Mathematica 11.3 Integration Test Results

Test results for the 35 problems in "Bondarenko Problems.m"

Problem 1: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{1}{\sqrt{2} + \text{Cos}[z] + \text{Sin}[z]} \, dz$$

Optimal (type 3, 22 leaves, 1 step):

$$-\frac{1 - \sqrt{2}\,\text{Sin}[z]}{\text{Cos}[z] - \text{Sin}[z]}$$

Result (type 3, 77 leaves):

$$\frac{-\left(\left(1+3\,i\right)+\sqrt{2}\right)\text{Cos}\left[\frac{z}{2}\right]+\left(\left(1+i\right)-i\,\sqrt{2}\right)\text{Sin}\left[\frac{z}{2}\right]}{\left(\left(1+i\right)+\sqrt{2}\right)\text{Cos}\left[\frac{z}{2}\right]+i\left(\left(-1-i\right)+\sqrt{2}\right)\text{Sin}\left[\frac{z}{2}\right]}$$

Problem 7: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Log}[1+x]}{x\sqrt{1+\sqrt{1+x}}} \, dx$$

Optimal (type 4, 291 leaves, ? steps):

$$-8\,\text{ArcTanh}\left[\sqrt{1+\sqrt{1+x}}\right] - \frac{2\,\text{Log}[1+x]}{\sqrt{1+\sqrt{1+x}}} - \sqrt{2}\,\text{ArcTanh}\left[\frac{\sqrt{1+\sqrt{1+x}}}{\sqrt{2}}\right]\text{Log}[1+x] +$$
$$2\sqrt{2}\,\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]\text{Log}\left[1-\sqrt{1+\sqrt{1+x}}\right] - 2\sqrt{2}\,\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]\text{Log}\left[1+\sqrt{1+\sqrt{1+x}}\right] + \sqrt{2}\,\text{PolyLog}\left[2, -\frac{\sqrt{2}\left(1-\sqrt{1+\sqrt{1+x}}\right)}{2-\sqrt{2}}\right] -$$
$$\sqrt{2}\,\text{PolyLog}\left[2, \frac{\sqrt{2}\left(1-\sqrt{1+\sqrt{1+x}}\right)}{2+\sqrt{2}}\right] - \sqrt{2}\,\text{PolyLog}\left[2, -\frac{\sqrt{2}\left(1+\sqrt{1+\sqrt{1+x}}\right)}{2-\sqrt{2}}\right] + \sqrt{2}\,\text{PolyLog}\left[2, \frac{\sqrt{2}\left(1+\sqrt{1+\sqrt{1+x}}\right)}{2+\sqrt{2}}\right]$$

Result (type 4, 816 leaves) :

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

$$\left(\text{Log}[1+x]-2\left(\text{Log}\left[1+\sqrt{1+x}\right]+\text{Log}\left[-1+\frac{1}{\sqrt{1+\sqrt{1+x}}}\right]+\text{Log}\left[1+\frac{1}{\sqrt{1+\sqrt{1+x}}}\right]\right)\right)\left(\text{Log}\left[\sqrt{2}-\frac{2}{\sqrt{1+\sqrt{1+x}}}\right]-\text{Log}\left[\sqrt{2}+\frac{2}{\sqrt{1+\sqrt{1+x}}}\right]\right)-$$

$$\frac{1}{2\sqrt{1+\sqrt{1+x}}}\left(\text{Log}[1+x]-2\left(\text{Log}\left[1+\sqrt{1+x}\right]+\text{Log}\left[-1+\frac{1}{\sqrt{1+\sqrt{1+x}}}\right]+\text{Log}\left[1+\frac{1}{\sqrt{1+\sqrt{1+x}}}\right]\right)\right)$$

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

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

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

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

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

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

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

Problem 8: Result more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{1+\sqrt{1+x}}\ \text{Log}[1+x]}{x}\,dx$$

Optimal (type 4, 308 leaves, ? steps):

$$-16\sqrt{1+\sqrt{1+x}}+16\,\text{ArcTanh}\left[\sqrt{1+\sqrt{1+x}}\right]+4\sqrt{1+\sqrt{1+x}}\ \text{Log}[1+x]-2\sqrt{2}\ \text{ArcTanh}\left[\frac{\sqrt{1+\sqrt{1+x}}}{\sqrt{2}}\right]\text{Log}[1+x]+4\sqrt{2}\ \text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]\text{Log}\left[1-\sqrt{1+\sqrt{1+x}}\right]-4\sqrt{2}\ \text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]\text{Log}\left[1+\sqrt{1+\sqrt{1+x}}\right]+2\sqrt{2}\ \text{PolyLog}\left[2,-\frac{\sqrt{2}\left(1-\sqrt{1+\sqrt{1+x}}\right)}{2-\sqrt{2}}\right]-2\sqrt{2}\ \text{PolyLog}\left[2,\frac{\sqrt{2}\left(1-\sqrt{1+\sqrt{1+x}}\right)}{2+\sqrt{2}}\right]-2\sqrt{2}\ \text{PolyLog}\left[2,-\frac{\sqrt{2}\left(1+\sqrt{1+\sqrt{1+x}}\right)}{2-\sqrt{2}}\right]+2\sqrt{2}\ \text{PolyLog}\left[2,\frac{\sqrt{2}\left(1+\sqrt{1+\sqrt{1+x}}\right)}{2+\sqrt{2}}\right]$$

Result (type 4, 654 leaves):

$$-16\sqrt{1+\sqrt{1+x}}+4\sqrt{1+\sqrt{1+x}}\ \text{Log}[1+x]+\sqrt{2}\ \text{Log}[1+x]\ \text{Log}\left[\sqrt{2}-\sqrt{1+\sqrt{1+x}}\right]-8\,\text{Log}\left[-1+\sqrt{1+\sqrt{1+x}}\right]-2\sqrt{2}\ \text{Log}\left[\sqrt{2}-\sqrt{1+\sqrt{1+x}}\right]\text{Log}\left[-1+\sqrt{1+\sqrt{1+x}}\right]+8\,\text{Log}\left[1+\sqrt{1+\sqrt{1+x}}\right]-2\sqrt{2}\ \text{Log}\left[\sqrt{2}-\sqrt{1+\sqrt{1+x}}\right]\text{Log}\left[1+\sqrt{1+\sqrt{1+x}}\right]-\sqrt{2}\ \text{Log}[1+x]\ \text{Log}\left[\sqrt{2}+\sqrt{1+\sqrt{1+x}}\right]+2\sqrt{2}\ \text{Log}\left[-1+\sqrt{1+\sqrt{1+x}}\right]\text{Log}\left[\sqrt{2}+\sqrt{1+\sqrt{1+x}}\right]+2\sqrt{2}\ \text{Log}\left[1+\sqrt{1+\sqrt{1+x}}\right]\text{Log}\left[\sqrt{2}+\sqrt{1+\sqrt{1+x}}\right]-2\sqrt{2}\ \text{Log}\left[-1+\sqrt{1+\sqrt{1+x}}\right]\text{Log}\left[\left(-1+\sqrt{2}\right)\left(\sqrt{2}+\sqrt{1+\sqrt{1+x}}\right)\right]-2\sqrt{2}\ \text{Log}\left[1+\sqrt{1+\sqrt{1+x}}\right]\text{Log}\left[2+\sqrt{2}+\sqrt{1+\sqrt{1+x}}+\sqrt{2}\sqrt{1+\sqrt{1+x}}\right]+2\sqrt{2}\ \text{Log}\left[-1+\sqrt{1+\sqrt{1+x}}\right]\text{Log}\left[1-\left(1+\sqrt{2}\right)\left(-1+\sqrt{1+\sqrt{1+x}}\right)\right]+2\sqrt{2}\ \text{Log}\left[1+\sqrt{1+\sqrt{1+x}}\right]\text{Log}\left[1-\left(-1+\sqrt{2}\right)\left(1+\sqrt{1+\sqrt{1+x}}\right)\right]-2\sqrt{2}\ \text{PolyLog}\left[2,-\left(-1+\sqrt{2}\right)\left(-1+\sqrt{1+\sqrt{1+x}}\right)\right]+2\sqrt{2}\ \text{PolyLog}\left[2,\left(1+\sqrt{2}\right)\left(-1+\sqrt{1+\sqrt{1+x}}\right)\right]+2\sqrt{2}\ \text{PolyLog}\left[2,\left(-1+\sqrt{2}\right)\left(1+\sqrt{1+\sqrt{1+x}}\right)\right]-2\sqrt{2}\ \text{PolyLog}\left[2,-\left(1+\sqrt{2}\right)\left(1+\sqrt{1+\sqrt{1+x}}\right)\right]$$

Problem 9: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{1+\sqrt{x+\sqrt{1+x^2}}}\,dx$$

Optimal (type 3, 84 leaves, 4 steps):

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

Result (type 3, 347 leaves):

$$\frac{1}{12}\left(6x-6\sqrt{1+x^2}+4\left(-2x+\sqrt{1+x^2}\right)\sqrt{x+\sqrt{1+x^2}}-12\,\text{Log}[x]+6\,\text{Log}\left[1+\sqrt{1+x^2}\right]+\frac{1}{1+x^2+x\sqrt{1+x^2}}6\sqrt{1+x^2}\left(x+\sqrt{1+x^2}\right)\left(2\sqrt{x+\sqrt{1+x^2}}-2\,\text{ArcTan}\left[\sqrt{x+\sqrt{1+x^2}}\right]+\text{Log}\left[1-\sqrt{x+\sqrt{1+x^2}}\right]-\text{Log}\left[1+\sqrt{x+\sqrt{1+x^2}}\right]\right)+\frac{1}{\left(1+x^2+x\sqrt{1+x^2}\right)^2}2\left(1+x^2\right)\left(x+\sqrt{1+x^2}\right)^{3/2}\left(4+2x^2+2x\sqrt{1+x^2}+6\sqrt{x+\sqrt{1+x^2}}\,\text{ArcTan}\left[\sqrt{x+\sqrt{1+x^2}}\right]+3\sqrt{x+\sqrt{1+x^2}}\,\text{Log}\left[1-\sqrt{x+\sqrt{1+x^2}}\right]-3\sqrt{x+\sqrt{1+x^2}}\,\text{Log}\left[1+\sqrt{x+\sqrt{1+x^2}}\right]\right)\right)$$

Problem 10: Result more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{1+x}}{x+\sqrt{1+\sqrt{1+x}}}\,dx$$

Optimal (type 3, 41 leaves, 6 steps):

$$2\sqrt{1+x}+\frac{8\,\text{ArcTanh}\left[\frac{1+2\sqrt{1+\sqrt{1+x}}}{\sqrt{5}}\right]}{\sqrt{5}}$$

Result (type 3, 147 leaves):

$$\frac{1}{5}\left(10\sqrt{1+x}-\left(-5+\sqrt{5}\right)\sqrt{2\left(3+\sqrt{5}\right)}\,\text{ArcTanh}\left[\sqrt{\frac{2}{3-\sqrt{5}}}\sqrt{1+\sqrt{1+x}}\right]+2\sqrt{\frac{2}{3+\sqrt{5}}}\left(5+\sqrt{5}\right)\text{ArcTanh}\left[\sqrt{\frac{2}{3+\sqrt{5}}}\sqrt{1+\sqrt{1+x}}\right]-4\sqrt{5}\,\text{ArcTanh}\left[\frac{-1+2\sqrt{1+x}}{\sqrt{5}}\right]\right)$$

Problem 12: Result more than twice size of optimal antiderivative.

$$\int \frac{x}{x+\sqrt{1-\sqrt{1+x}}}\,dx$$

Optimal (type 3, 73 leaves, 6 steps):

$$2\sqrt{1+x}-4\sqrt{1-\sqrt{1+x}}+\left(1-\sqrt{1+x}\right)^2+\frac{8\,\text{ArcTanh}\left[\frac{1+2\sqrt{1-\sqrt{1+x}}}{\sqrt{5}}\right]}{\sqrt{5}}$$

Result (type 3, 151 leaves):

$$x-4\sqrt{1-\sqrt{1+x}}+2\left(1+\sqrt{5}\right)\sqrt{\frac{2}{5\left(3+\sqrt{5}\right)}}\,\text{ArcTanh}\left[\frac{\sqrt{2-2\sqrt{1+x}}}{\sqrt{3+\sqrt{5}}}\right]+$$
$$\left(-1+\sqrt{5}\right)\sqrt{\frac{2}{5}\left(3+\sqrt{5}\right)}\,\text{ArcTanh}\left[\sqrt{2}\sqrt{\frac{-1+\sqrt{1+x}}{-3+\sqrt{5}}}\right]+\frac{4\,\text{ArcTanh}\left[\frac{1+2\sqrt{1+x}}{\sqrt{5}}\right]}{\sqrt{5}}$$

Problem 13: Result more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{x+\sqrt{1+x}}}{\sqrt{1+x}\,\left(1+x^2\right)}\,dx$$

Optimal (type 3, 365 leaves, 20 steps):

$$-\frac{i\,\text{ArcTan}\left[\frac{2+\sqrt{1-i}-\left(1-2\sqrt{1-i}\right)\sqrt{1+x}}{2\sqrt{i+\sqrt{1-i}}\,\sqrt{x+\sqrt{1+x}}}\right]}{2\sqrt{\frac{1-i}{i+\sqrt{1-i}}}}+\frac{i\,\text{ArcTan}\left[\frac{2+\sqrt{1+i}-\left(1-2\sqrt{1+i}\right)\sqrt{1+x}}{2\sqrt{-i+\sqrt{1+i}}\,\sqrt{x+\sqrt{1+x}}}\right]}{2\sqrt{-\frac{1+i}{i-\sqrt{1+i}}}}+\frac{i\,\text{ArcTanh}\left[\frac{2-\sqrt{1-i}-\left(1+2\sqrt{1-i}\right)\sqrt{1+x}}{2\sqrt{-i+\sqrt{1-i}}\,\sqrt{x+\sqrt{1+x}}}\right]}{2\sqrt{-\frac{1-i}{i-\sqrt{1-i}}}}-\frac{i\,\text{ArcTanh}\left[\frac{2-\sqrt{1+i}-\left(1+2\sqrt{1+i}\right)\sqrt{1+x}}{2\sqrt{i+\sqrt{1+i}}\,\sqrt{x+\sqrt{1+x}}}\right]}{2\sqrt{\frac{1+i}{i+\sqrt{1+i}}}}$$

Result (type 3, 2177 leaves):

$$\frac{1}{2\sqrt{1-i}\,\sqrt{i-\sqrt{1-i}}}$$
$$i\left(-i+\sqrt{1-i}\right)\text{ArcTan}\Big[\Big(\left(-1-2i\right)+\left(2-4i\right)\sqrt{1-i}-\left(6-6i\right)\sqrt{1+x}-\left(1-2i\right)\sqrt{1-i}\,\sqrt{1+x}+4i\left(1+x\right)+\left(1+3i\right)\sqrt{1-i}\,\left(1+x\right)+$$
$$\left(4-4i\right)\sqrt{i-\sqrt{1-i}}\,\sqrt{x+\sqrt{1+x}}-2\sqrt{1-i}\,\sqrt{i-\sqrt{1-i}}\,\sqrt{x+\sqrt{1+x}}-\left(2-2i\right)\sqrt{i-\sqrt{1-i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}-$$

$$4\sqrt{1-i}\,\sqrt{i-\sqrt{1-i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}\Big)\Big/\left(1-(4-2i)\sqrt{1-i}-(2-2i)\sqrt{1+x}+\frac{4\sqrt{1+x}}{\sqrt{1-i}}+(6-4i)(1+x)+8\sqrt{1-i}\,(1+x)\right)\Big]+$$

$$\frac{1}{2\sqrt{1-i}}\,i\sqrt{i+\sqrt{1-i}}\;\mathrm{ArcTan}\Big[\Big((1+2i)+(2-4i)\sqrt{1-i}+(6-6i)\sqrt{1+x}-(1-2i)\sqrt{1-i}\,\sqrt{1+x}-4i(1+x)+(1+3i)\sqrt{1-i}\,(1+x)-$$

$$(4-4i)\sqrt{i+\sqrt{1-i}}\,\sqrt{x+\sqrt{1+x}}-2\sqrt{1-i}\,\sqrt{i+\sqrt{1-i}}\,\sqrt{x+\sqrt{1+x}}+(2-2i)\sqrt{i+\sqrt{1-i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}-$$

$$4\sqrt{1-i}\,\sqrt{i+\sqrt{1-i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}\Big)\Big/\left(-1-(4-2i)\sqrt{1-i}+(2-2i)\sqrt{1+x}+\frac{4\sqrt{1+x}}{\sqrt{1-i}}-(6-4i)(1+x)+8\sqrt{1-i}\,(1+x)\right)\Big]-$$

$$\frac{1}{2\sqrt{1+i}\,\sqrt{i-\sqrt{1+i}}}\left(-i+\sqrt{1+i}\right)\mathrm{ArcTan}\Big[\Big((-2-i)+(4-2i)\sqrt{1+i}+(6-6i)\sqrt{1+x}-(2-i)\sqrt{1+i}\,\sqrt{1+x}+4(1+x)-$$

$$(3+i)\sqrt{1+i}\,(1+x)+2i\sqrt{1+i}\,\sqrt{i-\sqrt{1+i}}\,\sqrt{x+\sqrt{1+x}}+4i\sqrt{1+i}\,\sqrt{i-\sqrt{1+i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}\Big)\Big/$$

$$\Big((-4+5i)+2\sqrt{1+i}+(2+6i)\sqrt{1+x}+(2+8i)\sqrt{1+i}\,\sqrt{1+x}+(3+3i)(1+x)+4i\sqrt{1+i}\,(1+x)\Big)\Big]-$$

$$\frac{1}{2\sqrt{1+i}}\sqrt{i+\sqrt{1+i}}\;\mathrm{ArcTan}\Big[\Big((2+i)+(4-2i)\sqrt{1+i}-(6-6i)\sqrt{1+x}-(2-i)\sqrt{1+i}\,\sqrt{1+x}-4(1+x)-$$

$$(3+i)\sqrt{1+i}\,(1+x)+2i\sqrt{1+i}\,\sqrt{i+\sqrt{1+i}}\,\sqrt{x+\sqrt{1+x}}+4i\sqrt{1+i}\,\sqrt{i+\sqrt{1+i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}\Big)\Big/$$

$$\Big((4-5i)+2\sqrt{1+i}-(2+6i)\sqrt{1+x}+(2+8i)\sqrt{1+i}\,\sqrt{1+x}-(3+3i)(1+x)+4i\sqrt{1+i}\,(1+x)\Big)\Big]-$$

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

$$\frac{\sqrt{i+\sqrt{1-i}}\;\mathrm{Log}\Big[\left(\sqrt{1-i}+\sqrt{1+x}\right)^2\Big]}{4\sqrt{1-i}}-$$

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

$$\frac{1}{4\sqrt{1-i}\,\sqrt{i-\sqrt{1-i}}}$$

$$\left(-i+\sqrt{1-i}\right)\mathrm{Log}\Big[(3+5i)+\frac{4}{\sqrt{1-i}}-8\sqrt{1+x}+(3-7i)\sqrt{1-i}\,\sqrt{1+x}-(8-5i)(1+x)-$$

$$\frac{4(1+x)}{\sqrt{1-i}}-2(1-i)^{3/2}\sqrt{i-\sqrt{1-i}}\,\sqrt{x+\sqrt{1+x}}-4(1-i)^{3/2}\sqrt{i-\sqrt{1-i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}\Big]+$$

$$\frac{1}{4\sqrt{1-i}}\sqrt{i+\sqrt{1-i}}\;\text{Log}\Big[(-3-5i)+\frac{4}{\sqrt{1-i}}+8\sqrt{1+x}+(3-7i)\sqrt{1-i}\sqrt{1+x}+(8-5i)(1+x)-\frac{4(1+x)}{\sqrt{1-i}}-$$

$$2(1-i)^{3/2}\sqrt{i+\sqrt{1-i}}\sqrt{x+\sqrt{1+x}}-4(1-i)^{3/2}\sqrt{i+\sqrt{1-i}}\sqrt{1+x}\sqrt{x+\sqrt{1+x}}\Big]+\frac{1}{4\sqrt{1+i}\sqrt{i-\sqrt{1+i}}}$$

$$i\left(-i+\sqrt{1+i}\right)\text{Log}\Big[(-5+5i)-(6-2i)\sqrt{1+i}+(1+3i)\sqrt{1+i}\sqrt{1+x}-5(1+x)+(6-2i)\sqrt{1+i}(1+x)+$$

$$8\sqrt{i-\sqrt{1+i}}\sqrt{x+\sqrt{1+x}}+\frac{4\sqrt{i-\sqrt{1+i}}\sqrt{x+\sqrt{1+x}}}{\sqrt{1+i}}-4\sqrt{i-\sqrt{1+i}}\sqrt{1+x}\sqrt{x+\sqrt{1+x}}+\frac{8\sqrt{i-\sqrt{1+i}}\sqrt{1+x}\sqrt{x+\sqrt{1+x}}}{\sqrt{1+i}}\Big]+$$

$$\frac{1}{4\sqrt{1+i}}i\sqrt{i+\sqrt{1+i}}\;\text{Log}\Big[(5-5i)-(6-2i)\sqrt{1+i}+(1+3i)\sqrt{1+i}\sqrt{1+x}+5(1+x)+(6-2i)\sqrt{1+i}(1+x)-$$

$$8\sqrt{i+\sqrt{1+i}}\sqrt{x+\sqrt{1+x}}+\frac{4\sqrt{i+\sqrt{1+i}}\sqrt{x+\sqrt{1+x}}}{\sqrt{1+i}}+4\sqrt{i+\sqrt{1+i}}\sqrt{1+x}\sqrt{x+\sqrt{1+x}}+\frac{8\sqrt{i+\sqrt{1+i}}\sqrt{1+x}\sqrt{x+\sqrt{1+x}}}{\sqrt{1+i}}\Big]$$

Problem 14: Result more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{x+\sqrt{1+x}}}{1+x^2}\,dx$$

Optimal (type 3, 337 leaves, 22 steps):

$$\frac{1}{2}i\sqrt{i+\sqrt{1-i}}\;\text{ArcTan}\Big[\frac{2+\sqrt{1-i}-\left(1-2\sqrt{1-i}\right)\sqrt{1+x}}{2\sqrt{i+\sqrt{1-i}}\sqrt{x+\sqrt{1+x}}}\Big]-\frac{1}{2}i\sqrt{-i+\sqrt{1+i}}\;\text{ArcTan}\Big[\frac{2+\sqrt{1+i}-\left(1-2\sqrt{1+i}\right)\sqrt{1+x}}{2\sqrt{-i+\sqrt{1+i}}\sqrt{x+\sqrt{1+x}}}\Big]+$$

$$\frac{1}{2}i\sqrt{-i+\sqrt{1-i}}\;\text{ArcTanh}\Big[\frac{2-\sqrt{1-i}-\left(1+2\sqrt{1-i}\right)\sqrt{1+x}}{2\sqrt{-i+\sqrt{1-i}}\sqrt{x+\sqrt{1+x}}}\Big]-\frac{1}{2}i\sqrt{i+\sqrt{1+i}}\;\text{ArcTanh}\Big[\frac{2-\sqrt{1+i}-\left(1+2\sqrt{1+i}\right)\sqrt{1+x}}{2\sqrt{i+\sqrt{1+i}}\sqrt{x+\sqrt{1+x}}}\Big]$$

Result (type 3, 2581 leaves):

$$\frac{1}{2\sqrt{1-i}\sqrt{i-\sqrt{1-i}}}\left((1+i)+\sqrt{1-i}\right)$$

$$\text{ArcTan}\Big[\Big((2-3i)+(3-i)\sqrt{1-i}-8\sqrt{1+x}-5\sqrt{1-i}\sqrt{1+x}+(2+5i)(1+x)+5i\sqrt{1-i}(1+x)+4\sqrt{i-\sqrt{1-i}}\sqrt{x+\sqrt{1+x}}+$$

$$2\sqrt{1-i}\sqrt{i-\sqrt{1-i}}\sqrt{x+\sqrt{1+x}}-(6+2i)\sqrt{i-\sqrt{1-i}}\sqrt{1+x}\sqrt{x+\sqrt{1+x}}-\frac{8\sqrt{i-\sqrt{1-i}}\sqrt{1+x}\sqrt{x+\sqrt{1+x}}}{\sqrt{1-i}}\Big)\Big/$$

$$\left(\left(-4+7\,i\right)-\left(6-2\,i\right)\sqrt{1-i}+\left(4-2\,i\right)\sqrt{1+x}+\left(6-2\,i\right)\sqrt{1-i}\,\sqrt{1+x}+\left(10+i\right)\left(1+x\right)+\left(8+4\,i\right)\sqrt{1-i}\,\left(1+x\right)\right)\Big]+$$

$$\frac{1}{2\sqrt{1-i}\,\sqrt{i+\sqrt{1-i}}}\left(\left(-1-i\right)+\sqrt{1-i}\right)$$

$$\text{ArcTan}\Big[\Big(\left(-2+3\,i\right)+\left(3-i\right)\sqrt{1-i}+8\sqrt{1+x}-5\sqrt{1-i}\,\sqrt{1+x}-\left(2+5\,i\right)\left(1+x\right)+5\,i\sqrt{1-i}\,\left(1+x\right)-4\sqrt{i+\sqrt{1-i}}\,\sqrt{x+\sqrt{1+x}}+$$

$$2\sqrt{1-i}\,\sqrt{i+\sqrt{1-i}}\,\sqrt{x+\sqrt{1+x}}+\left(6+2\,i\right)\sqrt{i+\sqrt{1-i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}-\frac{8\sqrt{i+\sqrt{1-i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}}{\sqrt{1-i}}\Big)\Big/$$

$$\left(\left(4-7\,i\right)-\left(6-2\,i\right)\sqrt{1-i}-\left(4-2\,i\right)\sqrt{1+x}+\left(6-2\,i\right)\sqrt{1-i}\,\sqrt{1+x}-\left(10+i\right)\left(1+x\right)+\left(8+4\,i\right)\sqrt{1-i}\,\left(1+x\right)\right)\Big]-$$

$$\frac{1}{2\sqrt{1+i}\,\sqrt{i-\sqrt{1+i}}}\,i\left(\left(-1+i\right)+\sqrt{1+i}\right)\text{ArcTan}\Big[\Big(\left(1+8\,i\right)-5\left(1+i\right)^{3/2}-\left(16+8\,i\right)\sqrt{1+x}+\left(10+5\,i\right)\sqrt{1+i}\,\sqrt{1+x}+$$

$$\left(9-8\,i\right)\left(1+x\right)-\left(5-10\,i\right)\sqrt{1+i}\,\left(1+x\right)-4\sqrt{i-\sqrt{1+i}}\,\sqrt{x+\sqrt{1+x}}+\left(4-2\,i\right)\sqrt{1+i}\,\sqrt{i-\sqrt{1+i}}\,\sqrt{x+\sqrt{1+x}}-$$

$$8\sqrt{i-\sqrt{1+i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}+\left(8-4\,i\right)\sqrt{1+i}\,\sqrt{i-\sqrt{1+i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}\Big)\Big/$$

$$\left(\left(9+20\,i\right)-12\left(1+i\right)^{3/2}-\left(14+20\,i\right)\sqrt{1+x}+\left(22+12\,i\right)\sqrt{1+i}\,\sqrt{1+x}+\left(6-15\,i\right)\left(1+x\right)+\left(2+12\,i\right)\sqrt{1+i}\,\left(1+x\right)\right)\Big]-$$

$$\frac{1}{2\sqrt{1+i}\,\sqrt{i+\sqrt{1+i}}}\,i\left(\left(1-i\right)+\sqrt{1+i}\right)\text{ArcTan}\Big[\Big(\left(-1-8\,i\right)-5\left(1+i\right)^{3/2}+\left(16+8\,i\right)\sqrt{1+x}+\left(10+5\,i\right)\sqrt{1+i}\,\sqrt{1+x}-$$

$$\left(9-8\,i\right)\left(1+x\right)-\left(5-10\,i\right)\sqrt{1+i}\,\left(1+x\right)+4\sqrt{i+\sqrt{1+i}}\,\sqrt{x+\sqrt{1+x}}+\left(4-2\,i\right)\sqrt{1+i}\,\sqrt{i+\sqrt{1+i}}\,\sqrt{x+\sqrt{1+x}}+$$

$$8\sqrt{i+\sqrt{1+i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}+\left(8-4\,i\right)\sqrt{1+i}\,\sqrt{i+\sqrt{1+i}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}\Big)\Big/$$

$$\left(\left(-9-20\,i\right)-12\left(1+i\right)^{3/2}+\left(14+20\,i\right)\sqrt{1+x}+\left(22+12\,i\right)\sqrt{1+i}\,\sqrt{1+x}-\left(6-15\,i\right)\left(1+x\right)+\left(2+12\,i\right)\sqrt{1+i}\,\left(1+x\right)\right)\Big]+$$

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

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

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

$$\frac{1}{4\sqrt{1-i}\,\sqrt{i-\sqrt{1-i}}}$$

$$\mathrm{i}\left(\left(1+\mathrm{i}\right)+\sqrt{1-\mathrm{i}}\right)\mathrm{Log}\Big[\left(5+17\,\mathrm{i}\right)+14\,\mathrm{i}\,\sqrt{1-\mathrm{i}}-\left(10+22\,\mathrm{i}\right)\sqrt{1+x}+\left(5-19\,\mathrm{i}\right)\sqrt{1-\mathrm{i}}\,\sqrt{1+x}-\left(25+2\,\mathrm{i}\right)\left(1+x\right)-$$

$$\left(15+9\,\mathrm{i}\right)\sqrt{1-\mathrm{i}}\,\left(1+x\right)-\left(4-4\,\mathrm{i}\right)\sqrt{\mathrm{i}-\sqrt{1-\mathrm{i}}}\,\sqrt{x+\sqrt{1+x}}-\left(6-2\,\mathrm{i}\right)\sqrt{1-\mathrm{i}}\,\sqrt{\mathrm{i}-\sqrt{1-\mathrm{i}}}\,\sqrt{x+\sqrt{1+x}}-$$

$$\left(8-8\,\mathrm{i}\right)\sqrt{\mathrm{i}-\sqrt{1-\mathrm{i}}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}-\left(12-4\,\mathrm{i}\right)\sqrt{1-\mathrm{i}}\,\sqrt{\mathrm{i}-\sqrt{1-\mathrm{i}}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}\Big]-$$

$$\frac{1}{4\sqrt{1-\mathrm{i}}\,\sqrt{\mathrm{i}+\sqrt{1-\mathrm{i}}}}\,\mathrm{i}\left(\left(-1-\mathrm{i}\right)+\sqrt{1-\mathrm{i}}\right)\mathrm{Log}\Big[\left(-5-17\,\mathrm{i}\right)+14\,\mathrm{i}\,\sqrt{1-\mathrm{i}}+\left(10+22\,\mathrm{i}\right)\sqrt{1+x}+\left(5-19\,\mathrm{i}\right)\sqrt{1-\mathrm{i}}\,\sqrt{1+x}+$$

$$\left(25+2\,\mathrm{i}\right)\left(1+x\right)-\left(15+9\,\mathrm{i}\right)\sqrt{1-\mathrm{i}}\,\left(1+x\right)+\left(4-4\,\mathrm{i}\right)\sqrt{\mathrm{i}+\sqrt{1-\mathrm{i}}}\,\sqrt{x+\sqrt{1+x}}-\left(6-2\,\mathrm{i}\right)\sqrt{1-\mathrm{i}}\,\sqrt{\mathrm{i}+\sqrt{1-\mathrm{i}}}\,\sqrt{x+\sqrt{1+x}}+$$

$$\left(8-8\,\mathrm{i}\right)\sqrt{\mathrm{i}+\sqrt{1-\mathrm{i}}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}-\left(12-4\,\mathrm{i}\right)\sqrt{1-\mathrm{i}}\,\sqrt{\mathrm{i}+\sqrt{1-\mathrm{i}}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}\Big]-$$

$$\frac{1}{4\sqrt{1+\mathrm{i}}\,\sqrt{\mathrm{i}-\sqrt{1+\mathrm{i}}}}\left(\left(-1+\mathrm{i}\right)+\sqrt{1+\mathrm{i}}\right)\mathrm{Log}\Big[\left(-3+5\,\mathrm{i}\right)-\left(2+4\,\mathrm{i}\right)\sqrt{1+\mathrm{i}}+\left(2-2\,\mathrm{i}\right)\sqrt{1+x}-\left(1-3\,\mathrm{i}\right)\sqrt{1+\mathrm{i}}\,\sqrt{1+x}-$$

$$\left(8+7\,\mathrm{i}\right)\left(1+x\right)+\left(9+3\,\mathrm{i}\right)\sqrt{1+\mathrm{i}}\,\left(1+x\right)+\left(4+4\,\mathrm{i}\right)\sqrt{\mathrm{i}-\sqrt{1+\mathrm{i}}}\,\sqrt{x+\sqrt{1+x}}-2\left(1+\mathrm{i}\right)^{3/2}\sqrt{\mathrm{i}-\sqrt{1+\mathrm{i}}}\,\sqrt{x+\sqrt{1+x}}-$$

$$\left(8+4\,\mathrm{i}\right)\sqrt{\mathrm{i}-\sqrt{1+\mathrm{i}}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}+8\sqrt{1+\mathrm{i}}\,\sqrt{\mathrm{i}-\sqrt{1+\mathrm{i}}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}\Big]-$$

$$\frac{1}{4\sqrt{1+\mathrm{i}}\,\sqrt{\mathrm{i}+\sqrt{1+\mathrm{i}}}}\left(\left(1-\mathrm{i}\right)+\sqrt{1+\mathrm{i}}\right)\mathrm{Log}\Big[\left(3-5\,\mathrm{i}\right)-\left(2+4\,\mathrm{i}\right)\sqrt{1+\mathrm{i}}-\left(2-2\,\mathrm{i}\right)\sqrt{1+x}-\left(1-3\,\mathrm{i}\right)\sqrt{1+\mathrm{i}}\,\sqrt{1+x}+$$

$$\left(8+7\,\mathrm{i}\right)\left(1+x\right)+\left(9+3\,\mathrm{i}\right)\sqrt{1+\mathrm{i}}\,\left(1+x\right)-\left(4+4\,\mathrm{i}\right)\sqrt{\mathrm{i}+\sqrt{1+\mathrm{i}}}\,\sqrt{x+\sqrt{1+x}}-2\left(1+\mathrm{i}\right)^{3/2}\sqrt{\mathrm{i}+\sqrt{1+\mathrm{i}}}\,\sqrt{x+\sqrt{1+x}}+$$

$$\left(8+4\,\mathrm{i}\right)\sqrt{\mathrm{i}+\sqrt{1+\mathrm{i}}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}+8\sqrt{1+\mathrm{i}}\,\sqrt{\mathrm{i}+\sqrt{1+\mathrm{i}}}\,\sqrt{1+x}\,\sqrt{x+\sqrt{1+x}}\Big]$$

Problem 15: Unable to integrate problem.

$$\int\sqrt{1+\sqrt{x}+\sqrt{1+2\sqrt{x}+2x}}\,dx$$

Optimal (type 2, 77 leaves, 2 steps):

$$\frac{2\sqrt{1+\sqrt{x}+\sqrt{1+2\sqrt{x}+2x}}\,\left(2+\sqrt{x}+6x^{3/2}-\left(2-\sqrt{x}\right)\sqrt{1+2\sqrt{x}+2x}\right)}{15\sqrt{x}}$$

Result (type 8, 29 leaves):

$$\int\sqrt{1+\sqrt{x}+\sqrt{1+2\sqrt{x}+2x}}\,dx$$

Problem 16: Unable to integrate problem.

$$\int \sqrt{\sqrt{2}+\sqrt{x}+\sqrt{2+2\sqrt{2}\sqrt{x}+2x}}\,dx$$

Optimal (type 2, 118 leaves, 3 steps):

$$\frac{1}{15\sqrt{x}}2\sqrt{2}\sqrt{\sqrt{2}+\sqrt{x}+\sqrt{2}\sqrt{1+\sqrt{2}\sqrt{x}+x}}\left(4+\sqrt{2}\sqrt{x}+3\sqrt{2}x^{3/2}-\sqrt{2}\left(2\sqrt{2}-\sqrt{x}\right)\sqrt{1+\sqrt{2}\sqrt{x}+x}\right)$$

Result (type 8, 38 leaves):

$$\int \sqrt{\sqrt{2}+\sqrt{x}+\sqrt{2+2\sqrt{2}\sqrt{x}+2x}}\,dx$$

Problem 18: Unable to integrate problem.

$$\int \sqrt{\sqrt{1+\frac{1}{x}}+\frac{1}{x}}\,dx$$

Optimal (type 3, 96 leaves, 7 steps):

$$\sqrt{\sqrt{1+\frac{1}{x}}+\frac{1}{x}}\,x+\frac{1}{4}\text{ArcTan}\left[\frac{3+\sqrt{1+\frac{1}{x}}}{2\sqrt{\sqrt{1+\frac{1}{x}}+\frac{1}{x}}}\right]-\frac{3}{4}\text{ArcTanh}\left[\frac{1-3\sqrt{1+\frac{1}{x}}}{2\sqrt{\sqrt{1+\frac{1}{x}}+\frac{1}{x}}}\right]$$

Result (type 8, 19 leaves):

$$\int \sqrt{\sqrt{1+\frac{1}{x}}+\frac{1}{x}}\,dx$$

Problem 19: Result more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{1+e^{-x}}}{-e^{-x}+e^{x}}\,dx$$

Optimal (type 3, 25 leaves, 6 steps):

$$-\sqrt{2}\ \text{ArcTanh}\left[\frac{\sqrt{1+e^{-x}}}{\sqrt{2}}\right]$$

Result (type 3, 112 leaves):

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

Problem 20: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 25 leaves, 7 steps):

$$-2\sqrt{2}\ \text{ArcTanh}\left[\frac{\sqrt{1+e^{-x}}}{\sqrt{2}}\right]$$

Result (type 3, 126 leaves):

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

Problem 21: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{1}{(\text{Cos}[x]+\text{Cos}[3x])^{5}}\,dx$$

Optimal (type 3, 108 leaves, ? steps):

$$-\frac{523}{256}\text{ArcTanh}[\text{Sin}[x]]+\frac{1483\ \text{ArcTanh}\left[\sqrt{2}\ \text{Sin}[x]\right]}{512\sqrt{2}}+\frac{\text{Sin}[x]}{32\left(1-2\,\text{Sin}[x]^{2}\right)^{4}}-\frac{17\,\text{Sin}[x]}{192\left(1-2\,\text{Sin}[x]^{2}\right)^{3}}+\frac{203\,\text{Sin}[x]}{768\left(1-2\,\text{Sin}[x]^{2}\right)^{2}}-\frac{437\,\text{Sin}[x]}{512\left(1-2\,\text{Sin}[x]^{2}\right)}-\frac{43}{256}\text{Sec}[x]\ \text{Tan}[x]-\frac{1}{128}\text{Sec}[x]^{3}\ \text{Tan}[x]$$

Result (type 3, 478 leaves):

$$-\frac{1483\,i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{x}{2}\right]-\text{Sin}\left[\frac{x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{x}{2}\right]}{-\text{Cos}\left[\frac{x}{2}\right]+\sqrt{2}\,\text{Cos}\left[\frac{x}{2}\right]-\text{Sin}\left[\frac{x}{2}\right]}\right]}{1024\sqrt{2}}+\frac{\left(\frac{1483}{2048}+\frac{1483\,i}{2048}\right)\left((-1-i)+\sqrt{2}\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{x}{2}\right]}{\text{Cos}\left[\frac{x}{2}\right]+\sqrt{2}\,\text{Cos}\left[\frac{x}{2}\right]-\text{Sin}\left[\frac{x}{2}\right]}\right]}{(-1+i)+\sqrt{2}}+$$

$$\frac{523}{256}\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]-\text{Sin}\left[\frac{x}{2}\right]\right]-\frac{523}{256}\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right]+\frac{1483\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}[x]\right]}{1024\sqrt{2}}-\frac{1483\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}[x]-\sqrt{2}\,\text{Sin}[x]\right]}{2048\sqrt{2}}+$$

$$\frac{\left(\frac{1483}{4096}-\frac{1483\,i}{4096}\right)\left((-1-i)+\sqrt{2}\right)\text{Log}\left[2+\sqrt{2}\,\text{Cos}[x]-\sqrt{2}\,\text{Sin}[x]\right]}{(-1+i)+\sqrt{2}}-\frac{1}{512\left(\text{Cos}\left[\frac{x}{2}\right]-\text{Sin}\left[\frac{x}{2}\right]\right)^4}-\frac{43}{512\left(\text{Cos}\left[\frac{x}{2}\right]-\text{Sin}\left[\frac{x}{2}\right]\right)^2}+$$

$$\frac{1}{512\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^4}+\frac{43}{512\left(\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right)^2}-\frac{17}{768\,(\text{Cos}[x]-\text{Sin}[x])^3}-\frac{437}{1024\,(\text{Cos}[x]-\text{Sin}[x])}+\frac{\text{Sin}[x]}{128\,(\text{Cos}[x]-\text{Sin}[x])^4}+$$

$$\frac{83\,\text{Sin}[x]}{512\,(\text{Cos}[x]-\text{Sin}[x])^2}+\frac{\text{Sin}[x]}{128\,(\text{Cos}[x]+\text{Sin}[x])^4}+\frac{17}{768\,(\text{Cos}[x]+\text{Sin}[x])^3}+\frac{83\,\text{Sin}[x]}{512\,(\text{Cos}[x]+\text{Sin}[x])^2}+\frac{437}{1024\,(\text{Cos}[x]+\text{Sin}[x])}$$

Problem 24: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Tanh}[x]}{\sqrt{e^x+e^{2x}}}\,dx$$

Optimal (type 3, 110 leaves, ? steps):

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

Result (type 3, 444 leaves) :

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

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

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

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

Problem 26: Unable to integrate problem.

$$\int \text{Log}\left[x^2+\sqrt{1-x^2}\right] \, dx$$

Optimal (type 3, 185 leaves, ? steps):

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

Result (type 8, 18 leaves) :

$$\int \text{Log}\left[x^2+\sqrt{1-x^2}\right] \, dx$$

Problem 27: Unable to integrate problem.

$$\int \frac{\text{Log}\left[1+e^x\right]}{1+e^{2 x}} \, dx$$

Optimal (type 4, 102 leaves, 12 steps) :

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

Result (type 8, 18 leaves) :

$$\int \frac{\text{Log}\left[1+e^x\right]}{1+e^{2 x}} \, dx$$

Problem 28: Unable to integrate problem.

$$\int \text{Cosh}[x] \, \text{Log}\left[1+\text{Cosh}[x]^2\right]^2 \, dx$$

Optimal (type 4, 159 leaves, 13 steps) :

$$-8\sqrt{2}\,\text{ArcTan}\left[\frac{\text{Sinh}[x]}{\sqrt{2}}\right]+4\,i\sqrt{2}\,\text{ArcTan}\left[\frac{\text{Sinh}[x]}{\sqrt{2}}\right]^2+8\sqrt{2}\,\text{ArcTan}\left[\frac{\text{Sinh}[x]}{\sqrt{2}}\right]\text{Log}\left[\frac{2\sqrt{2}}{\sqrt{2}+i\,\text{Sinh}[x]}\right]+4\sqrt{2}\,\text{ArcTan}\left[\frac{\text{Sinh}[x]}{\sqrt{2}}\right]\text{Log}\left[2+\text{Sinh}[x]^2\right]+$$
$$4\,i\sqrt{2}\,\text{PolyLog}\left[2,1-\frac{2\sqrt{2}}{\sqrt{2}+i\,\text{Sinh}[x]}\right]+8\,\text{Sinh}[x]-4\,\text{Log}\left[2+\text{Sinh}[x]^2\right]\text{Sinh}[x]+\text{Log}\left[2+\text{Sinh}[x]^2\right]^2\text{Sinh}[x]$$

Result (type 8, 14 leaves):

$$\int \text{Cosh}[x]\,\text{Log}\left[1+\text{Cosh}[x]^2\right]^2\,dx$$

Problem 29: Unable to integrate problem.

$$\int \text{Cosh}[x]\,\text{Log}\left[\text{Cosh}[x]^2+\text{Sinh}[x]\right]^2\,dx$$

Optimal (type 4, 395 leaves, 28 steps):

$$-4\sqrt{3}\,\text{ArcTan}\left[\frac{1+2\,\text{Sinh}[x]}{\sqrt{3}}\right]-\frac{1}{2}\left(1-i\sqrt{3}\right)\text{Log}\left[1-i\sqrt{3}+2\,\text{Sinh}[x]\right]^2-\left(1+i\sqrt{3}\right)\text{Log}\left[\frac{i\left(1-i\sqrt{3}+2\,\text{Sinh}[x]\right)}{2\sqrt{3}}\right]\text{Log}\left[1+i\sqrt{3}+2\,\text{Sinh}[x]\right]-$$
$$\frac{1}{2}\left(1+i\sqrt{3}\right)\text{Log}\left[1+i\sqrt{3}+2\,\text{Sinh}[x]\right]^2-\left(1-i\sqrt{3}\right)\text{Log}\left[1-i\sqrt{3}+2\,\text{Sinh}[x]\right]\text{Log}\left[-\frac{i\left(1+i\sqrt{3}+2\,\text{Sinh}[x]\right)}{2\sqrt{3}}\right]-$$
$$2\,\text{Log}\left[1+\text{Sinh}[x]+\text{Sinh}[x]^2\right]+\left(1-i\sqrt{3}\right)\text{Log}\left[1-i\sqrt{3}+2\,\text{Sinh}[x]\right]\text{Log}\left[1+\text{Sinh}[x]+\text{Sinh}[x]^2\right]+$$
$$\left(1+i\sqrt{3}\right)\text{Log}\left[1+i\sqrt{3}+2\,\text{Sinh}[x]\right]\text{Log}\left[1+\text{Sinh}[x]+\text{Sinh}[x]^2\right]-\left(1+i\sqrt{3}\right)\text{PolyLog}\left[2,-\frac{i-\sqrt{3}+2\,i\,\text{Sinh}[x]}{2\sqrt{3}}\right]-$$
$$\left(1-i\sqrt{3}\right)\text{PolyLog}\left[2,\frac{i+\sqrt{3}+2\,i\,\text{Sinh}[x]}{2\sqrt{3}}\right]+8\,\text{Sinh}[x]-4\,\text{Log}\left[1+\text{Sinh}[x]+\text{Sinh}[x]^2\right]\text{Sinh}[x]+\text{Log}\left[1+\text{Sinh}[x]+\text{Sinh}[x]^2\right]^2\text{Sinh}[x]$$

Result (type 8, 15 leaves):

$$\int \text{Cosh}[x]\,\text{Log}\left[\text{Cosh}[x]^2+\text{Sinh}[x]\right]^2\,dx$$

Problem 31: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Log}\left[x+\sqrt{1+x}\right]^2}{(1+x)^2}\,dx$$

Optimal (type 4, 555 leaves, 35 steps):

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

Result (type 4, 1283 leaves) :

$$\text{Log}[1+x]-\text{Log}\left[-1+\sqrt{5}-2\sqrt{1+x}\right]-\sqrt{5}\,\text{Log}\left[-1+\sqrt{5}-2\sqrt{1+x}\right]+\frac{\text{Log}[100]\,\text{Log}\left[\frac{1}{2}-\frac{\sqrt{5}}{2}+\sqrt{1+x}\right]}{\sqrt{5}}-6\,\text{Log}\left[\frac{2\sqrt{1+x}}{-1+\sqrt{5}}\right]\text{Log}\left[\frac{1}{2}-\frac{\sqrt{5}}{2}+\sqrt{1+x}\right]+$$

$$3\,\text{Log}[1+x]\,\text{Log}\left[\frac{1}{2}-\frac{\sqrt{5}}{2}+\sqrt{1+x}\right]-3\,\text{Log}\left[-1+\sqrt{5}-2\sqrt{1+x}\right]\text{Log}\left[\frac{1}{2}-\frac{\sqrt{5}}{2}+\sqrt{1+x}\right]-\sqrt{5}\,\text{Log}\left[-1+\sqrt{5}-2\sqrt{1+x}\right]\text{Log}\left[\frac{1}{2}-\frac{\sqrt{5}}{2}+\sqrt{1+x}\right]+$$

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

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

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

$$3\,\text{Log}\left[-1+\sqrt{5}-2\sqrt{1+x}\right]\text{Log}\left[x+\sqrt{1+x}\right]+\sqrt{5}\,\text{Log}\left[-1+\sqrt{5}-2\sqrt{1+x}\right]\text{Log}\left[x+\sqrt{1+x}\right]-\frac{\text{Log}\left[x+\sqrt{1+x}\right]^2}{1+x}-\text{Log}\left[1+\sqrt{5}+2\sqrt{1+x}\right]+$$

$$\sqrt{5}\,\text{Log}\left[1+\sqrt{5}+2\sqrt{1+x}\right]-3\,\text{Log}\left[\frac{1}{2}-\frac{\sqrt{5}}{2}+\sqrt{1+x}\right]\text{Log}\left[1+\sqrt{5}+2\sqrt{1+x}\right]+\sqrt{5}\,\text{Log}\left[\frac{1}{2}-\frac{\sqrt{5}}{2}+\sqrt{1+x}\right]\text{Log}\left[1+\sqrt{5}+2\sqrt{1+x}\right]-$$

$$3\,\text{Log}\left[\frac{1}{2}\left(1+\sqrt{5}\right)+\sqrt{1+x}\right]\text{Log}\left[1+\sqrt{5}+2\sqrt{1+x}\right]+\frac{7\,\text{Log}\left[\frac{1}{2}\left(1+\sqrt{5}\right)+\sqrt{1+x}\right]\text{Log}\left[1+\sqrt{5}+2\sqrt{1+x}\right]}{2\sqrt{5}}+$$

$$3\,\text{Log}\left[x+\sqrt{1+x}\right]\text{Log}\left[1+\sqrt{5}+2\sqrt{1+x}\right]-\sqrt{5}\,\text{Log}\left[x+\sqrt{1+x}\right]\text{Log}\left[1+\sqrt{5}+2\sqrt{1+x}\right]+3\,\text{Log}\left[\frac{1}{2}-\frac{\sqrt{5}}{2}+\sqrt{1+x}\right]\text{Log}\left[\frac{1+\sqrt{5}+2\sqrt{1+x}}{2\sqrt{5}}\right]-$$

$$\frac{3\,\text{Log}\left[\frac{1}{2}-\frac{\sqrt{5}}{2}+\sqrt{1+x}\right]\text{Log}\left[\frac{1+\sqrt{5}+2\sqrt{1+x}}{2\sqrt{5}}\right]}{\sqrt{5}}+3\,\text{Log}\left[\frac{1}{2}\left(1+\sqrt{5}\right)+\sqrt{1+x}\right]\text{Log}\left[\frac{1}{10}\left(5-\sqrt{5}-2\sqrt{5}\sqrt{1+x}\right)\right]+$$

$$\sqrt{5}\,\text{Log}\left[\frac{1}{2}\left(1+\sqrt{5}\right)+\sqrt{1+x}\right]\text{Log}\left[\frac{1}{10}\left(5-\sqrt{5}-2\sqrt{5}\sqrt{1+x}\right)\right]-\frac{2\,\text{Log}\left[\frac{1}{2}-\frac{\sqrt{5}}{2}+\sqrt{1+x}\right]\text{Log}\left[5+\sqrt{5}+2\sqrt{5}\sqrt{1+x}\right]}{\sqrt{5}}+$$

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

$$6\,\text{PolyLog}\left[2,\frac{-1+\sqrt{5}-2\sqrt{1+x}}{-1+\sqrt{5}}\right]+3\,\text{PolyLog}\left[2,\frac{1+\sqrt{5}+2\sqrt{1+x}}{2\sqrt{5}}\right]+\sqrt{5}\,\text{PolyLog}\left[2,\frac{1+\sqrt{5}+2\sqrt{1+x}}{2\sqrt{5}}\right]$$

Problem 33: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTan}[2\,\text{Tan}[x]]\,dx$$

Optimal (type 4, 80 leaves, 7 steps):

$$x \,\text{ArcTan}[2\,\text{Tan}[x]] + \frac{1}{2}\, i\, x\,\text{Log}\left[1 - 3\, e^{2 i x}\right] - \frac{1}{2}\, i\, x\,\text{Log}\left[1 - \frac{1}{3}\, e^{2 i x}\right] - \frac{1}{4}\,\text{PolyLog}\left[2, \frac{1}{3}\, e^{2 i x}\right] + \frac{1}{4}\,\text{PolyLog}\left[2, 3\, e^{2 i x}\right]$$

Result (type 4, 262 leaves):

$$x\,\text{ArcTan}[2\,\text{Tan}[x]] - \frac{1}{4}\, i \left(4\, i\, x\,\text{ArcTan}\left[\frac{\text{Cot}[x]}{2}\right] + 2\, i\,\text{ArcCos}\left[\frac{5}{3}\right]\text{ArcTan}[2\,\text{Tan}[x]] + \left(\text{ArcCos}\left[\frac{5}{3}\right] + 2\,\text{ArcTan}\left[\frac{\text{Cot}[x]}{2}\right] + 2\,\text{ArcTan}[2\,\text{Tan}[x]]\right)\text{Log}\left[\frac{2\, i\sqrt{\frac{2}{3}}\, e^{-i x}}{\sqrt{-5 + 3\,\text{Cos}[2 x]}}\right] + \left(\text{ArcCos}\left[\frac{5}{3}\right] - 2\,\text{ArcTan}\left[\frac{\text{Cot}[x]}{2}\right] - 2\,\text{ArcTan}[2\,\text{Tan}[x]]\right)\text{Log}\left[\frac{2\, i\sqrt{\frac{2}{3}}\, e^{i x}}{\sqrt{-5 + 3\,\text{Cos}[2 x]}}\right] - \left(\text{ArcCos}\left[\frac{5}{3}\right] - 2\,\text{ArcTan}[2\,\text{Tan}[x]]\right)\text{Log}\left[\frac{4\, i - 4\,\text{Tan}[x]}{i + 2\,\text{Tan}[x]}\right] - \left(\text{ArcCos}\left[\frac{5}{3}\right] + 2\,\text{ArcTan}[2\,\text{Tan}[x]]\right)\text{Log}\left[\frac{4\left(i + \text{Tan}[x]\right)}{3\, i + 6\,\text{Tan}[x]}\right] + i\left(-\text{PolyLog}\left[2, \frac{-3\, i + 6\,\text{Tan}[x]}{i + 2\,\text{Tan}[x]}\right] + \text{PolyLog}\left[2, \frac{-i + 2\,\text{Tan}[x]}{3\, i + 6\,\text{Tan}[x]}\right]\right)\right)$$

Problem 35: Result more than twice size of optimal antiderivative.

$$\int \sqrt{1 + x^2}\;\text{ArcTan}[x]^2\, dx$$

Optimal (type 4, 121 leaves, 10 steps):

$$\text{ArcSinh}[x] - \sqrt{1 + x^2}\;\text{ArcTan}[x] + \frac{1}{2}\, x\sqrt{1 + x^2}\;\text{ArcTan}[x]^2 - i\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[x]}\right]\text{ArcTan}[x]^2 + i\,\text{ArcTan}[x]\,\text{PolyLog}\left[2, -i\, e^{i\,\text{ArcTan}[x]}\right] - i\,\text{ArcTan}[x]\,\text{PolyLog}\left[2, i\, e^{i\,\text{ArcTan}[x]}\right] - \text{PolyLog}\left[3, -i\, e^{i\,\text{ArcTan}[x]}\right] + \text{PolyLog}\left[3, i\, e^{i\,\text{ArcTan}[x]}\right]$$

Result (type 4, 405 leaves):

$$\frac{1}{2}\left(\sqrt{1+x^2}\ \text{ArcTan}[x]\ (-2+x\,\text{ArcTan}[x])-\pi\,\text{ArcTan}[x]\ \text{Log}[2]+\text{ArcTan}[x]^2\ \text{Log}\left[1-i\,e^{i\,\text{ArcTan}[x]}\right]-\text{ArcTan}[x]^2\ \text{Log}\left[1+i\,e^{i\,\text{ArcTan}[x]}\right]+\right.$$

$$\pi\,\text{ArcTan}[x]\ \text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[x]}\left(-i+e^{i\,\text{ArcTan}[x]}\right)\right]-\text{ArcTan}[x]^2\ \text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[x]}\left(-i+e^{i\,\text{ArcTan}[x]}\right)\right]+$$

$$\pi\,\text{ArcTan}[x]\ \text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[x]}\right)\right]+\text{ArcTan}[x]^2\ \text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[x]}\right)\right]-$$

$$\pi\,\text{ArcTan}[x]\ \text{Log}\left[-\text{Cos}\left[\frac{1}{4}(\pi+2\,\text{ArcTan}[x])\right]\right]-2\,\text{Log}\left[\text{Cos}\left[\frac{\text{ArcTan}[x]}{2}\right]-\text{Sin}\left[\frac{\text{ArcTan}[x]}{2}\right]\right]+$$

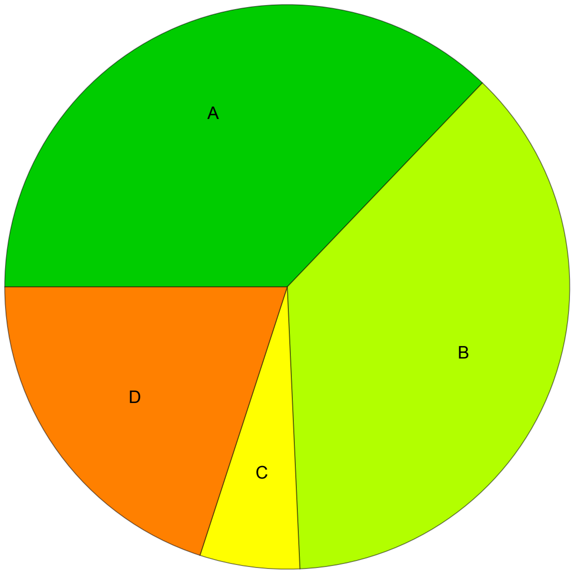
$$\text{ArcTan}[x]^2\ \text{Log}\left[\text{Cos}\left[\frac{\text{ArcTan}[x]}{2}\right]-\text{Sin}\left[\frac{\text{ArcTan}[x]}{2}\right]\right]+2\,\text{Log}\left[\text{Cos}\left[\frac{\text{ArcTan}[x]}{2}\right]+\text{Sin}\left[\frac{\text{ArcTan}[x]}{2}\right]\right]-$$

$$\text{ArcTan}[x]^2\ \text{Log}\left[\text{Cos}\left[\frac{\text{ArcTan}[x]}{2}\right]+\text{Sin}\left[\frac{\text{ArcTan}[x]}{2}\right]\right]-\pi\,\text{ArcTan}[x]\ \text{Log}\left[\text{Sin}\left[\frac{1}{4}(\pi+2\,\text{ArcTan}[x])\right]\right]+$$

$$\left.2\,i\,\text{ArcTan}[x]\ \text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[x]}\right]-2\,i\,\text{ArcTan}[x]\ \text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[x]}\right]-2\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[x]}\right]+2\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[x]}\right]\right)$$

Summary of Integration Test Results

35 integration problems



A - 13 optimal antiderivatives

B - 13 more than twice size of optimal antiderivatives

C - 2 unnecessarily complex antiderivatives

D - 7 unable to integrate problems

E - 0 integration timeouts