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{5}{2},3+m,-a x,a x\right]+\text{AppellF1}\left[2+m,\frac{1}{2},\frac{3}{2},3+m,-a x,a x\right]\right)\right)\right)+$$
$$\left((2+m)\,x^{1+m}\sqrt{1-a x}\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,a x,-a x\right]\right)\Big/\left(4 c^2\,(1+m)\,(1+a x)^{3/2}\left(2\,(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,a x,-a x\right]-a x\left(3\,\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{5}{2},3+m,a x,-a x\right]+\text{AppellF1}\left[2+m,\frac{1}{2},\frac{3}{2},3+m,a x,-a x\right]\right)\right)\right)-$$
$$\left((2+m)\,x^{1+m}\sqrt{-1-a x}\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{5}{2},2+m,-a x,a x\right]\right)\Big/\left(2 c^2\,(1+m)\,(-1+a x)^{5/2}\left(2\,(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{5}{2},2+m,-a x,a x\right]+a x\left(5\,\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{7}{2},3+m,-a x,a x\right]+\text{AppellF1}\left[2+m,\frac{1}{2},\frac{5}{2},3+m,-a x,a x\right]\right)\right)\right)+$$
$$\left(3\,(2+m)\,x^{1+m}\sqrt{-1-a x}\,\sqrt{1-a x}\,\sqrt{1-a^2 x^2}\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,-a x,a x\right]\right)\Big/\left(8 c^2\,(1+m)\,(-1+a x)^{3/2}\sqrt{1+a x}\left(2\,(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,-a x,a x\right]+a x\left(\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{3}{2},3+m,-a x,a x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2 x^2\right]\right)\right)\right)+$$
$$\left(3\,(2+m)\,x^{1+m}\sqrt{1-a x}\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,a x,-a x\right]\right)\Big/\left(8 c^2\,(1+m)\,\sqrt{1+a x}\left(2\,(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,a x,-a x\right]-a x\left(\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{3}{2},3+m,a x,-a x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2 x^2\right]\right)\right)\right)$$

Problem 991: Unable to integrate problem.

$$\int \frac{e^{\text{ArcTanh}[a x]}\,x^m}{\left(c-a^2 c x^2\right)^3}\,dx$$

Optimal (type 5, 80 leaves, 4 steps):

$$\frac{x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{7}{2},\frac{1+m}{2},\frac{3+m}{2},a^2 x^2\right]}{c^3\,(1+m)}+\frac{a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{7}{2},\frac{2+m}{2},\frac{4+m}{2},a^2 x^2\right]}{c^3\,(2+m)}$$

Result (type 8, 25 leaves):

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2\,c\,x^2\right)^3}\,dx$$

Problem 1001: Unable to integrate problem.

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,x^m}{\sqrt{c-a^2\,c\,x^2}}\,dx$$

Optimal (type 5, 51 leaves, 3 steps):

$$\frac{x^{1+m}\,\sqrt{1-a^2\,x^2}\;\text{Hypergeometric2F1}[1,\,1+m,\,2+m,\,a\,x]}{(1+m)\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 8, 27 leaves):

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,x^m}{\sqrt{c-a^2\,c\,x^2}}\,dx$$

Problem 1002: Unable to integrate problem.

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2\,c\,x^2\right)^{3/2}}\,dx$$

Optimal (type 5, 134 leaves, 7 steps):

$$\frac{x^{1+m}\,\sqrt{1-a^2\,x^2}\;\text{Hypergeometric2F1}\left[2,\,\frac{1+m}{2},\,\frac{3+m}{2},\,a^2\,x^2\right]}{c\,(1+m)\,\sqrt{c-a^2\,c\,x^2}}+\frac{a\,x^{2+m}\,\sqrt{1-a^2\,x^2}\;\text{Hypergeometric2F1}\left[2,\,\frac{2+m}{2},\,\frac{4+m}{2},\,a^2\,x^2\right]}{c\,(2+m)\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 8, 27 leaves):

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2\,c\,x^2\right)^{3/2}}\,dx$$

Problem 1003: Unable to integrate problem.

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2\,c\,x^2\right)^{5/2}}\,dx$$

Optimal (type 5, 134 leaves, 7 steps):

$$\frac{x^{1+m}\sqrt{1-a^2x^2}\text{ Hypergeometric2F1}\left[3,\frac{1+m}{2},\frac{3+m}{2},a^2x^2\right]}{c^2(1+m)\sqrt{c-a^2cx^2}}+\frac{a\,x^{2+m}\sqrt{1-a^2x^2}\text{ Hypergeometric2F1}\left[3,\frac{2+m}{2},\frac{4+m}{2},a^2x^2\right]}{c^2(2+m)\sqrt{c-a^2cx^2}}$$

Result (type 8, 27 leaves):

$$\int\frac{e^{\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2cx^2\right)^{5/2}}\,dx$$

Problem 1004: Unable to integrate problem.

$$\int e^{\text{ArcTanh}[a\,x]}\,x^m\left(c-a^2cx^2\right)^p\,dx$$

Optimal (type 5, 136 leaves, 5 steps):

$$\frac{1}{1+m}x^{1+m}\left(1-a^2x^2\right)^{-p}\left(c-a^2cx^2\right)^p\text{Hypergeometric2F1}\left[\frac{1+m}{2},\frac{1}{2}-p,\frac{3+m}{2},a^2x^2\right]+\frac{1}{2+m}a\,x^{2+m}\left(1-a^2x^2\right)^{-p}\left(c-a^2cx^2\right)^p\text{Hypergeometric2F1}\left[\frac{2+m}{2},\frac{1}{2}-p,\frac{4+m}{2},a^2x^2\right]$$

Result (type 8, 25 leaves):

$$\int e^{\text{ArcTanh}[a\,x]}\,x^m\left(c-a^2cx^2\right)^p\,dx$$

Problem 1005: Result more than twice size of optimal antiderivative.

$$\int e^{\text{ArcTanh}[a\,x]}\,x^3\left(1-a^2x^2\right)^p\,dx$$

Optimal (type 5, 85 leaves, 6 steps):

$$-\frac{\left(1-a^2x^2\right)^{\frac{1}{2}+p}}{a^4(1+2p)}+\frac{\left(1-a^2x^2\right)^{\frac{3}{2}+p}}{a^4(3+2p)}+\frac{1}{5}a\,x^5\text{Hypergeometric2F1}\left[\frac{5}{2},\frac{1}{2}-p,\frac{7}{2},a^2x^2\right]$$

Result (type 5, 183 leaves):

$$\frac{1}{3a^4}\left(-3a\,x\,\text{Hypergeometric2F1}\left[\frac{1}{2},-\frac{1}{2}-p,\frac{3}{2},a^2x^2\right]+\frac{1}{3+2p}\left(-3+3\left(1-a^2x^2\right)^{\frac{1}{2}+p}-3a^2x^2\left(1-a^2x^2\right)^{\frac{1}{2}+p}-a^3(3+2p)x^3\,\text{Hypergeometric2F1}\left[\frac{3}{2},-\frac{1}{2}-p,\frac{5}{2},a^2x^2\right]+3(1-a\,x)^{-\frac{1}{2}-p}(1+a\,x)\left(2-2a^2x^2\right)^{\frac{1}{2}+p}\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\frac{3}{2}+p,\frac{5}{2}+p,\frac{1}{2}(1+a\,x)\right]\right)\right)$$

Problem 1009: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,\left(1-a^2\,x^2\right)^p}{x}\,dx$$

Optimal (type 5, 72 leaves, 5 steps):

$$a\,x\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{2}-p,\,\frac{3}{2},\,a^2\,x^2\right]-\frac{\left(1-a^2\,x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[1,\,\frac{1}{2}+p,\,\frac{3}{2}+p,\,1-a^2\,x^2\right]}{1+2\,p}$$

Result (type 5, 147 leaves):

$$\left(1-a^2\,x^2\right)^{\frac{1}{2}+p}\left(\frac{\text{Hypergeometric2F1}\left[-\frac{1}{2}-p,\,-\frac{1}{2}-p,\,\frac{1}{2}-p,\,\frac{1}{a^2\,x^2}\right]}{\left(1-\frac{1}{a^2\,x^2}\right)^{\frac{1}{2}+p}+2\,p\,\left(1-\frac{1}{a^2\,x^2}\right)^{\frac{1}{2}+p}}+\frac{1}{3+2\,p}\right.$$
$$\left.2^{\frac{1}{2}+p}\,\left(1-a\,x\right)^{-\frac{1}{2}-p}\,\left(1+a\,x\right)\,\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\,\frac{3}{2}+p,\,\frac{5}{2}+p,\,\frac{1}{2}\,\left(1+a\,x\right)\right]\right)$$

Problem 1010: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,\left(1-a^2\,x^2\right)^p}{x^2}\,dx$$

Optimal (type 5, 75 leaves, 5 steps):

$$-\frac{\text{Hypergeometric2F1}\left[-\frac{1}{2},\,\frac{1}{2}-p,\,\frac{1}{2},\,a^2\,x^2\right]}{x}-\frac{a\,\left(1-a^2\,x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[1,\,\frac{1}{2}+p,\,\frac{3}{2}+p,\,1-a^2\,x^2\right]}{1+2\,p}$$

Result (type 5, 170 leaves):

$$-\frac{\text{Hypergeometric2F1}\left[-\frac{1}{2},\,-\frac{1}{2}-p,\,\frac{1}{2},\,a^2\,x^2\right]}{x}+\frac{1}{1+2\,p}$$
$$a\,\left(1-\frac{1}{a^2\,x^2}\right)^{-\frac{1}{2}-p}\,\left(1-a^2\,x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[-\frac{1}{2}-p,\,-\frac{1}{2}-p,\,\frac{1}{2}-p,\,\frac{1}{a^2\,x^2}\right]+\frac{1}{3+2\,p}$$
$$a\,\left(1-a\,x\right)^{-\frac{1}{2}-p}\,\left(1+a\,x\right)\,\left(2-2\,a^2\,x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\,\frac{3}{2}+p,\,\frac{5}{2}+p,\,\frac{1}{2}\,\left(1+a\,x\right)\right]$$

Problem 1011: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,\left(1-a^2\,x^2\right)^p}{x^3}\,dx$$

Optimal (type 5, 78 leaves, 5 steps):

$$-\frac{a\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1}{2}-p,\frac{1}{2},a^2x^2\right]}{x}-\frac{a^2\left(1-a^2x^2\right)^{\frac{1}{2}+p}\text{Hypergeometric2F1}\left[2,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2x^2\right]}{1+2p}$$

Result (type 5, 262 leaves):

$$-\frac{a\,\text{Hypergeometric2F1}\left[-\frac{1}{2},-\frac{1}{2}-p,\frac{1}{2},a^2x^2\right]}{x}+\frac{a^2\left(1-a^2x^2\right)^{\frac{1}{2}+p}\text{Hypergeometric2F1}\left[-\frac{1}{2}-p,-\frac{1}{2}-p,\frac{1}{2}-p,\frac{1}{a^2x^2}\right]}{\left(1-\frac{1}{a^2x^2}\right)^{\frac{1}{2}+p}+2p\left(1-\frac{1}{a^2x^2}\right)^{\frac{1}{2}+p}}+\frac{1}{(-1+2p)\,x^2}$$
$$\left(1-\frac{1}{a^2x^2}\right)^{-\frac{1}{2}-p}\left(1-a^2x^2\right)^{\frac{1}{2}+p}\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\frac{1}{2}-p,\frac{3}{2}-p,\frac{1}{a^2x^2}\right]+\frac{1}{3+2p}$$
$$a^2\left(1-a x\right)^{-\frac{1}{2}-p}\left(1+a x\right)\left(2-2a^2x^2\right)^{\frac{1}{2}+p}\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\frac{3}{2}+p,\frac{5}{2}+p,\frac{1}{2}\left(1+a x\right)\right]$$

Problem 1012: Result more than twice size of optimal antiderivative.

$$\int e^{\text{ArcTanh}[a x]}\,x^3\left(c-a^2c\,x^2\right)^p\,dx$$

Optimal (type 5, 134 leaves, 7 steps):

$$-\frac{\sqrt{1-a^2x^2}\left(c-a^2c\,x^2\right)^p}{a^4\left(1+2p\right)}+\frac{\left(1-a^2x^2\right)^{3/2}\left(c-a^2c\,x^2\right)^p}{a^4\left(3+2p\right)}+$$
$$\frac{1}{5}a\,x^5\left(1-a^2x^2\right)^{-p}\left(c-a^2c\,x^2\right)^p\text{Hypergeometric2F1}\left[\frac{5}{2},\frac{1}{2}-p,\frac{7}{2},a^2x^2\right]$$

Result (type 5, 295 leaves):

$$\frac{1}{a^4\left(3+2p\right)\left(5+2p\right)\left(7+2p\right)\left(9+2p\right)}$$
$$4^{1+p}\,e^{3\,\text{ArcTanh}[a x]}\left(\frac{e^{\text{ArcTanh}[a x]}}{1+e^{2\,\text{ArcTanh}[a x]}}\right)^{2p}\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^{2p}\left(1-a^2x^2\right)^{-p}\left(c\left(1-a^2x^2\right)\right)^p$$
$$\left(-\left(315+286p+84p^2+8p^3\right)\text{Hypergeometric2F1}\left[\frac{3}{2}+p,5+2p,\frac{5}{2}+p,-e^{2\,\text{ArcTanh}[a x]}\right]+\right.$$
$$e^{2\,\text{ArcTanh}[a x]}\left(3+2p\right)$$
$$\left(3\left(63+32p+4p^2\right)\text{Hypergeometric2F1}\left[\frac{5}{2}+p,5+2p,\frac{7}{2}+p,-e^{2\,\text{ArcTanh}[a x]}\right]+\right.$$
$$e^{2\,\text{ArcTanh}[a x]}\left(5+2p\right)\left(-3\left(9+2p\right)\text{Hypergeometric2F1}\left[\frac{7}{2}+p,5+2p,\frac{9}{2}+p,-e^{2\,\text{ArcTanh}[a x]}\right]+\right.$$
$$\left.\left.\left.e^{2\,\text{ArcTanh}[a x]}\left(7+2p\right)\text{Hypergeometric2F1}\left[\frac{9}{2}+p,5+2p,\frac{11}{2}+p,-e^{2\,\text{ArcTanh}[a x]}\right]\right)\right)\right)$$

Problem 1016: Unable to integrate problem.

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p}{x}\,dx$$

Optimal (type 5, 110 leaves, 6 steps):

$$a\,x\,\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{1}{2}-p,\,\frac{3}{2},\,a^2\,x^2\right]-\frac{1}{1+2\,p}\sqrt{1-a^2\,x^2}\,\left(c-a^2\,c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[1,\,\frac{1}{2}+p,\,\frac{3}{2}+p,\,1-a^2\,x^2\right]$$

Result (type 8, 25 leaves):

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p}{x}\,dx$$

Problem 1017: Unable to integrate problem.

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p}{x^2}\,dx$$

Optimal (type 5, 113 leaves, 6 steps):

$$-\frac{\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\,\frac{1}{2}-p,\,\frac{1}{2},\,a^2\,x^2\right]}{x}-\frac{1}{1+2\,p}a\,\sqrt{1-a^2\,x^2}\,\left(c-a^2\,c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[1,\,\frac{1}{2}+p,\,\frac{3}{2}+p,\,1-a^2\,x^2\right]$$

Result (type 8, 25 leaves):

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p}{x^2}\,dx$$

Problem 1018: Unable to integrate problem.

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p}{x^3}\,dx$$

Optimal (type 5, 116 leaves, 6 steps):

$$-\frac{1}{x}a\,\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\,\frac{1}{2}-p,\,\frac{1}{2},\,a^2\,x^2\right]-\frac{1}{1+2\,p}a^2\,\sqrt{1-a^2\,x^2}\,\left(c-a^2\,c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[2,\,\frac{1}{2}+p,\,\frac{3}{2}+p,\,1-a^2\,x^2\right]$$

Result (type 8, 25 leaves):

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p}{x^3}\,dx$$

Problem 1035: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{2\,\text{ArcTanh}[a\,x]}\left(c-a^2\,c\,x^2\right)^2}{x^3}\,dx$$

Optimal (type 1, 17 leaves, 2 steps):

$$-\frac{c^2\,(1+a\,x)^4}{2\,x^2}$$

Result (type 1, 42 leaves):

$$-\frac{c^2}{2\,x^2}-\frac{2\,a\,c^2}{x}-2\,a^3\,c^2\,x-\frac{1}{2}\,a^4\,c^2\,x^2$$

Problem 1053: Result unnecessarily involves higher level functions.

$$\int \frac{e^{2\,\text{ArcTanh}[a\,x]}}{c-a^2\,c\,x^2}\,dx$$

Optimal (type 1, 15 leaves, 2 steps):

$$\frac{1}{a\,c\,(1-a\,x)}$$

Result (type 3, 18 leaves):

$$\frac{e^{2\,\text{ArcTanh}[a\,x]}}{2\,a\,c}$$

Problem 1130: Result unnecessarily involves higher level functions.

$$\int \frac{e^{2\,\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2\,c\,x^2\right)^3}\,dx$$

Optimal (type 5, 203 leaves, 8 steps):

$$-\frac{(2-m)\,(4-m)\,x^{1+m}}{24\,c^3\,(1+a\,x)}+\frac{x^{1+m}}{6\,c^3\,(1-a\,x)^3\,(1+a\,x)}+\frac{(4-m)\,x^{1+m}}{12\,c^3\,(1-a\,x)^2\,(1+a\,x)}+\frac{(7-2\,m)\,(2-m)\,x^{1+m}}{24\,c^3\,(1-a\,x)\,(1+a\,x)}+\frac{(2-m)\,x^{1+m}\,\text{Hypergeometric2F1}[1,1+m,2+m,-a\,x]}{16\,c^3\,(1+m)}+\frac{(2-m)\,\left(3-8\,m+2\,m^2\right)\,x^{1+m}\,\text{Hypergeometric2F1}[1,1+m,2+m,a\,x]}{48\,c^3\,(1+m)}$$

Result (type 6, 109 leaves):

$$\left((2+m)\,x^{1+m}\,\text{AppellF1}[1+m,4,2,2+m,a\,x,-a\,x]\right)\Big/\left(c^3\,(1+m)\,(-1+a\,x)^4\,(1+a\,x)^2\,\left((2+m)\,\text{AppellF1}[1+m,4,2,2+m,a\,x,-a\,x]-2\,a\,x\,\left(\text{AppellF1}[2+m,4,3,3+m,a\,x,-a\,x]-2\,\text{AppellF1}[2+m,5,2,3+m,a\,x,-a\,x]\right)\right)\right)$$

Problem 1133: Result unnecessarily involves higher level functions.

$$\int e^{2\,\text{ArcTanh}[a\,x]}\,x^m\,\sqrt{c-a^2\,c\,x^2}\,dx$$

Optimal (type 5, 172 leaves, 7 steps):

$$-\frac{x^{1+m}\,\sqrt{c-a^2\,c\,x^2}}{2+m}+\frac{c\,(3+2\,m)\,x^{1+m}\,\sqrt{1-a^2\,x^2}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{(1+m)\,(2+m)\,\sqrt{c-a^2\,c\,x^2}}+\frac{2\,a\,c\,x^{2+m}\,\sqrt{1-a^2\,x^2}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{(2+m)\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 6, 193 leaves):

$$\frac{1}{1+m}x^{1+m}\left(-\frac{\sqrt{c-a^2\,c\,x^2}\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{\sqrt{1-a^2\,x^2}}-\left(4\,(2+m)\,\sqrt{-c\,(1+a\,x)}\,\text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,a\,x,-a\,x\right]\right)\Big/\left(\sqrt{-1+a\,x}\,\left(2\,(2+m)\,\text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,a\,x,-a\,x\right]+a\,x\,\left(\text{AppellF1}\left[2+m,\frac{3}{2},-\frac{1}{2},3+m,a\,x,-a\,x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2\,x^2\right]\right)\right)\right)\right)$$

Problem 1134: Result unnecessarily involves higher level functions.

$$\int \frac{e^{2\,\text{ArcTanh}[a\,x]}\,x^m}{\sqrt{c-a^2\,c\,x^2}}\,dx$$

Optimal (type 5, 169 leaves, 7 steps):

$$\frac{2\,x^{1+m}\,(1+a\,x)}{\sqrt{c-a^2\,c\,x^2}}-\frac{(1+2\,m)\,x^{1+m}\,\sqrt{1-a^2\,x^2}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{(1+m)\,\sqrt{c-a^2\,c\,x^2}}-\frac{2\,a\,(1+m)\,x^{2+m}\,\sqrt{1-a^2\,x^2}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{(2+m)\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 6, 133 leaves):

$$\left(2\,(2+m)\,x^{1+m}\,\sqrt{-c\,(1+a\,x)}\,\text{AppellF1}\left[1+m,\frac{3}{2},-\frac{1}{2},2+m,a\,x,-a\,x\right]\right)\Big/\left(c\,(1+m)\,(-1+a\,x)^{3/2}\,\left(2\,(2+m)\,\text{AppellF1}\left[1+m,\frac{3}{2},-\frac{1}{2},2+m,a\,x,-a\,x\right]+a\,x\,\left(\text{AppellF1}\left[2+m,\frac{3}{2},\frac{1}{2},3+m,a\,x,-a\,x\right]+3\,\text{AppellF1}\left[2+m,\frac{5}{2},-\frac{1}{2},3+m,a\,x,-a\,x\right]\right)\right)\right)$$

Problem 1135: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{e^{2\,\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2\,c\,x^2\right)^{3/2}}\,dx$$

Optimal (type 5, 183 leaves, 7 steps):

$$\frac{2\,x^{1+m}\,(1+a\,x)}{3\,\left(c-a^2\,c\,x^2\right)^{3/2}}+\frac{(1-2\,m)\,x^{1+m}\,\sqrt{1-a^2\,x^2}\;\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{3\,c\,(1+m)\,\sqrt{c-a^2\,c\,x^2}}+\frac{2\,a\,(1-m)\,x^{2+m}\,\sqrt{1-a^2\,x^2}\;\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{3\,c\,(2+m)\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 6, 582 leaves):

$$\left((2+m)\,x^{1+m}\,\sqrt{-c\,(1+a\,x)}\;\text{AppellF1}\left[1+m,\frac{3}{2},-\frac{1}{2},2+m,a\,x,-a\,x\right]\right)\Big/\left(2\,c^2\,(1+m)\,(-1+a\,x)^{3/2}\left(2\,(2+m)\,\text{AppellF1}\left[1+m,\frac{3}{2},-\frac{1}{2},2+m,a\,x,-a\,x\right]+a\,x\left(\text{AppellF1}\left[2+m,\frac{3}{2},\frac{1}{2},3+m,a\,x,-a\,x\right]+3\,\text{AppellF1}\left[2+m,\frac{5}{2},-\frac{1}{2},3+m,a\,x,-a\,x\right]\right)\right)\right)-$$
$$\left((2+m)\,x^{1+m}\,\sqrt{-c\,(1+a\,x)}\;\text{AppellF1}\left[1+m,\frac{5}{2},-\frac{1}{2},2+m,a\,x,-a\,x\right]\right)\Big/\left(c^2\,(1+m)\,(-1+a\,x)^{5/2}\left(2\,(2+m)\,\text{AppellF1}\left[1+m,\frac{5}{2},-\frac{1}{2},2+m,a\,x,-a\,x\right]+a\,x\left(\text{AppellF1}\left[2+m,\frac{5}{2},\frac{1}{2},3+m,a\,x,-a\,x\right]+5\,\text{AppellF1}\left[2+m,\frac{7}{2},-\frac{1}{2},3+m,a\,x,-a\,x\right]\right)\right)\right)+$$
$$\left((2+m)\,x^{1+m}\,\sqrt{c-a\,c\,x}\;\text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,-a\,x,a\,x\right]\right)\Big/\left(4\,c^2\,(1+m)\,\sqrt{1+a\,x}\left(2\,(2+m)\,\text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,-a\,x,a\,x\right]-a\,x\left(\text{AppellF1}\left[2+m,\frac{3}{2},-\frac{1}{2},3+m,-a\,x,a\,x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2\,x^2\right]\right)\right)\right)+$$
$$\left((2+m)\,x^{1+m}\,\sqrt{1-a\,x}\,\sqrt{-c\,(1+a\,x)}\,\sqrt{1-a^2\,x^2}\;\text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,a\,x,-a\,x\right]\right)\Big/\left(4\,c^2\,(1+m)\,(-1+a\,x)^{3/2}\,\sqrt{1+a\,x}\left(2\,(2+m)\,\text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,a\,x,-a\,x\right]+a\,x\left(\text{AppellF1}\left[2+m,\frac{3}{2},-\frac{1}{2},3+m,a\,x,-a\,x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2\,x^2\right]\right)\right)\right)$$

Problem 1136: Result more than twice size of optimal antiderivative.

$$\int e^{2\,\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Optimal (type 5, 55 leaves, 3 steps):

$$-\frac{1}{a\,p}2^{1+p}\,(1+a\,x)^{-p}\,(c-a^2\,c\,x^2)^p\,\text{Hypergeometric2F1}\left[-1-p,\,p,\,1+p,\,\frac{1}{2}\,(1-a\,x)\right]$$

Result (type 5, 133 leaves):

$$\frac{1}{a\,(1+p)}\left(-(-1+a\,x)^2\right)^{-p}\,(-2+2\,a\,x)^p\,(1-a^2\,x^2)^{-p}\,(c-a^2\,c\,x^2)^p$$
$$\left(-a\,(1+p)\,x\left(\frac{1}{2}-\frac{a\,x}{2}\right)^p\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,-p,\,\frac{3}{2},\,a^2\,x^2\right]+\right.$$
$$\left.(1+a\,x)\,(1-a^2\,x^2)^p\,\text{Hypergeometric2F1}\left[1-p,\,1+p,\,2+p,\,\frac{1}{2}\,(1+a\,x)\right]\right)$$

Problem 1171: Result unnecessarily involves higher level functions.

$$\int\frac{e^{3\,\text{ArcTanh}[a\,x]}}{(c-a^2\,c\,x^2)^{5/2}}\,dx$$

Optimal (type 3, 185 leaves, 5 steps):

$$\frac{\sqrt{1-a^2\,x^2}}{6\,a\,c^2\,(1-a\,x)^3\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{1-a^2\,x^2}}{8\,a\,c^2\,(1-a\,x)^2\,\sqrt{c-a^2\,c\,x^2}}+$$
$$\frac{\sqrt{1-a^2\,x^2}}{8\,a\,c^2\,(1-a\,x)\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{1-a^2\,x^2}\,\text{ArcTanh}[a\,x]}{8\,a\,c^2\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 4, 108 leaves):

$$-\left(\left(a\,\sqrt{1-a^2\,x^2}\right.\right.$$
$$\left.\left(\sqrt{-a^2}\,(-10+9\,a\,x-3\,a^2\,x^2)-3\,i\,a\,(-1+a\,x)^3\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],\,1\right]\right)\right)\Big/$$
$$\left.\left(24\,(-a^2)^{3/2}\,c^2\,(-1+a\,x)^3\,\sqrt{c-a^2\,c\,x^2}\right)\right)$$

Problem 1172: Result unnecessarily involves higher level functions.

$$\int\frac{e^{3\,\text{ArcTanh}[a\,x]}}{(c-a^2\,c\,x^2)^{7/2}}\,dx$$

Optimal (type 3, 278 leaves, 5 steps):

$$\frac{\sqrt{1-a^2\,x^2}}{16\,a\,c^3\,(1-a\,x)^4\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{1-a^2\,x^2}}{12\,a\,c^3\,(1-a\,x)^3\,\sqrt{c-a^2\,c\,x^2}}+\frac{3\,\sqrt{1-a^2\,x^2}}{32\,a\,c^3\,(1-a\,x)^2\,\sqrt{c-a^2\,c\,x^2}}+$$
$$\frac{\sqrt{1-a^2\,x^2}}{8\,a\,c^3\,(1-a\,x)\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{1-a^2\,x^2}}{32\,a\,c^3\,(1+a\,x)\,\sqrt{c-a^2\,c\,x^2}}+\frac{5\,\sqrt{1-a^2\,x^2}\,\text{ArcTanh}[a\,x]}{32\,a\,c^3\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 4, 136 leaves):

$$-\left(\left(a\sqrt{1-a^2x^2}\left(\sqrt{-a^2}\left(32-15\,a\,x-35\,a^2x^2+45\,a^3x^3-15\,a^4x^4\right)-15\,\mathrm{i}\,a\left(-1+a\,x\right)^4\left(1+a\,x\right)\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]\right)\right)\Big/\left(96\left(-a^2\right)^{3/2}c^3\left(-1+a\,x\right)^4\left(1+a\,x\right)\sqrt{c-a^2c\,x^2}\right)\right)$$

Problem 1173: Unable to integrate problem.

$$\int e^{3\,\mathrm{ArcTanh}[a\,x]}\,x^m\sqrt{c-a^2c\,x^2}\,dx$$

Optimal (type 5, 136 leaves, 5 steps):

$$-\frac{3\,x^{1+m}\sqrt{c-a^2c\,x^2}}{(1+m)\sqrt{1-a^2x^2}}-\frac{a\,x^{2+m}\sqrt{c-a^2c\,x^2}}{(2+m)\sqrt{1-a^2x^2}}+\frac{4\,x^{1+m}\sqrt{c-a^2c\,x^2}\,\mathrm{Hypergeometric2F1}[1,1+m,2+m,a\,x]}{(1+m)\sqrt{1-a^2x^2}}$$

Result (type 8, 29 leaves):

$$\int e^{3\,\mathrm{ArcTanh}[a\,x]}\,x^m\sqrt{c-a^2c\,x^2}\,dx$$

Problem 1174: Unable to integrate problem.

$$\int e^{3\,\mathrm{ArcTanh}[a\,x]}\,x^m\left(c-a^2c\,x^2\right)^p\,dx$$

Optimal (type 5, 251 leaves, 7 steps):

$$-\frac{3\,x^{1+m}\left(c-a^2c\,x^2\right)^p}{(m+2\,p)\sqrt{1-a^2x^2}}-\frac{a\,x^{2+m}\left(c-a^2c\,x^2\right)^p}{(1+m+2\,p)\sqrt{1-a^2x^2}}+\frac{1}{(1+m)\,(m+2\,p)}\left(3+4\,m+2\,p\right)x^{1+m}\left(1-a^2x^2\right)^{-p}\left(c-a^2c\,x^2\right)^p\,\mathrm{Hypergeometric2F1}\left[\frac{1+m}{2},\frac{3}{2}-p,\frac{3+m}{2},a^2x^2\right]+\left(a\,(5+4\,m+6\,p)\,x^{2+m}\left(1-a^2x^2\right)^{-p}\left(c-a^2c\,x^2\right)^p\,\mathrm{Hypergeometric2F1}\left[\frac{2+m}{2},\frac{3}{2}-p,\frac{4+m}{2},a^2x^2\right]\right)\Big/\left((2+m)\,(1+m+2\,p)\right)$$

Result (type 8, 27 leaves):

$$\int e^{3\,\mathrm{ArcTanh}[a\,x]}\,x^m\left(c-a^2c\,x^2\right)^p\,dx$$

Problem 1179: Unable to integrate problem.

$$\int\frac{e^{3\,\mathrm{ArcTanh}[a\,x]}\left(c-a^2c\,x^2\right)^p}{x}\,dx$$

Optimal (type 5, 193 leaves, 8 steps):

$$\frac{4\left(c-a^2 c x^2\right)^p}{(1-2 p) \sqrt{1-a^2 x^2}}-\frac{a x\left(c-a^2 c x^2\right)^p}{2 p \sqrt{1-a^2 x^2}}+\frac{1}{2 p}$$
$$a(1+6 p) x\left(1-a^2 x^2\right)^{-p}\left(c-a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{2}-p, \frac{3}{2}, a^2 x^2\right]-$$
$$\frac{1}{1+2 p} \sqrt{1-a^2 x^2}\left(c-a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[1, \frac{1}{2}+p, \frac{3}{2}+p, 1-a^2 x^2\right]$$

Result (type 8, 27 leaves) :

$$\int \frac{e^{3 \operatorname{ArcTanh}[a x]}\left(c-a^2 c x^2\right)^p}{x} d x$$

Problem 1180: Unable to integrate problem.

$$\int \frac{e^{3 \operatorname{ArcTanh}[a x]}\left(c-a^2 c x^2\right)^p}{x^2} d x$$

Optimal (type 5, 187 leaves, 9 steps) :

$$\frac{4 a\left(c-a^2 c x^2\right)^p}{(1-2 p) \sqrt{1-a^2 x^2}}-\frac{\left(c-a^2 c x^2\right)^p}{x \sqrt{1-a^2 x^2}}+$$
$$a^2(5-2 p) x\left(1-a^2 x^2\right)^{-p}\left(c-a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{2}-p, \frac{3}{2}, a^2 x^2\right]-$$
$$\frac{1}{1+2 p} 3 a \sqrt{1-a^2 x^2}\left(c-a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[1, \frac{1}{2}+p, \frac{3}{2}+p, 1-a^2 x^2\right]$$

Result (type 8, 27 leaves) :

$$\int \frac{e^{3 \operatorname{ArcTanh}[a x]}\left(c-a^2 c x^2\right)^p}{x^2} d x$$

Problem 1181: Unable to integrate problem.

$$\int \frac{e^{3 \operatorname{ArcTanh}[a x]}\left(c-a^2 c x^2\right)^p}{x^3} d x$$

Optimal (type 5, 194 leaves, 8 steps) :

$$-\frac{\left(c-a^2 c x^2\right)^p}{2 x^2 \sqrt{1-a^2 x^2}}-\frac{3 a\left(c-a^2 c x^2\right)^p}{x \sqrt{1-a^2 x^2}}+$$
$$a^3(7-6 p) x\left(1-a^2 x^2\right)^{-p}\left(c-a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{2}-p, \frac{3}{2}, a^2 x^2\right]+$$
$$\left(a^2(9-2 p)\left(c-a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[1,-\frac{1}{2}+p, \frac{1}{2}+p, 1-a^2 x^2\right]\right) /$$
$$\left(2(1-2 p) \sqrt{1-a^2 x^2}\right)$$

Result (type 8, 27 leaves) :

$$\int \frac{e^{3\,\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p}{x^3}\,dx$$

Problem 1185: Result more than twice size of optimal antiderivative.

$$\int e^{4\,\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^2\,dx$$

Optimal (type 1, 17 leaves, 2 steps):

$$\frac{c^2\,(1+a\,x)^5}{5\,a}$$

Result (type 1, 49 leaves):

$$c^2\,x+2\,a\,c^2\,x^2+2\,a^2\,c^2\,x^3+a^3\,c^2\,x^4+\frac{1}{5}\,a^4\,c^2\,x^5$$

Problem 1187: Result unnecessarily involves higher level functions.

$$\int \frac{e^{4\,\text{ArcTanh}[a\,x]}}{c-a^2\,c\,x^2}\,dx$$

Optimal (type 1, 13 leaves, 2 steps):

$$\frac{x}{c\,(1-a\,x)^2}$$

Result (type 3, 18 leaves):

$$\frac{e^{4\,\text{ArcTanh}[a\,x]}}{4\,a\,c}$$

Problem 1191: Result more than twice size of optimal antiderivative.

$$\int e^{4\,\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Optimal (type 5, 63 leaves, 3 steps):

$$\frac{1}{a\,(1-p)}2^{2+p}\,c\,(1+a\,x)^{1-p}\,\left(c-a^2\,c\,x^2\right)^{-1+p}\,\text{Hypergeometric2F1}\left[-2-p,\,-1+p,\,p,\,\frac{1}{2}\,(1-a\,x)\right]$$

Result (type 5, 159 leaves):

$$\frac{1}{a\,(1+p)}\left(-\left(-1+a\,x\right)^2\right)^{-p}\,(-2+2\,a\,x)^p\,\left(1-a^2\,x^2\right)^{-p}$$
$$\left(c-a^2\,c\,x^2\right)^p\,\left(a\,(1+p)\,x\,\left(\frac{1}{2}-\frac{a\,x}{2}\right)^p\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,-p,\,\frac{3}{2},\,a^2\,x^2\right]-\right.$$
$$(1+a\,x)\,\left(1-a^2\,x^2\right)^p\,\left(2\,\text{Hypergeometric2F1}\left[1-p,\,1+p,\,2+p,\,\frac{1}{2}\,(1+a\,x)\right]-\right.$$
$$\left.\left.\text{Hypergeometric2F1}\left[2-p,\,1+p,\,2+p,\,\frac{1}{2}\,(1+a\,x)\right]\right)\right)$$

Problem 1211: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{e^{-\text{ArcTanh}[a x]}}{\sqrt{c-a^2 c x^2}} \, dx$$

Optimal (type 3, 39 leaves, 3 steps):

$$\frac{\sqrt{1-a^2 x^2}\ \text{Log}[1+a x]}{a \sqrt{c-a^2 c x^2}}$$

Result (type 4, 87 leaves):

$$-\left(\left(a \sqrt{1-a^2 x^2}\ \left(-2\, i\, a\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\sqrt{-a^2}\ x\right], 1\right] + \sqrt{-a^2}\ \text{Log}\left[-1+a^2 x^2\right]\right)\right) \Big/ \left(2 \left(-a^2\right)^{3/2} \sqrt{c-a^2 c x^2}\right)\right)$$

Problem 1212: Result unnecessarily involves higher level functions.

$$\int \frac{e^{-\text{ArcTanh}[a x]}}{\left(c-a^2 c x^2\right)^{3/2}} \, dx$$

Optimal (type 3, 90 leaves, 5 steps):

$$-\frac{\sqrt{1-a^2 x^2}}{2 a c (1+a x) \sqrt{c-a^2 c x^2}}+\frac{\sqrt{1-a^2 x^2}\ \text{ArcTanh}[a x]}{2 a c \sqrt{c-a^2 c x^2}}$$

Result (type 4, 89 leaves):

$$\left(a \sqrt{1-a^2 x^2}\ \left(\sqrt{-a^2} + i\, a\, (1+a x)\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\sqrt{-a^2}\ x\right], 1\right]\right)\right) \Big/ \left(2 \left(-a^2\right)^{3/2} (c+a c x) \sqrt{c-a^2 c x^2}\right)$$

Problem 1213: Result unnecessarily involves higher level functions.

$$\int \frac{e^{-\text{ArcTanh}[a x]}}{\left(c-a^2 c x^2\right)^{5/2}} \, dx$$

Optimal (type 3, 183 leaves, 5 steps):

$$\frac{\sqrt{1-a^2 x^2}}{8 a c^2 (1-a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{8 a c^2 (1+a x)^2 \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{4 a c^2 (1+a x) \sqrt{c-a^2 c x^2}}+\frac{3 \sqrt{1-a^2 x^2}\ \text{ArcTanh}[a x]}{8 a c^2 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 118 leaves):

$$-\left(\left(a\sqrt{1-a^2x^2}\left(\sqrt{-a^2}\left(2-3ax-3a^2x^2\right)-3\,\mathrm{i}\,a\,(-1+ax)\,(1+ax)^2\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]\right)\right)\Big/\left(8\left(-a^2\right)^{3/2}(-1+ax)\,(c+acx)^2\sqrt{c-a^2cx^2}\right)\right)$$

Problem 1214: Result unnecessarily involves higher level functions.

$$\int\frac{e^{-\text{ArcTanh}[a x]}}{\left(c-a^2cx^2\right)^{7/2}}\,dx$$

Optimal (type 3, 276 leaves, 5 steps):

$$\frac{\sqrt{1-a^2x^2}}{32ac^3(1-ax)^2\sqrt{c-a^2cx^2}}+\frac{\sqrt{1-a^2x^2}}{8ac^3(1-ax)\sqrt{c-a^2cx^2}}-\frac{\sqrt{1-a^2x^2}}{24ac^3(1+ax)^3\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}}{32ac^3(1+ax)^2\sqrt{c-a^2cx^2}}-\frac{3\sqrt{1-a^2x^2}}{16ac^3(1+ax)\sqrt{c-a^2cx^2}}+\frac{5\sqrt{1-a^2x^2}\,\text{ArcTanh}[ax]}{16ac^3\sqrt{c-a^2cx^2}}$$

Result (type 4, 136 leaves):

$$-\left(\left(a\sqrt{1-a^2x^2}\left(\sqrt{-a^2}\left(-8+25ax+25a^2x^2-15a^3x^3-15a^4x^4\right)-15\,\mathrm{i}\,a\,(-1+ax)^2(1+ax)^3\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]\right)\right)\Big/\left(48\left(-a^2\right)^{3/2}(-1+ax)^2(c+acx)^3\sqrt{c-a^2cx^2}\right)\right)$$

Problem 1215: Unable to integrate problem.

$$\int e^{-\text{ArcTanh}[a x]}\,x^m\left(c-a^2cx^2\right)^p\,dx$$

Optimal (type 5, 137 leaves, 5 steps):

$$\frac{1}{1+m}x^{1+m}\left(1-a^2x^2\right)^{-p}\left(c-a^2cx^2\right)^p\,\text{Hypergeometric2F1}\left[\frac{1+m}{2},\frac{1}{2}-p,\frac{3+m}{2},a^2x^2\right]-\frac{1}{2+m}a\,x^{2+m}\left(1-a^2x^2\right)^{-p}\left(c-a^2cx^2\right)^p\,\text{Hypergeometric2F1}\left[\frac{2+m}{2},\frac{1}{2}-p,\frac{4+m}{2},a^2x^2\right]$$

Result (type 8, 27 leaves):

$$\int e^{-\text{ArcTanh}[a x]}\,x^m\left(c-a^2cx^2\right)^p\,dx$$

Problem 1216: Result more than twice size of optimal antiderivative.

$$\int e^{-\text{ArcTanh}[a x]}\,x^3\left(1-a^2x^2\right)^p\,dx$$

Optimal (type 5, 85 leaves, 6 steps):

$$-\frac{\left(1-a^2 x^2\right)^{\frac{1}{2}+p}}{a^4\,(1+2 p)}+\frac{\left(1-a^2 x^2\right)^{\frac{3}{2}+p}}{a^4\,(3+2 p)}-\frac{1}{5}\,a\,x^5\,\text{Hypergeometric2F1}\left[\frac{5}{2},\frac{1}{2}-p,\frac{7}{2},a^2 x^2\right]$$

Result (type 5, 183 leaves):

$$\frac{1}{3\,a^4}\left(3\,a\,x\,\text{Hypergeometric2F1}\left[\frac{1}{2},-\frac{1}{2}-p,\frac{3}{2},a^2 x^2\right]+\frac{1}{3+2 p}\left(-3+3\,\left(1-a^2 x^2\right)^{\frac{1}{2}+p}-3\,a^2 x^2\,\left(1-a^2 x^2\right)^{\frac{1}{2}+p}+a^3\,(3+2 p)\,x^3\,\text{Hypergeometric2F1}\left[\frac{3}{2},-\frac{1}{2}-p,\frac{5}{2},a^2 x^2\right]+3\,(1-a x)\,(1+a x)^{-\frac{1}{2}-p}\,\left(2-2 a^2 x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\frac{3}{2}+p,\frac{5}{2}+p,\frac{1}{2}-\frac{a x}{2}\right]\right)\right)$$

Problem 1220: Result more than twice size of optimal antiderivative.

$$\int\frac{e^{-\text{ArcTanh}[a\,x]}\,\left(1-a^2 x^2\right)^p}{x}\,dx$$

Optimal (type 5, 73 leaves, 5 steps):

$$-a\,x\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}-p,\frac{3}{2},a^2 x^2\right]-\frac{\left(1-a^2 x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2 x^2\right]}{1+2 p}$$

Result (type 5, 148 leaves):

$$\left(1-a^2 x^2\right)^{\frac{1}{2}+p}\left(\frac{\text{Hypergeometric2F1}\left[-\frac{1}{2}-p,-\frac{1}{2}-p,\frac{1}{2}-p,\frac{1}{a^2 x^2}\right]}{\left(1-\frac{1}{a^2 x^2}\right)^{\frac{1}{2}+p}+2 p\,\left(1-\frac{1}{a^2 x^2}\right)^{\frac{1}{2}+p}}+\frac{1}{3+2 p}\,2^{\frac{1}{2}+p}\,(1-a x)\,(1+a x)^{-\frac{1}{2}-p}\,\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\frac{3}{2}+p,\frac{5}{2}+p,\frac{1}{2}-\frac{a x}{2}\right]\right)$$

Problem 1221: Result more than twice size of optimal antiderivative.

$$\int\frac{e^{-\text{ArcTanh}[a\,x]}\,\left(1-a^2 x^2\right)^p}{x^2}\,dx$$

Optimal (type 5, 74 leaves, 5 steps):

$$-\frac{\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1}{2}-p,\frac{1}{2},a^2 x^2\right]}{x}+\frac{a\,\left(1-a^2 x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2 x^2\right]}{1+2 p}$$

Result (type 5, 171 leaves):

$$-\frac{\text{Hypergeometric2F1}\left[-\frac{1}{2},-\frac{1}{2}-p,\frac{1}{2},a^2 x^2\right]}{x}-\frac{1}{1+2p}$$
$$a\left(1-\frac{1}{a^2 x^2}\right)^{-\frac{1}{2}-p}\left(1-a^2 x^2\right)^{\frac{1}{2}+p}\text{Hypergeometric2F1}\left[-\frac{1}{2}-p,-\frac{1}{2}-p,\frac{1}{2}-p,\frac{1}{a^2 x^2}\right]+\frac{1}{3+2p}$$
$$a\left(-1+a x\right)\left(1+a x\right)^{-\frac{1}{2}-p}\left(2-2a^2 x^2\right)^{\frac{1}{2}+p}\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\frac{3}{2}+p,\frac{5}{2}+p,\frac{1}{2}-\frac{a x}{2}\right]$$

Problem 1222: Result more than twice size of optimal antiderivative.

$$\int e^{-\text{ArcTanh}[a x]}\,x^3\left(c-a^2 c x^2\right)^p\,dx$$

Optimal (type 5, 134 leaves, 7 steps):

$$-\frac{\sqrt{1-a^2 x^2}\left(c-a^2 c x^2\right)^p}{a^4\left(1+2p\right)}+\frac{\left(1-a^2 x^2\right)^{3/2}\left(c-a^2 c x^2\right)^p}{a^4\left(3+2p\right)}-$$
$$\frac{1}{5}a x^5\left(1-a^2 x^2\right)^{-p}\left(c-a^2 c x^2\right)^p\text{Hypergeometric2F1}\left[\frac{5}{2},\frac{1}{2}-p,\frac{7}{2},a^2 x^2\right]$$

Result (type 5, 290 leaves):

$$\frac{1}{a^4\left(1+2p\right)\left(3+2p\right)\left(5+2p\right)\left(7+2p\right)}$$
$$4^{1+p}\left(\frac{e^{\text{ArcTanh}[a x]}}{1+e^{2\,\text{ArcTanh}[a x]}}\right)^{1+2p}\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^{1+2p}\left(1-a^2 x^2\right)^{-p}\left(c-a^2 c x^2\right)^p$$
$$\left(-\left(105+142p+60p^2+8p^3\right)\text{Hypergeometric2F1}\left[\frac{1}{2}+p,5+2p,\frac{3}{2}+p,-e^{2\,\text{ArcTanh}[a x]}\right]+\right.$$
$$e^{2\,\text{ArcTanh}[a x]}\left(1+2p\right)$$
$$\left(3\left(35+24p+4p^2\right)\text{Hypergeometric2F1}\left[\frac{3}{2}+p,5+2p,\frac{5}{2}+p,-e^{2\,\text{ArcTanh}[a x]}\right]+\right.$$
$$e^{2\,\text{ArcTanh}[a x]}\left(3+2p\right)\left(-3\left(7+2p\right)\text{Hypergeometric2F1}\left[\frac{5}{2}+p,5+2p,\frac{7}{2}+p,-e^{2\,\text{ArcTanh}[a x]}\right]+\right.$$
$$\left.\left.\left.e^{2\,\text{ArcTanh}[a x]}\left(5+2p\right)\text{Hypergeometric2F1}\left[\frac{7}{2}+p,5+2p,\frac{9}{2}+p,-e^{2\,\text{ArcTanh}[a x]}\right]\right)\right)\right)$$

Problem 1226: Unable to integrate problem.

$$\int\frac{e^{-\text{ArcTanh}[a x]}\left(c-a^2 c x^2\right)^p}{x}\,dx$$

Optimal (type 5, 111 leaves, 6 steps):

$$-a x\left(1-a^2 x^2\right)^{-p}\left(c-a^2 c x^2\right)^p\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}-p,\frac{3}{2},a^2 x^2\right]-$$
$$\frac{1}{1+2p}\sqrt{1-a^2 x^2}\left(c-a^2 c x^2\right)^p\text{Hypergeometric2F1}\left[1,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2 x^2\right]$$

Result (type 8, 27 leaves):

$$\int \frac{e^{-\text{ArcTanh}[a x]} \left(c - a^2 c x^2\right)^p}{x} \, dx$$

Problem 1227: Unable to integrate problem.

$$\int \frac{e^{-\text{ArcTanh}[a x]} \left(c - a^2 c x^2\right)^p}{x^2} \, dx$$

Optimal (type 5, 112 leaves, 6 steps):

$$-\frac{\left(1 - a^2 x^2\right)^{-p} \left(c - a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[-\frac{1}{2}, \frac{1}{2} - p, \frac{1}{2}, a^2 x^2\right]}{x} + \frac{1}{1 + 2 p} a \sqrt{1 - a^2 x^2} \left(c - a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[1, \frac{1}{2} + p, \frac{3}{2} + p, 1 - a^2 x^2\right]$$

Result (type 8, 27 leaves):

$$\int \frac{e^{-\text{ArcTanh}[a x]} \left(c - a^2 c x^2\right)^p}{x^2} \, dx$$

Problem 1232: Result unnecessarily involves higher level functions.

$$\int \frac{e^{-2 \text{ArcTanh}[a x]}}{c - a^2 c x^2} \, dx$$

Optimal (type 1, 15 leaves, 2 steps):

$$-\frac{1}{a c (1 + a x)}$$

Result (type 3, 18 leaves):

$$-\frac{e^{-2 \text{ArcTanh}[a x]}}{2 a c}$$

Problem 1252: Result unnecessarily involves higher level functions.

$$\int e^{-2 \text{ArcTanh}[a x]} x^m \sqrt{c - a^2 c x^2} \, dx$$

Optimal (type 5, 172 leaves, 7 steps):

$$-\frac{x^{1+m} \sqrt{c - a^2 c x^2}}{2 + m} + \frac{c (3 + 2 m) x^{1+m} \sqrt{1 - a^2 x^2} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, a^2 x^2\right]}{(1 + m) (2 + m) \sqrt{c - a^2 c x^2}} - \frac{2 a c x^{2+m} \sqrt{1 - a^2 x^2} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, a^2 x^2\right]}{(2 + m) \sqrt{c - a^2 c x^2}}$$

Result (type 6, 192 leaves):

$$\frac{1}{1+m}x^{1+m}\left(-\frac{\sqrt{c-a^2 c x^2}\ \text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2 x^2\right]}{\sqrt{1-a^2 x^2}}-\left(4\ (2+m)\ \sqrt{c-a c x}\ \text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,-a x,a x\right]\right)\Big/\left(\sqrt{1+a x}\ \left(-2\ (2+m)\ \text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,-a x,a x\right]+a x\left(\text{AppellF1}\left[2+m,\frac{3}{2},-\frac{1}{2},3+m,-a x,a x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2 x^2\right]\right)\right)\right)\right)$$

Problem 1253: Result more than twice size of optimal antiderivative.

$$\int e^{-2\,\text{ArcTanh}[a x]}\left(c-a^2 c x^2\right)^p\, dx$$

Optimal (type 5, 54 leaves, 3 steps):

$$\frac{1}{a p}2^{1+p}\ (1-a x)^{-p}\ \left(c-a^2 c x^2\right)^p\ \text{Hypergeometric2F1}\left[-1-p,p,1+p,\frac{1}{2}\ (1+a x)\right]$$

Result (type 5, 125 leaves):

$$\frac{1}{a\ (1+p)}2^p\ (1+a x)^{-p}\ \left(1-a^2 x^2\right)^{-p}\ \left(c-a^2 c x^2\right)^p\left(-a\ (1+p)\ x\left(\frac{1}{2}+\frac{a x}{2}\right)^p\ \text{Hypergeometric2F1}\left[\frac{1}{2},-p,\frac{3}{2},a^2 x^2\right]+(-1+a x)\ \left(1-a^2 x^2\right)^p\ \text{Hypergeometric2F1}\left[1-p,1+p,2+p,\frac{1}{2}-\frac{a x}{2}\right]\right)$$

Problem 1277: Result unnecessarily involves higher level functions.

$$\int\frac{e^{-3\,\text{ArcTanh}[a x]}}{\left(c-a^2 c x^2\right)^{5/2}}\, dx$$

Optimal (type 3, 182 leaves, 5 steps):

$$-\frac{\sqrt{1-a^2 x^2}}{6 a c^2\ (1+a x)^3\ \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{8 a c^2\ (1+a x)^2\ \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{8 a c^2\ (1+a x)\ \sqrt{c-a^2 c x^2}}+\frac{\sqrt{1-a^2 x^2}\ \text{ArcTanh}[a x]}{8 a c^2\ \sqrt{c-a^2 c x^2}}$$

Result (type 4, 108 leaves):

$$\left(a\sqrt{1-a^2 x^2}\ \left(\sqrt{-a^2}\ \left(10+9 a x+3 a^2 x^2\right)+3\, i\, a\ (1+a x)^3\ \text{EllipticF}\left[i\ \text{ArcSinh}\left[\sqrt{-a^2}\ x\right],1\right]\right)\right)\Big/\left(24\ \left(-a^2\right)^{3/2} c^2\ (1+a x)^3\ \sqrt{c-a^2 c x^2}\right)$$

Problem 1278: Result unnecessarily involves higher level functions.

$$\int \frac{e^{-3\,\text{ArcTanh}[a\,x]}}{\left(c-a^2\,c\,x^2\right)^{7/2}}\,dx$$

Optimal (type 3, 275 leaves, 5 steps):

$$\frac{\sqrt{1-a^2\,x^2}}{32\,a\,c^3\,(1-a\,x)\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{1-a^2\,x^2}}{16\,a\,c^3\,(1+a\,x)^4\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{1-a^2\,x^2}}{12\,a\,c^3\,(1+a\,x)^3\,\sqrt{c-a^2\,c\,x^2}}-\frac{3\,\sqrt{1-a^2\,x^2}}{32\,a\,c^3\,(1+a\,x)^2\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{1-a^2\,x^2}}{8\,a\,c^3\,(1+a\,x)\,\sqrt{c-a^2\,c\,x^2}}+\frac{5\,\sqrt{1-a^2\,x^2}\,\text{ArcTanh}[a\,x]}{32\,a\,c^3\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 4, 136 leaves):

$$-\left(\left(a\,\sqrt{1-a^2\,x^2}\,\left(\sqrt{-a^2}\,\left(32+15\,a\,x-35\,a^2\,x^2-45\,a^3\,x^3-15\,a^4\,x^4\right)-15\,i\,a\,(-1+a\,x)\,(1+a\,x)^4\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]\right)\right)\Big/\left(96\,\left(-a^2\right)^{3/2}\,c^3\,(-1+a\,x)\,(1+a\,x)^4\,\sqrt{c-a^2\,c\,x^2}\right)\right)$$

Problem 1279: Unable to integrate problem.

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\,x^m\,\sqrt{c-a^2\,c\,x^2}\,dx$$

Optimal (type 5, 136 leaves, 5 steps):

$$-\frac{3\,x^{1+m}\,\sqrt{c-a^2\,c\,x^2}}{(1+m)\,\sqrt{1-a^2\,x^2}}+\frac{a\,x^{2+m}\,\sqrt{c-a^2\,c\,x^2}}{(2+m)\,\sqrt{1-a^2\,x^2}}+\frac{4\,x^{1+m}\,\sqrt{c-a^2\,c\,x^2}\,\text{Hypergeometric2F1}[1,1+m,2+m,-a\,x]}{(1+m)\,\sqrt{1-a^2\,x^2}}$$

Result (type 8, 29 leaves):

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\,x^m\,\sqrt{c-a^2\,c\,x^2}\,dx$$

Problem 1281: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\,\text{ArcTanh}[a\,x]}\,\left(1-a^2\,x^2\right)^{5/2}\,dx$$

Optimal (type 3, 359 leaves, 18 steps):

$$\frac{231\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{512\,a}+\frac{231\,(1-a\,x)^{5/4}\,(1+a\,x)^{3/4}}{1280\,a}+\frac{77\,(1-a\,x)^{9/4}\,(1+a\,x)^{3/4}}{960\,a}-\frac{77\,(1-a\,x)^{13/4}\,(1+a\,x)^{3/4}}{480\,a}-\frac{11\,(1-a\,x)^{13/4}\,(1+a\,x)^{7/4}}{60\,a}-\frac{(1-a\,x)^{13/4}\,(1+a\,x)^{11/4}}{6\,a}+\frac{231\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{512\,\sqrt{2}\,a}-\frac{231\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{512\,\sqrt{2}\,a}+\frac{231\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{1024\,\sqrt{2}\,a}-\frac{231\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{1024\,\sqrt{2}\,a}$$

Result (type 7, 422 leaves) :

$$\frac{1}{1920\, a\, \left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^6}\left(960\, e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4\left(-1+3\,e^{2\,\text{ArcTanh}[a\,x]}\right)-\right.$$

$$360\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^6\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]+$$

$$80\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2\left(\frac{39\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{\left(-1+a^2\,x^2\right)^2}-\right.$$

$$\left(\text{Cosh}\left[\frac{1}{2}\text{ArcTanh}[a\,x]\right]+\text{Sinh}\left[\frac{1}{2}\text{ArcTanh}[a\,x]\right]\right)$$

$$\left.\left(13\,\text{Cosh}[3\,\text{ArcTanh}[a\,x]]+\frac{7-166\,a\,x+26\,\sqrt{1-a^2\,x^2}\,\text{Sinh}[3\,\text{ArcTanh}[a\,x]]}{\sqrt{1-a^2\,x^2}}\right)\right)$$

$$\left(\text{Cosh}[4\,\text{ArcTanh}[a\,x]]+\text{Sinh}[4\,\text{ArcTanh}[a\,x]]\right)-$$

$$\left(-\frac{3300\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{\left(-1+a^2\,x^2\right)^3}-\right.$$

$$\left(\text{Cosh}\left[\frac{1}{2}\text{ArcTanh}[a\,x]\right]+\text{Sinh}\left[\frac{1}{2}\text{ArcTanh}[a\,x]\right]\right)$$

$$\left(\frac{286}{\sqrt{1-a^2\,x^2}}+\frac{12\,556\,a\,x}{\sqrt{1-a^2\,x^2}}-129\,\text{Cosh}[3\,\text{ArcTanh}[a\,x]]+275\,\text{Cosh}[5\,\text{ArcTanh}[a\,x]]-\right.$$

$$\left.\left.7374\,\text{Sinh}[3\,\text{ArcTanh}[a\,x]]+550\,\text{Sinh}[5\,\text{ArcTanh}[a\,x]]\right)\right)$$

$$\left.\left(\text{Cosh}[6\,\text{ArcTanh}[a\,x]]+\text{Sinh}[6\,\text{ArcTanh}[a\,x]]\right)\right)$$

Problem 1282: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\left(1-a^2\,x^2\right)^{3/2}\,dx$$

Optimal (type 3, 307 leaves, 16 steps):

$$\frac{35 (1-a x)^{1/4} (1+a x)^{3/4}}{64 a}+\frac{7 (1-a x)^{5/4} (1+a x)^{3/4}}{32 a}-\frac{7 (1-a x)^{9/4} (1+a x)^{3/4}}{24 a}-\frac{(1-a x)^{9/4} (1+a x)^{7/4}}{4 a}+\frac{35 \text{ArcTan}\left[1-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{64 \sqrt{2} a}-\frac{35 \text{ArcTan}\left[1+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{64 \sqrt{2} a}+\frac{35 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{128 \sqrt{2} a}-\frac{35 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{128 \sqrt{2} a}$$

Result (type 7, 249 leaves):

$$\frac{1}{48 a \left(1+e^{2 \text{ArcTanh}[a x]}\right)^4}\left(24 e^{\frac{3}{2} \text{ArcTanh}[a x]} \left(1+e^{2 \text{ArcTanh}[a x]}\right)^2 \left(-1+3 e^{2 \text{ArcTanh}[a x]}\right)-9 \left(1+e^{2 \text{ArcTanh}[a x]}\right)^4 \text{RootSum}\left[1+\#1^4\&,\frac{\text{ArcTanh}[a x]-2 \text{Log}\left[e^{\frac{1}{2} \text{ArcTanh}[a x]}-\#1\right]}{\#1}\&\right]+\left(\frac{39 \text{RootSum}\left[1+\#1^4\&,\frac{\text{ArcTanh}[a x]-2 \text{Log}\left[e^{\frac{1}{2} \text{ArcTanh}[a x]}-\#1\right]}{\#1}\&\right]}{\left(-1+a^2 x^2\right)^2}-\left(\text{Cosh}\left[\frac{1}{2} \text{ArcTanh}[a x]\right]+\text{Sinh}\left[\frac{1}{2} \text{ArcTanh}[a x]\right]\right) \left(13 \text{Cosh}[3 \text{ArcTanh}[a x]]+\frac{7-166 a x+26 \sqrt{1-a^2 x^2} \text{Sinh}[3 \text{ArcTanh}[a x]]}{\sqrt{1-a^2 x^2}}\right)\right) (\text{Cosh}[4 \text{ArcTanh}[a x]]+\text{Sinh}[4 \text{ArcTanh}[a x]])\right)$$

Problem 1283: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2} \text{ArcTanh}[a x]} \sqrt{1-a^2 x^2}\, dx$$

Optimal (type 3, 255 leaves, 14 steps):

$$\frac{3 (1-a x)^{1/4} (1+a x)^{3/4}}{4 a}-\frac{(1-a x)^{5/4} (1+a x)^{3/4}}{2 a}+\frac{3 \text{ArcTan}\left[1-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{4 \sqrt{2} a}-\frac{3 \text{ArcTan}\left[1+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{4 \sqrt{2} a}+\frac{3 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a}-\frac{3 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a}$$

Result (type 7, 83 leaves):

$$\frac{1}{16\,a}\left(\frac{8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(-1+3\,e^{2\,\text{ArcTanh}[a\,x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2}-3\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]\right)$$

Problem 1284: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{2}\text{ArcTanh}[a\,x]}}{\sqrt{1-a^2\,x^2}}\,dx$$

Optimal (type 3, 193 leaves, 12 steps):

$$\frac{\sqrt{2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{a}-\frac{\sqrt{2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{a}+\frac{\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}\,a}-\frac{\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}\,a}$$

Result (type 7, 46 leaves):

$$\frac{\text{RootSum}\left[1+\#1^4\,\&,\,\frac{-\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{2\,a}$$

Problem 1289: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\left(c-a^2\,c\,x^2\right)^{5/2}\,dx$$

Optimal (type 3, 679 leaves, 19 steps):

$$\frac{231\,c^2\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}\,\sqrt{c-a^2\,c\,x^2}}{512\,a\,\sqrt{1-a^2\,x^2}}+\frac{231\,c^2\,(1-a\,x)^{5/4}\,(1+a\,x)^{3/4}\,\sqrt{c-a^2\,c\,x^2}}{1280\,a\,\sqrt{1-a^2\,x^2}}+\frac{77\,c^2\,(1-a\,x)^{9/4}\,(1+a\,x)^{3/4}\,\sqrt{c-a^2\,c\,x^2}}{960\,a\,\sqrt{1-a^2\,x^2}}-\frac{77\,c^2\,(1-a\,x)^{13/4}\,(1+a\,x)^{3/4}\,\sqrt{c-a^2\,c\,x^2}}{480\,a\,\sqrt{1-a^2\,x^2}}-\frac{11\,c^2\,(1-a\,x)^{13/4}\,(1+a\,x)^{7/4}\,\sqrt{c-a^2\,c\,x^2}}{60\,a\,\sqrt{1-a^2\,x^2}}-\frac{c^2\,(1-a\,x)^{13/4}\,(1+a\,x)^{11/4}\,\sqrt{c-a^2\,c\,x^2}}{6\,a\,\sqrt{1-a^2\,x^2}}+\frac{231\,c^2\,\sqrt{c-a^2\,c\,x^2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{512\,\sqrt{2}\,a\,\sqrt{1-a^2\,x^2}}-\frac{231\,c^2\,\sqrt{c-a^2\,c\,x^2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{512\,\sqrt{2}\,a\,\sqrt{1-a^2\,x^2}}+\frac{231\,c^2\,\sqrt{c-a^2\,c\,x^2}\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{1024\,\sqrt{2}\,a\,\sqrt{1-a^2\,x^2}}-\frac{231\,c^2\,\sqrt{c-a^2\,c\,x^2}\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{1024\,\sqrt{2}\,a\,\sqrt{1-a^2\,x^2}}$$

Result (type 7, 167 leaves):

$$-\left(\left(c^3\sqrt{1-a^2x^2}\left(-8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(-1155-6435\,e^{2\,\text{ArcTanh}[a\,x]}-14670\,e^{4\,\text{ArcTanh}[a\,x]}+48202\,e^{6\,\text{ArcTanh}[a\,x]}+20097\,e^{8\,\text{ArcTanh}[a\,x]}+3465\,e^{10\,\text{ArcTanh}[a\,x]}\right)+3465\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^6\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]\right)\right)\Big/\left(30720\,a\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^6\sqrt{c-a^2c\,x^2}\right)\right)$$

Problem 1290: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\left(c-a^2c\,x^2\right)^{3/2}dx$$

Optimal (type 3, 547 leaves, 17 steps):

$$\frac{35\,c\,(1-a\,x)^{1/4}(1+a\,x)^{3/4}\sqrt{c-a^2c\,x^2}}{64\,a\sqrt{1-a^2x^2}}+\frac{7\,c\,(1-a\,x)^{5/4}(1+a\,x)^{3/4}\sqrt{c-a^2c\,x^2}}{32\,a\sqrt{1-a^2x^2}}-\frac{7\,c\,(1-a\,x)^{9/4}(1+a\,x)^{3/4}\sqrt{c-a^2c\,x^2}}{24\,a\sqrt{1-a^2x^2}}-\frac{c\,(1-a\,x)^{9/4}(1+a\,x)^{7/4}\sqrt{c-a^2c\,x^2}}{4\,a\sqrt{1-a^2x^2}}+\frac{35\,c\sqrt{c-a^2c\,x^2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\sqrt{2}\,a\sqrt{1-a^2x^2}}-\frac{35\,c\sqrt{c-a^2c\,x^2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\sqrt{2}\,a\sqrt{1-a^2x^2}}+\frac{35\,c\sqrt{c-a^2c\,x^2}\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\sqrt{2}\,a\sqrt{1-a^2x^2}}-\frac{35\,c\sqrt{c-a^2c\,x^2}\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\sqrt{2}\,a\sqrt{1-a^2x^2}}$$

Result (type 7, 147 leaves):

$$-\left(\left(c^2\sqrt{1-a^2x^2}\left(-8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(-35-125\,e^{2\,\text{ArcTanh}[a\,x]}+399\,e^{4\,\text{ArcTanh}[a\,x]}+105\,e^{6\,\text{ArcTanh}[a\,x]}\right)+105\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]\right)\right)\Big/\left(768\,a\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4\sqrt{c-a^2c\,x^2}\right)\right)$$

Problem 1291: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\sqrt{c-a^2c\,x^2}\,dx$$

Optimal (type 3, 429 leaves, 15 steps):

$$\frac{3\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}\,\sqrt{c-a^2\,c\,x^2}}{4\,a\,\sqrt{1-a^2\,x^2}}-\frac{(1-a\,x)^{5/4}\,(1+a\,x)^{3/4}\,\sqrt{c-a^2\,c\,x^2}}{2\,a\,\sqrt{1-a^2\,x^2}}+\frac{3\,\sqrt{c-a^2\,c\,x^2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{4\,\sqrt{2}\,a\,\sqrt{1-a^2\,x^2}}-\frac{3\,\sqrt{c-a^2\,c\,x^2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{4\,\sqrt{2}\,a\,\sqrt{1-a^2\,x^2}}+\frac{3\,\sqrt{c-a^2\,c\,x^2}\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a\,\sqrt{1-a^2\,x^2}}-\frac{3\,\sqrt{c-a^2\,c\,x^2}\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a\,\sqrt{1-a^2\,x^2}}$$

Result (type 7, 126 leaves):

$$\left(c\,\sqrt{1-a^2\,x^2}\,\left(8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,\left(-1+3\,e^{2\,\text{ArcTanh}[a\,x]}\right)-3\,\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2\,\text{RootSum}\left[1+\sharp1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\sharp1\right]}{\sharp1}\,\&\right]\right)\right)\Big/\left(16\,a\,\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2\,\sqrt{c\,\left(1-a^2\,x^2\right)}\right)$$

Problem 1292: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{2}\text{ArcTanh}[a\,x]}}{\sqrt{c-a^2\,c\,x^2}}\,dx$$

Optimal (type 3, 309 leaves, 13 steps):

$$\frac{\sqrt{2}\,\sqrt{1-a^2\,x^2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{a\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{2}\,\sqrt{1-a^2\,x^2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{a\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{1-a^2\,x^2}\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}\,a\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{1-a^2\,x^2}\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}\,a\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 7, 79 leaves):

$$\frac{\sqrt{c\,\left(1-a^2\,x^2\right)}\,\text{RootSum}\left[1+\sharp1^4\,\&,\,\frac{-\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\sharp1\right]}{\sharp1}\,\&\right]}{2\,a\,c\,\sqrt{1-a^2\,x^2}}$$

Problem 1307: Unable to integrate problem.

$$\int \frac{e^{\frac{1}{2}\text{ArcTanh}[a\,x]}}{x\,\left(c-a^2\,c\,x^2\right)^{9/8}}\,dx$$

Optimal (type 6, 73 leaves, 3 steps):

$$-\frac{1}{c\left(c-a^2 c x^2\right)^{1/8}} 2\times 2^{5/8}(1+a x)^{1/8}\left(1-a^2 x^2\right)^{1/8} \text{AppellF1}\left[\frac{1}{8},\frac{11}{8},1,\frac{9}{8},\frac{1}{2}(1+a x),1+a x\right]$$

Result (type 8, 31 leaves):

$$\int \frac{e^{\frac{1}{2}\text{ArcTanh}[a x]}}{x\left(c-a^2 c x^2\right)^{9/8}}\,dx$$

Problem 1309: Result more than twice size of optimal antiderivative.

$$\int e^{n\,\text{ArcTanh}[a x]}\left(c-a^2 c x^2\right)^2 dx$$

Optimal (type 5, 70 leaves, 2 steps):

$$-\frac{1}{a(6-n)} 2^{3+\frac{n}{2}} c^2 (1-a x)^{3-\frac{n}{2}} \text{Hypergeometric2F1}\left[-2-\frac{n}{2},3-\frac{n}{2},4-\frac{n}{2},\frac{1}{2}(1-a x)\right]$$

Result (type 5, 184 leaves):

$$\frac{1}{120 a} c^2 e^{n\,\text{ArcTanh}[a x]} \left(22 n-n^3+120 a x-22 a n^2 x+a n^4 x-28 a^2 n x^2+a^2 n^3 x^2-80 a^3 x^3+2 a^3 n^2 x^3+6 a^4 n x^4+24 a^5 x^5-e^{2\,\text{ArcTanh}[a x]} n\left(32-16 n-2 n^2+n^3\right) \text{Hypergeometric2F1}\left[1,1+\frac{n}{2},2+\frac{n}{2},-e^{2\,\text{ArcTanh}[a x]}\right]+\left(64-20 n^2+n^4\right) \text{Hypergeometric2F1}\left[1,\frac{n}{2},1+\frac{n}{2},-e^{2\,\text{ArcTanh}[a x]}\right]\right)$$

Problem 1310: Result more than twice size of optimal antiderivative.

$$\int e^{n\,\text{ArcTanh}[a x]}\left(c-a^2 c x^2\right)^3 dx$$

Optimal (type 5, 70 leaves, 2 steps):

$$-\frac{1}{a(8-n)} 2^{4+\frac{n}{2}} c^3 (1-a x)^{4-\frac{n}{2}} \text{Hypergeometric2F1}\left[-3-\frac{n}{2},4-\frac{n}{2},5-\frac{n}{2},\frac{1}{2}(1-a x)\right]$$

Result (type 5, 272 leaves):

$$-\frac{1}{5040 a} c^3 e^{n\,\text{ArcTanh}[a x]} \left(-912 n+58 n^3-n^5-5040 a x+912 a n^2 x-58 a n^4 x+a n^6 x+1368 a^2 n x^2-64 a^2 n^3 x^2+a^2 n^5 x^2+5040 a^3 x^3-152 a^3 n^2 x^3+2 a^3 n^4 x^3-576 a^4 n x^4+6 a^4 n^3 x^4-3024 a^5 x^5+24 a^5 n^2 x^5+120 a^6 n x^6+720 a^7 x^7-e^{2\,\text{ArcTanh}[a x]} n\left(-1152+576 n+104 n^2-52 n^3-2 n^4+n^5\right) \text{Hypergeometric2F1}\left[1,1+\frac{n}{2},2+\frac{n}{2},-e^{2\,\text{ArcTanh}[a x]}\right]+\left(-2304+784 n^2-56 n^4+n^6\right) \text{Hypergeometric2F1}\left[1,\frac{n}{2},1+\frac{n}{2},-e^{2\,\text{ArcTanh}[a x]}\right]\right)$$

Problem 1356: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,\left(c-a^2\,c\,x^2\right)^2\,dx$$

Optimal (type 6, 42 leaves, 2 steps):

$$\frac{c^2\,x^{1+m}\,\text{AppellF1}\left[1+m,\frac{1}{2}\,(-4+n),-2-\frac{n}{2},2+m,a\,x,-a\,x\right]}{1+m}$$

Result (type 8, 27 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,\left(c-a^2\,c\,x^2\right)^2\,dx$$

Problem 1357: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,\left(c-a^2\,c\,x^2\right)\,dx$$

Optimal (type 6, 40 leaves, 2 steps):

$$\frac{c\,x^{1+m}\,\text{AppellF1}\left[1+m,\frac{1}{2}\,(-2+n),-1-\frac{n}{2},2+m,a\,x,-a\,x\right]}{1+m}$$

Result (type 8, 25 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,\left(c-a^2\,c\,x^2\right)\,dx$$

Problem 1358: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}\,x^m}{c-a^2\,c\,x^2}\,dx$$

Optimal (type 6, 42 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\frac{2+n}{2},1-\frac{n}{2},2+m,a\,x,-a\,x\right]}{c\,(1+m)}$$

Result (type 6, 106 leaves):

$$\frac{1}{a\,c\,n}e^{n\,\text{ArcTanh}[a\,x]}\,\left(-1+e^{-2\,\text{ArcTanh}[a\,x]}\right)^m\,\left(1+e^{-2\,\text{ArcTanh}[a\,x]}\right)^m\,\left(-e^{-4\,\text{ArcTanh}[a\,x]}\,\left(-1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2\right)^{-m}$$
$$x^m\,\text{AppellF1}\left[-\frac{n}{2},m,-m,1-\frac{n}{2},-e^{-2\,\text{ArcTanh}[a\,x]},e^{-2\,\text{ArcTanh}[a\,x]}\right]$$

Problem 1359: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2\,c\,x^2\right)^2}\,dx$$

Optimal (type 6, 42 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\frac{4+n}{2},2-\frac{n}{2},2+m,a\,x,-a\,x\right]}{c^2\,(1+m)}$$

Result (type 8, 27 leaves):

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2\,c\,x^2\right)^2}\,dx$$

Problem 1360: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Optimal (type 6, 70 leaves, 3 steps):

$$\frac{1}{1+m}x^{1+m}\,\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p\,\text{AppellF1}\left[1+m,\frac{1}{2}\,(n-2\,p),-\frac{n}{2}-p,2+m,a\,x,-a\,x\right]$$

Result (type 8, 27 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Problem 1361: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Optimal (type 5, 177 leaves, 4 steps):

$$-\frac{(1-a\,x)^{1-\frac{n}{2}+p}\,(1+a\,x)^{1+\frac{n}{2}+p}\,\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p}{2\,a^2\,(1+p)}-$$
$$\left(2^{\frac{n}{2}+p}\,n\,(1-a\,x)^{1-\frac{n}{2}+p}\,\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p\right.$$
$$\left.\text{Hypergeometric2F1}\left[-\frac{n}{2}-p,1-\frac{n}{2}+p,2-\frac{n}{2}+p,\frac{1}{2}\,(1-a\,x)\right]\right)\Big/\left(a^2\,(1+p)\,(2-n+2\,p)\right)$$

Result (type 8, 25 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Problem 1362: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Optimal (type 5, 103 leaves, 3 steps):

$$-\frac{1}{a\,(2-n+2\,p)}2^{1+\frac{n}{2}+p}\,(1-a\,x)^{1-\frac{n}{2}+p}\,\left(1-a^2\,x^2\right)^{-p}$$
$$\left(c-a^2\,c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[-\frac{n}{2}-p,\,1-\frac{n}{2}+p,\,2-\frac{n}{2}+p,\,\frac{1}{2}\,(1-a\,x)\right]$$

Result (type 8, 24 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Problem 1363: Unable to integrate problem.

$$\int e^{2\,(1+p)\,\text{ArcTanh}[a\,x]}\,\left(1-a^2\,x^2\right)^{-p}\,dx$$

Optimal (type 3, 41 leaves, 3 steps):

$$\frac{(1-a\,x)^{1-2\,p}}{a\,(1-2\,p)}+\frac{(1-a\,x)^{-2\,p}}{a\,p}$$

Result (type 8, 28 leaves):

$$\int e^{2\,(1+p)\,\text{ArcTanh}[a\,x]}\,\left(1-a^2\,x^2\right)^{-p}\,dx$$

Problem 1364: Unable to integrate problem.

$$\int e^{2\,(1+p)\,\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^{-p}\,dx$$

Optimal (type 3, 95 leaves, 4 steps):

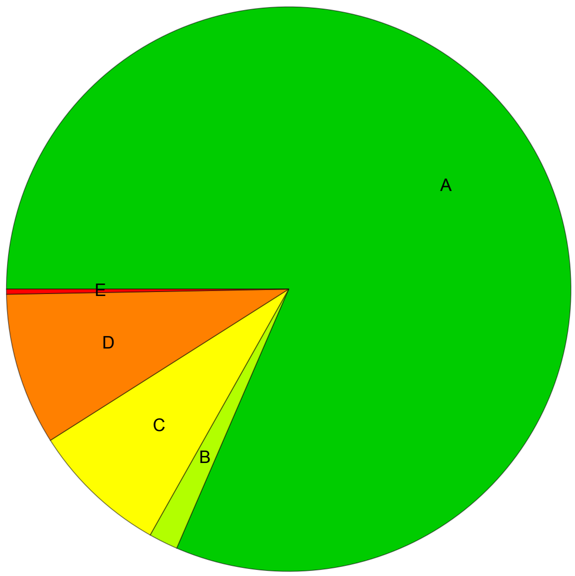
$$\frac{(1-a\,x)^{1-2\,p}\,\left(1-a^2\,x^2\right)^p\,\left(c-a^2\,c\,x^2\right)^{-p}}{a\,(1-2\,p)}+\frac{(1-a\,x)^{-2\,p}\,\left(1-a^2\,x^2\right)^p\,\left(c-a^2\,c\,x^2\right)^{-p}}{a\,p}$$

Result (type 8, 29 leaves):

$$\int e^{2\,(1+p)\,\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^{-p}\,dx$$

Summary of Integration Test Results

1378 integration problems



A - 1123 optimal antiderivatives

B - 23 more than twice size of optimal antiderivatives

C - 108 unnecessarily complex antiderivatives

D - 120 unable to integrate problems

E - 4 integration timeouts