Mathematica 11.3 Integration Test Results

Test results for the 454 problems in "1.1.4.2 (c x)^m (a x^j+b x^n)^p.m"

Problem 26: Result more than twice size of optimal antiderivative.

$$\int \frac{x^5}{x - x^3} \, dx$$

Optimal (type 3, 13 leaves, 4 steps):

$$-x - \frac{x^3}{3} + \text{ArcTanh}[x]$$

Result (type 3, 29 leaves):

$$-x - \frac{x^3}{3} - \frac{1}{2} \text{Log}[1 - x] + \frac{1}{2} \text{Log}[1 + x]$$

Problem 28: Result more than twice size of optimal antiderivative.

$$\int \frac{x^3}{x - x^3} \, dx$$

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

$$-x + \text{ArcTanh}[x]$$

Result (type 3, 22 leaves):

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

Problem 30: Result more than twice size of optimal antiderivative.

$$\int \frac{x}{x - x^3} \, dx$$

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

$$\text{ArcTanh}[x]$$

Result (type 3, 19 leaves):

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

Problem 32: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{x\,(x - x^3)}\,dx$$

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

$$-\frac{1}{x} + \text{ArcTanh}[x]$$

Result (type 3, 24 leaves):

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

Problem 34: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{x^3\,(x - x^3)}\,dx$$

Optimal (type 3, 15 leaves, 4 steps):

$$-\frac{1}{3\,x^3} - \frac{1}{x} + \text{ArcTanh}[x]$$

Result (type 3, 31 leaves):

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

Problem 38: Result unnecessarily involves imaginary or complex numbers.

$$\int x^3\,\sqrt{a\,x + b\,x^3}\,dx$$

Optimal (type 4, 163 leaves, 6 steps):

$$-\frac{20\,a^2\,\sqrt{a\,x + b\,x^3}}{231\,b^2} + \frac{4\,a\,x^2\,\sqrt{a\,x + b\,x^3}}{77\,b} + \frac{2}{11}\,x^4\,\sqrt{a\,x + b\,x^3} + \left(10\,a^{11/4}\,\sqrt{x}\,\left(\sqrt{a} + \sqrt{b}\,x\right)\,\sqrt{\frac{a + b\,x^2}{\left(\sqrt{a} + \sqrt{b}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{b^{1/4}\,\sqrt{x}}{a^{1/4}}\right],\,\frac{1}{2}\right]\right) \Big/ \left(231\,b^{9/4}\,\sqrt{a\,x + b\,x^3}\right)$$

Result (type 4, 148 leaves):

$$\left(2 x \left(\sqrt{\frac{i \sqrt{a}}{\sqrt{b}}} \left(-10 a^3 - 4 a^2 b x^2 + 27 a b^2 x^4 + 21 b^3 x^6\right) + 10 i a^3 \sqrt{1 + \frac{a}{b x^2}} \sqrt{x} \text{ EllipticF}\left[i \text{ ArcSinh}\left[\frac{\sqrt{\frac{i \sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right], -1\right]\right)\right) \Big/ \left(231 \sqrt{\frac{i \sqrt{a}}{\sqrt{b}}} b^2 \sqrt{x \left(a + b x^2\right)}\right)$$

Problem 39: Result unnecessarily involves imaginary or complex numbers.

$$\int x^2 \sqrt{a x + b x^3} \, dx$$

Optimal (type 4, 281 leaves, 7 steps):

$$-\frac{4 a^2 x \left(a + b x^2\right)}{15 b^{3/2} \left(\sqrt{a} + \sqrt{b} x\right) \sqrt{a x + b x^3}} + \frac{4 a x \sqrt{a x + b x^3}}{45 b} + \frac{2}{9} x^3 \sqrt{a x + b x^3} + \left(4 a^{9/4} \sqrt{x} \left(\sqrt{a} + \sqrt{b} x\right) \sqrt{\frac{a + b x^2}{\left(\sqrt{a} + \sqrt{b} x\right)^2}} \text{ EllipticE}\left[2 \text{ ArcTan}\left[\frac{b^{1/4} \sqrt{x}}{a^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(15 b^{7/4} \sqrt{a x + b x^3}\right) - \left(2 a^{9/4} \sqrt{x} \left(\sqrt{a} + \sqrt{b} x\right) \sqrt{\frac{a + b x^2}{\left(\sqrt{a} + \sqrt{b} x\right)^2}} \text{ EllipticF}\left[2 \text{ ArcTan}\left[\frac{b^{1/4} \sqrt{x}}{a^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(15 b^{7/4} \sqrt{a x + b x^3}\right)$$

Result (type 4, 184 leaves):

$$\left(2 x \left(\sqrt{b} x \sqrt{\frac{i \sqrt{b} x}{\sqrt{a}}} \left(2 a^2 + 7 a b x^2 + 5 b^2 x^4\right) - 6 a^{5/2} \sqrt{1 + \frac{b x^2}{a}} \text{ EllipticE}\left[i \text{ ArcSinh}\left[\sqrt{\frac{i \sqrt{b} x}{\sqrt{a}}}\right], -1\right] + 6 a^{5/2} \sqrt{1 + \frac{b x^2}{a}} \text{ EllipticF}\left[i \text{ ArcSinh}\left[\sqrt{\frac{i \sqrt{b} x}{\sqrt{a}}}\right], -1\right]\right)\right) \Big/ \left(45 b^{3/2} \sqrt{\frac{i \sqrt{b} x}{\sqrt{a}}} \sqrt{x \left(a + b x^2\right)}\right)$$

Problem 40: Result unnecessarily involves imaginary or complex numbers.

$$\int x \sqrt{a x + b x^3}\, dx$$

Optimal (type 4, 137 leaves, 5 steps):

$$\frac{4 a \sqrt{a x + b x^3}}{21 b} + \frac{2}{7} x^2 \sqrt{a x + b x^3} - \left(2 a^{7/4} \sqrt{x} \left(\sqrt{a} + \sqrt{b}\, x\right) \sqrt{\frac{a + b x^2}{\left(\sqrt{a} + \sqrt{b}\, x\right)^2}}\, \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{b^{1/4} \sqrt{x}}{a^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(21 b^{5/4} \sqrt{a x + b x^3}\right)$$

Result (type 4, 137 leaves):

$$\left(2 x \left(\sqrt{\frac{i \sqrt{a}}{\sqrt{b}}} \left(2 a^2 + 5 a b x^2 + 3 b^2 x^4\right) - 2 i a^2 \sqrt{1 + \frac{a}{b x^2}} \sqrt{x}\, \text{EllipticF}\left[i \text{ArcSinh}\left[\frac{\sqrt{\frac{i \sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right], -1\right]\right)\right) \Big/ \left(21 \sqrt{\frac{i \sqrt{a}}{\sqrt{b}}}\, b \sqrt{x \left(a + b x^2\right)}\right)$$

Problem 41: Result unnecessarily involves imaginary or complex numbers.

$$\int \sqrt{a x + b x^3}\, dx$$

Optimal (type 4, 255 leaves, 6 steps):

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

Result (type 4, 170 leaves):

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

Problem 42: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\sqrt{a x + b x^3}}{x}\, dx$$

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

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

Result (type 4, 101 leaves):

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

Problem 43: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\sqrt{a x + b x^3}}{x^2}\, dx$$

Optimal (type 4, 248 leaves, 6 steps):

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

Result (type 4, 168 leaves):

$$-\left(\left(\left(2\left(\sqrt{\frac{\mathrm{i}\sqrt{b}\,x}{\sqrt{a}}}\left(a+b\,x^2\right)-2\sqrt{a}\,\sqrt{b}\,x\,\sqrt{1+\frac{b\,x^2}{a}}\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{\mathrm{i}\sqrt{b}\,x}{\sqrt{a}}}\right],-1\right]+2\sqrt{a}\right.\right.\right.\right.$$

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

Problem 44: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\sqrt{a\,x+b\,x^3}}{x^3}\,dx$$

Optimal (type 4, 116 leaves, 4 steps):

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

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

Result (type 4, 104 leaves):

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

Problem 45: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\sqrt{a\,x+b\,x^3}}{x^4}\,dx$$

Optimal (type 4, 283 leaves, 7 steps):

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

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

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

Result (type 4, 192 leaves):

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

Problem 46: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 186 leaves, 7 steps):

$$-\frac{8\,a^3\,\sqrt{a\,x+b\,x^3}}{231\,b^2}+\frac{8\,a^2\,x^2\,\sqrt{a\,x+b\,x^3}}{385\,b}+\frac{4}{55}\,a\,x^4\,\sqrt{a\,x+b\,x^3}+\frac{2}{15}\,x^3\,\left(a\,x+b\,x^3\right)^{3/2}+\left(4\,a^{15/4}\,\sqrt{x}\,\left(\sqrt{a}+\sqrt{b}\,x\right)\,\sqrt{\frac{a+b\,x^2}{\left(\sqrt{a}+\sqrt{b}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{b^{1/4}\,\sqrt{x}}{a^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(231\,b^{9/4}\,\sqrt{a\,x+b\,x^3}\right)$$

Result (type 4, 159 leaves):

$$\left(2\,x\,\left(\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\,\left(-20\,a^4-8\,a^3\,b\,x^2+131\,a^2\,b^2\,x^4+196\,a\,b^3\,x^6+77\,b^4\,x^8\right)+20\,i\,a^4\,\sqrt{1+\frac{a}{b\,x^2}}\,\sqrt{x}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right],-1\right]\right)\right)\Big/\left(1155\,\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\,b^2\,\sqrt{x\,\left(a+b\,x^2\right)}\right)$$

Problem 47: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 304 leaves, 8 steps):

$$-\frac{8 a^3 x \left(a+b x^2\right)}{65 b^{3/2} \left(\sqrt{a}+\sqrt{b} x\right) \sqrt{a x+b x^3}}+\frac{8 a^2 x \sqrt{a x+b x^3}}{195 b}+\frac{4}{39} a x^3 \sqrt{a x+b x^3}+\frac{2}{13} x^2 \left(a x+b x^3\right)^{3/2}+$$
$$\left(8 a^{13/4} \sqrt{x} \left(\sqrt{a}+\sqrt{b} x\right) \sqrt{\frac{a+b x^2}{\left(\sqrt{a}+\sqrt{b} x\right)^2}} \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{b^{1/4} \sqrt{x}}{a^{1/4}}\right],\frac{1}{2}\right]\right)\Big/$$
$$\left(65 b^{7/4} \sqrt{a x+b x^3}\right)-$$
$$\left(4 a^{13/4} \sqrt{x} \left(\sqrt{a}+\sqrt{b} x\right) \sqrt{\frac{a+b x^2}{\left(\sqrt{a}+\sqrt{b} x\right)^2}} \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{b^{1/4} \sqrt{x}}{a^{1/4}}\right],\frac{1}{2}\right]\right)\Big/$$
$$\left(65 b^{7/4} \sqrt{a x+b x^3}\right)$$

Result (type 4, 195 leaves):

$$\left(2 x \left(\sqrt{b} x \sqrt{\frac{i \sqrt{b} x}{\sqrt{a}}} \left(4 a^3+29 a^2 b x^2+40 a b^2 x^4+15 b^3 x^6\right)-\right.\right.$$
$$12 a^{7/2} \sqrt{1+\frac{b x^2}{a}} \text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{\frac{i \sqrt{b} x}{\sqrt{a}}}\right],-1\right]+$$
$$\left.\left.12 a^{7/2} \sqrt{1+\frac{b x^2}{a}} \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{\frac{i \sqrt{b} x}{\sqrt{a}}}\right],-1\right]\right)\right)\Big/$$
$$\left(195 b^{3/2} \sqrt{\frac{i \sqrt{b} x}{\sqrt{a}}} \sqrt{x \left(a+b x^2\right)}\right)$$

Problem 48: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 158 leaves, 6 steps):

$$\frac{8 a^2 \sqrt{a x+b x^3}}{77 b}+\frac{12}{77} a x^2 \sqrt{a x+b x^3}+\frac{2}{11} x \left(a x+b x^3\right)^{3/2}-$$
$$\left(4 a^{11/4} \sqrt{x} \left(\sqrt{a}+\sqrt{b} x\right) \sqrt{\frac{a+b x^2}{\left(\sqrt{a}+\sqrt{b} x\right)^2}} \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{b^{1/4} \sqrt{x}}{a^{1/4}}\right],\frac{1}{2}\right]\right)\Big/$$
$$\left(77 b^{5/4} \sqrt{a x+b x^3}\right)$$

Result (type 4, 148 leaves):

$$\left(2x\left(\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\left(4a^3+17a^2bx^2+20ab^2x^4+7b^3x^6\right)-4ia^3\sqrt{1+\frac{a}{bx^2}}\sqrt{x}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right],-1\right]\right)\right)\Big/\left(77\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\,b\sqrt{x\left(a+bx^2\right)}\right)$$

Problem 49: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 275 leaves, 7 steps):

$$\frac{8a^2x\left(a+bx^2\right)}{15\sqrt{b}\left(\sqrt{a}+\sqrt{b}\,x\right)\sqrt{ax+bx^3}}+\frac{4}{15}ax\sqrt{ax+bx^3}+\frac{2}{9}\left(ax+bx^3\right)^{3/2}-\left(8a^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}\,x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{b^{1/4}\sqrt{x}}{a^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(15b^{3/4}\sqrt{ax+bx^3}\right)+\left(4a^{9/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}\,x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{b^{1/4}\sqrt{x}}{a^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(15b^{3/4}\sqrt{ax+bx^3}\right)$$

Result (type 4, 184 leaves):

$$\left(2x\left(\sqrt{b}\,x\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\left(11a^2+16abx^2+5b^2x^4\right)+12a^{5/2}\sqrt{1+\frac{bx^2}{a}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\right],-1\right]-12a^{5/2}\sqrt{1+\frac{bx^2}{a}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\right],-1\right]\right)\right)\Big/\left(45\sqrt{b}\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}\right)$$

Problem 50: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 134 leaves, 5 steps):

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

Result (type 4, 113 leaves):

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

Problem 51: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 274 leaves, 7 steps):

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

Result (type 4, 183 leaves):

$$\left(2\left(\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\left(-5a^2-4abx^2+b^2x^4\right)+\right.\right.$$

$$12a^{3/2}\sqrt{b}\,x\sqrt{1+\frac{bx^2}{a}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\right],-1\right]-12a^{3/2}\sqrt{b}\,x$$

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

Problem 52: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 134 leaves, 5 steps):

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

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

Result (type 4, 107 leaves):

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

Problem 53: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 277 leaves, 7 steps):

$$\frac{24\,b^{3/2}\,x\,\left(a+b\,x^2\right)}{5\,\left(\sqrt{a}+\sqrt{b}\,x\right)\,\sqrt{a\,x+b\,x^3}}-\frac{12\,b\,\sqrt{a\,x+b\,x^3}}{5\,x}-\frac{2\,\left(a\,x+b\,x^3\right)^{3/2}}{5\,x^4}-\frac{1}{5\,\sqrt{a\,x+b\,x^3}}$$

$$24\,a^{1/4}\,b^{5/4}\,\sqrt{x}\,\left(\sqrt{a}+\sqrt{b}\,x\right)\,\sqrt{\frac{a+b\,x^2}{\left(\sqrt{a}+\sqrt{b}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{b^{1/4}\,\sqrt{x}}{a^{1/4}}\right],\,\frac{1}{2}\right]+$$

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

Result (type 4, 189 leaves):

$$-\left(\left(2\left(\sqrt{\frac{i\,\sqrt{b}\,x}{\sqrt{a}}}\,\left(a^2+8\,a\,b\,x^2+7\,b^2\,x^4\right)-\right.\right.\right.$$

$$12\,\sqrt{a}\,b^{3/2}\,x^3\,\sqrt{1+\frac{b\,x^2}{a}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\,\sqrt{b}\,x}{\sqrt{a}}}\right],\,-1\right]+12\,\sqrt{a}\,b^{3/2}\,x^3$$

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

Problem 54: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 137 leaves, 5 steps):

$$-\frac{4\,b\,\sqrt{a\,x+b\,x^3}}{7\,x^2}-\frac{2\,\left(a\,x+b\,x^3\right)^{3/2}}{7\,x^5}+\frac{1}{7\,a^{1/4}\,\sqrt{a\,x+b\,x^3}}$$

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

Result (type 4, 116 leaves):

$$\frac{2\left(-a^2-4\,a\,b\,x^2-3\,b^2\,x^4+\frac{4\,i\,b^2\,\sqrt{1+\frac{a}{b\,x^2}}\,x^{9/2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\,\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right],-1\right]}{\sqrt{\frac{i\,\sqrt{a}}{\sqrt{b}}}}\right)}{7\,x^3\,\sqrt{x\,\left(a+b\,x^2\right)}}$$

Problem 55: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(a x+b x^3\right)^{3/2}}{x^7}\, dx$$

Optimal (type 4, 306 leaves, 8 steps):

$$\frac{8 b^{5/2} x \left(a+b x^2\right)}{15 a \left(\sqrt{a}+\sqrt{b}\, x\right) \sqrt{a x+b x^3}}-\frac{4 b \sqrt{a x+b x^3}}{15 x^3}-\frac{8 b^2 \sqrt{a x+b x^3}}{15 a x}-\frac{2 \left(a x+b x^3\right)^{3/2}}{9 x^6}-\left(8 b^{9/4} \sqrt{x} \left(\sqrt{a}+\sqrt{b}\, x\right) \sqrt{\frac{a+b x^2}{\left(\sqrt{a}+\sqrt{b}\, x\right)^2}}\, \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{b^{1/4} \sqrt{x}}{a^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(15 a^{3/4} \sqrt{a x+b x^3}\right)+\left(4 b^{9/4} \sqrt{x} \left(\sqrt{a}+\sqrt{b}\, x\right) \sqrt{\frac{a+b x^2}{\left(\sqrt{a}+\sqrt{b}\, x\right)^2}}\, \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{b^{1/4} \sqrt{x}}{a^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(15 a^{3/4} \sqrt{a x+b x^3}\right)$$

Result (type 4, 205 leaves):

$$-\left(\left(2 \left(\sqrt{\frac{i \sqrt{b}\, x}{\sqrt{a}}} \left(5 a^3+16 a^2 b x^2+23 a b^2 x^4+12 b^3 x^6\right)-12 \sqrt{a}\, b^{5/2} x^5 \sqrt{1+\frac{b x^2}{a}}\, \text{EllipticE}\left[i\, \text{ArcSinh}\left[\sqrt{\frac{i \sqrt{b}\, x}{\sqrt{a}}}\right], -1\right]+12 \sqrt{a}\, b^{5/2} x^5 \sqrt{1+\frac{b x^2}{a}}\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\sqrt{\frac{i \sqrt{b}\, x}{\sqrt{a}}}\right], -1\right]\right)\right) \Big/ \left(45 a x^4 \sqrt{\frac{i \sqrt{b}\, x}{\sqrt{a}}} \sqrt{x \left(a+b x^2\right)}\right)\right)$$

Problem 56: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 163 leaves, 6 steps):

$$-\frac{12\,b\,\sqrt{a\,x+b\,x^3}}{77\,x^4}-\frac{8\,b^2\,\sqrt{a\,x+b\,x^3}}{77\,a\,x^2}-\frac{2\,\left(a\,x+b\,x^3\right)^{3/2}}{11\,x^7}-\left(4\,b^{11/4}\,\sqrt{x}\,\left(\sqrt{a}+\sqrt{b}\,x\right)\,\sqrt{\frac{a+b\,x^2}{\left(\sqrt{a}+\sqrt{b}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{b^{1/4}\,\sqrt{x}}{a^{1/4}}\right],\frac{1}{2}\right]\right)\bigg/\left(77\,a^{5/4}\,\sqrt{a\,x+b\,x^3}\right)$$

Result (type 4, 150 leaves):

$$-\left(\left(2\left(\sqrt{\frac{i\,\sqrt{a}}{\sqrt{b}}}\,\left(7\,a^3+20\,a^2\,b\,x^2+17\,a\,b^2\,x^4+4\,b^3\,x^6\right)+4\,i\,b^3\,\sqrt{1+\frac{a}{b\,x^2}}\,x^{13/2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\,\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right],-1\right]\right)\right)\bigg/\left(77\,a\,\sqrt{\frac{i\,\sqrt{a}}{\sqrt{b}}}\,x^5\,\sqrt{x\,\left(a+b\,x^2\right)}\right)\right)$$

Problem 57: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{x^4}{\sqrt{a\,x+b\,x^3}}\,dx$$

Optimal (type 4, 140 leaves, 5 steps):

$$-\frac{10\,a\,\sqrt{a\,x+b\,x^3}}{21\,b^2}+\frac{2\,x^2\,\sqrt{a\,x+b\,x^3}}{7\,b}+\left(5\,a^{7/4}\,\sqrt{x}\,\left(\sqrt{a}+\sqrt{b}\,x\right)\,\sqrt{\frac{a+b\,x^2}{\left(\sqrt{a}+\sqrt{b}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{b^{1/4}\,\sqrt{x}}{a^{1/4}}\right],\frac{1}{2}\right]\right)\bigg/\left(21\,b^{9/4}\,\sqrt{a\,x+b\,x^3}\right)$$

Result (type 4, 138 leaves):

$$\left(-2\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\ x\left(5a^2+2abx^2-3b^2x^4\right)+10\,i\,a^2\sqrt{1+\frac{a}{bx^2}}\ x^{3/2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right],-1\right]\right)\Big/\left(21\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\ b^2\sqrt{x\left(a+bx^2\right)}\right)$$

Problem 58: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^3}{\sqrt{a x+b x^3}}\,dx$$

Optimal (type 4, 258 leaves, 6 steps):

$$-\frac{6ax\left(a+bx^2\right)}{5b^{3/2}\left(\sqrt{a}+\sqrt{b}\,x\right)\sqrt{ax+bx^3}}+\frac{2x\sqrt{ax+bx^3}}{5b}+\frac{1}{5b^{7/4}\sqrt{ax+bx^3}}6a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}\,x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{b^{1/4}\sqrt{x}}{a^{1/4}}\right],\frac{1}{2}\right]-\frac{1}{5b^{7/4}\sqrt{ax+bx^3}}3a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}\,x\right)\sqrt{\frac{a+bx^2}{\left(\sqrt{a}+\sqrt{b}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{b^{1/4}\sqrt{x}}{a^{1/4}}\right],\frac{1}{2}\right]$$

Result (type 4, 170 leaves):

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

Problem 59: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^2}{\sqrt{a x+b x^3}}\,dx$$

Optimal (type 4, 116 leaves, 4 steps):

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

Result (type 4, 101 leaves):

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

Problem 60: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x}{\sqrt{a x+b x^3}}\,dx$$

Optimal (type 4, 229 leaves, 5 steps):

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

Result (type 4, 108 leaves):

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

Problem 61: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{\sqrt{a\,x+b\,x^3}}\,dx$$

Optimal (type 4, 92 leaves, 3 steps):

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

Result (type 4, 85 leaves):

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

Problem 62: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{x\,\sqrt{a\,x+b\,x^3}}\,dx$$

Optimal (type 4, 253 leaves, 6 steps):

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

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

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

Result (type 4, 170 leaves):

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

Problem 63: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 119 leaves, 4 steps):

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

Result (type 4, 106 leaves):

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

Problem 64: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{x^3\,\sqrt{a\,x+b\,x^3}}\,dx$$

Optimal (type 4, 286 leaves, 7 steps):

$$-\frac{6\, b^{3/2}\, x\, \left(a+b\, x^2\right)}{5\, a^2\, \left(\sqrt{a}+\sqrt{b}\, x\right)\, \sqrt{a\, x+b\, x^3}}-\frac{2\, \sqrt{a\, x+b\, x^3}}{5\, a\, x^3}+\frac{6\, b\, \sqrt{a\, x+b\, x^3}}{5\, a^2\, x}+\frac{1}{5\, a^{7/4}\, \sqrt{a\, x+b\, x^3}}$$

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

$$\frac{1}{5\, a^{7/4}\, \sqrt{a\, x+b\, x^3}}3\, b^{5/4}\, \sqrt{x}\, \left(\sqrt{a}+\sqrt{b}\, x\right)\, \sqrt{\frac{a+b\, x^2}{\left(\sqrt{a}+\sqrt{b}\, x\right)^2}}\, \text{EllipticF}\left[2\, \text{ArcTan}\left[\frac{b^{1/4}\, \sqrt{x}}{a^{1/4}}\right],\, \frac{1}{2}\right]$$

Result (type 4, 195 leaves):

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

$$6\, \sqrt{a}\, b^{3/2}\, x^3\, \sqrt{1+\frac{b\, x^2}{a}}\, \text{EllipticE}\left[i\, \text{ArcSinh}\left[\sqrt{\frac{i\, \sqrt{b}\, x}{\sqrt{a}}}\right],\, -1\right]+$$

$$\left.6\, \sqrt{a}\, b^{3/2}\, x^3\, \sqrt{1+\frac{b\, x^2}{a}}\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\sqrt{\frac{i\, \sqrt{b}\, x}{\sqrt{a}}}\right],\, -1\right]\right)\Big/$$

$$\left(5\, a^2\, x^2\, \sqrt{\frac{i\, \sqrt{b}\, x}{\sqrt{a}}}\, \sqrt{x\, \left(a+b\, x^2\right)}\right)$$

Problem 65: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{x^7}{\left(a\, x+b\, x^3\right)^{3/2}}\, dx$$

Optimal (type 4, 161 leaves, 6 steps):

$$-\frac{x^5}{b\, \sqrt{a\, x+b\, x^3}}-\frac{15\, a\, \sqrt{a\, x+b\, x^3}}{7\, b^3}+\frac{9\, x^2\, \sqrt{a\, x+b\, x^3}}{7\, b^2}+$$

$$\left(15\, a^{7/4}\, \sqrt{x}\, \left(\sqrt{a}+\sqrt{b}\, x\right)\, \sqrt{\frac{a+b\, x^2}{\left(\sqrt{a}+\sqrt{b}\, x\right)^2}}\, \text{EllipticF}\left[2\, \text{ArcTan}\left[\frac{b^{1/4}\, \sqrt{x}}{a^{1/4}}\right],\, \frac{1}{2}\right]\right)\Big/$$

$$\left(14\, b^{13/4}\, \sqrt{a\, x+b\, x^3}\right)$$

Result (type 4, 137 leaves):

$$\left(\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\;x\left(-15\,a^2-6\,a\,b\,x^2+2\,b^2\,x^4\right)+\right.$$

$$\left.15\,i\,a^2\sqrt{1+\frac{a}{b\,x^2}}\;x^{3/2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}}{\sqrt{x}}\right],-1\right]\right)\Bigg/\left(7\sqrt{\frac{i\sqrt{a}}{\sqrt{b}}}\;b^3\sqrt{x\left(a+b\,x^2\right)}\right)$$

Problem 66: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 279 leaves, 7 steps):

$$-\frac{x^4}{b\sqrt{a\,x+b\,x^3}}-\frac{21\,a\,x\left(a+b\,x^2\right)}{5\,b^{5/2}\left(\sqrt{a}+\sqrt{b}\,x\right)\sqrt{a\,x+b\,x^3}}+\frac{7\,x\sqrt{a\,x+b\,x^3}}{5\,b^2}+$$

$$\left(21\,a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}\,x\right)\sqrt{\frac{a+b\,x^2}{\left(\sqrt{a}+\sqrt{b}\,x\right)^2}}\;\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{b^{1/4}\sqrt{x}}{a^{1/4}}\right],\frac{1}{2}\right]\right)\Bigg/$$

$$\left(5\,b^{11/4}\sqrt{a\,x+b\,x^3}\right)-$$

$$\left(21\,a^{5/4}\sqrt{x}\left(\sqrt{a}+\sqrt{b}\,x\right)\sqrt{\frac{a+b\,x^2}{\left(\sqrt{a}+\sqrt{b}\,x\right)^2}}\;\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{b^{1/4}\sqrt{x}}{a^{1/4}}\right],\frac{1}{2}\right]\right)\Bigg/$$

$$\left(10\,b^{11/4}\sqrt{a\,x+b\,x^3}\right)$$

Result (type 4, 173 leaves):

$$\left(x\left(\sqrt{b}\,x\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\left(7\,a+2\,b\,x^2\right)-21\,a^{3/2}\sqrt{1+\frac{b\,x^2}{a}}\;\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\right],-1\right]+\right.\right.$$

$$\left.\left.21\,a^{3/2}\sqrt{1+\frac{b\,x^2}{a}}\;\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\right],-1\right]\right)\right)\Bigg/$$

$$\left(5\,b^{5/2}\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\sqrt{x\left(a+b\,x^2\right)}\right)$$

Problem 67: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 137 leaves, 5 steps):

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

Result (type 4, 124 leaves):

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

Problem 68: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 253 leaves, 6 steps):

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

Result (type 4, 161 leaves):

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

Problem 69: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^3}{(a\,x+b\,x^3)^{3/2}}\,dx$$

Optimal (type 4, 115 leaves, 4 steps):

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

Result (type 4, 111 leaves):

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

Problem 70: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^2}{(a\,x+b\,x^3)^{3/2}}\,dx$$

Optimal (type 4, 254 leaves, 6 steps):

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

Result (type 4, 162 leaves):

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

Problem 71: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 114 leaves, 4 steps):

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

Result (type 4, 110 leaves):

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

Problem 72: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 273 leaves, 7 steps):

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

Result (type 4, 174 leaves):

$$\left(-\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\left(2a+3bx^2\right)+3\sqrt{a}\,\sqrt{b}\,x\sqrt{1+\frac{bx^2}{a}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\right],-1\right]-\right.$$
$$\left.3\sqrt{a}\,\sqrt{b}\,x\sqrt{1+\frac{bx^2}{a}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\right],-1\right]\right)\Bigg/\left(a^2\sqrt{\frac{i\sqrt{b}\,x}{\sqrt{a}}}\sqrt{x\left(a+bx^2\right)}\right)$$

Problem 73: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 139 leaves, 5 steps):

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

Result (type 4, 106 leaves):

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

Problem 74: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 306 leaves, 8 steps):

$$\frac{1}{a x^2 \sqrt{a x+b x^3}}-\frac{21 b^{3/2} x \left(a+b x^2\right)}{5 a^3 \left(\sqrt{a}+\sqrt{b} x\right) \sqrt{a x+b x^3}}-\frac{7 \sqrt{a x+b x^3}}{5 a^2 x^3}+\frac{21 b \sqrt{a x+b x^3}}{5 a^3 x}+$$
$$\left(21 b^{5/4} \sqrt{x} \left(\sqrt{a}+\sqrt{b} x\right) \sqrt{\frac{a+b x^2}{\left(\sqrt{a}+\sqrt{b} x\right)^2}} \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{b^{1/4} \sqrt{x}}{a^{1/4}}\right], \frac{1}{2}\right]\right) \Big/$$
$$\left(5 a^{11/4} \sqrt{a x+b x^3}\right)-$$
$$\left(21 b^{5/4} \sqrt{x} \left(\sqrt{a}+\sqrt{b} x\right) \sqrt{\frac{a+b x^2}{\left(\sqrt{a}+\sqrt{b} x\right)^2}} \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{b^{1/4} \sqrt{x}}{a^{1/4}}\right], \frac{1}{2}\right]\right) \Big/$$
$$\left(10 a^{11/4} \sqrt{a x+b x^3}\right)$$

Result (type 4, 194 leaves) :

$$\left(\sqrt{\frac{i \sqrt{b} x}{\sqrt{a}}} \left(-2 a^2+14 a b x^2+21 b^2 x^4\right)-\right.$$
$$21 \sqrt{a} b^{3/2} x^3 \sqrt{1+\frac{b x^2}{a}} \text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{\frac{i \sqrt{b} x}{\sqrt{a}}}\right], -1\right]+$$
$$\left.21 \sqrt{a} b^{3/2} x^3 \sqrt{1+\frac{b x^2}{a}} \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{\frac{i \sqrt{b} x}{\sqrt{a}}}\right], -1\right]\right) \Big/$$
$$\left(5 a^3 x^2 \sqrt{\frac{i \sqrt{b} x}{\sqrt{a}}} \sqrt{x \left(a+b x^2\right)}\right)$$

Problem 97: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{x^3}{\sqrt{a x+b x^4}} \, dx$$

Optimal (type 4, 224 leaves, 4 steps) :

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

Result (type 4, 174 leaves):

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

Problem 98: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{\sqrt{a x+b x^4}}\, dx$$

Optimal (type 4, 197 leaves, 3 steps):

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

Result (type 4, 147 leaves):

$$-\left(\left(2\,\mathrm{i}\,b^{1/3}\sqrt{(-1)^{5/6}\left(-1+\frac{(-a)^{1/3}}{b^{1/3}\,x}\right)}\sqrt{1+\frac{(-a)^{2/3}}{b^{2/3}\,x^2}+\frac{(-a)^{1/3}}{b^{1/3}\,x}}\;x^2\right.\right.$$

$$\left.\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-(-1)^{5/6}-\frac{\mathrm{i}\,(-a)^{1/3}}{b^{1/3}\,x}}}{3^{1/4}}\right],\,(-1)^{1/3}\right]\right)\Big/\left(3^{1/4}\,(-a)^{1/3}\sqrt{x\,(a+b\,x^3)}\right)\right)$$

Problem 99: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 225 leaves, 4 steps):

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

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

$$\left(5\times3^{1/4}\,a^{4/3}\sqrt{\frac{b^{1/3}\,x\,\left(a^{1/3}+b^{1/3}\,x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\sqrt{a\,x+b\,x^4}\right)$$

Result (type 4, 172 leaves):

$$-\left(\left(-6\,(-a)^{1/3}\,\left(a+b\,x^3\right)+4\,\mathrm{i}\,3^{3/4}\,b^{4/3}\sqrt{(-1)^{5/6}\left(-1+\frac{(-a)^{1/3}}{b^{1/3}\,x}\right)}\;x^4\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{(-a)^{1/3}\,x}{b^{1/3}}+x^2}{x^2}}\right.\right.$$

$$\left.\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-(-1)^{5/6}-\frac{\mathrm{i}\,(-a)^{1/3}}{b^{1/3}\,x}}}{3^{1/4}}\right],\,(-1)^{1/3}\right]\right)\Big/\left(15\,(-a)^{4/3}\,x^2\sqrt{x\,(a+b\,x^3)}\right)\right)$$

Problem 100: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^5}{\sqrt{a\,x+b\,x^4}}\,dx$$

Optimal (type 4, 503 leaves, 6 steps):

$$-\frac{5\left(1+\sqrt{3}\right)a\,x\left(a+b\,x^{3}\right)}{8\,b^{5/3}\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x\right)\sqrt{a\,x+b\,x^{4}}}+\frac{x^{2}\sqrt{a\,x+b\,x^{4}}}{4\,b}+\left(5\times 3^{1/4}a^{4/3}x\left(a^{1/3}+b^{1/3}x\right)\sqrt{\frac{a^{2/3}-a^{1/3}b^{1/3}x+b^{2/3}x^{2}}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x\right)^{2}}}\,\text{EllipticE}\left[\text{ArcCos}\left[\frac{a^{1/3}+\left(1-\sqrt{3}\right)b^{1/3}x}{a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right)\Big/\left(8\,b^{5/3}\sqrt{\frac{b^{1/3}x\left(a^{1/3}+b^{1/3}x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x\right)^{2}}}\sqrt{a\,x+b\,x^{4}}\right)+\left(5\left(1-\sqrt{3}\right)a^{4/3}x\left(a^{1/3}+b^{1/3}x\right)\sqrt{\frac{a^{2/3}-a^{1/3}b^{1/3}x+b^{2/3}x^{2}}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x\right)^{2}}}\,\text{EllipticF}\left[\text{ArcCos}\left[\frac{a^{1/3}+\left(1-\sqrt{3}\right)b^{1/3}x}{a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right)\Big/\left(16\times 3^{1/4}b^{5/3}\sqrt{\frac{b^{1/3}x\left(a^{1/3}+b^{1/3}x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x\right)^{2}}}\sqrt{a\,x+b\,x^{4}}\right)$$

Result (type 4, 355 leaves):

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

Problem 101: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 474 leaves, 5 steps):

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

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

$$\left.\left.\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right)\Bigg/\left(b^{2/3}\sqrt{\frac{b^{1/3}\,x\left(a^{1/3}+b^{1/3}\,x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\;\sqrt{a\,x+b\,x^4}\right)-$$

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

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

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

Result (type 4, 333 leaves):

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

$$\sqrt{\frac{a^{1/3}+(-1)^{2/3}\,b^{1/3}\,x}{a^{1/3}+b^{1/3}\,x}}\left(\left(-3-\mathrm{i}\,\sqrt{3}\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(3+\mathrm{i}\,\sqrt{3}\right)b^{1/3}\,x}{a^{1/3}+b^{1/3}\,x}}}{\sqrt{2}}\right],\frac{-\mathrm{i}+\sqrt{3}}{\mathrm{i}+\sqrt{3}}\right]+\right.$$

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

Problem 102: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{1}{x\,\sqrt{a\,x+b\,x^4}}\,dx$$

Optimal (type 4, 497 leaves, 6 steps):

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

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

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

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

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

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

Result (type 4, 334 leaves):

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

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

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

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

Problem 131: Result unnecessarily involves higher level functions.

$$\int x^3 \sqrt{b x^{1/3} + a x} \, dx$$

Optimal (type 4, 301 leaves, 11 steps):

$$-\frac{884 b^6 \sqrt{b x^{1/3} + a x}}{14421 a^6} + \frac{884 b^5 x^{2/3} \sqrt{b x^{1/3} + a x}}{24035 a^5} - \frac{6188 b^4 x^{4/3} \sqrt{b x^{1/3} + a x}}{216315 a^4} + \frac{476 b^3 x^2 \sqrt{b x^{1/3} + a x}}{19665 a^3} - \frac{28 b^2 x^{8/3} \sqrt{b x^{1/3} + a x}}{1311 a^2} + \frac{4 b x^{10/3} \sqrt{b x^{1/3} + a x}}{207 a} + \frac{2}{9} x^4 \sqrt{b x^{1/3} + a x} + \left(442 b^{27/4} \left(\sqrt{b} + \sqrt{a} x^{1/3}\right) \sqrt{\frac{b + a x^{2/3}}{\left(\sqrt{b} + \sqrt{a} x^{1/3}\right)^2}} x^{1/6} \, \text{EllipticF}\left[2 \, \text{ArcTan}\left[\frac{a^{1/4} x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(14421 a^{25/4} \sqrt{b x^{1/3} + a x}\right)$$

Result (type 5, 155 leaves):

$$\left(2 x^{1/3} \left(-6630 b^7 - 2652 a b^6 x^{2/3} + 884 a^2 b^5 x^{4/3} - 476 a^3 b^4 x^2 + 308 a^4 b^3 x^{8/3} - 220 a^5 b^2 x^{10/3} + 26125 a^6 b x^4 + 24035 a^7 x^{14/3} - 6630 b^7 \sqrt{1 + \frac{b}{a x^{2/3}}} \, \text{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, -\frac{b}{a x^{2/3}}\right]\right)\right) \Big/ \left(216315 a^6 \sqrt{b x^{1/3} + a x}\right)$$

Problem 132: Result unnecessarily involves higher level functions.

$$\int x^2 \sqrt{b x^{1/3} + a x} \, dx$$

Optimal (type 4, 411 leaves, 11 steps):

$$\frac{44\,b^5\left(b+a\,x^{2/3}\right)x^{1/3}}{221\,a^{9/2}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{b\,x^{1/3}+a\,x}}-\frac{44\,b^4\,x^{1/3}\sqrt{b\,x^{1/3}+a\,x}}{663\,a^4}+$$
$$\frac{220\,b^3\,x\sqrt{b\,x^{1/3}+a\,x}}{4641\,a^3}-\frac{60\,b^2\,x^{5/3}\sqrt{b\,x^{1/3}+a\,x}}{1547\,a^2}+\frac{4\,b\,x^{7/3}\sqrt{b\,x^{1/3}+a\,x}}{119\,a}+\frac{2}{7}x^3\sqrt{b\,x^{1/3}+a\,x}-$$
$$\left(44\,b^{21/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/$$
$$\left(221\,a^{19/4}\sqrt{b\,x^{1/3}+a\,x}\right)+$$
$$\left(22\,b^{21/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/$$
$$\left(221\,a^{19/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 131 leaves):

$$\left(2\,x^{2/3}\left(-154\,b^5-44\,a\,b^4\,x^{2/3}+20\,a^2\,b^3\,x^{4/3}-12\,a^3\,b^2\,x^2+741\,a^4\,b\,x^{8/3}+663\,a^5\,x^{10/3}+\right.\right.$$
$$\left.\left.462\,b^5\sqrt{1+\frac{b}{a\,x^{2/3}}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\right)\Big/\left(4641\,a^4\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 133: Result unnecessarily involves higher level functions.

$$\int x\sqrt{b\,x^{1/3}+a\,x}\,dx$$

Optimal (type 4, 213 leaves, 8 steps):

$$\frac{12\,b^3\sqrt{b\,x^{1/3}+a\,x}}{77\,a^3}-\frac{36\,b^2\,x^{2/3}\sqrt{b\,x^{1/3}+a\,x}}{385\,a^2}+\frac{4\,b\,x^{4/3}\sqrt{b\,x^{1/3}+a\,x}}{55\,a}+\frac{2}{5}x^2\sqrt{b\,x^{1/3}+a\,x}-$$
$$\left(6\,b^{15/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/$$
$$\left(77\,a^{13/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 118 leaves):

$$\left(2\,x^{1/3}\left(30\,b^4+12\,a\,b^3\,x^{2/3}-4\,a^2\,b^2\,x^{4/3}+91\,a^3\,b\,x^2+77\,a^4\,x^{8/3}+30\,b^4\sqrt{1+\frac{b}{a\,x^{2/3}}}\;\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\right)\bigg/\left(385\,a^3\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 134: Result unnecessarily involves higher level functions.

$$\int\sqrt{b\,x^{1/3}+a\,x}\;dx$$

Optimal (type 4, 323 leaves, 8 steps):

$$-\frac{4\,b^2\left(b+a\,x^{2/3}\right)x^{1/3}}{5\,a^{3/2}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{b\,x^{1/3}+a\,x}}+\frac{4\,b\,x^{1/3}\sqrt{b\,x^{1/3}+a\,x}}{15\,a}+\frac{2}{3}\,x\sqrt{b\,x^{1/3}+a\,x}+\left(4\,b^{9/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\bigg/\left(5\,a^{7/4}\sqrt{b\,x^{1/3}+a\,x}\right)-\left(2\,b^{9/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\bigg/\left(5\,a^{7/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 94 leaves):

$$\frac{1}{15\,a\sqrt{b\,x^{1/3}+a\,x}}\,2\,x^{2/3}\left(2\,b^2+7\,a\,b\,x^{2/3}+5\,a^2\,x^{4/3}-6\,b^2\sqrt{1+\frac{b}{a\,x^{2/3}}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-\frac{b}{a\,x^{2/3}}\right]\right)$$

Problem 135: Result unnecessarily involves higher level functions.

$$\int\frac{\sqrt{b\,x^{1/3}+a\,x}}{x}\,dx$$

Optimal (type 4, 123 leaves, 5 steps):

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

Result (type 5, 71 leaves):

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

Problem 136: Result unnecessarily involves higher level functions.

$$\int\frac{\sqrt{b x^{1/3}+a x}}{x^2}\,dx$$

Optimal (type 4, 325 leaves, 8 steps):

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

Result (type 5, 97 leaves):

$$-\left(\left(6\left(b^2+3 a b x^{2/3}+2 a^2 x^{4/3}-2 a^2\sqrt{1+\frac{b}{a x^{2/3}}}\, x^{4/3}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-\frac{b}{a x^{2/3}}\right]\right)\right)\Big/\right.$$
$$\left.\left(5 b x^{2/3}\sqrt{b x^{1/3}+a x}\right)\right)$$

Problem 137: Result unnecessarily involves higher level functions.

$$\int\frac{\sqrt{b x^{1/3}+a x}}{x^3}\,dx$$

Optimal (type 4, 188 leaves, 7 steps):

$$-\frac{6\sqrt{b\,x^{1/3}+a\,x}}{11\,x^2}-\frac{12\,a\sqrt{b\,x^{1/3}+a\,x}}{77\,b\,x^{4/3}}+\frac{20\,a^2\sqrt{b\,x^{1/3}+a\,x}}{77\,b^2\,x^{2/3}}+\left(10\,a^{11/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(77\,b^{9/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 108 leaves):

$$\left(-42\,b^3-54\,a\,b^2\,x^{2/3}+8\,a^2\,b\,x^{4/3}+20\,a^3\,x^2-20\,a^3\sqrt{1+\frac{b}{a\,x^{2/3}}}\,x^2\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\Big/\left(77\,b^2\,x^{5/3}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 138: Result unnecessarily involves higher level functions.

$$\int\frac{\sqrt{b\,x^{1/3}+a\,x}}{x^4}\,dx$$

Optimal (type 4, 413 leaves, 11 steps):

$$-\frac{308\,a^{9/2}\left(b+a\,x^{2/3}\right)x^{1/3}}{1105\,b^4\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{b\,x^{1/3}+a\,x}}-\frac{6\sqrt{b\,x^{1/3}+a\,x}}{17\,x^3}-\frac{12\,a\sqrt{b\,x^{1/3}+a\,x}}{221\,b\,x^{7/3}}+\frac{44\,a^2\sqrt{b\,x^{1/3}+a\,x}}{663\,b^2\,x^{5/3}}-\frac{308\,a^3\sqrt{b\,x^{1/3}+a\,x}}{3315\,b^3\,x}+\frac{308\,a^4\sqrt{b\,x^{1/3}+a\,x}}{1105\,b^4\,x^{1/3}}+\left(308\,a^{17/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(1105\,b^{15/4}\sqrt{b\,x^{1/3}+a\,x}\right)-\left(154\,a^{17/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(1105\,b^{15/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 136 leaves):

$$-\left(\left(2\left(585\, b^5+675\, a\, b^4\, x^{2/3}-20\, a^2\, b^3\, x^{4/3}+44\, a^3\, b^2\, x^2-308\, a^4\, b\, x^{8/3}-462\, a^5\, x^{10/3}+462\, a^5\sqrt{1+\frac{b}{a\, x^{2/3}}}\; x^{10/3}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-\frac{b}{a\, x^{2/3}}\right]\right)\right)\Big/\left(3315\, b^4\, x^{8/3}\sqrt{b\, x^{1/3}+a\, x}\right)\right)$$

Problem 139: Result unnecessarily involves higher level functions.

$$\int \frac{\sqrt{b\, x^{1/3}+a\, x}}{x^5}\, dx$$

Optimal (type 4, 276 leaves, 10 steps):

$$-\frac{6\sqrt{b\, x^{1/3}+a\, x}}{23\, x^4}-\frac{12\, a\sqrt{b\, x^{1/3}+a\, x}}{437\, b\, x^{10/3}}+\frac{68\, a^2\sqrt{b\, x^{1/3}+a\, x}}{2185\, b^2\, x^{8/3}}-\frac{884\, a^3\sqrt{b\, x^{1/3}+a\, x}}{24\,035\, b^3\, x^2}+\frac{7956\, a^4\sqrt{b\, x^{1/3}+a\, x}}{168\,245\, b^4\, x^{4/3}}-\frac{2652\, a^5\sqrt{b\, x^{1/3}+a\, x}}{33\,649\, b^5\, x^{2/3}}-\left(1326\, a^{23/4}\left(\sqrt{b}+\sqrt{a}\; x^{1/3}\right)\sqrt{\frac{b+a\, x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\; x^{1/3}\right)^2}}\; x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\, x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(33\,649\, b^{21/4}\sqrt{b\, x^{1/3}+a\, x}\right)$$

Result (type 5, 145 leaves):

$$-\left(\left(2\left(21\,945\, b^6+24\,255\, a\, b^5\, x^{2/3}-308\, a^2\, b^4\, x^{4/3}+476\, a^3\, b^3\, x^2-884\, a^4\, b^2\, x^{8/3}+2652\, a^5\, b\, x^{10/3}+6630\, a^6\, x^4-6630\, a^6\sqrt{1+\frac{b}{a\, x^{2/3}}}\; x^4\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-\frac{b}{a\, x^{2/3}}\right]\right)\right)\Big/\left(168\,245\, b^5\, x^{11/3}\sqrt{b\, x^{1/3}+a\, x}\right)\right)$$

Problem 140: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 298 leaves, 11 steps):

$$\frac{1768\,b^6\,\sqrt{b\,x^{1/3}+a\,x}}{100\,947\,a^5}-\frac{1768\,b^5\,x^{2/3}\,\sqrt{b\,x^{1/3}+a\,x}}{168\,245\,a^4}+\frac{1768\,b^4\,x^{4/3}\,\sqrt{b\,x^{1/3}+a\,x}}{216\,315\,a^3}-\frac{136\,b^3\,x^2\,\sqrt{b\,x^{1/3}+a\,x}}{19\,665\,a^2}+\frac{8\,b^2\,x^{8/3}\,\sqrt{b\,x^{1/3}+a\,x}}{1311\,a}+\frac{4}{69}\,b\,x^{10/3}\,\sqrt{b\,x^{1/3}+a\,x}+\frac{2}{9}\,x^3\,\left(b\,x^{1/3}+a\,x\right)^{3/2}-\left(884\,b^{27/4}\,\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\,\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(100\,947\,a^{21/4}\,\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 155 leaves):

$$\left(2\,x^{1/3}\,\left(13\,260\,b^7+5304\,a\,b^6\,x^{2/3}-1768\,a^2\,b^5\,x^{4/3}+952\,a^3\,b^4\,x^2-616\,a^4\,b^3\,x^{8/3}+216\,755\,a^5\,b^2\,x^{10/3}+380\,380\,a^6\,b\,x^4+168\,245\,a^7\,x^{14/3}+13\,260\,b^7\,\sqrt{1+\frac{b}{a\,x^{2/3}}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\right)\Big/\left(1\,514\,205\,a^5\,\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 141: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 408 leaves, 11 steps):

$$-\frac{88\,b^5\,\left(b+a\,x^{2/3}\right)\,x^{1/3}}{1105\,a^{7/2}\,\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\,\sqrt{b\,x^{1/3}+a\,x}}+\frac{88\,b^4\,x^{1/3}\,\sqrt{b\,x^{1/3}+a\,x}}{3315\,a^3}-\frac{88\,b^3\,x\,\sqrt{b\,x^{1/3}+a\,x}}{4641\,a^2}+\frac{24\,b^2\,x^{5/3}\,\sqrt{b\,x^{1/3}+a\,x}}{1547\,a}+\frac{12}{119}\,b\,x^{7/3}\,\sqrt{b\,x^{1/3}+a\,x}+\frac{2}{7}\,x^2\,\left(b\,x^{1/3}+a\,x\right)^{3/2}+\left(88\,b^{21/4}\,\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\,\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(1105\,a^{15/4}\,\sqrt{b\,x^{1/3}+a\,x}\right)-\left(44\,b^{21/4}\,\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\,\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(1105\,a^{15/4}\,\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 131 leaves):

$$\left(2 x^{2/3} \left(308 b^5 + 88 a b^4 x^{2/3} - 40 a^2 b^3 x^{4/3} + 4665 a^3 b^2 x^2 + 7800 a^4 b x^{8/3} + 3315 a^5 x^{10/3} - 924 b^5 \sqrt{1 + \frac{b}{a x^{2/3}}} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -\frac{b}{a x^{2/3}}\right]\right)\right) \Big/ \left(23205 a^3 \sqrt{b x^{1/3} + a x}\right)$$

Problem 142: Result unnecessarily involves higher level functions.

$$\int \left(b x^{1/3} + a x\right)^{3/2} dx$$

Optimal (type 4, 208 leaves, 8 steps):

$$-\frac{8 b^3 \sqrt{b x^{1/3} + a x}}{77 a^2} + \frac{24 b^2 x^{2/3} \sqrt{b x^{1/3} + a x}}{385 a} + \frac{12}{55} b x^{4/3} \sqrt{b x^{1/3} + a x} + \frac{2}{5} x \left(b x^{1/3} + a x\right)^{3/2} + \left(4 b^{15/4} \left(\sqrt{b} + \sqrt{a} x^{1/3}\right) \sqrt{\frac{b + a x^{2/3}}{\left(\sqrt{b} + \sqrt{a} x^{1/3}\right)^2}} x^{1/6} \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{a^{1/4} x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(77 a^{9/4} \sqrt{b x^{1/3} + a x}\right)$$

Result (type 5, 118 leaves):

$$\left(2 x^{1/3} \left(-20 b^4 - 8 a b^3 x^{2/3} + 131 a^2 b^2 x^{4/3} + 196 a^3 b x^2 + 77 a^4 x^{8/3} - 20 b^4 \sqrt{1 + \frac{b}{a x^{2/3}}} \text{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, -\frac{b}{a x^{2/3}}\right]\right)\right) \Big/ \left(385 a^2 \sqrt{b x^{1/3} + a x}\right)$$

Problem 143: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 319 leaves, 8 steps):

$$\frac{8 b^2 \left(b+a x^{2/3}\right) x^{1/3}}{5 \sqrt{a} \left(\sqrt{b}+\sqrt{a} x^{1/3}\right) \sqrt{b x^{1/3}+a x}}+\frac{4}{5} b x^{1/3} \sqrt{b x^{1/3}+a x}+\frac{2}{3} \left(b x^{1/3}+a x\right)^{3/2}-$$

$$\left(8 b^{9/4} \left(\sqrt{b}+\sqrt{a} x^{1/3}\right) \sqrt{\frac{b+a x^{2/3}}{\left(\sqrt{b}+\sqrt{a} x^{1/3}\right)^2}} x^{1/6} \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{a^{1/4} x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/$$

$$\left(5 a^{3/4} \sqrt{b x^{1/3}+a x}\right)+$$

$$\left(4 b^{9/4} \left(\sqrt{b}+\sqrt{a} x^{1/3}\right) \sqrt{\frac{b+a x^{2/3}}{\left(\sqrt{b}+\sqrt{a} x^{1/3}\right)^2}} x^{1/6} \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{a^{1/4} x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/$$

$$\left(5 a^{3/4} \sqrt{b x^{1/3}+a x}\right)$$

Result (type 5, 91 leaves) :

$$\frac{1}{15 \sqrt{b x^{1/3}+a x}}$$

$$2 x^{2/3} \left(11 b^2+16 a b x^{2/3}+5 a^2 x^{4/3}+12 b^2 \sqrt{1+\frac{b}{a x^{2/3}}} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -\frac{b}{a x^{2/3}}\right]\right)$$

Problem 144: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 144 leaves, 6 steps) :

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

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

Result (type 5, 82 leaves) :

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

Problem 145: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 350 leaves, 9 steps) :

$$\frac{8 a^{5/2} \left(b+a x^{2/3}\right) x^{1/3}}{5 b \left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right) \sqrt{b x^{1/3}+a x}}-\frac{4 a \sqrt{b x^{1/3}+a x}}{5 x}-\frac{8 a^2 \sqrt{b x^{1/3}+a x}}{5 b x^{1/3}}-\frac{2 \left(b x^{1/3}+a x\right)^{3/2}}{3 x^2}-$$

$$\left(8 a^{9/4} \left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right) \sqrt{\frac{b+a x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right)^2}}\, x^{1/6}\, \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{a^{1/4} x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/$$

$$\left(5 b^{3/4} \sqrt{b x^{1/3}+a x}\right)+$$

$$\left(4 a^{9/4} \left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right) \sqrt{\frac{b+a x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right)^2}}\, x^{1/6}\, \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{a^{1/4} x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/$$

$$\left(5 b^{3/4} \sqrt{b x^{1/3}+a x}\right)$$

Result (type 5, 108 leaves):

$$-\left(\left(2 \left(5 b^3+16 a b^2 x^{2/3}+23 a^2 b x^{4/3}+12 a^3 x^2-\right.\right.\right.$$

$$\left.\left.\left. 12 a^3 \sqrt{1+\frac{b}{a x^{2/3}}}\, x^2\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -\frac{b}{a x^{2/3}}\right]\right)\right) \Big/ \left(15 b x^{4/3} \sqrt{b x^{1/3}+a x}\right)\right)$$

Problem 146: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 213 leaves, 8 steps):

$$-\frac{12 a \sqrt{b x^{1/3}+a x}}{55 x^2}-\frac{24 a^2 \sqrt{b x^{1/3}+a x}}{385 b x^{4/3}}+\frac{8 a^3 \sqrt{b x^{1/3}+a x}}{77 b^2 x^{2/3}}-\frac{2 \left(b x^{1/3}+a x\right)^{3/2}}{5 x^3}+$$

$$\left(4 a^{15/4} \left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right) \sqrt{\frac{b+a x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right)^2}}\, x^{1/6}\, \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{a^{1/4} x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/$$

$$\left(77 b^{9/4} \sqrt{b x^{1/3}+a x}\right)$$

Result (type 5, 123 leaves):

$$-\left(\left(2 \left(77 b^4+196 a b^3 x^{2/3}+131 a^2 b^2 x^{4/3}-8 a^3 b x^2-20 a^4 x^{8/3}+20 a^4 \sqrt{1+\frac{b}{a x^{2/3}}}\right.\right.\right.$$

$$\left.\left.\left. x^{8/3}\, \text{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, -\frac{b}{a x^{2/3}}\right]\right)\right) \Big/ \left(385 b^2 x^{7/3} \sqrt{b x^{1/3}+a x}\right)\right)$$

Problem 147: Result unnecessarily involves higher level functions.

$$\int \frac{\left(b\, x^{1/3}+a\, x\right)^{3/2}}{x^5}\, dx$$

Optimal (type 4, 438 leaves, 12 steps):

$$-\frac{88\, a^{11/2}\left(b+a\, x^{2/3}\right) x^{1/3}}{1105\, b^4\left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right)\sqrt{b\, x^{1/3}+a\, x}}-\frac{12\, a\sqrt{b\, x^{1/3}+a\, x}}{119\, x^3}-\frac{24\, a^2\sqrt{b\, x^{1/3}+a\, x}}{1547\, b\, x^{7/3}}+\frac{88\, a^3\sqrt{b\, x^{1/3}+a\, x}}{4641\, b^2\, x^{5/3}}-\frac{88\, a^4\sqrt{b\, x^{1/3}+a\, x}}{3315\, b^3\, x}+\frac{88\, a^5\sqrt{b\, x^{1/3}+a\, x}}{1105\, b^4\, x^{1/3}}-\frac{2\left(b\, x^{1/3}+a\, x\right)^{3/2}}{7\, x^4}+\left(88\, a^{21/4}\left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right)\sqrt{\frac{b+a\, x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right)^2}}\, x^{1/6}\, \text{EllipticE}\left[2\, \text{ArcTan}\left[\frac{a^{1/4}\, x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right)\Big/\left(1105\, b^{15/4}\sqrt{b\, x^{1/3}+a\, x}\right)-\left(44\, a^{21/4}\left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right)\sqrt{\frac{b+a\, x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right)^2}}\, x^{1/6}\, \text{EllipticF}\left[2\, \text{ArcTan}\left[\frac{a^{1/4}\, x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right)\Big/\left(1105\, b^{15/4}\sqrt{b\, x^{1/3}+a\, x}\right)$$

Result (type 5, 145 leaves):

$$-\left(\left(2\left(3315\, b^6+7800\, a\, b^5\, x^{2/3}+4665\, a^2\, b^4\, x^{4/3}-40\, a^3\, b^3\, x^2+88\, a^4\, b^2\, x^{8/3}-616\, a^5\, b\, x^{10/3}-924\, a^6\, x^4+924\, a^6\sqrt{1+\frac{b}{a\, x^{2/3}}}\, x^4\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -\frac{b}{a\, x^{2/3}}\right]\right)\right)\Big/\left(23\,205\, b^4\, x^{10/3}\sqrt{b\, x^{1/3}+a\, x}\right)\right)$$

Problem 148: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 301 leaves, 11 steps):

$$-\frac{4 a \sqrt{b x^{1/3}+a x}}{69 x^4}-\frac{8 a^2 \sqrt{b x^{1/3}+a x}}{1311 b x^{10/3}}+\frac{136 a^3 \sqrt{b x^{1/3}+a x}}{19665 b^2 x^{8/3}}-\frac{1768 a^4 \sqrt{b x^{1/3}+a x}}{216315 b^3 x^2}+\frac{1768 a^5 \sqrt{b x^{1/3}+a x}}{168245 b^4 x^{4/3}}-\frac{1768 a^6 \sqrt{b x^{1/3}+a x}}{100947 b^5 x^{2/3}}-\frac{2 \left(b x^{1/3}+a x\right)^{3/2}}{9 x^5}-\left(884 a^{27/4} \left(\sqrt{b}+\sqrt{a} x^{1/3}\right) \sqrt{\frac{b+a x^{2/3}}{\left(\sqrt{b}+\sqrt{a} x^{1/3}\right)^2}} x^{1/6} \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{a^{1/4} x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(100947 b^{21/4} \sqrt{b x^{1/3}+a x}\right)$$

Result (type 5, 160 leaves) :

$$-\left(\left(2 \left(168245 b^7+380380 a b^6 x^{2/3}+216755 a^2 b^5 x^{4/3}-616 a^3 b^4 x^2+952 a^4 b^3 x^{8/3}-1768 a^5 b^2 x^{10/3}+5304 a^6 b x^4+13260 a^7 x^{14/3}-13260 a^7 \sqrt{1+\frac{b}{a x^{2/3}}} x^{14/3} \text{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, -\frac{b}{a x^{2/3}}\right]\right)\right) \Big/ \left(1514205 b^5 x^{13/3} \sqrt{b x^{1/3}+a x}\right)\right)$$

Problem 149: Result unnecessarily involves higher level functions.

$$\int \frac{x^4}{\sqrt{b x^{1/3}+a x}} \, dx$$

Optimal (type 4, 304 leaves, 11 steps) :

$$\frac{11050 b^6 \sqrt{b x^{1/3}+a x}}{14421 a^7}-\frac{2210 b^5 x^{2/3} \sqrt{b x^{1/3}+a x}}{4807 a^6}+\frac{15470 b^4 x^{4/3} \sqrt{b x^{1/3}+a x}}{43263 a^5}-\frac{1190 b^3 x^2 \sqrt{b x^{1/3}+a x}}{3933 a^4}+\frac{350 b^2 x^{8/3} \sqrt{b x^{1/3}+a x}}{1311 a^3}-\frac{50 b x^{10/3} \sqrt{b x^{1/3}+a x}}{207 a^2}+\frac{2 x^4 \sqrt{b x^{1/3}+a x}}{9 a}-\left(5525 b^{27/4} \left(\sqrt{b}+\sqrt{a} x^{1/3}\right) \sqrt{\frac{b+a x^{2/3}}{\left(\sqrt{b}+\sqrt{a} x^{1/3}\right)^2}} x^{1/6} \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{a^{1/4} x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(14421 a^{29/4} \sqrt{b x^{1/3}+a x}\right)$$

Result (type 5, 155 leaves) :

$$\left(2\,x^{1/3}\left(16575\,b^7+6630\,a\,b^6\,x^{2/3}-2210\,a^2\,b^5\,x^{4/3}+1190\,a^3\,b^4\,x^2-770\,a^4\,b^3\,x^{8/3}+550\,a^5\,b^2\,x^{10/3}-418\,a^6\,b\,x^4+4807\,a^7\,x^{14/3}+16575\,b^7\sqrt{1+\frac{b}{a\,x^{2/3}}}\;\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\right)\Big/\left(43263\,a^7\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 150: Result unnecessarily involves higher level functions.

$$\int\frac{x^3}{\sqrt{b\,x^{1/3}+a\,x}}\,dx$$

Optimal (type 4, 414 leaves, 11 steps):

$$-\frac{418\,b^5\left(b+a\,x^{2/3}\right)x^{1/3}}{221\,a^{11/2}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{b\,x^{1/3}+a\,x}}+\frac{418\,b^4\,x^{1/3}\sqrt{b\,x^{1/3}+a\,x}}{663\,a^5}-\frac{2090\,b^3\,x\sqrt{b\,x^{1/3}+a\,x}}{4641\,a^4}+\frac{570\,b^2\,x^{5/3}\sqrt{b\,x^{1/3}+a\,x}}{1547\,a^3}-\frac{38\,b\,x^{7/3}\sqrt{b\,x^{1/3}+a\,x}}{119\,a^2}+\frac{2\,x^3\sqrt{b\,x^{1/3}+a\,x}}{7\,a}+\left(418\,b^{21/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\;x^{1/6}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(221\,a^{23/4}\sqrt{b\,x^{1/3}+a\,x}\right)-\left(209\,b^{21/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\;x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(221\,a^{23/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 131 leaves):

$$\left(2\,x^{2/3}\left(1463\,b^5+418\,a\,b^4\,x^{2/3}-190\,a^2\,b^3\,x^{4/3}+114\,a^3\,b^2\,x^2-78\,a^4\,b\,x^{8/3}+663\,a^5\,x^{10/3}-4389\,b^5\sqrt{1+\frac{b}{a\,x^{2/3}}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\right)\Big/\left(4641\,a^5\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 151: Result unnecessarily involves higher level functions.

$$\int\frac{x^2}{\sqrt{b\,x^{1/3}+a\,x}}\,dx$$

Optimal (type 4, 216 leaves, 8 steps):

$$-\frac{78\,b^3\sqrt{b\,x^{1/3}+a\,x}}{77\,a^4}+\frac{234\,b^2\,x^{2/3}\sqrt{b\,x^{1/3}+a\,x}}{385\,a^3}-\frac{26\,b\,x^{4/3}\sqrt{b\,x^{1/3}+a\,x}}{55\,a^2}+\frac{2\,x^2\sqrt{b\,x^{1/3}+a\,x}}{5\,a}+\left(39\,b^{15/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(77\,a^{17/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 118 leaves):

$$\left(2\,x^{1/3}\left(-195\,b^4-78\,a\,b^3\,x^{2/3}+26\,a^2\,b^2\,x^{4/3}-14\,a^3\,b\,x^2+77\,a^4\,x^{8/3}-195\,b^4\sqrt{1+\frac{b}{a\,x^{2/3}}}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\right)\Big/\left(385\,a^4\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 152: Result unnecessarily involves higher level functions.

$$\int\frac{x}{\sqrt{b\,x^{1/3}+a\,x}}\,dx$$

Optimal (type 4, 326 leaves, 8 steps):

$$\frac{14\,b^2\left(b+a\,x^{2/3}\right)x^{1/3}}{5\,a^{5/2}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{b\,x^{1/3}+a\,x}}-\frac{14\,b\,x^{1/3}\sqrt{b\,x^{1/3}+a\,x}}{15\,a^2}+\frac{2\,x\sqrt{b\,x^{1/3}+a\,x}}{3\,a}-\left(14\,b^{9/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(5\,a^{11/4}\sqrt{b\,x^{1/3}+a\,x}\right)+\left(7\,b^{9/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(5\,a^{11/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 94 leaves):

$$\left(2\,x^{2/3}\left(-7\,b^2-2\,a\,b\,x^{2/3}+5\,a^2\,x^{4/3}+21\,b^2\sqrt{1+\frac{b}{a\,x^{2/3}}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\right)\Big/\left(15\,a^2\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 153: Result unnecessarily involves higher level functions.

$$\int \frac{1}{\sqrt{b\,x^{1/3}+a\,x}}\,dx$$

Optimal (type 4, 126 leaves, 5 steps):

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

Result (type 5, 73 leaves):

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

Problem 154: Result unnecessarily involves higher level functions.

$$\int \frac{1}{x\sqrt{b\,x^{1/3}+a\,x}}\,dx$$

Optimal (type 4, 294 leaves, 7 steps):

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

Result (type 5, 74 leaves):

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

Problem 155: Result unnecessarily involves higher level functions.

$$\int \frac{1}{x^2\sqrt{b\,x^{1/3}+a\,x}}\,dx$$

Optimal (type 4, 163 leaves, 6 steps):

$$-\frac{6\sqrt{b\,x^{1/3}+a\,x}}{7\,b\,x^{4/3}}+\frac{10\,a\sqrt{b\,x^{1/3}+a\,x}}{7\,b^2\,x^{2/3}}+\left(5\,a^{7/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(7\,b^{9/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 97 leaves) :

$$\left(-6\,b^2+4\,a\,b\,x^{2/3}+10\,a^2\,x^{4/3}-10\,a^2\sqrt{1+\frac{b}{a\,x^{2/3}}}\,x^{4/3}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\Big/\left(7\,b^2\,x\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 156: Result unnecessarily involves higher level functions.

$$\int\frac{1}{x^3\sqrt{b\,x^{1/3}+a\,x}}\,dx$$

Optimal (type 4, 388 leaves, 10 steps) :

$$-\frac{154\,a^{7/2}\left(b+a\,x^{2/3}\right)x^{1/3}}{65\,b^4\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{b\,x^{1/3}+a\,x}}-\frac{6\sqrt{b\,x^{1/3}+a\,x}}{13\,b\,x^{7/3}}+\frac{22\,a\sqrt{b\,x^{1/3}+a\,x}}{39\,b^2\,x^{5/3}}-\frac{154\,a^2\sqrt{b\,x^{1/3}+a\,x}}{195\,b^3\,x}+\frac{154\,a^3\sqrt{b\,x^{1/3}+a\,x}}{65\,b^4\,x^{1/3}}+\left(154\,a^{13/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(65\,b^{15/4}\sqrt{b\,x^{1/3}+a\,x}\right)-\left(77\,a^{13/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(65\,b^{15/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 121 leaves) :

$$\left(-90\, b^4 + 20\, a\, b^3\, x^{2/3} - 44\, a^2\, b^2\, x^{4/3} + 308\, a^3\, b\, x^2 + 462\, a^4\, x^{8/3} - 462\, a^4 \sqrt{1 + \frac{b}{a\, x^{2/3}}}\; x^{8/3}\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -\frac{b}{a\, x^{2/3}}\right]\right) \Big/ \left(195\, b^4\, x^2 \sqrt{b\, x^{1/3} + a\, x}\right)$$

Problem 157: Result unnecessarily involves higher level functions.

$$\int \frac{1}{x^4 \sqrt{b\, x^{1/3} + a\, x}}\, dx$$

Optimal (type 4, 251 leaves, 9 steps):

$$-\frac{6 \sqrt{b\, x^{1/3} + a\, x}}{19\, b\, x^{10/3}} + \frac{34\, a \sqrt{b\, x^{1/3} + a\, x}}{95\, b^2\, x^{8/3}} - \frac{442\, a^2 \sqrt{b\, x^{1/3} + a\, x}}{1045\, b^3\, x^2} + \frac{3978\, a^3 \sqrt{b\, x^{1/3} + a\, x}}{7315\, b^4\, x^{4/3}} - \frac{1326\, a^4 \sqrt{b\, x^{1/3} + a\, x}}{1463\, b^5\, x^{2/3}} - \left(663\, a^{19/4} \left(\sqrt{b} + \sqrt{a}\, x^{1/3}\right) \sqrt{\frac{b + a\, x^{2/3}}{\left(\sqrt{b} + \sqrt{a}\, x^{1/3}\right)^2}}\; x^{1/6}\, \text{EllipticF}\left[2\, \text{ArcTan}\left[\frac{a^{1/4}\, x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(1463\, b^{21/4} \sqrt{b\, x^{1/3} + a\, x}\right)$$

Result (type 5, 134 leaves):

$$\left(-2310\, b^5 + 308\, a\, b^4\, x^{2/3} - 476\, a^2\, b^3\, x^{4/3} + 884\, a^3\, b^2\, x^2 - 2652\, a^4\, b\, x^{8/3} - 6630\, a^5\, x^{10/3} + 6630\, a^5 \sqrt{1 + \frac{b}{a\, x^{2/3}}}\; x^{10/3}\, \text{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, -\frac{b}{a\, x^{2/3}}\right]\right) \Big/ \left(7315\, b^5\, x^3 \sqrt{b\, x^{1/3} + a\, x}\right)$$

Problem 158: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 437 leaves, 12 steps):

$$-\frac{4807 b^5 \left(b+a x^{2/3}\right) x^{1/3}}{221 a^{13/2} \left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right) \sqrt{b x^{1/3}+a x}}-\frac{3 x^4}{a \sqrt{b x^{1/3}+a x}}+\frac{4807 b^4 x^{1/3} \sqrt{b x^{1/3}+a x}}{663 a^6}-\frac{24035 b^3 x \sqrt{b x^{1/3}+a x}}{4641 a^5}+\frac{6555 b^2 x^{5/3} \sqrt{b x^{1/3}+a x}}{1547 a^4}-\frac{437 b x^{7/3} \sqrt{b x^{1/3}+a x}}{119 a^3}+\frac{23 x^3 \sqrt{b x^{1/3}+a x}}{7 a^2}+\left(4807 b^{21/4} \left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right) \sqrt{\frac{b+a x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right)^2}}\, x^{1/6}\, \text{EllipticE}\left[2 \text{ArcTan}\left[\frac{a^{1/4} x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(221 a^{27/4} \sqrt{b x^{1/3}+a x}\right)-\left(4807 b^{21/4} \left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right) \sqrt{\frac{b+a x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right)^2}}\, x^{1/6}\, \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{a^{1/4} x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(442 a^{27/4} \sqrt{b x^{1/3}+a x}\right)$$

Result (type 5, 131 leaves):

$$\left(x^{2/3} \left(33649 b^5+9614 a b^4 x^{2/3}-4370 a^2 b^3 x^{4/3}+2622 a^3 b^2 x^2-1794 a^4 b x^{8/3}+1326 a^5 x^{10/3}-100947 b^5 \sqrt{1+\frac{b}{a x^{2/3}}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -\frac{b}{a x^{2/3}}\right]\right)\right) \Big/ \left(4641 a^6 \sqrt{b x^{1/3}+a x}\right)$$

Problem 159: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 239 leaves, 9 steps):

$$-\frac{3 x^3}{a \sqrt{b x^{1/3}+a x}}-\frac{663 b^3 \sqrt{b x^{1/3}+a x}}{77 a^5}+\frac{1989 b^2 x^{2/3} \sqrt{b x^{1/3}+a x}}{385 a^4}-\frac{221 b x^{4/3} \sqrt{b x^{1/3}+a x}}{55 a^3}+\frac{17 x^2 \sqrt{b x^{1/3}+a x}}{5 a^2}+\left(663 b^{15/4} \left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right) \sqrt{\frac{b+a x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\, x^{1/3}\right)^2}}\, x^{1/6}\, \text{EllipticF}\left[2 \text{ArcTan}\left[\frac{a^{1/4} x^{1/6}}{b^{1/4}}\right], \frac{1}{2}\right]\right) \Big/ \left(154 a^{21/4} \sqrt{b x^{1/3}+a x}\right)$$

Result (type 5, 118 leaves):

$$\left(x^{1/3}\left(-3315\,b^4-1326\,a\,b^3\,x^{2/3}+442\,a^2\,b^2\,x^{4/3}-238\,a^3\,b\,x^2+154\,a^4\,x^{8/3}-3315\,b^4\sqrt{1+\frac{b}{a\,x^{2/3}}}\;\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\right)\Big/\left(385\,a^5\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 160: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 349 leaves, 9 steps):

$$\frac{77\,b^2\left(b+a\,x^{2/3}\right)x^{1/3}}{5\,a^{7/2}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{b\,x^{1/3}+a\,x}}-\frac{3\,x^2}{a\sqrt{b\,x^{1/3}+a\,x}}-\frac{77\,b\,x^{1/3}\sqrt{b\,x^{1/3}+a\,x}}{15\,a^3}+\frac{11\,x\sqrt{b\,x^{1/3}+a\,x}}{3\,a^2}-\left(77\,b^{9/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(5\,a^{15/4}\sqrt{b\,x^{1/3}+a\,x}\right)+\left(77\,b^{9/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(10\,a^{15/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 94 leaves):

$$\left(x^{2/3}\left(-77\,b^2-22\,a\,b\,x^{2/3}+10\,a^2\,x^{4/3}+231\,b^2\sqrt{1+\frac{b}{a\,x^{2/3}}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\right)\Big/\left(15\,a^3\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 161: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 149 leaves, 6 steps):

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

Result (type 5, 76 leaves):

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

Problem 162: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 296 leaves, 7 steps):

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

Result (type 5, 65 leaves):

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

Problem 163: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 158 leaves, 6 steps):

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

Result (type 5, 81 leaves):

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

Problem 164: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 383 leaves, 10 steps):

$$\frac{3}{b\,x^{4/3}\sqrt{b\,x^{1/3}+a\,x}}+\frac{77\,a^{5/2}\left(b+a\,x^{2/3}\right)x^{1/3}}{5\,b^4\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{b\,x^{1/3}+a\,x}}-\frac{11\sqrt{b\,x^{1/3}+a\,x}}{3\,b^2\,x^{5/3}}+\frac{77\,a\sqrt{b\,x^{1/3}+a\,x}}{15\,b^3\,x}-\frac{77\,a^2\sqrt{b\,x^{1/3}+a\,x}}{5\,b^4\,x^{1/3}}-\left(77\,a^{9/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(5\,b^{15/4}\sqrt{b\,x^{1/3}+a\,x}\right)+\left(77\,a^{9/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(10\,b^{15/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 108 leaves):

$$\left(-10\,b^3+22\,a\,b^2\,x^{2/3}-154\,a^2\,b\,x^{4/3}-231\,a^3\,x^2+ 231\,a^3\,\sqrt{1+\frac{b}{a\,x^{2/3}}}\;x^2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\Big/\left(15\,b^4\,x^{4/3}\,\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 165: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 246 leaves, 9 steps):

$$\frac{3}{b\,x^{7/3}\,\sqrt{b\,x^{1/3}+a\,x}}-\frac{17\,\sqrt{b\,x^{1/3}+a\,x}}{5\,b^2\,x^{8/3}}+\frac{221\,a\,\sqrt{b\,x^{1/3}+a\,x}}{55\,b^3\,x^2}-\frac{1989\,a^2\,\sqrt{b\,x^{1/3}+a\,x}}{385\,b^4\,x^{4/3}}+\frac{663\,a^3\,\sqrt{b\,x^{1/3}+a\,x}}{77\,b^5\,x^{2/3}}+\left(663\,a^{15/4}\,\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\,\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\;x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/\left(154\,b^{21/4}\,\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 123 leaves):

$$\left(-154\,b^4+238\,a\,b^3\,x^{2/3}-442\,a^2\,b^2\,x^{4/3}+1326\,a^3\,b\,x^2+3315\,a^4\,x^{8/3}- 3315\,a^4\,\sqrt{1+\frac{b}{a\,x^{2/3}}}\;x^{8/3}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-\frac{b}{a\,x^{2/3}}\right]\right)\Big/\left(385\,b^5\,x^{7/3}\,\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 166: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 471 leaves, 13 steps):

$$\frac{3}{b\,x^{10/3}\sqrt{b\,x^{1/3}+a\,x}}-\frac{4807\,a^{11/2}\left(b+a\,x^{2/3}\right)x^{1/3}}{221\,b^7\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{b\,x^{1/3}+a\,x}}-\frac{23\sqrt{b\,x^{1/3}+a\,x}}{7\,b^2\,x^{11/3}}+\frac{437\,a\sqrt{b\,x^{1/3}+a\,x}}{119\,b^3\,x^3}-$$

$$\frac{6555\,a^2\sqrt{b\,x^{1/3}+a\,x}}{1547\,b^4\,x^{7/3}}+\frac{24\,035\,a^3\sqrt{b\,x^{1/3}+a\,x}}{4641\,b^5\,x^{5/3}}-\frac{4807\,a^4\sqrt{b\,x^{1/3}+a\,x}}{663\,b^6\,x}+\frac{4807\,a^5\sqrt{b\,x^{1/3}+a\,x}}{221\,b^7\,x^{1/3}}+$$

$$\left(4807\,a^{21/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/$$

$$\left(221\,b^{27/4}\sqrt{b\,x^{1/3}+a\,x}\right)-$$

$$\left(4807\,a^{21/4}\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)\sqrt{\frac{b+a\,x^{2/3}}{\left(\sqrt{b}+\sqrt{a}\,x^{1/3}\right)^2}}\,x^{1/6}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{a^{1/4}\,x^{1/6}}{b^{1/4}}\right],\frac{1}{2}\right]\right)\Big/$$

$$\left(442\,b^{27/4}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Result (type 5, 145 leaves):

$$\Big(-1326\,b^6+1794\,a\,b^5\,x^{2/3}-2622\,a^2\,b^4\,x^{4/3}+4370\,a^3\,b^3\,x^2-9614\,a^4\,b^2\,x^{8/3}+67\,298\,a^5\,b\,x^{10/3}+$$

$$100\,947\,a^6\,x^4-100\,947\,a^6\sqrt{1+\frac{b}{a\,x^{2/3}}}\,x^4\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-\frac{b}{a\,x^{2/3}}\right]\Big)\Big/$$

$$\left(4641\,b^7\,x^{10/3}\sqrt{b\,x^{1/3}+a\,x}\right)$$

Problem 281: Result unnecessarily involves higher level functions.

$$\int x^{-3-3\,n}\left(a\,x^2+b\,x^3\right)^n\,dx$$

Optimal (type 3, 70 leaves, 2 steps):

$$-\frac{x^{-4-3\,n}\left(a\,x^2+b\,x^3\right)^{1+n}}{a\,(2+n)}+\frac{b\,x^{-3\,(1+n)}\left(a\,x^2+b\,x^3\right)^{1+n}}{a^2\,(1+n)\,(2+n)}$$

Result (type 5, 58 leaves):

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

Problem 289: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 238 leaves, 3 steps):

$$\frac{2\sqrt{a x^2+b x^5}}{5 b}-\left(4\sqrt{2+\sqrt{3}}\;a\,x\,\left(a^{1/3}+b^{1/3}x\right)\sqrt{\frac{a^{2/3}-a^{1/3}b^{1/3}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)a^{1/3}+b^{1/3}x\right)^2}}\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right)a^{1/3}+b^{1/3}x}{\left(1+\sqrt{3}\right)a^{1/3}+b^{1/3}x}\right],-7-4\sqrt{3}\right]\right)\Bigg/\left(5\times 3^{1/4}b^{4/3}\sqrt{\frac{a^{1/3}\left(a^{1/3}+b^{1/3}x\right)}{\left(\left(1+\sqrt{3}\right)a^{1/3}+b^{1/3}x\right)^2}}\sqrt{a x^2+b x^5}\right)$$

Result (type 4, 165 leaves):

$$\left(-6\left(-b\right)^{1/3}x^2\left(a+b x^3\right)+4\,\mathrm{i}\,3^{3/4}a^{4/3}x\sqrt{\left(-1\right)^{5/6}\left(-1+\frac{\left(-b\right)^{1/3}x}{a^{1/3}}\right)}\sqrt{1+\frac{\left(-b\right)^{1/3}x}{a^{1/3}}+\frac{\left(-b\right)^{2/3}x^2}{a^{2/3}}}\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\left(-1\right)^{5/6}-\frac{\mathrm{i}\,\left(-b\right)^{1/3}x}{a^{1/3}}}}{3^{1/4}}\right],\left(-1\right)^{1/3}\right]\right)\Bigg/\left(15\left(-b\right)^{4/3}\sqrt{x^2\left(a+b x^3\right)}\right)$$

Problem 290: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x}{\sqrt{a x^2+b x^5}}\,dx$$

Optimal (type 4, 212 leaves, 2 steps):

$$\left(2\sqrt{2+\sqrt{3}}\;x\left(a^{1/3}+b^{1/3}x\right)\sqrt{\frac{a^{2/3}-a^{1/3}b^{1/3}x+b^{2/3}x^2}{\left(\left(1+\sqrt{3}\right)a^{1/3}+b^{1/3}x\right)^2}}\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right)a^{1/3}+b^{1/3}x}{\left(1+\sqrt{3}\right)a^{1/3}+b^{1/3}x}\right],-7-4\sqrt{3}\right]\right)\Bigg/\left(3^{1/4}b^{1/3}\sqrt{\frac{a^{1/3}\left(a^{1/3}+b^{1/3}x\right)}{\left(\left(1+\sqrt{3}\right)a^{1/3}+b^{1/3}x\right)^2}}\sqrt{a x^2+b x^5}\right)$$

Result (type 4, 141 leaves):

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

Problem 291: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{1}{x^2\,\sqrt{a\,x^2+b\,x^5}}\,dx$$

Optimal (type 4, 243 leaves, 3 steps):

$$-\frac{\sqrt{a\,x^2+b\,x^5}}{2\,a\,x^3}-\left(\sqrt{2+\sqrt{3}}\,b^{2/3}\,x\,\left(a^{1/3}+b^{1/3}\,x\right)\right.$$
$$\left.\sqrt{\frac{a^{2/3}-a^{1/3}\,b^{1/3}\,x+b^{2/3}\,x^2}{\left(\left(1+\sqrt{3}\right)a^{1/3}+b^{1/3}\,x\right)^2}}\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right)a^{1/3}+b^{1/3}\,x}{\left(1+\sqrt{3}\right)a^{1/3}+b^{1/3}\,x}\right],\,-7-4\,\sqrt{3}\right]\right)\Big/$$
$$\left(2\times 3^{1/4}\,a\,\sqrt{\frac{a^{1/3}\,\left(a^{1/3}+b^{1/3}\,x\right)}{\left(\left(1+\sqrt{3}\right)a^{1/3}+b^{1/3}\,x\right)^2}}\,\sqrt{a\,x^2+b\,x^5}\right)$$

Result (type 4, 171 leaves):

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

Problem 292: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^5}{\sqrt{a\,x^2+b\,x^5}}\,dx$$

Optimal (type 4, 514 leaves, 5 steps):

$$-\frac{8\,a\,x\,\left(a+b\,x^3\right)}{7\,b^{5/3}\,\left(\left(1+\sqrt{3}\right)\,a^{1/3}+b^{1/3}\,x\right)\,\sqrt{a\,x^2+b\,x^5}}+\frac{2\,x\,\sqrt{a\,x^2+b\,x^5}}{7\,b}+$$

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

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

$$\left(7\,b^{5/3}\,\sqrt{\frac{a^{1/3}\,\left(a^{1/3}+b^{1/3}\,x\right)}{\left(\left(1+\sqrt{3}\right)\,a^{1/3}+b^{1/3}\,x\right)^2}}\,\,\sqrt{a\,x^2+b\,x^5}\right)-\left(8\,\sqrt{2}\,\,a^{4/3}\,x\,\left(a^{1/3}+b^{1/3}\,x\right)\right.$$

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

$$\left(7\times 3^{1/4}\,b^{5/3}\,\sqrt{\frac{a^{1/3}\,\left(a^{1/3}+b^{1/3}\,x\right)}{\left(\left(1+\sqrt{3}\right)\,a^{1/3}+b^{1/3}\,x\right)^2}}\,\,\sqrt{a\,x^2+b\,x^5}\right)$$

Result (type 4, 228 leaves) :

$$\left(2\,x\,\left(3\,x^2\,\left(a+b\,x^3\right)-\frac{1}{\left(-b\right)^{2/3}}\right.\right.$$

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

$$\left(-\mathrm{i}\,\sqrt{3}\,\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{-\left(-1\right)^{5/6}-\frac{\mathrm{i}\,\left(-b\right)^{1/3}\,x}{a^{1/3}}}}{3^{1/4}}\right],\,\left(-1\right)^{1/3}\right]+\right.$$

$$\left.\left.\left.\left(-1\right)^{1/3}\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-\left(-1\right)^{5/6}-\frac{\mathrm{i}\,\left(-b\right)^{1/3}\,x}{a^{1/3}}}}{3^{1/4}}\right],\,\left(-1\right)^{1/3}\right]\right)\right)\right)\Big/\left(21\,b\,\sqrt{x^2\,\left(a+b\,x^3\right)}\,\right)$$

Problem 293: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{x^2}{\sqrt{a x^2 + b x^5}} \, dx$$

Optimal (type 4, 484 leaves, 4 steps):

$$\frac{2 x \left(a + b x^3\right)}{b^{2/3} \left(\left(1+\sqrt{3}\right) a^{1/3} + b^{1/3} x\right) \sqrt{a x^2 + b x^5}} - \left(3^{1/4} \sqrt{2-\sqrt{3}}\; a^{1/3} x \left(a^{1/3} + b^{1/3} x\right) \sqrt{\frac{a^{2/3} - a^{1/3} b^{1/3} x + b^{2/3} x^2}{\left(\left(1+\sqrt{3}\right) a^{1/3} + b^{1/3} x\right)^2}}\; \text{EllipticE}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right) a^{1/3} + b^{1/3} x}{\left(1+\sqrt{3}\right) a^{1/3} + b^{1/3} x}\right], -7-4\sqrt{3}\right]\right) \Big/ \left(b^{2/3} \sqrt{\frac{a^{1/3} \left(a^{1/3} + b^{1/3} x\right)}{\left(\left(1+\sqrt{3}\right) a^{1/3} + b^{1/3} x\right)^2}} \sqrt{a x^2 + b x^5}\right) + \left(2 \sqrt{2}\; a^{1/3} x \left(a^{1/3} + b^{1/3} x\right) \sqrt{\frac{a^{2/3} - a^{1/3} b^{1/3} x + b^{2/3} x^2}{\left(\left(1+\sqrt{3}\right) a^{1/3} + b^{1/3} x\right)^2}}\; \text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right) a^{1/3} + b^{1/3} x}{\left(1+\sqrt{3}\right) a^{1/3} + b^{1/3} x}\right], -7-4\sqrt{3}\right]\right) \Big/ \left(3^{1/4} b^{2/3} \sqrt{\frac{a^{1/3} \left(a^{1/3} + b^{1/3} x\right)}{\left(\left(1+\sqrt{3}\right) a^{1/3} + b^{1/3} x\right)^2}} \sqrt{a x^2 + b x^5}\right)$$

Result (type 4, 202 leaves):

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

Problem 294: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{x\sqrt{a x^2+b x^5}}\,dx$$

Optimal (type 4, 510 leaves, 5 steps):

$$\frac{b^{1/3} x \left(a+b x^3\right)}{a \left(\left(1+\sqrt{3}\right) a^{1/3}+b^{1/3} x\right) \sqrt{a x^2+b x^5}}-\frac{\sqrt{a x^2+b x^5}}{a x^2}-\left(3^{1/4} \sqrt{2-\sqrt{3}}\, b^{1/3} x \left(a^{1/3}+b^{1/3} x\right) \sqrt{\frac{a^{2/3}-a^{1/3} b^{1/3} x+b^{2/3} x^2}{\left(\left(1+\sqrt{3}\right) a^{1/3}+b^{1/3} x\right)^2}}\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right) a^{1/3}+b^{1/3} x}{\left(1+\sqrt{3}\right) a^{1/3}+b^{1/3} x}\right],-7-4 \sqrt{3}\right]\right)\Big/\left(2 a^{2/3} \sqrt{\frac{a^{1/3} \left(a^{1/3}+b^{1/3} x\right)}{\left(\left(1+\sqrt{3}\right) a^{1/3}+b^{1/3} x\right)^2}} \sqrt{a x^2+b x^5}\right)+\left(\sqrt{2}\, b^{1/3} x \left(a^{1/3}+b^{1/3} x\right) \sqrt{\frac{a^{2/3}-a^{1/3} b^{1/3} x+b^{2/3} x^2}{\left(\left(1+\sqrt{3}\right) a^{1/3}+b^{1/3} x\right)^2}}\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\left(1-\sqrt{3}\right) a^{1/3}+b^{1/3} x}{\left(1+\sqrt{3}\right) a^{1/3}+b^{1/3} x}\right],-7-4 \sqrt{3}\right]\right)\Big/\left(3^{1/4} a^{2/3} \sqrt{\frac{a^{1/3} \left(a^{1/3}+b^{1/3} x\right)}{\left(\left(1+\sqrt{3}\right) a^{1/3}+b^{1/3} x\right)^2}} \sqrt{a x^2+b x^5}\right)$$

Result (type 4, 225 leaves):

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

Problem 295: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{x^{13/2}}{\sqrt{a x^2 + b x^5}} \, dx$$

Optimal (type 4, 265 leaves, 5 steps):

$$-\frac{7 a \sqrt{a x^2 + b x^5}}{20 b^2 \sqrt{x}} + \frac{x^{5/2} \sqrt{a x^2 + b x^5}}{5 b} + \left(7 a^{5/3} x^{3/2} \left(a^{1/3} + b^{1/3} x\right) \sqrt{\frac{a^{2/3} - a^{1/3} b^{1/3} x + b^{2/3} x^2}{\left(a^{1/3} + \left(1 + \sqrt{3}\right) b^{1/3} x\right)^2}} \, \text{EllipticF}\left[\text{ArcCos}\left[\frac{a^{1/3} + \left(1 - \sqrt{3}\right) b^{1/3} x}{a^{1/3} + \left(1 + \sqrt{3}\right) b^{1/3} x}\right], \frac{1}{4} \left(2 + \sqrt{3}\right)\right]\right) \Bigg/ \left(40 \times 3^{1/4} b^2 \sqrt{\frac{b^{1/3} x \left(a^{1/3} + b^{1/3} x\right)}{\left(a^{1/3} + \left(1 + \sqrt{3}\right) b^{1/3} x\right)^2}} \sqrt{a x^2 + b x^5}\right)$$

Result (type 4, 194 leaves):

$$\left(x^{3/2} \left(-3 (-a)^{1/3} \left(7 a^2 + 3 a b x^3 - 4 b^2 x^6\right) - 7 \, i \, 3^{3/4} a^2 b^{1/3} \sqrt{(-1)^{5/6} \left(-1 + \frac{(-a)^{1/3}}{b^{1/3} x}\right)} \, x \sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}} + \frac{(-a)^{1/3} x}{b^{1/3}} + x^2}{x^2}} \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-(-1)^{5/6} - \frac{i (-a)^{1/3}}{b^{1/3} x}}}{3^{1/4}}\right], (-1)^{1/3}\right]\right)\right) \Bigg/ \left(60 (-a)^{1/3} b^2 \sqrt{x^2 \left(a + b x^3\right)}\right)$$

Problem 296: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{x^{11/2}}{\sqrt{a x^2 + b x^5}} \, dx$$

Optimal (type 4, 525 leaves, 6 steps):

$$-\frac{5\left(1+\sqrt{3}\right)a\,x^{3/2}\left(a+b\,x^{3}\right)}{8\,b^{5/3}\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)\sqrt{a\,x^{2}+b\,x^{5}}}+\frac{x^{3/2}\sqrt{a\,x^{2}+b\,x^{5}}}{4\,b}+$$

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

$$\left(8\,b^{5/3}\sqrt{\frac{b^{1/3}\,x\left(a^{1/3}+b^{1/3}\,x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^{2}}}\sqrt{a\,x^{2}+b\,x^{5}}\right)+\left(5\left(1-\sqrt{3}\right)a^{4/3}\,x^{3/2}\left(a^{1/3}+b^{1/3}\,x\right)\right.$$

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

$$\left(16\times 3^{1/4}\,b^{5/3}\sqrt{\frac{b^{1/3}\,x\left(a^{1/3}+b^{1/3}\,x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^{2}}}\sqrt{a\,x^{2}+b\,x^{5}}\right)$$

Result (type 4, 362 leaves) :

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

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

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

$$\left.\left.\left(1+i\sqrt{3}\right)\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(3+i\sqrt{3}\right)b^{1/3}\,x}{a^{1/3}+b^{1/3}\,x}}}{\sqrt{2}}\right],\frac{-i+\sqrt{3}}{i+\sqrt{3}}\right]\right)\right)\bigg/$$

$$\left.\left.\left(2\left(-1+(-1)^{2/3}\right)b\right)\right)\right)\bigg/\left(8\,b\,\sqrt{x^2\,\left(a+b\,x^3\right)}\right)$$

Problem 298: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^{7/2}}{\sqrt{a\,x^2+b\,x^5}}\,dx$$

Optimal (type 4, 237 leaves, 4 steps):

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

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

$$\left(4\times3^{1/4}\,b\,\sqrt{\frac{b^{1/3}\,x\,\left(a^{1/3}+b^{1/3}\,x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\,\sqrt{a\,x^2+b\,x^5}\right)$$

Result (type 4, 178 leaves):

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

Problem 299: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^{5/2}}{\sqrt{a\,x^2+b\,x^5}}\,dx$$

Optimal (type 4, 492 leaves, 5 steps):

$$\frac{\left(1+\sqrt{3}\right)x^{3/2}\left(a+b\,x^3\right)}{b^{2/3}\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)\sqrt{a\,x^2+b\,x^5}}-$$
$$\left(3^{1/4}\,a^{1/3}\,x^{3/2}\left(a^{1/3}+b^{1/3}\,x\right)\sqrt{\frac{a^{2/3}-a^{1/3}\,b^{1/3}\,x+b^{2/3}\,x^2}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\;\text{EllipticE}\left[\text{ArcCos}\left[\frac{a^{1/3}+\left(1-\sqrt{3}\right)b^{1/3}\,x}{a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x}\right],\right.\right.$$
$$\left.\left.\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right)\Big/\left(b^{2/3}\sqrt{\frac{b^{1/3}\,x\left(a^{1/3}+b^{1/3}\,x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\;\sqrt{a\,x^2+b\,x^5}\right)-$$
$$\left(\left(1-\sqrt{3}\right)a^{1/3}\,x^{3/2}\left(a^{1/3}+b^{1/3}\,x\right)\sqrt{\frac{a^{2/3}-a^{1/3}\,b^{1/3}\,x+b^{2/3}\,x^2}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\right.$$
$$\left.\text{EllipticF}\left[\text{ArcCos}\left[\frac{a^{1/3}+\left(1-\sqrt{3}\right)b^{1/3}\,x}{a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x}\right],\,\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right)\Big/$$
$$\left(2\times3^{1/4}\,b^{2/3}\sqrt{\frac{b^{1/3}\,x\left(a^{1/3}+b^{1/3}\,x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\;\sqrt{a\,x^2+b\,x^5}\right)$$

Result (type 4, 340 leaves):

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

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

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

Problem 301: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\sqrt{x}}{\sqrt{a x^2+b x^5}}\,dx$$

Optimal (type 4, 203 leaves, 3 steps):

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

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

$$\left(3^{1/4}a^{1/3}\sqrt{\frac{b^{1/3}x\left(a^{1/3}+b^{1/3}x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x\right)^2}}\sqrt{a x^2+b x^5}\right)$$

Result (type 4, 151 leaves):

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

Problem 302: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{\sqrt{x}\,\sqrt{a x^2+b x^5}}\,dx$$

Optimal (type 4, 519 leaves, 6 steps):

$$\frac{2\left(1+\sqrt{3}\right)b^{1/3}x^{3/2}\left(a+b x^3\right)}{a\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x\right)\sqrt{a x^2+b x^5}}-\frac{2\sqrt{a x^2+b x^5}}{a x^{3/2}}-$$
$$\left(2\times 3^{1/4}b^{1/3}x^{3/2}\left(a^{1/3}+b^{1/3}x\right)\sqrt{\frac{a^{2/3}-a^{1/3}b^{1/3}x+b^{2/3}x^2}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x\right)^2}}\right.$$
$$\left.\text{EllipticE}\left[\text{ArcCos}\left[\frac{a^{1/3}+\left(1-\sqrt{3}\right)b^{1/3}x}{a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right)\Big/$$
$$\left(a^{2/3}\sqrt{\frac{b^{1/3}x\left(a^{1/3}+b^{1/3}x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x\right)^2}}\sqrt{a x^2+b x^5}\right)-\left(\left(1-\sqrt{3}\right)b^{1/3}x^{3/2}\left(a^{1/3}+b^{1/3}x\right)\right.$$
$$\left.\sqrt{\frac{a^{2/3}-a^{1/3}b^{1/3}x+b^{2/3}x^2}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x\right)^2}}\;\text{EllipticF}\left[\text{ArcCos}\left[\frac{a^{1/3}+\left(1-\sqrt{3}\right)b^{1/3}x}{a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x}\right],\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right)\Big/$$
$$\left(3^{1/4}a^{2/3}\sqrt{\frac{b^{1/3}x\left(a^{1/3}+b^{1/3}x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}x\right)^2}}\sqrt{a x^2+b x^5}\right)$$

Result (type 4, 341 leaves):

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

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

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

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

Problem 304: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{1}{x^{5/2}\sqrt{a\,x^2+b\,x^5}}\,dx$$

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

$$-\frac{2\sqrt{a\,x^2+b\,x^5}}{5\,a\,x^{7/2}}-\left(2\,b\,x^{3/2}\left(a^{1/3}+b^{1/3}\,x\right)\sqrt{\frac{a^{2/3}-a^{1/3}\,b^{1/3}\,x+b^{2/3}\,x^2}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\right.$$

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

$$\left(5\times3^{1/4}\,a^{4/3}\sqrt{\frac{b^{1/3}\,x\left(a^{1/3}+b^{1/3}\,x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\sqrt{a\,x^2+b\,x^5}\right)$$

Result (type 4, 176 leaves):

$$\left(6\,(-a)^{1/3}\left(a+b\,x^3\right)-4\,i\,3^{3/4}\,b^{4/3}\sqrt{(-1)^{5/6}\left(-1+\frac{(-a)^{1/3}}{b^{1/3}\,x}\right)}\;x^4\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{(-a)^{1/3}\,x}{b^{1/3}}+x^2}{x^2}}\right.$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-(-1)^{5/6}-\frac{i\,(-a)^{1/3}}{b^{1/3}\,x}}}{3^{1/4}}\right],\,(-1)^{1/3}\right]\right)\Big/\left(15\,(-a)^{4/3}\,x^{3/2}\sqrt{x^2\left(a+b\,x^3\right)}\right)$$

Problem 305: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{x^{7/2}\sqrt{a\,x^2+b\,x^5}}\,dx$$

Optimal (type 4, 555 leaves, 7 steps):

$$-\frac{8\left(1+\sqrt{3}\right)b^{4/3}\,x^{3/2}\left(a+b\,x^3\right)}{7\,a^2\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)\sqrt{a\,x^2+b\,x^5}}-\frac{2\sqrt{a\,x^2+b\,x^5}}{7\,a\,x^{9/2}}+$$

$$\frac{8\,b\sqrt{a\,x^2+b\,x^5}}{7\,a^2\,x^{3/2}}+\left(8\times 3^{1/4}\,b^{4/3}\,x^{3/2}\left(a^{1/3}+b^{1/3}\,x\right)\sqrt{\frac{a^{2/3}-a^{1/3}\,b^{1/3}\,x+b^{2/3}\,x^2}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\right.$$

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

$$\left(7\,a^{5/3}\sqrt{\frac{b^{1/3}\,x\left(a^{1/3}+b^{1/3}\,x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\sqrt{a\,x^2+b\,x^5}\right)+\left(4\left(1-\sqrt{3}\right)b^{4/3}\,x^{3/2}\left(a^{1/3}+b^{1/3}\,x\right)\right.$$

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

$$\left(7\times 3^{1/4}\,a^{5/3}\sqrt{\frac{b^{1/3}\,x\left(a^{1/3}+b^{1/3}\,x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\sqrt{a\,x^2+b\,x^5}\right)$$

Result (type 4, 369 leaves):

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

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

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

$$\left.\left.\left.\left(1+i\sqrt{3}\right)\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(3+i\sqrt{3}\right)b^{1/3}\,x}{a^{1/3}+b^{1/3}\,x}}}{\sqrt{2}}\right],\frac{-i+\sqrt{3}}{i+\sqrt{3}}\right]\right)\right)\right)\Big/\left(7\,a^2\sqrt{x^2\left(a+b\,x^3\right)}\right)$$

Problem 307: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{1}{x^{11/2}\sqrt{a\,x^2+b\,x^5}}\,dx$$

Optimal (type 4, 265 leaves, 5 steps):

$$-\frac{2\sqrt{a\,x^2+b\,x^5}}{11\,a\,x^{13/2}}+\frac{16\,b\sqrt{a\,x^2+b\,x^5}}{55\,a^2\,x^{7/2}}+$$

$$\left(16\,b^2\,x^{3/2}\left(a^{1/3}+b^{1/3}\,x\right)\sqrt{\frac{a^{2/3}-a^{1/3}\,b^{1/3}\,x+b^{2/3}\,x^2}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\;\text{EllipticF}\left[\text{ArcCos}\left[\frac{a^{1/3}+\left(1-\sqrt{3}\right)b^{1/3}\,x}{a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x}\right],\right.\right.$$

$$\left.\left.\frac{1}{4}\left(2+\sqrt{3}\right)\right]\right)\Big/\left(55\times3^{1/4}\,a^{7/3}\sqrt{\frac{b^{1/3}\,x\left(a^{1/3}+b^{1/3}\,x\right)}{\left(a^{1/3}+\left(1+\sqrt{3}\right)b^{1/3}\,x\right)^2}}\sqrt{a\,x^2+b\,x^5}\right)$$

Result (type 4, 190 leaves):

$$\left(6\,(-a)^{1/3}\left(-5\,a^2+3\,a\,b\,x^3+8\,b^2\,x^6\right)-\right.$$

$$32\,\mathrm{i}\,3^{3/4}\,b^{7/3}\sqrt{(-1)^{5/6}\left(-1+\frac{(-a)^{1/3}}{b^{1/3}\,x}\right)}\;x^7\sqrt{\frac{\frac{(-a)^{2/3}}{b^{2/3}}+\frac{(-a)^{1/3}\,x}{b^{1/3}}+x^2}{x^2}}$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{-(-1)^{5/6}-\frac{\mathrm{i}\,(-a)^{1/3}}{b^{1/3}\,x}}}{3^{1/4}}\right],\,(-1)^{1/3}\right]\right)\Big/\left(165\,(-a)^{7/3}\,x^{9/2}\sqrt{x^2\left(a+b\,x^3\right)}\right)$$

Problem 328: Result more than twice size of optimal antiderivative.

$$\int\left(a\,x+b\,x^{14}\right)^{12}\,dx$$

Optimal (type 1, 16 leaves, 2 steps):

$$\frac{\left(a+b\,x^{13}\right)^{13}}{169\,b}$$

Result (type 1, 160 leaves):

$$\frac{a^{12}\,x^{13}}{13}+\frac{6}{13}\,a^{11}\,b\,x^{26}+\frac{22}{13}\,a^{10}\,b^2\,x^{39}+\frac{55}{13}\,a^9\,b^3\,x^{52}+\frac{99}{13}\,a^8\,b^4\,x^{65}+\frac{132}{13}\,a^7\,b^5\,x^{78}+\frac{132}{13}\,a^6\,b^6\,x^{91}+$$
$$\frac{99}{13}\,a^5\,b^7\,x^{104}+\frac{55}{13}\,a^4\,b^8\,x^{117}+\frac{22}{13}\,a^3\,b^9\,x^{130}+\frac{6}{13}\,a^2\,b^{10}\,x^{143}+\frac{1}{13}\,a\,b^{11}\,x^{156}+\frac{b^{12}\,x^{169}}{169}$$

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

$$\int x^{12}\left(a\,x+b\,x^{26}\right)^{12}\,dx$$

Optimal (type 1, 16 leaves, 2 steps):

$$\frac{\left(a+b\,x^{25}\right)^{13}}{325\,b}$$

Result (type 1, 160 leaves):

$$\frac{a^{12}\,x^{25}}{25}+\frac{6}{25}\,a^{11}\,b\,x^{50}+\frac{22}{25}\,a^{10}\,b^2\,x^{75}+\frac{11}{5}\,a^9\,b^3\,x^{100}+\frac{99}{25}\,a^8\,b^4\,x^{125}+\frac{132}{25}\,a^7\,b^5\,x^{150}+\frac{132}{25}\,a^6\,b^6\,x^{175}+$$
$$\frac{99}{25}\,a^5\,b^7\,x^{200}+\frac{11}{5}\,a^4\,b^8\,x^{225}+\frac{22}{25}\,a^3\,b^9\,x^{250}+\frac{6}{25}\,a^2\,b^{10}\,x^{275}+\frac{1}{25}\,a\,b^{11}\,x^{300}+\frac{b^{12}\,x^{325}}{325}$$

Problem 330: Result more than twice size of optimal antiderivative.

$$\int x^{24}\left(a x+b x^{38}\right)^{12} dx$$

Optimal (type 1, 16 leaves, 2 steps):

$$\frac{\left(a+b x^{37}\right)^{13}}{481 b}$$

Result (type 1, 160 leaves):

$$\frac{a^{12} x^{37}}{37}+\frac{6}{37} a^{11} b x^{74}+\frac{22}{37} a^{10} b^2 x^{111}+\frac{55}{37} a^9 b^3 x^{148}+\frac{99}{37} a^8 b^4 x^{185}+\frac{132}{37} a^7 b^5 x^{222}+\frac{132}{37} a^6 b^6 x^{259}+\frac{99}{37} a^5 b^7 x^{296}+\frac{55}{37} a^4 b^8 x^{333}+\frac{22}{37} a^3 b^9 x^{370}+\frac{6}{37} a^2 b^{10} x^{407}+\frac{1}{37} a b^{11} x^{444}+\frac{b^{12} x^{481}}{481}$$

Problem 332: Result more than twice size of optimal antiderivative.

$$\int\left(a x+b x^{14}\right)^{12} dx$$

Optimal (type 1, 16 leaves, 2 steps):

$$\frac{\left(a+b x^{13}\right)^{13}}{169 b}$$

Result (type 1, 160 leaves):

$$\frac{a^{12} x^{13}}{13}+\frac{6}{13} a^{11} b x^{26}+\frac{22}{13} a^{10} b^2 x^{39}+\frac{55}{13} a^9 b^3 x^{52}+\frac{99}{13} a^8 b^4 x^{65}+\frac{132}{13} a^7 b^5 x^{78}+\frac{132}{13} a^6 b^6 x^{91}+\frac{99}{13} a^5 b^7 x^{104}+\frac{55}{13} a^4 b^8 x^{117}+\frac{22}{13} a^3 b^9 x^{130}+\frac{6}{13} a^2 b^{10} x^{143}+\frac{1}{13} a b^{11} x^{156}+\frac{b^{12} x^{169}}{169}$$

Problem 333: Result more than twice size of optimal antiderivative.

$$\int\left(a x^2+b x^{27}\right)^{12} dx$$

Optimal (type 1, 16 leaves, 2 steps):

$$\frac{\left(a+b x^{25}\right)^{13}}{325 b}$$

Result (type 1, 160 leaves):

$$\frac{a^{12} x^{25}}{25}+\frac{6}{25} a^{11} b x^{50}+\frac{22}{25} a^{10} b^2 x^{75}+\frac{11}{5} a^9 b^3 x^{100}+\frac{99}{25} a^8 b^4 x^{125}+\frac{132}{25} a^7 b^5 x^{150}+\frac{132}{25} a^6 b^6 x^{175}+\frac{99}{25} a^5 b^7 x^{200}+\frac{11}{5} a^4 b^8 x^{225}+\frac{22}{25} a^3 b^9 x^{250}+\frac{6}{25} a^2 b^{10} x^{275}+\frac{1}{25} a b^{11} x^{300}+\frac{b^{12} x^{325}}{325}$$

Problem 334: Result more than twice size of optimal antiderivative.

$$\int \left(a x^3 + b x^{40}\right)^{12} \, dx$$

Optimal (type 1, 16 leaves, 2 steps):

$$\frac{\left(a + b x^{37}\right)^{13}}{481 b}$$

Result (type 1, 160 leaves):

$$\frac{a^{12} x^{37}}{37} + \frac{6}{37} a^{11} b x^{74} + \frac{22}{37} a^{10} b^2 x^{111} + \frac{55}{37} a^9 b^3 x^{148} + \frac{99}{37} a^8 b^4 x^{185} + \frac{132}{37} a^7 b^5 x^{222} + \frac{132}{37} a^6 b^6 x^{259} + \frac{99}{37} a^5 b^7 x^{296} + \frac{55}{37} a^4 b^8 x^{333} + \frac{22}{37} a^3 b^9 x^{370} + \frac{6}{37} a^2 b^{10} x^{407} + \frac{1}{37} a b^{11} x^{444} + \frac{b^{12} x^{481}}{481}$$

Problem 335: Result more than twice size of optimal antiderivative.

$$\int \left(a x^m + b x^{1+13 m}\right)^{12} \, dx$$

Optimal (type 3, 27 leaves, 2 steps):

$$\frac{\left(a + b x^{1+12 m}\right)^{13}}{13 b \left(1 + 12 m\right)}$$

Result (type 3, 193 leaves):

$$\frac{1}{13 + 156 m} x^{1+12 m} \left(13 a^{12} + 78 a^{11} b x^{1+12 m} + 286 a^{10} b^2 x^{2+24 m} + 715 a^9 b^3 x^{3+36 m} + 1287 a^8 b^4 x^{4+48 m} + 1716 a^7 b^5 x^{5+60 m} + 1716 a^6 b^6 x^{6+72 m} + 1287 a^5 b^7 x^{7+84 m} + 715 a^4 b^8 x^{8+96 m} + 286 a^3 b^9 x^{9+108 m} + 78 a^2 b^{10} x^{10+120 m} + 13 a b^{11} x^{11+132 m} + b^{12} x^{12+144 m}\right)$$

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

$$\int \left(a x^m + b x^{1+6 m}\right)^5 \, dx$$

Optimal (type 3, 27 leaves, 2 steps):

$$\frac{\left(a + b x^{1+5 m}\right)^6}{6 b \left(1 + 5 m\right)}$$

Result (type 3, 88 leaves):

$$\frac{1}{6 + 30 m} x^{1+5 m} \left(6 a^5 + 15 a^4 b x^{1+5 m} + 20 a^3 b^2 x^{2+10 m} + 15 a^2 b^3 x^{3+15 m} + 6 a b^4 x^{4+20 m} + b^5 x^{5+25 m}\right)$$

Problem 348: Result more than twice size of optimal antiderivative.

$$\int x^p \left(a x^n + b x^{1+13 n+p}\right)^{12} \, dx$$

Optimal (type 3, 29 leaves, 2 steps):

$$\frac{\left(a + b x^{1+12 n+p}\right)^{13}}{13 b (1 + 12 n + p)}$$

Result (type 3, 232 leaves):

$$\frac{1}{13 (1 + 12 n + p)} x^{1+12 n+p} \left(13 a^{12} + 78 a^{11} b x^{1+12 n+p} + 286 a^3 b^9 x^{9 (1+12 n+p)} + 78 a^2 b^{10} x^{10 (1+12 n+p)} + 13 a b^{11} x^{11 (1+12 n+p)} + b^{12} x^{12 (1+12 n+p)} + 286 a^{10} b^2 x^{2+24 n+2 p} + 715 a^9 b^3 x^{3+36 n+3 p} + 1287 a^8 b^4 x^{4+48 n+4 p} + 1716 a^7 b^5 x^{5+60 n+5 p} + 1716 a^6 b^6 x^{6+72 n+6 p} + 1287 a^5 b^7 x^{7+84 n+7 p} + 715 a^4 b^8 x^{8+96 n+8 p}\right)$$

Problem 349: Result more than twice size of optimal antiderivative.

$$\int x^{12} \left(a + b x^{13}\right)^{12} \, dx$$

Optimal (type 1, 16 leaves, 1 step):

$$\frac{\left(a + b x^{13}\right)^{13}}{169 b}$$

Result (type 1, 160 leaves):

$$\frac{a^{12} x^{13}}{13} + \frac{6}{13} a^{11} b x^{26} + \frac{22}{13} a^{10} b^2 x^{39} + \frac{55}{13} a^9 b^3 x^{52} + \frac{99}{13} a^8 b^4 x^{65} + \frac{132}{13} a^7 b^5 x^{78} + \frac{132}{13} a^6 b^6 x^{91} + \frac{99}{13} a^5 b^7 x^{104} + \frac{55}{13} a^4 b^8 x^{117} + \frac{22}{13} a^3 b^9 x^{130} + \frac{6}{13} a^2 b^{10} x^{143} + \frac{1}{13} a b^{11} x^{156} + \frac{b^{12} x^{169}}{169}$$

Problem 350: Result more than twice size of optimal antiderivative.

$$\int x^{12} \left(a x + b x^{26}\right)^{12} \, dx$$

Optimal (type 1, 16 leaves, 2 steps):

$$\frac{\left(a + b x^{25}\right)^{13}}{325 b}$$

Result (type 1, 160 leaves):

$$\frac{a^{12} x^{25}}{25} + \frac{6}{25} a^{11} b x^{50} + \frac{22}{25} a^{10} b^2 x^{75} + \frac{11}{5} a^9 b^3 x^{100} + \frac{99}{25} a^8 b^4 x^{125} + \frac{132}{25} a^7 b^5 x^{150} + \frac{132}{25} a^6 b^6 x^{175} + \frac{99}{25} a^5 b^7 x^{200} + \frac{11}{5} a^4 b^8 x^{225} + \frac{22}{25} a^3 b^9 x^{250} + \frac{6}{25} a^2 b^{10} x^{275} + \frac{1}{25} a b^{11} x^{300} + \frac{b^{12} x^{325}}{325}$$

Problem 351: Result more than twice size of optimal antiderivative.

$$\int x^{12}\left(a x^2+b x^{39}\right)^{12} dx$$

Optimal (type 1, 16 leaves, 2 steps):

$$\frac{\left(a+b x^{37}\right)^{13}}{481 b}$$

Result (type 1, 160 leaves):

$$\frac{a^{12} x^{37}}{37}+\frac{6}{37} a^{11} b x^{74}+\frac{22}{37} a^{10} b^2 x^{111}+\frac{55}{37} a^9 b^3 x^{148}+\frac{99}{37} a^8 b^4 x^{185}+\frac{132}{37} a^7 b^5 x^{222}+\frac{132}{37} a^6 b^6 x^{259}+\frac{99}{37} a^5 b^7 x^{296}+\frac{55}{37} a^4 b^8 x^{333}+\frac{22}{37} a^3 b^9 x^{370}+\frac{6}{37} a^2 b^{10} x^{407}+\frac{1}{37} a b^{11} x^{444}+\frac{b^{12} x^{481}}{481}$$

Problem 352: Result more than twice size of optimal antiderivative.

$$\int x^{24}\left(a+b x^{25}\right)^{12} dx$$

Optimal (type 1, 16 leaves, 1 step):

$$\frac{\left(a+b x^{25}\right)^{13}}{325 b}$$

Result (type 1, 160 leaves):

$$\frac{a^{12} x^{25}}{25}+\frac{6}{25} a^{11} b x^{50}+\frac{22}{25} a^{10} b^2 x^{75}+\frac{11}{5} a^9 b^3 x^{100}+\frac{99}{25} a^8 b^4 x^{125}+\frac{132}{25} a^7 b^5 x^{150}+\frac{132}{25} a^6 b^6 x^{175}+\frac{99}{25} a^5 b^7 x^{200}+\frac{11}{5} a^4 b^8 x^{225}+\frac{22}{25} a^3 b^9 x^{250}+\frac{6}{25} a^2 b^{10} x^{275}+\frac{1}{25} a b^{11} x^{300}+\frac{b^{12} x^{325}}{325}$$

Problem 353: Result more than twice size of optimal antiderivative.

$$\int x^{24}\left(a x+b x^{38}\right)^{12} dx$$

Optimal (type 1, 16 leaves, 2 steps):

$$\frac{\left(a+b x^{37}\right)^{13}}{481 b}$$

Result (type 1, 160 leaves):

$$\frac{a^{12} x^{37}}{37}+\frac{6}{37} a^{11} b x^{74}+\frac{22}{37} a^{10} b^2 x^{111}+\frac{55}{37} a^9 b^3 x^{148}+\frac{99}{37} a^8 b^4 x^{185}+\frac{132}{37} a^7 b^5 x^{222}+\frac{132}{37} a^6 b^6 x^{259}+\frac{99}{37} a^5 b^7 x^{296}+\frac{55}{37} a^4 b^8 x^{333}+\frac{22}{37} a^3 b^9 x^{370}+\frac{6}{37} a^2 b^{10} x^{407}+\frac{1}{37} a b^{11} x^{444}+\frac{b^{12} x^{481}}{481}$$

Problem 354: Result more than twice size of optimal antiderivative.

$$\int x^{36} \left(a+b x^{37}\right)^{12} dx$$

Optimal (type 1, 16 leaves, 1 step):

$$\frac{\left(a+b x^{37}\right)^{13}}{481 b}$$

Result (type 1, 160 leaves):

$$\frac{a^{12} x^{37}}{37}+\frac{6}{37} a^{11} b x^{74}+\frac{22}{37} a^{10} b^2 x^{111}+\frac{55}{37} a^9 b^3 x^{148}+\frac{99}{37} a^8 b^4 x^{185}+\frac{132}{37} a^7 b^5 x^{222}+\frac{132}{37} a^6 b^6 x^{259}+\frac{99}{37} a^5 b^7 x^{296}+\frac{55}{37} a^4 b^8 x^{333}+\frac{22}{37} a^3 b^9 x^{370}+\frac{6}{37} a^2 b^{10} x^{407}+\frac{1}{37} a b^{11} x^{444}+\frac{b^{12} x^{481}}{481}$$

Problem 378: Unable to integrate problem.

$$\int \sqrt{c x} \left(\frac{a}{x}+b x^n\right)^{3/2} dx$$

Optimal (type 3, 117 leaves, 5 steps):

$$\frac{2 a \sqrt{c x} \sqrt{\frac{a}{x}+b x^n}}{1+n}+\frac{2 (c x)^{3/2} \left(\frac{a}{x}+b x^n\right)^{3/2}}{3 c (1+n)}-\frac{2 a^{3/2} c \sqrt{x} \operatorname{ArcTanh}\left[\frac{\sqrt{a}}{\sqrt{x} \sqrt{\frac{a}{x}+b x^n}}\right]}{(1+n) \sqrt{c x}}$$

Result (type 8, 25 leaves):

$$\int \sqrt{c x} \left(\frac{a}{x}+b x^n\right)^{3/2} dx$$

Problem 380: Unable to integrate problem.

$$\int (c x)^{7/2} \left(\frac{a}{x^3}+b x^n\right)^{3/2} dx$$

Optimal (type 3, 122 leaves, 5 steps):

$$\frac{2 a c^2 (c x)^{3/2} \sqrt{\frac{a}{x^3}+b x^n}}{3+n}+\frac{2 (c x)^{9/2} \left(\frac{a}{x^3}+b x^n\right)^{3/2}}{3 c (3+n)}-\frac{2 a^{3/2} c^4 \sqrt{x} \operatorname{ArcTanh}\left[\frac{\sqrt{a}}{x^{3/2} \sqrt{\frac{a}{x^3}+b x^n}}\right]}{(3+n) \sqrt{c x}}$$

Result (type 8, 25 leaves):

$$\int (c x)^{7/2} \left(\frac{a}{x^3}+b x^n\right)^{3/2} dx$$

Problem 392: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 37 leaves, 2 steps):

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

Result (type 3, 78 leaves):

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

Problem 396: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{c^2\,x^2\,\sqrt{\frac{a}{x^2}+b\,x^n}}\,dx$$

Optimal (type 3, 40 leaves, 3 steps):

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

Result (type 3, 81 leaves):

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

Problem 409: Unable to integrate problem.

$$\int \frac{1}{\sqrt{\frac{a+b\,x^5}{x^3}}}\,dx$$

Optimal (type 3, 32 leaves, 3 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{b}\,x}{\sqrt{\frac{a}{x^3}+b\,x^2}}\right]}{5\,\sqrt{b}}$$

Result (type 8, 17 leaves):

$$\int \frac{1}{\sqrt{\frac{a+b\,x^5}{x^3}}}\,dx$$

Problem 410: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 37 leaves, 3 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{b}\,x}{\sqrt{b\,x^2+a\,x^{2-n}}}\right]}{\sqrt{b}\,n}$$

Result (type 3, 76 leaves):

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

Problem 413: Unable to integrate problem.

$$\int \frac{1}{\sqrt{\frac{a-b\,x^5}{x^3}}}\,dx$$

Optimal (type 3, 33 leaves, 3 steps):

$$\frac{2\,\text{ArcTan}\left[\frac{\sqrt{b}\,x}{\sqrt{\frac{a}{x^3}-b\,x^2}}\right]}{5\,\sqrt{b}}$$

Result (type 8, 18 leaves):

$$\int \frac{1}{\sqrt{\frac{a-b\,x^5}{x^3}}}\,dx$$

Problem 415: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 37 leaves, 3 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{b}\;x}{\sqrt{b\,x^2+a\,x^n}}\right]}{\sqrt{b}\;(2-n)}$$

Result (type 3, 78 leaves):

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

Problem 416: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 37 leaves, 3 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{b}\;x}{\sqrt{b\,x^2+a\,x^n}}\right]}{\sqrt{b}\;(2-n)}$$

Result (type 3, 78 leaves):

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

Problem 417: Result more than twice size of optimal antiderivative.

$$\int\frac{1}{\sqrt{x\,\left(b\,x+a\,x^{-1+n}\right)}}\,dx$$

Optimal (type 3, 37 leaves, 3 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{b}\;x}{\sqrt{b\,x^2+a\,x^n}}\right]}{\sqrt{b}\;(2-n)}$$

Result (type 3, 78 leaves):

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

Problem 418: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 38 leaves, 3 steps):

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

Result (type 3, 80 leaves):

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

Problem 419: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 38 leaves, 3 steps):

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

Result (type 3, 80 leaves):

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

Problem 420: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\sqrt{x\left(-b\,x+a\,x^{-1+n}\right)}}\,dx$$

Optimal (type 3, 38 leaves, 3 steps):

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

Result (type 3, 80 leaves):

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

Problem 421: Result more than twice size of optimal antiderivative.

$$\int (c\,x)^m\,\left(a\,x^j+b\,x^n\right)^{3/2}\,dx$$

Optimal (type 5, 107 leaves, 3 steps):

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

Result (type 5, 218 leaves):

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

Problem 437: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 988 leaves, 11 steps):

$$-\frac{45\,a^2\,\left(a+2\,b\,x^{1/3}\right)\,\left(-\frac{b\,\left(a\,x^{1/3}+b\,x^{2/3}\right)}{a^2}\right)^{1/3}}{14\times 2^{1/3}\,b^3\,\left(1-\sqrt{3}-2^{2/3}\,\left(-\frac{b\,\left(a+b\,x^{1/3}\right)\,x^{1/3}}{a^2}\right)^{1/3}\right)\,\left(a\,x^{1/3}+b\,x^{2/3}\right)^{1/3}}-\frac{45\,a\,\left(a+b\,x^{1/3}\right)\,x^{1/3}}{28\,b^2\,\left(a\,x^{1/3}+b\,x^{2/3}\right)^{1/3}}+$$

$$\frac{9\left(a+b\,x^{1/3}\right)x^{2/3}}{7\,b\left(a\,x^{1/3}+b\,x^{2/3}\right)^{1/3}}-\left(45\times 3^{1/4}\sqrt{2+\sqrt{3}}\;a^4\left(1-2^{2/3}\left(-\frac{b\left(a+b\,x^{1/3}\right)x^{1/3}}{a^2}\right)^{1/3}\right)\right.$$

$$\sqrt{\frac{1+2^{2/3}\left(-\frac{b\left(a+b\,x^{1/3}\right)x^{1/3}}{a^2}\right)^{1/3}+2\times 2^{1/3}\left(-\frac{b\left(a+b\,x^{1/3}\right)x^{1/3}}{a^2}\right)^{2/3}}{\left(1-\sqrt{3}-2^{2/3}\left(-\frac{b\left(a+b\,x^{1/3}\right)x^{1/3}}{a^2}\right)^{1/3}\right)^2}}\;\left(-\frac{b\left(a\,x^{1/3}+b\,x^{2/3}\right)}{a^2}\right)^{1/3}$$

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

$$\left(28\times 2^{1/3}\,b^3\sqrt{-\frac{1-2^{2/3}\left(-\frac{b\left(a+b\,x^{1/3}\right)x^{1/3}}{a^2}\right)^{1/3}}{\left(1-\sqrt{3}-2^{2/3}\left(-\frac{b\left(a+b\,x^{1/3}\right)x^{1/3}}{a^2}\right)^{1/3}\right)^2}}\;\left(a+2\,b\,x^{1/3}\right)\left(a\,x^{1/3}+b\,x^{2/3}\right)^{1/3}\right)+$$

$$\left(15\times 3^{3/4}\,a^4\left(1-2^{2/3}\left(-\frac{b\left(a+b\,x^{1/3}\right)x^{1/3}}{a^2}\right)^{1/3}\right)\right.$$

$$\sqrt{\frac{1+2^{2/3}\left(-\frac{b\left(a+b\,x^{1/3}\right)x^{1/3}}{a^2}\right)^{1/3}+2\times 2^{1/3}\left(-\frac{b\left(a+b\,x^{1/3}\right)x^{1/3}}{a^2}\right)^{2/3}}{\left(1-\sqrt{3}-2^{2/3}\left(-\frac{b\left(a+b\,x^{1/3}\right)x^{1/3}}{a^2}\right)^{1/3}\right)^2}}\;\left(-\frac{b\left(a\,x^{1/3}+b\,x^{2/3}\right)}{a^2}\right)^{1/3}$$

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

$$\left(7\times 2^{5/6}\, b^3 \sqrt{-\frac{1-2^{2/3}\left(-\frac{b\left(a+b x^{1/3}\right) x^{1/3}}{a^2}\right)^{1/3}}{\left(1-\sqrt{3}-2^{2/3}\left(-\frac{b\left(a+b x^{1/3}\right) x^{1/3}}{a^2}\right)^{1/3}\right)^2}}\;\left(a+2 b x^{1/3}\right)\left(a x^{1/3}+b x^{2/3}\right)^{1/3}\right)$$

Result (type 5, 99 leaves):

$$\left(9\left(-5 a^2 x^{1/3}-a b x^{2/3}+4 b^2 x+5 a^2\left(1+\frac{b x^{1/3}}{a}\right)^{1/3} x^{1/3}\, \text{Hypergeometric2F1}\left[\frac{1}{3},\frac{2}{3},\frac{5}{3},-\frac{b x^{1/3}}{a}\right]\right)\right)\Big/ \left(28 b^2\left(\left(a+b x^{1/3}\right) x^{1/3}\right)^{1/3}\right)$$

Problem 438: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 487 leaves, 9 steps):

$$-\frac{18 a\left(a+b x^{1/3}\right) x^{1/3}}{5 b^2\left(a x^{1/3}+b x^{2/3}\right)^{2/3}}+\frac{9\left(a+b x^{1/3}\right) x^{2/3}}{5 b\left(a x^{1/3}+b x^{2/3}\right)^{2/3}}+$$

$$\left(6\times 2^{1/3}\times 3^{3/4}\sqrt{2-\sqrt{3}}\; a^4\left(1-2^{2/3}\left(-\frac{b\left(a+b x^{1/3}\right) x^{1/3}}{a^2}\right)^{1/3}\right)\right.$$

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

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

$$\left(5 b^3\sqrt{-\frac{1-2^{2/3}\left(-\frac{b\left(a+b x^{1/3}\right) x^{1/3}}{a^2}\right)^{1/3}}{\left(1-\sqrt{3}-2^{2/3}\left(-\frac{b\left(a+b x^{1/3}\right) x^{1/3}}{a^2}\right)^{1/3}\right)^2}}\;\left(a+2 b x^{1/3}\right)\left(a x^{1/3}+b x^{2/3}\right)^{2/3}\right)$$

Result (type 5, 98 leaves):

$$\left(9 \left(-2 a^2 x^{1/3} - a b x^{2/3} + b^2 x + 2 a^2 \left(1 + \frac{b x^{1/3}}{a}\right)^{2/3} x^{1/3} \text{Hypergeometric2F1}\left[\frac{1}{3}, \frac{2}{3}, \frac{4}{3}, -\frac{b x^{1/3}}{a}\right]\right)\right) \Big/ \left(5 b^2 \left(\left(a + b x^{1/3}\right) x^{1/3}\right)^{2/3}\right)$$

Problem 453: Result more than twice size of optimal antiderivative.

$$\int x^{-1+n-p (1+q)} \left(a x^n + b x^p\right)^q \, dx$$

Optimal (type 3, 39 leaves, 1 step):

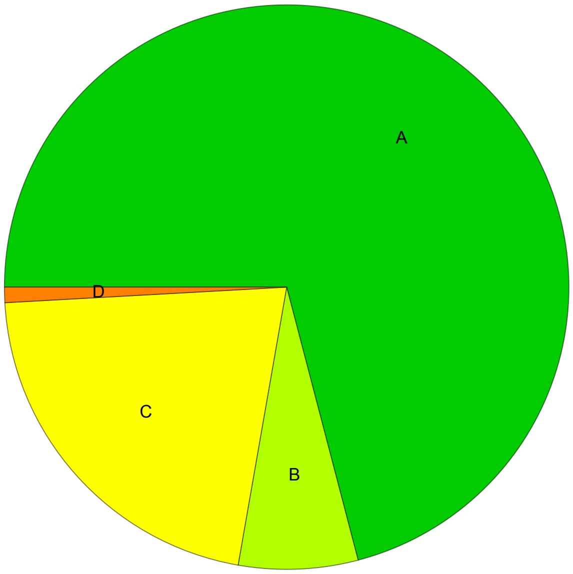
$$\frac{x^{-p (1+q)} \left(a x^n + b x^p\right)^{1+q}}{a (n-p) (1+q)}$$

Result (type 3, 100 leaves):

$$\frac{1}{a (n-p) (1+q)} x^{-p (1+q)} \left(1 + \frac{a x^{n-p}}{b}\right)^{-q} \left(a x^n + b x^p\right)^q \left(a x^n \left(1 + \frac{a x^{n-p}}{b}\right)^q + b x^p \left(-1 + \left(1 + \frac{a x^{n-p}}{b}\right)^q\right)\right)$$

Summary of Integration Test Results

454 integration problems



A - 322 optimal antiderivatives

B - 31 more than twice size of optimal antiderivatives

C - 97 unnecessarily complex antiderivatives

D - 4 unable to integrate problems

E - 0 integration timeouts