Mathematica 11.3 Integration Test Results

Test results for the 413 problems in "1.2.2.4 (f x)^m (d+e x^2)^q (a+b x^2+c x^4)^p.m"

Problem 15: Result unnecessarily involves imaginary or complex numbers.

$$\int x^4 \left(2+3 x^2\right) \sqrt{5+x^4}\, dx$$

Optimal (type 4, 208 leaves, 6 steps):

$$\frac{20}{21} x \sqrt{5+x^4}+\frac{2}{3} x^3 \sqrt{5+x^4}-\frac{10 x \sqrt{5+x^4}}{\sqrt{5}+x^2}+\frac{1}{21} x^5 \left(6+7 x^2\right) \sqrt{5+x^4}+$$
$$\frac{10\times 5^{1/4} \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\, \text{EllipticE}\left[2 \,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right], \frac{1}{2}\right]}{\sqrt{5+x^4}}-\frac{1}{21 \sqrt{5+x^4}}$$
$$5\times 5^{1/4} \left(21+2 \sqrt{5}\right) \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\, \text{EllipticF}\left[2 \,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right], \frac{1}{2}\right]$$

Result (type 4, 105 leaves):

$$\frac{1}{21} \left(\frac{x \left(100+70 x^2+50 x^4+49 x^6+6 x^8+7 x^{10}\right)}{\sqrt{5+x^4}}+\right.$$
$$210 (-1)^{3/4} 5^{1/4}\, \text{EllipticE}\left[i \,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right], -1\right]+$$
$$\left.10 (-5)^{1/4} \left(-21 i+2 \sqrt{5}\right) \text{EllipticF}\left[i \,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right], -1\right]\right)$$

Problem 16: Result unnecessarily involves imaginary or complex numbers.

$$\int x^2 \left(2+3 x^2\right) \sqrt{5+x^4}\, dx$$

Optimal (type 4, 192 leaves, 5 steps):

$$\frac{10}{7} x \sqrt{5+x^4} + \frac{4 x \sqrt{5+x^4}}{\sqrt{5}+x^2} + \frac{1}{35} x^3 \left(14+15 x^2\right) \sqrt{5+x^4} - \frac{4\times 5^{1/4} \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\ \text{EllipticE}\left[2 \,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right], \frac{1}{2}\right]}{\sqrt{5+x^4}} + \frac{1}{7 \sqrt{5+x^4}} 5^{1/4} \left(14-5 \sqrt{5}\right) \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\ \text{EllipticF}\left[2 \,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right], \frac{1}{2}\right]$$

Result (type 4, 101 leaves):

$$\frac{x \left(250+70 x^2+125 x^4+14 x^6+15 x^8\right)}{35 \sqrt{5+x^4}} - 4 (-1)^{3/4} 5^{1/4} \text{EllipticE}\left[i \,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right], -1\right] + \frac{2}{7} (-5)^{1/4} \left(14 i + 5 \sqrt{5}\right) \text{EllipticF}\left[i \,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right], -1\right]$$

Problem 17: Result unnecessarily involves imaginary or complex numbers.

$$\int \left(2+3 x^2\right) \sqrt{5+x^4}\, dx$$

Optimal (type 4, 176 leaves, 4 steps):

$$\frac{6 x \sqrt{5+x^4}}{\sqrt{5}+x^2} + \frac{1}{15} x \left(10+9 x^2\right) \sqrt{5+x^4} - \frac{6\times 5^{1/4} \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\ \text{EllipticE}\left[2 \,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right], \frac{1}{2}\right]}{\sqrt{5+x^4}} + \frac{1}{3 \sqrt{5+x^4}} 5^{1/4} \left(9+2 \sqrt{5}\right) \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\ \text{EllipticF}\left[2 \,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right], \frac{1}{2}\right]$$

Result (type 4, 96 leaves):

$$\frac{x \left(50+45 x^2+10 x^4+9 x^6\right)}{15 \sqrt{5+x^4}} - 6 (-1)^{3/4} 5^{1/4} \text{EllipticE}\left[i \,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right], -1\right] + \frac{2}{3} (-5)^{1/4} \left(9 i - 2 \sqrt{5}\right) \text{EllipticF}\left[i \,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right], -1\right]$$

Problem 18: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(2+3 x^2\right) \sqrt{5+x^4}}{x^2}\, dx$$

Optimal (type 4, 171 leaves, 4 steps):

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

Result (type 4, 108 leaves):

$$\frac{1}{x\sqrt{5+x^4}}\left(-10+5x^2-2x^4+x^6-4(-1)^{3/4}5^{1/4}x\sqrt{5+x^4}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4}x\right],-1\right]-2(-5)^{1/4}\left(-2i+\sqrt{5}\right)x\sqrt{5+x^4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4}x\right],-1\right]\right)$$

Problem 19: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(2+3x^2\right)\sqrt{5+x^4}}{x^4}\,dx$$

Optimal (type 4, 192 leaves, 5 steps):

$$-\frac{6\sqrt{5+x^4}}{x}-\frac{\left(2-9x^2\right)\sqrt{5+x^4}}{3x^3}+\frac{6x\sqrt{5+x^4}}{\sqrt{5}+x^2}-\frac{6\times 5^{1/4}\left(\sqrt{5}+x^2\right)\sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{\sqrt{5+x^4}}+\frac{\left(2+9\sqrt{5}\right)\left(\sqrt{5}+x^2\right)\sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{3\times 5^{1/4}\sqrt{5+x^4}}$$

Result (type 4, 98 leaves):

$$\frac{1}{15}\left(-\frac{5\left(10+45x^2+2x^4+9x^6\right)}{x^3\sqrt{5+x^4}}-90(-1)^{3/4}5^{1/4}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4}x\right],-1\right]+2(-5)^{1/4}\left(45i-2\sqrt{5}\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4}x\right],-1\right]\right)$$

Problem 27: Result unnecessarily involves imaginary or complex numbers.

$$\int x^4\left(2+3x^2\right)\left(5+x^4\right)^{3/2}\,dx$$

Optimal (type 4, 235 leaves, 7 steps):

$$\frac{200}{77} x \sqrt{5+x^4} + \frac{20}{13} x^3 \sqrt{5+x^4} - \frac{300 x \sqrt{5+x^4}}{13 \left(\sqrt{5}+x^2\right)} + \frac{10 x^5 \left(78+77 x^2\right) \sqrt{5+x^4}}{1001} + \frac{1}{143} x^5 \left(26+33 x^2\right) \left(5+x^4\right)^{3/2} + \frac{300 \times 5^{1/4} \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}} \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right], \frac{1}{2}\right]}{13 \sqrt{5+x^4}} - \frac{1}{1001 \sqrt{5+x^4}} 50 \times 5^{1/4} \left(231+26 \sqrt{5}\right) \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}} \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right], \frac{1}{2}\right]$$

Result (type 4, 115 leaves):

$$\frac{1}{1001} \left(\frac{1}{\sqrt{5+x^4}} x \left(13000+7700 x^2+11050 x^4+11165 x^6+2600 x^8+3080 x^{10}+182 x^{12}+231 x^{14}\right) + 23100 (-1)^{3/4} 5^{1/4} \text{EllipticE}\left[i \text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right], -1\right] + 100 (-5)^{1/4} \left(-231 i+26 \sqrt{5}\right) \text{EllipticF}\left[i \text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right], -1\right]\right)$$

Problem 28: Result unnecessarily involves imaginary or complex numbers.

$$\int x^2 \left(2+3 x^2\right) \left(5+x^4\right)^{3/2} dx$$

Optimal (type 4, 219 leaves, 6 steps):

$$\frac{300}{77} x \sqrt{5+x^4} + \frac{40 x \sqrt{5+x^4}}{3 \left(\sqrt{5}+x^2\right)} + \frac{2}{231} x^3 \left(154+135 x^2\right) \sqrt{5+x^4} + \frac{1}{99} x^3 \left(22+27 x^2\right) \left(5+x^4\right)^{3/2} - \frac{40 \times 5^{1/4} \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}} \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right], \frac{1}{2}\right]}{3 \sqrt{5+x^4}} + \frac{1}{231 \sqrt{5+x^4}} 10 \times 5^{1/4} \left(154-45 \sqrt{5}\right) \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}} \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right], \frac{1}{2}\right]$$

Result (type 4, 110 leaves):

$$\frac{1}{693} \left(\frac{x \left(13500+8470 x^2+11475 x^4+2464 x^6+2700 x^8+154 x^{10}+189 x^{12}\right)}{\sqrt{5+x^4}} - 9240 (-1)^{3/4} 5^{1/4} \text{EllipticE}\left[i \text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right], -1\right] + 60 (-5)^{1/4} \left(154 i+45 \sqrt{5}\right) \text{EllipticF}\left[i \text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right], -1\right]\right)$$

Problem 29: Result unnecessarily involves imaginary or complex numbers.

$$\int \left(2+3 x^2\right) \left(5+x^4\right)^{3/2} \, dx$$

Optimal (type 4, 197 leaves, 5 steps):

$$\frac{20 x \sqrt{5+x^4}}{\sqrt{5}+x^2}+\frac{2}{7} x \left(10+7 x^2\right) \sqrt{5+x^4}+\frac{1}{21} x \left(6+7 x^2\right) \left(5+x^4\right)^{3/2}-\frac{20\times 5^{1/4} \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\, \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{\sqrt{5+x^4}}+\frac{1}{7 \sqrt{5+x^4}} 10\times 5^{1/4} \left(7+2 \sqrt{5}\right) \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\, \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]$$

Result (type 4, 106 leaves):

$$\frac{x \left(450+385 x^2+120 x^4+112 x^6+6 x^8+7 x^{10}\right)}{21 \sqrt{5+x^4}}-20 (-1)^{3/4} 5^{1/4} \text{EllipticE}\left[i \text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right],-1\right]+\frac{20}{7} (-5)^{1/4} \left(7 i-2 \sqrt{5}\right) \text{EllipticF}\left[i \text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right],-1\right]$$

Problem 30: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(2+3 x^2\right) \left(5+x^4\right)^{3/2}}{x^2} \, dx$$

Optimal (type 4, 199 leaves, 5 steps):

$$\frac{24 x \sqrt{5+x^4}}{\sqrt{5}+x^2}+\frac{6}{35} x \left(25+14 x^2\right) \sqrt{5+x^4}-\frac{\left(14-3 x^2\right) \left(5+x^4\right)^{3/2}}{7 x}-\frac{24\times 5^{1/4} \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\, \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{\sqrt{5+x^4}}+\frac{1}{7 \sqrt{5+x^4}} 6\times 5^{1/4} \left(14+5 \sqrt{5}\right) \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\, \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]$$

Result (type 4, 125 leaves):

$$\frac{1}{35 x \sqrt{5+x^4}}\left(-1750+1125 x^2-280 x^4+300 x^6+14 x^8+15 x^{10}-840 (-1)^{3/4} 5^{1/4} x \sqrt{5+x^4}\, \text{EllipticE}\left[i \,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right],-1\right]+60 (-5)^{1/4} \left(14 i-5 \sqrt{5}\right) x \sqrt{5+x^4}\, \text{EllipticF}\left[i \,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right],-1\right]\right)$$

Problem 31: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(2+3 x^2\right) \left(5+x^4\right)^{3/2}}{x^4}\, dx$$

Optimal (type 4, 201 leaves, 5 steps):

$$-\frac{2 \left(27-2 x^2\right) \sqrt{5+x^4}}{3 x}+\frac{36 x \sqrt{5+x^4}}{\sqrt{5}+x^2}-\frac{\left(10-9 x^2\right) \left(5+x^4\right)^{3/2}}{15 x^3}-\frac{36\times 5^{1/4} \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\, \text{EllipticE}\left[2 \,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{\sqrt{5+x^4}}+\frac{1}{3 \sqrt{5+x^4}}2\times 5^{1/4} \left(27+2 \sqrt{5}\right) \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\, \text{EllipticF}\left[2 \,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]$$

Result (type 4, 124 leaves):

$$\frac{1}{15 x^3 \sqrt{5+x^4}}\left(-250-1125 x^2-180 x^6+10 x^8+9 x^{10}-540 (-1)^{3/4} 5^{1/4} x^3 \sqrt{5+x^4}\, \text{EllipticE}\left[i \,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right],-1\right]+20 (-5)^{1/4} \left(27 i-2 \sqrt{5}\right) x^3 \sqrt{5+x^4}\, \text{EllipticF}\left[i \,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right],-1\right]\right)$$

Problem 39: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{x^4 \left(2+3 x^2\right)}{\sqrt{5+x^4}}\, dx$$

Optimal (type 4, 185 leaves, 5 steps):

$$\frac{2}{3} x \sqrt{5+x^4}+\frac{3}{5} x^3 \sqrt{5+x^4}-\frac{9 x \sqrt{5+x^4}}{\sqrt{5}+x^2}+\frac{9\times 5^{1/4} \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\ \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{\sqrt{5+x^4}}-\frac{1}{6 \sqrt{5+x^4}}$$

$$5^{1/4} \left(27+2 \sqrt{5}\right) \left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\ \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]$$

Result (type 4, 96 leaves) :

$$9 (-1)^{3/4} 5^{1/4} \text{EllipticE}\left[\text{i} \text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right],-1\right]+$$

$$\frac{1}{15} \left(\frac{x \left(50+45 x^2+10 x^4+9 x^6\right)}{\sqrt{5+x^4}}+5 (-5)^{1/4} \left(-27 \text{i}+2 \sqrt{5}\right) \text{EllipticF}\left[\text{i} \text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right],-1\right]\right)$$

Problem 40: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{x^2 \left(2+3 x^2\right)}{\sqrt{5+x^4}} \, dx$$

Optimal (type 4, 166 leaves, 4 steps) :

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

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

Result (type 4, 71 leaves) :

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

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

Problem 41: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{2+3 x^2}{\sqrt{5+x^4}} \, dx$$

Optimal (type 4, 155 leaves, 3 steps) :

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

Result (type 4, 62 leaves):

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

Problem 42: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{2+3x^2}{x^2\sqrt{5+x^4}}\,dx$$

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

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

Result (type 4, 81 leaves):

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

Problem 43: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{2+3x^2}{x^4\sqrt{5+x^4}}\,dx$$

Optimal (type 4, 189 leaves, 5 steps):

$$-\frac{2\sqrt{5+x^4}}{15x^3}-\frac{3\sqrt{5+x^4}}{5x}+\frac{3x\sqrt{5+x^4}}{5\left(\sqrt{5}+x^2\right)}-\frac{3\left(\sqrt{5}+x^2\right)\sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\ \text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{5^{3/4}\sqrt{5+x^4}}-\frac{\left(2-9\sqrt{5}\right)\left(\sqrt{5}+x^2\right)\sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\ \text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{30\times 5^{1/4}\sqrt{5+x^4}}$$

Result (type 4, 97 leaves):

$$\frac{1}{75}\left(-\frac{5\left(10+45x^2+2x^4+9x^6\right)}{x^3\sqrt{5+x^4}}-45\,(-1)^{3/4}\,5^{1/4}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4}x\right],-1\right]+(-5)^{1/4}\left(45\,i+2\sqrt{5}\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4}x\right],-1\right]\right)$$

Problem 50: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^4\left(2+3x^2\right)}{\left(5+x^4\right)^{3/2}}\,dx$$

Optimal (type 4, 196 leaves, 5 steps):

$$-\frac{x^3\left(15-2x^2\right)}{10\sqrt{5+x^4}}-\frac{1}{5}x\sqrt{5+x^4}+\frac{9x\sqrt{5+x^4}}{2\left(\sqrt{5}+x^2\right)}-\frac{9\times 5^{1/4}\left(\sqrt{5}+x^2\right)\sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\ \text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{2\sqrt{5+x^4}}+\frac{\left(2+9\sqrt{5}\right)\left(\sqrt{5}+x^2\right)\sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\ \text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{4\times 5^{1/4}\sqrt{5+x^4}}$$

Result (type 4, 85 leaves):

$$\frac{1}{10}\left(-\frac{5x\left(2+3x^2\right)}{\sqrt{5+x^4}}-45\,(-1)^{3/4}\,5^{1/4}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4}x\right],-1\right]+(-5)^{1/4}\left(45\,i-2\sqrt{5}\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4}x\right],-1\right]\right)$$

Problem 51: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^2\left(2+3x^2\right)}{\left(5+x^4\right)^{3/2}}\,dx$$

Optimal (type 4, 177 leaves, 4 steps):

$$-\frac{x\left(15-2 x^2\right)}{10 \sqrt{5+x^4}}-\frac{x \sqrt{5+x^4}}{5\left(\sqrt{5}+x^2\right)}+\frac{\left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}} \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{5^{3/4} \sqrt{5+x^4}}-\frac{\left(2-3 \sqrt{5}\right)\left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}} \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{4\times 5^{3/4} \sqrt{5+x^4}}$$

Result (type 4, 85 leaves):

$$\frac{1}{10}\left(\frac{x\left(-15+2 x^2\right)}{\sqrt{5+x^4}}+2(-1)^{3/4} 5^{1/4} \text{EllipticE}\left[i \text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right],-1\right]-(-5)^{1/4}\left(2 i+3 \sqrt{5}\right) \text{EllipticF}\left[i \text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right],-1\right]\right)$$

Problem 52: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{2+3 x^2}{\left(5+x^4\right)^{3/2}} \, dx$$

Optimal (type 4, 180 leaves, 4 steps):

$$\frac{x\left(2+3 x^2\right)}{10 \sqrt{5+x^4}}-\frac{3 x \sqrt{5+x^4}}{10\left(\sqrt{5}+x^2\right)}+\frac{3\left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}} \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{2\times 5^{3/4} \sqrt{5+x^4}}+\frac{\left(2-3 \sqrt{5}\right)\left(\sqrt{5}+x^2\right) \sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}} \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{20\times 5^{1/4} \sqrt{5+x^4}}$$

Result (type 4, 86 leaves):

$$\frac{1}{50}\left(\frac{5 x\left(2+3 x^2\right)}{\sqrt{5+x^4}}+15(-1)^{3/4} 5^{1/4} \text{EllipticE}\left[i \text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right],-1\right]-(-5)^{1/4}\left(15 i+2 \sqrt{5}\right) \text{EllipticF}\left[i \text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4} x\right],-1\right]\right)$$

Problem 53: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{2+3 x^2}{x^2\left(5+x^4\right)^{3/2}} \, dx$$

Optimal (type 4, 196 leaves, 5 steps):

$$\frac{2+3x^2}{10x\sqrt{5+x^4}}-\frac{3\sqrt{5+x^4}}{25x}+\frac{3x\sqrt{5+x^4}}{25\left(\sqrt{5}+x^2\right)}-\frac{3\left(\sqrt{5}+x^2\right)\sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{5\times 5^{3/4}\sqrt{5+x^4}}+$$
$$\frac{3\left(2+\sqrt{5}\right)\left(\sqrt{5}+x^2\right)\sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{20\times 5^{3/4}\sqrt{5+x^4}}$$

Result (type 4, 108 leaves):

$$-\frac{1}{50x\sqrt{5+x^4}}\left(20-15x^2+6x^4+6(-1)^{3/4}5^{1/4}x\sqrt{5+x^4}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4}x\right],-1\right]+\right.$$
$$\left.3(-5)^{1/4}\left(-2i+\sqrt{5}\right)x\sqrt{5+x^4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4}x\right],-1\right]\right)$$

Problem 54: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{2+3x^2}{x^4\left(5+x^4\right)^{3/2}}\,dx$$

Optimal (type 4, 214 leaves, 6 steps):

$$\frac{2+3x^2}{10x^3\sqrt{5+x^4}}-\frac{\sqrt{5+x^4}}{15x^3}-\frac{9\sqrt{5+x^4}}{50x}+\frac{9x\sqrt{5+x^4}}{50\left(\sqrt{5}+x^2\right)}-$$
$$\frac{9\left(\sqrt{5}+x^2\right)\sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{10\times 5^{3/4}\sqrt{5+x^4}}+$$
$$\frac{\left(27-2\sqrt{5}\right)\left(\sqrt{5}+x^2\right)\sqrt{\frac{5+x^4}{\left(\sqrt{5}+x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{x}{5^{1/4}}\right],\frac{1}{2}\right]}{60\times 5^{3/4}\sqrt{5+x^4}}$$

Result (type 4, 119 leaves):

$$-\frac{1}{150x^3\sqrt{5+x^4}}$$
$$\left(20+90x^2+10x^4+27x^6+27(-1)^{3/4}5^{1/4}x^3\sqrt{5+x^4}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4}x\right],-1\right]-\right.$$
$$\left.(-5)^{1/4}\left(27i+2\sqrt{5}\right)x^3\sqrt{5+x^4}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\left(-\frac{1}{5}\right)^{1/4}x\right],-1\right]\right)$$

Problem 56: Result more than twice size of optimal antiderivative.

$$\int x^5\left(d+e x^2\right)\left(1+2x^2+x^4\right)^5\,dx$$

Optimal (type 1, 63 leaves, 4 steps):

$$\frac{1}{22} (d - e) \left(1 + x^2\right)^{11} - \frac{1}{24} (2 d - 3 e) \left(1 + x^2\right)^{12} + \frac{1}{26} (d - 3 e) \left(1 + x^2\right)^{13} + \frac{1}{28} e \left(1 + x^2\right)^{14}$$

Result (type 1, 153 leaves):

$$\frac{d x^6}{6} + \frac{1}{8} (10 d + e) x^8 + \frac{1}{2} (9 d + 2 e) x^{10} + \frac{5}{4} (8 d + 3 e) x^{12} + \frac{15}{7} (7 d + 4 e) x^{14} + \frac{21}{8} (6 d + 5 e) x^{16} + \frac{7}{3} (5 d + 6 e) x^{18} + \frac{3}{2} (4 d + 7 e) x^{20} + \frac{15}{22} (3 d + 8 e) x^{22} + \frac{5}{24} (2 d + 9 e) x^{24} + \frac{1}{26} (d + 10 e) x^{26} + \frac{e x^{28}}{28}$$

Problem 58: Result more than twice size of optimal antiderivative.

$$\int x^3 \left(d + e x^2\right) \left(1 + 2 x^2 + x^4\right)^5 dx$$

Optimal (type 1, 45 leaves, 4 steps):

$$-\frac{1}{22} (d - e) \left(1 + x^2\right)^{11} + \frac{1}{24} (d - 2 e) \left(1 + x^2\right)^{12} + \frac{1}{26} e \left(1 + x^2\right)^{13}$$

Result (type 1, 151 leaves):

$$\frac{d x^4}{4} + \frac{1}{6} (10 d + e) x^6 + \frac{5}{8} (9 d + 2 e) x^8 + \frac{3}{2} (8 d + 3 e) x^{10} + \frac{5}{2} (7 d + 4 e) x^{12} + 3 (6 d + 5 e) x^{14} + \frac{21}{8} (5 d + 6 e) x^{16} + \frac{5}{3} (4 d + 7 e) x^{18} + \frac{3}{4} (3 d + 8 e) x^{20} + \frac{5}{22} (2 d + 9 e) x^{22} + \frac{1}{24} (d + 10 e) x^{24} + \frac{e x^{26}}{26}$$

Problem 60: Result more than twice size of optimal antiderivative.

$$\int x \left(d + e x^2\right) \left(1 + 2 x^2 + x^4\right)^5 dx$$

Optimal (type 1, 29 leaves, 4 steps):

$$\frac{1}{22} (d - e) \left(1 + x^2\right)^{11} + \frac{1}{24} e \left(1 + x^2\right)^{12}$$

Result (type 1, 149 leaves):

$$\frac{d x^2}{2} + \frac{1}{4} (10 d + e) x^4 + \frac{5}{6} (9 d + 2 e) x^6 + \frac{15}{8} (8 d + 3 e) x^8 + 3 (7 d + 4 e) x^{10} + \frac{7}{2} (6 d + 5 e) x^{12} + 3 (5 d + 6 e) x^{14} + \frac{15}{8} (4 d + 7 e) x^{16} + \frac{5}{6} (3 d + 8 e) x^{18} + \frac{1}{4} (2 d + 9 e) x^{20} + \frac{1}{22} (d + 10 e) x^{22} + \frac{e x^{24}}{24}$$

Problem 66: Result more than twice size of optimal antiderivative.

$$\int x^5 \left(1 + x^2\right) \left(1 + 2 x^2 + x^4\right)^5 dx$$

Optimal (type 1, 34 leaves, 4 steps):

$$\frac{1}{24} \left(1 + x^2\right)^{12} - \frac{1}{13} \left(1 + x^2\right)^{13} + \frac{1}{28} \left(1 + x^2\right)^{14}$$

Result (type 1, 85 leaves):

$$\frac{x^6}{6}+\frac{11\,x^8}{8}+\frac{11\,x^{10}}{2}+\frac{55\,x^{12}}{4}+\frac{165\,x^{14}}{7}+\frac{231\,x^{16}}{8}+\frac{77\,x^{18}}{3}+\frac{33\,x^{20}}{2}+\frac{15\,x^{22}}{2}+\frac{55\,x^{24}}{24}+\frac{11\,x^{26}}{26}+\frac{x^{28}}{28}$$

Problem 68: Result more than twice size of optimal antiderivative.

$$\int x^3\left(1+x^2\right)\left(1+2\,x^2+x^4\right)^5\,dx$$

Optimal (type 1, 23 leaves, 4 steps):

$$-\frac{1}{24}\left(1+x^2\right)^{12}+\frac{1}{26}\left(1+x^2\right)^{13}$$

Result (type 1, 83 leaves):

$$\frac{x^4}{4}+\frac{11\,x^6}{6}+\frac{55\,x^8}{8}+\frac{33\,x^{10}}{2}+\frac{55\,x^{12}}{2}+33\,x^{14}+\frac{231\,x^{16}}{8}+\frac{55\,x^{18}}{3}+\frac{33\,x^{20}}{4}+\frac{5\,x^{22}}{2}+\frac{11\,x^{24}}{24}+\frac{x^{26}}{26}$$

Problem 151: Result unnecessarily involves imaginary or complex numbers.

$$\int x^4\left(2+3\,x^2\right)\sqrt{3+5\,x^2+x^4}\,dx$$

Optimal (type 4, 322 leaves, 6 steps):

$$-\frac{1924\,x\left(5+\sqrt{13}+2\,x^2\right)}{105\,\sqrt{3+5\,x^2+x^4}}+\frac{13}{3}\,x\,\sqrt{3+5\,x^2+x^4}-\frac{26}{35}\,x^3\,\sqrt{3+5\,x^2+x^4}+\frac{1}{21}\,x^5\left(11+7\,x^2\right)\sqrt{3+5\,x^2+x^4}+\left(962\,\sqrt{\frac{2}{3}\left(5+\sqrt{13}\right)}\,\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\,\sqrt{13}\right)\right]\right)\Big/\left(105\,\sqrt{3+5\,x^2+x^4}\right)-\left(13\,\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\,\sqrt{13}\right)\right]\right)\Big/\left(\sqrt{6\left(5+\sqrt{13}\right)}\,\sqrt{3+5\,x^2+x^4}\right)$$

Result (type 4, 237 leaves):

$$\left(2730\,x+4082\,x^3+460\,x^5+604\,x^7+460\,x^9+70\,x^{11}-1924\,i\,\sqrt{2}\,\left(-5+\sqrt{13}\right)\sqrt{\frac{-5+\sqrt{13}-2\,x^2}{-5+\sqrt{13}}}\right.$$
$$\sqrt{5+\sqrt{13}+2\,x^2}\;\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]+$$
$$13\,i\,\sqrt{2}\,\left(-635+148\sqrt{13}\right)\sqrt{\frac{-5+\sqrt{13}-2\,x^2}{-5+\sqrt{13}}}\,\sqrt{5+\sqrt{13}+2\,x^2}$$
$$\left.\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right)\Big/\left(210\sqrt{3+5\,x^2+x^4}\right)$$

Problem 152: Result unnecessarily involves imaginary or complex numbers.

$$\int x^2\,\left(2+3\,x^2\right)\sqrt{3+5\,x^2+x^4}\;dx$$

Optimal (type 4, 305 leaves, 5 steps):

$$\frac{1247\,x\left(5+\sqrt{13}+2\,x^2\right)}{210\sqrt{3+5\,x^2+x^4}}-\frac{4}{3}\,x\sqrt{3+5\,x^2+x^4}+\frac{1}{35}\,x^3\left(29+15\,x^2\right)\sqrt{3+5\,x^2+x^4}-$$
$$\left(1247\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)\right.$$
$$\left.\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]\right)\Big/\left(210\sqrt{3+5\,x^2+x^4}\right)+$$
$$\frac{1}{\sqrt{3+5\,x^2+x^4}}2\sqrt{\frac{2}{3\left(5+\sqrt{13}\right)}}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)$$
$$\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]$$

Result (type 4, 234 leaves):

$$\left(4 x \left(-420-439 x^2+430 x^4+312 x^6+45 x^8\right)+1247 \mathrm{i} \sqrt{2} \left(-5+\sqrt{13}\right) \sqrt{\frac{-5+\sqrt{13}-2 x^2}{-5+\sqrt{13}}} \sqrt{5+\sqrt{13}+2 x^2} \,\text{EllipticE}\left[\mathrm{i}\, \text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\, x\right], \frac{19}{6}+\frac{5 \sqrt{13}}{6}\right]-\mathrm{i} \sqrt{2} \left(-5395+1247 \sqrt{13}\right) \sqrt{\frac{-5+\sqrt{13}-2 x^2}{-5+\sqrt{13}}} \sqrt{5+\sqrt{13}+2 x^2} \,\text{EllipticF}\left[\mathrm{i}\, \text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\, x\right], \frac{19}{6}+\frac{5 \sqrt{13}}{6}\right]\right) \bigg/ \left(420 \sqrt{3+5 x^2+x^4}\right)$$

Problem 153: Result unnecessarily involves imaginary or complex numbers.

$$\int \left(2+3 x^2\right) \sqrt{3+5 x^2+x^4}\, dx$$

Optimal (type 4, 279 leaves, 4 steps):

$$-\frac{23 x \left(5+\sqrt{13}+2 x^2\right)}{15 \sqrt{3+5 x^2+x^4}}+\frac{1}{15} x \left(25+9 x^2\right) \sqrt{3+5 x^2+x^4}+\frac{1}{15 \sqrt{3+5 x^2+x^4}} 23 \sqrt{\frac{1}{6} \left(5+\sqrt{13}\right)} \sqrt{\frac{6+\left(5-\sqrt{13}\right) x^2}{6+\left(5+\sqrt{13}\right) x^2}} \left(6+\left(5+\sqrt{13}\right) x^2\right) \text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6} \left(5+\sqrt{13}\right)}\, x\right], \frac{1}{6} \left(-13+5 \sqrt{13}\right)\right]+\left(\sqrt{\frac{6+\left(5-\sqrt{13}\right) x^2}{6+\left(5+\sqrt{13}\right) x^2}} \left(6+\left(5+\sqrt{13}\right) x^2\right) \text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6} \left(5+\sqrt{13}\right)}\, x\right], \frac{1}{6} \left(-13+5 \sqrt{13}\right)\right]\right) \bigg/ \left(\sqrt{6 \left(5+\sqrt{13}\right)} \sqrt{3+5 x^2+x^4}\right)$$

Result (type 4, 229 leaves):

$$\frac{1}{30\sqrt{3+5x^2+x^4}}\left(2x\left(75+152x^2+70x^4+9x^6\right)-23\,i\sqrt{2}\left(-5+\sqrt{13}\right)\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\right.$$
$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]+i\sqrt{2}\left(-130+23\sqrt{13}\right)$$
$$\left.\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right)$$

Problem 154: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(2+3x^2\right)\sqrt{3+5x^2+x^4}}{x^2}\,dx$$

Optimal (type 4, 284 leaves, 4 steps):

$$\frac{9x\left(5+\sqrt{13}+2x^2\right)}{2\sqrt{3+5x^2+x^4}}-\frac{\left(2-x^2\right)\sqrt{3+5x^2+x^4}}{x}-$$
$$\frac{1}{2\sqrt{3+5x^2+x^4}}3\sqrt{\frac{3}{2}\left(5+\sqrt{13}\right)}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)$$
$$\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]+$$
$$\frac{1}{\sqrt{3+5x^2+x^4}}8\sqrt{\frac{2}{3\left(5+\sqrt{13}\right)}}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)$$
$$\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]$$

Result (type 4, 231 leaves):

$$\frac{1}{4 x \sqrt{3+5 x^2+x^4}} \left(4 \left(-6-7 x^2+3 x^4+x^6\right)+9 i \sqrt{2} \left(-5+\sqrt{13}\right) x \sqrt{\frac{-5+\sqrt{13}-2 x^2}{-5+\sqrt{13}}} \sqrt{5+\sqrt{13}+2 x^2} \text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}} x\right], \frac{19}{6}+\frac{5 \sqrt{13}}{6}\right] - i \sqrt{2} \left(-13+9 \sqrt{13}\right) x \sqrt{\frac{-5+\sqrt{13}-2 x^2}{-5+\sqrt{13}}} \sqrt{5+\sqrt{13}+2 x^2} \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}} x\right], \frac{19}{6}+\frac{5 \sqrt{13}}{6}\right]\right)$$

Problem 155: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(2+3 x^2\right) \sqrt{3+5 x^2+x^4}}{x^4} \, dx$$

Optimal (type 4, 305 leaves, 5 steps):

$$\frac{32 x \left(5+\sqrt{13}+2 x^2\right)}{9 \sqrt{3+5 x^2+x^4}} - \frac{64 \sqrt{3+5 x^2+x^4}}{9 x} - \frac{\left(2-9 x^2\right) \sqrt{3+5 x^2+x^4}}{3 x^3} - \frac{1}{9 \sqrt{3+5 x^2+x^4}} 16 \sqrt{\frac{2}{3} \left(5+\sqrt{13}\right)} \sqrt{\frac{6+\left(5-\sqrt{13}\right) x^2}{6+\left(5+\sqrt{13}\right) x^2}} \left(6+\left(5+\sqrt{13}\right) x^2\right) \text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6} \left(5+\sqrt{13}\right)} x\right], \frac{1}{6} \left(-13+5 \sqrt{13}\right)\right] + \left(49 \sqrt{\frac{6+\left(5-\sqrt{13}\right) x^2}{6+\left(5+\sqrt{13}\right) x^2}} \left(6+\left(5+\sqrt{13}\right) x^2\right) \text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6} \left(5+\sqrt{13}\right)} x\right], \frac{1}{6} \left(-13+5 \sqrt{13}\right)\right]\right) \Big/ \left(3 \sqrt{6 \left(5+\sqrt{13}\right)} \sqrt{3+5 x^2+x^4}\right)$$

Result (type 4, 237 leaves):

$$\left(-2\left(18+141x^2+191x^4+37x^6\right)+32\,\mathrm{i}\sqrt{2}\left(-5+\sqrt{13}\right)x^3\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\;\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]-\mathrm{i}\sqrt{2}\left(-13+32\sqrt{13}\right)x^3\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\;\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right)\Bigg/\left(18x^3\sqrt{3+5x^2+x^4}\right)$$

Problem 163: Result unnecessarily involves imaginary or complex numbers.

$$\int x^4\left(2+3x^2\right)\left(3+5x^2+x^4\right)^{3/2}\,dx$$

Optimal (type 4, 356 leaves, 7 steps):

$$\frac{176723\,x\left(5+\sqrt{13}+2x^2\right)}{4290\sqrt{3+5x^2+x^4}}-\frac{4210}{429}x\sqrt{3+5x^2+x^4}+\frac{1251}{715}x^3\sqrt{3+5x^2+x^4}-\frac{1}{429}x^5\left(283+272x^2\right)\sqrt{3+5x^2+x^4}+\frac{1}{143}x^5\left(71+33x^2\right)\left(3+5x^2+x^4\right)^{3/2}-\left(176723\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)\mathrm{EllipticE}\left[\mathrm{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]\right)\Bigg/\left(4290\sqrt{3+5x^2+x^4}\right)+\left(2105\sqrt{\frac{2}{3\left(5+\sqrt{13}\right)}}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)\mathrm{EllipticF}\left[\mathrm{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]\right)\Bigg/\left(143\sqrt{3+5x^2+x^4}\right)$$

Result (type 4, 249 leaves):

$$\frac{1}{8580\sqrt{3+5x^2+x^4}}\left(4x\left(-63150-93991x^2+3055x^4+29003x^6+39650x^8+24635x^{10}+6015x^{12}+495x^{14}\right)+176723\,i\sqrt{2}\left(-5+\sqrt{13}\right)\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]-i\sqrt{2}\left(-757315+176723\sqrt{13}\right)\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right)$$

Problem 164: Result unnecessarily involves imaginary or complex numbers.

$$\int x^2\left(2+3x^2\right)\left(3+5x^2+x^4\right)^{3/2}\,dx$$

Optimal (type 4, 331 leaves, 6 steps):

$$-\frac{49949\,x\left(5+\sqrt{13}+2x^2\right)}{3465\sqrt{3+5x^2+x^4}}+\frac{353}{99}x\sqrt{3+5x^2+x^4}-\frac{x^3\left(911+890x^2\right)\sqrt{3+5x^2+x^4}}{1155}+\frac{1}{99}x^3\left(67+27x^2\right)\left(3+5x^2+x^4\right)^{3/2}+\left(49949\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]\right)\Big/\left(3465\sqrt{3+5x^2+x^4}\right)-\left(353\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]\right)\Big/\left(33\sqrt{6\left(5+\sqrt{13}\right)}\sqrt{3+5x^2+x^4}\right)$$

Result (type 4, 244 leaves):

$$\frac{1}{6930\sqrt{3+5x^2+x^4}}\left(2x\left(37065+74681x^2+69535x^4+84962x^6+50075x^8+11795x^{10}+945x^{12}\right)-49949\,i\sqrt{2}\left(-5+\sqrt{13}\right)\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]+i\sqrt{2}\left(-212680+49949\sqrt{13}\right)\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right)$$

Problem 165: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(2+3x^2\right)\left(3+5x^2+x^4\right)^{3/2}dx$$

Optimal (type 4, 308 leaves, 5 steps):

$$\frac{203x\left(5+\sqrt{13}+2x^2\right)}{30\sqrt{3+5x^2+x^4}}-\frac{1}{15}x\left(5+12x^2\right)\sqrt{3+5x^2+x^4}+\frac{1}{3}x\left(3+x^2\right)\left(3+5x^2+x^4\right)^{3/2}-\frac{1}{30\sqrt{3+5x^2+x^4}}203\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]+\frac{1}{\sqrt{3+5x^2+x^4}}5\sqrt{\frac{2}{3\left(5+\sqrt{13}\right)}}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]$$

Result (type 4, 239 leaves):

$$\frac{1}{60\sqrt{3+5x^2+x^4}}\left(4x\left(120+434x^2+550x^4+293x^6+65x^8+5x^{10}\right)+203\,i\sqrt{2}\left(-5+\sqrt{13}\right)\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\right.$$
$$\sqrt{5+\sqrt{13}+2x^2}\ \text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]-i\sqrt{2}\left(-715+203\sqrt{13}\right)$$
$$\left.\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\ \text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right)$$

Problem 166: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(2+3x^2\right)\left(3+5x^2+x^4\right)^{3/2}}{x^2}\,dx$$

Optimal (type 4, 312 leaves, 5 steps):

$$\frac{412x\left(5+\sqrt{13}+2x^2\right)}{35\sqrt{3+5x^2+x^4}}+\frac{1}{35}x\left(655+129x^2\right)\sqrt{3+5x^2+x^4}-$$
$$\frac{\left(14-3x^2\right)\left(3+5x^2+x^4\right)^{3/2}}{7x}-\frac{1}{35\sqrt{3+5x^2+x^4}}206\sqrt{\frac{2}{3}\left(5+\sqrt{13}\right)}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}$$
$$\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]+$$
$$\frac{1}{\sqrt{3+5x^2+x^4}}19\sqrt{\frac{3}{2\left(5+\sqrt{13}\right)}}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)$$
$$\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]$$

Result (type 4, 235 leaves):

$$\left(-1260+3884 x^4+2130 x^6+418 x^8+30 x^{10}+412 i \sqrt{2} \left(-5+\sqrt{13}\right) x \sqrt{\frac{-5+\sqrt{13}-2 x^2}{-5+\sqrt{13}}} \sqrt{5+\sqrt{13}+2 x^2} \text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}} x\right], \frac{19}{6}+\frac{5 \sqrt{13}}{6}\right]- i \sqrt{2} \left(-65+412 \sqrt{13}\right) x \sqrt{\frac{-5+\sqrt{13}-2 x^2}{-5+\sqrt{13}}} \sqrt{5+\sqrt{13}+2 x^2} \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}} x\right], \frac{19}{6}+\frac{5 \sqrt{13}}{6}\right]\right) \Big/ \left(70 x \sqrt{3+5 x^2+x^4}\right)$$

Problem 167: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(2+3 x^2\right) \left(3+5 x^2+x^4\right)^{3/2}}{x^4} \, dx$$

Optimal (type 4, 314 leaves, 5 steps):

$$\frac{949 x \left(5+\sqrt{13}+2 x^2\right)}{30 \sqrt{3+5 x^2+x^4}}-\frac{13 \left(24-5 x^2\right) \sqrt{3+5 x^2+x^4}}{15 x}-\frac{\left(10-9 x^2\right) \left(3+5 x^2+x^4\right)^{3/2}}{15 x^3}-\frac{1}{30 \sqrt{3+5 x^2+x^4}} 949 \sqrt{\frac{1}{6} \left(5+\sqrt{13}\right)} \sqrt{\frac{6+\left(5-\sqrt{13}\right) x^2}{6+\left(5+\sqrt{13}\right) x^2}} \left(6+\left(5+\sqrt{13}\right) x^2\right) \text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6} \left(5+\sqrt{13}\right)} x\right], \frac{1}{6} \left(-13+5 \sqrt{13}\right)\right]+\frac{1}{\sqrt{3+5 x^2+x^4}} 65 \sqrt{\frac{2}{3 \left(5+\sqrt{13}\right)}} \sqrt{\frac{6+\left(5-\sqrt{13}\right) x^2}{6+\left(5+\sqrt{13}\right) x^2}} \left(6+\left(5+\sqrt{13}\right) x^2\right) \text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6} \left(5+\sqrt{13}\right)} x\right], \frac{1}{6} \left(-13+5 \sqrt{13}\right)\right]$$

Result (type 4, 247 leaves):

$$\left(4\left(-90-1155x^2-1405x^4+192x^6+145x^8+9x^{10}\right)+949\,i\sqrt{2}\left(-5+\sqrt{13}\right)x^3\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\;\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]-13\,i\sqrt{2}\left(-65+73\sqrt{13}\right)x^3\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\;\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right)\Big/\left(60x^3\sqrt{3+5x^2+x^4}\right)$$

Problem 168: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(2+3x^2\right)\left(3+5x^2+x^4\right)^{3/2}}{x^6}\,dx$$

Optimal (type 4, 331 leaves, 6 steps):

$$\frac{361x\left(5+\sqrt{13}+2x^2\right)}{15\sqrt{3+5x^2+x^4}}-\frac{722\sqrt{3+5x^2+x^4}}{15x}-\frac{\left(40-87x^2\right)\sqrt{3+5x^2+x^4}}{5x^3}-\frac{\left(2-5x^2\right)\left(3+5x^2+x^4\right)^{3/2}}{5x^5}-\frac{1}{15\sqrt{3+5x^2+x^4}}361\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]+\left(103\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]\right)\Big/\left(\sqrt{6\left(5+\sqrt{13}\right)}\sqrt{3+5x^2+x^4}\right)$$

Result (type 4, 244 leaves):

$$\left(-108-810 x^2-3438 x^4-4040 x^6-634 x^8+30 x^{10}+361 i \sqrt{2} \left(-5+\sqrt{13}\right) x^5 \sqrt{\frac{-5+\sqrt{13}-2 x^2}{-5+\sqrt{13}}} \sqrt{5+\sqrt{13}+2 x^2} \text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}} x\right], \frac{19}{6}+\frac{5\sqrt{13}}{6}\right] - i \sqrt{2} \left(-260+361\sqrt{13}\right) x^5 \sqrt{\frac{-5+\sqrt{13}-2 x^2}{-5+\sqrt{13}}} \sqrt{5+\sqrt{13}+2 x^2} \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}} x\right], \frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right) \Big/ \left(30 x^5 \sqrt{3+5 x^2+x^4}\right)$$

Problem 176: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{x^4 \left(A+B x^2\right)}{\sqrt{a+b x^2+c x^4}} \, dx$$

Optimal (type 4, 403 leaves, 5 steps):

$$-\frac{(4 b B-5 A c) x \sqrt{a+b x^2+c x^4}}{15 c^2}+\frac{B x^3 \sqrt{a+b x^2+c x^4}}{5 c}+\frac{\left(8 b^2 B-10 A b c-9 a B c\right) x \sqrt{a+b x^2+c x^4}}{15 c^{5/2} \left(\sqrt{a}+\sqrt{c} x^2\right)}-\left(a^{1/4} \left(8 b^2 B-10 A b c-9 a B c\right) \left(\sqrt{a}+\sqrt{c} x^2\right) \sqrt{\frac{a+b x^2+c x^4}{\left(\sqrt{a}+\sqrt{c} x^2\right)^2}} \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{c^{1/4} x}{a^{1/4}}\right], \frac{1}{4}\left(2-\frac{b}{\sqrt{a}\sqrt{c}}\right)\right]\right) \Big/ \left(15 c^{11/4} \sqrt{a+b x^2+c x^4}\right)+\left(a^{1/4} \left(8 b^2 B-10 A b c-9 a B c+\sqrt{a}\sqrt{c}(4 b B-5 A c)\right) \left(\sqrt{a}+\sqrt{c} x^2\right) \sqrt{\frac{a+b x^2+c x^4}{\left(\sqrt{a}+\sqrt{c} x^2\right)^2}} \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{c^{1/4} x}{a^{1/4}}\right], \frac{1}{4}\left(2-\frac{b}{\sqrt{a}\sqrt{c}}\right)\right]\right) \Big/ \left(30 c^{11/4} \sqrt{a+b x^2+c x^4}\right)$$

Result (type 4, 532 leaves):

$$\frac{1}{60\,c^3\,\sqrt{\frac{c}{b+\sqrt{b^2-4\,a\,c}}}\,\sqrt{a+b\,x^2+c\,x^4}}$$

$$\left(4\,c\,\sqrt{\frac{c}{b+\sqrt{b^2-4\,a\,c}}}\,x\,\left(-4\,b\,B+5\,A\,c+3\,B\,c\,x^2\right)\,\left(a+b\,x^2+c\,x^4\right)+\mathrm{i}\,\left(8\,b^2\,B-10\,A\,b\,c-9\,a\,B\,c\right)\right.$$

$$\left(-b+\sqrt{b^2-4\,a\,c}\right)\,\sqrt{\frac{b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\,\sqrt{\frac{2\,b-2\,\sqrt{b^2-4\,a\,c}+4\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}$$

$$\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{2}\,\sqrt{\frac{c}{b+\sqrt{b^2-4\,a\,c}}}\,x\right],\frac{b+\sqrt{b^2-4\,a\,c}}{b-\sqrt{b^2-4\,a\,c}}\right]-$$

$$\mathrm{i}\,\left(-8\,b^3\,B+b\,c\,\left(17\,a\,B-10\,A\,\sqrt{b^2-4\,a\,c}\right)+2\,b^2\,\left(5\,A\,c+4\,B\,\sqrt{b^2-4\,a\,c}\right)-\right.$$

$$\left.a\,c\,\left(10\,A\,c+9\,B\,\sqrt{b^2-4\,a\,c}\right)\right)\,\sqrt{\frac{b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\,\sqrt{\frac{2\,b-2\,\sqrt{b^2-4\,a\,c}+4\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}$$

$$\left.\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{2}\,\sqrt{\frac{c}{b+\sqrt{b^2-4\,a\,c}}}\,x\right],\frac{b+\sqrt{b^2-4\,a\,c}}{b-\sqrt{b^2-4\,a\,c}}\right]\right)$$

Problem 177: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^2\,\left(A+B\,x^2\right)}{\sqrt{a+b\,x^2+c\,x^4}}\,dx$$

Optimal (type 4, 336 leaves, 4 steps):

$$\frac{B x \sqrt{a+b x^2+c x^4}}{3 c}-\frac{(2 b B-3 A c) x \sqrt{a+b x^2+c x^4}}{3 c^{3/2} \left(\sqrt{a}+\sqrt{c} x^2\right)}+$$

$$\left(a^{1/4} (2 b B-3 A c) \left(\sqrt{a}+\sqrt{c} x^2\right) \sqrt{\frac{a+b x^2+c x^4}{\left(\sqrt{a}+\sqrt{c} x^2\right)^2}}\right.$$

$$\left.\text{EllipticE}\left[2 \text{ArcTan}\left[\frac{c^{1/4} x}{a^{1/4}}\right], \frac{1}{4} \left(2-\frac{b}{\sqrt{a} \sqrt{c}}\right)\right]\right) \Big/ \left(3 c^{7/4} \sqrt{a+b x^2+c x^4}\right)-$$

$$\left(a^{1/4} \left(2 b B+\sqrt{a} B \sqrt{c}-3 A c\right) \left(\sqrt{a}+\sqrt{c} x^2\right) \sqrt{\frac{a+b x^2+c x^4}{\left(\sqrt{a}+\sqrt{c} x^2\right)^2}}\right.$$

$$\left.\text{EllipticF}\left[2 \text{ArcTan}\left[\frac{c^{1/4} x}{a^{1/4}}\right], \frac{1}{4} \left(2-\frac{b}{\sqrt{a} \sqrt{c}}\right)\right]\right) \Big/ \left(6 c^{7/4} \sqrt{a+b x^2+c x^4}\right)$$

Result (type 4, 479 leaves):

$$\frac{1}{12 c^2 \sqrt{\frac{c}{b+\sqrt{b^2-4 a c}}} \sqrt{a+b x^2+c x^4}} \left(4 B c \sqrt{\frac{c}{b+\sqrt{b^2-4 a c}}} x \left(a+b x^2+c x^4\right)-\right.$$

$$i (2 b B-3 A c) \left(-b+\sqrt{b^2-4 a c}\right) \sqrt{\frac{b+\sqrt{b^2-4 a c}+2 c x^2}{b+\sqrt{b^2-4 a c}}} \sqrt{\frac{2 b-2 \sqrt{b^2-4 a c}+4 c x^2}{b-\sqrt{b^2-4 a c}}}$$

$$\text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{2} \sqrt{\frac{c}{b+\sqrt{b^2-4 a c}}} x\right], \frac{b+\sqrt{b^2-4 a c}}{b-\sqrt{b^2-4 a c}}\right]+$$

$$i \left(-2 b^2 B+3 A b c+2 a B c+2 b B \sqrt{b^2-4 a c}-3 A c \sqrt{b^2-4 a c}\right) \sqrt{\frac{b+\sqrt{b^2-4 a c}+2 c x^2}{b+\sqrt{b^2-4 a c}}}$$

$$\left.\sqrt{\frac{2 b-2 \sqrt{b^2-4 a c}+4 c x^2}{b-\sqrt{b^2-4 a c}}} \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{2} \sqrt{\frac{c}{b+\sqrt{b^2-4 a c}}} x\right], \frac{b+\sqrt{b^2-4 a c}}{b-\sqrt{b^2-4 a c}}\right]\right)$$

Problem 178: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+B x^2}{\sqrt{a+b x^2+c x^4}} \, dx$$

Optimal (type 4, 283 leaves, 3 steps):

$$\frac{B x \sqrt{a+b x^2+c x^4}}{\sqrt{c}\left(\sqrt{a}+\sqrt{c}\, x^2\right)}-$$

$$\left(a^{1/4} B \left(\sqrt{a}+\sqrt{c}\, x^2\right)\sqrt{\frac{a+b x^2+c x^4}{\left(\sqrt{a}+\sqrt{c}\, x^2\right)^2}}\, \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{c^{1/4} x}{a^{1/4}}\right], \frac{1}{4}\left(2-\frac{b}{\sqrt{a}\sqrt{c}}\right)\right]\right)\Big/$$

$$\left(c^{3/4}\sqrt{a+b x^2+c x^4}\right)+\left(a^{1/4}\left(B+\frac{A\sqrt{c}}{\sqrt{a}}\right)\left(\sqrt{a}+\sqrt{c}\, x^2\right)\sqrt{\frac{a+b x^2+c x^4}{\left(\sqrt{a}+\sqrt{c}\, x^2\right)^2}}\right.$$

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

Result (type 4, 302 leaves):

$$\left(i \sqrt{\frac{b+\sqrt{b^2-4 a c}+2 c x^2}{b+\sqrt{b^2-4 a c}}}\sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}}\right.$$

$$\left(B\left(-b+\sqrt{b^2-4 a c}\right)\text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{2}\sqrt{\frac{c}{b+\sqrt{b^2-4 a c}}}\, x\right], \frac{b+\sqrt{b^2-4 a c}}{b-\sqrt{b^2-4 a c}}\right]+\right.$$

$$\left(b B-2 A c-B\sqrt{b^2-4 a c}\right)$$

$$\left.\left.\text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{2}\sqrt{\frac{c}{b+\sqrt{b^2-4 a c}}}\, x\right], \frac{b+\sqrt{b^2-4 a c}}{b-\sqrt{b^2-4 a c}}\right]\right)\right)\Big/$$

$$\left(2\sqrt{2}\, c\sqrt{\frac{c}{b+\sqrt{b^2-4 a c}}}\sqrt{a+b x^2+c x^4}\right)$$

Problem 179: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+B x^2}{x^2\sqrt{a+b x^2+c x^4}}\, dx$$

Optimal (type 4, 312 leaves, 4 steps):

$$-\frac{A\sqrt{a+b x^2+c x^4}}{a x}+\frac{A\sqrt{c}\, x\sqrt{a+b x^2+c x^4}}{a\left(\sqrt{a}+\sqrt{c}\, x^2\right)}-\left(A c^{1/4}\left(\sqrt{a}+\sqrt{c}\, x^2\right)\sqrt{\frac{a+b x^2+c x^4}{\left(\sqrt{a}+\sqrt{c}\, x^2\right)^2}}\, \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{c^{1/4} x}{a^{1/4}}\right],\frac{1}{4}\left(2-\frac{b}{\sqrt{a}\sqrt{c}}\right)\right]\right)\Big/\left(a^{3/4}\sqrt{a+b x^2+c x^4}\right)+\left(\left(\sqrt{a}\, B+A\sqrt{c}\right)\left(\sqrt{a}+\sqrt{c}\, x^2\right)\sqrt{\frac{a+b x^2+c x^4}{\left(\sqrt{a}+\sqrt{c}\, x^2\right)^2}}\, \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{c^{1/4} x}{a^{1/4}}\right],\frac{1}{4}\left(2-\frac{b}{\sqrt{a}\sqrt{c}}\right)\right]\right)\Big/\left(2 a^{3/4} c^{1/4}\sqrt{a+b x^2+c x^4}\right)$$

Result (type 4, 448 leaves) :

$$\left(-4 A\sqrt{\frac{c}{b+\sqrt{b^2-4 a c}}}\left(a+b x^2+c x^4\right)+i A\left(-b+\sqrt{b^2-4 a c}\right) x\sqrt{\frac{b+\sqrt{b^2-4 a c}+2 c x^2}{b+\sqrt{b^2-4 a c}}}\sqrt{\frac{2 b-2\sqrt{b^2-4 a c}+4 c x^2}{b-\sqrt{b^2-4 a c}}}\, \text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{2}\sqrt{\frac{c}{b+\sqrt{b^2-4 a c}}}\, x\right],\frac{b+\sqrt{b^2-4 a c}}{b-\sqrt{b^2-4 a c}}\right]-i\left(2 a B+A\left(-b+\sqrt{b^2-4 a c}\right)\right) x\sqrt{\frac{b+\sqrt{b^2-4 a c}+2 c x^2}{b+\sqrt{b^2-4 a c}}}\sqrt{\frac{2 b-2\sqrt{b^2-4 a c}+4 c x^2}{b-\sqrt{b^2-4 a c}}}\, \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{2}\sqrt{\frac{c}{b+\sqrt{b^2-4 a c}}}\, x\right],\frac{b+\sqrt{b^2-4 a c}}{b-\sqrt{b^2-4 a c}}\right]\right)\Big/\left(4 a\sqrt{\frac{c}{b+\sqrt{b^2-4 a c}}}\, x\sqrt{a+b x^2+c x^4}\right)$$

Problem 180: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B x^2}{x^4\sqrt{a+b x^2+c x^4}}\, dx$$

Optimal (type 4, 376 leaves, 5 steps) :

$$-\frac{A\sqrt{a+b\,x^2+c\,x^4}}{3\,a\,x^3}+\frac{(2\,A\,b-3\,a\,B)\sqrt{a+b\,x^2+c\,x^4}}{3\,a^2\,x}-\frac{(2\,A\,b-3\,a\,B)\sqrt{c}\;x\sqrt{a+b\,x^2+c\,x^4}}{3\,a^2\left(\sqrt{a}+\sqrt{c}\;x^2\right)}+\left((2\,A\,b-3\,a\,B)\,c^{1/4}\left(\sqrt{a}+\sqrt{c}\;x^2\right)\sqrt{\frac{a+b\,x^2+c\,x^4}{\left(\sqrt{a}+\sqrt{c}\;x^2\right)^2}}\;\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{c^{1/4}\,x}{a^{1/4}}\right],\frac{1}{4}\left(2-\frac{b}{\sqrt{a}\;\sqrt{c}}\right)\right]\right)\Big/\left(3\,a^{7/4}\sqrt{a+b\,x^2+c\,x^4}\right)-\left(\left(2\,A\,b-3\,a\,B+\sqrt{a}\;A\sqrt{c}\right)c^{1/4}\left(\sqrt{a}+\sqrt{c}\;x^2\right)\sqrt{\frac{a+b\,x^2+c\,x^4}{\left(\sqrt{a}+\sqrt{c}\;x^2\right)^2}}\;\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{c^{1/4}\,x}{a^{1/4}}\right],\frac{1}{4}\left(2-\frac{b}{\sqrt{a}\;\sqrt{c}}\right)\right]\right)\Big/\left(6\,a^{7/4}\sqrt{a+b\,x^2+c\,x^4}\right)$$

Result (type 4, 373 leaves):

$$\left(-\frac{4\left(a+b\,x^2+c\,x^4\right)\left(-2\,A\,b\,x^2+a\left(A+3\,B\,x^2\right)\right)}{x^3}+\frac{1}{\sqrt{\frac{c}{b+\sqrt{b^2-4\,a\,c}}}}\,i\sqrt{2}\sqrt{\frac{b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\left(-(2\,A\,b-3\,a\,B)\left(-b+\sqrt{b^2-4\,a\,c}\right)\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{2}\sqrt{\frac{c}{b+\sqrt{b^2-4\,a\,c}}}\;x\right],\frac{b+\sqrt{b^2-4\,a\,c}}{b-\sqrt{b^2-4\,a\,c}}\right]+\left(3\,a\,B\left(b-\sqrt{b^2-4\,a\,c}\right)+2\,A\left(-b^2+a\,c+b\sqrt{b^2-4\,a\,c}\right)\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{2}\sqrt{\frac{c}{b+\sqrt{b^2-4\,a\,c}}}\;x\right],\frac{b+\sqrt{b^2-4\,a\,c}}{b-\sqrt{b^2-4\,a\,c}}\right]\right)\right)\Big/\left(12\,a^2\sqrt{a+b\,x^2+c\,x^4}\right)$$

Problem 189: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^4\left(2+3\,x^2\right)}{\sqrt{3+5\,x^2+x^4}}\,dx$$

Optimal (type 4, 298 leaves, 5 steps):

$$\frac{419\,x\left(5+\sqrt{13}+2\,x^2\right)}{30\,\sqrt{3+5\,x^2+x^4}}-\frac{10}{3}\,x\,\sqrt{3+5\,x^2+x^4}+\frac{3}{5}\,x^3\,\sqrt{3+5\,x^2+x^4}-$$

$$\frac{1}{30\,\sqrt{3+5\,x^2+x^4}}419\,\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}$$

$$\left(6+\left(5+\sqrt{13}\right)x^2\right)\,\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\,\frac{1}{6}\left(-13+5\,\sqrt{13}\right)\right]+$$

$$\frac{1}{\sqrt{3+5\,x^2+x^4}}5\,\sqrt{\frac{2}{3\left(5+\sqrt{13}\right)}}\,\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\,\left(6+\left(5+\sqrt{13}\right)x^2\right)$$

$$\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\,\frac{1}{6}\left(-13+5\,\sqrt{13}\right)\right]$$

Result (type 4, 229 leaves):

$$\frac{1}{60\,\sqrt{3+5\,x^2+x^4}}$$

$$\left(4\,x\left(-150-223\,x^2-5\,x^4+9\,x^6\right)+419\,i\,\sqrt{2}\,\left(-5+\sqrt{13}\right)\,\sqrt{\frac{-5+\sqrt{13}-2\,x^2}{-5+\sqrt{13}}}\,\sqrt{5+\sqrt{13}+2\,x^2}\right.$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\,\frac{19}{6}+\frac{5\,\sqrt{13}}{6}\right]-i\,\sqrt{2}\,\left(-1795+419\,\sqrt{13}\right)$$

$$\left.\sqrt{\frac{-5+\sqrt{13}-2\,x^2}{-5+\sqrt{13}}}\,\sqrt{5+\sqrt{13}+2\,x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\,\frac{19}{6}+\frac{5\,\sqrt{13}}{6}\right]\right)$$

Problem 190: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^2\left(2+3\,x^2\right)}{\sqrt{3+5\,x^2+x^4}}\,dx$$

Optimal (type 4, 270 leaves, 4 steps):

$$-\frac{4x\left(5+\sqrt{13}+2x^2\right)}{\sqrt{3+5x^2+x^4}}+x\sqrt{3+5x^2+x^4}+\frac{1}{\sqrt{3+5x^2+x^4}}2\sqrt{\frac{2}{3}\left(5+\sqrt{13}\right)}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}$$

$$\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]-$$

$$\frac{1}{\sqrt{3+5x^2+x^4}}\sqrt{\frac{3}{2\left(5+\sqrt{13}\right)}}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)$$

$$\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]$$

Result (type 4, 222 leaves):

$$\frac{1}{2\sqrt{3+5x^2+x^4}}\left(2x\left(3+5x^2+x^4\right)-4\,i\sqrt{2}\left(-5+\sqrt{13}\right)\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\right.$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]+i\sqrt{2}\left(-17+4\sqrt{13}\right)$$

$$\left.\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right)$$

Problem 191: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{2+3x^2}{\sqrt{3+5x^2+x^4}}\,dx$$

Optimal (type 4, 257 leaves, 3 steps):

$$\frac{3x\left(5+\sqrt{13}+2x^2\right)}{2\sqrt{3+5x^2+x^4}}-\frac{1}{2\sqrt{3+5x^2+x^4}}\sqrt{\frac{3}{2}\left(5+\sqrt{13}\right)}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}$$
$$\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]+$$
$$\frac{1}{\sqrt{3+5x^2+x^4}}\sqrt{\frac{2}{3\left(5+\sqrt{13}\right)}}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)$$
$$\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]$$

Result (type 4, 159 leaves):

$$\left(i\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\right.$$
$$\left(3\left(-5+\sqrt{13}\right)\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]+\right.$$
$$\left.\left.\left(11-3\sqrt{13}\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right)\right)\Big/\left(2\sqrt{2}\sqrt{3+5x^2+x^4}\right)$$

Problem 192: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{2+3x^2}{x^2\sqrt{3+5x^2+x^4}}\,dx$$

Optimal (type 4, 278 leaves, 4 steps):

$$\frac{x\left(5+\sqrt{13}+2x^2\right)}{3\sqrt{3+5x^2+x^4}}-\frac{2\sqrt{3+5x^2+x^4}}{3x}-\frac{1}{3\sqrt{3+5x^2+x^4}}\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}$$
$$\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]+$$
$$\frac{1}{\sqrt{3+5x^2+x^4}}\sqrt{\frac{3}{2\left(5+\sqrt{13}\right)}}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)$$
$$\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]$$

Result (type 4, 224 leaves) :

$$\frac{1}{6x\sqrt{3+5x^2+x^4}}\left(-4\left(3+5x^2+x^4\right)+i\sqrt{2}\left(-5+\sqrt{13}\right)x\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\right.$$
$$\sqrt{5+\sqrt{13}+2x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]-i\sqrt{2}\left(4+\sqrt{13}\right)x$$
$$\left.\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right)$$

Problem 193: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{2+3x^2}{x^4\sqrt{3+5x^2+x^4}}\,dx$$

Optimal (type 4, 302 leaves, 5 steps) :

$$\frac{7x\left(5+\sqrt{13}+2x^2\right)}{54\sqrt{3+5x^2+x^4}}-\frac{2\sqrt{3+5x^2+x^4}}{9x^3}-\frac{7\sqrt{3+5x^2+x^4}}{27x}-$$
$$\frac{1}{54\sqrt{3+5x^2+x^4}}7\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}$$
$$\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]-$$
$$\frac{1}{9\sqrt{3+5x^2+x^4}}\sqrt{\frac{2}{3\left(5+\sqrt{13}\right)}}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)$$
$$\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]$$

Result (type 4, 237 leaves):

$$\left(-4\left(18+51x^2+41x^4+7x^6\right)+7\,i\sqrt{2}\left(-5+\sqrt{13}\right)x^3\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\right.$$
$$\sqrt{5+\sqrt{13}+2x^2}\;\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]-$$
$$i\sqrt{2}\left(-47+7\sqrt{13}\right)x^3\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}$$
$$\left.\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right)\Bigg/\left(108x^3\sqrt{3+5x^2+x^4}\right)$$

Problem 199: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^4\left(2+3x^2\right)}{\left(3+5x^2+x^4\right)^{3/2}}\,dx$$

Optimal (type 4, 307 leaves, 5 steps):

$$\frac{43\,x\,\left(5+\sqrt{13}+2\,x^2\right)}{13\,\sqrt{3+5\,x^2+x^4}}+\frac{x^3\,\left(8+11\,x^2\right)}{13\,\sqrt{3+5\,x^2+x^4}}-\frac{11}{13}\,x\,\sqrt{3+5\,x^2+x^4}-$$

$$\frac{1}{13\,\sqrt{3+5\,x^2+x^4}}43\,\sqrt{\frac{1}{6}\,\left(5+\sqrt{13}\right)}\,\sqrt{\frac{6+\left(5-\sqrt{13}\right)\,x^2}{6+\left(5+\sqrt{13}\right)\,x^2}}$$

$$\left(6+\left(5+\sqrt{13}\right)\,x^2\right)\,\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\,\left(5+\sqrt{13}\right)}\,x\right],\,\frac{1}{6}\,\left(-13+5\,\sqrt{13}\right)\right]+$$

$$\frac{1}{13\,\sqrt{3+5\,x^2+x^4}}11\,\sqrt{\frac{3}{2\,\left(5+\sqrt{13}\right)}}\,\sqrt{\frac{6+\left(5-\sqrt{13}\right)\,x^2}{6+\left(5+\sqrt{13}\right)\,x^2}}\,\left(6+\left(5+\sqrt{13}\right)\,x^2\right)$$

$$\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\,\left(5+\sqrt{13}\right)}\,x\right],\,\frac{1}{6}\,\left(-13+5\,\sqrt{13}\right)\right]$$

Result (type 4, 219 leaves):

$$\frac{1}{26\,\sqrt{3+5\,x^2+x^4}}\left(-2\,x\,\left(33+47\,x^2\right)+43\,i\,\sqrt{2}\,\left(-5+\sqrt{13}\right)\,\sqrt{\frac{-5+\sqrt{13}-2\,x^2}{-5+\sqrt{13}}}\,\sqrt{5+\sqrt{13}+2\,x^2}\right.$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\,\frac{19}{6}+\frac{5\,\sqrt{13}}{6}\right]-i\,\sqrt{2}\,\left(-182+43\,\sqrt{13}\right)$$

$$\left.\sqrt{\frac{-5+\sqrt{13}-2\,x^2}{-5+\sqrt{13}}}\,\sqrt{5+\sqrt{13}+2\,x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\,\frac{19}{6}+\frac{5\,\sqrt{13}}{6}\right]\right)$$

Problem 200: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^2\,\left(2+3\,x^2\right)}{\left(3+5\,x^2+x^4\right)^{3/2}}\,dx$$

Optimal (type 4, 286 leaves, 4 steps):

$$-\frac{11 x \left(5+\sqrt{13}+2 x^2\right)}{26 \sqrt{3+5 x^2+x^4}}+\frac{x \left(8+11 x^2\right)}{13 \sqrt{3+5 x^2+x^4}}+\frac{1}{26 \sqrt{3+5 x^2+x^4}} 11 \sqrt{\frac{1}{6} \left(5+\sqrt{13}\right)} \sqrt{\frac{6+\left(5-\sqrt{13}\right) x^2}{6+\left(5+\sqrt{13}\right) x^2}} \left(6+\left(5+\sqrt{13}\right) x^2\right) \text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6} \left(5+\sqrt{13}\right)} x\right], \frac{1}{6} \left(-13+5 \sqrt{13}\right)\right] - \frac{1}{13 \sqrt{3+5 x^2+x^4}} 4 \sqrt{\frac{2}{3 \left(5+\sqrt{13}\right)}} \sqrt{\frac{6+\left(5-\sqrt{13}\right) x^2}{6+\left(5+\sqrt{13}\right) x^2}} \left(6+\left(5+\sqrt{13}\right) x^2\right) \text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6} \left(5+\sqrt{13}\right)} x\right], \frac{1}{6} \left(-13+5 \sqrt{13}\right)\right]$$

Result (type 4, 219 leaves):

$$\frac{1}{52 \sqrt{3+5 x^2+x^4}} \left(4 x \left(8+11 x^2\right) - 11 i \sqrt{2} \left(-5+\sqrt{13}\right) \sqrt{\frac{-5+\sqrt{13}-2 x^2}{-5+\sqrt{13}}} \sqrt{5+\sqrt{13}+2 x^2} \text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}} x\right], \frac{19}{6}+\frac{5 \sqrt{13}}{6}\right] + i \sqrt{2} \left(-39+11 \sqrt{13}\right) \sqrt{\frac{-5+\sqrt{13}-2 x^2}{-5+\sqrt{13}}} \sqrt{5+\sqrt{13}+2 x^2} \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}} x\right], \frac{19}{6}+\frac{5 \sqrt{13}}{6}\right]\right)$$

Problem 201: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{2+3 x^2}{\left(3+5 x^2+x^4\right)^{3/2}} \, dx$$

Optimal (type 4, 282 leaves, 4 steps):

$$\frac{4x\left(5+\sqrt{13}+2x^2\right)}{39\sqrt{3+5x^2+x^4}}-\frac{x\left(7+8x^2\right)}{39\sqrt{3+5x^2+x^4}}-\frac{1}{39\sqrt{3+5x^2+x^4}}2\sqrt{\frac{2}{3}\left(5+\sqrt{13}\right)}\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}$$

$$\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]+$$

$$\left(11\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\left(6+\left(5+\sqrt{13}\right)x^2\right)\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\right.\right.$$

$$\left.\left.\frac{1}{6}\left(-13+5\sqrt{13}\right)\right]\right)\Big/\left(13\sqrt{6\left(5+\sqrt{13}\right)}\sqrt{3+5x^2+x^4}\right)$$

Result (type 4, 219 leaves):

$$\frac{1}{78\sqrt{3+5x^2+x^4}}\left(-2x\left(7+8x^2\right)+4\,i\sqrt{2}\left(-5+\sqrt{13}\right)\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\right.$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]-i\sqrt{2}\left(13+4\sqrt{13}\right)$$

$$\left.\sqrt{\frac{-5+\sqrt{13}-2x^2}{-5+\sqrt{13}}}\sqrt{5+\sqrt{13}+2x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\sqrt{13}}{6}\right]\right)$$

Problem 202: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{2+3x^2}{x^2\left(3+5x^2+x^4\right)^{3/2}}\,dx$$

Optimal (type 4, 309 leaves, 5 steps):

$$\frac{19 x \left(5+\sqrt{13}+2 x^2\right)}{234 \sqrt{3+5 x^2+x^4}}-\frac{7+8 x^2}{39 x \sqrt{3+5 x^2+x^4}}-\frac{19 \sqrt{3+5 x^2+x^4}}{117 x}-\left(19 \sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)} \sqrt{\frac{6+\left(5-\sqrt{13}\right) x^2}{6+\left(5+\sqrt{13}\right) x^2}} \left(6+\left(5+\sqrt{13}\right) x^2\right) \text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)} x\right],\frac{1}{6}\left(-13+5 \sqrt{13}\right)\right]\right) \Big/ \left(234 \sqrt{3+5 x^2+x^4}\right)-\frac{1}{39 \sqrt{3+5 x^2+x^4}} 4 \sqrt{\frac{2}{3\left(5+\sqrt{13}\right)}} \sqrt{\frac{6+\left(5-\sqrt{13}\right) x^2}{6+\left(5+\sqrt{13}\right) x^2}} \left(6+\left(5+\sqrt{13}\right) x^2\right) \text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)} x\right],\frac{1}{6}\left(-13+5 \sqrt{13}\right)\right]$$

Result (type 4, 228 leaves) :

$$\left(-4 \left(78+119 x^2+19 x^4\right)+19 i \sqrt{2} \left(-5+\sqrt{13}\right) x \sqrt{\frac{-5+\sqrt{13}-2 x^2}{-5+\sqrt{13}}} \sqrt{5+\sqrt{13}+2 x^2} \text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}} x\right],\frac{19}{6}+\frac{5 \sqrt{13}}{6}\right]-i \sqrt{2} \left(-143+19 \sqrt{13}\right) x \sqrt{\frac{-5+\sqrt{13}-2 x^2}{-5+\sqrt{13}}} \sqrt{5+\sqrt{13}+2 x^2} \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}} x\right],\frac{19}{6}+\frac{5 \sqrt{13}}{6}\right]\right) \Big/ \left(468 x \sqrt{3+5 x^2+x^4}\right)$$

Problem 203: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{2+3 x^2}{x^4 \left(3+5 x^2+x^4\right)^{3/2}} \, dx$$

Optimal (type 4, 326 leaves, 6 steps) :

$$-\frac{133\,x\,\left(5+\sqrt{13}+2\,x^2\right)}{1053\,\sqrt{3+5\,x^2+x^4}}-\frac{7+8\,x^2}{39\,x^3\,\sqrt{3+5\,x^2+x^4}}-\frac{5\,\sqrt{3+5\,x^2+x^4}}{351\,x^3}+\frac{266\,\sqrt{3+5\,x^2+x^4}}{1053\,x}+\left(133\,\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\,\left(6+\left(5+\sqrt{13}\right)x^2\right)\,\text{EllipticE}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\,\sqrt{13}\right)\right]\right)\Big/\left(1053\,\sqrt{3+5\,x^2+x^4}\right)-\left(5\,\sqrt{\frac{6+\left(5-\sqrt{13}\right)x^2}{6+\left(5+\sqrt{13}\right)x^2}}\,\left(6+\left(5+\sqrt{13}\right)x^2\right)\,\text{EllipticF}\left[\text{ArcTan}\left[\sqrt{\frac{1}{6}\left(5+\sqrt{13}\right)}\,x\right],\frac{1}{6}\left(-13+5\,\sqrt{13}\right)\right]\right)\Big/\left(351\,\sqrt{6\left(5+\sqrt{13}\right)}\,\sqrt{3+5\,x^2+x^4}\right)$$

Result (type 4, 234 leaves):

$$\left(-468+1014\,x^2+2630\,x^4+532\,x^6-133\,i\,\sqrt{2}\,\left(-5+\sqrt{13}\right)x^3\,\sqrt{\frac{-5+\sqrt{13}-2\,x^2}{-5+\sqrt{13}}}\,\sqrt{5+\sqrt{13}+2\,x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\,\sqrt{13}}{6}\right]+i\,\sqrt{2}\,\left(-650+133\,\sqrt{13}\right)x^3\,\sqrt{\frac{-5+\sqrt{13}-2\,x^2}{-5+\sqrt{13}}}\,\sqrt{5+\sqrt{13}+2\,x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{2}{5+\sqrt{13}}}\,x\right],\frac{19}{6}+\frac{5\,\sqrt{13}}{6}\right]\right)\Big/\left(2106\,x^3\,\sqrt{3+5\,x^2+x^4}\right)$$

Problem 204: Result more than twice size of optimal antiderivative.

$$\int (f\,x)^{3/2}\left(d+e\,x^2\right)\sqrt{a+b\,x^2+c\,x^4}\,dx$$

Optimal (type 6, 297 leaves, 6 steps):

$$\left(2\, d\, (f\, x)^{5/2} \sqrt{a+b\, x^2+c\, x^4}\ \text{AppellF1}\left[\frac{5}{4}, -\frac{1}{2}, -\frac{1}{2}, \frac{9}{4}, -\frac{2\, c\, x^2}{b-\sqrt{b^2-4\, a\, c}}, -\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}}\right]\right) \Big/ \left(5\, f \sqrt{1+\frac{2\, c\, x^2}{b-\sqrt{b^2-4\, a\, c}}} \sqrt{1+\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}}}\right) + \left(2\, e\, (f\, x)^{9/2} \sqrt{a+b\, x^2+c\, x^4}\ \text{AppellF1}\left[\frac{9}{4}, -\frac{1}{2}, -\frac{1}{2}, \frac{13}{4}, -\frac{2\, c\, x^2}{b-\sqrt{b^2-4\, a\, c}}, -\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}}\right]\right) \Big/ \left(9\, f^3 \sqrt{1+\frac{2\, c\, x^2}{b-\sqrt{b^2-4\, a\, c}}} \sqrt{1+\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}}}\right)$$

Result (type 6, 2835 leaves) :

$$\frac{1}{x^{3/2}} (f\, x)^{3/2} \sqrt{a+b\, x^2+c\, x^4} \left(\frac{4\, \left(13\, b\, c\, d-7\, b^2\, e+18\, a\, c\, e\right) \sqrt{x}}{585\, c^2}+\frac{2\, \left(13\, c\, d+2\, b\, e\right) x^{5/2}}{117\, c}+\frac{2}{13}\, e\, x^{9/2}\right) + \left(4\, a^3\, b\, d\, (f\, x)^{3/2} \left(b-\sqrt{b^2-4\, a\, c}+2\, c\, x^2\right) \left(b+\sqrt{b^2-4\, a\, c}+2\, c\, x^2\right) \text{AppellF1}\left[\frac{1}{4}, \frac{1}{2}, \frac{1}{2}, \frac{5}{4}, -\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}}, \frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]\right) \Big/ \left(9\, c \left(b-\sqrt{b^2-4\, a\, c}\right) \left(b+\sqrt{b^2-4\, a\, c}\right) x \left(a+b\, x^2+c\, x^4\right)^{3/2} \left(-5\, a\, \text{AppellF1}\left[\frac{1}{4}, \frac{1}{2}, \frac{1}{2}, \frac{5}{4}, -\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}}, \frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right] + x^2 \left(\left(b+\sqrt{b^2-4\, a\, c}\right) \text{AppellF1}\left[\frac{5}{4}, \frac{1}{2}, \frac{3}{2}, \frac{9}{4}, -\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}}, \frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right] + \left(b-\sqrt{b^2-4\, a\, c}\right) \text{AppellF1}\left[\frac{5}{4}, \frac{3}{2}, \frac{1}{2}, \frac{9}{4}, -\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}}, \frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]\right)\right)\right) - \left(28\, a^3\, b^2\, e\, (f\, x)^{3/2} \left(b-\sqrt{b^2-4\, a\, c}+2\, c\, x^2\right) \left(b+\sqrt{b^2-4\, a\, c}+2\, c\, x^2\right) \text{AppellF1}\left[\frac{1}{4}, \frac{1}{2}, \frac{1}{2}, \frac{5}{4}, -\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}}, \frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]\right) \Big/ \left(117\, c^2 \left(b-\sqrt{b^2-4\, a\, c}\right) \left(b+\sqrt{b^2-4\, a\, c}\right) x \left(a+b\, x^2+c\, x^4\right)^{3/2} \left(-5\, a\, \text{AppellF1}\left[\frac{1}{4}, \frac{1}{2}, \frac{1}{2}, \frac{5}{4}, -\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}}, \frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right] + x^2 \left(\left(b+\sqrt{b^2-4\, a\, c}\right) \text{AppellF1}\left[\frac{5}{4}, \frac{1}{2}, \frac{3}{2}, \frac{9}{4}, -\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}}, \frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right] + \left(b-\sqrt{b^2-4\, a\, c}\right) \text{AppellF1}\left[\frac{5}{4}, \frac{3}{2}, \frac{1}{2}, \frac{9}{4}, -\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}}, \frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]\right)\right)\right) + \left(8\, a^4\, e\, (f\, x)^{3/2} \left(b-\sqrt{b^2-4\, a\, c}+2\, c\, x^2\right) \left(b+\sqrt{b^2-4\, a\, c}+2\, c\, x^2\right)\right.$$

$$\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(13c\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)x\left(a+bx^2+cx^4\right)^{3/2}$$

$$\Bigg(-5a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)-$$

$$\Bigg(8a^3dx(fx)^{3/2}\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(5\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)\left(a+bx^2+cx^4\right)^{3/2}$$

$$\Bigg(-9a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)+$$

$$\Bigg(12a^2b^2dx(fx)^{3/2}\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(25c\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)\left(a+bx^2+cx^4\right)^{3/2}$$

$$\Bigg(-9a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)-$$

$$\Bigg(84a^2b^3ex(fx)^{3/2}\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(325c^2\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)\left(a+bx^2+cx^4\right)^{3/2}$$

$$\left(-9\,a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)+$$
$$\left(316\,a^3\,b\,e\,x\,(f\,x)^{3/2}\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(325\,c\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$
$$\left(-9\,a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)$$

Problem 205: Result more than twice size of optimal antiderivative.

$$\int\sqrt{f\,x}\,\left(d+e\,x^2\right)\sqrt{a+b\,x^2+c\,x^4}\,dx$$

Optimal (type 6, 297 leaves, 6 steps):

$$\left(2\,d\,(f\,x)^{3/2}\sqrt{a+b\,x^2+c\,x^4}\,\text{AppellF1}\left[\frac{3}{4},-\frac{1}{2},-\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(3\,f\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right)+$$
$$\left(2\,e\,(f\,x)^{7/2}\sqrt{a+b\,x^2+c\,x^4}\,\text{AppellF1}\left[\frac{7}{4},-\frac{1}{2},-\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(7\,f^3\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right)$$

Result (type 6, 1717 leaves):

$$\frac{1}{1617\,c^2\left(a+b\,x^2+c\,x^4\right)^{3/2}}$$
$$x\sqrt{f\,x}\left(42\,c\left(11\,c\,d+2\,b\,e+7\,c\,e\,x^2\right)\left(a+b\,x^2+c\,x^4\right)^2+\left(1078\,a^2\,c\,d\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.\right.$$

$$\left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\Bigg) \Bigg/ \left(7 a \text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]-x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)-$$

$$\Bigg(147 a^2 b e \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\Bigg) \Bigg/ \left(7 a \text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]-x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)+$$

$$\Bigg(363 a b c d x^2 \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\Bigg) \Bigg/ \left(11 a \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]-x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)+$$

$$\Bigg(462 a^2 c e x^2 \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\Bigg) \Bigg/ \left(11 a \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]-x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)+$$

$$\Bigg(165 a b^2 e x^2 \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right)$$

$$\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\Big)\Big/$$
$$\Big(-11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+$$
$$x^2\Big(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+$$
$$\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\Big)\Big)\Big)$$

Problem 206: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(d+e\,x^2\right)\sqrt{a+b\,x^2+c\,x^4}}{\sqrt{f\,x}}\,dx$$

Optimal (type 6, 295 leaves, 6 steps):

$$\left(2\,d\,\sqrt{f\,x}\,\sqrt{a+b\,x^2+c\,x^4}\,\text{AppellF1}\left[\frac{1}{4},-\frac{1}{2},-\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(f\,\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right)+$$
$$\left(2\,e\,(f\,x)^{5/2}\,\sqrt{a+b\,x^2+c\,x^4}\,\text{AppellF1}\left[\frac{5}{4},-\frac{1}{2},-\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(5\,f^3\,\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right)$$

Result (type 6, 1717 leaves):

$$\frac{1}{225\,c^2\,\sqrt{f\,x}\,\left(a+b\,x^2+c\,x^4\right)^{3/2}}$$
$$x\,\Big(10\,c\,\left(9\,c\,d+2\,b\,e+5\,c\,e\,x^2\right)\left(a+b\,x^2+c\,x^4\right)^2+\Big(450\,a^2\,c\,d\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)$$
$$\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\Big)\Big/$$
$$\Big(5\,a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-$$
$$x^2\Big(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+$$
$$\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\Big)\Big)-$$
$$\Big(25\,a^2\,b\,e\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)$$

$$\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(5a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]-$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)+$$

$$\Bigg(81\,a\,b\,c\,d\,x^2\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(9a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]-$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)+$$

$$\Bigg(90\,a^2\,c\,e\,x^2\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(9a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]-$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)+$$

$$\Bigg(27\,a\,b^2\,e\,x^2\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(-9a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)$$

Problem 207: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(d+e x^2\right) \sqrt{a+b x^2+c x^4}}{(f x)^{3/2}} \, dx$$

Optimal (type 6, 295 leaves, 6 steps):

$$-\left(\left(2 d \sqrt{a+b x^2+c x^4} \, \text{AppellF1}\left[-\frac{1}{4},-\frac{1}{2},-\frac{1}{2},\frac{3}{4},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right) \Bigg/ \left(f \sqrt{f x} \sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}} \sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}}\right)\right)+$$
$$\left(2 e (f x)^{3/2} \sqrt{a+b x^2+c x^4} \, \text{AppellF1}\left[\frac{3}{4},-\frac{1}{2},-\frac{1}{2},\frac{7}{4},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right) \Bigg/ \left(3 f^3 \sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}} \sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}}\right)$$

Result (type 6, 1383 leaves):

$$\frac{1}{147 (f x)^{3/2} \left(a+b x^2+c x^4\right)^{3/2}}$$
$$x \left(42 \left(-7 d+e x^2\right) \left(a+b x^2+c x^4\right)^2+\left(343 a b d x^2 \left(b-\sqrt{b^2-4 a c}+2 c x^2\right)\right.\right.$$
$$\left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\Bigg) \Bigg/$$
$$\left(c \left(7 a \, \text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]-\right.\right.$$
$$x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)+$$
$$\left(98 a^2 e x^2 \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\right.\right.$$
$$\left.\left.\frac{1}{2},\frac{7}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Bigg/$$
$$\left(c \left(7 a \, \text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]-\right.\right.$$
$$x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)+$$

$$\left(462\,a\,d\,x^4\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)+\left(33\,a\,b\,e\,x^4\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(c\,\left(11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)\right)\right)$$

Problem 208: Result more than twice size of optimal antiderivative.

$$\int (f\,x)^{3/2}\,\left(d+e\,x^2\right)\,\left(a+b\,x^2+c\,x^4\right)^{3/2}\,dx$$

Optimal (type 6, 299 leaves, 6 steps):

$$\left(2\,a\,d\,(f\,x)^{5/2}\,\sqrt{a+b\,x^2+c\,x^4}\,\text{AppellF1}\left[\frac{5}{4},-\frac{3}{2},-\frac{3}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(5\,f\,\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right)+\left(2\,a\,e\,(f\,x)^{9/2}\,\sqrt{a+b\,x^2+c\,x^4}\,\text{AppellF1}\left[\frac{9}{4},-\frac{3}{2},-\frac{3}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(9\,f^3\,\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right)$$

Result (type 6, 4499 leaves):

$$\frac{1}{x^{3/2}}\,(f\,x)^{3/2}\,\sqrt{a+b\,x^2+c\,x^4}\,\left(\frac{8\,\left(-147\,b^3\,c\,d+924\,a\,b\,c^2\,d+77\,b^4\,e-501\,a\,b^2\,c\,e+612\,a^2\,c^2\,e\right)\,\sqrt{x}}{69\,615\,c^3}+\right.$$

$$\frac{2\left(84 b^2 c d+1911 a c^2 d-44 b^3 e+240 a b c e\right) x^{5/2}}{13923 c^2}+$$

$$\left.\frac{2\left(399 b c d+12 b^2 e+425 a c e\right) x^{9/2}}{4641 c}+\frac{2}{357}\left(21 c d+23 b e\right) x^{13/2}+\frac{2}{21} c e x^{17/2}\right)-$$

$$\left(56 a^3 b^3 d (f x)^{3/2}\left(b-\sqrt{b^2-4 a c}+2 c x^2\right)\left(b+\sqrt{b^2-4 a c}+2 c x^2\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\Big/$$

$$\left(663 c^2\left(b-\sqrt{b^2-4 a c}\right)\left(b+\sqrt{b^2-4 a c}\right) x\left(a+b x^2+c x^4\right)^{3/2}\right.$$

$$\left(-5 a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$

$$x^2\left(\left(b+\sqrt{b^2-4 a c}\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$

$$\left.\left.\left.\left(b-\sqrt{b^2-4 a c}\right)\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)+$$

$$\left(352 a^4 b d (f x)^{3/2}\left(b-\sqrt{b^2-4 a c}+2 c x^2\right)\left(b+\sqrt{b^2-4 a c}+2 c x^2\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\Big/$$

$$\left(663 c\left(b-\sqrt{b^2-4 a c}\right)\left(b+\sqrt{b^2-4 a c}\right) x\left(a+b x^2+c x^4\right)^{3/2}\right.$$

$$\left(-5 a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$

$$x^2\left(\left(b+\sqrt{b^2-4 a c}\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$

$$\left.\left.\left.\left(b-\sqrt{b^2-4 a c}\right)\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)+$$

$$\left(88 a^3 b^4 e (f x)^{3/2}\left(b-\sqrt{b^2-4 a c}+2 c x^2\right)\left(b+\sqrt{b^2-4 a c}+2 c x^2\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\Big/$$

$$\left(1989 c^3\left(b-\sqrt{b^2-4 a c}\right)\left(b+\sqrt{b^2-4 a c}\right) x\left(a+b x^2+c x^4\right)^{3/2}\right.$$

$$\left(-5 a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$

$$x^2\left(\left(b+\sqrt{b^2-4 a c}\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$

$$\left.\left.\left.\left(b-\sqrt{b^2-4 a c}\right)\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)-$$

$$\left(1336\, a^4 b^2 e\, (f x)^{3/2} \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/$$

$$\left(4641\, c^2 \left(b-\sqrt{b^2-4 a c}\right) \left(b+\sqrt{b^2-4 a c}\right) x \left(a+b x^2+c x^4\right)^{3/2} \left(-5 a\, \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+ x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+ \left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)+$$

$$\left(32\, a^5 e\, (f x)^{3/2} \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/$$

$$\left(91\, c \left(b-\sqrt{b^2-4 a c}\right) \left(b+\sqrt{b^2-4 a c}\right) x \left(a+b x^2+c x^4\right)^{3/2} \left(-5 a\, \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+ x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+ \left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)-$$

$$\left(96\, a^4 d\, x\, (f x)^{3/2} \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/$$

$$\left(85 \left(b-\sqrt{b^2-4 a c}\right) \left(b+\sqrt{b^2-4 a c}\right) \left(a+b x^2+c x^4\right)^{3/2} \left(-9 a\, \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+ x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+ \left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)-$$

$$\left(504\, a^2 b^4 d\, x\, (f x)^{3/2} \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/$$

$$\left(5525\,c^2\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$
$$\left(-9\,a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)+$$
$$\left(3768\,a^3\,b^2\,d\,x\,(f\,x)^{3/2}\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(5525\,c\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$
$$\left(-9\,a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)+$$
$$\left(264\,a^2\,b^5\,e\,x\,(f\,x)^{3/2}\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(5525\,c^3\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$
$$\left(-9\,a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)-$$
$$\left(2032\,a^3\,b^3\,e\,x\,(f\,x)^{3/2}\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(5525\,c^2\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$
$$\left(-9\,a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$

$$x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Bigg)\Bigg)+$$

$$\left(26688a^4bex(fx)^{3/2}\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Bigg/$$

$$\Bigg(38675c\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)\left(a+bx^2+cx^4\right)^{3/2}\Bigg(-9a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Bigg)\Bigg)$$

Problem 209: Result more than twice size of optimal antiderivative.

$$\int\sqrt{fx}\left(d+ex^2\right)\left(a+bx^2+cx^4\right)^{3/2}dx$$

Optimal (type 6, 299 leaves, 6 steps):

$$\left(2ad(fx)^{3/2}\sqrt{a+bx^2+cx^4}\,\text{AppellF1}\left[\frac{3}{4},-\frac{3}{2},-\frac{3}{2},\frac{7}{4},-\frac{2cx^2}{b-\sqrt{b^2-4ac}},-\frac{2cx^2}{b+\sqrt{b^2-4ac}}\right]\right)\Bigg/\left(3f\sqrt{1+\frac{2cx^2}{b-\sqrt{b^2-4ac}}}\sqrt{1+\frac{2cx^2}{b+\sqrt{b^2-4ac}}}\right)+$$

$$\left(2ae(fx)^{7/2}\sqrt{a+bx^2+cx^4}\,\text{AppellF1}\left[\frac{7}{4},-\frac{3}{2},-\frac{3}{2},\frac{11}{4},-\frac{2cx^2}{b-\sqrt{b^2-4ac}},-\frac{2cx^2}{b+\sqrt{b^2-4ac}}\right]\right)\Bigg/\left(7f^3\sqrt{1+\frac{2cx^2}{b-\sqrt{b^2-4ac}}}\sqrt{1+\frac{2cx^2}{b+\sqrt{b^2-4ac}}}\right)$$

Result (type 6, 3656 leaves):

$$\frac{1}{\sqrt{x}}\sqrt{fx}\sqrt{a+bx^2+cx^4}\left(\frac{2\left(228b^2cd+3971ac^2d-108b^3e+624abce\right)x^{3/2}}{21945c^2}+\frac{2\left(323bcd+12b^2e+345ace\right)x^{7/2}}{3135c}+\frac{2}{285}\left(19cd+21be\right)x^{11/2}+\frac{2}{19}cex^{15/2}\right)-$$

$$\Bigg(32a^4dx\sqrt{fx}\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\Bigg)\Bigg/$$

$$\Bigg(15\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}$$

$$\Bigg(-7\,a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+$$

$$\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\Bigg)\Bigg)\Bigg)+$$

$$\Bigg(8\,a^3\,b^2\,d\,x\,\sqrt{f\,x}\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)$$

$$\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\Bigg)\Bigg/$$

$$\Bigg(55\,c\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}$$

$$\Bigg(-7\,a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+$$

$$\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\Bigg)\Bigg)\Bigg)-$$

$$\Bigg(72\,a^3\,b^3\,e\,x\,\sqrt{f\,x}\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)$$

$$\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\Bigg)\Bigg/$$

$$\Bigg(1045\,c^2\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}$$

$$\Bigg(-7\,a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+$$

$$\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\Bigg)\Bigg)\Bigg)+$$

$$\Bigg(416\,a^4\,b\,e\,x\,\sqrt{f\,x}\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)$$

$$\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\Bigg)\Bigg/$$

$$\Bigg(1045\,c\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}$$

$$\left(-7\,a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$

$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$

$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)-$$

$$\left(288\,a^3\,b\,d\,x^3\,\sqrt{f\,x}\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(245\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$

$$\left(-11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$

$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$

$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)+$$

$$\left(8\,a^2\,b^3\,d\,x^3\,\sqrt{f\,x}\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(49\,c\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$

$$\left(-11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$

$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$

$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)-$$

$$\left(96\,a^4\,e\,x^3\,\sqrt{f\,x}\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$

$$\left.\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(133\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$

$$\left(-11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$

$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)-$$

$$\Bigg(72a^2b^4ex^3\sqrt{fx}\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Big/$$

$$\Bigg(931c^2\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)\left(a+bx^2+cx^4\right)^{3/2}$$

$$\Bigg(-11a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)+$$

$$\Bigg(2472a^3b^2ex^3\sqrt{fx}\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Big/$$

$$\Bigg(4655c\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)\left(a+bx^2+cx^4\right)^{3/2}$$

$$\Bigg(-11a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)$$

Problem 210: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(d+ex^2\right)\left(a+bx^2+cx^4\right)^{3/2}}{\sqrt{fx}}\,dx$$

Optimal (type 6, 297 leaves, 6 steps):

$$\left(2\,a\,d\,\sqrt{f\,x}\,\sqrt{a+b\,x^2+c\,x^4}\;\text{AppellF1}\left[\frac{1}{4},-\frac{3}{2},-\frac{3}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(f\,\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right)+\left(2\,a\,e\,(f\,x)^{5/2}\,\sqrt{a+b\,x^2+c\,x^4}\;\text{AppellF1}\left[\frac{5}{4},-\frac{3}{2},-\frac{3}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(5\,f^3\,\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right)$$

Result (type 6, 3656 leaves):

$$\frac{1}{\sqrt{f\,x}}\sqrt{x}\,\sqrt{a+b\,x^2+c\,x^4}\left(\frac{2\,(68\,b^2\,c\,d+867\,a\,c^2\,d-28\,b^3\,e+176\,a\,b\,c\,e)\,\sqrt{x}}{3315\,c^2}+\frac{2\,(85\,b\,c\,d+4\,b^2\,e+91\,a\,c\,e)\,x^{5/2}}{663\,c}+\frac{2}{221}\,(17\,c\,d+19\,b\,e)\,x^{9/2}+\frac{2}{17}\,c\,e\,x^{13/2}\right)-$$

$$\left(96\,a^4\,d\,x\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\;\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(13\,\left(b-\sqrt{b^2-4\,a\,c}\right)\,\left(b+\sqrt{b^2-4\,a\,c}\right)\,\sqrt{f\,x}\,\left(a+b\,x^2+c\,x^4\right)^{3/2}\left(-5\,a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)+$$

$$\left(8\,a^3\,b^2\,d\,x\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\;\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(39\,c\,\left(b-\sqrt{b^2-4\,a\,c}\right)\,\left(b+\sqrt{b^2-4\,a\,c}\right)\,\sqrt{f\,x}\,\left(a+b\,x^2+c\,x^4\right)^{3/2}\left(-5\,a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)-$$

$$\left(56\, a^3 b^3 e\, x \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/$$

$$\left(663\, c^2 \left(b-\sqrt{b^2-4 a c}\right) \left(b+\sqrt{b^2-4 a c}\right) \sqrt{f x} \left(a+b x^2+c x^4\right)^{3/2} \left(-5 a\, \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+ x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+ \left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)+$$

$$\left(352\, a^4 b\, e\, x \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/$$

$$\left(663\, c \left(b-\sqrt{b^2-4 a c}\right) \left(b+\sqrt{b^2-4 a c}\right) \sqrt{f x} \left(a+b x^2+c x^4\right)^{3/2} \left(-5 a\, \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+ x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+ \left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)-$$

$$\left(672\, a^3 b\, d\, x^3 \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/$$

$$\left(325 \left(b-\sqrt{b^2-4 a c}\right) \left(b+\sqrt{b^2-4 a c}\right) \sqrt{f x} \left(a+b x^2+c x^4\right)^{3/2} \left(-9 a\, \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+ x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+ \left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)+$$

$$\left(72\, a^2 b^3 d\, x^3 \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/$$

$$\left(325\, c \left(b-\sqrt{b^2-4\, a\, c}\right) \left(b+\sqrt{b^2-4\, a\, c}\right) \sqrt{f\, x} \left(a+b\, x^2+c\, x^4\right)^{3/2}\right.$$
$$\left(-9\, a\, \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]+\right.$$
$$x^2 \left(\left(b+\sqrt{b^2-4\, a\, c}\right) \text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\, a\, c}\right) \text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]\right)\right)\right)-$$
$$\left(96\, a^4\, e\, x^3 \left(b-\sqrt{b^2-4\, a\, c}+2\, c\, x^2\right) \left(b+\sqrt{b^2-4\, a\, c}+2\, c\, x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]\right) \Big/$$
$$\left(85 \left(b-\sqrt{b^2-4\, a\, c}\right) \left(b+\sqrt{b^2-4\, a\, c}\right) \sqrt{f\, x} \left(a+b\, x^2+c\, x^4\right)^{3/2}\right.$$
$$\left(-9\, a\, \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]+\right.$$
$$x^2 \left(\left(b+\sqrt{b^2-4\, a\, c}\right) \text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\, a\, c}\right) \text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]\right)\right)\right)-$$
$$\left(504\, a^2\, b^4\, e\, x^3 \left(b-\sqrt{b^2-4\, a\, c}+2\, c\, x^2\right) \left(b+\sqrt{b^2-4\, a\, c}+2\, c\, x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]\right) \Big/$$
$$\left(5525\, c^2 \left(b-\sqrt{b^2-4\, a\, c}\right) \left(b+\sqrt{b^2-4\, a\, c}\right) \sqrt{f\, x} \left(a+b\, x^2+c\, x^4\right)^{3/2}\right.$$
$$\left(-9\, a\, \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]+\right.$$
$$x^2 \left(\left(b+\sqrt{b^2-4\, a\, c}\right) \text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\, a\, c}\right) \text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]\right)\right)\right)+$$
$$\left(3768\, a^3\, b^2\, e\, x^3 \left(b-\sqrt{b^2-4\, a\, c}+2\, c\, x^2\right) \left(b+\sqrt{b^2-4\, a\, c}+2\, c\, x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]\right) \Big/$$
$$\left(5525\, c \left(b-\sqrt{b^2-4\, a\, c}\right) \left(b+\sqrt{b^2-4\, a\, c}\right) \sqrt{f\, x} \left(a+b\, x^2+c\, x^4\right)^{3/2}\right.$$
$$\left(-9\, a\, \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\, c\, x^2}{b+\sqrt{b^2-4\, a\, c}},\frac{2\, c\, x^2}{-b+\sqrt{b^2-4\, a\, c}}\right]+\right.$$

$$x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\right)\right)$$

Problem 211: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(d+e x^2\right)\left(a+b x^2+c x^4\right)^{3/2}}{(f x)^{3/2}}\,dx$$

Optimal (type 6, 297 leaves, 6 steps):

$$-\left(\left(2ad\sqrt{a+bx^2+cx^4}\,\text{AppellF1}\left[-\frac{1}{4},-\frac{3}{2},-\frac{3}{2},\frac{3}{4},-\frac{2cx^2}{b-\sqrt{b^2-4ac}},-\frac{2cx^2}{b+\sqrt{b^2-4ac}}\right]\right)\Big/\left(f\sqrt{fx}\sqrt{1+\frac{2cx^2}{b-\sqrt{b^2-4ac}}}\sqrt{1+\frac{2cx^2}{b+\sqrt{b^2-4ac}}}\right)\right)+\left(2ae(fx)^{3/2}\sqrt{a+bx^2+cx^4}\,\text{AppellF1}\left[\frac{3}{4},-\frac{3}{2},-\frac{3}{2},\frac{7}{4},-\frac{2cx^2}{b-\sqrt{b^2-4ac}},-\frac{2cx^2}{b+\sqrt{b^2-4ac}}\right]\right)\Big/\left(3f^3\sqrt{1+\frac{2cx^2}{b-\sqrt{b^2-4ac}}}\sqrt{1+\frac{2cx^2}{b+\sqrt{b^2-4ac}}}\right)$$

Result (type 6, 2839 leaves):

$$\frac{1}{(fx)^{3/2}}x^{3/2}\sqrt{a+bx^2+cx^4}\left(-\frac{2ad}{\sqrt{x}}+\frac{2\left(195bcd+12b^2e+209ace\right)x^{3/2}}{1155c}+\frac{2}{165}\left(15cd+17be\right)x^{7/2}+\frac{2}{15}cex^{11/2}\right)-$$

$$\left(128a^3bdx^3\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Big/$$

$$\left(11\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)(fx)^{3/2}\left(a+bx^2+cx^4\right)^{3/2}\left(-7a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\right)\right)-$$

$$\left(32\,a^4\,e\,x^3\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(15\,\left(b-\sqrt{b^2-4\,a\,c}\right)\,\left(b+\sqrt{b^2-4\,a\,c}\right)\,(f\,x)^{3/2}\,\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$
$$\left(-7\,a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\,\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)+$$
$$\left(8\,a^3\,b^2\,e\,x^3\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(55\,c\,\left(b-\sqrt{b^2-4\,a\,c}\right)\,\left(b+\sqrt{b^2-4\,a\,c}\right)\,(f\,x)^{3/2}\,\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$
$$\left(-7\,a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\,\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)-$$
$$\left(24\,a^2\,b^2\,d\,x^5\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(49\,\left(b-\sqrt{b^2-4\,a\,c}\right)\,\left(b+\sqrt{b^2-4\,a\,c}\right)\,(f\,x)^{3/2}\,\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$
$$\left(-11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\,\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)-$$
$$\left(96\,a^3\,c\,d\,x^5\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(7\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)(f x)^{3/2}\left(a+b x^2+c x^4\right)^{3/2}\right.$$
$$\left(-11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\right)\right)-$$
$$\left(288\,a^3\,b\,e\,x^5\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Big/$$
$$\left(245\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)(f x)^{3/2}\left(a+b x^2+c x^4\right)^{3/2}\right.$$
$$\left(-11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\right)\right)+$$
$$\left(8\,a^2\,b^3\,e\,x^5\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Big/$$
$$\left(49\,c\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)(f x)^{3/2}\left(a+b x^2+c x^4\right)^{3/2}\right.$$
$$\left(-11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\right)\right)$$

Problem 212: Result more than twice size of optimal antiderivative.

$$\int \frac{(f x)^{3/2}\left(d+e x^2\right)}{\sqrt{a+b x^2+c x^4}}\,dx$$

Optimal (type 6, 297 leaves, 6 steps):

$$\left(2\,d\,(f\,x)^{5/2}\,\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right.$$

$$\left.\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(5\,f\,\sqrt{a+b\,x^2+c\,x^4}\right)+$$

$$\left(2\,e\,(f\,x)^{9/2}\,\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right.$$

$$\left.\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{1}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(9\,f^3\,\sqrt{a+b\,x^2+c\,x^4}\right)$$

Result (type 6, 1037 leaves) :

$$\frac{1}{50\,c^2\,\left(a+b\,x^2+c\,x^4\right)^{3/2}}$$
$$f\,\sqrt{f\,x}\,\left(20\,c\,e\,\left(a+b\,x^2+c\,x^4\right)^2+\left(25\,a^2\,e\,\left(-b+\sqrt{b^2-4\,a\,c}-2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.\right.$$
$$\left.\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(5\,a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-\right.$$
$$x^2\,\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)+$$
$$\left(45\,a\,c\,d\,x^2\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(9\,a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-\right.$$
$$x^2\,\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)+$$
$$\left(27\,a\,b\,e\,x^2\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(-9\,a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\,\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)\right)$$

Problem 213: Result more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{f\,x}\,\left(d+e\,x^2\right)}{\sqrt{a+b\,x^2+c\,x^4}}\,dx$$

Optimal (type 6, 297 leaves, 6 steps):

$$\left(2 d (f x)^{3/2} \sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}} \sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}} \text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right) \Big/ \left(3 f \sqrt{a+b x^2+c x^4}\right)+\left(2 e (f x)^{7/2} \sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}} \sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}} \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right) \Big/ \left(7 f^3 \sqrt{a+b x^2+c x^4}\right)$$

Result (type 6, 642 leaves) :

$$\frac{1}{42 c \left(a+b x^2+c x^4\right)^{3/2}} a x \sqrt{f x} \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \left(-\left(\left(49 d \text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/ \left(-7 a \text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)-\left(33 e x^2 \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/ \left(-11 a \text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)$$

Problem 214: Result more than twice size of optimal antiderivative.

$$\int \frac{d+e x^2}{\sqrt{f x} \sqrt{a+b x^2+c x^4}} \, dx$$

Optimal (type 6, 295 leaves, 6 steps) :

$$\frac{1}{f\sqrt{a+b x^2+c x^4}}2 d \sqrt{f x} \sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}} \sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}}\ \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]+$$
$$\left(2 e (f x)^{5/2} \sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}} \sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}}\ \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right)\bigg/\left(5 f^3 \sqrt{a+b x^2+c x^4}\right)$$

Result (type 6, 642 leaves):

$$\frac{1}{10 c \sqrt{f x}\ \left(a+b x^2+c x^4\right)^{3/2}} a x \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right)$$
$$\left(-\left(\left(25 d\ \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\bigg/\right.\right.$$
$$\left(-5 a\ \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$
$$x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$
$$\left.\left.\left.\left.\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)\right)-$$
$$\left(9 e x^2\ \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\bigg/$$
$$\left(-9 a\ \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$
$$x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)$$

Problem 215: Result more than twice size of optimal antiderivative.

$$\int \frac{d+e x^2}{(f x)^{3/2} \sqrt{a+b x^2+c x^4}}\, dx$$

Optimal (type 6, 295 leaves, 6 steps):

$$-\left(\left(2\,d\,\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\,\text{AppellF1}\left[-\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{3}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(f\,\sqrt{f\,x}\,\sqrt{a+b\,x^2+c\,x^4}\right)\right)+$$

$$\left(2\,e\,(f\,x)^{3/2}\,\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(3\,f^3\,\sqrt{a+b\,x^2+c\,x^4}\right)$$

Result (type 6, 1049 leaves) :

$$\frac{1}{21\,a\,(f\,x)^{3/2}\left(a+b\,x^2+c\,x^4\right)^{3/2}}$$

$$2\,x\left(-21\,d\left(a+b\,x^2+c\,x^4\right)^2+\left(49\,a\,b\,d\,x^2\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.\right.$$

$$\left.\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(4\,c\left(7\,a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-\right.\right.$$

$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$

$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)+$$

$$\left(49\,a^2\,e\,x^2\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\right.\right.$$

$$\left.\left.\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(4\,c\left(7\,a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-\right.\right.$$

$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$

$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)+$$

$$\left(99\,a\,d\,x^4\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\right.\right.$$

$$\left.\left.\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(44\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-\right.$$

$$4\,x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$

$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)$$

Problem 216: Result more than twice size of optimal antiderivative.

$$\int\frac{(f\,x)^{3/2}\left(d+e\,x^2\right)}{\left(a+b\,x^2+c\,x^4\right)^{3/2}}\,dx$$

Optimal (type 6, 303 leaves, 6 steps):

$$\left(2 d (f x)^{5/2} \sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}} \sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}} \text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{3}{2},\frac{9}{4},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right) \Big/ \left(5 a f \sqrt{a+b x^2+c x^4}\right)+\left(2 e (f x)^{9/2} \sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}} \sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}} \text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{3}{2},\frac{13}{4},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right) \Big/ \left(9 a f^3 \sqrt{a+b x^2+c x^4}\right)$$

Result (type 6, 1404 leaves):

$$\frac{1}{5 \left(b^2-4 a c\right) \left(a+b x^2+c x^4\right)^{3/2}} f \sqrt{f x} \left(5 \left(-b d+2 a e-2 c d x^2+b e x^2\right) \left(a+b x^2+c x^4\right)+\left(25 a^2 e \left(-b+\sqrt{b^2-4 a c}-2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/ \left(2 c \left(5 a \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]-x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)+\left(25 a b d \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/ \left(4 c \left(5 a \text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]-x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)+\left(9 a d x^2 \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right) \text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right) \Big/$$

$$\left(18\,a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-\right.$$
$$2\,x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)-$$
$$\left(9\,a\,b\,e\,x^2\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(4\,c\left(9\,a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-\right.\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)\right)$$

Problem 217: Result more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{f\,x}\,\left(d+e\,x^2\right)}{\left(a+b\,x^2+c\,x^4\right)^{3/2}}\,dx$$

Optimal (type 6, 303 leaves, 6 steps):

$$\left(2\,d\,(f\,x)^{3/2}\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right.$$
$$\left.\text{AppellF1}\left[\frac{3}{4},\frac{3}{2},\frac{3}{2},\frac{7}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(3\,a\,f\sqrt{a+b\,x^2+c\,x^4}\right)+$$
$$\left(2\,e\,(f\,x)^{7/2}\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right.$$
$$\left.\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{3}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(7\,a\,f^3\sqrt{a+b\,x^2+c\,x^4}\right)$$

Result (type 6, 1740 leaves):

$$\frac{1}{84\,a\left(-b^2+4\,a\,c\right)\left(a+b\,x^2+c\,x^4\right)^{3/2}}\,x\sqrt{f\,x}$$
$$\left(84\left(a+b\,x^2+c\,x^4\right)\left(-b^2\,d+b\left(a\,e-c\,d\,x^2\right)+2\,a\,c\left(d+e\,x^2\right)\right)+\left(196\,a^2\,d\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.\right.$$

$$\left(b+\sqrt{b^2-4ac}+2cx^2\right) \text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg) \Bigg/$$

$$\Bigg(14a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]-$$

$$2x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\right.$$

$$\left.\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Bigg)+$$

$$\Bigg(49ab^2d\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(c\Bigg(7a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]-$$

$$x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\right.$$

$$\left.\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Bigg)\Bigg)-$$

$$\Bigg(147a^2be\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(c\Bigg(7a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]-$$

$$x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\right.$$

$$\left.\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Bigg)\Bigg)-$$

$$\Bigg(99abdx^2\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(-11a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\right.$$

$$\left.\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Bigg)+$$

$$\Bigg(198a^2ex^2\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$
$$\Bigg(-11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$
$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$
$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)$$

Problem 218: Result more than twice size of optimal antiderivative.

$$\int\frac{d+e x^2}{\sqrt{f x}\,\left(a+b x^2+c x^4\right)^{3/2}}\,dx$$

Optimal (type 6, 301 leaves, 6 steps):

$$\Bigg(2d\sqrt{fx}\sqrt{1+\frac{2cx^2}{b-\sqrt{b^2-4ac}}}\sqrt{1+\frac{2cx^2}{b+\sqrt{b^2-4ac}}}$$
$$\text{AppellF1}\left[\frac{1}{4},\frac{3}{2},\frac{3}{2},\frac{5}{4},-\frac{2cx^2}{b-\sqrt{b^2-4ac}},-\frac{2cx^2}{b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/\left(af\sqrt{a+bx^2+cx^4}\right)+$$
$$\Bigg(2e\,(fx)^{5/2}\sqrt{1+\frac{2cx^2}{b-\sqrt{b^2-4ac}}}\sqrt{1+\frac{2cx^2}{b+\sqrt{b^2-4ac}}}$$
$$\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{3}{2},\frac{9}{4},-\frac{2cx^2}{b-\sqrt{b^2-4ac}},-\frac{2cx^2}{b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/\left(5af^3\sqrt{a+bx^2+cx^4}\right)$$

Result (type 6, 1740 leaves):

$$\frac{1}{20a\left(-b^2+4ac\right)\sqrt{fx}\left(a+bx^2+cx^4\right)^{3/2}}$$
$$\times\Bigg(20\left(a+bx^2+cx^4\right)\left(-b^2d+b\left(ae-cdx^2\right)+2ac\left(d+ex^2\right)\right)+\Bigg(300a^2d\left(b-\sqrt{b^2-4ac}+2cx^2\right)$$
$$\left(b+\sqrt{b^2-4ac}+2cx^2\right)\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$
$$\Bigg(10\,a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]-$$
$$2x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$
$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)-$$

$$\left(25\,a\,b^2\,d\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(c\,\left(5\,a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-x^2\,\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)-$$

$$\left(25\,a^2\,b\,e\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(c\,\left(5\,a\,\text{AppellF1}\left[\frac{1}{4},\frac{1}{2},\frac{1}{2},\frac{5}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-x^2\,\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{3}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{3}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)-$$

$$\left(9\,a\,b\,d\,x^2\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(-9\,a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+x^2\,\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\left(b-\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)+$$

$$\left(18\,a^2\,e\,x^2\,\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$

$$\left(-9\,a\,\text{AppellF1}\left[\frac{5}{4},\frac{1}{2},\frac{1}{2},\frac{9}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+x^2\,\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\,\text{AppellF1}\left[\frac{9}{4},\frac{1}{2},\frac{3}{2},\frac{13}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.\right.$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{9}{4},\frac{3}{2},\frac{1}{2},\frac{13}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)$$

Problem 219: Result more than twice size of optimal antiderivative.

$$\int \frac{d+ex^2}{(fx)^{3/2}\left(a+bx^2+cx^4\right)^{3/2}}\,dx$$

Optimal (type 6, 301 leaves, 6 steps):

$$-\left(\left(2d\sqrt{1+\frac{2cx^2}{b-\sqrt{b^2-4ac}}}\sqrt{1+\frac{2cx^2}{b+\sqrt{b^2-4ac}}}\text{AppellF1}\left[-\frac{1}{4},\frac{3}{2},\frac{3}{2},\frac{3}{4},-\frac{2cx^2}{b-\sqrt{b^2-4ac}},-\frac{2cx^2}{b+\sqrt{b^2-4ac}}\right]\right)\Big/\left(af\sqrt{fx}\sqrt{a+bx^2+cx^4}\right)\right)+$$
$$\left(2e(fx)^{3/2}\sqrt{1+\frac{2cx^2}{b-\sqrt{b^2-4ac}}}\sqrt{1+\frac{2cx^2}{b+\sqrt{b^2-4ac}}}\text{AppellF1}\left[\frac{3}{4},\frac{3}{2},\frac{3}{2},\frac{7}{4},-\frac{2cx^2}{b-\sqrt{b^2-4ac}},-\frac{2cx^2}{b+\sqrt{b^2-4ac}}\right]\right)\Big/\left(3af^3\sqrt{a+bx^2+cx^4}\right)$$

Result (type 6, 2959 leaves):

$$\frac{1}{(fx)^{3/2}}x^{3/2}\sqrt{a+bx^2+cx^4}\left(-\frac{2d}{a^2\sqrt{x}}+\left(b^3dx^{3/2}-3abcdx^{3/2}-ab^2ex^{3/2}+2a^2cex^{3/2}+b^2cdx^{7/2}-2ac^2dx^{7/2}-abcex^{7/2}\right)\Big/\left(a^2\left(-b^2+4ac\right)\left(a+bx^2+cx^4\right)\right)\right)+$$
$$\left(7b^3dx^3\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Big/$$
$$\Bigg(\left(-b^2+4ac\right)\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)(fx)^{3/2}\left(a+bx^2+cx^4\right)^{3/2}$$
$$\Bigg(-7a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$
$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$
$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)-$$
$$\Bigg(21abcdx^3\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(\left(-b^2+4ac\right)\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)(fx)^{3/2}\left(a+bx^2+cx^4\right)^{3/2}$$

$$\Bigg(-7a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)-$$

$$\Bigg(7ab^2ex^3\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(3\left(-b^2+4ac\right)\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)(fx)^{3/2}\left(a+bx^2+cx^4\right)^{3/2}$$

$$\Bigg(-7a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)-$$

$$\Bigg(14a^2cex^3\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(3\left(-b^2+4ac\right)\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)(fx)^{3/2}\left(a+bx^2+cx^4\right)^{3/2}$$

$$\Bigg(-7a\,\text{AppellF1}\left[\frac{3}{4},\frac{1}{2},\frac{1}{2},\frac{7}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$x^2\Bigg(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{3}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+$$

$$\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{7}{4},\frac{3}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg)\Bigg)+$$

$$\Bigg(99b^2cdx^5\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)$$

$$\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\Bigg)\Bigg/$$

$$\Bigg(7\left(-b^2+4ac\right)\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)(fx)^{3/2}\left(a+bx^2+cx^4\right)^{3/2}$$

$$\left(-11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)-$$
$$\left(330\,a\,c^2\,d\,x^5\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(7\left(-b^2+4\,a\,c\right)\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)(f\,x)^{3/2}\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$
$$\left(-11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)-$$
$$\left(33\,a\,b\,c\,e\,x^5\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left.\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(7\left(-b^2+4\,a\,c\right)\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right)(f\,x)^{3/2}\left(a+b\,x^2+c\,x^4\right)^{3/2}\right.$$
$$\left(-11\,a\,\text{AppellF1}\left[\frac{7}{4},\frac{1}{2},\frac{1}{2},\frac{11}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{1}{2},\frac{3}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{11}{4},\frac{3}{2},\frac{1}{2},\frac{15}{4},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)\right)$$

Problem 223: Result is not expressed in closed-form.

$$\int \frac{(f\,x)^m\left(d+e\,x^2\right)}{a+b\,x^2+c\,x^4}\,dx$$

Optimal (type 5, 194 leaves, 3 steps):

$$\frac{\left(e+\frac{2 c d-b e}{\sqrt{b^2-4 a c}}\right) (f x)^{1+m} \text{Hypergeometric2F1}\left[1, \frac{1+m}{2}, \frac{3+m}{2}, -\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}\right]}{\left(b-\sqrt{b^2-4 a c}\right) f (1+m)}+\frac{\left(e-\frac{2 c d-b e}{\sqrt{b^2-4 a c}}\right) (f x)^{1+m} \text{Hypergeometric2F1}\left[1, \frac{1+m}{2}, \frac{3+m}{2}, -\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]}{\left(b+\sqrt{b^2-4 a c}\right) f (1+m)}$$

Result (type 7, 316 leaves):

$$\frac{1}{2 m} d (f x)^m \text{RootSum}\left[a+b \#1^2+c \#1^4 \&, \frac{\text{Hypergeometric2F1}\left[-m, -m, 1-m, -\frac{\#1}{x-\#1}\right] \left(\frac{x}{x-\#1}\right)^{-m}}{b \#1+2 c \#1^3} \&\right]+\left(e (f x)^m \text{RootSum}\left[a+b \#1^2+c \#1^4 \&, \frac{1}{b \#1+2 c \#1^3} \left(m x^2+m^2 x^2+2 m x \#1+m^2 x \#1+2 \text{Hypergeometric2F1}\left[-m, -m, 1-m, -\frac{\#1}{x-\#1}\right] \left(\frac{x}{x-\#1}\right)^{-m} \#1^2+3 m \text{Hypergeometric2F1}\left[-m, -m, 1-m, -\frac{\#1}{x-\#1}\right] \left(\frac{x}{x-\#1}\right)^{-m} \#1^2+m^2 \text{Hypergeometric2F1}\left[-m, -m, 1-m, -\frac{\#1}{x-\#1}\right] \left(\frac{x}{x-\#1}\right)^{-m} \#1^2+m \left(\frac{x}{\#1}\right)^{-m} \#1^2\right) \&\right]\right) \Big/ (2 m (1+m) (2+m))$$

Problem 224: Result unnecessarily involves higher level functions.

$$\int \frac{(f x)^m \left(d+e x^2\right)}{\left(a+b x^2+c x^4\right)^2} \, dx$$

Optimal (type 5, 392 leaves, 4 steps):

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

Result (type 6, 692 leaves):

$$\frac{1}{4 c (3+m) \left(a+b x^2+c x^4\right)^3} a x (f x)^m \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right)$$
$$\left(\left(d (3+m)^2 \text{AppellF1}\left[\frac{1+m}{2},2,2,\frac{3+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\Big/\right.$$
$$\left((1+m) \left(a (3+m) \text{AppellF1}\left[\frac{1+m}{2},2,2,\frac{3+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]-\right.\right.$$
$$2 x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{3+m}{2},2,3,\frac{5+m}{2},\right.\right.$$
$$\left.-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\left(b-\sqrt{b^2-4 a c}\right)$$
$$\left.\left.\left.\left.\text{AppellF1}\left[\frac{3+m}{2},3,2,\frac{5+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)+$$
$$\left(e (5+m) x^2 \text{AppellF1}\left[\frac{3+m}{2},2,2,\frac{5+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\Big/$$
$$\left(a (5+m) \text{AppellF1}\left[\frac{3+m}{2},2,2,\frac{5+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]-\right.$$
$$2 x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5+m}{2},2,3,\frac{7+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5+m}{2},3,2,\frac{7+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)$$

Problem 225: Result more than twice size of optimal antiderivative.

$$\int (f x)^m \left(d+e x^2\right) \left(a+b x^2+c x^4\right)^{3/2} dx$$

Optimal (type 6, 319 leaves, 6 steps):

$$\left(a d (f x)^{1+m} \sqrt{a+b x^2+c x^4}\right.$$
$$\left.\text{AppellF1}\left[\frac{1+m}{2},-\frac{3}{2},-\frac{3}{2},\frac{3+m}{2},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right)\Big/$$
$$\left(f (1+m) \sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}} \sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}}\right)+\left(a e (f x)^{3+m} \sqrt{a+b x^2+c x^4}\right.$$
$$\left.\text{AppellF1}\left[\frac{3+m}{2},-\frac{3}{2},-\frac{3}{2},\frac{5+m}{2},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right)\Big/$$
$$\left(f^3 (3+m) \sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}} \sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}}\right)$$

Result (type 6, 2559 leaves):

$$\left(a\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)d\,(3+m)\,x\,(f x)^m\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)\text{AppellF1}\left[\frac{1+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{3+m}{2},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Big/$$

$$\left(8c^2(1+m)\sqrt{a+bx^2+cx^4}\left(2a(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{3+m}{2},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},\frac{1}{2},\frac{5+m}{2},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{3+m}{2},\frac{1}{2},-\frac{1}{2},\frac{5+m}{2},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\right)\right)+$$

$$\left(b\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)d\,(5+m)\,x^3\,(f x)^m\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)\text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{5+m}{2},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Big/$$

$$\left(8c^2(3+m)\sqrt{a+bx^2+cx^4}\left(2a(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{5+m}{2},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+x^2\left(\left(b+\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{5+m}{2},-\frac{1}{2},\frac{1}{2},\frac{7+m}{2},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\left(b-\sqrt{b^2-4ac}\right)\text{AppellF1}\left[\frac{5+m}{2},\frac{1}{2},-\frac{1}{2},\frac{7+m}{2},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\right)\right)+$$

$$\left(a\left(b-\sqrt{b^2-4ac}\right)\left(b+\sqrt{b^2-4ac}\right)e\,(5+m)\,x^3\,(f x)^m\left(b-\sqrt{b^2-4ac}+2cx^2\right)\left(b+\sqrt{b^2-4ac}+2cx^2\right)\text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{5+m}{2},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]\right)\Big/$$

$$\left(8c^2(3+m)\sqrt{a+bx^2+cx^4}\left(2a(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{5+m}{2},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},\frac{2cx^2}{-b+\sqrt{b^2-4ac}}\right]+\right.\right.$$

$$x^2 \left(\left(b+\sqrt{b^2-4\,a\,c}\right) \text{AppellF1}\left[\frac{5+m}{2},-\frac{1}{2},\frac{1}{2},\frac{7+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left(b-\sqrt{b^2-4\,a\,c}\right) \text{AppellF1}\left[\frac{5+m}{2},\frac{1}{2},-\frac{1}{2},\right.$$
$$\left.\left.\left.\left.\frac{7+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)+$$
$$\left(\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right) d\,(7+m)\,x^5\,(f\,x)^m\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)$$
$$\left.\text{AppellF1}\left[\frac{5+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{7+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(8\,c\,(5+m)\sqrt{a+b\,x^2+c\,x^4}\right.$$
$$\left(2\,a\,(7+m)\,\text{AppellF1}\left[\frac{5+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{7+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7+m}{2},-\frac{1}{2},\frac{1}{2},\frac{9+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7+m}{2},\frac{1}{2},-\frac{1}{2},\right.$$
$$\left.\left.\left.\left.\frac{9+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)+$$
$$\left(b\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right) e\,(7+m)\,x^5\,(f\,x)^m\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)$$
$$\left.\text{AppellF1}\left[\frac{5+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{7+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(8\,c^2\,(5+m)\sqrt{a+b\,x^2+c\,x^4}\right.$$
$$\left(2\,a\,(7+m)\,\text{AppellF1}\left[\frac{5+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{7+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7+m}{2},-\frac{1}{2},\frac{1}{2},\frac{9+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{7+m}{2},\frac{1}{2},-\frac{1}{2},\right.$$
$$\left.\left.\left.\left.\frac{9+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)+$$
$$\left(\left(b-\sqrt{b^2-4\,a\,c}\right)\left(b+\sqrt{b^2-4\,a\,c}\right) e\,(9+m)\,x^7\,(f\,x)^m\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\right.$$
$$\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)$$

$$\text{AppellF1}\left[\frac{7+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{9+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\Bigg)\Bigg/$$
$$\Bigg(8 c (7+m) \sqrt{a+b x^2+c x^4}$$
$$\Bigg(2 a (9+m) \text{AppellF1}\left[\frac{7+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{9+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+$$
$$x^2\Bigg(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{9+m}{2},-\frac{1}{2},\frac{1}{2},\frac{11+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+$$
$$\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{9+m}{2},\frac{1}{2},-\frac{1}{2},\frac{11+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\Bigg)\Bigg)\Bigg)$$

Problem 226: Result more than twice size of optimal antiderivative.

$$\int (f x)^m \left(d+e x^2\right) \sqrt{a+b x^2+c x^4}\, dx$$

Optimal (type 6, 317 leaves, 6 steps):

$$\left(d (f x)^{1+m} \sqrt{a+b x^2+c x^4}\, \text{AppellF1}\left[\frac{1+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{3+m}{2},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right)\Bigg/$$
$$\left(f (1+m) \sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}} \sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}}\right)+$$
$$\left(e (f x)^{3+m} \sqrt{a+b x^2+c x^4}\, \text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{5+m}{2},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right)\Bigg/\left(f^3 (3+m) \sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}} \sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}}\right)$$

Result (type 6, 755 leaves):

$$\frac{1}{8 c^2 (3+m) \sqrt{a+b x^2+c x^4}} \left(b-\sqrt{b^2-4 a c}\right) \left(b+\sqrt{b^2-4 a c}\right) x (f x)^m \left(b-\sqrt{b^2-4 a c}+2 c x^2\right) \left(b+\sqrt{b^2-4 a c}+2 c x^2\right)$$
$$\left(\left(d (3+m)^2 \text{AppellF1}\left[\frac{1+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{3+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\Big/\right.$$
$$\left((1+m) \left(2 a (3+m) \text{AppellF1}\left[\frac{1+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{3+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.\right.$$
$$x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},\frac{1}{2},\frac{5+m}{2},\right.\right.$$
$$\left.-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\left(b-\sqrt{b^2-4 a c}\right)$$
$$\left.\left.\left.\text{AppellF1}\left[\frac{3+m}{2},\frac{1}{2},-\frac{1}{2},\frac{5+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)+$$
$$\left(e (5+m) x^2 \text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{5+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\Big/$$
$$\left(2 a (5+m) \text{AppellF1}\left[\frac{3+m}{2},-\frac{1}{2},-\frac{1}{2},\frac{5+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$
$$x^2 \left(\left(b+\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5+m}{2},-\frac{1}{2},\frac{1}{2},\frac{7+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\right.$$
$$\left(b-\sqrt{b^2-4 a c}\right) \text{AppellF1}\left[\frac{5+m}{2},\frac{1}{2},-\frac{1}{2},\right.$$
$$\left.\left.\left.\left.\frac{7+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)$$

Problem 227: Result more than twice size of optimal antiderivative.

$$\int \frac{(f x)^m \left(d+e x^2\right)}{\sqrt{a+b x^2+c x^4}} \, dx$$

Optimal (type 6, 317 leaves, 6 steps):

$$\left(d\,(f\,x)^{1+m}\,\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\right.$$
$$\left.\text{AppellF1}\left[\frac{1+m}{2},\frac{1}{2},\frac{1}{2},\frac{3+m}{2},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(f\,(1+m)\,\sqrt{a+b\,x^2+c\,x^4}\right)+\left(e\,(f\,x)^{3+m}\,\sqrt{1+\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}}}\,\sqrt{1+\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}}\,\text{AppellF1}\left[\right.\right.$$
$$\left.\left.\frac{3+m}{2},\frac{1}{2},\frac{1}{2},\frac{5+m}{2},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\left(f^3\,(3+m)\,\sqrt{a+b\,x^2+c\,x^4}\right)$$

Result (type 6, 728 leaves):

$$\frac{1}{2\,c\,(3+m)\,\left(a+b\,x^2+c\,x^4\right)^{3/2}}\,a\,x\,(f\,x)^m\left(b-\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)\left(b+\sqrt{b^2-4\,a\,c}+2\,c\,x^2\right)$$
$$\left(\left(d\,(3+m)^2\,\text{AppellF1}\left[\frac{1+m}{2},\frac{1}{2},\frac{1}{2},\frac{3+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/\right.$$
$$\left((1+m)\left(2\,a\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},\frac{1}{2},\frac{1}{2},\frac{3+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]-\right.\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{3+m}{2},\frac{1}{2},\frac{3}{2},\frac{5+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{3+m}{2},\frac{3}{2},\frac{1}{2},\frac{5+m}{2},\right.$$
$$\left.\left.\left.\left.-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)-$$
$$\left(e\,(5+m)\,x^2\,\text{AppellF1}\left[\frac{3+m}{2},\frac{1}{2},\frac{1}{2},\frac{5+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\Big/$$
$$\left(-2\,a\,(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},\frac{1}{2},\frac{1}{2},\frac{5+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$x^2\left(\left(b+\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{5+m}{2},\frac{1}{2},\frac{3}{2},\frac{7+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]+\right.$$
$$\left.\left.\left.\left(b-\sqrt{b^2-4\,a\,c}\right)\text{AppellF1}\left[\frac{5+m}{2},\frac{3}{2},\frac{1}{2},\frac{7+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\frac{2\,c\,x^2}{-b+\sqrt{b^2-4\,a\,c}}\right]\right)\right)\right)$$

Problem 228: Result more than twice size of optimal antiderivative.

$$\int\frac{(f\,x)^m\,\left(d+e\,x^2\right)}{\left(a+b\,x^2+c\,x^4\right)^{3/2}}\,dx$$

Optimal (type 6, 323 leaves, 6 steps):

$$\left(d\,(f x)^{1+m}\sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}}\sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}}\ \text{AppellF1}\left[\frac{1+m}{2},\frac{3}{2},\frac{3}{2},\frac{3+m}{2},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right)\Big/\left(a f\,(1+m)\sqrt{a+b x^2+c x^4}\right)+\left(e\,(f x)^{3+m}\sqrt{1+\frac{2 c x^2}{b-\sqrt{b^2-4 a c}}}\sqrt{1+\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}}\ \text{AppellF1}\left[\frac{3+m}{2},\frac{3}{2},\frac{3}{2},\frac{5+m}{2},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}}\right]\right)\Big/\left(a f^3\,(3+m)\sqrt{a+b x^2+c x^4}\right)$$

Result (type 6, 728 leaves):

$$\frac{1}{2 c\,(3+m)\left(a+b x^2+c x^4\right)^{5/2}}\,a x\,(f x)^m\left(b-\sqrt{b^2-4 a c}+2 c x^2\right)\left(b+\sqrt{b^2-4 a c}+2 c x^2\right)\left(\left(d\,(3+m)^2\,\text{AppellF1}\left[\frac{1+m}{2},\frac{3}{2},\frac{3}{2},\frac{3+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\Big/\left((1+m)\left(2 a\,(3+m)\,\text{AppellF1}\left[\frac{1+m}{2},\frac{3}{2},\frac{3}{2},\frac{3+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]-3 x^2\left(\left(b+\sqrt{b^2-4 a c}\right)\text{AppellF1}\left[\frac{3+m}{2},\frac{3}{2},\frac{5}{2},\frac{5+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\left(b-\sqrt{b^2-4 a c}\right)\text{AppellF1}\left[\frac{3+m}{2},\frac{5}{2},\frac{3}{2},\frac{5+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)+\left(e\,(5+m)\,x^2\,\text{AppellF1}\left[\frac{3+m}{2},\frac{3}{2},\frac{3}{2},\frac{5+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\Big/\left(2 a\,(5+m)\,\text{AppellF1}\left[\frac{3+m}{2},\frac{3}{2},\frac{3}{2},\frac{5+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]-3 x^2\left(\left(b+\sqrt{b^2-4 a c}\right)\text{AppellF1}\left[\frac{5+m}{2},\frac{3}{2},\frac{5}{2},\frac{7+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]+\left(b-\sqrt{b^2-4 a c}\right)\text{AppellF1}\left[\frac{5+m}{2},\frac{5}{2},\frac{3}{2},\frac{7+m}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},\frac{2 c x^2}{-b+\sqrt{b^2-4 a c}}\right]\right)\right)\right)$$

Problem 259: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 70 leaves, 4 steps):

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

Result (type 4, 40 leaves):

$$(-1)^{1/4}\left(-\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}x\right],-1\right]+\text{EllipticPi}\left[-i,i\,\text{ArcSinh}\left[(-1)^{1/4}x\right],-1\right]\right)$$

Problem 260: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 70 leaves, 4 steps):

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

Result (type 4, 36 leaves):

$$(-1)^{1/4}\left(\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}x\right],-1\right]-\text{EllipticPi}\left[i,\text{ArcSin}\left[(-1)^{3/4}x\right],-1\right]\right)$$

Problem 265: Result unnecessarily involves imaginary or complex numbers.

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

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

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

Result (type 4, 60 leaves):

$$\frac{1}{\sqrt{-1-x^4}}(-1)^{1/4}\sqrt{1+x^4}\left(-\text{EllipticF}\left[i\,\text{ArcSinh}\left[(-1)^{1/4}x\right],-1\right]+\text{EllipticPi}\left[-i,i\,\text{ArcSinh}\left[(-1)^{1/4}x\right],-1\right]\right)$$

Problem 266: Result unnecessarily involves imaginary or complex numbers.

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

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

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

Result (type 4, 56 leaves) :

$$\frac{1}{\sqrt{-1-x^4}}(-1)^{1/4}\sqrt{1+x^4}\left(\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[(-1)^{1/4}x\right],-1\right]-\text{EllipticPi}\left[\text{i},\text{ArcSin}\left[(-1)^{3/4}x\right],-1\right]\right)$$

Problem 310: Result is not expressed in closed-form.

$$\int\frac{1}{\sqrt{f\,x}\,\left(d+e\,x^2\right)\,\left(a+b\,x^2+c\,x^4\right)}\,dx$$

Optimal (type 3, 866 leaves, 19 steps) :

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

$$\frac{c^{3/4}\left(2\,c\,d-\left(b+\sqrt{b^2-4\,a\,c}\right)e\right)\text{ArcTan}\left[\frac{2^{1/4}\,c^{1/4}\,\sqrt{f\,x}}{\left(-b+\sqrt{b^2-4\,a\,c}\right)^{1/4}\sqrt{f}}\right]}{2^{1/4}\,\sqrt{b^2-4\,a\,c}\,\left(-b+\sqrt{b^2-4\,a\,c}\right)^{3/4}\left(c\,d^2-b\,d\,e+a\,e^2\right)\sqrt{f}}-\frac{e^{7/4}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,e^{1/4}\,\sqrt{f\,x}}{d^{1/4}\,\sqrt{f}}\right]}{\sqrt{2}\,d^{3/4}\left(c\,d^2-b\,d\,e+a\,e^2\right)\sqrt{f}}+$$

$$\frac{e^{7/4}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,e^{1/4}\,\sqrt{f\,x}}{d^{1/4}\,\sqrt{f}}\right]}{\sqrt{2}\,d^{3/4}\left(c\,d^2-b\,d\,e+a\,e^2\right)\sqrt{f}}+\frac{c^{3/4}\left(2\,c\,d-\left(b-\sqrt{b^2-4\,a\,c}\right)e\right)\text{ArcTanh}\left[\frac{2^{1/4}\,c^{1/4}\,\sqrt{f\,x}}{\left(-b-\sqrt{b^2-4\,a\,c}\right)^{1/4}\sqrt{f}}\right]}{2^{1/4}\,\sqrt{b^2-4\,a\,c}\,\left(-b-\sqrt{b^2-4\,a\,c}\right)^{3/4}\left(c\,d^2-b\,d\,e+a\,e^2\right)\sqrt{f}}-$$

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

$$\frac{e^{7/4}\,\text{Log}\left[\sqrt{d}\,\sqrt{f}+\sqrt{e}\,\sqrt{f}\,x-\sqrt{2}\,d^{1/4}\,e^{1/4}\,\sqrt{f\,x}\right]}{2\sqrt{2}\,d^{3/4}\left(c\,d^2-b\,d\,e+a\,e^2\right)\sqrt{f}}+$$

$$\frac{e^{7/4}\,\text{Log}\left[\sqrt{d}\,\sqrt{f}+\sqrt{e}\,\sqrt{f}\,x+\sqrt{2}\,d^{1/4}\,e^{1/4}\,\sqrt{f\,x}\right]}{2\sqrt{2}\,d^{3/4}\left(c\,d^2-b\,d\,e+a\,e^2\right)\sqrt{f}}$$

Result (type 7, 267 leaves) :

$$\left(\sqrt{x}\left(\sqrt{2}\, e^{7/4}\left(-2\,\text{ArcTan}\left[1-\frac{\sqrt{2}\, e^{1/4}\sqrt{x}}{d^{1/4}}\right]+2\,\text{ArcTan}\left[1+\frac{\sqrt{2}\, e^{1/4}\sqrt{x}}{d^{1/4}}\right]-\text{Log}\left[\sqrt{d}-\sqrt{2}\, d^{1/4} e^{1/4}\sqrt{x}+\sqrt{e}\, x\right]+\text{Log}\left[\sqrt{d}+\sqrt{2}\, d^{1/4} e^{1/4}\sqrt{x}+\sqrt{e}\, x\right]\right)-2\, d^{3/4}\,\text{RootSum}\left[a+b\, \#1^4+c\, \#1^8\,\&,\ \frac{-c\, d\,\text{Log}\left[\sqrt{x}-\#1\right]+b\, e\,\text{Log}\left[\sqrt{x}-\#1\right]+c\, e\,\text{Log}\left[\sqrt{x}-\#1\right]\#1^4}{b\, \#1^3+2\, c\, \#1^7}\,\&\right]\right)\right)\Big/\left(4\, d^{3/4}\left(c\, d^2+e\left(-b\, d+a\, e\right)\right)\sqrt{f\, x}\right)$$

Problem 316: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{x^4\sqrt{1+2\, x^2+2\, x^4}}{3+2\, x^2}\, dx$$

Optimal (type 4, 424 leaves, 17 steps):

$$-\frac{1}{60}\, x\left(13-6\, x^2\right)\sqrt{1+2\, x^2+2\, x^4}+\frac{109\, x\sqrt{1+2\, x^2+2\, x^4}}{60\sqrt{2}\left(1+\sqrt{2}\, x^2\right)}+\frac{3}{16}\sqrt{15}\,\text{ArcTan}\left[\frac{\sqrt{\frac{5}{3}}\, x}{\sqrt{1+2\, x^2+2\, x^4}}\right]-\left(109\left(1+\sqrt{2}\, x^2\right)\sqrt{\frac{1+2\, x^2+2\, x^4}{\left(1+\sqrt{2}\, x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[2^{1/4}\, x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(60\times 2^{3/4}\sqrt{1+2\, x^2+2\, x^4}\right)+\left(\left(-70+263\sqrt{2}\right)\left(1+\sqrt{2}\, x^2\right)\sqrt{\frac{1+2\, x^2+2\, x^4}{\left(1+\sqrt{2}\, x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}\, x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(60\times 2^{3/4}\left(-2+3\sqrt{2}\right)\sqrt{1+2\, x^2+2\, x^4}\right)+\left(15\left(3+\sqrt{2}\right)\left(1+\sqrt{2}\, x^2\right)\sqrt{\frac{1+2\, x^2+2\, x^4}{\left(1+\sqrt{2}\, x^2\right)^2}}\,\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),\ 2\,\text{ArcTan}\left[2^{1/4}\, x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(16\times 2^{3/4}\left(2-3\sqrt{2}\right)\sqrt{1+2\, x^2+2\, x^4}\right)$$

Result (type 4, 209 leaves):

$$\frac{1}{240\sqrt{1+2x^2+2x^4}}\left(-52x-80x^3-56x^5+48x^7-218\,i\sqrt{1-i}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-(199-417\,i)\sqrt{1-i}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+225\,(1-i)^{3/2}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticPi}\left[\frac{1}{3}+\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)$$

Problem 317: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^2\sqrt{1+2x^2+2x^4}}{3+2x^2}\,dx$$

Optimal (type 4, 417 leaves, 13 steps):

$$\frac{1}{6}x\sqrt{1+2x^2+2x^4}-\frac{7x\sqrt{1+2x^2+2x^4}}{6\sqrt{2}\left(1+\sqrt{2}x^2\right)}-\frac{1}{8}\sqrt{15}\,\text{ArcTan}\left[\frac{\sqrt{\frac{5}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]+\frac{7\left(1+\sqrt{2}x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]}{6\times2^{3/4}\sqrt{1+2x^2+2x^4}}-\left(\left(-4+17\sqrt{2}\right)\left(1+\sqrt{2}x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(6\times2^{3/4}\left(-2+3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)-\left(5\left(3+\sqrt{2}\right)\left(1+\sqrt{2}x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}x^2\right)^2}}\,\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(8\times2^{3/4}\left(2-3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 204 leaves):

$$\left(4x+8x^3+8x^5+14\,i\sqrt{1-i}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+(13-27\,i)\sqrt{1-i}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-15\,(1-i)^{3/2}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticPi}\left[\frac{1}{3}+\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)\Big/\left(24\sqrt{1+2x^2+2x^4}\right)$$

Problem 318: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\sqrt{1+2x^2+2x^4}}{3+2x^2}\,dx$$

Optimal (type 4, 381 leaves, 7 steps):

$$\frac{x\sqrt{1+2x^2+2x^4}}{\sqrt{2}\left(1+\sqrt{2}\,x^2\right)}+\frac{1}{4}\sqrt{\frac{5}{3}}\,\text{ArcTan}\left[\frac{\sqrt{\frac{5}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]-$$
$$\frac{\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]}{2^{3/4}\sqrt{1+2x^2+2x^4}}+$$
$$\left(2^{3/4}\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/$$
$$\left(\left(-2+3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)+$$
$$\left(5\left(3+\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),\right.\right.$$
$$\left.\left.2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(12\times 2^{3/4}\left(2-3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 127 leaves):

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

Problem 319: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\sqrt{1+2x^2+2x^4}}{x^2\left(3+2x^2\right)}\,dx$$

Optimal (type 4, 399 leaves, 8 steps):

$$-\frac{\sqrt{1+2x^2+2x^4}}{3x}+\frac{\sqrt{2}\,x\sqrt{1+2x^2+2x^4}}{3\left(1+\sqrt{2}\,x^2\right)}-\frac{1}{6}\sqrt{\frac{5}{3}}\,\text{ArcTan}\left[\frac{\sqrt{\frac{5}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]-\frac{1}{3\sqrt{1+2x^2+2x^4}}$$

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

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

$$\left(21\times2^{1/4}\sqrt{1+2x^2+2x^4}\right)+\left(5\left(3+\sqrt{2}\right)^2\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\right.$$

$$\left.\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(252\times2^{1/4}\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 208 leaves) :

$$\Big(-6-12x^2-12x^4-$$

$$6\,i\sqrt{1-i}\,x\sqrt{1+(1-i)\,x^2}\sqrt{1+(1+i)\,x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+$$

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

$$5\,(1-i)^{3/2}\,x\sqrt{1+(1-i)\,x^2}\sqrt{1+(1+i)\,x^2}$$

$$\text{EllipticPi}\left[\frac{1}{3}+\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\Big)\Big/\left(18\,x\sqrt{1+2x^2+2x^4}\right)$$

Problem 320: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\sqrt{1+2x^2+2x^4}}{x^4\left(3+2x^2\right)}\,dx$$

Optimal (type 4, 360 leaves, 7 steps) :

$$-\frac{\sqrt{1+2x^2+2x^4}}{9x^3}+\frac{1}{9}\sqrt{\frac{5}{3}}\,\text{ArcTan}\left[\frac{\sqrt{\frac{5}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]-$$

$$\frac{\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}\,x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]}{9\times2^{1/4}\sqrt{1+2x^2+2x^4}}+$$

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

$$\left(63\times2^{1/4}\sqrt{1+2x^2+2x^4}\right)-\left(5\left(3+\sqrt{2}\right)^2\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\right.$$

$$\left.\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),2\,\text{ArcTan}\left[2^{1/4}\,x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(378\times2^{1/4}\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 154 leaves):

$$-\left(\left(3+6x^2+6x^4+3\left(1-i\right)^{3/2}x^3\sqrt{1+\left(1-i\right)x^2}\sqrt{1+\left(1+i\right)x^2}\right.\right.$$

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

$$\left.\left.\text{EllipticPi}\left[\frac{1}{3}+\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)\Big/\left(27x^3\sqrt{1+2x^2+2x^4}\right)\right)$$

Problem 321: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\sqrt{1+2x^2+2x^4}}{x^6\left(3+2x^2\right)}\,dx$$

Optimal (type 4, 546 leaves, 13 steps):

$$-\frac{\sqrt{1+2x^2+2x^4}}{15x^5}+\frac{4\sqrt{1+2x^2+2x^4}}{135x^3}-\frac{4\sqrt{1+2x^2+2x^4}}{45x}+\frac{4\sqrt{2}\,x\sqrt{1+2x^2+2x^4}}{45\left(1+\sqrt{2}\,x^2\right)}-\frac{2}{27}\sqrt{\frac{5}{3}}\,\text{ArcTan}\left[\frac{\sqrt{\frac{5}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]-$$

$$\left(4\times 2^{1/4}\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(45\sqrt{1+2x^2+2x^4}\right)+$$

$$\left(5\times 2^{1/4}\left(5-3\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(189\sqrt{1+2x^2+2x^4}\right)-$$

$$\left(2^{1/4}\left(19-2\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(135\sqrt{1+2x^2+2x^4}\right)+\left(5\left(3+\sqrt{2}\right)^2\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(567\times 2^{1/4}\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 224 leaves) :

$$-\frac{1}{405x^5\sqrt{1+2x^2+2x^4}}\Big(27+42x^2+66x^4+48x^6+72x^8+36\,i\sqrt{1-i}\,x^5\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-(12+24\,i)\sqrt{1-i}\,x^5\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+50(1-i)^{3/2}x^5\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticPi}\left[\frac{1}{3}+\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\Big)$$

Problem 327: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^2\left(1+2x^2+2x^4\right)^{3/2}}{3-2x^2}\,dx$$

Optimal (type 4, 463 leaves, 19 steps) :

$$-\frac{213}{140}x\sqrt{1+2x^2+2x^4}-\frac{27}{70}x^3\sqrt{1+2x^2+2x^4}-\frac{2211\,x\sqrt{1+2x^2+2x^4}}{140\sqrt{2}\left(1+\sqrt{2}\,x^2\right)}-\frac{1}{14}x\left(1+2x^2+2x^4\right)^{3/2}+\frac{17}{16}\sqrt{51}\,\text{ArcTanh}\left[\frac{\sqrt{\frac{17}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]+$$

$$\left(2211\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(140\times 2^{3/4}\sqrt{1+2x^2+2x^4}\right)-$$

$$\left(3\left(514+2717\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(140\times 2^{3/4}\left(2+3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)-$$

$$\left(289\left(3-\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticPi}\left[\frac{1}{24}\left(12+11\sqrt{2}\right),2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(16\times 2^{3/4}\left(2+3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 214 leaves):

$$\frac{1}{560\sqrt{1+2x^2+2x^4}}\left(-892x-2080x^3-2456x^5-752x^7-160x^9+4422\,i\sqrt{1-i}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-(9669-5247\,i)\sqrt{1-i}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+10115(1-i)^{3/2}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticPi}\left[-\frac{1}{3}-\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)$$

Problem 328: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(1+2x^2+2x^4\right)^{3/2}}{3-2x^2}\,dx$$

Optimal (type 4, 428 leaves, 12 steps):

$$-\frac{1}{10}x\left(9+2x^2\right)\sqrt{1+2x^2+2x^4}-\frac{103x\sqrt{1+2x^2+2x^4}}{10\sqrt{2}\left(1+\sqrt{2}x^2\right)}+\frac{17}{8}\sqrt{\frac{17}{3}}\,\text{ArcTanh}\left[\frac{\sqrt{\frac{17}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]+$$
$$\left(103\left(1+\sqrt{2}x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/$$
$$\left(10\times 2^{3/4}\sqrt{1+2x^2+2x^4}\right)-$$
$$\left(\left(66+383\sqrt{2}\right)\left(1+\sqrt{2}x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/$$
$$\left(10\times 2^{3/4}\left(2+3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)-$$
$$\left(289\left(3-\sqrt{2}\right)\left(1+\sqrt{2}x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}x^2\right)^2}}\,\text{EllipticPi}\left[\frac{1}{24}\left(12+11\sqrt{2}\right),\right.\right.$$
$$\left.\left.2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(24\times 2^{3/4}\left(2+3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 209 leaves):

$$\frac{1}{120\sqrt{1+2x^2+2x^4}}\left(-108x-240x^3-264x^5-48x^7+\right.$$
$$618\,i\sqrt{1-i}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-$$
$$(1371-753\,i)\sqrt{1-i}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+$$
$$\left.1445(1-i)^{3/2}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticPi}\left[-\frac{1}{3}-\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)$$

Problem 329: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(1+2x^2+2x^4\right)^{3/2}}{x^2\left(3-2x^2\right)}\,dx$$

Optimal (type 4, 722 leaves, 13 steps):

$$-\frac{\left(1+x^2\right)\sqrt{1+2x^2+2x^4}}{3x}-\frac{17x\sqrt{1+2x^2+2x^4}}{3\sqrt{2}\left(1+\sqrt{2}x^2\right)}+\frac{\sqrt{2}x\sqrt{1+2x^2+2x^4}}{3\left(1+\sqrt{2}x^2\right)}+\frac{17}{12}\sqrt{\frac{17}{3}}\text{ArcTanh}\left[\frac{\sqrt{\frac{17}{3}}x}{\sqrt{1+2x^2+2x^4}}\right]+$$

$$\left(17\left(1+\sqrt{2}x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}x^2\right)^2}}\text{EllipticE}\left[2\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(3\times 2^{3/4}\sqrt{1+2x^2+2x^4}\right)-\frac{1}{3\sqrt{1+2x^2+2x^4}}$$

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

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

$$\left(289\left(3-\sqrt{2}\right)\left(1+\sqrt{2}x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}x^2\right)^2}}\text{EllipticF}\left[2\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(84\times 2^{1/4}\sqrt{1+2x^2+2x^4}\right)-$$

$$\left(17\left(5+\sqrt{2}\right)\left(1+\sqrt{2}x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}x^2\right)^2}}\text{EllipticF}\left[2\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(12\times 2^{1/4}\sqrt{1+2x^2+2x^4}\right)-\left(289\left(11-6\sqrt{2}\right)\left(1+\sqrt{2}x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}x^2\right)^2}}\right.$$

$$\left.\text{EllipticPi}\left[\frac{1}{24}\left(12+11\sqrt{2}\right),2\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(504\times 2^{1/4}\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 213 leaves):

$$\frac{1}{36x\sqrt{1+2x^2+2x^4}}\left(-12-36x^2-48x^4-24x^6+\right.$$
$$90i\sqrt{1-i}x\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\text{EllipticE}\left[i\text{ArcSinh}\left[\sqrt{1-i}x\right],i\right]-$$
$$(255-165i)\sqrt{1-i}x\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\text{EllipticF}\left[i\text{ArcSinh}\left[\sqrt{1-i}x\right],i\right]+$$
$$\left.289(1-i)^{3/2}x\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\text{EllipticPi}\left[-\frac{1}{3}-\frac{i}{3},i\text{ArcSinh}\left[\sqrt{1-i}x\right],i\right]\right)$$

Problem 330: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(1+2x^2+2x^4\right)^{3/2}}{x^4\left(3-2x^2\right)}\,dx$$

Optimal (type 4, 625 leaves, 13 steps):

$$-\frac{2\sqrt{1+2x^2+2x^4}}{x}-\frac{\left(1-8x^2\right)\sqrt{1+2x^2+2x^4}}{9x^3}+\frac{\sqrt{2}\,x\sqrt{1+2x^2+2x^4}}{9\left(1+\sqrt{2}\,x^2\right)}+\frac{17}{18}\sqrt{\frac{17}{3}}\,\text{ArcTanh}\left[\frac{\sqrt{\frac{17}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]-\frac{1}{9\sqrt{1+2x^2+2x^4}}2^{1/4}\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]+\left(289\left(3-\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(126\times 2^{1/4}\sqrt{1+2x^2+2x^4}\right)-\left(17\left(5+\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(18\times 2^{1/4}\sqrt{1+2x^2+2x^4}\right)+\frac{1}{9\sqrt{1+2x^2+2x^4}}2^{1/4}\left(9+5\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]-\left(289\left(11-6\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticPi}\left[\frac{1}{24}\left(12+11\sqrt{2}\right),2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(756\times 2^{1/4}\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 219 leaves):

$$\frac{1}{54\,x^3\,\sqrt{1+2\,x^2+2\,x^4}}\left(-6-72\,x^2-132\,x^4-120\,x^6-6\,i\,\sqrt{1-i}\,x^3\,\sqrt{1+(1-i)\,x^2}\,\sqrt{1+(1+i)\,x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-(195-201\,i)\,\sqrt{1-i}\,x^3\,\sqrt{1+(1-i)\,x^2}\,\sqrt{1+(1+i)\,x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+289\,(1-i)^{3/2}\,x^3\,\sqrt{1+(1-i)\,x^2}\,\sqrt{1+(1+i)\,x^2}\,\text{EllipticPi}\left[-\frac{1}{3}-\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)$$

Problem 331: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(1+2\,x^2+2\,x^4\right)^{3/2}}{x^6\,\left(3-2\,x^2\right)}\,dx$$

Optimal (type 4, 553 leaves, 15 steps):

$$\frac{74\,\sqrt{1+2\,x^2+2\,x^4}}{135\,x^3}-\frac{262\,\sqrt{1+2\,x^2+2\,x^4}}{135\,x}-\frac{\left(3+40\,x^2\right)\,\sqrt{1+2\,x^2+2\,x^4}}{45\,x^5}+\frac{262\,\sqrt{2}\,x\,\sqrt{1+2\,x^2+2\,x^4}}{135\,\left(1+\sqrt{2}\,x^2\right)}+\frac{17}{27}\,\sqrt{\frac{17}{3}}\,\text{ArcTanh}\left[\frac{\sqrt{\frac{17}{3}}\,x}{\sqrt{1+2\,x^2+2\,x^4}}\right]-\left(262\times 2^{1/4}\,\left(1+\sqrt{2}\,x^2\right)\,\sqrt{\frac{1+2\,x^2+2\,x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[2^{1/4}\,x\right],\frac{1}{4}\,\left(2-\sqrt{2}\right)\right]\right)\Big/\left(135\,\sqrt{1+2\,x^2+2\,x^4}\right)+\left(85\times 2^{3/4}\,\left(3-\sqrt{2}\right)\,\left(1+\sqrt{2}\,x^2\right)\,\sqrt{\frac{1+2\,x^2+2\,x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}\,x\right],\frac{1}{4}\,\left(2-\sqrt{2}\right)\right]\right)\Big/\left(189\,\sqrt{1+2\,x^2+2\,x^4}\right)+\left(2^{3/4}\,\left(37+23\,\sqrt{2}\right)\,\left(1+\sqrt{2}\,x^2\right)\,\sqrt{\frac{1+2\,x^2+2\,x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}\,x\right],\frac{1}{4}\,\left(2-\sqrt{2}\right)\right]\right)\Big/\left(135\,\sqrt{1+2\,x^2+2\,x^4}\right)-\left(289\,\left(11-6\,\sqrt{2}\right)\,\left(1+\sqrt{2}\,x^2\right)\,\sqrt{\frac{1+2\,x^2+2\,x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticPi}\left[\frac{1}{24}\,\left(12+11\,\sqrt{2}\right),2\,\text{ArcTan}\left[2^{1/4}\,x\right],\frac{1}{4}\,\left(2-\sqrt{2}\right)\right]\right)\Big/\left(1134\times 2^{1/4}\,\sqrt{1+2\,x^2+2\,x^4}\right)$$

Result (type 4, 224 leaves):

$$-\frac{1}{405 x^5 \sqrt{1+2 x^2+2 x^4}}\Big(27+192 x^2+1116 x^4+1848 x^6+1572 x^8+786 i \sqrt{1-i}\, x^5 \sqrt{1+(1-i) x^2} \sqrt{1+(1+i) x^2}\, \text{EllipticE}\big[i \text{ArcSinh}\big[\sqrt{1-i}\, x\big], i\big]+(543-1329 i) \sqrt{1-i}\, x^5 \sqrt{1+(1-i) x^2} \sqrt{1+(1+i) x^2}\, \text{EllipticF}\big[i \text{ArcSinh}\big[\sqrt{1-i}\, x\big], i\big]-1445 (1-i)^{3/2} x^5 \sqrt{1+(1-i) x^2} \sqrt{1+(1+i) x^2}\, \text{EllipticPi}\Big[-\frac{1}{3}-\frac{i}{3}, i \text{ArcSinh}\big[\sqrt{1-i}\, x\big], i\Big]\Big)$$

Problem 337: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{x^4}{(3+2 x^2) \sqrt{1+2 x^2+2 x^4}}\, dx$$

Optimal (type 4, 418 leaves, 4 steps):

$$\frac{x \sqrt{1+2 x^2+2 x^4}}{2 \sqrt{2} (1+\sqrt{2} x^2)}-\frac{3 \sqrt{\frac{3}{10}} (3-\sqrt{2}) \text{ArcTan}\Big[\frac{\sqrt{\frac{5}{3}} x}{\sqrt{1+2 x^2+2 x^4}}\Big]}{4 (2-3 \sqrt{2})}-\frac{(1+\sqrt{2} x^2) \sqrt{\frac{1+2 x^2+2 x^4}{(1+\sqrt{2} x^2)^2}}\, \text{EllipticE}\Big[2 \text{ArcTan}\big[2^{1/4} x\big], \frac{1}{4} (2-\sqrt{2})\Big]}{2\times 2^{3/4} \sqrt{1+2 x^2+2 x^4}}+\left((1-3 \sqrt{2}) (1+\sqrt{2} x^2) \sqrt{\frac{1+2 x^2+2 x^4}{(1+\sqrt{2} x^2)^2}}\, \text{EllipticF}\Big[2 \text{ArcTan}\big[2^{1/4} x\big], \frac{1}{4} (2-\sqrt{2})\Big]\right) \Big/ \left(2\times 2^{3/4} (2-3 \sqrt{2}) \sqrt{1+2 x^2+2 x^4}\right)+\left(3 (3+\sqrt{2}) (1+\sqrt{2} x^2) \sqrt{\frac{1+2 x^2+2 x^4}{(1+\sqrt{2} x^2)^2}}\, \text{EllipticPi}\Big[\frac{1}{24} (12-11 \sqrt{2}), 2 \text{ArcTan}\big[2^{1/4} x\big], \frac{1}{4} (2-\sqrt{2})\Big]\right) \Big/ \left(8\times 2^{3/4} (2-3 \sqrt{2}) \sqrt{1+2 x^2+2 x^4}\right)$$

Result (type 4, 127 leaves):

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

Problem 338: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{x^2}{\left(3+2 x^2\right) \sqrt{1+2 x^2+2 x^4}} \, dx$$

Optimal (type 4, 247 leaves, 3 steps):

$$-\frac{1}{4} \sqrt{\frac{3}{5}} \operatorname{ArcTan}\left[\frac{\sqrt{\frac{5}{3}} x}{\sqrt{1+2 x^2+2 x^4}}\right] - \left(\left(3+\sqrt{2}\right) \left(1+\sqrt{2} x^2\right) \sqrt{\frac{1+2 x^2+2 x^4}{\left(1+\sqrt{2} x^2\right)^2}} \operatorname{EllipticF}\left[2 \operatorname{ArcTan}\left[2^{1/4} x\right], \frac{1}{4} \left(2-\sqrt{2}\right)\right]\right) \Big/ \left(14 \times 2^{3/4} \sqrt{1+2 x^2+2 x^4}\right) + \left(\left(3+\sqrt{2}\right)^2 \left(1+\sqrt{2} x^2\right) \sqrt{\frac{1+2 x^2+2 x^4}{\left(1+\sqrt{2} x^2\right)^2}} \operatorname{EllipticPi}\left[\frac{1}{24} \left(12-11 \sqrt{2}\right), 2 \operatorname{ArcTan}\left[2^{1/4} x\right], \frac{1}{4} \left(2-\sqrt{2}\right)\right]\right) \Big/ \left(56 \times 2^{1/4} \sqrt{1+2 x^2+2 x^4}\right)$$

Result (type 4, 99 leaves):

$$\frac{1}{4 \sqrt{1+2 x^2+2 x^4}} (1-i)^{3/2} \sqrt{1+(1-i) x^2} \sqrt{1+(1+i) x^2} \left(\operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{1-i} x\right], i\right] - \operatorname{EllipticPi}\left[\frac{1}{3}+\frac{i}{3}, i \operatorname{ArcSinh}\left[\sqrt{1-i} x\right], i\right]\right)$$

Problem 339: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{\left(3+2 x^2\right) \sqrt{1+2 x^2+2 x^4}} \, dx$$

Optimal (type 4, 245 leaves, 3 steps):

$$\frac{\text{ArcTan}\left[\frac{\sqrt{\frac{5}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]}{2\sqrt{15}}+$$
$$\left(\left(3+\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/$$
$$\left(14\times 2^{1/4}\sqrt{1+2x^2+2x^4}\right)-\left(\left(3+\sqrt{2}\right)^2\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\right.$$
$$\left.\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(84\times 2^{1/4}\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 80 leaves) :

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

Problem 340: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{1}{x^2\left(3+2x^2\right)\sqrt{1+2x^2+2x^4}}\,dx$$

Optimal (type 4, 399 leaves, 6 steps) :

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

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

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

$$\left(21\times 2^{3/4}\sqrt{1+2x^2+2x^4}\right)+\left(\left(3+\sqrt{2}\right)^2\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\right.$$

$$\left.\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),2\,\text{ArcTan}\left[2^{1/4}\,x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(126\times 2^{1/4}\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 147 leaves):

$$-\left(\left(i\left(-3\,i\left(1+2x^2+2x^4\right)+\sqrt{1-i}\,x\sqrt{1+(1-i)\,x^2}\,\sqrt{1+(1+i)\,x^2}\right.\right.\right.$$

$$\left(3\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-3\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-\right.$$

$$\left.\left.\left.\left.(1+i)\,\text{EllipticPi}\left[\frac{1}{3}+\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)\right)\right)\Big/\left(9x\sqrt{1+2x^2+2x^4}\right)\right)$$

Problem 341: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{1}{x^4\left(3+2x^2\right)\sqrt{1+2x^2+2x^4}}\,dx$$

Optimal (type 4, 422 leaves, 7 steps):

$$-\frac{\sqrt{1+2x^2+2x^4}}{9x^3}+\frac{2\sqrt{1+2x^2+2x^4}}{3x}-\frac{2\sqrt{2}\,x\sqrt{1+2x^2+2x^4}}{3\left(1+\sqrt{2}\,x^2\right)}+\frac{2\,\text{ArcTan}\left[\frac{\sqrt{\frac{5}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]}{9\sqrt{15}}+$$

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

$$\left(\left(1+19\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/$$

$$\left(63\times 2^{1/4}\sqrt{1+2x^2+2x^4}\right)-\left(\left(3+\sqrt{2}\right)^2\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\right.$$

$$\left.\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(189\times 2^{1/4}\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 219 leaves):

$$\frac{1}{27x^3\sqrt{1+2x^2+2x^4}}\left(-3+12x^2+30x^4+36x^6+\right.$$

$$18\,i\sqrt{1-i}\,x^3\sqrt{1+(1-i)\,x^2}\,\sqrt{1+(1+i)\,x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-$$

$$(3+15\,i)\sqrt{1-i}\,x^3\sqrt{1+(1-i)\,x^2}\,\sqrt{1+(1+i)\,x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+$$

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

Problem 348: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^8}{\left(3+2x^2\right)\left(1+2x^2+2x^4\right)^{3/2}}\,dx$$

Optimal (type 4, 449 leaves, 10 steps):

$$\frac{x^3\left(1-2x^2\right)}{20\sqrt{1+2x^2+2x^4}}+\frac{1}{20}x\sqrt{1+2x^2+2x^4}+\frac{x\sqrt{1+2x^2+2x^4}}{10\sqrt{2}\left(1+\sqrt{2}\,x^2\right)}+\frac{27}{80}\sqrt{\frac{3}{5}}\,\text{ArcTan}\left[\frac{\sqrt{\frac{5}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]-$$

$$\frac{\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]}{10\times 2^{3/4}\sqrt{1+2x^2+2x^4}}+$$

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

$$\left(8\times 2^{3/4}\left(-2+3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)+$$

$$\left(27\left(3+\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),\right.\right.$$

$$\left.\left.2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(80\times 2^{3/4}\left(2-3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 199 leaves):

$$\left(4x+12x^3-4\,i\sqrt{1-i}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-\right.$$

$$\left(29-33\,i\right)\sqrt{1-i}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+$$

$$27\left(1-i\right)^{3/2}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}$$

$$\left.\text{EllipticPi}\left[\frac{1}{3}+\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)\Big/\left(80\sqrt{1+2x^2+2x^4}\right)$$

Problem 349: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^6}{\left(3+2x^2\right)\left(1+2x^2+2x^4\right)^{3/2}}\,dx$$

Optimal (type 4, 423 leaves, 8 steps):

$$\frac{x\left(1-2x^2\right)}{20\sqrt{1+2x^2+2x^4}}+\frac{x\sqrt{1+2x^2+2x^4}}{10\sqrt{2}\left(1+\sqrt{2}\,x^2\right)}-\frac{9}{40}\sqrt{\frac{3}{5}}\,\mathrm{ArcTan}\left[\frac{\sqrt{\frac{5}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]-$$

$$\frac{\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\mathrm{EllipticE}\left[2\,\mathrm{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]}{10\times 2^{3/4}\sqrt{1+2x^2+2x^4}}-$$

$$\left(\left(2^{1/4}+2^{3/4}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\mathrm{EllipticF}\left[2\,\mathrm{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/$$

$$\left(8\left(-2+3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)-$$

$$\left(9\left(3+\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\mathrm{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),\right.\right.$$

$$\left.\left.2\,\mathrm{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(40\times 2^{3/4}\left(2-3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 199 leaves) :

$$\left(2x-4x^3-2\,i\sqrt{1-i}\sqrt{1+(1-i)\,x^2}\sqrt{1+(1+i)\,x^2}\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+\right.$$

$$(8-6\,i)\sqrt{1-i}\sqrt{1+(1-i)\,x^2}\sqrt{1+(1+i)\,x^2}\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-$$

$$9\,(1-i)^{3/2}\sqrt{1+(1-i)\,x^2}\sqrt{1+(1+i)\,x^2}$$

$$\left.\mathrm{EllipticPi}\left[\frac{1}{3}+\frac{i}{3},i\,\mathrm{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)\Big/\left(40\sqrt{1+2x^2+2x^4}\right)$$

Problem 350: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^4}{\left(3+2x^2\right)\left(1+2x^2+2x^4\right)^{3/2}}\,dx$$

Optimal (type 4, 422 leaves, 8 steps) :

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

$$\frac{\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]}{10\times 2^{3/4}\sqrt{1+2x^2+2x^4}}+$$

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

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

$$\left(3\left(3+\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),\right.\right.$$

$$\left.\left.2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(20\times 2^{3/4}\left(2-3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 199 leaves):

$$-\left(\left(4x+2x^3+i\sqrt{1-i}\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+\right.\right.$$

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

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

$$\left.\left.\text{EllipticPi}\left[\frac{1}{3}+\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)\Big/\left(20\sqrt{1+2x^2+2x^4}\right)\right)$$

Problem 351: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^2}{\left(3+2x^2\right)\left(1+2x^2+2x^4\right)^{3/2}}\,dx$$

Optimal (type 4, 423 leaves, 8 steps):

$$\frac{x\left(3+4x^2\right)}{10\sqrt{1+2x^2+2x^4}}-\frac{\sqrt{2}\,x\sqrt{1+2x^2+2x^4}}{5\left(1+\sqrt{2}\,x^2\right)}-\frac{1}{10}\sqrt{\frac{3}{5}}\,\text{ArcTan}\left[\frac{\sqrt{\frac{5}{3}}\,x}{\sqrt{1+2x^2+2x^4}}\right]+$$
$$\frac{1}{5\sqrt{1+2x^2+2x^4}}2^{1/4}\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]-$$
$$\left(\left(2^{1/4}+2^{3/4}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/$$
$$\left(4\left(-2+3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)-$$
$$\left(\left(3+\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),\right.\right.$$
$$\left.\left.2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(10\times2^{3/4}\left(2-3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 199 leaves) :

$$\left(6x+8x^3+4\,i\sqrt{1-i}\sqrt{1+(1-i)\,x^2}\sqrt{1+(1+i)\,x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-\right.$$
$$(1+3\,i)\sqrt{1-i}\sqrt{1+(1-i)\,x^2}\sqrt{1+(1+i)\,x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-$$
$$2\,(1-i)^{3/2}\sqrt{1+(1-i)\,x^2}\sqrt{1+(1+i)\,x^2}$$
$$\left.\text{EllipticPi}\left[\frac{1}{3}+\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)\Big/\left(20\sqrt{1+2x^2+2x^4}\right)$$

Problem 352: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{1}{\left(3+2x^2\right)\left(1+2x^2+2x^4\right)^{3/2}}\,dx$$

Optimal (type 4, 422 leaves, 8 steps) :

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

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

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

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

$$\left(\left(3+\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\;\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),\right.\right.$$

$$\left.\left.2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(15\times 2^{3/4}\left(2-3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 199 leaves) :

$$\left(-6x-18x^3-9\,i\sqrt{1-i}\sqrt{1+(1-i)\,x^2}\sqrt{1+(1+i)\,x^2}\;\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+\right.$$

$$(6+3\,i)\sqrt{1-i}\sqrt{1+(1-i)\,x^2}\sqrt{1+(1+i)\,x^2}\;\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]+$$

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

$$\left.\text{EllipticPi}\left[\frac{1}{3}+\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)\Big/\left(30\sqrt{1+2x^2+2x^4}\right)$$

Problem 353: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{1}{x^2\left(3+2x^2\right)\left(1+2x^2+2x^4\right)^{3/2}}\,dx$$

Optimal (type 4, 468 leaves, 15 steps) :

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

$$\left(2\times 2^{1/4}\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(15\sqrt{1+2x^2+2x^4}\right)+$$

$$\left(\left(-7+3\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(3\times 2^{3/4}\left(-2+3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)-$$

$$\left(2^{1/4}\left(3+\sqrt{2}\right)\left(1+\sqrt{2}\,x^2\right)\sqrt{\frac{1+2x^2+2x^4}{\left(1+\sqrt{2}\,x^2\right)^2}}\,\text{EllipticPi}\left[\frac{1}{24}\left(12-11\sqrt{2}\right),2\,\text{ArcTan}\left[2^{1/4}x\right],\frac{1}{4}\left(2-\sqrt{2}\right)\right]\right)\Big/\left(45\left(2-3\sqrt{2}\right)\sqrt{1+2x^2+2x^4}\right)$$

Result (type 4, 211 leaves):

$$\frac{1}{90\,x\sqrt{1+2x^2+2x^4}}\left(-12\,i\sqrt{1-i}\,x\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-\left(27-39\,i\right)\sqrt{1-i}\,x\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]-2\left(15+39x^2+12x^4+2\,(1-i)^{3/2}x\sqrt{1+(1-i)x^2}\sqrt{1+(1+i)x^2}\,\text{EllipticPi}\left[\frac{1}{3}+\frac{i}{3},i\,\text{ArcSinh}\left[\sqrt{1-i}\,x\right],i\right]\right)\right)$$

Problem 361: Unable to integrate problem.

$$\int\frac{x^4\sqrt{d+e\,x^2}}{a+b\,x^2+c\,x^4}\,dx$$

Optimal (type 3, 390 leaves, 10 steps):

$$\frac{x\sqrt{d+e x^2}}{2 c}-\left(\left(b c d-b^2 e+a c e-\frac{b^2 c d-2 a c^2 d-b^3 e+3 a b c e}{\sqrt{b^2-4 a c}}\right)\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\ x}{\sqrt{b-\sqrt{b^2-4 a c}}\ \sqrt{d+e x^2}}\right]\right)\Big/\left(c^2\sqrt{b-\sqrt{b^2-4 a c}}\ \sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\right)-\left(\left(b c d-b^2 e+a c e+\frac{b^2 c d-2 a c^2 d-b^3 e+3 a b c e}{\sqrt{b^2-4 a c}}\right)\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\ x}{\sqrt{b+\sqrt{b^2-4 a c}}\ \sqrt{d+e x^2}}\right]\right)\Big/\left(c^2\sqrt{b+\sqrt{b^2-4 a c}}\ \sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\right)+\frac{(c d-2 b e)\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e x^2}}\right]}{2 c^2\sqrt{e}}$$

Result (type 8, 31 leaves):

$$\int \frac{x^4\sqrt{d+e x^2}}{a+b x^2+c x^4}\,dx$$

Problem 362: Unable to integrate problem.

$$\int \frac{x^2\sqrt{d+e x^2}}{a+b x^2+c x^4}\,dx$$

Optimal (type 3, 324 leaves, 9 steps):

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

Result (type 8, 31 leaves):

$$\int \frac{x^2 \sqrt{d+e x^2}}{a+b x^2+c x^4}\,dx$$

Problem 363: Unable to integrate problem.

$$\int \frac{\sqrt{d+e x^2}}{a+b x^2+c x^4}\,dx$$

Optimal (type 3, 240 leaves, 11 steps):

$$\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\ \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\ x}{\sqrt{b-\sqrt{b^2-4 a c}}\ \sqrt{d+e x^2}}\right]}{\sqrt{b^2-4 a c}\ \sqrt{b-\sqrt{b^2-4 a c}}}-\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\ \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\ x}{\sqrt{b+\sqrt{b^2-4 a c}}\ \sqrt{d+e x^2}}\right]}{\sqrt{b^2-4 a c}\ \sqrt{b+\sqrt{b^2-4 a c}}}$$

Result (type 8, 28 leaves):

$$\int \frac{\sqrt{d+e x^2}}{a+b x^2+c x^4}\,dx$$

Problem 364: Unable to integrate problem.

$$\int \frac{\sqrt{d+e x^2}}{x^2 \left(a+b x^2+c x^4\right)}\,dx$$

Optimal (type 3, 291 leaves, 8 steps):

$$-\frac{\sqrt{d+e x^2}}{a x}-\frac{c \left(d+\frac{b d-2 a e}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\ x}{\sqrt{b-\sqrt{b^2-4 a c}}\ \sqrt{d+e x^2}}\right]}{a \sqrt{b-\sqrt{b^2-4 a c}}\ \sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}}-\frac{c \left(d-\frac{b d-2 a e}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\ x}{\sqrt{b+\sqrt{b^2-4 a c}}\ \sqrt{d+e x^2}}\right]}{a \sqrt{b+\sqrt{b^2-4 a c}}\ \sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}}$$

Result (type 8, 31 leaves):

$$\int \frac{\sqrt{d+e x^2}}{x^2 \left(a+b x^2+c x^4\right)} \, dx$$

Problem 365: Unable to integrate problem.

$$\int \frac{\sqrt{d+e x^2}}{x^4 \left(a+b x^2+c x^4\right)} \, dx$$

Optimal (type 3, 373 leaves, 12 steps):

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

Result (type 8, 31 leaves):

$$\int \frac{\sqrt{d+e x^2}}{x^4 \left(a+b x^2+c x^4\right)} \, dx$$

Problem 366: Unable to integrate problem.

$$\int \frac{\sqrt{d+e x^2}}{x^6 \left(a+b x^2+c x^4\right)} \, dx$$

Optimal (type 3, 512 leaves, 15 steps):

$$-\frac{\sqrt{d+e x^2}}{5 a x^5}+\frac{4 e \sqrt{d+e x^2}}{15 a d x^3}+\frac{(b d-a e) \sqrt{d+e x^2}}{3 a^2 d x^3}-\frac{8 e^2 \sqrt{d+e x^2}}{15 a d^2 x}-\frac{2 e (b d-a e) \sqrt{d+e x^2}}{3 a^2 d^2 x}-\frac{\left(b^2 d-a c d-a b e\right) \sqrt{d+e x^2}}{a^3 d x}-\left(c \left(b^2 d-a c d-a b e+\frac{b^3 d-3 a b c d-a b^2 e+2 a^2 c e}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\; x}{\sqrt{b-\sqrt{b^2-4 a c}}\; \sqrt{d+e x^2}}\right]\right)\Big/\left(a^3 \sqrt{b-\sqrt{b^2-4 a c}}\; \sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\right)-\left(c \left(b^2 d-a c d-a b e-\frac{b^3 d-3 a b c d-a b^2 e+2 a^2 c e}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\; x}{\sqrt{b+\sqrt{b^2-4 a c}}\; \sqrt{d+e x^2}}\right]\right)\Big/\left(a^3 \sqrt{b+\sqrt{b^2-4 a c}}\; \sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\right)$$

Result (type 8, 31 leaves):

$$\int \frac{\sqrt{d+e x^2}}{x^6 \left(a+b x^2+c x^4\right)} \, dx$$

Problem 371: Unable to integrate problem.

$$\int \frac{x^4 \left(d+e x^2\right)^{3/2}}{a+b x^2+c x^4} \, dx$$

Optimal (type 3, 595 leaves, 17 steps):

$$\frac{(3 c d-4 b e) x \sqrt{d+e x^2}}{8 c^2}+\frac{x \left(d+e x^2\right)^{3/2}}{4 c}-$$

$$\left(\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e} \left(b c d-b^2 e+a c e-\frac{b^2 c d-2 a c^2 d-b^3 e+3 a b c e}{\sqrt{b^2-4 a c}}\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e} x}{\sqrt{b-\sqrt{b^2-4 a c}} \sqrt{d+e x^2}}\right]\right) \Big/ \left(2 c^3 \sqrt{b-\sqrt{b^2-4 a c}}\right)-$$

$$\left(\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e} \left(b c d-b^2 e+a c e+\frac{b^2 c d-2 a c^2 d-b^3 e+3 a b c e}{\sqrt{b^2-4 a c}}\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e} x}{\sqrt{b+\sqrt{b^2-4 a c}} \sqrt{d+e x^2}}\right]\right) \Big/$$

$$\left(2 c^3 \sqrt{b+\sqrt{b^2-4 a c}}\right)+\frac{d (3 c d-4 b e) \text{ArcTanh}\left[\frac{\sqrt{e} x}{\sqrt{d+e x^2}}\right]}{8 c^2 \sqrt{e}}-$$

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

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

Result (type 8, 31 leaves) :

$$\int \frac{x^4 \left(d+e x^2\right)^{3/2}}{a+b x^2+c x^4} \, dx$$

Problem 372: Unable to integrate problem.

$$\int \frac{x^2 \left(d+e x^2\right)^{3/2}}{a+b x^2+c x^4} \, dx$$

Optimal (type 3, 491 leaves, 16 steps) :

$$\frac{e x \sqrt{d+e x^2}}{2 c}+\left(\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\left(c d-b e-\frac{b c d-b^2 e+2 a c e}{\sqrt{b^2-4 a c}}\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\, x}{\sqrt{b-\sqrt{b^2-4 a c}}\,\sqrt{d+e x^2}}\right]\right)\Bigg/\left(2 c^2 \sqrt{b-\sqrt{b^2-4 a c}}\right)+$$

$$\left(\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\left(c d-b e+\frac{b c d-b^2 e+2 a c e}{\sqrt{b^2-4 a c}}\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\, x}{\sqrt{b+\sqrt{b^2-4 a c}}\,\sqrt{d+e x^2}}\right]\right)\Bigg/\left(2 c^2 \sqrt{b+\sqrt{b^2-4 a c}}\right)+$$

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

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

Result (type 8, 31 leaves):

$$\int \frac{x^2 \left(d+e x^2\right)^{3/2}}{a+b x^2+c x^4}\, dx$$

Problem 373: Unable to integrate problem.

$$\int \frac{\left(d+e x^2\right)^{3/2}}{a+b x^2+c x^4}\, dx$$

Optimal (type 3, 487 leaves, 13 steps):

$$\left(\left(2 c^2 d^2 + b \left(b - \sqrt{b^2 - 4 a c}\right) e^2 - 2 c e \left(b d - \sqrt{b^2 - 4 a c}\, d + a e\right)\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\sqrt{2 c d - \left(b - \sqrt{b^2 - 4 a c}\right) e}\; x}{\sqrt{b - \sqrt{b^2 - 4 a c}}\;\sqrt{d + e x^2}}\right]\right) \Bigg/$$

$$\left(c \sqrt{b^2 - 4 a c}\;\sqrt{b - \sqrt{b^2 - 4 a c}}\;\sqrt{2 c d - \left(b - \sqrt{b^2 - 4 a c}\right) e}\right) -$$

$$\left(\left(2 c^2 d^2 + b \left(b + \sqrt{b^2 - 4 a c}\right) e^2 - 2 c e \left(b d + \sqrt{b^2 - 4 a c}\, d + a e\right)\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\sqrt{2 c d - \left(b + \sqrt{b^2 - 4 a c}\right) e}\; x}{\sqrt{b + \sqrt{b^2 - 4 a c}}\;\sqrt{d + e x^2}}\right]\right) \Bigg/$$

$$\left(c \sqrt{b^2 - 4 a c}\;\sqrt{b + \sqrt{b^2 - 4 a c}}\;\sqrt{2 c d - \left(b + \sqrt{b^2 - 4 a c}\right) e}\right) +$$

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

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

Result (type 8, 28 leaves) :

$$\int \frac{\left(d + e x^2\right)^{3/2}}{a + b x^2 + c x^4}\, dx$$

Problem 374: Unable to integrate problem.

$$\int \frac{\left(d + e x^2\right)^{3/2}}{x^2 \left(a + b x^2 + c x^4\right)}\, dx$$

Optimal (type 3, 260 leaves, ? steps):

$$-\frac{d\sqrt{d+e x^2}}{a x}-\frac{\left(2 c d-\left(b-\sqrt{b^2-4 a c}\right) e\right)^{3/2} \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\; x}{\sqrt{b-\sqrt{b^2-4 a c}}\;\sqrt{d+e x^2}}\right]}{\sqrt{b^2-4 a c}\left(b-\sqrt{b^2-4 a c}\right)^{3/2}}+$$

$$\frac{\left(2 c d-\left(b+\sqrt{b^2-4 a c}\right) e\right)^{3/2} \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\; x}{\sqrt{b+\sqrt{b^2-4 a c}}\;\sqrt{d+e x^2}}\right]}{\sqrt{b^2-4 a c}\left(b+\sqrt{b^2-4 a c}\right)^{3/2}}$$

Result (type 8, 31 leaves) :

$$\int \frac{\left(d+e x^2\right)^{3/2}}{x^2\left(a+b x^2+c x^4\right)}\,dx$$

Problem 375: Unable to integrate problem.

$$\int \frac{\left(d+e x^2\right)^{3/2}}{x^4\left(a+b x^2+c x^4\right)}\,dx$$

Optimal (type 3, 523 leaves, 19 steps) :

$$\frac{(b d - a e)\sqrt{d+e x^2}}{a^2 x} - \frac{\left(d+e x^2\right)^{3/2}}{3 a x^3} + \left(\sqrt{2 c d - \left(b - \sqrt{b^2 - 4 a c}\right) e}\left(b d - a e + \frac{b^2 d - 2 a c d - a b e}{\sqrt{b^2 - 4 a c}}\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\sqrt{2 c d - \left(b - \sqrt{b^2 - 4 a c}\right) e}\; x}{\sqrt{b - \sqrt{b^2 - 4 a c}}\;\sqrt{d + e x^2}}\right]\right) \Big/ \left(2 a^2 \sqrt{b - \sqrt{b^2 - 4 a c}}\right) +$$

$$\left(\sqrt{2 c d - \left(b + \sqrt{b^2 - 4 a c}\right) e}\left(b d - a e - \frac{b^2 d - 2 a c d - a b e}{\sqrt{b^2 - 4 a c}}\right)\right.$$

$$\left.\text{ArcTan}\left[\frac{\sqrt{2 c d - \left(b + \sqrt{b^2 - 4 a c}\right) e}\; x}{\sqrt{b + \sqrt{b^2 - 4 a c}}\;\sqrt{d + e x^2}}\right]\right) \Big/ \left(2 a^2 \sqrt{b + \sqrt{b^2 - 4 a c}}\right) -$$

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

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

Result (type 8, 31 leaves):

$$\int \frac{\left(d + e x^2\right)^{3/2}}{x^4 \left(a + b x^2 + c x^4\right)} \, dx$$

Problem 381: Unable to integrate problem.

$$\int \frac{x^4 \sqrt{1 - x^2}}{a + b x^2 + c x^4} \, dx$$

Optimal (type 3, 325 leaves, 9 steps):

$$\frac{x\sqrt{1-x^2}}{2c}+\frac{(2b+c)\,\text{ArcSin}[x]}{2c^2}-\frac{\left(b^2-ac+bc-\frac{b^3-3abc+b^2c-2ac^2}{\sqrt{b^2-4ac}}\right)\text{ArcTan}\left[\frac{\sqrt{b+2c-\sqrt{b^2-4ac}}\,x}{\sqrt{b-\sqrt{b^2-4ac}}\,\sqrt{1-x^2}}\right]}{c^2\sqrt{b-\sqrt{b^2-4ac}}\,\sqrt{b+2c-\sqrt{b^2-4ac}}}-\frac{\left(b^2-ac+bc+\frac{b^3-3abc+b^2c-2ac^2}{\sqrt{b^2-4ac}}\right)\text{ArcTan}\left[\frac{\sqrt{b+2c+\sqrt{b^2-4ac}}\,x}{\sqrt{b+\sqrt{b^2-4ac}}\,\sqrt{1-x^2}}\right]}{c^2\sqrt{b+\sqrt{b^2-4ac}}\,\sqrt{b+2c+\sqrt{b^2-4ac}}}$$

Result (type 8, 31 leaves):

$$\int\frac{x^4\sqrt{1-x^2}}{a+b\,x^2+c\,x^4}\,dx$$

Problem 382: Unable to integrate problem.

$$\int\frac{x^2\sqrt{1-x^2}}{a+b\,x^2+c\,x^4}\,dx$$

Optimal (type 3, 263 leaves, 8 steps):

$$-\frac{\text{ArcSin}[x]}{c}+\frac{\left(b+c-\frac{b^2-2ac+bc}{\sqrt{b^2-4ac}}\right)\text{ArcTan}\left[\frac{\sqrt{b+2c-\sqrt{b^2-4ac}}\,x}{\sqrt{b-\sqrt{b^2-4ac}}\,\sqrt{1-x^2}}\right]}{c\sqrt{b-\sqrt{b^2-4ac}}\,\sqrt{b+2c-\sqrt{b^2-4ac}}}+\frac{\left(b+c+\frac{b^2-2ac+bc}{\sqrt{b^2-4ac}}\right)\text{ArcTan}\left[\frac{\sqrt{b+2c+\sqrt{b^2-4ac}}\,x}{\sqrt{b+\sqrt{b^2-4ac}}\,\sqrt{1-x^2}}\right]}{c\sqrt{b+\sqrt{b^2-4ac}}\,\sqrt{b+2c+\sqrt{b^2-4ac}}}$$

Result (type 8, 31 leaves):

$$\int\frac{x^2\sqrt{1-x^2}}{a+b\,x^2+c\,x^4}\,dx$$

Problem 383: Unable to integrate problem.

$$\int\frac{\sqrt{1-x^2}}{a+b\,x^2+c\,x^4}\,dx$$

Optimal (type 3, 220 leaves, 9 steps):

$$\frac{\sqrt{b+2c-\sqrt{b^2-4ac}}\ \mathrm{ArcTan}\left[\frac{\sqrt{b+2c-\sqrt{b^2-4ac}}\ x}{\sqrt{b-\sqrt{b^2-4ac}}\ \sqrt{1-x^2}}\right]}{\sqrt{b^2-4ac}\ \sqrt{b-\sqrt{b^2-4ac}}}-\frac{\sqrt{b+2c+\sqrt{b^2-4ac}}\ \mathrm{ArcTan}\left[\frac{\sqrt{b+2c+\sqrt{b^2-4ac}}\ x}{\sqrt{b+\sqrt{b^2-4ac}}\ \sqrt{1-x^2}}\right]}{\sqrt{b^2-4ac}\ \sqrt{b+\sqrt{b^2-4ac}}}$$

Result (type 8, 28 leaves):

$$\int \frac{\sqrt{1-x^2}}{a+b x^2+c x^4}\,dx$$

Problem 384: Unable to integrate problem.

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

Optimal (type 3, 265 leaves, 8 steps):

$$-\frac{\sqrt{1-x^2}}{a\,x}-\frac{c\left(1+\frac{2a+b}{\sqrt{b^2-4ac}}\right)\mathrm{ArcTan}\left[\frac{\sqrt{b+2c-\sqrt{b^2-4ac}}\ x}{\sqrt{b-\sqrt{b^2-4ac}}\ \sqrt{1-x^2}}\right]}{a\sqrt{b-\sqrt{b^2-4ac}}\ \sqrt{b+2c-\sqrt{b^2-4ac}}}-\frac{c\left(1-\frac{2a+b}{\sqrt{b^2-4ac}}\right)\mathrm{ArcTan}\left[\frac{\sqrt{b+2c+\sqrt{b^2-4ac}}\ x}{\sqrt{b+\sqrt{b^2-4ac}}\ \sqrt{1-x^2}}\right]}{a\sqrt{b+\sqrt{b^2-4ac}}\ \sqrt{b+2c+\sqrt{b^2-4ac}}}$$

Result (type 8, 31 leaves):

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

Problem 385: Unable to integrate problem.

$$\int \frac{x^2\sqrt{1-x^2}}{-1+x^2+x^4}\,dx$$

Optimal (type 3, 96 leaves, 8 steps):

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

Result (type 8, 27 leaves):

$$\int \frac{x^2\sqrt{1-x^2}}{-1+x^2+x^4}\,dx$$

Problem 386: Unable to integrate problem.

$$\int \frac{x^8}{\sqrt{d+e x^2}\left(a+b x^2+c x^4\right)}\,dx$$

Optimal (type 3, 479 leaves, 17 steps):

$$-\frac{3 d x\sqrt{d+e x^2}}{8 c e^2}-\frac{b x\sqrt{d+e x^2}}{2 c^2 e}+\frac{x^3\sqrt{d+e x^2}}{4 c e}-\frac{\left(b^3-2 a b c-\frac{b^4-4 a b^2 c+2 a^2 c^2}{\sqrt{b^2-4 a c}}\right)\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\ x}{\sqrt{b-\sqrt{b^2-4 a c}}\ \sqrt{d+e x^2}}\right]}{c^3\sqrt{b-\sqrt{b^2-4 a c}}\ \sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}}-\frac{\left(b^3-2 a b c+\frac{b^4-4 a b^2 c+2 a^2 c^2}{\sqrt{b^2-4 a c}}\right)\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\ x}{\sqrt{b+\sqrt{b^2-4 a c}}\ \sqrt{d+e x^2}}\right]}{c^3\sqrt{b+\sqrt{b^2-4 a c}}\ \sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}}+\frac{3 d^2\,\text{ArcTanh}\left[\frac{\sqrt{e}\ x}{\sqrt{d+e x^2}}\right]}{8 c e^{5/2}}+\frac{b d\,\text{ArcTanh}\left[\frac{\sqrt{e}\ x}{\sqrt{d+e x^2}}\right]}{2 c^2 e^{3/2}}+\frac{\left(b^2-a c\right)\text{ArcTanh}\left[\frac{\sqrt{e}\ x}{\sqrt{d+e x^2}}\right]}{c^3\sqrt{e}}$$

Result (type 8, 31 leaves):

$$\int \frac{x^8}{\sqrt{d+e x^2}\left(a+b x^2+c x^4\right)}\,dx$$

Problem 387: Unable to integrate problem.

$$\int \frac{x^6}{\sqrt{d+e x^2}\,\left(a+b x^2+c x^4\right)}\,dx$$

Optimal (type 3, 366 leaves, 13 steps):

$$\frac{x\sqrt{d+e x^2}}{2 c e}+\frac{\left(b^2-a c-\frac{b\left(b^2-3 a c\right)}{\sqrt{b^2-4 a c}}\right)\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\; x}{\sqrt{b-\sqrt{b^2-4 a c}}\;\sqrt{d+e x^2}}\right]}{c^2\sqrt{b-\sqrt{b^2-4 a c}}\;\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}}+\frac{\left(b^2-a c+\frac{b\left(b^2-3 a c\right)}{\sqrt{b^2-4 a c}}\right)\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\; x}{\sqrt{b+\sqrt{b^2-4 a c}}\;\sqrt{d+e x^2}}\right]}{c^2\sqrt{b+\sqrt{b^2-4 a c}}\;\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}}-\frac{d\,\text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{2 c e^{3/2}}-\frac{b\,\text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{c^2\sqrt{e}}$$

Result (type 8, 31 leaves):

$$\int \frac{x^6}{\sqrt{d+e x^2}\,\left(a+b x^2+c x^4\right)}\,dx$$

Problem 388: Unable to integrate problem.

$$\int \frac{x^4}{\sqrt{d+e x^2}\,\left(a+b x^2+c x^4\right)}\,dx$$

Optimal (type 3, 298 leaves, 10 steps):

$$-\frac{\left(b-\frac{b^2-2 a c}{\sqrt{b^2-4 a c}}\right)\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\; x}{\sqrt{b-\sqrt{b^2-4 a c}}\;\sqrt{d+e x^2}}\right]}{c\sqrt{b-\sqrt{b^2-4 a c}}\;\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}}-\frac{\left(b+\frac{b^2-2 a c}{\sqrt{b^2-4 a c}}\right)\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\; x}{\sqrt{b+\sqrt{b^2-4 a c}}\;\sqrt{d+e x^2}}\right]}{c\sqrt{b+\sqrt{b^2-4 a c}}\;\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}}+\frac{\text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{c\sqrt{e}}$$

Result (type 8, 31 leaves):

$$\int \frac{x^4}{\sqrt{d+e\,x^2}\,\left(a+b\,x^2+c\,x^4\right)}\,dx$$

Problem 389: Unable to integrate problem.

$$\int \frac{x^2}{\sqrt{d+e\,x^2}\,\left(a+b\,x^2+c\,x^4\right)}\,dx$$

Optimal (type 3, 240 leaves, 6 steps):

$$-\frac{\sqrt{b-\sqrt{b^2-4\,a\,c}}\ \mathrm{ArcTan}\left[\frac{\sqrt{2\,c\,d-\left(b-\sqrt{b^2-4\,a\,c}\right)\,e}\ x}{\sqrt{b-\sqrt{b^2-4\,a\,c}}\ \sqrt{d+e\,x^2}}\right]}{\sqrt{b^2-4\,a\,c}\ \sqrt{2\,c\,d-\left(b-\sqrt{b^2-4\,a\,c}\right)\,e}}+\frac{\sqrt{b+\sqrt{b^2-4\,a\,c}}\ \mathrm{ArcTan}\left[\frac{\sqrt{2\,c\,d-\left(b+\sqrt{b^2-4\,a\,c}\right)\,e}\ x}{\sqrt{b+\sqrt{b^2-4\,a\,c}}\ \sqrt{d+e\,x^2}}\right]}{\sqrt{b^2-4\,a\,c}\ \sqrt{2\,c\,d-\left(b+\sqrt{b^2-4\,a\,c}\right)\,e}}$$

Result (type 8, 31 leaves):

$$\int \frac{x^2}{\sqrt{d+e\,x^2}\,\left(a+b\,x^2+c\,x^4\right)}\,dx$$

Problem 390: Unable to integrate problem.

$$\int \frac{1}{\sqrt{d+e\,x^2}\,\left(a+b\,x^2+c\,x^4\right)}\,dx$$

Optimal (type 3, 243 leaves, 5 steps):

$$\frac{2\,c\,\mathrm{ArcTan}\left[\frac{\sqrt{2\,c\,d-\left(b-\sqrt{b^2-4\,a\,c}\right)\,e}\ x}{\sqrt{b-\sqrt{b^2-4\,a\,c}}\ \sqrt{d+e\,x^2}}\right]}{\sqrt{b^2-4\,a\,c}\ \sqrt{b-\sqrt{b^2-4\,a\,c}}\ \sqrt{2\,c\,d-\left(b-\sqrt{b^2-4\,a\,c}\right)\,e}}-\frac{2\,c\,\mathrm{ArcTan}\left[\frac{\sqrt{2\,c\,d-\left(b+\sqrt{b^2-4\,a\,c}\right)\,e}\ x}{\sqrt{b+\sqrt{b^2-4\,a\,c}}\ \sqrt{d+e\,x^2}}\right]}{\sqrt{b^2-4\,a\,c}\ \sqrt{b+\sqrt{b^2-4\,a\,c}}\ \sqrt{2\,c\,d-\left(b+\sqrt{b^2-4\,a\,c}\right)\,e}}$$

Result (type 8, 28 leaves):

$$\int \frac{1}{\sqrt{d+e x^2}\,\left(a+b x^2+c x^4\right)}\,dx$$

Problem 391: Unable to integrate problem.

$$\int \frac{1}{x^2 \sqrt{d+e x^2}\,\left(a+b x^2+c x^4\right)}\,dx$$

Optimal (type 3, 280 leaves, 9 steps):

$$-\frac{\sqrt{d+e x^2}}{a d x}-\frac{c\left(1+\frac{b}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\; x}{\sqrt{b-\sqrt{b^2-4 a c}}\;\sqrt{d+e x^2}}\right]}{a \sqrt{b-\sqrt{b^2-4 a c}}\;\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}}-$$

$$\frac{c\left(1-\frac{b}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\; x}{\sqrt{b+\sqrt{b^2-4 a c}}\;\sqrt{d+e x^2}}\right]}{a \sqrt{b+\sqrt{b^2-4 a c}}\;\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}}$$

Result (type 8, 31 leaves):

$$\int \frac{1}{x^2 \sqrt{d+e x^2}\,\left(a+b x^2+c x^4\right)}\,dx$$

Problem 392: Unable to integrate problem.

$$\int \frac{1}{x^4 \sqrt{d+e x^2}\,\left(a+b x^2+c x^4\right)}\,dx$$

Optimal (type 3, 341 leaves, 11 steps):

$$-\frac{\sqrt{d+e x^2}}{3 a d x^3}+\frac{b \sqrt{d+e x^2}}{a^2 d x}+\frac{2 e \sqrt{d+e x^2}}{3 a d^2 x}+$$

$$\frac{c\left(b+\frac{b^2-2 a c}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\; x}{\sqrt{b-\sqrt{b^2-4 a c}}\;\sqrt{d+e x^2}}\right]}{a^2 \sqrt{b-\sqrt{b^2-4 a c}}\;\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}}+\frac{c\left(b-\frac{b^2-2 a c}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\; x}{\sqrt{b+\sqrt{b^2-4 a c}}\;\sqrt{d+e x^2}}\right]}{a^2 \sqrt{b+\sqrt{b^2-4 a c}}\;\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}}$$

Result (type 8, 31 leaves):

$$\int \frac{1}{x^4 \sqrt{d+e x^2} \left(a+b x^2+c x^4\right)} \, dx$$

Problem 393: Unable to integrate problem.

$$\int \frac{1}{x^6 \sqrt{d+e x^2} \left(a+b x^2+c x^4\right)} \, dx$$

Optimal (type 3, 443 leaves, 14 steps):

$$-\frac{\sqrt{d+e x^2}}{5 a d x^5}+\frac{b \sqrt{d+e x^2}}{3 a^2 d x^3}+\frac{4 e \sqrt{d+e x^2}}{15 a d^2 x^3}-\frac{\left(b^2-a c\right) \sqrt{d+e x^2}}{a^3 d x}-\frac{2 b e \sqrt{d+e x^2}}{3 a^2 d^2 x}-\frac{8 e^2 \sqrt{d+e x^2}}{15 a d^3 x}-\frac{c \left(b^2-a c+\frac{b \left(b^2-3 a c\right)}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\, x}{\sqrt{b-\sqrt{b^2-4 a c}} \sqrt{d+e x^2}}\right]}{a^3 \sqrt{b-\sqrt{b^2-4 a c}} \sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}}-\frac{c \left(b^2-a c-\frac{b \left(b^2-3 a c\right)}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\, x}{\sqrt{b+\sqrt{b^2-4 a c}} \sqrt{d+e x^2}}\right]}{a^3 \sqrt{b+\sqrt{b^2-4 a c}} \sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}}$$

Result (type 8, 31 leaves):

$$\int \frac{1}{x^6 \sqrt{d+e x^2} \left(a+b x^2+c x^4\right)} \, dx$$

Problem 394: Unable to integrate problem.

$$\int \frac{x^6}{\left(d+e x^2\right)^{3/2} \left(a+b x^2+c x^4\right)} \, dx$$

Optimal (type 3, 350 leaves, 14 steps):

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

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

Result (type 8, 31 leaves) :

$$\int \frac{x^6}{\left(d+e x^2\right)^{3/2}\left(a+b x^2+c x^4\right)}\, dx$$

Problem 395: Unable to integrate problem.

$$\int \frac{x^4}{\left(d+e x^2\right)^{3/2}\left(a+b x^2+c x^4\right)}\, dx$$

Optimal (type 3, 360 leaves, 8 steps) :

$$\frac{d x}{\left(c d^2-b d e+a e^2\right)\sqrt{d+e x^2}}-\frac{\left(b d-a e-\frac{b^2 d-2 a c d-a b e}{\sqrt{b^2-4 a c}}\right)\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\, x}{\sqrt{b-\sqrt{b^2-4 a c}}\,\sqrt{d+e x^2}}\right]}{\sqrt{b-\sqrt{b^2-4 a c}}\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\left(c d^2-b d e+a e^2\right)}-$$

$$\frac{\left(b d-a e+\frac{b^2 d-2 a c d-a b e}{\sqrt{b^2-4 a c}}\right)\text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\, x}{\sqrt{b+\sqrt{b^2-4 a c}}\,\sqrt{d+e x^2}}\right]}{\sqrt{b+\sqrt{b^2-4 a c}}\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\left(c d^2-b d e+a e^2\right)}$$

Result (type 8, 31 leaves) :

$$\int \frac{x^4}{\left(d+e x^2\right)^{3/2}\left(a+b x^2+c x^4\right)}\, dx$$

Problem 396: Unable to integrate problem.

$$\int \frac{x^2}{\left(d+e x^2\right)^{3/2} \left(a+b x^2+c x^4\right)} \, dx$$

Optimal (type 3, 333 leaves, 8 steps):

$$-\frac{e x}{\left(c d^2-b d e+a e^2\right) \sqrt{d+e x^2}}+\frac{c \left(d-\frac{b d-2 a e}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\, x}{\sqrt{b-\sqrt{b^2-4 a c}}\, \sqrt{d+e x^2}}\right]}{\sqrt{b-\sqrt{b^2-4 a c}}\, \sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\, \left(c d^2-b d e+a e^2\right)}+$$

$$\frac{c \left(d+\frac{b d-2 a e}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\, x}{\sqrt{b+\sqrt{b^2-4 a c}}\, \sqrt{d+e x^2}}\right]}{\sqrt{b+\sqrt{b^2-4 a c}}\, \sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\, \left(c d^2-b d e+a e^2\right)}$$

Result (type 8, 31 leaves):

$$\int \frac{x^2}{\left(d+e x^2\right)^{3/2} \left(a+b x^2+c x^4\right)} \, dx$$

Problem 397: Unable to integrate problem.

$$\int \frac{1}{\left(d+e x^2\right)^{3/2} \left(a+b x^2+c x^4\right)} \, dx$$

Optimal (type 3, 341 leaves, 8 steps):

$$\frac{e^2 x}{d \left(c d^2-b d e+a e^2\right) \sqrt{d+e x^2}}-\frac{c \left(e-\frac{2 c d-b e}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\, x}{\sqrt{b-\sqrt{b^2-4 a c}}\, \sqrt{d+e x^2}}\right]}{\sqrt{b-\sqrt{b^2-4 a c}}\, \sqrt{2 c d-\left(b-\sqrt{b^2-4 a c}\right) e}\, \left(c d^2-b d e+a e^2\right)}-$$

$$\frac{c \left(e+\frac{2 c d-b e}{\sqrt{b^2-4 a c}}\right) \text{ArcTan}\left[\frac{\sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\, x}{\sqrt{b+\sqrt{b^2-4 a c}}\, \sqrt{d+e x^2}}\right]}{\sqrt{b+\sqrt{b^2-4 a c}}\, \sqrt{2 c d-\left(b+\sqrt{b^2-4 a c}\right) e}\, \left(c d^2-b d e+a e^2\right)}$$

Result (type 8, 28 leaves):

$$\int \frac{1}{\left(d+e x^2\right)^{3/2} \left(a+b x^2+c x^4\right)} \, dx$$

Problem 398: Unable to integrate problem.

$$\int \frac{1}{x^2 \left(d+e x^2\right)^{3/2} \left(a+b x^2+c x^4\right)} \, dx$$

Optimal (type 3, 339 leaves, 12 steps):

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

Result (type 8, 31 leaves):

$$\int \frac{1}{x^2 \left(d+e x^2\right)^{3/2} \left(a+b x^2+c x^4\right)} \, dx$$

Problem 399: Unable to integrate problem.

$$\int \frac{1}{x^4 \left(d+e x^2\right)^{3/2} \left(a+b x^2+c x^4\right)} \, dx$$

Optimal (type 3, 419 leaves, 15 steps):

$$-\frac{1}{3\,a\,d\,x^3\sqrt{d+e\,x^2}}+\frac{3\,b\,d+4\,a\,e}{3\,a^2\,d^2\,x\sqrt{d+e\,x^2}}+\frac{2\,e\,(3\,b\,d+4\,a\,e)\,x}{3\,a^2\,d^3\sqrt{d+e\,x^2}}-$$

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

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

Result (type 8, 31 leaves) :

$$\int\frac{1}{x^4\,(d+e\,x^2)^{3/2}\,(a+b\,x^2+c\,x^4)}\,dx$$

Problem 400: Unable to integrate problem.

$$\int\frac{(f\,x)^m\,(d+e\,x^2)^q}{a+b\,x^2+c\,x^4}\,dx$$

Optimal (type 6, 243 leaves, 6 steps) :

$$\left(2\,c\,(f\,x)^{1+m}\,(d+e\,x^2)^q\left(1+\frac{e\,x^2}{d}\right)^{-q}\mathrm{AppellF1}\left[\frac{1+m}{2},1,-q,\frac{3+m}{2},-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},-\frac{e\,x^2}{d}\right]\right)\Big/$$
$$\left(\sqrt{b^2-4\,a\,c}\,\left(b-\sqrt{b^2-4\,a\,c}\right)f\,(1+m)\right)-$$
$$\left(2\,c\,(f\,x)^{1+m}\,(d+e\,x^2)^q\left(1+\frac{e\,x^2}{d}\right)^{-q}\mathrm{AppellF1}\left[\frac{1+m}{2},1,-q,\frac{3+m}{2},-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},-\frac{e\,x^2}{d}\right]\right)\Big/$$
$$\left(\sqrt{b^2-4\,a\,c}\,\left(b+\sqrt{b^2-4\,a\,c}\right)f\,(1+m)\right)$$

Result (type 8, 31 leaves) :

$$\int\frac{(f\,x)^m\,(d+e\,x^2)^q}{a+b\,x^2+c\,x^4}\,dx$$

Problem 405: Unable to integrate problem.

$$\int\frac{(d+e\,x^2)^q}{x\,(a+b\,x^2+c\,x^4)}\,dx$$

Optimal (type 5, 262 leaves, 8 steps) :

$$\left(c\left(1+\frac{b}{\sqrt{b^2-4ac}}\right)\left(d+e x^2\right)^{1+q}\text{Hypergeometric2F1}\left[1,1+q,2+q,\frac{2c\left(d+e x^2\right)}{2cd-\left(b-\sqrt{b^2-4ac}\right)e}\right]\right)\Big/\left(2a\left(2cd-\left(b-\sqrt{b^2-4ac}\right)e\right)(1+q)\right)+\left(c\left(1-\frac{b}{\sqrt{b^2-4ac}}\right)\left(d+e x^2\right)^{1+q}\text{Hypergeometric2F1}\left[1,1+q,2+q,\frac{2c\left(d+e x^2\right)}{2cd-\left(b+\sqrt{b^2-4ac}\right)e}\right]\right)\Big/\left(2a\left(2cd-\left(b+\sqrt{b^2-4ac}\right)e\right)(1+q)\right)-\frac{\left(d+e x^2\right)^{1+q}\text{Hypergeometric2F1}\left[1,1+q,2+q,1+\frac{e x^2}{d}\right]}{2ad(1+q)}$$

Result (type 8, 29 leaves):

$$\int\frac{\left(d+e x^2\right)^q}{x\left(a+b x^2+c x^4\right)}\,dx$$

Problem 407: Unable to integrate problem.

$$\int\frac{x^6\left(d+e x^2\right)^q}{a+b x^2+c x^4}\,dx$$

Optimal (type 6, 339 leaves, 12 steps):

$$\left(\left(b^2-ac-\frac{b\left(b^2-3ac\right)}{\sqrt{b^2-4ac}}\right)x\left(d+e x^2\right)^q\left(1+\frac{e x^2}{d}\right)^{-q}\text{AppellF1}\left[\frac{1}{2},1,-q,\frac{3}{2},-\frac{2c x^2}{b-\sqrt{b^2-4ac}},-\frac{e x^2}{d}\right]\right)\Big/\left(c^2\left(b-\sqrt{b^2-4ac}\right)\right)+\left(\left(b^2-ac+\frac{b\left(b^2-3ac\right)}{\sqrt{b^2-4ac}}\right)x\left(d+e x^2\right)^q\left(1+\frac{e x^2}{d}\right)^{-q}\text{AppellF1}\left[\frac{1}{2},1,-q,\frac{3}{2},-\frac{2c x^2}{b+\sqrt{b^2-4ac}},-\frac{e x^2}{d}\right]\right)\Big/\left(c^2\left(b+\sqrt{b^2-4ac}\right)\right)-\frac{b x\left(d+e x^2\right)^q\left(1+\frac{e x^2}{d}\right)^{-q}\text{Hypergeometric2F1}\left[\frac{1}{2},-q,\frac{3}{2},-\frac{e x^2}{d}\right]}{c^2}+\frac{x^3\left(d+e x^2\right)^q\left(1+\frac{e x^2}{d}\right)^{-q}\text{Hypergeometric2F1}\left[\frac{3}{2},-q,\frac{5}{2},-\frac{e x^2}{d}\right]}{3c}$$

Result (type 8, 29 leaves):

$$\int\frac{x^6\left(d+e x^2\right)^q}{a+b x^2+c x^4}\,dx$$

Problem 408: Unable to integrate problem.

$$\int \frac{x^4 \left(d+e x^2\right)^q}{a+b x^2+c x^4} \, dx$$

Optimal (type 6, 273 leaves, 10 steps):

$$-\left(\left(\left(b-\frac{b^2-2 a c}{\sqrt{b^2-4 a c}}\right) x \left(d+e x^2\right)^q \left(1+\frac{e x^2}{d}\right)^{-q} \text{AppellF1}\left[\frac{1}{2},1,-q,\frac{3}{2},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{e x^2}{d}\right]\right)\Big/\left(c \left(b-\sqrt{b^2-4 a c}\right)\right)\right)-\left(\left(b+\frac{b^2-2 a c}{\sqrt{b^2-4 a c}}\right) x \left(d+e x^2\right)^q \left(1+\frac{e x^2}{d}\right)^{-q} \text{AppellF1}\left[\frac{1}{2},1,-q,\frac{3}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},-\frac{e x^2}{d}\right]\right)\Big/\left(c \left(b+\sqrt{b^2-4 a c}\right)\right)+\frac{x \left(d+e x^2\right)^q \left(1+\frac{e x^2}{d}\right)^{-q} \text{Hypergeometric2F1}\left[\frac{1}{2},-q,\frac{3}{2},-\frac{e x^2}{d}\right]}{c}$$

Result (type 8, 29 leaves):

$$\int \frac{x^4 \left(d+e x^2\right)^q}{a+b x^2+c x^4} \, dx$$

Problem 409: Unable to integrate problem.

$$\int \frac{x^2 \left(d+e x^2\right)^q}{a+b x^2+c x^4} \, dx$$

Optimal (type 6, 162 leaves, 6 steps):

$$-\frac{x \left(d+e x^2\right)^q \left(1+\frac{e x^2}{d}\right)^{-q} \text{AppellF1}\left[\frac{1}{2},1,-q,\frac{3}{2},-\frac{2 c x^2}{b-\sqrt{b^2-4 a c}},-\frac{e x^2}{d}\right]}{\sqrt{b^2-4 a c}}+\frac{x \left(d+e x^2\right)^q \left(1+\frac{e x^2}{d}\right)^{-q} \text{AppellF1}\left[\frac{1}{2},1,-q,\frac{3}{2},-\frac{2 c x^2}{b+\sqrt{b^2-4 a c}},-\frac{e x^2}{d}\right]}{\sqrt{b^2-4 a c}}$$

Result (type 8, 29 leaves):

$$\int \frac{x^2 \left(d+e x^2\right)^q}{a+b x^2+c x^4} \, dx$$

Problem 410: Unable to integrate problem.

$$\int \frac{\left(d+e x^2\right)^q}{a+b x^2+c x^4} \, dx$$

Optimal (type 6, 190 leaves, 5 steps):

$$-\left(\left(2\,c\,x\,\left(d+e\,x^2\right)^q\,\left(1+\frac{e\,x^2}{d}\right)^{-q}\,\text{AppellF1}\left[\frac{1}{2},\,1,\,-q,\,\frac{3}{2},\,-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},\,-\frac{e\,x^2}{d}\right]\right)\Big/\left(b^2-4\,a\,c-b\,\sqrt{b^2-4\,a\,c}\right)\right)-\left(2\,c\,x\,\left(d+e\,x^2\right)^q\,\left(1+\frac{e\,x^2}{d}\right)^{-q}\,\text{AppellF1}\left[\frac{1}{2},\,1,\,-q,\,\frac{3}{2},\,-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\,-\frac{e\,x^2}{d}\right]\right)\Big/\left(b^2-4\,a\,c+b\,\sqrt{b^2-4\,a\,c}\right)$$

Result (type 8, 26 leaves):

$$\int\frac{\left(d+e\,x^2\right)^q}{a+b\,x^2+c\,x^4}\,dx$$

Problem 411: Unable to integrate problem.

$$\int\frac{\left(d+e\,x^2\right)^q}{x^2\,\left(a+b\,x^2+c\,x^4\right)}\,dx$$

Optimal (type 6, 264 leaves, 10 steps):

$$-\left(\left(c\,\left(1+\frac{b}{\sqrt{b^2-4\,a\,c}}\right)\,x\,\left(d+e\,x^2\right)^q\,\left(1+\frac{e\,x^2}{d}\right)^{-q}\,\text{AppellF1}\left[\frac{1}{2},\,1,\,-q,\,\frac{3}{2},\,-\frac{2\,c\,x^2}{b-\sqrt{b^2-4\,a\,c}},\,-\frac{e\,x^2}{d}\right]\right)\Big/\left(a\,\left(b-\sqrt{b^2-4\,a\,c}\right)\right)\right)-\left(c\,\left(1-\frac{b}{\sqrt{b^2-4\,a\,c}}\right)\,x\,\left(d+e\,x^2\right)^q\,\left(1+\frac{e\,x^2}{d}\right)^{-q}\,\text{AppellF1}\left[\frac{1}{2},\,1,\,-q,\,\frac{3}{2},\,-\frac{2\,c\,x^2}{b+\sqrt{b^2-4\,a\,c}},\,-\frac{e\,x^2}{d}\right]\right)\Big/\left(a\,\left(b+\sqrt{b^2-4\,a\,c}\right)\right)-\frac{\left(d+e\,x^2\right)^q\,\left(1+\frac{e\,x^2}{d}\right)^{-q}\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\,-q,\,\frac{1}{2},\,-\frac{e\,x^2}{d}\right]}{a\,x}$$

Result (type 8, 29 leaves):

$$\int\frac{\left(d+e\,x^2\right)^q}{x^2\,\left(a+b\,x^2+c\,x^4\right)}\,dx$$

Problem 412: Unable to integrate problem.

$$\int\frac{\left(d+e\,x^2\right)^q}{x^4\,\left(a+b\,x^2+c\,x^4\right)}\,dx$$

Optimal (type 6, 328 leaves, 12 steps):

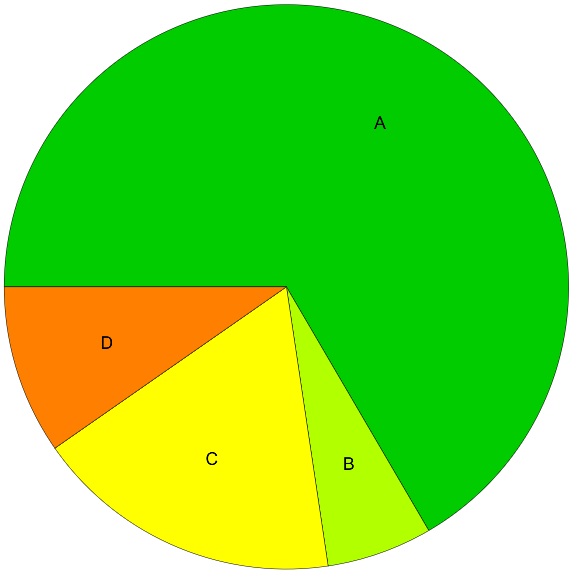
$$\left(c\left(b+\frac{b^2-2ac}{\sqrt{b^2-4ac}}\right)x\left(d+ex^2\right)^q\left(1+\frac{ex^2}{d}\right)^{-q}\text{AppellF1}\left[\frac{1}{2},1,-q,\frac{3}{2},-\frac{2cx^2}{b-\sqrt{b^2-4ac}},-\frac{ex^2}{d}\right]\right)\Big/\left(a^2\left(b-\sqrt{b^2-4ac}\right)\right)+\left(c\left(b-\frac{b^2-2ac}{\sqrt{b^2-4ac}}\right)x\left(d+ex^2\right)^q\left(1+\frac{ex^2}{d}\right)^{-q}\text{AppellF1}\left[\frac{1}{2},1,-q,\frac{3}{2},-\frac{2cx^2}{b+\sqrt{b^2-4ac}},-\frac{ex^2}{d}\right]\right)\Big/\left(a^2\left(b+\sqrt{b^2-4ac}\right)\right)-\frac{\left(d+ex^2\right)^q\left(1+\frac{ex^2}{d}\right)^{-q}\text{Hypergeometric2F1}\left[-\frac{3}{2},-q,-\frac{1}{2},-\frac{ex^2}{d}\right]}{3ax^3}+\frac{b\left(d+ex^2\right)^q\left(1+\frac{ex^2}{d}\right)^{-q}\text{Hypergeometric2F1}\left[-\frac{1}{2},-q,\frac{1}{2},-\frac{ex^2}{d}\right]}{a^2x}$$

Result (type 8, 29 leaves):

$$\int\frac{\left(d+ex^2\right)^q}{x^4\left(a+bx^2+cx^4\right)}\,dx$$

Summary of Integration Test Results

413 integration problems



A - 275 optimal antiderivatives

B - 25 more than twice size of optimal antiderivatives

C - 73 unnecessarily complex antiderivatives

D - 40 unable to integrate problems

E - 0 integration timeouts