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                    Maple 2018.2 Integration Test Results
          on the problems in "1 Algebraic functions/1.2 Trinomial products/1.2.4 Improper"
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Test results for the 40 problems in "1.2.4.2 (d x)^m (a x^q+b x^n+c x^(2 n-q))^p.txt"
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Problem 9: Result more than twice size of optimal antiderivative.
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$$\int \frac{x^8}{\left(c x^4+b x^3+a x^2\right)^2}\, dx$$

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Optimal(type 3, 146 leaves, 8 steps):
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$$\frac{2\left(-3 a c+b^2\right) x}{c^2\left(-4 a c+b^2\right)}-\frac{b x^2}{c\left(-4 a c+b^2\right)}+\frac{x^3(b x+2 a)}{\left(-4 a c+b^2\right)\left(c x^2+b x+a\right)}-\frac{2\left(6 a^2 c^2-6 a b^2 c+b^4\right) \operatorname{arctanh}\left(\frac{2 c x+b}{\sqrt{-4 a c+b^2}}\right)}{c^3\left(-4 a c+b^2\right)^{3/2}}-\frac{b \ln\left(c x^2+b x+a\right)}{c^3}$$

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Result(type 3, 568 leaves):
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$$\frac{x}{c^2}+\frac{2 x a^2}{c\left(c x^2+b x+a\right)\left(4 a c-b^2\right)}-\frac{4 x a b^2}{c^2\left(c x^2+b x+a\right)\left(4 a c-b^2\right)}+\frac{x b^4}{c^3\left(c x^2+b x+a\right)\left(4 a c-b^2\right)}-\frac{3 b a^2}{c^2\left(c x^2+b x+a\right)\left(4 a c-b^2\right)}$$
$$+\frac{b^3 a}{c^3\left(c x^2+b x+a\right)\left(4 a c-b^2\right)}-\frac{4 \ln\left(\left(4 a c-b^2\right)\left(c x^2+b x+a\right)\right) a b}{c^2\left(4 a c-b^2\right)}+\frac{\ln\left(\left(4 a c-b^2\right)\left(c x^2+b x+a\right)\right) b^3}{c^3\left(4 a c-b^2\right)}$$
$$-\frac{12 \arctan\left(\frac{2\left(4 a c-b^2\right) c x+\left(4 a c-b^2\right) b}{\sqrt{64 a^3 c^3-48 a^2 b^2 c^2+12 a b^4 c-b^6}}\right) a^2}{c \sqrt{64 a^3 c^3-48 a^2 b^2 c^2+12 a b^4 c-b^6}}+\frac{12 \arctan\left(\frac{2\left(4 a c-b^2\right) c x+\left(4 a c-b^2\right) b}{\sqrt{64 a^3 c^3-48 a^2 b^2 c^2+12 a b^4 c-b^6}}\right) b^2 a}{c^2 \sqrt{64 a^3 c^3-48 a^2 b^2 c^2+12 a b^4 c-b^6}}$$
$$-\frac{2 \arctan\left(\frac{2\left(4 a c-b^2\right) c x+\left(4 a c-b^2\right) b}{\sqrt{64 a^3 c^3-48 a^2 b^2 c^2+12 a b^4 c-b^6}}\right) b^4}{c^3 \sqrt{64 a^3 c^3-48 a^2 b^2 c^2+12 a b^4 c-b^6}}$$

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Problem 12: Result more than twice size of optimal antiderivative.
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$$\int \frac{\sqrt{c x^4+b x^3+a x^2}}{x^4}\, dx$$

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Optimal(type 3, 96 leaves, 5 steps):
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$$\frac{\left(-4 a c+b^2\right) \operatorname{arctanh}\left(\frac{x(b x+2 a)}{2 \sqrt{a}\, \sqrt{c x^4+b x^3+a x^2}}\right)}{8 a^{3/2}}-\frac{\sqrt{c x^4+b x^3+a x^2}}{2 x^3}-\frac{b \sqrt{c x^4+b x^3+a x^2}}{4 a x^2}$$

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Result(type 3, 206 leaves):
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$$-\frac{1}{8x^3\sqrt{cx^2+bx+a}\,a^2}\Bigg(\sqrt{cx^4+bx^3+ax^2}\,\Bigg(4a^{3/2}c\ln\left(\frac{2a+bx+2\sqrt{a}\sqrt{cx^2+bx+a}}{x}\right)x^2+2c\sqrt{cx^2+bx+a}\,x^3b$$
$$-\sqrt{a}\ln\left(\frac{2a+bx+2\sqrt{a}\sqrt{cx^2+bx+a}}{x}\right)x^2b^2-4c\sqrt{cx^2+bx+a}\,x^2a-2\left(cx^2+bx+a\right)^{3/2}xb+2\sqrt{cx^2+bx+a}\,x^2b^2+4\left(cx^2+bx\right.$$
$$\left.+a\right)^{3/2}a\Bigg)\Bigg)$$

Problem 16: Result more than twice size of optimal antiderivative.

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

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

$$-\frac{\left(cx^4+bx^3+ax^2\right)^{3/2}}{4x^7}-\frac{3\left(-4ac+b^2\right)^2\operatorname{arctanh}\left(\frac{x\left(bx+2a\right)}{2\sqrt{a}\sqrt{cx^4+bx^3+ax^2}}\right)}{128a^{5/2}}-\frac{\left(-12ac+b^2\right)\sqrt{cx^4+bx^3+ax^2}}{32ax^3}$$
$$+\frac{b\left(-20ac+3b^2\right)\sqrt{cx^4+bx^3+ax^2}}{64a^2x^2}-\frac{\left(6cx+b\right)\sqrt{cx^4+bx^3+ax^2}}{8x^4}$$

Result(type 3, 500 leaves):

$$-\frac{1}{128x^7\left(cx^2+bx+a\right)^{3/2}a^4}\Bigg(\left(cx^4+bx^3+ax^2\right)^{3/2}\Bigg(48a^{7/2}c^2\ln\left(\frac{2a+bx+2\sqrt{a}\sqrt{cx^2+bx+a}}{x}\right)x^4$$
$$-24a^{5/2}c\ln\left(\frac{2a+bx+2\sqrt{a}\sqrt{cx^2+bx+a}}{x}\right)x^4b^2+24c^2\left(cx^2+bx+a\right)^{3/2}x^5ab-16c^2\left(cx^2+bx+a\right)^{3/2}x^4a^2+24c^2\sqrt{cx^2+bx+a}\,x^5a^2b$$
$$-2c\left(cx^2+bx+a\right)^{3/2}x^5b^3+3a^{3/2}\ln\left(\frac{2a+bx+2\sqrt{a}\sqrt{cx^2+bx+a}}{x}\right)x^4b^4-48c^2\sqrt{cx^2+bx+a}\,x^4a^3-24c\left(cx^2+bx+a\right)^{5/2}x^3ab$$
$$+20c\left(cx^2+bx+a\right)^{3/2}x^4ab^2-6c\sqrt{cx^2+bx+a}\,x^5ab^3+16c\left(cx^2+bx+a\right)^{5/2}x^2a^2+36c\sqrt{cx^2+bx+a}\,x^4a^2b^2+2\left(cx^2+bx+a\right)^{5/2}x^3b^3$$
$$-2\left(cx^2+bx+a\right)^{3/2}x^4b^4+4\left(cx^2+bx+a\right)^{5/2}x^2ab^2-6\sqrt{cx^2+bx+a}\,x^4ab^4-16\left(cx^2+bx+a\right)^{5/2}xa^2b+32\left(cx^2+bx+a\right)^{5/2}a^3\Bigg)\Bigg)$$

Problem 21: Result more than twice size of optimal antiderivative.

$$\int x^m\left(cx^5+bx^3+ax\right)dx$$

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

$$\frac{a x^{2+m}}{2+m}+\frac{b x^{4+m}}{4+m}+\frac{c x^{6+m}}{6+m}$$

Result(type 3, 76 leaves):

$$\frac{x^{2+m}\left(c m^2 x^4+6 c m x^4+b m^2 x^2+8 c x^4+8 b m x^2+a m^2+12 b x^2+10 a m+24 a\right)}{(6+m)(4+m)(2+m)}$$

Problem 25: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 144 leaves, 5 steps):

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

Result(type 3, 342 leaves):

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

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

$$\int \frac{x^9}{\left(c x^5+b x^3+a x\right)^2}\, dx$$

Optimal(type 3, 120 leaves, 8 steps):

$$-\frac{b x^2}{2 c\left(-4 a c+b^2\right)}+\frac{x^4\left(b x^2+2 a\right)}{2\left(-4 a c+b^2\right)\left(c x^4+b x^2+a\right)}+\frac{b\left(-6 a c+b^2\right)\mathrm{arctanh}\left(\frac{2 c x^2+b}{\sqrt{-4 a c+b^2}}\right)}{2 c^2\left(-4 a c+b^2\right)^{3/2}}+\frac{\ln\left(c x^4+b x^2+a\right)}{4 c^2}$$

Result(type 3, 341 leaves):

$$\frac{\frac{b\left(3ac-b^2\right)x^2}{c^2\left(4ac-b^2\right)}+\frac{a\left(2ac-b^2\right)}{\left(4ac-b^2\right)c^2}}{2\left(cx^4+bx^2+a\right)}+\frac{\ln\left(\left(4ac-b^2\right)c\left(cx^4+bx^2+a\right)\right)}{4c^2}-\frac{3\arctan\left(\frac{2c^2\left(4ac-b^2\right)x^2+\left(4ac-b^2\right)cb}{\sqrt{64a^3c^5-48a^2b^2c^4+12ab^4c^3-b^6c^2}}\right)ba}{\sqrt{64a^3c^5-48a^2b^2c^4+12ab^4c^3-b^6c^2}}$$

$$+\frac{\arctan\left(\frac{2c^2\left(4ac-b^2\right)x^2+\left(4ac-b^2\right)cb}{\sqrt{64a^3c^5-48a^2b^2c^4+12ab^4c^3-b^6c^2}}\right)b^3}{2\sqrt{64a^3c^5-48a^2b^2c^4+12ab^4c^3-b^6c^2}\,c}$$

Problem 27: Result more than twice size of optimal antiderivative.

$$\int\frac{x^8}{\left(cx^5+bx^3+ax\right)^2}\,dx$$

Optimal(type 3, 227 leaves, 6 steps):

$$-\frac{bx}{2c\left(-4ac+b^2\right)}+\frac{x^3\left(bx^2+2a\right)}{2\left(-4ac+b^2\right)\left(cx^4+bx^2+a\right)}+\frac{\arctan\left(\frac{x\sqrt{2}\sqrt{c}}{\sqrt{b-\sqrt{-4ac+b^2}}}\right)\left(b^2-6ac-\frac{b\left(-8ac+b^2\right)}{\sqrt{-4ac+b^2}}\right)\sqrt{2}}{4c^{3/2}\left(-4ac+b^2\right)\sqrt{b-\sqrt{-4ac+b^2}}}$$

$$+\frac{\arctan\left(\frac{x\sqrt{2}\sqrt{c}}{\sqrt{b+\sqrt{-4ac+b^2}}}\right)\left(b^2-6ac+\frac{b\left(-8ac+b^2\right)}{\sqrt{-4ac+b^2}}\right)\sqrt{2}}{4c^{3/2}\left(-4ac+b^2\right)\sqrt{b+\sqrt{-4ac+b^2}}}$$

Result(type ?, 2157 leaves): Display of huge result suppressed!

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

$$\int\frac{1}{\left(cx^5+bx^3+ax\right)^2}\,dx$$

Optimal(type 3, 260 leaves, 6 steps):

$$\frac{10ac-3b^2}{2a^2\left(-4ac+b^2\right)x}+\frac{bcx^2-2ac+b^2}{2a\left(-4ac+b^2\right)x\left(cx^4+bx^2+a\right)}-\frac{\arctan\left(\frac{x\sqrt{2}\sqrt{c}}{\sqrt{b-\sqrt{-4ac+b^2}}}\right)\sqrt{c}\left(3b^3-16abc+\left(-10ac+3b^2\right)\sqrt{-4ac+b^2}\right)\sqrt{2}}{4a^2\left(-4ac+b^2\right)^{3/2}\sqrt{b-\sqrt{-4ac+b^2}}}$$

$$+\frac{\arctan\left(\frac{x\sqrt{2}\sqrt{c}}{\sqrt{b+\sqrt{-4ac+b^2}}}\right)\sqrt{c}\left(3b^3-16abc-\left(-10ac+3b^2\right)\sqrt{-4ac+b^2}\right)\sqrt{2}}{4a^2\left(-4ac+b^2\right)^{3/2}\sqrt{b+\sqrt{-4ac+b^2}}}$$

Result(type ?, 2011 leaves): Display of huge result suppressed!

Problem 29: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 155 leaves, 9 steps):

$$\frac{3 a c-b^2}{a^2\left(-4 a c+b^2\right) x^2}+\frac{b c x^2-2 a c+b^2}{2 a\left(-4 a c+b^2\right) x^2\left(c x^4+b x^2+a\right)}-\frac{\left(6 a^2 c^2-6 a b^2 c+b^4\right) \operatorname{arctanh}\left(\frac{2 c x^2+b}{\sqrt{-4 a c+b^2}}\right)}{a^3\left(-4 a c+b^2\right)^{3/2}}-\frac{2 b \ln (x)}{a^3}+\frac{b \ln \left(c x^4+b x^2+a\right)}{2 a^3}$$

Result(type 3, 568 leaves):

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

$$+\frac{2 c \ln \left(\left(4 a c-b^2\right)\left(c x^4+b x^2+a\right)\right) b}{a^2\left(4 a c-b^2\right)}-\frac{\ln \left(\left(4 a c-b^2\right)\left(c x^4+b x^2+a\right)\right) b^3}{2 a^3\left(4 a c-b^2\right)}-\frac{6 \arctan\left(\frac{2\left(4 a c-b^2\right) c x^2+\left(4 a c-b^2\right) b}{\sqrt{64 a^3 c^3-48 a^2 b^2 c^2+12 a b^4 c-b^6}}\right) c^2}{a \sqrt{64 a^3 c^3-48 a^2 b^2 c^2+12 a b^4 c-b^6}}$$

$$+\frac{6 \arctan\left(\frac{2\left(4 a c-b^2\right) c x^2+\left(4 a c-b^2\right) b}{\sqrt{64 a^3 c^3-48 a^2 b^2 c^2+12 a b^4 c-b^6}}\right) b^2 c}{a^2 \sqrt{64 a^3 c^3-48 a^2 b^2 c^2+12 a b^4 c-b^6}}-\frac{\arctan\left(\frac{2\left(4 a c-b^2\right) c x^2+\left(4 a c-b^2\right) b}{\sqrt{64 a^3 c^3-48 a^2 b^2 c^2+12 a b^4 c-b^6}}\right) b^4}{a^3 \sqrt{64 a^3 c^3-48 a^2 b^2 c^2+12 a b^4 c-b^6}}-\frac{1}{2 a^2 x^2}-\frac{2 b \ln (x)}{a^3}$$

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

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

Optimal(type 3, 311 leaves, 7 steps):

$$\frac{14 a c-5 b^2}{6 a^2\left(-4 a c+b^2\right) x^3}+\frac{b\left(-19 a c+5 b^2\right)}{2 a^3\left(-4 a c+b^2\right) x}+\frac{b c x^2-2 a c+b^2}{2 a\left(-4 a c+b^2\right) x^3\left(c x^4+b x^2+a\right)}$$

$$+\frac{\arctan\left(\frac{x \sqrt{2} \sqrt{c}}{\sqrt{b-\sqrt{-4 a c+b^2}}}\right) \sqrt{c}\left(5 b^4-29 a b^2 c+28 a^2 c^2+b\left(-19 a c+5 b^2\right) \sqrt{-4 a c+b^2}\right) \sqrt{2}}{4 a^3\left(-4 a c+b^2\right)^{3/2} \sqrt{b-\sqrt{-4 a c+b^2}}}$$

$$-\frac{\arctan\left(\frac{x \sqrt{2} \sqrt{c}}{\sqrt{b+\sqrt{-4 a c+b^2}}}\right) \sqrt{c}\left(5 b^4-29 a b^2 c+28 a^2 c^2-b\left(-19 a c+5 b^2\right) \sqrt{-4 a c+b^2}\right) \sqrt{2}}{4 a^3\left(-4 a c+b^2\right)^{3/2} \sqrt{b+\sqrt{-4 a c+b^2}}}$$

Result(type ?, 2348 leaves): Display of huge result suppressed!

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

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

Optimal(type 3, 87 leaves, 3 steps):

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

Result(type 3, 178 leaves):

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

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

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

Optimal(type 4, 454 leaves, 6 steps):

$$\frac{2\left(-3 a c+b^2\right) x^{3/2}\left(c x^4+b x^2+a\right)\sqrt{c}}{a^2\left(-4 a c+b^2\right)\left(\sqrt{a}+x^2\sqrt{c}\right)\sqrt{c x^5+b x^3+a x}}+\frac{b c x^2-2 a c+b^2}{a\left(-4 a c+b^2\right)\sqrt{x}\,\sqrt{c x^5+b x^3+a x}}-\frac{2\left(-3 a c+b^2\right)\sqrt{c x^5+b x^3+a x}}{a^2\left(-4 a c+b^2\right) x^{3/2}}$$
$$-\frac{2 c^{1/4}\left(-3 a c+b^2\right)\sqrt{\cos\left(2\arctan\left(\frac{c^{1/4} x}{a^{1/4}}\right)\right)^2}\operatorname{EllipticE}\left(\sin\left(2\arctan\left(\frac{c^{1/4} x}{a^{1/4}}\right)\right),\frac{\sqrt{2-\frac{b}{\sqrt{a}\,\sqrt{c}}}}{2}\right)\left(\sqrt{a}+x^2\sqrt{c}\right)\sqrt{x}\,\sqrt{\frac{c x^4+b x^2+a}{\left(\sqrt{a}+x^2\sqrt{c}\right)^2}}}{\cos\left(2\arctan\left(\frac{c^{1/4} x}{a^{1/4}}\right)\right) a^{7/4}\left(-4 a c+b^2\right)\sqrt{c x^5+b x^3+a x}}$$
$$+\frac{1}{2\cos\left(2\arctan\left(\frac{c^{1/4} x}{a^{1/4}}\right)\right) a^{7/4}\left(-4 a c+b^2\right)\sqrt{c x^5+b x^3+a x}}\left(c^{1/4}\sqrt{\cos\left(2\arctan\left(\frac{c^{1/4} x}{a^{1/4}}\right)\right)^2}\operatorname{EllipticF}\left(\sin\left(2\arctan\left(\frac{c^{1/4} x}{a^{1/4}}\right)\right),\right.\right.$$
$$\left.\left.\frac{\sqrt{2-\frac{b}{\sqrt{a}\,\sqrt{c}}}}{2}\right)\left(\sqrt{a}+x^2\sqrt{c}\right)\left(2 b^2-6 a c+b\sqrt{a}\,\sqrt{c}\right)\sqrt{x}\,\sqrt{\frac{c x^4+b x^2+a}{\left(\sqrt{a}+x^2\sqrt{c}\right)^2}}\right)$$

Result(type 4, 1135 leaves):

$$
-\Bigg(\sqrt{x\,(c\,x^4+b\,x^2+a)}\,\Bigg(12\sqrt{-4\,a\,c+b^2}\,\sqrt{\frac{-b+\sqrt{-4\,a\,c+b^2}}{a}}\;x^4\,a\,c^2-4\sqrt{-4\,a\,c+b^2}\,\sqrt{\frac{-b+\sqrt{-4\,a\,c+b^2}}{a}}\;x^4\,b^2\,c
$$

$$
+12\sqrt{\frac{-b+\sqrt{-4\,a\,c+b^2}}{a}}\;x^4\,a\,b\,c^2-4\sqrt{\frac{-b+\sqrt{-4\,a\,c+b^2}}{a}}\;x^4\,b^3\,c
$$

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

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

$$
+12\sqrt{-\frac{2\left(x^2\sqrt{-4\,a\,c+b^2}-b\,x^2-2\,a\right)}{a}}\,\sqrt{\frac{x^2\sqrt{-4\,a\,c+b^2}+b\,x^2+2\,a}{a}}\;\mathrm{EllipticF}\left(\frac{x\sqrt{2}\,\sqrt{\frac{-b+\sqrt{-4\,a\,c+b^2}}{a}}}{2},\right.
$$

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

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

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

$$
-12\sqrt{-\frac{2\left(x^2\sqrt{-4\,a\,c+b^2}-b\,x^2-2\,a\right)}{a}}\,\sqrt{\frac{x^2\sqrt{-4\,a\,c+b^2}+b\,x^2+2\,a}{a}}\;\mathrm{EllipticE}\left(\frac{x\sqrt{2}\,\sqrt{\frac{-b+\sqrt{-4\,a\,c+b^2}}{a}}}{2},\right.
$$

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

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

$$\left.\frac{\sqrt{2}\sqrt{\frac{b\sqrt{-4ac+b^2}-2ac+b^2}{ac}}}{2}\right) x a b^2 c + 14\sqrt{-4ac+b^2}\sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}}\, x^2 a b c - 4\sqrt{-4ac+b^2}\sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}}\, x^2 b^3$$

$$+ 14\sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}}\, x^2 a b^2 c - 4\sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}}\, x^2 b^4 + 8\sqrt{-4ac+b^2}\sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}}\, a^2 c$$

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

$$\left.\left.- b^2\right) a^2 \sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}} \left(b + \sqrt{-4ac+b^2}\right)\right)$$

Problem 36: Unable to integrate problem.

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

Optimal(type 6, 239 leaves, 7 steps):

$$\frac{2 d x^2\, AppellF1\left(\frac{3}{4}, \frac{1}{2}, \frac{1}{2}, \frac{7}{4}, -\frac{2x^2 c}{b-\sqrt{-4ac+b^2}}, -\frac{2x^2 c}{b+\sqrt{-4ac+b^2}}\right)\sqrt{1+\frac{2x^2 c}{b-\sqrt{-4ac+b^2}}}\sqrt{1+\frac{2x^2 c}{b+\sqrt{-4ac+b^2}}}}{3\sqrt{c x^5 + b x^3 + a x}}$$

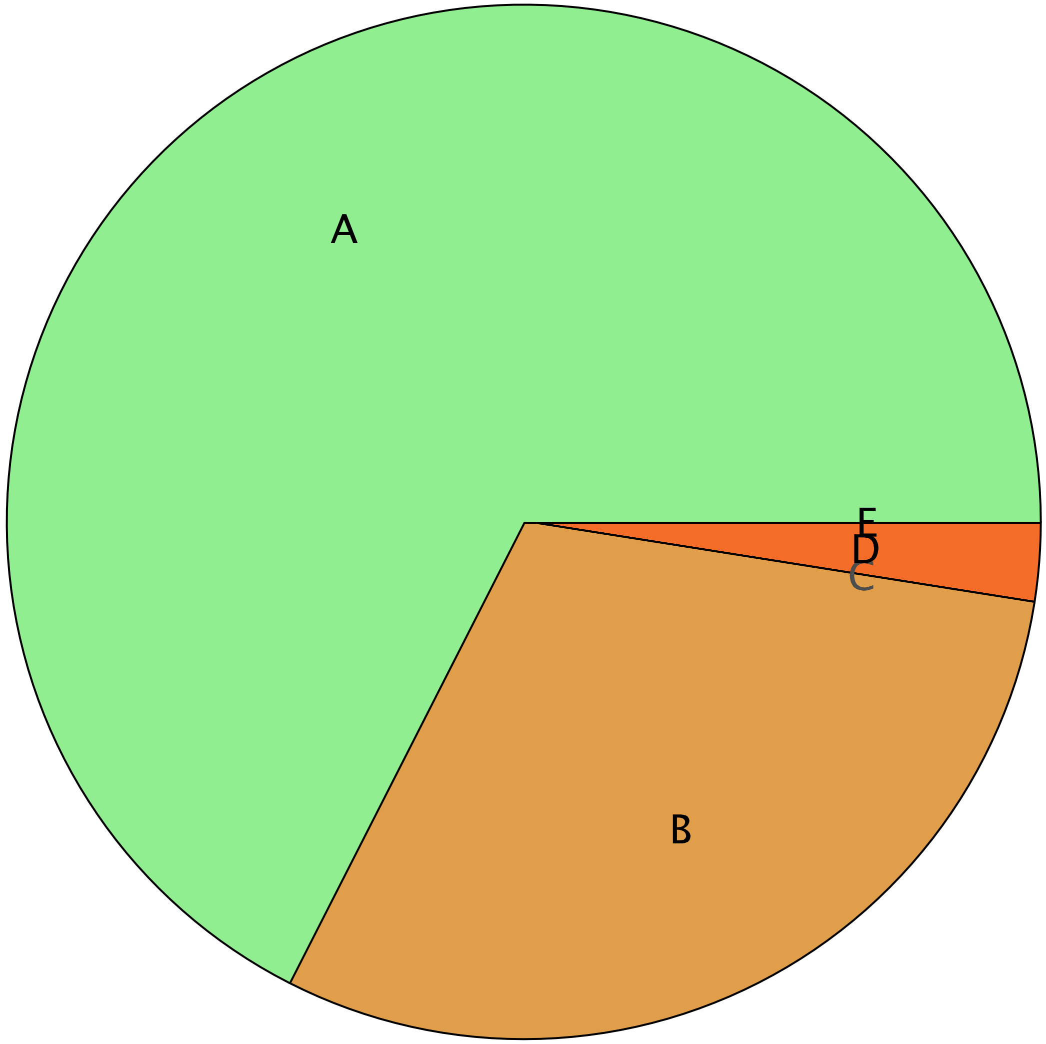
$$+ \frac{2 e x^4\, AppellF1\left(\frac{7}{4}, \frac{1}{2}, \frac{1}{2}, \frac{11}{4}, -\frac{2x^2 c}{b-\sqrt{-4ac+b^2}}, -\frac{2x^2 c}{b+\sqrt{-4ac+b^2}}\right)\sqrt{1+\frac{2x^2 c}{b-\sqrt{-4ac+b^2}}}\sqrt{1+\frac{2x^2 c}{b+\sqrt{-4ac+b^2}}}}{7\sqrt{c x^5 + b x^3 + a x}}$$

Result(type 8, 27 leaves):

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

Summary of Integration Test Results

40 integration problems



A - 27 optimal antiderivatives
B - 12 more than twice size of optimal antiderivatives
C - 0 unnecessarily complex antiderivatives
D - 1 unable to integrate problems
E - 0 integration timeouts