Mathematica 11.3 Integration Test Results

Test results for the 361 problems in "7.3.7 Inverse hyperbolic tangent functions.m"

Problem 16: Result unnecessarily involves imaginary or complex numbers.

$$\int x^{9/2} \operatorname{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right] dx$$

Optimal (type 4, 196 leaves, 6 steps):

$$-\frac{60 d^2 \sqrt{x} \sqrt{d+e x^2}}{847 e^{5/2}}+\frac{36 d x^{5/2} \sqrt{d+e x^2}}{847 e^{3/2}}-\frac{4 x^{9/2} \sqrt{d+e x^2}}{121 \sqrt{e}}+\frac{2}{11} x^{11/2} \operatorname{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]+$$
$$\left(30 d^{11/4} \left(\sqrt{d}+\sqrt{e}\, x\right) \sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\, x\right)^2}} \operatorname{EllipticF}\left[2 \operatorname{ArcTan}\left[\frac{e^{1/4} \sqrt{x}}{d^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(847 e^{11/4} \sqrt{d+e x^2}\right)$$

Result (type 4, 161 leaves):

$$\frac{2}{847} \sqrt{x} \left(-\frac{2 \sqrt{d+e x^2} \left(15 d^2-9 d e x^2+7 e^2 x^4\right)}{e^{5/2}}+77 x^5 \operatorname{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]\right)+$$
$$\frac{60 d^{5/2} \sqrt{\frac{i \sqrt{d}}{\sqrt{e}}} \sqrt{1+\frac{d}{e x^2}}\, x \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\frac{\sqrt{\frac{i \sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right], -1\right]}{847 e^2 \sqrt{d+e x^2}}$$

Problem 17: Result unnecessarily involves imaginary or complex numbers.

$$\int x^{5/2} \operatorname{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right] dx$$

Optimal (type 4, 168 leaves, 5 steps):

$$\frac{20\,d\,\sqrt{x}\,\sqrt{d+e\,x^2}}{147\,e^{3/2}}-\frac{4\,x^{5/2}\,\sqrt{d+e\,x^2}}{49\,\sqrt{e}}+\frac{2}{7}\,x^{7/2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]-\left(10\,d^{7/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\,\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(147\,e^{7/4}\,\sqrt{d+e\,x^2}\right)$$

Result (type 4, 147 leaves):

$$\frac{2}{147}\sqrt{x}\left(\frac{2\left(5\,d-3\,e\,x^2\right)\sqrt{d+e\,x^2}}{e^{3/2}}+21\,x^3\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]\right)+\frac{20\,\sqrt{d}\left(\frac{i\sqrt{d}}{\sqrt{e}}\right)^{5/2}\sqrt{1+\frac{d}{e\,x^2}}\;x\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{147\,\sqrt{d+e\,x^2}}$$

Problem 18: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{x}\;\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]dx$$

Optimal (type 4, 142 leaves, 4 steps):

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

Result (type 4, 135 leaves):

$$\frac{2}{9}\sqrt{x}\left(-\frac{2\,\sqrt{d+e\,x^2}}{\sqrt{e}}+3\,x\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]\right)+\frac{4\,\sqrt{d}\,\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}\,\sqrt{1+\frac{d}{e\,x^2}}\;x\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{9\,\sqrt{d+e\,x^2}}$$

Problem 19: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{x^{3/2}}\,dx$$

Optimal (type 4, 113 leaves, 3 steps):

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

Result (type 4, 111 leaves):

$$-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{\sqrt{x}}+\frac{4\,i\,\sqrt{e}\,\sqrt{1+\frac{d}{e\,x^2}}\,x\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}\,\sqrt{d+e\,x^2}}$$

Problem 20: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{x^{7/2}}\,dx$$

Optimal (type 4, 145 leaves, 4 steps):

$$-\frac{4\,\sqrt{e}\,\sqrt{d+e\,x^2}}{15\,d\,x^{3/2}}-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{5\,x^{5/2}}-\frac{2\,e^{5/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{15\,d^{5/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 142 leaves):

$$-\frac{2\left(2\,\sqrt{e}\,x\,\sqrt{d+e\,x^2}+3\,d\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]\right)}{15\,d\,x^{5/2}}-\frac{4\,\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}\,e^2\,\sqrt{1+\frac{d}{e\,x^2}}\,x\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{15\,d^{3/2}\sqrt{d+e\,x^2}}$$

Problem 21: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{x^{11/2}}\,dx$$

Optimal (type 4, 173 leaves, 5 steps):

$$-\frac{4\sqrt{e}\ \sqrt{d+e\,x^2}}{63\,d\,x^{7/2}}+\frac{20\,e^{3/2}\sqrt{d+e\,x^2}}{189\,d^2\,x^{3/2}}-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{9\,x^{9/2}}+\frac{10\,e^{9/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\ \text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{189\,d^{9/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 154 leaves) :

$$\frac{4\sqrt{e}\ x\sqrt{d+e\,x^2}\ \left(-3\,d+5\,e\,x^2\right)-42\,d^2\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{189\,d^2\,x^{9/2}}+\frac{20\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}\ e^3\sqrt{1+\frac{d}{e\,x^2}}\ x\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{189\,d^{5/2}\sqrt{d+e\,x^2}}$$

Problem 22: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{x^{15/2}}\,dx$$

Optimal (type 4, 201 leaves, 6 steps) :

$$-\frac{4\sqrt{e}\ \sqrt{d+e\,x^2}}{143\,d\,x^{11/2}}+\frac{36\,e^{3/2}\sqrt{d+e\,x^2}}{1001\,d^2\,x^{7/2}}-\frac{60\,e^{5/2}\sqrt{d+e\,x^2}}{1001\,d^3\,x^{3/2}}-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{13\,x^{13/2}}-\left(30\,e^{13/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\ \text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(1001\,d^{13/4}\sqrt{d+e\,x^2}\right)$$

Result (type 4, 163 leaves) :

$$\frac{1}{1001\,x^{13/2}}2\left(-\frac{2\sqrt{e}\,x\sqrt{d+e\,x^2}\,\left(7\,d^2-9\,d\,e\,x^2+15\,e^2\,x^4\right)}{d^3}-77\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]-\right.$$

$$\left.\frac{30\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}\,e^4\sqrt{1+\frac{d}{e\,x^2}}\,x^{15/2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{d^{7/2}\sqrt{d+e\,x^2}}\right)$$

Problem 23: Result unnecessarily involves imaginary or complex numbers.

$$\int x^{7/2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]\,dx$$

Optimal (type 4, 297 leaves, 7 steps):

$$\frac{28\,d\,x^{3/2}\sqrt{d+e\,x^2}}{405\,e^{3/2}}-\frac{4\,x^{7/2}\sqrt{d+e\,x^2}}{81\sqrt{e}}-\frac{28\,d^2\sqrt{x}\,\sqrt{d+e\,x^2}}{135\,e^2\left(\sqrt{d}+\sqrt{e}\,x\right)}+\frac{2}{9}\,x^{9/2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]+$$

$$\frac{28\,d^{9/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{135\,e^{9/4}\sqrt{d+e\,x^2}}-$$

$$\frac{14\,d^{9/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{135\,e^{9/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 224 leaves):

$$\left(2\sqrt{x}\left(\sqrt{e}\,x\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\left(14\,d^2+4\,d\,e\,x^2-10\,e^2\,x^4+45\,e^{3/2}\,x^3\sqrt{d+e\,x^2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]\right)-\right.\right.$$

$$42\,d^{5/2}\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]+$$

$$\left.\left.42\,d^{5/2}\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]\right)\right)\Big/\left(405\,e^2\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\sqrt{d+e\,x^2}\right)$$

Problem 24: Result unnecessarily involves imaginary or complex numbers.

$$\int x^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]dx$$

Optimal (type 4, 269 leaves, 6 steps):

$$-\frac{4\,x^{3/2}\sqrt{d+e\,x^2}}{25\sqrt{e}}+\frac{12\,d\sqrt{x}\,\sqrt{d+e\,x^2}}{25\,e\left(\sqrt{d}+\sqrt{e}\,x\right)}+\frac{2}{5}\,x^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]-$$
$$\frac{12\,d^{5/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{25\,e^{5/4}\sqrt{d+e\,x^2}}+$$
$$\frac{6\,d^{5/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{25\,e^{5/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 211 leaves):

$$-\left(\left(2\sqrt{x}\left(\sqrt{e}\,x\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\left(2\,d+2\,e\,x^2-5\sqrt{e}\,x\sqrt{d+e\,x^2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]\right)-\right.\right.\right.$$
$$6\,d^{3/2}\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]+$$
$$\left.\left.\left.6\,d^{3/2}\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]\right)\right)\Big/\left(25\,e\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\sqrt{d+e\,x^2}\right)\right)$$

Problem 25: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{\sqrt{x}}\,dx$$

Optimal (type 4, 232 leaves, 5 steps):

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

Result (type 4, 182 leaves):

$$\left(2\sqrt{x}\left(\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\,\sqrt{d+e\,x^2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]-2\sqrt{d}\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]+2\sqrt{d}\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]\right)\right)\Big/\left(\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\,\sqrt{d+e\,x^2}\right)$$

Problem 26: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{x^{5/2}}\,dx$$

Optimal (type 4, 272 leaves, 6 steps):

$$-\frac{4\sqrt{e}\,\sqrt{d+e\,x^2}}{3\,d\,\sqrt{x}}+\frac{4\,e\,\sqrt{x}\,\sqrt{d+e\,x^2}}{3\,d\left(\sqrt{d}+\sqrt{e}\,x\right)}-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{3\,x^{3/2}}-\frac{4\,e^{3/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{3\,d^{3/4}\sqrt{d+e\,x^2}}+\frac{2\,e^{3/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{3\,d^{3/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 214 leaves):

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

Problem 27: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{x^{9/2}}\,dx$$

Optimal (type 4, 302 leaves, 7 steps):

$$-\frac{4\sqrt{e}\,\sqrt{d+e\,x^2}}{35\,d\,x^{5/2}}+\frac{12\,e^{3/2}\sqrt{d+e\,x^2}}{35\,d^2\sqrt{x}}-\frac{12\,e^2\sqrt{x}\,\sqrt{d+e\,x^2}}{35\,d^2\left(\sqrt{d}+\sqrt{e}\,x\right)}-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{7\,x^{7/2}}+\frac{12\,e^{7/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{35\,d^{7/4}\sqrt{d+e\,x^2}}-\frac{6\,e^{7/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{35\,d^{7/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 234 leaves):

$$\left(2\left(\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\left(2\sqrt{e}\,x\left(-d^2+2\,d\,e\,x^2+3\,e^2\,x^4\right)-5\,d^2\sqrt{d+e\,x^2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]\right)-6\sqrt{d}\,e^2\,x^4\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]+6\sqrt{d}\,e^2\,x^4\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]\right)\right)\Big/\left(35\,d^2\,x^{7/2}\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\sqrt{d+e\,x^2}\right)$$

Problem 31: Unable to integrate problem.

$$\int \frac{\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^3}{1-c^2\,x^2}\,dx$$

Optimal (type 4, 409 leaves, 9 steps):

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

Result (type 8, 42 leaves):

$$\int \frac{\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^3}{1-c^2\,x^2}\,dx$$

Problem 32: Unable to integrate problem.

$$\int \frac{\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^2}{1-c^2\,x^2}\,dx$$

Optimal (type 4, 268 leaves, 7 steps):

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

Result (type 8, 42 leaves):

$$\int\frac{\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^2}{1-c^2\,x^2}\,dx$$

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

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

Optimal (type 3, 34 leaves, 3 steps):

$$\frac{x\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^3}{3\,b}-\frac{\text{ArcTanh}[\text{Tanh}[a+b\,x]]^4}{12\,b^2}$$

Result (type 3, 74 leaves):

$$\frac{1}{12\,b^2}(a+b\,x)\left(-(3\,a-b\,x)\,(a+b\,x)^2+4\left(2\,a^2+a\,b\,x-b^2\,x^2\right)\text{ArcTanh}[\text{Tanh}[a+b\,x]]-6\,(a-b\,x)\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^2\right)$$

Problem 57: Result more than twice size of optimal antiderivative.

$$\int x\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^3\,dx$$

Optimal (type 3, 34 leaves, 3 steps):

$$\frac{x\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^4}{4\,b}-\frac{\text{ArcTanh}[\text{Tanh}[a+b\,x]]^5}{20\,b^2}$$

Result (type 3, 99 leaves):

$$\frac{1}{20\,b^2}(a+b\,x)\left((4\,a-b\,x)\,(a+b\,x)^3-5\,(3\,a-b\,x)\,(a+b\,x)^2\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]+10\,\left(2\,a^2+a\,b\,x-b^2\,x^2\right)\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^2-10\,(a-b\,x)\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^3\right)$$

Problem 71: Result more than twice size of optimal antiderivative.

$$\int x\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^4\,dx$$

Optimal (type 3, 34 leaves, 3 steps):

$$\frac{x\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^5}{5\,b}-\frac{\text{ArcTanh}[\text{Tanh}[a+b\,x]]^6}{30\,b^2}$$

Result (type 3, 125 leaves):

$$-\frac{1}{30\,b^2}(a+b\,x)\left((5\,a-b\,x)\,(a+b\,x)^4-6\,(4\,a-b\,x)\,(a+b\,x)^3\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]+15\,(3\,a-b\,x)\,(a+b\,x)^2\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^2-20\,\left(2\,a^2+a\,b\,x-b^2\,x^2\right)\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^3+15\,(a-b\,x)\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^4\right)$$

Problem 78: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{ArcTanh}[\text{Tanh}[a+b\,x]]^4}{x^6}\,dx$$

Optimal (type 3, 31 leaves, 1 step):

$$\frac{\text{ArcTanh}[\text{Tanh}[a+b\,x]]^5}{5\,x^5\,(b\,x-\text{ArcTanh}[\text{Tanh}[a+b\,x]])}$$

Result (type 3, 66 leaves):

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

Problem 84: Result more than twice size of optimal antiderivative.

$$\int x\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^6\,dx$$

Optimal (type 3, 34 leaves, 3 steps):

$$\frac{x\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^7}{7\,b}-\frac{\text{ArcTanh}[\text{Tanh}[a+b\,x]]^8}{56\,b^2}$$

Result (type 3, 177 leaves):

$$-\frac{1}{56\,b^2}(a+b\,x)\Big((7\,a-b\,x)\,(a+b\,x)^6-8\,(6\,a-b\,x)\,(a+b\,x)^5\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]+28\,(5\,a-b\,x)\,(a+b\,x)^4\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^2-56\,(4\,a-b\,x)\,(a+b\,x)^3\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^3+70\,(3\,a-b\,x)\,(a+b\,x)^2\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^4-56\,(2\,a^2+a\,b\,x-b^2\,x^2)\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^5+28\,(a-b\,x)\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^6\Big)$$

Problem 286: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[c+d\,\text{Tanh}[a+b\,x]]\,dx$$

Optimal (type 4, 150 leaves, 7 steps):

$$x\,\text{ArcTanh}[c+d\,\text{Tanh}[a+b\,x]]+\frac{1}{2}\,x\,\text{Log}\Big[1+\frac{(1-c-d)\,e^{2a+2bx}}{1-c+d}\Big]-\frac{1}{2}\,x\,\text{Log}\Big[1+\frac{(1+c+d)\,e^{2a+2bx}}{1+c-d}\Big]+\frac{\text{PolyLog}\Big[2,-\frac{(1-c-d)\,e^{2a+2bx}}{1-c+d}\Big]}{4\,b}-\frac{\text{PolyLog}\Big[2,-\frac{(1+c+d)\,e^{2a+2bx}}{1+c-d}\Big]}{4\,b}$$

Result (type 4, 366 leaves):

$$x\,\text{ArcTanh}[c+d\,\text{Tanh}[a+b\,x]]+\frac{1}{2\,b}\Bigg((a+b\,x)\,\text{Log}\Big[1-\frac{\sqrt{-1+c+d}\;e^{a+bx}}{\sqrt{1-c+d}}\Big]+(a+b\,x)\,\text{Log}\Big[1+\frac{\sqrt{-1+c+d}\;e^{a+bx}}{\sqrt{1-c+d}}\Big]-(a+b\,x)\,\text{Log}\Big[1-\frac{\sqrt{1+c+d}\;e^{a+bx}}{\sqrt{-1-c+d}}\Big]-(a+b\,x)\,\text{Log}\Big[1+\frac{\sqrt{1+c+d}\;e^{a+bx}}{\sqrt{-1-c+d}}\Big]+a\,\text{Log}\Big[1+c-d+e^{2\,(a+b\,x)}+c\,e^{2\,(a+b\,x)}+d\,e^{2\,(a+b\,x)}\Big]-a\,\text{Log}\Big[1+d+e^{2\,(a+b\,x)}-d\,e^{2\,(a+b\,x)}-c\,\big(1+e^{2\,(a+b\,x)}\big)\Big]+\text{PolyLog}\Big[2,-\frac{\sqrt{-1+c+d}\;e^{a+bx}}{\sqrt{1-c+d}}\Big]+\text{PolyLog}\Big[2,\frac{\sqrt{-1+c+d}\;e^{a+bx}}{\sqrt{1-c+d}}\Big]-\text{PolyLog}\Big[2,-\frac{\sqrt{1+c+d}\;e^{a+bx}}{\sqrt{-1-c+d}}\Big]-\text{PolyLog}\Big[2,\frac{\sqrt{1+c+d}\;e^{a+bx}}{\sqrt{-1-c+d}}\Big]\Bigg)$$

Problem 291: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[1+d+d\,\text{Tanh}[a+b\,x]]\,dx$$

Optimal (type 4, 69 leaves, 5 steps):

$$\frac{b\,x^2}{2}+x\,\text{ArcTanh}[1+d+d\,\text{Tanh}[a+b\,x]]-\frac{1}{2}\,x\,\text{Log}\big[1+(1+d)\,e^{2a+2bx}\big]-\frac{\text{PolyLog}\big[2,-(1+d)\,e^{2a+2bx}\big]}{4\,b}$$

Result (type 4, 168 leaves):

$$x\,\text{ArcTanh}[1+d+d\,\text{Tanh}[a+b\,x]]-\frac{1}{2\,b}\left(b\,x\left(-b\,x-\text{Log}\left[e^{-a-b\,x}+(1+d)\,e^{a+b\,x}\right]+\text{Log}\left[1-e^{b\,x}\sqrt{-(1+d)\,e^{2\,a}}\right]+\text{Log}\left[1+e^{b\,x}\sqrt{-(1+d)\,e^{2\,a}}\right]+\text{Log}\left[(2+d)\,\text{Cosh}[a+b\,x]+d\,\text{Sinh}[a+b\,x]\right]\right)+\text{PolyLog}\left[2,-e^{b\,x}\sqrt{-(1+d)\,e^{2\,a}}\right]+\text{PolyLog}\left[2,e^{b\,x}\sqrt{-(1+d)\,e^{2\,a}}\right]\right)$$

Problem 296: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[1-d-d\,\text{Tanh}[a+b\,x]]\,dx$$

Optimal (type 4, 76 leaves, 5 steps):

$$\frac{b\,x^2}{2}+x\,\text{ArcTanh}[1-d-d\,\text{Tanh}[a+b\,x]]-\frac{1}{2}\,x\,\text{Log}\left[1+(1-d)\,e^{2\,a+2\,b\,x}\right]-\frac{\text{PolyLog}\left[2,-(1-d)\,e^{2\,a+2\,b\,x}\right]}{4\,b}$$

Result (type 4, 171 leaves):

$$x\,\text{ArcTanh}[1-d-d\,\text{Tanh}[a+b\,x]]-\frac{1}{2\,b}\left(b\,x\left(-b\,x-\text{Log}\left[e^{-a-b\,x}\left(-1+(-1+d)\,e^{2\,(a+b\,x)}\right)\right]+\text{Log}\left[1-e^{b\,x}\sqrt{(-1+d)\,e^{2\,a}}\right]+\text{Log}\left[1+e^{b\,x}\sqrt{(-1+d)\,e^{2\,a}}\right]+\text{Log}\left[(-2+d)\,\text{Cosh}[a+b\,x]+d\,\text{Sinh}[a+b\,x]\right]\right)+\text{PolyLog}\left[2,-e^{b\,x}\sqrt{(-1+d)\,e^{2\,a}}\right]+\text{PolyLog}\left[2,e^{b\,x}\sqrt{(-1+d)\,e^{2\,a}}\right]\right)$$

Problem 300: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[c+d\,\text{Coth}[a+b\,x]]\,dx$$

Optimal (type 4, 150 leaves, 7 steps):

$$x\,\text{ArcTanh}[c+d\,\text{Coth}[a+b\,x]]+\frac{1}{2}\,x\,\text{Log}\left[1-\frac{(1-c-d)\,e^{2\,a+2\,b\,x}}{1-c+d}\right]-\frac{1}{2}\,x\,\text{Log}\left[1-\frac{(1+c+d)\,e^{2\,a+2\,b\,x}}{1+c-d}\right]+\frac{\text{PolyLog}\left[2,\frac{(1-c-d)\,e^{2\,a+2\,b\,x}}{1-c+d}\right]}{4\,b}-\frac{\text{PolyLog}\left[2,\frac{(1+c+d)\,e^{2\,a+2\,b\,x}}{1+c-d}\right]}{4\,b}$$

Result (type 4, 369 leaves):

$$x\,\text{ArcTanh}[c+d\,\text{Coth}[a+b\,x]]-\frac{1}{2\,b}\left(-(a+b\,x)\,\text{Log}\left[1-\frac{\sqrt{-1+c+d}\;e^{a+b\,x}}{\sqrt{-1+c-d}}\right]-(a+b\,x)\,\text{Log}\left[1+\frac{\sqrt{-1+c+d}\;e^{a+b\,x}}{\sqrt{-1+c-d}}\right]+(a+b\,x)\,\text{Log}\left[1-\frac{\sqrt{1+c+d}\;e^{a+b\,x}}{\sqrt{1+c-d}}\right]+(a+b\,x)\,\text{Log}\left[1+\frac{\sqrt{1+c+d}\;e^{a+b\,x}}{\sqrt{1+c-d}}\right]+a\,\text{Log}\left[1+d-e^{2\,(a+b\,x)}+d\,e^{2\,(a+b\,x)}+c\left(-1+e^{2\,(a+b\,x)}\right)\right]-a\,\text{Log}\left[1+c-e^{2\,(a+b\,x)}-c\,e^{2\,(a+b\,x)}-d\left(1+e^{2\,(a+b\,x)}\right)\right]-\text{PolyLog}\left[2,-\frac{\sqrt{-1+c+d}\;e^{a+b\,x}}{\sqrt{-1+c-d}}\right]-\text{PolyLog}\left[2,\frac{\sqrt{-1+c+d}\;e^{a+b\,x}}{\sqrt{-1+c-d}}\right]+\text{PolyLog}\left[2,-\frac{\sqrt{1+c+d}\;e^{a+b\,x}}{\sqrt{1+c-d}}\right]+\text{PolyLog}\left[2,\frac{\sqrt{1+c+d}\;e^{a+b\,x}}{\sqrt{1+c-d}}\right]\right)$$

Problem 305: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[1+d+d\,\text{Coth}[a+b\,x]]\,dx$$

Optimal (type 4, 69 leaves, 5 steps):

$$\frac{b\,x^2}{2}+x\,\text{ArcTanh}[1+d+d\,\text{Coth}[a+b\,x]]-\frac{1}{2}\,x\,\text{Log}\left[1-(1+d)\,e^{2\,a+2\,b\,x}\right]-\frac{\text{PolyLog}\left[2,(1+d)\,e^{2\,a+2\,b\,x}\right]}{4\,b}$$

Result (type 4, 168 leaves):

$$x\,\text{ArcTanh}[1+d+d\,\text{Coth}[a+b\,x]]-\frac{1}{2\,b}\left(b\,x\left(-b\,x-\text{Log}\left[e^{-a-b\,x}\left(-1+(1+d)\,e^{2\,(a+b\,x)}\right)\right]+\text{Log}\left[1-e^{b\,x}\sqrt{(1+d)\,e^{2\,a}}\right]+\text{Log}\left[1+e^{b\,x}\sqrt{(1+d)\,e^{2\,a}}\right]+\text{Log}[d\,\text{Cosh}[a+b\,x]+(2+d)\,\text{Sinh}[a+b\,x]]\right)+\text{PolyLog}\left[2,-e^{b\,x}\sqrt{(1+d)\,e^{2\,a}}\right]+\text{PolyLog}\left[2,e^{b\,x}\sqrt{(1+d)\,e^{2\,a}}\right]\right)$$

Problem 310: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[1-d-d\,\text{Coth}[a+b\,x]]\,dx$$

Optimal (type 4, 76 leaves, 5 steps):

$$\frac{b\,x^2}{2}+x\,\text{ArcTanh}[1-d-d\,\text{Coth}[a+b\,x]]-\frac{1}{2}\,x\,\text{Log}\left[1-(1-d)\,e^{2\,a+2\,b\,x}\right]-\frac{\text{PolyLog}\left[2,(1-d)\,e^{2\,a+2\,b\,x}\right]}{4\,b}$$

Result (type 4, 175 leaves):

$$x\,\text{ArcTanh}[1-d-d\,\text{Coth}[a+b\,x]]-\frac{1}{2\,b}\left(b\,x\left(-b\,x-\text{Log}\left[e^{-a-b\,x}\left(1+(-1+d)\,e^{2\,(a+b\,x)}\right)\right]+\text{Log}\left[1-e^{b\,x}\sqrt{-(-1+d)\,e^{2\,a}}\right]+\text{Log}\left[1+e^{b\,x}\sqrt{-(-1+d)\,e^{2\,a}}\right]+\text{Log}[d\,\text{Cosh}[a+b\,x]+(-2+d)\,\text{Sinh}[a+b\,x]]\right)+\text{PolyLog}\left[2,-e^{b\,x}\sqrt{-(-1+d)\,e^{2\,a}}\right]+\text{PolyLog}\left[2,e^{b\,x}\sqrt{-(-1+d)\,e^{2\,a}}\right]\right)$$

Problem 312: Result more than twice size of optimal antiderivative.

$$\int (e+f\,x)^3\,\text{ArcTanh}[\text{Tan}[a+b\,x]]\,dx$$

Optimal (type 4, 302 leaves, 12 steps):

$$\frac{i\,(e+f\,x)^4\,\text{ArcTan}\left[e^{2\,i\,(a+b\,x)}\right]}{4\,f}+\frac{(e+f\,x)^4\,\text{ArcTanh}[\text{Tan}[a+b\,x]]}{4\,f}-\frac{i\,(e+f\,x)^3\,\text{PolyLog}\left[2,-i\,e^{2\,i\,(a+b\,x)}\right]}{4\,b}+\frac{i\,(e+f\,x)^3\,\text{PolyLog}\left[2,i\,e^{2\,i\,(a+b\,x)}\right]}{4\,b}+\frac{3\,f\,(e+f\,x)^2\,\text{PolyLog}\left[3,-i\,e^{2\,i\,(a+b\,x)}\right]}{8\,b^2}-\frac{3\,f\,(e+f\,x)^2\,\text{PolyLog}\left[3,i\,e^{2\,i\,(a+b\,x)}\right]}{8\,b^2}+\frac{3\,i\,f^2\,(e+f\,x)\,\text{PolyLog}\left[4,-i\,e^{2\,i\,(a+b\,x)}\right]}{8\,b^3}-\frac{3\,i\,f^2\,(e+f\,x)\,\text{PolyLog}\left[4,i\,e^{2\,i\,(a+b\,x)}\right]}{8\,b^3}-\frac{3\,f^3\,\text{PolyLog}\left[5,-i\,e^{2\,i\,(a+b\,x)}\right]}{16\,b^4}+\frac{3\,f^3\,\text{PolyLog}\left[5,i\,e^{2\,i\,(a+b\,x)}\right]}{16\,b^4}$$

Result (type 4, 654 leaves):

$$\frac{1}{4}\,x\,\left(4\,e^3+6\,e^2\,f\,x+4\,e\,f^2\,x^2+f^3\,x^3\right)\,\text{ArcTanh}[\text{Tan}[a+b\,x]]+\frac{1}{16\,b^4}\left(-8\,b^4\,e^3\,x\,\text{Log}\left[1-i\,e^{2\,i\,(a+b\,x)}\right]-12\,b^4\,e^2\,f\,x^2\,\text{Log}\left[1-i\,e^{2\,i\,(a+b\,x)}\right]-8\,b^4\,e\,f^2\,x^3\,\text{Log}\left[1-i\,e^{2\,i\,(a+b\,x)}\right]-2\,b^4\,f^3\,x^4\,\text{Log}\left[1-i\,e^{2\,i\,(a+b\,x)}\right]+8\,b^4\,e^3\,x\,\text{Log}\left[1+i\,e^{2\,i\,(a+b\,x)}\right]+12\,b^4\,e^2\,f\,x^2\,\text{Log}\left[1+i\,e^{2\,i\,(a+b\,x)}\right]+8\,b^4\,e\,f^2\,x^3\,\text{Log}\left[1+i\,e^{2\,i\,(a+b\,x)}\right]+2\,b^4\,f^3\,x^4\,\text{Log}\left[1+i\,e^{2\,i\,(a+b\,x)}\right]-4\,i\,b^3\,(e+f\,x)^3\,\text{PolyLog}\left[2,-i\,e^{2\,i\,(a+b\,x)}\right]+4\,i\,b^3\,(e+f\,x)^3\,\text{PolyLog}\left[2,i\,e^{2\,i\,(a+b\,x)}\right]+6\,b^2\,e^2\,f\,\text{PolyLog}\left[3,-i\,e^{2\,i\,(a+b\,x)}\right]+12\,b^2\,e\,f^2\,x\,\text{PolyLog}\left[3,-i\,e^{2\,i\,(a+b\,x)}\right]+6\,b^2\,f^3\,x^2\,\text{PolyLog}\left[3,-i\,e^{2\,i\,(a+b\,x)}\right]-6\,b^2\,e^2\,f\,\text{PolyLog}\left[3,i\,e^{2\,i\,(a+b\,x)}\right]-12\,b^2\,e\,f^2\,x\,\text{PolyLog}\left[3,i\,e^{2\,i\,(a+b\,x)}\right]-6\,b^2\,f^3\,x^2\,\text{PolyLog}\left[3,i\,e^{2\,i\,(a+b\,x)}\right]+6\,i\,b\,e\,f^2\,\text{PolyLog}\left[4,-i\,e^{2\,i\,(a+b\,x)}\right]+6\,i\,b\,f^3\,x\,\text{PolyLog}\left[4,-i\,e^{2\,i\,(a+b\,x)}\right]-6\,i\,b\,e\,f^2\,\text{PolyLog}\left[4,i\,e^{2\,i\,(a+b\,x)}\right]-6\,i\,b\,f^3\,x\,\text{PolyLog}\left[4,i\,e^{2\,i\,(a+b\,x)}\right]-3\,f^3\,\text{PolyLog}\left[5,-i\,e^{2\,i\,(a+b\,x)}\right]+3\,f^3\,\text{PolyLog}\left[5,i\,e^{2\,i\,(a+b\,x)}\right]\right)$$

Problem 319: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[c+d\,\text{Tan}[a+b\,x]]\,dx$$

Optimal (type 4, 194 leaves, 7 steps):

$$x\,\text{ArcTanh}[c+d\,\text{Tan}[a+b\,x]]+\frac{1}{2}\,x\,\text{Log}\left[1+\frac{(1-c+i\,d)\,e^{2\,i\,a+2\,i\,b\,x}}{1-c-i\,d}\right]-\frac{1}{2}\,x\,\text{Log}\left[1+\frac{(1+c-i\,d)\,e^{2\,i\,a+2\,i\,b\,x}}{1+c+i\,d}\right]-\frac{i\,\text{PolyLog}\left[2,-\frac{(1-c+i\,d)\,e^{2\,i\,a+2\,i\,b\,x}}{1-c-i\,d}\right]}{4\,b}+\frac{i\,\text{PolyLog}\left[2,-\frac{(1+c-i\,d)\,e^{2\,i\,a+2\,i\,b\,x}}{1+c+i\,d}\right]}{4\,b}$$

Result (type 4, 4654 leaves) :

$$x\,\text{ArcTanh}[c+d\,\text{Tan}[a+b\,x]]+$$

$$\left(d\left(-a\,\text{Log}\left[-\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2((-1+c)\,\text{Cos}[a+b\,x]+d\,\text{Sin}[a+b\,x])\right]+\right.\right.$$

$$a\,\text{Log}\left[\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2(\text{Cos}[a+b\,x]+c\,\text{Cos}[a+b\,x]+d\,\text{Sin}[a+b\,x])\right]+$$

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

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

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

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

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

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

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

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

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

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

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

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

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

$$i\,\text{PolyLog}\Big[2,\frac{d+\sqrt{1-2\,c+c^2+d^2}-(-1+c)\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{i-i\,c+d+\sqrt{1-2\,c+c^2+d^2}}\Big]-$$

$$i\,\text{PolyLog}\Big[2,\frac{d+\sqrt{1-2\,c+c^2+d^2}-(-1+c)\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{-i+i\,c+d+\sqrt{1-2\,c+c^2+d^2}}\Big]-$$

$$i\,\text{PolyLog}\Big[2,\frac{-d+\sqrt{1-2\,c+c^2+d^2}+(-1+c)\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{i-i\,c-d+\sqrt{1-2\,c+c^2+d^2}}\Big]+$$

$$i\,\text{PolyLog}\Big[2,\frac{-d+\sqrt{1-2\,c+c^2+d^2}+(-1+c)\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{-i+i\,c-d+\sqrt{1-2\,c+c^2+d^2}}\Big]-$$

$$i\,\text{PolyLog}\Big[2,\frac{d+\sqrt{1+2\,c+c^2+d^2}-(1+c)\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{-i-i\,c+d+\sqrt{1+2\,c+c^2+d^2}}\Big]+$$

$$i\,\text{PolyLog}\Big[2,\frac{d+\sqrt{1+2\,c+c^2+d^2}-(1+c)\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{i+i\,c+d+\sqrt{1+2\,c+c^2+d^2}}\Big]+$$

$$i\,\text{PolyLog}\Big[2,\frac{-d+\sqrt{1+2\,c+c^2+d^2}+(1+c)\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{-i-i\,c-d+\sqrt{1+2\,c+c^2+d^2}}\Big]-$$

$$i\,\text{PolyLog}\Big[2,\frac{-d+\sqrt{1+2\,c+c^2+d^2}+(1+c)\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{i+i\,c-d+\sqrt{1+2\,c+c^2+d^2}}\Big]\Bigg)$$

$$\Big(-\big((2\,a)\,/\,\big(b\,\big(-1+c^2+d^2-\text{Cos}[2\,(a+b\,x)]+c^2\,\text{Cos}[2\,(a+b\,x)]-d^2\,\text{Cos}[2\,(a+b\,x)]+$$
$$2\,c\,d\,\text{Sin}[2\,(a+b\,x)]\big)\big)\big)+(2\,(a+b\,x))\,/\,\big(b\,\big(-1+c^2+d^2-\text{Cos}[2\,(a+b\,x)]+$$
$$c^2\,\text{Cos}[2\,(a+b\,x)]-d^2\,\text{Cos}[2\,(a+b\,x)]+2\,c\,d\,\text{Sin}[2\,(a+b\,x)]\big)\big)\Big)\Big/$$

$$\Bigg(\text{Log}\Big[\frac{-d+\sqrt{1-2\,c+c^2+d^2}}{-1+c}+\text{Tan}\Big[\frac{1}{2}(a+b\,x)\Big]\Big]+\text{Log}\Big[\frac{d+\sqrt{1-2\,c+c^2+d^2}}{1-c}+\text{Tan}\Big[\frac{1}{2}(a+b\,x)\Big]\Big]-$$

$$\text{Log}\Big[-\frac{d+\sqrt{1+2\,c+c^2+d^2}}{1+c}+\text{Tan}\Big[\frac{1}{2}(a+b\,x)\Big]\Big]-$$

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

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

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

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

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

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

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

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

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

$$\frac{(a+bx)\,\text{Sec}\left[\frac{1}{2}(a+bx)\right]^2}{2\left(\frac{-d+\sqrt{1-2c+c^2+d^2}}{-1+c}+\text{Tan}\left[\frac{1}{2}(a+bx)\right]\right)}+$$

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

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

$$\frac{(a+bx)\,\text{Sec}\left[\frac{1}{2}(a+bx)\right]^2}{2\left(\frac{d+\sqrt{1-2c+c^2+d^2}}{1-c}+\text{Tan}\left[\frac{1}{2}(a+bx)\right]\right)}+$$

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

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

$$\frac{(a+b x) \text{Sec}\left[\frac{1}{2} (a+b x)\right]^2}{2 \left(-\frac{d+\sqrt{1+2 c+c^2+d^2}}{1+c}+\text{Tan}\left[\frac{1}{2} (a+b x)\right]\right)}-$$

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

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

$$\left(i (-1+c) \text{Log}\left[1-\frac{d+\sqrt{1-2 c+c^2+d^2}-(-1+c) \text{Tan}\left[\frac{1}{2} (a+b x)\right]}{i-i c+d+\sqrt{1-2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2} (a+b x)\right]^2\right) \Big/$$
$$\left(2 \left(d+\sqrt{1-2 c+c^2+d^2}-(-1+c) \text{Tan}\left[\frac{1}{2} (a+b x)\right]\right)\right)-$$
$$\left(i (-1+c) \text{Log}\left[1-\frac{d+\sqrt{1-2 c+c^2+d^2}-(-1+c) \text{Tan}\left[\frac{1}{2} (a+b x)\right]}{-i+i c+d+\sqrt{1-2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2} (a+b x)\right]^2\right) \Big/$$
$$\left(2 \left(d+\sqrt{1-2 c+c^2+d^2}-(-1+c) \text{Tan}\left[\frac{1}{2} (a+b x)\right]\right)\right)+$$
$$\left(i (-1+c) \text{Log}\left[1-\frac{-d+\sqrt{1-2 c+c^2+d^2}+(-1+c) \text{Tan}\left[\frac{1}{2} (a+b x)\right]}{i-i c-d+\sqrt{1-2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2} (a+b x)\right]^2\right) \Big/$$
$$\left(2 \left(-d+\sqrt{1-2 c+c^2+d^2}+(-1+c) \text{Tan}\left[\frac{1}{2} (a+b x)\right]\right)\right)-$$
$$\left(i (-1+c) \text{Log}\left[1-\frac{-d+\sqrt{1-2 c+c^2+d^2}+(-1+c) \text{Tan}\left[\frac{1}{2} (a+b x)\right]}{-i+i c-d+\sqrt{1-2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2} (a+b x)\right]^2\right) \Big/$$
$$\left(2 \left(-d+\sqrt{1-2 c+c^2+d^2}+(-1+c) \text{Tan}\left[\frac{1}{2} (a+b x)\right]\right)\right)-$$

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

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

$$\frac{(1+c)\,(a+b x)\,\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-d+\sqrt{1+2c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+$$

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

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

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

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

$$\left(a\,\mathrm{Cos}\left[\frac{1}{2}(a+b x)\right]^2\left(-\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2(d\,\mathrm{Cos}[a+b x]-(-1+c)\,\mathrm{Sin}[a+b x])-\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2((-1+c)\,\mathrm{Cos}[a+b x]+d\,\mathrm{Sin}[a+b x])\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)\right)\Big/$$
$$((-1+c)\,\mathrm{Cos}[a+b x]+d\,\mathrm{Sin}[a+b x])+$$
$$\left(a\,\mathrm{Cos}\left[\frac{1}{2}(a+b x)\right]^2\left(\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2(d\,\mathrm{Cos}[a+b x]-\mathrm{Sin}[a+b x]-c\,\mathrm{Sin}[a+b x])+\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2(\mathrm{Cos}[a+b x]+c\,\mathrm{Cos}[a+b x]+d\,\mathrm{Sin}[a+b x])\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)\right)\Big/$$
$$(\mathrm{Cos}[a+b x]+c\,\mathrm{Cos}[a+b x]+d\,\mathrm{Sin}[a+b x])$$

Problem 329: Result more than twice size of optimal antiderivative.

$$\int (e + f x)^3 \text{ArcTanh}[\text{Cot}[a + b x]] \, dx$$

Optimal (type 4, 302 leaves, 12 steps):

$$\frac{i (e + f x)^4 \text{ArcTan}\left[e^{2 i (a+b x)}\right]}{4 f} + \frac{(e + f x)^4 \text{ArcTanh}[\text{Cot}[a + b x]]}{4 f} - \frac{i (e + f x)^3 \text{PolyLog}\left[2, -i e^{2 i (a+b x)}\right]}{4 b} + \frac{i (e + f x)^3 \text{PolyLog}\left[2, i e^{2 i (a+b x)}\right]}{4 b} + \frac{3 f (e + f x)^2 \text{PolyLog}\left[3, -i e^{2 i (a+b x)}\right]}{8 b^2} - \frac{3 f (e + f x)^2 \text{PolyLog}\left[3, i e^{2 i (a+b x)}\right]}{8 b^2} + \frac{3 i f^2 (e + f x) \text{PolyLog}\left[4, -i e^{2 i (a+b x)}\right]}{8 b^3} - \frac{3 i f^2 (e + f x) \text{PolyLog}\left[4, i e^{2 i (a+b x)}\right]}{8 b^3} - \frac{3 f^3 \text{PolyLog}\left[5, -i e^{2 i (a+b x)}\right]}{16 b^4} + \frac{3 f^3 \text{PolyLog}\left[5, i e^{2 i (a+b x)}\right]}{16 b^4}$$

Result (type 4, 654 leaves):

$$\frac{1}{4} x \left(4 e^3 + 6 e^2 f x + 4 e f^2 x^2 + f^3 x^3\right) \text{ArcTanh}[\text{Cot}[a + b x]] + \frac{1}{16 b^4} \Big(-8 b^4 e^3 x \text{Log}\left[1 - i e^{2 i (a+b x)}\right] - 12 b^4 e^2 f x^2 \text{Log}\left[1 - i e^{2 i (a+b x)}\right] - 8 b^4 e f^2 x^3 \text{Log}\left[1 - i e^{2 i (a+b x)}\right] - 2 b^4 f^3 x^4 \text{Log}\left[1 - i e^{2 i (a+b x)}\right] + 8 b^4 e^3 x \text{Log}\left[1 + i e^{2 i (a+b x)}\right] + 12 b^4 e^2 f x^2 \text{Log}\left[1 + i e^{2 i (a+b x)}\right] + 8 b^4 e f^2 x^3 \text{Log}\left[1 + i e^{2 i (a+b x)}\right] + 2 b^4 f^3 x^4 \text{Log}\left[1 + i e^{2 i (a+b x)}\right] - 4 i b^3 (e + f x)^3 \text{PolyLog}\left[2, -i e^{2 i (a+b x)}\right] + 4 i b^3 (e + f x)^3 \text{PolyLog}\left[2, i e^{2 i (a+b x)}\right] + 6 b^2 e^2 f \text{PolyLog}\left[3, -i e^{2 i (a+b x)}\right] + 12 b^2 e f^2 x \text{PolyLog}\left[3, -i e^{2 i (a+b x)}\right] + 6 b^2 f^3 x^2 \text{PolyLog}\left[3, -i e^{2 i (a+b x)}\right] - 6 b^2 e^2 f \text{PolyLog}\left[3, i e^{2 i (a+b x)}\right] - 12 b^2 e f^2 x \text{PolyLog}\left[3, i e^{2 i (a+b x)}\right] - 6 b^2 f^3 x^2 \text{PolyLog}\left[3, i e^{2 i (a+b x)}\right] + 6 i b e f^2 \text{PolyLog}\left[4, -i e^{2 i (a+b x)}\right] + 6 i b f^3 x \text{PolyLog}\left[4, -i e^{2 i (a+b x)}\right] - 6 i b e f^2 \text{PolyLog}\left[4, i e^{2 i (a+b x)}\right] - 6 i b f^3 x \text{PolyLog}\left[4, i e^{2 i (a+b x)}\right] - 3 f^3 \text{PolyLog}\left[5, -i e^{2 i (a+b x)}\right] + 3 f^3 \text{PolyLog}\left[5, i e^{2 i (a+b x)}\right]\Big)$$

Problem 336: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[c + d \text{Cot}[a + b x]] \, dx$$

Optimal (type 4, 194 leaves, 7 steps):

$$x \text{ArcTanh}[c + d \text{Cot}[a + b x]] + \frac{1}{2} x \text{Log}\left[1 - \frac{(1 - c - i d) e^{2 i a+2 i b x}}{1 - c + i d}\right] - \frac{1}{2} x \text{Log}\left[1 - \frac{(1 + c + i d) e^{2 i a+2 i b x}}{1 + c - i d}\right] - \frac{i \text{PolyLog}\left[2, \frac{(1-c-i d) e^{2 i a+2 i b x}}{1-c+i d}\right]}{4 b} + \frac{i \text{PolyLog}\left[2, \frac{(1+c+i d) e^{2 i a+2 i b x}}{1+c-i d}\right]}{4 b}$$

Result (type 4, 4463 leaves):

$$x \text{ArcTanh}[c + d \text{Cot}[a + b x]] - \left(d \left(a \text{Log}\left[-\text{Sec}\left[\frac{1}{2} (a + b x)\right]^2 (d \text{Cos}[a + b x] + (-1 + c) \text{Sin}[a + b x])\right] - \right.\right.$$

$$a\,\mathrm{Log}\left[-\mathrm{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2\,(d\,\mathrm{Cos}[a+b\,x]+\mathrm{Sin}[a+b\,x]+c\,\mathrm{Sin}[a+b\,x])\right]-$$

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

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

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

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

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

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

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

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

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

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

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

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

$$i\,\mathrm{PolyLog}\left[2,\,\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}-d\,\mathrm{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]}{-1+c-i\,d+\sqrt{1-2\,c+c^2+d^2}}\right]+$$

$$i\,\mathrm{PolyLog}\left[2,\,\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}-d\,\mathrm{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]}{-1+c+i\,d+\sqrt{1-2\,c+c^2+d^2}}\right]-$$

$$i\,\mathrm{PolyLog}\left[2,\,\frac{1+c-\sqrt{1+2\,c+c^2+d^2}-d\,\mathrm{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]}{1+c+i\,d-\sqrt{1+2\,c+c^2+d^2}}\right]+$$

$$i\,\mathrm{PolyLog}\left[2,\,\frac{1+c+\sqrt{1+2\,c+c^2+d^2}-d\,\mathrm{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]}{1+c-i\,d+\sqrt{1+2\,c+c^2+d^2}}\right]-$$

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

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

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

$$\left.\text{i PolyLog}\left[2, \frac{-1-c+\sqrt{1+2c+c^2+d^2}+d\,\text{Tan}\left[\frac{1}{2}(a+b x)\right]}{-1-c+\text{i} d+\sqrt{1+2c+c^2+d^2}}\right]\right)$$

$$\left(\left(2a\right)/\left(b\left(1-c^2-d^2-\text{Cos}[2(a+b x)]+c^2\,\text{Cos}[2(a+b x)]-d^2\,\text{Cos}[2(a+b x)]-\right.\right.\right.$$
$$\left.\left.2 c d\,\text{Sin}[2(a+b x)]\right)\right)-\left(2(a+b x)\right)/\left(b\left(1-c^2-d^2-\text{Cos}[2(a+b x)]+\right.\right.$$
$$\left.\left.\left.c^2\,\text{Cos}[2(a+b x)]-d^2\,\text{Cos}[2(a+b x)]-2 c d\,\text{Sin}[2(a+b x)]\right)\right)\right)\Big/$$

$$\left(-\text{Log}\left[-\frac{-1+c+\sqrt{1-2c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right]+\right.$$

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

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

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

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

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

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

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

$$\frac{i \operatorname{Log}\left[-\frac{-1+c+\sqrt{1-2 c+c^2+d^2}}{d}+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right] \operatorname{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(i+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i \operatorname{Log}\left[-\frac{1+c+\sqrt{1+2 c+c^2+d^2}}{d}+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right] \operatorname{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(i+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+$$

$$\frac{i \operatorname{Log}\left[\frac{1-c+\sqrt{1-2 c+c^2+d^2}+d \operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]}{d}\right] \operatorname{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(i+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i \operatorname{Log}\left[\frac{-1-c+\sqrt{1+2 c+c^2+d^2}+d \operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]}{d}\right] \operatorname{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(i+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{(a+b x) \operatorname{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-\frac{-1+c+\sqrt{1-2 c+c^2+d^2}}{d}+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i \operatorname{Log}\left[\frac{d\left(-i+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}{-1+c-i d+\sqrt{1-2 c+c^2+d^2}}\right] \operatorname{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-\frac{-1+c+\sqrt{1-2 c+c^2+d^2}}{d}+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+$$

$$\frac{i \operatorname{Log}\left[\frac{d\left(i+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}{-1+c+i d+\sqrt{1-2 c+c^2+d^2}}\right] \operatorname{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-\frac{-1+c+\sqrt{1-2 c+c^2+d^2}}{d}+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+$$

$$\frac{(a+b x) \operatorname{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-\frac{1+c+\sqrt{1+2 c+c^2+d^2}}{d}+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+\frac{i \operatorname{Log}\left[\frac{d\left(-i+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}{1+c-i d+\sqrt{1+2 c+c^2+d^2}}\right] \operatorname{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-\frac{1+c+\sqrt{1+2 c+c^2+d^2}}{d}+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i \operatorname{Log}\left[\frac{d\left(i+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}{1+c+i d+\sqrt{1+2 c+c^2+d^2}}\right] \operatorname{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-\frac{1+c+\sqrt{1+2 c+c^2+d^2}}{d}+\operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i d \operatorname{Log}\left[1-\frac{-1+c+\sqrt{1-2 c+c^2+d^2}-d \operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]}{-1+c-i d+\sqrt{1-2 c+c^2+d^2}}\right] \operatorname{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-1+c+\sqrt{1-2 c+c^2+d^2}-d \operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+$$

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

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

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

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

$$\frac{d\,(a+b x)\, \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(1-c+\sqrt{1-2 c+c^2+d^2}+d\, \text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

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

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

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

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

$$\frac{d\,(a+b x)\, \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-1-c+\sqrt{1+2 c+c^2+d^2}+d\, \text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+$$

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

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

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

$$\left(a\, \text{Cos}\left[\frac{1}{2}(a+b x)\right]^2\left(-\text{Sec}\left[\frac{1}{2}(a+b x)\right]^2((-1+c)\, \text{Cos}[a+b x]-d\, \text{Sin}[a+b x])-\text{Sec}\left[\frac{1}{2}(a+b x)\right]^2(d\, \text{Cos}[a+b x]+(-1+c)\, \text{Sin}[a+b x])\, \text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)\right)\Big/$$
$$(d\, \text{Cos}[a+b x]+(-1+c)\, \text{Sin}[a+b x])+$$
$$\left(a\, \text{Cos}\left[\frac{1}{2}(a+b x)\right]^2\left(-\text{Sec}\left[\frac{1}{2}(a+b x)\right]^2(\text{Cos}[a+b x]+c\, \text{Cos}[a+b x]-d\, \text{Sin}[a+b x])-\text{Sec}\left[\frac{1}{2}(a+b x)\right]^2(d\, \text{Cos}[a+b x]+\text{Sin}[a+b x]+c\, \text{Sin}[a+b x])\, \text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)\right)\Big/$$
$$\left.(d\, \text{Cos}[a+b x]+\text{Sin}[a+b x]+c\, \text{Sin}[a+b x])\right)$$

Problem 346: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}\left[e^x\right] dx$$

Optimal (type 4, 21 leaves, 2 steps):

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

Result (type 4, 46 leaves):

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

Problem 361: Result unnecessarily involves higher level functions.

$$\int \frac{(a+b\, \text{ArcTanh}[c\, x^n])\,(d+e\, \text{Log}[f\, x^m])}{x}\, dx$$

Optimal (type 4, 136 leaves, 11 steps):

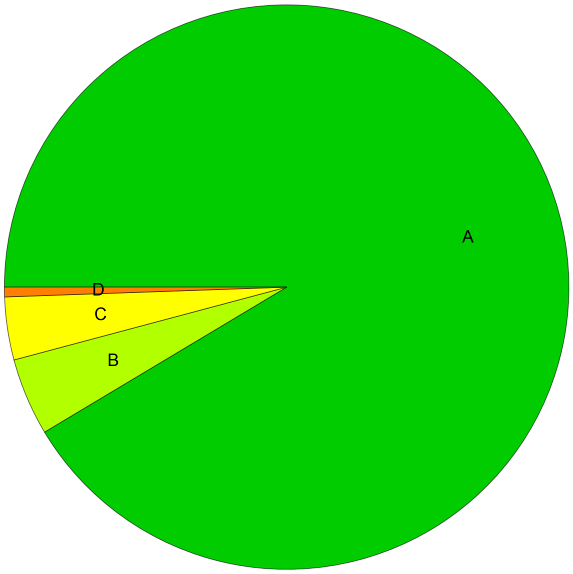
$$a\,d\,\text{Log}[x]+\frac{a\,e\,\text{Log}[f\,x^m]^2}{2\,m}-\frac{b\,d\,\text{PolyLog}[2,-c\,x^n]}{2\,n}-\frac{b\,e\,\text{Log}[f\,x^m]\,\text{PolyLog}[2,-c\,x^n]}{2\,n}+\frac{b\,d\,\text{PolyLog}[2,c\,x^n]}{2\,n}+\frac{b\,e\,\text{Log}[f\,x^m]\,\text{PolyLog}[2,c\,x^n]}{2\,n}+\frac{b\,e\,m\,\text{PolyLog}[3,-c\,x^n]}{2\,n^2}-\frac{b\,e\,m\,\text{PolyLog}[3,c\,x^n]}{2\,n^2}$$

Result (type 5, 114 leaves):

$$-\frac{b\,c\,e\,m\,x^n\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},\frac{1}{2},\frac{1}{2},1\right\},\left\{\frac{3}{2},\frac{3}{2},\frac{3}{2}\right\},c^2\,x^{2\,n}\right]}{n^2}+\frac{1}{n}\,b\,c\,x^n\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},\frac{1}{2},1\right\},\left\{\frac{3}{2},\frac{3}{2}\right\},c^2\,x^{2\,n}\right]\left(d+e\,\text{Log}\left[f\,x^m\right]\right)+\frac{1}{2}\,a\,\text{Log}[x]\,\left(2\,d-e\,m\,\text{Log}[x]+2\,e\,\text{Log}\left[f\,x^m\right]\right)$$

Summary of Integration Test Results

361 integration problems



A - 330 optimal antiderivatives

B - 16 more than twice size of optimal antiderivatives

C - 13 unnecessarily complex antiderivatives

D - 2 unable to integrate problems

E - 0 integration timeouts