Maple 2018.2 Integration Test Results
on the problems in "4 Trig functions/4.7 Miscellaneous"

Test results for the 69 problems in "4.7.1 (c trig)^m (d trig)^n.txt"

Problem 1: Result more than twice size of optimal antiderivative.

$$\int \sin(b x + a) \sin(2 b x + 2 a)^7 \, dx$$

Optimal(type 3, 53 leaves, 4 steps):

$$\frac{128 \sin(b x + a)^9}{9 b} - \frac{384 \sin(b x + a)^{11}}{11 b} + \frac{384 \sin(b x + a)^{13}}{13 b} - \frac{128 \sin(b x + a)^{15}}{15 b}$$

Result(type 3, 110 leaves):

$$\frac{35 \sin(b x + a)}{128 b} - \frac{35 \sin(3 b x + 3 a)}{384 b} - \frac{21 \sin(5 b x + 5 a)}{640 b} + \frac{3 \sin(7 b x + 7 a)}{128 b} + \frac{7 \sin(9 b x + 9 a)}{1152 b} - \frac{7 \sin(11 b x + 11 a)}{1408 b} - \frac{\sin(13 b x + 13 a)}{1664 b} + \frac{\sin(15 b x + 15 a)}{1920 b}$$

Problem 2: Result more than twice size of optimal antiderivative.

$$\int \sin(b x + a) \sin(2 b x + 2 a)^5 \, dx$$

Optimal(type 3, 40 leaves, 4 steps):

$$\frac{32 \sin(b x + a)^7}{7 b} - \frac{64 \sin(b x + a)^9}{9 b} + \frac{32 \sin(b x + a)^{11}}{11 b}$$

Result(type 3, 82 leaves):

$$\frac{5 \sin(b x + a)}{16 b} - \frac{5 \sin(3 b x + 3 a)}{48 b} - \frac{\sin(5 b x + 5 a)}{32 b} + \frac{5 \sin(7 b x + 7 a)}{224 b} + \frac{\sin(9 b x + 9 a)}{288 b} - \frac{\sin(11 b x + 11 a)}{352 b}$$

Problem 5: Result more than twice size of optimal antiderivative.

$$\int \sin(b x + a)^2 \sin(2 b x + 2 a)^3 \, dx$$

Optimal(type 3, 27 leaves, 4 steps):

$$\frac{4 \sin(b x + a)^6}{3 b} - \frac{\sin(b x + a)^8}{b}$$

Result(type 3, 57 leaves):

$$-\frac{3 \cos(2 b x + 2 a)}{16 b} + \frac{\cos(4 b x + 4 a)}{32 b} + \frac{\cos(6 b x + 6 a)}{48 b} - \frac{\cos(8 b x + 8 a)}{128 b}$$

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

$$\int \sin(bx+a)^2 \sin(2bx+2a)\, dx$$

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

$$\frac{\sin(bx+a)^4}{2b}$$

Result(type 3, 29 leaves):

$$-\frac{\cos(2bx+2a)}{4b} + \frac{\cos(4bx+4a)}{16b}$$

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

$$\int \sin(bx+a)^3 \sin(2bx+2a)^5\, dx$$

Optimal(type 3, 40 leaves, 4 steps):

$$\frac{32\sin(bx+a)^9}{9b} - \frac{64\sin(bx+a)^{11}}{11b} + \frac{32\sin(bx+a)^{13}}{13b}$$

Result(type 3, 96 leaves):

$$\frac{5\sin(bx+a)}{32b} - \frac{25\sin(3bx+3a)}{384b} - \frac{\sin(5bx+5a)}{128b} + \frac{\sin(7bx+7a)}{64b} - \frac{\sin(9bx+9a)}{576b} - \frac{3\sin(11bx+11a)}{1408b} + \frac{\sin(13bx+13a)}{1664b}$$

Problem 24: Attempted integration timed out after 120 seconds.

$$\int \frac{\sin(bx+a)}{\sin(2bx+2a)^{9/2}}\, dx$$

Optimal(type 3, 89 leaves, 4 steps):

$$\frac{\sin(bx+a)}{7b\sin(2bx+2a)^{7/2}} - \frac{6\cos(bx+a)}{35b\sin(2bx+2a)^{5/2}} + \frac{8\sin(bx+a)}{35b\sin(2bx+2a)^{3/2}} - \frac{16\cos(bx+a)}{35b\sqrt{\sin(2bx+2a)}}$$

Result(type 1, 1 leaves):???

Problem 25: Attempted integration timed out after 120 seconds.

$$\int \sin(bx+a)^2 \sin(2bx+2a)^{7/2}\, dx$$

Optimal(type 4, 109 leaves, 4 steps):

$$-\frac{5\sqrt{\sin\left(a+\frac{\pi}{4}+bx\right)^2}\,\mathrm{EllipticF}\left(\cos\left(a+\frac{\pi}{4}+bx\right),\sqrt{2}\right)}{42\sin\left(a+\frac{\pi}{4}+bx\right)b} - \frac{\cos(2bx+2a)\sin(2bx+2a)^{5/2}}{14b} - \frac{\sin(2bx+2a)^{9/2}}{18b}$$

$$-\frac{5\cos(2bx+2a)\sqrt{\sin(2bx+2a)}}{42b}$$

Result(type 1, 1 leaves):???

Problem 26: Humongous result has more than 20000 leaves.

$$\int \frac{\sin(bx+a)^3}{\sqrt{\sin(2bx+2a)}}\,dx$$

Optimal(type 3, 74 leaves, 2 steps):

$$-\frac{3\arcsin(\cos(bx+a)-\sin(bx+a))}{8b}-\frac{3\ln\left(\cos(bx+a)+\sin(bx+a)+\sqrt{\sin(2bx+2a)}\right)}{8b}-\frac{\sin(bx+a)\sqrt{\sin(2bx+2a)}}{4b}$$

Result(type ?, 155738893 leaves): Display of huge result suppressed!

Problem 27: Humongous result has more than 20000 leaves.

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

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

$$\frac{\arcsin(\cos(bx+a)-\sin(bx+a))}{4b}-\frac{\ln\left(\cos(bx+a)+\sin(bx+a)+\sqrt{\sin(2bx+2a)}\right)}{4b}+\frac{\sin(bx+a)}{b\sqrt{\sin(2bx+2a)}}$$

Result(type ?, 149376344 leaves): Display of huge result suppressed!

Problem 28: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \csc(bx+a)\sqrt{\sin(2bx+2a)}\,dx$$

Optimal(type 3, 51 leaves, 2 steps):

$$-\frac{\arcsin(\cos(bx+a)-\sin(bx+a))}{b}+\frac{\ln\left(\cos(bx+a)+\sin(bx+a)+\sqrt{\sin(2bx+2a)}\right)}{b}$$

Result(type 4, 156 leaves):

$$\left(2\sqrt{-\frac{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2-1}}\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2-1\right)\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1}\sqrt{-2\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+2}\sqrt{-\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}\,\mathrm{EllipticF}\left(\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1},\frac{\sqrt{2}}{2}\right)\right)\Bigg/\left(b\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2-1\right)\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^3-\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}\right)$$

Problem 29: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\csc(b x+a)}{\sqrt{\sin(2 b x+2 a)}}\, dx$$

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

$$-\frac{\csc(b x+a)\sqrt{\sin(2 b x+2 a)}}{b}$$

Result(type 4, 307 leaves):

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

Problem 30: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal(type 3, 45 leaves, 3 steps):

$$-\frac{2\cos(b x+a)}{3 b\sin(2 b x+2 a)^{3/2}}+\frac{4\sin(b x+a)}{3 b\sqrt{\sin(2 b x+2 a)}}$$

Result(type 4, 193 leaves):

$$-\left(\sqrt{-\frac{\tan\left(\frac{b x}{2}+\frac{a}{2}\right)}{\tan\left(\frac{b x}{2}+\frac{a}{2}\right)^2-1}}\left(\tan\left(\frac{b x}{2}+\frac{a}{2}\right)^2\right.\right.$$
$$\left.-1\right)\left(2\sqrt{\tan\left(\frac{b x}{2}+\frac{a}{2}\right)+1}\sqrt{-2\tan\left(\frac{b x}{2}+\frac{a}{2}\right)+2}\sqrt{-\tan\left(\frac{b x}{2}+\frac{a}{2}\right)}\operatorname{EllipticF}\left(\sqrt{\tan\left(\frac{b x}{2}+\frac{a}{2}\right)+1},\frac{\sqrt{2}}{2}\right)\tan\left(\frac{b x}{2}+\frac{a}{2}\right)\right.$$
$$\left.\left.-\tan\left(\frac{b x}{2}+\frac{a}{2}\right)^4+1\right)\right)\Bigg/\left(12 b\tan\left(\frac{b x}{2}+\frac{a}{2}\right)\sqrt{\tan\left(\frac{b x}{2}+\frac{a}{2}\right)\left(\tan\left(\frac{b x}{2}+\frac{a}{2}\right)^2-1\right)}\sqrt{\tan\left(\frac{b x}{2}+\frac{a}{2}\right)^3-\tan\left(\frac{b x}{2}+\frac{a}{2}\right)}\right)$$

Problem 31: Attempted integration timed out after 120 seconds.

$$\int \frac{\csc(bx+a)^2}{\sin(2bx+2a)^{7/2}}\,dx$$

Optimal(type 4, 117 leaves, 4 steps):

$$\frac{14\sqrt{\sin\left(a+\frac{\pi}{4}+bx\right)^2}\,\text{EllipticE}\left(\cos\left(a+\frac{\pi}{4}+bx\right),\sqrt{2}\right)}{15\sin\left(a+\frac{\pi}{4}+bx\right)b}-\frac{14\cos(2bx+2a)}{45b\sin(2bx+2a)^{5/2}}-\frac{\csc(bx+a)^2}{9b\sin(2bx+2a)^{5/2}}-\frac{14\cos(2bx+2a)}{15b\sqrt{\sin(2bx+2a)}}$$

Result(type 1, 1 leaves):???

Problem 32: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \csc(bx+a)^3\sin(2bx+2a)^{5/2}\,dx$$

Optimal(type 3, 119 leaves, 5 steps):

$$-\frac{3\arcsin(\cos(bx+a)-\sin(bx+a))}{b}+\frac{3\ln\left(\cos(bx+a)+\sin(bx+a)+\sqrt{\sin(2bx+2a)}\right)}{b}+\frac{4\sin(bx+a)\sin(2bx+2a)^{3/2}}{b}+\frac{\csc(bx+a)^3\sin(2bx+2a)^{7/2}}{b}-\frac{6\cos(bx+a)\sqrt{\sin(2bx+2a)}}{b}$$

Result(type 4, 242 leaves):

$$\left(16\sqrt{-\frac{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2-1}}\left(\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1}\,\sqrt{-2\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+2}\,\sqrt{-\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}\,\text{EllipticF}\left(\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1},\frac{\sqrt{2}}{2}\right)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2-\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1}\,\sqrt{-2\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+2}\,\sqrt{-\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}\,\text{EllipticF}\left(\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1},\frac{\sqrt{2}}{2}\right)-\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^3-\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\right)\right)\Big/\left(3\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^3-\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}\,\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2-1\right)b\right)$$

Problem 33: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \csc(bx+a)^3\sin(2bx+2a)^{3/2}\,dx$$

Optimal(type 3, 98 leaves, 4 steps):

$$\frac{2\arcsin(\cos(bx+a)-\sin(bx+a))}{b}+\frac{2\ln\left(\cos(bx+a)+\sin(bx+a)+\sqrt{\sin(2bx+2a)}\right)}{b}-\frac{\csc(bx+a)^3\sin(2bx+2a)^{5/2}}{b}$$

$$-\frac{4\sin(bx+a)\sqrt{\sin(2bx+2a)}}{b}$$

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Result(type 4, 541 leaves):
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$$\Bigg(4\sqrt{-\frac{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2-1}}\Bigg(4\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1}\sqrt{-2\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+2}\sqrt{-\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2-1\right)}$$

$$\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)-1\right)\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1\right)}\,\mathrm{EllipticE}\left(\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1},\frac{\sqrt{2}}{2}\right)$$

$$-2\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1}\sqrt{-2\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+2}\sqrt{-\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2-1\right)}$$

$$\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)-1\right)\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1\right)}\,\mathrm{EllipticF}\left(\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1},\frac{\sqrt{2}}{2}\right)$$

$$+\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^3-\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)-1\right)\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1\right)}\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2+2\tan\left(\frac{bx}{2}\right.$$

$$\left.+\frac{a}{2}\right)^2\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2-1\right)}\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^3-\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}$$

$$-\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^3-\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}\sqrt{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)-1\right)\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+1\right)}\Bigg)\Bigg)\Bigg/\Bigg(\tan\left(\frac{bx}{2}\right.$$

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

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Problem 34: Result unnecessarily involves higher level functions and more than twice size of optimal
antiderivative.
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$$\int \csc(bx+a)^3\sqrt{\sin(2bx+2a)}\,dx$$

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Optimal(type 3, 24 leaves, 1 step):
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$$-\frac{\csc(bx+a)^3\sin(2bx+2a)^{3/2}}{3b}$$

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Result(type 4, 191 leaves):
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$$\Bigg(\sqrt{-\frac{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)}{\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2-1}}\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2\right.$$

$$-1\Bigg)\Bigg(4\sqrt{\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)+1}\,\sqrt{-2\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)+2}\,\sqrt{-\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)}\,\mathrm{EllipticF}\left(\sqrt{\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)+1},\frac{\sqrt{2}}{2}\right)\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)$$

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

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Problem 35: Result unnecessarily involves higher level functions and more than twice size of optimal
antiderivative.
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$$\int\frac{\csc(b\,x+a)^3}{\sqrt{\sin(2\,b\,x+2\,a)}}\,dx$$

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Optimal(type 3, 47 leaves, 2 steps):
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$$-\frac{4\csc(b\,x+a)\sqrt{\sin(2\,b\,x+2\,a)}}{5\,b}-\frac{\csc(b\,x+a)^3\sqrt{\sin(2\,b\,x+2\,a)}}{5\,b}$$

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Result(type 4, 481 leaves):
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$$\frac{1}{20\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)^3\sqrt{\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)^3-\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)}\,b}\left(\sqrt{-\frac{\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)}{\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)^2-1}}\left(16\sqrt{\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)\left(\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)^2-1\right)}\right.\right.$$

$$\sqrt{\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)+1}\,\sqrt{-2\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)+2}\,\sqrt{-\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)}\,\mathrm{EllipticE}\left(\sqrt{\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)+1},\frac{\sqrt{2}}{2}\right)\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)^2$$

$$-8\sqrt{\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)\left(\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)^2-1\right)}\,\sqrt{\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)+1}\,\sqrt{-2\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)+2}\,\sqrt{-\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)}\,\mathrm{EllipticF}\Bigg($$

$$\sqrt{\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)+1},\frac{\sqrt{2}}{2}\Bigg)\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)^2-\sqrt{\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)\left(\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)^2-1\right)}\,\tan\left(\frac{b\,x}{2}+\frac{a}{2}\right)^6+\tan\Bigg(\frac{b\,x}{2}$$

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

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

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

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Problem 36: Attempted integration timed out after 120 seconds.
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$$\int \frac{\csc(bx+a)^3}{\sin(2bx+2a)^{5/2}}\,dx$$

Optimal(type 3, 91 leaves, 5 steps):

$$-\frac{8\cos(bx+a)}{15b\sin(2bx+2a)^{5/2}}-\frac{\csc(bx+a)^3}{9b\sin(2bx+2a)^{3/2}}+\frac{32\sin(bx+a)}{45b\sin(2bx+2a)^{3/2}}-\frac{64\cos(bx+a)}{45b\sqrt{\sin(2bx+2a)}}$$

Result(type 1, 1 leaves):???

Problem 37: Unable to integrate problem.

$$\int \sin(bx+a)^2\sin(2bx+2a)^m\,dx$$

Optimal(type 5, 74 leaves, 2 steps):

$$\frac{\left(\cos(bx+a)^2\right)^{\frac{1}{2}-\frac{m}{2}}\operatorname{hypergeom}\left(\left[\frac{1}{2}-\frac{m}{2},\frac{3}{2}+\frac{m}{2}\right],\left[\frac{5}{2}+\frac{m}{2}\right],\sin(bx+a)^2\right)\sin(bx+a)^2\sin(2bx+2a)^m\tan(bx+a)}{b\,(3+m)}$$

Result(type 8, 22 leaves):

$$\int \sin(bx+a)^2\sin(2bx+2a)^m\,dx$$

Problem 38: Unable to integrate problem.

$$\int \csc(bx+a)\sin(2bx+2a)^m\,dx$$

Optimal(type 5, 62 leaves, 2 steps):

$$\frac{\left(\cos(bx+a)^2\right)^{\frac{1}{2}-\frac{m}{2}}\operatorname{hypergeom}\left(\left[\frac{m}{2},\frac{1}{2}-\frac{m}{2}\right],\left[1+\frac{m}{2}\right],\sin(bx+a)^2\right)\sec(bx+a)\sin(2bx+2a)^m}{b\,m}$$

Result(type 8, 20 leaves):

$$\int \csc(bx+a)\sin(2bx+2a)^m\,dx$$

Problem 39: Result more than twice size of optimal antiderivative.

$$\int \cos(bx+a)\sin(2bx+2a)^5\,dx$$

Optimal(type 3, 40 leaves, 4 steps):

$$-\frac{32\cos(bx+a)^7}{7b}+\frac{64\cos(bx+a)^9}{9b}-\frac{32\cos(bx+a)^{11}}{11b}$$

Result(type 3, 82 leaves):

$$-\frac{5\cos(bx+a)}{16b}-\frac{5\cos(3bx+3a)}{48b}+\frac{\cos(5bx+5a)}{32b}+\frac{5\cos(7bx+7a)}{224b}-\frac{\cos(9bx+9a)}{288b}-\frac{\cos(11bx+11a)}{352b}$$

Problem 45: Result more than twice size of optimal antiderivative.

$$\int \cos(b x + a)^3 \sin(2 b x + 2 a) \, dx$$

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

$$-\frac{2 \cos(b x + a)^5}{5 b}$$

Result(type 3, 40 leaves):

$$-\frac{\cos(b x + a)}{4 b} - \frac{\cos(3 b x + 3 a)}{8 b} - \frac{\cos(5 b x + 5 a)}{40 b}$$

Problem 47: Humongous result has more than 20000 leaves.

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

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

$$-\frac{\cos(b x + a)}{b \sqrt{\sin(2 b x + 2 a)}}$$

Result(type ?, 55916573 leaves): Display of huge result suppressed!

Problem 48: Attempted integration timed out after 120 seconds.

$$\int \frac{\cos(b x + a)}{\sin(2 b x + 2 a)^{7/2}} \, dx$$

Optimal(type 3, 67 leaves, 3 steps):

$$-\frac{\cos(b x + a)}{5 b \sin(2 b x + 2 a)^{5/2}} + \frac{4 \sin(b x + a)}{15 b \sin(2 b x + 2 a)^{3/2}} - \frac{8 \cos(b x + a)}{15 b \sqrt{\sin(2 b x + 2 a)}}$$

Result(type 1, 1 leaves):???

Problem 49: Unable to integrate problem.

$$\int \cos(b x + a)^2 \sin(2 b x + 2 a)^m \, dx$$

Optimal(type 5, 75 leaves, 2 steps):

$$-\frac{\cos(b x + a)^2 \cot(b x + a) \operatorname{hypergeom}\left(\left[\frac{1}{2} - \frac{m}{2}, \frac{3}{2} + \frac{m}{2}\right], \left[\frac{5}{2} + \frac{m}{2}\right], \cos(b x + a)^2\right) \left(\sin(b x + a)^2\right)^{\frac{1}{2} - \frac{m}{2}} \sin(2 b x + 2 a)^m}{b (3 + m)}$$

Result(type 8, 22 leaves):

$$\int \cos(b x + a)^2 \sin(2 b x + 2 a)^m \, dx$$

Problem 51: Result more than twice size of optimal antiderivative.

$$\int \csc(bx+c)^3 \sin(bx+a)\, dx$$

Optimal(type 3, 37 leaves, 5 steps):

$$-\frac{\cos(a-c)\cot(bx+c)}{b} - \frac{\csc(bx+c)^2 \sin(a-c)}{2b}$$

Result(type 3, 119 leaves):

$$\frac{1}{b}\left(-\frac{1}{(\cos(a)\cos(c)+\sin(a)\sin(c))^2(\tan(bx+a)\cos(a)\cos(c)+\tan(bx+a)\sin(a)\sin(c)+\cos(a)\sin(c)-\sin(a)\cos(c))}\right.$$
$$\left.-\frac{\sin(a)\cos(c)-\cos(a)\sin(c)}{2(\cos(a)\cos(c)+\sin(a)\sin(c))^2(\tan(bx+a)\cos(a)\cos(c)+\tan(bx+a)\sin(a)\sin(c)+\cos(a)\sin(c)-\sin(a)\cos(c))^2}\right)$$

Problem 52: Humongous result has more than 20000 leaves.

$$\int \csc(bx+c)^6 \sin(bx+a)\, dx$$

Optimal(type 3, 86 leaves, 6 steps):

$$-\frac{3\operatorname{arctanh}(\cos(bx+c))\cos(a-c)}{8b} - \frac{3\cos(a-c)\cot(bx+c)\csc(bx+c)}{8b} - \frac{\cos(a-c)\cot(bx+c)\csc(bx+c)^3}{4b} - \frac{\csc(bx+c)^5\sin(a-c)}{5b}$$

Result(type ?, 97947 leaves): Display of huge result suppressed!

Problem 53: Unable to integrate problem.

$$\int \sin(bx+a)^3 \sin(dx+c)^n\, dx$$

Optimal(type 5, 540 leaves, 18 steps):

$$\frac{2^{-3-n} e^{I(-cn+3a)+I(-nd+3b)x+In(dx+c)}\left(\frac{I}{e^{I(dx+c)}}-Ie^{I(dx+c)}\right)^n \operatorname{hypergeom}\left(\left[-n, \frac{3b}{2d}-\frac{n}{2}\right],\left[1+\frac{3b}{2d}-\frac{n}{2}\right], e^{2I(dx+c)}\right)}{\left(1-e^{2Ic+2Idx}\right)^n(-nd+3b)}$$
$$-\frac{3\,2^{-3-n} e^{I(-cn+a)+I(-nd+b)x+In(dx+c)}\left(\frac{I}{e^{I(dx+c)}}-Ie^{I(dx+c)}\right)^n \operatorname{hypergeom}\left(\left[-n, \frac{-nd+b}{2d}\right],\left[1+\frac{b}{2d}-\frac{n}{2}\right], e^{2I(dx+c)}\right)}{\left(1-e^{2Ic+2Idx}\right)^n(-nd+b)}$$
$$-\frac{3\,2^{-3-n} e^{-I(cn+a)-I(nd+b)x+In(dx+c)}\left(\frac{I}{e^{I(dx+c)}}-Ie^{I(dx+c)}\right)^n \operatorname{hypergeom}\left(\left[-n, \frac{-nd-b}{2d}\right],\left[1+\frac{-nd-b}{2d}\right], e^{2I(dx+c)}\right)}{\left(1-e^{2Ic+2Idx}\right)^n(nd+b)}$$
$$+\frac{2^{-3-n} e^{-I(cn+3a)-I(nd+3b)x+In(dx+c)}\left(\frac{I}{e^{I(dx+c)}}-Ie^{I(dx+c)}\right)^n \operatorname{hypergeom}\left(\left[-n, \frac{-nd-3b}{2d}\right],\left[1-\frac{3b}{2d}-\frac{n}{2}\right], e^{2I(dx+c)}\right)}{\left(1-e^{2Ic+2Idx}\right)^n(nd+3b)}$$

Result(type 8, 19 leaves):

$$\int \sin(bx+a)^3 \sin(dx+c)^n\, dx$$

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Problem 56: Result more than twice size of optimal antiderivative.
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$$\int \sec(bx+c)^5 \sin(bx+a)\, dx$$

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Optimal(type 3, 55 leaves, 5 steps):
```

$$\frac{\cos(a-c)\sec(bx+c)^4}{4b}+\frac{\sin(a-c)\tan(bx+c)}{b}+\frac{\sin(a-c)\tan(bx+c)^3}{3b}$$

```
Result(type 3, 380 leaves):
```

$$\frac{1}{b}\Big(-\left(-3\cos(a)^2\cos(c)^2-\cos(a)^2\sin(c)^2-4\cos(a)\sin(a)\cos(c)\sin(c)-\sin(a)^2\cos(c)^2-3\sin(a)^2\sin(c)^2\right)\Big/\Big(3\,(\cos(a)\sin(c)$$

$$-\sin(a)\cos(c))^3\,(\sin(a)\cos(c)-\cos(a)\sin(c))\,(-\tan(bx+a)\cos(a)\sin(c)+\tan(bx+a)\sin(a)\cos(c)+\cos(a)\cos(c)$$

$$+\sin(a)\sin(c))^3\Big)-\Big((\cos(a)\cos(c)+\sin(a)\sin(c))\left(\cos(a)^2\cos(c)^2+\cos(a)^2\sin(c)^2+\sin(a)^2\cos(c)^2+\sin(a)^2\sin(c)^2\right)\Big)\Big/$$

$$\Big(4\,(\cos(a)\sin(c)-\sin(a)\cos(c))^3\,(\sin(a)\cos(c)-\cos(a)\sin(c))\,(-\tan(bx+a)\cos(a)\sin(c)+\tan(bx+a)\sin(a)\cos(c)+\cos(a)\cos(c)$$

$$+\sin(a)\sin(c))^4\Big)+\big(-3\cos(a)\cos(c)-3\sin(a)\sin(c)\big)\Big/\Big(2\,(\cos(a)\sin(c)-\sin(a)\cos(c))^3\,(\sin(a)\cos(c)-\cos(a)\sin(c))\,(-\tan(bx+a)\cos(a)\sin$$

$$+\sin(a)\sin(c))^2\Big)+1\Big/\Big((\cos(a)\sin(c)-\sin(a)\cos(c))^3\,(\sin(a)\cos(c)-\cos(a)\sin(c))\,(-\tan(bx+a)\cos(a)\sin(c)+\tan(bx$$

$$+a)\sin(a)\cos(c)+\cos(a)\cos(c)+\sin(a)\sin(c))\Big)\Big)$$

```
Problem 60: Result more than twice size of optimal antiderivative.
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$$\int \frac{\cos(bx+a)}{\sin(bx+c)^2}\, dx$$

```
Optimal(type 3, 35 leaves, 4 steps):
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$$-\frac{\cos(a-c)\csc(bx+c)}{b}+\frac{\operatorname{arctanh}(\cos(bx+c))\sin(a-c)}{b}$$

```
Result(type 3, 1055 leaves):
```

$$-\left(\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\cos(a)^2\cos(c)^2\right)\Bigg/\Bigg(b\Bigg(-\frac{\cos(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2}{2}+\frac{\sin(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2}{2}+\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\cos(a)\cos(c)$$

$$+\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\sin(a)\sin(c)+\frac{\cos(a)\sin(c)}{2}-\frac{\sin(a)\cos(c)}{2}\Bigg)\left(\cos(a)^2\cos(c)^2+\cos(a)^2\sin(c)^2+\sin(a)^2\cos(c)^2\right.$$

$$\left.+\sin(a)^2\sin(c)^2\right)(\cos(a)\sin(c)-\sin(a)\cos(c))\Bigg)-\left(2\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\cos(a)\sin(a)\cos(c)\sin(c)\right)\Bigg/\Bigg(b\Bigg($$

$$-\frac{\cos(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^{2}}{2}+\frac{\sin(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^{2}}{2}+\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\cos(a)\cos(c)+\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\sin(a)\sin(c)+\frac{\cos(a)\sin(c)}{2}$$

$$-\frac{\sin(a)\cos(c)}{2}\Bigg)\left(\cos(a)^{2}\cos(c)^{2}+\cos(a)^{2}\sin(c)^{2}+\sin(a)^{2}\cos(c)^{2}+\sin(a)^{2}\sin(c)^{2}\right)\left(\cos(a)\sin(c)-\sin(a)\cos(c)\right)\Bigg)-\Bigg(\tan\Bigg(\frac{bx}{2}$$

$$+\frac{a}{2}\Bigg)\sin(a)^{2}\sin(c)^{2}\Bigg)\Bigg/\Bigg(b\Bigg(-\frac{\cos(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^{2}}{2}+\frac{\sin(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^{2}}{2}+\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\cos(a)\cos(c)+\tan\Bigg(\frac{bx}{2}$$

$$+\frac{a}{2}\Bigg)\sin(a)\sin(c)+\frac{\cos(a)\sin(c)}{2}-\frac{\sin(a)\cos(c)}{2}\Bigg)\left(\cos(a)^{2}\cos(c)^{2}+\cos(a)^{2}\sin(c)^{2}+\sin(a)^{2}\cos(c)^{2}+\sin(a)^{2}\sin(c)^{2}\right)\Big(\cos(a)\sin(c)$$

$$-\sin(a)\cos(c)\Big)\Bigg)-\left(\cos(a)\cos(c)\right)\Bigg/\Bigg(b\Bigg(-\frac{\cos(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^{2}}{2}+\frac{\sin(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^{2}}{2}+\tan\Bigg(\frac{bx}{2}$$

$$+\frac{a}{2}\Bigg)\cos(a)\cos(c)+\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\sin(a)\sin(c)+\frac{\cos(a)\sin(c)}{2}-\frac{\sin(a)\cos(c)}{2}\Bigg)\Big(\cos(a)^{2}\cos(c)^{2}+\cos(a)^{2}\sin(c)^{2}+\sin(a)^{2}\cos(c)^{2}$$

$$+\sin(a)^{2}\sin(c)^{2}\Big)\Bigg)-\left(\sin(a)\sin(c)\right)\Bigg/\Bigg(b\Bigg(-\frac{\cos(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^{2}}{2}+\frac{\sin(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^{2}}{2}+\tan\Bigg(\frac{bx}{2}$$

$$+\frac{a}{2}\Bigg)\cos(a)\cos(c)+\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\sin(a)\sin(c)+\frac{\cos(a)\sin(c)}{2}-\frac{\sin(a)\cos(c)}{2}\Bigg)\Big(\cos(a)^{2}\cos(c)^{2}+\cos(a)^{2}\sin(c)^{2}+\sin(a)^{2}\cos(c)^{2}$$

$$+\sin(a)^{2}\sin(c)^{2}\Big)\Bigg)$$

$$+\left(2\arctan\left(\frac{2\left(-2\cos(a)\sin(c)+2\sin(a)\cos(c)\right)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+4\cos(a)\cos(c)+4\sin(a)\sin(c)}{4\sqrt{-\cos(a)^{2}\cos(c)^{2}-\cos(a)^{2}\sin(c)^{2}-\sin(a)^{2}\cos(c)^{2}-\sin(a)^{2}\sin(c)^{2}}}\right)\cos(a)\sin(c)\right)\Bigg/$$

$$\Big(b\,\Big(\cos(a)^{2}\cos(c)^{2}+\cos(a)^{2}\sin(c)^{2}+\sin(a)^{2}\cos(c)^{2}$$

$$+\sin(a)^{2}\sin(c)^{2}\Big)\sqrt{-\cos(a)^{2}\cos(c)^{2}-\cos(a)^{2}\sin(c)^{2}-\sin(a)^{2}\cos(c)^{2}-\sin(a)^{2}\sin(c)^{2}}\Big)$$

$$-\left(2\arctan\left(\frac{2\left(-2\cos(a)\sin(c)+2\sin(a)\cos(c)\right)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+4\cos(a)\cos(c)+4\sin(a)\sin(c)}{4\sqrt{-\cos(a)^{2}\cos(c)^{2}-\cos(a)^{2}\sin(c)^{2}-\sin(a)^{2}\cos(c)^{2}-\sin(a)^{2}\sin(c)^{2}}}\right)\sin(a)\cos(c)\right)\Bigg/$$

$$\Big(b\,\Big(\cos(a)^{2}\cos(c)^{2}+\cos(a)^{2}\sin(c)^{2}+\sin(a)^{2}\cos(c)^{2}$$

$$+\sin(a)^{2}\sin(c)^{2}\Big)\sqrt{-\cos(a)^{2}\cos(c)^{2}-\cos(a)^{2}\sin(c)^{2}-\sin(a)^{2}\cos(c)^{2}-\sin(a)^{2}\sin(c)^{2}}\Big)$$

Problem 61: Result more than twice size of optimal antiderivative.

$$\int \sin(bx+a)\tan(bx+c)^3\,dx$$

Optimal(type 3, 68 leaves, 9 steps):

$$-\frac{3\operatorname{arctanh}(\sin(bx+c))\cos(a-c)}{2b}+\frac{\sec(bx+c)\sin(a-c)}{b}+\frac{\sin(bx+a)}{b}+\frac{\cos(a-c)\sec(bx+c)\tan(bx+c)}{2b}$$

Result(type 3, 185 leaves):

$$-\frac{I e^{I(bx+a)}}{2b}+\frac{I e^{-I(bx+a)}}{2b}-\frac{I\left(3e^{I(3bx+5a+2c)}-e^{I(3bx+3a+4c)}+e^{I(bx+5a)}-3e^{I(bx+3a+2c)}\right)}{2b\left(e^{2I(bx+a+c)}+e^{2Ia}\right)^2}+\frac{3\ln\left(e^{I(bx+a)}-Ie^{I(a-c)}\right)\cos(a-c)}{2b}$$
$$-\frac{3\ln\left(e^{I(bx+a)}+Ie^{I(a-c)}\right)\cos(a-c)}{2b}$$

Problem 62: Result more than twice size of optimal antiderivative.

$$\int \sin(bx+a)\tan(bx+c)^2\,dx$$

Optimal(type 3, 44 leaves, 6 steps):

$$\frac{\cos(bx+a)}{b}+\frac{\cos(a-c)\sec(bx+c)}{b}+\frac{\operatorname{arctanh}(\sin(bx+c))\sin(a-c)}{b}$$

Result(type 3, 142 leaves):

$$\frac{e^{I(bx+a)}}{2b}+\frac{e^{-I(bx+a)}}{2b}+\frac{e^{I(bx+3a)}+e^{I(bx+a+2c)}}{b\left(e^{2I(bx+a+c)}+e^{2Ia}\right)}+\frac{\ln\left(e^{I(bx+a)}+Ie^{I(a-c)}\right)\sin(a-c)}{b}-\frac{\ln\left(e^{I(bx+a)}-Ie^{I(a-c)}\right)\sin(a-c)}{b}$$

Problem 63: Result more than twice size of optimal antiderivative.

$$\int \cot(bx+c)\sin(bx+a)\,dx$$

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

$$-\frac{\operatorname{arctanh}(\cos(bx+c))\sin(a-c)}{b}+\frac{\sin(bx+a)}{b}$$

Result(type 3, 94 leaves):

$$-\frac{I e^{I(bx+a)}}{2b}+\frac{I e^{-I(bx+a)}}{2b}+\frac{\ln\left(e^{I(bx+a)}-e^{I(a-c)}\right)\sin(a-c)}{b}-\frac{\ln\left(e^{I(bx+a)}+e^{I(a-c)}\right)\sin(a-c)}{b}$$

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

$$\int \cos(bx+a)\sec(bx+c)^2\,dx$$

Optimal(type 3, 35 leaves, 4 steps):

$$\frac{\operatorname{arctanh}(\sin(bx+c))\cos(a-c)}{b}-\frac{\sec(bx+c)\sin(a-c)}{b}$$

Result(type 3, 1048 leaves):

$$\left(2\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\cos(a)^2\sin(c)^2\right)\Big/\left(b\left(\cos(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2+\sin(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2+2\cos(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\right.\right.$$

$$\left.-2\sin(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)-\cos(a)\cos(c)-\sin(a)\sin(c)\right)\left(\cos(a)\cos(c)+\sin(a)\sin(c)\right)\left(\cos(a)^2\cos(c)^2+\cos(a)^2\sin(c)^2\right.$$

$$\left.\left.+\sin(a)^2\cos(c)^2+\sin(a)^2\sin(c)^2\right)\right)-\left(4\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\cos(a)\sin(a)\cos(c)\sin(c)\right)\Big/\left(b\left(\cos(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2\right.\right.$$

$$+\sin(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2+2\cos(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)-2\sin(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)-\cos(a)\cos(c)-\sin(a)\sin(c)\Big)\Big(\cos(a)\cos(c)$$

$$\left.+\sin(a)\sin(c)\right)\left(\cos(a)^2\cos(c)^2+\cos(a)^2\sin(c)^2+\sin(a)^2\cos(c)^2+\sin(a)^2\sin(c)^2\right)\Big)+\left(2\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\sin(a)^2\cos(c)^2\right)\Big/$$

$$\left(b\left(\cos(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2+\sin(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2+2\cos(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)-2\sin(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)\right.\right.$$

$$\left.\left.-\cos(a)\cos(c)-\sin(a)\sin(c)\right)\left(\cos(a)\cos(c)+\sin(a)\sin(c)\right)\left(\cos(a)^2\cos(c)^2+\cos(a)^2\sin(c)^2+\sin(a)^2\cos(c)^2+\sin(a)^2\sin(c)^2\right)\right)$$

$$-\left(2\cos(a)\sin(c)\right)\Big/\left(b\left(\cos(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2+\sin(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2+2\cos(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)-2\sin(a)\cos(c)\tan\left(\frac{bx}{2}+\right.\right.\right.$$

$$\left.\left.+\sin(a)^2\sin(c)^2\right)\right)+\left(2\sin(a)\cos(c)\right)\Big/\left(b\left(\cos(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2+\sin(a)\sin(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)^2+2\cos(a)\sin(c)\tan\left(\frac{bx}{2}\right.\right.\right.$$

$$\left.\left.\left.+\frac{a}{2}\right)-2\sin(a)\cos(c)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)-\cos(a)\cos(c)-\sin(a)\sin(c)\right)\left(\cos(a)^2\cos(c)^2+\cos(a)^2\sin(c)^2+\sin(a)^2\cos(c)^2+\sin(a)^2\sin(c)^2\right)\right)$$

$$-\left(2\arctan\left(\frac{2\left(\cos(a)\cos(c)+\sin(a)\sin(c)\right)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+2\cos(a)\sin(c)-2\sin(a)\cos(c)}{2\sqrt{-\cos(a)^2\cos(c)^2-\cos(a)^2\sin(c)^2-\sin(a)^2\cos(c)^2-\sin(a)^2\sin(c)^2}}\right)\cos(a)\cos(c)\right)\Big/\left(b\left(\cos(a)^2\cos(c)^2\right.\right.$$

$$\left.\left.+\cos(a)^2\sin(c)^2+\sin(a)^2\cos(c)^2+\sin(a)^2\sin(c)^2\right)\sqrt{-\cos(a)^2\cos(c)^2-\cos(a)^2\sin(c)^2-\sin(a)^2\cos(c)^2-\sin(a)^2\sin(c)^2}\right)$$

$$-\left(2\arctan\left(\frac{2\left(\cos(a)\cos(c)+\sin(a)\sin(c)\right)\tan\left(\frac{bx}{2}+\frac{a}{2}\right)+2\cos(a)\sin(c)-2\sin(a)\cos(c)}{2\sqrt{-\cos(a)^2\cos(c)^2-\cos(a)^2\sin(c)^2-\sin(a)^2\cos(c)^2-\sin(a)^2\sin(c)^2}}\right)\sin(a)\sin(c)\right)\Big/\left(b\left(\cos(a)^2\cos(c)^2\right.\right.$$

$$\left.\left.+\cos(a)^2\sin(c)^2+\sin(a)^2\cos(c)^2+\sin(a)^2\sin(c)^2\right)\sqrt{-\cos(a)^2\cos(c)^2-\cos(a)^2\sin(c)^2-\sin(a)^2\cos(c)^2-\sin(a)^2\sin(c)^2}\right)$$

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

$$\int\cos(bx+a)\tan(bx+c)^3\,dx$$

Optimal(type 3, 68 leaves, 9 steps):

$$\frac{\cos(bx+a)}{b}+\frac{\cos(a-c)\sec(bx+c)}{b}+\frac{3\operatorname{arctanh}(\sin(bx+c))\sin(a-c)}{2b}-\frac{\sec(bx+c)\sin(a-c)\tan(bx+c)}{2b}$$

Result(type 3, 180 leaves):

$$\frac{e^{I(bx+a)}}{2b}+\frac{e^{-I(bx+a)}}{2b}+\frac{3e^{I(3bx+5a+2c)}+e^{I(3bx+3a+4c)}+e^{I(bx+5a)}+3e^{I(bx+3a+2c)}}{2b\left(e^{2I(bx+a+c)}+e^{2Ia}\right)^2}-\frac{3\ln\left(e^{I(bx+a)}-I e^{I(a-c)}\right)\sin(a-c)}{2b}$$
$$+\frac{3\ln\left(e^{I(bx+a)}+I e^{I(a-c)}\right)\sin(a-c)}{2b}$$

Problem 69: Result more than twice size of optimal antiderivative.

$$\int \cos(bx+a)\cot(bx+c)\,dx$$

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

$$-\frac{\operatorname{arctanh}(\cos(bx+c))\cos(a-c)}{b}+\frac{\cos(bx+a)}{b}$$

Result(type 3, 92 leaves):

$$\frac{e^{I(bx+a)}}{2b}+\frac{e^{-I(bx+a)}}{2b}-\frac{\ln\left(e^{I(bx+a)}+e^{I(a-c)}\right)\cos(a-c)}{b}+\frac{\ln\left(e^{I(bx+a)}-e^{I(a-c)}\right)\cos(a-c)}{b}$$

Test results for the 78 problems in "4.7.2 trig^m (a trig+b trig)^n.txt"

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

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

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

$$-\frac{(a^2-2b^2)\operatorname{arctanh}\left(\frac{-b+a\tan\left(\frac{x}{2}\right)}{\sqrt{a^2+b^2}}\right)}{(a^2+b^2)^{5/2}}+\frac{a\left(3ab\cos(x)+(a^2+4b^2)\sin(x)\right)}{2(a^2+b^2)^2(a\cos(x)+b\sin(x))^2}$$

Result(type 3, 211 leaves):

$$-\frac{8\left(-\frac{a(a^2-2b^2)\tan\left(\frac{x}{2}\right)^3}{8(a^4+2a^2b^2+b^4)}+\frac{3b(a^2-2b^2)\tan\left(\frac{x}{2}\right)^2}{8(a^4+2a^2b^2+b^4)}-\frac{(a^2+10b^2)a\tan\left(\frac{x}{2}\right)}{8(a^4+2a^2b^2+b^4)}-\frac{3a^2b}{8(a^4+2a^2b^2+b^4)}\right)}{\left(\tan\left(\frac{x}{2}\right)^2a-2\tan\left(\frac{x}{2}\right)b-a\right)^2}$$
$$-\frac{(a^2-2b^2)\operatorname{arctanh}\left(\frac{2a\tan\left(\frac{x}{2}\right)-2b}{2\sqrt{a^2+b^2}}\right)}{(a^4+2a^2b^2+b^4)\sqrt{a^2+b^2}}$$

Problem 11: Unable to integrate problem.

$$\int \frac{(a\cos(dx+c)+\mathrm{I}\,a\sin(dx+c))^n}{\sin(dx+c)^n}\,dx$$

Optimal(type 5, 60 leaves, 1 step):

$$\frac{-\frac{\mathrm{I}}{2}\,\mathrm{hypergeom}\left([1,n],[1+n],-\frac{\mathrm{I}}{2}\,(\mathrm{I}+\cot(dx+c))\right)(a\cos(dx+c)+\mathrm{I}\,a\sin(dx+c))^n}{d\,n\sin(dx+c)^n}$$

Result(type 8, 34 leaves):

$$\int \frac{(a\cos(dx+c)+\mathrm{I}\,a\sin(dx+c))^n}{\sin(dx+c)^n}\,dx$$

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

$$\int \frac{\sec(dx+c)^2}{a\cos(dx+c)+b\sin(dx+c)}\,dx$$

Optimal(type 3, 76 leaves, 4 steps):

$$-\frac{a\,\mathrm{arctanh}(\sin(dx+c))}{b^2 d}+\frac{\sec(dx+c)}{b\,d}-\frac{\mathrm{arctanh}\left(\frac{b\cos(dx+c)-a\sin(dx+c)}{\sqrt{a^2+b^2}}\right)\sqrt{a^2+b^2}}{b^2 d}$$

Result(type 3, 173 leaves):

$$-\frac{1}{d\,b\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)}+\frac{a\ln\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)}{d\,b^2}+\frac{1}{d\,b\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)+1\right)}-\frac{a\ln\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)+1\right)}{d\,b^2}$$
$$+\frac{2\,\mathrm{arctanh}\left(\frac{2\,a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-2\,b}{2\sqrt{a^2+b^2}}\right)a^2}{d\,b^2\sqrt{a^2+b^2}}+\frac{2\,\mathrm{arctanh}\left(\frac{2\,a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-2\,b}{2\sqrt{a^2+b^2}}\right)}{d\sqrt{a^2+b^2}}$$

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

$$\int \frac{\sec(dx+c)^4}{a\cos(dx+c)+b\sin(dx+c)}\,dx$$

Optimal(type 3, 143 leaves, 7 steps):

$$-\frac{a\,\mathrm{arctanh}(\sin(dx+c))}{2\,b^2 d}-\frac{a\left(a^2+b^2\right)\mathrm{arctanh}(\sin(dx+c))}{b^4 d}-\frac{\left(a^2+b^2\right)^{3/2}\mathrm{arctanh}\left(\frac{b\cos(dx+c)-a\sin(dx+c)}{\sqrt{a^2+b^2}}\right)}{b^4 d}+\frac{\left(a^2+b^2\right)\sec(dx+c)}{b^3 d}$$

$$+\frac{\sec(dx+c)^3}{3bd}-\frac{a\sec(dx+c)\tan(dx+c)}{2b^2d}$$

Result(type 3, 487 leaves):

$$-\frac{1}{3db\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)^3}-\frac{a}{2db^2\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)^2}-\frac{1}{2db\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)^2}-\frac{a^2}{db^3\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)}$$
$$-\frac{a}{2db^2\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)}-\frac{3}{2db\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)}+\frac{a^3\ln\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)}{db^4}+\frac{3a\ln\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)}{2db^2}$$
$$+\frac{1}{3db\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)+1\right)^3}+\frac{a}{2db^2\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)+1\right)^2}-\frac{1}{2db\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)+1\right)^2}+\frac{a^2}{db^3\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)+1\right)}$$
$$-\frac{a}{2db^2\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)+1\right)}+\frac{3}{2db\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)+1\right)}-\frac{a^3\ln\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)+1\right)}{db^4}-\frac{3a\ln\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)+1\right)}{2db^2}$$
$$+\frac{2\operatorname{arctanh}\left(\frac{2a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-2b}{2\sqrt{a^2+b^2}}\right)a^4}{db^4\sqrt{a^2+b^2}}+\frac{4\operatorname{arctanh}\left(\frac{2a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-2b}{2\sqrt{a^2+b^2}}\right)a^2}{db^2\sqrt{a^2+b^2}}+\frac{2\operatorname{arctanh}\left(\frac{2a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-2b}{2\sqrt{a^2+b^2}}\right)}{d\sqrt{a^2+b^2}}$$

Problem 36: Result more than twice size of optimal antiderivative.

$$\int\frac{\cos(dx+c)^4}{(a\cos(dx+c)+b\sin(dx+c))^2}\,dx$$

Optimal(type 3, 141 leaves, 7 steps):

$$\frac{\left(a^4+6a^2b^2-3b^4\right)x}{2\left(a^2+b^2\right)^3}+\frac{b^4}{a\left(a^2+b^2\right)^2d\,(b+a\cot(dx+c))}+\frac{4ab^3\ln(a\cos(dx+c)+b\sin(dx+c))}{\left(a^2+b^2\right)^3d}$$
$$-\frac{\left(2ab-\left(a^2-b^2\right)\cot(dx+c)\right)\sin(dx+c)^2}{2\left(a^2+b^2\right)^2d}$$

Result(type 3, 291 leaves):

$$\frac{\tan(dx+c)\,a^4}{2d\left(a^2+b^2\right)^3\left(\tan(dx+c)^2+1\right)}-\frac{\tan(dx+c)\,b^4}{2d\left(a^2+b^2\right)^3\left(\tan(dx+c)^2+1\right)}+\frac{a^3b}{d\left(a^2+b^2\right)^3\left(\tan(dx+c)^2+1\right)}+\frac{ab^3}{d\left(a^2+b^2\right)^3\left(\tan(dx+c)^2+1\right)}$$
$$-\frac{2ab^3\ln\left(\tan(dx+c)^2+1\right)}{d\left(a^2+b^2\right)^3}+\frac{3\arctan(\tan(dx+c))\,a^2b^2}{d\left(a^2+b^2\right)^3}-\frac{3\arctan(\tan(dx+c))\,b^4}{2d\left(a^2+b^2\right)^3}+\frac{\arctan(\tan(dx+c))\,a^4}{2d\left(a^2+b^2\right)^3}$$

$$-\frac{b^3}{d\left(a^2+b^2\right)^2\left(a+b\tan(dx+c)\right)}+\frac{4b^3a\ln(a+b\tan(dx+c))}{d\left(a^2+b^2\right)^3}$$

```
Problem 40: Result more than twice size of optimal antiderivative.
```

$$\int\frac{\cos(dx+c)^2}{\left(a\cos(dx+c)+b\sin(dx+c)\right)^3}\,dx$$

```
Optimal(type 3, 112 leaves, ? steps):
```

$$\frac{\left(2a^2-b^2\right)\operatorname{arctanh}\left(\frac{-b+a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)}{\sqrt{a^2+b^2}}\right)}{\left(a^2+b^2\right)^{5/2}d}-\frac{b\left(\left(4a^2+b^2\right)\cos(dx+c)+3ab\sin(dx+c)\right)}{2\left(a^2+b^2\right)^2d\left(a\cos(dx+c)+b\sin(dx+c)\right)^2}$$

```
Result(type 3, 279 leaves):
```

$$\frac{1}{d}\left(-\frac{2\left(-\frac{b^2\left(5a^2+2b^2\right)\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^3}{2\left(a^4+2a^2b^2+b^4\right)a}-\frac{b\left(4a^4-7a^2b^2-2b^4\right)\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2}{2\left(a^4+2a^2b^2+b^4\right)a^2}+\frac{b^2\left(11a^2+2b^2\right)\tan\left(\frac{dx}{2}+\frac{c}{2}\right)}{2\left(a^4+2a^2b^2+b^4\right)a}+\frac{b\left(4a^2+b^2\right)}{2\left(a^4+2a^2b^2+b^4\right)}\right)}{\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^2}\right.$$
$$\left.+\frac{\left(2a^2-b^2\right)\operatorname{arctanh}\left(\frac{2a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-2b}{2\sqrt{a^2+b^2}}\right)}{\left(a^4+2a^2b^2+b^4\right)\sqrt{a^2+b^2}}\right)$$

```
Problem 41: Result more than twice size of optimal antiderivative.
```

$$\int\frac{\cos(dx+c)^3}{\left(a\cos(dx+c)+b\sin(dx+c)\right)^4}\,dx$$

```
Optimal(type 3, 151 leaves, ? steps):
```

$$\frac{a\left(2a^2-3b^2\right)\operatorname{arctanh}\left(\frac{-b+a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)}{\sqrt{a^2+b^2}}\right)}{\left(a^2+b^2\right)^{7/2}d}+\frac{-3\left(3a^4b-a^2b^3+b^5\right)\cos(2dx+2c)+\frac{b\left(-9a^2+b^2\right)\left(2a^2+2b^2+3ab\sin(2dx+2c)\right)}{2}}{6\left(a^2+b^2\right)^3d\left(a\cos(dx+c)+b\sin(dx+c)\right)^3}$$

```
Result(type 3, 493 leaves):
```

$$\frac{1}{d}\left(-\frac{1}{\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right) b-a\right)^3}\left(2\left(-\frac{b^2\left(9a^4+6a^2b^2+2b^4\right)\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^5}{2a\left(a^6+3a^4b^2+3a^2b^4+b^6\right)}\right.\right.\right.$$

$$-\frac{b\left(6a^6-27a^4b^2-12a^2b^4-4b^6\right)\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^4}{2a^2\left(a^6+3a^4b^2+3a^2b^4+b^6\right)}+\frac{b^2\left(54a^6-21a^4b^2-4a^2b^4-4b^6\right)\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^3}{3a^3\left(a^6+3a^4b^2+3a^2b^4+b^6\right)}$$

$$\left.\left.+\frac{b\left(6a^6-20a^4b^2-3a^2b^4-2b^6\right)\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2}{a^2\left(a^6+3a^4b^2+3a^2b^4+b^6\right)}-\frac{b^2\left(27a^4+4a^2b^2+2b^4\right)\tan\left(\frac{dx}{2}+\frac{c}{2}\right)}{2a\left(a^6+3a^4b^2+3a^2b^4+b^6\right)}-\frac{b\left(18a^4+5a^2b^2+2b^4\right)}{6\left(a^6+3a^4b^2+3a^2b^4+b^6\right)}\right)\right)$$

$$\left.+\frac{a\left(2a^2-3b^2\right)\operatorname{arctanh}\left(\frac{2a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-2b}{2\sqrt{a^2+b^2}}\right)}{\left(a^6+3a^4b^2+3a^2b^4+b^6\right)\sqrt{a^2+b^2}}\right)$$

Problem 43: Result more than twice size of optimal antiderivative.

$$\int\frac{\sec(dx+c)^3}{\left(a\cos(dx+c)+b\sin(dx+c)\right)^4}\,dx$$

Optimal(type 3, 382 leaves, 32 steps):

$$\frac{8a^2\operatorname{arctanh}(\sin(dx+c))}{b^6d}+\frac{\operatorname{arctanh}(\sin(dx+c))}{2b^4d}+\frac{2\left(a^2+b^2\right)\operatorname{arctanh}(\sin(dx+c))}{b^6d}-\frac{4a\sec(dx+c)}{b^5d}+\frac{-a^2-b^2}{3b^3d\left(a\cos(dx+c)+b\sin(dx+c)\right)^3}$$

$$+\frac{3a\left(b\cos(dx+c)-a\sin(dx+c)\right)}{2b^4d\left(a\cos(dx+c)+b\sin(dx+c)\right)^2}-\frac{4a^2}{b^5d\left(a\cos(dx+c)+b\sin(dx+c)\right)}-\frac{2\left(a^2+b^2\right)}{b^5d\left(a\cos(dx+c)+b\sin(dx+c)\right)}$$

$$+\frac{4a^3\operatorname{arctanh}\left(\frac{b\cos(dx+c)-a\sin(dx+c)}{\sqrt{a^2+b^2}}\right)}{b^6d\sqrt{a^2+b^2}}+\frac{3a\operatorname{arctanh}\left(\frac{b\cos(dx+c)-a\sin(dx+c)}{\sqrt{a^2+b^2}}\right)}{2b^4d\sqrt{a^2+b^2}}$$

$$+\frac{6a\operatorname{arctanh}\left(\frac{b\cos(dx+c)-a\sin(dx+c)}{\sqrt{a^2+b^2}}\right)\sqrt{a^2+b^2}}{b^6d}+\frac{\sec(dx+c)\tan(dx+c)}{2b^4d}$$

Result(type 3, 1254 leaves):

$$
\frac{2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)}{d\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3 a}+\frac{2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^5}{d\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3 a}
$$

$$
+\frac{8\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^3}{3\,d\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3 a}+\frac{4\,a}{d\,b^5\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)}-\frac{10\ln\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)a^2}{d\,b^6}
$$

$$
-\frac{4\,a}{d\,b^5\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)+1\right)}+\frac{10\ln\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)+1\right)a^2}{d\,b^6}+\frac{18\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2}{d\,b\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3}
$$

$$
+\frac{12\,a^4}{d\,b^5\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3}+\frac{5\,a^2}{3\,d\,b^3\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3}
$$

$$
+\frac{4\,b\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2}{d\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3 a^2}+\frac{63\,a^3\tan\left(\frac{dx}{2}+\frac{c}{2}\right)}{d\,b^4\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3}
$$

$$
+\frac{10\,a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)}{d\,b^2\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3}-\frac{20\,a^3\operatorname{arctanh}\left(\frac{2\,a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-2\,b}{2\sqrt{a^2+b^2}}\right)}{d\,b^6\sqrt{a^2+b^2}}-\frac{15\,a\operatorname{arctanh}\left(\frac{2\,a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)-2\,b}{2\sqrt{a^2+b^2}}\right)}{d\,b^4\sqrt{a^2+b^2}}
$$

$$
+\frac{9\,a^3\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^5}{d\,b^4\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3}+\frac{12\,a^4\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^4}{d\,b^5\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3}
$$

$$
-\frac{39\,a^2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^4}{d\,b^3\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3}-\frac{4\,b\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^4}{d\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3 a^2}
$$

$$
-\frac{72\,a^3\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^3}{d\,b^4\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3}+\frac{38\,a\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^3}{d\,b^2\left(\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2 a-2\tan\left(\frac{dx}{2}+\frac{c}{2}\right)b-a\right)^3}
$$

$$+\frac{8 b^{2} \tan\left(\frac{d x}{2}+\frac{c}{2}\right)^{3}}{3 d \left(\tan\left(\frac{d x}{2}+\frac{c}{2}\right)^{2} a-2 \tan\left(\frac{d x}{2}+\frac{c}{2}\right) b-a\right)^{3} a^{3}}-\frac{24 a^{4} \tan\left(\frac{d x}{2}+\frac{c}{2}\right)^{2}}{d b^{5} \left(\tan\left(\frac{d x}{2}+\frac{c}{2}\right)^{2} a-2 \tan\left(\frac{d x}{2}+\frac{c}{2}\right) b-a\right)^{3}}$$

$$+\frac{100 a^{2} \tan\left(\frac{d x}{2}+\frac{c}{2}\right)^{2}}{d b^{3} \left(\tan\left(\frac{d x}{2}+\frac{c}{2}\right)^{2} a-2 \tan\left(\frac{d x}{2}+\frac{c}{2}\right) b-a\right)^{3}}+\frac{1}{2 d b^{4} \left(\tan\left(\frac{d x}{2}+\frac{c}{2}\right)-1\right)^{2}}+\frac{1}{2 d b^{4} \left(\tan\left(\frac{d x}{2}+\frac{c}{2}\right)-1\right)}$$

$$-\frac{5 \ln\left(\tan\left(\frac{d x}{2}+\frac{c}{2}\right)-1\right)}{2 d b^{4}}-\frac{1}{2 d b^{4} \left(\tan\left(\frac{d x}{2}+\frac{c}{2}\right)+1\right)^{2}}+\frac{1}{2 d b^{4} \left(\tan\left(\frac{d x}{2}+\frac{c}{2}\right)+1\right)}+\frac{5 \ln\left(\tan\left(\frac{d x}{2}+\frac{c}{2}\right)+1\right)}{2 d b^{4}}$$

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

Problem 50: Result more than twice size of optimal antiderivative.

$$\int \frac{\cos(x)}{\sec(x)+\tan(x)}\, dx$$

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

$$x+\cos(x)$$

Result(type 3, 14 leaves):

$$\frac{2}{\tan\left(\frac{x}{2}\right)^{2}+1}+x$$

Problem 51: Result more than twice size of optimal antiderivative.

$$\int \frac{\cos(x)}{\sec(x)-\tan(x)}\, dx$$

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

$$x-\cos(x)$$

Result(type 3, 14 leaves):

$$-\frac{2}{\tan\left(\frac{x}{2}\right)^{2}+1}+x$$

Problem 53: Result more than twice size of optimal antiderivative.

$$\int \frac{\tan(x)}{\cot(x) + \csc(x)}\, dx$$

Optimal(type 3, 7 leaves, 4 steps):

$$-x + \operatorname{arctanh}(\sin(x))$$

Result(type 3, 20 leaves):

$$-\ln\left(\tan\left(\frac{x}{2}\right) - 1\right) + \ln\left(\tan\left(\frac{x}{2}\right) + 1\right) - x$$

Problem 76: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 161 leaves, 13 steps):

$$\frac{a^3 b^2 x}{(a^2+b^2)^3} - \frac{a b^2 x}{2(a^2+b^2)^2} + \frac{a x}{8(a^2+b^2)} - \frac{b\cos(x)^4}{4(a^2+b^2)} + \frac{a^2 b^3 \ln(a\cos(x) + b\sin(x))}{(a^2+b^2)^3} - \frac{a b^2 \cos(x)\sin(x)}{2(a^2+b^2)^2} + \frac{a\cos(x)\sin(x)}{8(a^2+b^2)} - \frac{a\cos(x)^3\sin(x)}{4(a^2+b^2)} - \frac{a^2 b\sin(x)^2}{2(a^2+b^2)^2}$$

Result(type 3, 362 leaves):

$$\frac{\tan(x)^3 a^5}{8(a^2+b^2)^3(\tan(x)^2+1)^2} - \frac{\tan(x)^3 a^3 b^2}{4(a^2+b^2)^3(\tan(x)^2+1)^2} - \frac{3\tan(x)^3 a b^4}{8(a^2+b^2)^3(\tan(x)^2+1)^2} + \frac{\tan(x)^2 a^4 b}{2(a^2+b^2)^3(\tan(x)^2+1)^2} + \frac{\tan(x)^2 a^2 b^3}{2(a^2+b^2)^3(\tan(x)^2+1)^2} - \frac{3\tan(x) a^3 b^2}{4(a^2+b^2)^3(\tan(x)^2+1)^2} - \frac{5\tan(x) a b^4}{8(a^2+b^2)^3(\tan(x)^2+1)^2} - \frac{\tan(x) a^5}{8(a^2+b^2)^3(\tan(x)^2+1)^2} + \frac{a^4 b}{4(a^2+b^2)^3(\tan(x)^2+1)^2} - \frac{b^5}{4(a^2+b^2)^3(\tan(x)^2+1)^2} - \frac{a^2 b^3\ln(\tan(x)^2+1)}{2(a^2+b^2)^3} + \frac{\arctan(\tan(x)) a^5}{8(a^2+b^2)^3} + \frac{3\arctan(\tan(x)) a^3 b^2}{4(a^2+b^2)^3} - \frac{3\arctan(\tan(x)) a b^4}{8(a^2+b^2)^3} + \frac{b^3 a^2 \ln(\tan(x) b + a)}{(a^2+b^2)^3}$$

Test results for the 107 problems in "4.7.3 (c+d x)^m trig^n trig^p.txt"

Problem 1: Unable to integrate problem.

$$\int (dx+c)^m \cos(bx+a)\sin(bx+a)\, dx$$

Optimal(type 4, 131 leaves, 5 steps):

$$-\frac{2^{-3-m}e^{2I\left(a-\frac{bc}{d}\right)}(dx+c)^m\Gamma\left(1+m,\frac{-2Ib(dx+c)}{d}\right)}{b\left(\frac{-Ib(dx+c)}{d}\right)^m}-\frac{2^{-3-m}(dx+c)^m\Gamma\left(1+m,\frac{2Ib(dx+c)}{d}\right)}{b\,e^{2I\left(a-\frac{bc}{d}\right)}\left(\frac{Ib(dx+c)}{d}\right)^m}$$

Result(type 8, 22 leaves):

$$\int (dx+c)^m\cos(bx+a)\sin(bx+a)\,dx$$

Problem 2: Result more than twice size of optimal antiderivative.

$$\int (dx+c)^3\cos(bx+a)\sin(bx+a)\,dx$$

Optimal(type 3, 108 leaves, 5 steps):

$$\frac{3d^3x}{8b^3}-\frac{(dx+c)^3}{4b}-\frac{3d^3\cos(bx+a)\sin(bx+a)}{8b^4}+\frac{3d(dx+c)^2\cos(bx+a)\sin(bx+a)}{4b^2}-\frac{3d^2(dx+c)\sin(bx+a)^2}{4b^3}+\frac{(dx+c)^3\sin(bx+a)^2}{2b}$$

Result(type 3, 465 leaves):

$$\frac{1}{b}\left(\frac{1}{b^3}\left(d^3\left(-\frac{(bx+a)^3\cos(bx+a)^2}{2}+\frac{3(bx+a)^2\left(\frac{\cos(bx+a)\sin(bx+a)}{2}+\frac{bx}{2}+\frac{a}{2}\right)}{2}+\frac{3(bx+a)\cos(bx+a)^2}{4}\right.\right.\right.$$
$$\left.\left.-\frac{3\cos(bx+a)\sin(bx+a)}{8}-\frac{3bx}{8}-\frac{3a}{8}-\frac{(bx+a)^3}{2}\right)\right)$$
$$-\frac{3ad^3\left(-\frac{(bx+a)^2\cos(bx+a)^2}{2}+(bx+a)\left(\frac{\cos(bx+a)\sin(bx+a)}{2}+\frac{bx}{2}+\frac{a}{2}\right)-\frac{(bx+a)^2}{4}-\frac{\sin(bx+a)^2}{4}\right)}{b^3}$$
$$+\frac{3cd^2\left(-\frac{(bx+a)^2\cos(bx+a)^2}{2}+(bx+a)\left(\frac{\cos(bx+a)\sin(bx+a)}{2}+\frac{bx}{2}+\frac{a}{2}\right)-\frac{(bx+a)^2}{4}-\frac{\sin(bx+a)^2}{4}\right)}{b^2}$$
$$+\frac{3a^2d^3\left(-\frac{(bx+a)\cos(bx+a)^2}{2}+\frac{\cos(bx+a)\sin(bx+a)}{4}+\frac{bx}{4}+\frac{a}{4}\right)}{b^3}$$
$$-\frac{6acd^2\left(-\frac{(bx+a)\cos(bx+a)^2}{2}+\frac{\cos(bx+a)\sin(bx+a)}{4}+\frac{bx}{4}+\frac{a}{4}\right)}{b^2}$$
$$+\frac{3c^2d\left(-\frac{(bx+a)\cos(bx+a)^2}{2}+\frac{\cos(bx+a)\sin(bx+a)}{4}+\frac{bx}{4}+\frac{a}{4}\right)}{b}+\frac{a^3d^3\cos(bx+a)^2}{2b^3}-\frac{3a^2cd^2\cos(bx+a)^2}{2b^2}$$

$$+\frac{3 a c^2 d\cos(bx+a)^2}{2 b}-\frac{c^3\cos(bx+a)^2}{2}\Bigg)$$

Problem 5: Result more than twice size of optimal antiderivative.

$$\int (dx+c)^3\cos(bx+a)\sin(bx+a)^2\,dx$$

Optimal(type 3, 137 leaves, 7 steps):

$$-\frac{14 d^3\cos(bx+a)}{9 b^4}+\frac{2 d (dx+c)^2\cos(bx+a)}{3 b^2}+\frac{2 d^3\cos(bx+a)^3}{27 b^4}-\frac{4 d^2 (dx+c)\sin(bx+a)}{3 b^3}+\frac{d (dx+c)^2\cos(bx+a)\sin(bx+a)^2}{3 b^2}-\frac{2 d^2 (dx+c)\sin(bx+a)^3}{9 b^3}+\frac{(dx+c)^3\sin(bx+a)^3}{3 b}$$

Result(type 3, 446 leaves):

$$\frac{1}{b}\Bigg(\frac{1}{b^3}\Bigg(d^3\Bigg(\frac{(bx+a)^3\sin(bx+a)^3}{3}+\frac{(bx+a)^2\left(2+\sin(bx+a)^2\right)\cos(bx+a)}{3}-\frac{4\cos(bx+a)}{3}-\frac{4\sin(bx+a)\,(bx+a)}{3}-\frac{2\,(bx+a)\sin(bx+a)^3}{9}-\frac{2\left(2+\sin(bx+a)^2\right)\cos(bx+a)}{27}\Bigg)\Bigg)$$
$$-\frac{3 a d^3\left(\frac{(bx+a)^2\sin(bx+a)^3}{3}+\frac{2\,(bx+a)\left(2+\sin(bx+a)^2\right)\cos(bx+a)}{9}-\frac{2\sin(bx+a)^3}{27}-\frac{4\sin(bx+a)}{9}\right)}{b^3}$$
$$+\frac{3 c d^2\left(\frac{(bx+a)^2\sin(bx+a)^3}{3}+\frac{2\,(bx+a)\left(2+\sin(bx+a)^2\right)\cos(bx+a)}{9}-\frac{2\sin(bx+a)^3}{27}-\frac{4\sin(bx+a)}{9}\right)}{b^2}$$
$$+\frac{3 a^2 d^3\left(\frac{(bx+a)\sin(bx+a)^3}{3}+\frac{\left(2+\sin(bx+a)^2\right)\cos(bx+a)}{9}\right)}{b^3}-\frac{6 a c d^2\left(\frac{(bx+a)\sin(bx+a)^3}{3}+\frac{\left(2+\sin(bx+a)^2\right)\cos(bx+a)}{9}\right)}{b^2}$$
$$+\frac{3 c^2 d\left(\frac{(bx+a)\sin(bx+a)^3}{3}+\frac{\left(2+\sin(bx+a)^2\right)\cos(bx+a)}{9}\right)}{b}-\frac{a^3 d^3\sin(bx+a)^3}{3 b^3}+\frac{a^2 c d^2\sin(bx+a)^3}{b^2}-\frac{a c^2 d\sin(bx+a)^3}{b}$$
$$+\frac{c^3\sin(bx+a)^3}{3}\Bigg)$$

Problem 6: Result more than twice size of optimal antiderivative.

$$\int (dx+c)^2 \cos(bx+a)\sin(bx+a)^2\,dx$$

Optimal(type 3, 93 leaves, 4 steps):

$$\frac{4d(dx+c)\cos(bx+a)}{9b^2}-\frac{4d^2\sin(bx+a)}{9b^3}+\frac{2d(dx+c)\cos(bx+a)\sin(bx+a)^2}{9b^2}-\frac{2d^2\sin(bx+a)^3}{27b^3}+\frac{(dx+c)^2\sin(bx+a)^3}{3b}$$

Result(type 3, 203 leaves):

$$\frac{1}{b}\left(\frac{d^2\left(\frac{(bx+a)^2\sin(bx+a)^3}{3}+\frac{2(bx+a)\left(2+\sin(bx+a)^2\right)\cos(bx+a)}{9}-\frac{2\sin(bx+a)^3}{27}-\frac{4\sin(bx+a)}{9}\right)}{b^2}\right.$$
$$-\frac{2ad^2\left(\frac{(bx+a)\sin(bx+a)^3}{3}+\frac{\left(2+\sin(bx+a)^2\right)\cos(bx+a)}{9}\right)}{b^2}+\frac{2cd\left(\frac{(bx+a)\sin(bx+a)^3}{3}+\frac{\left(2+\sin(bx+a)^2\right)\cos(bx+a)}{9}\right)}{b}$$
$$\left.+\frac{a^2d^2\sin(bx+a)^3}{3b^2}-\frac{2acd\sin(bx+a)^3}{3b}+\frac{c^2\sin(bx+a)^3}{3}\right)$$

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

$$\int (dx+c)^4 \cos(bx+a)\sin(bx+a)^3\,dx$$

Optimal(type 3, 236 leaves, 9 steps):

$$\frac{45cd^3x}{64b^3}+\frac{45d^4x^2}{128b^3}-\frac{3(dx+c)^4}{32b}-\frac{45d^3(dx+c)\cos(bx+a)\sin(bx+a)}{64b^4}+\frac{3d(dx+c)^3\cos(bx+a)\sin(bx+a)}{8b^2}+\frac{45d^4\sin(bx+a)^2}{128b^5}$$
$$-\frac{9d^2(dx+c)^2\sin(bx+a)^2}{16b^3}-\frac{3d^3(dx+c)\cos(bx+a)\sin(bx+a)^3}{32b^4}+\frac{d(dx+c)^3\cos(bx+a)\sin(bx+a)^3}{4b^2}+\frac{3d^4\sin(bx+a)^4}{128b^5}$$
$$-\frac{3d^2(dx+c)^2\sin(bx+a)^4}{16b^3}+\frac{(dx+c)^4\sin(bx+a)^4}{4b}$$

Result(type 3, 1142 leaves):

$$\frac{1}{b}\left(\frac{1}{b^4}\left(d^4\left(\frac{(bx+a)^4\sin(bx+a)^4}{4}-(bx+a)^3\left(-\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4}+\frac{3bx}{8}+\frac{3a}{8}\right)-\frac{3(bx+a)^2\sin(bx+a)^4}{16}\right.\right.\right.$$
$$+\frac{3(bx+a)\left(-\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4}+\frac{3bx}{8}+\frac{3a}{8}\right)}{8}+\frac{27(bx+a)^2}{128}+\frac{3\sin(bx+a)^4}{128}+\frac{45\sin(bx+a)^2}{128}$$

$$+\frac{9\,(b\,x+a)^2\cos(b\,x+a)^2}{16}-\frac{9\,(b\,x+a)\left(\frac{\cos(b\,x+a)\,\sin(b\,x+a)}{2}+\frac{b\,x}{2}+\frac{a}{2}\right)}{8}+\frac{9\,(b\,x+a)^4}{32}\Bigg)\Bigg)$$

$$-\frac{1}{b^4}\Bigg(4\,a\,d^4\Bigg(\frac{(b\,x+a)^3\sin(b\,x+a)^4}{4}-\frac{3\,(b\,x+a)^2\left(-\frac{\left(\sin(b\,x+a)^3+\frac{3\sin(b\,x+a)}{2}\right)\cos(b\,x+a)}{4}+\frac{3\,b\,x}{8}+\frac{3\,a}{8}\right)}{4}$$

$$-\frac{3\,(b\,x+a)\,\sin(b\,x+a)^4}{32}-\frac{3\left(\sin(b\,x+a)^3+\frac{3\sin(b\,x+a)}{2}\right)\cos(b\,x+a)}{128}-\frac{27\,b\,x}{256}-\frac{27\,a}{256}+\frac{9\,(b\,x+a)\,\cos(b\,x+a)^2}{32}$$

$$-\frac{9\cos(b\,x+a)\,\sin(b\,x+a)}{64}+\frac{3\,(b\,x+a)^3}{16}\Bigg)\Bigg)+\frac{1}{b^3}\Bigg(4\,c\,d^3\Bigg(\frac{(b\,x+a)^3\sin(b\,x+a)^4}{4}$$

$$-\frac{3\,(b\,x+a)^2\left(-\frac{\left(\sin(b\,x+a)^3+\frac{3\sin(b\,x+a)}{2}\right)\cos(b\,x+a)}{4}+\frac{3\,b\,x}{8}+\frac{3\,a}{8}\right)}{4}-\frac{3\,(b\,x+a)\,\sin(b\,x+a)^4}{32}$$

$$-\frac{3\left(\sin(b\,x+a)^3+\frac{3\sin(b\,x+a)}{2}\right)\cos(b\,x+a)}{128}-\frac{27\,b\,x}{256}-\frac{27\,a}{256}+\frac{9\,(b\,x+a)\,\cos(b\,x+a)^2}{32}-\frac{9\cos(b\,x+a)\,\sin(b\,x+a)}{64}+\frac{3\,(b\,x+a)^3}{16}\Bigg)\Bigg)$$

$$+\frac{1}{b^4}\Bigg(6\,a^2\,d^4\Bigg(\frac{(b\,x+a)^2\sin(b\,x+a)^4}{4}-\frac{(b\,x+a)\left(-\frac{\left(\sin(b\,x+a)^3+\frac{3\sin(b\,x+a)}{2}\right)\cos(b\,x+a)}{4}+\frac{3\,b\,x}{8}+\frac{3\,a}{8}\right)}{2}+\frac{3\,(b\,x+a)^2}{32}$$

$$-\frac{\sin(b\,x+a)^4}{32}-\frac{3\sin(b\,x+a)^2}{32}\Bigg)\Bigg)-\frac{1}{b^3}\Bigg(12\,a\,c\,d^3\Bigg(\frac{(b\,x+a)^2\sin(b\,x+a)^4}{4}$$

$$- \frac{(bx+a)\left(-\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4}+\frac{3bx}{8}+\frac{3a}{8}\right)}{2} + \frac{3(bx+a)^2}{32} - \frac{\sin(bx+a)^4}{32} - \frac{3\sin(bx+a)^2}{32} \Bigg)\Bigg)$$

$$+ \frac{1}{b^2}\Bigg(6c^2d^2\Bigg(\frac{(bx+a)^2\sin(bx+a)^4}{4} - \frac{(bx+a)\left(-\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4}+\frac{3bx}{8}+\frac{3a}{8}\right)}{2} + \frac{3(bx+a)^2}{32}$$

$$- \frac{\sin(bx+a)^4}{32} - \frac{3\sin(bx+a)^2}{32}\Bigg)\Bigg) - \frac{4a^3d^4\left(\frac{(bx+a)\sin(bx+a)^4}{4}+\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{16}-\frac{3bx}{32}-\frac{3a}{32}\right)}{b^4}$$

$$+ \frac{12a^2cd^3\left(\frac{(bx+a)\sin(bx+a)^4}{4}+\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{16}-\frac{3bx}{32}-\frac{3a}{32}\right)}{b^3}$$

$$- \frac{12ac^2d^2\left(\frac{(bx+a)\sin(bx+a)^4}{4}+\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{16}-\frac{3bx}{32}-\frac{3a}{32}\right)}{b^2}$$

$$+ \frac{4c^3d\left(\frac{(bx+a)\sin(bx+a)^4}{4}+\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{16}-\frac{3bx}{32}-\frac{3a}{32}\right)}{b} + \frac{a^4d^4\sin(bx+a)^4}{4b^4} - \frac{a^3cd^3\sin(bx+a)^4}{b^3}$$

$$+ \frac{3a^2c^2d^2\sin(bx+a)^4}{2b^2} - \frac{ac^3d\sin(bx+a)^4}{b} + \frac{c^4\sin(bx+a)^4}{4}\Bigg)$$

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

$$\int (dx+c)\cos(bx+a)\csc(bx+a)\,dx$$

Optimal(type 4, 55 leaves, 4 steps):

$$-\frac{I(dx+c)^2}{2d} + \frac{(dx+c)\ln\left(1-e^{2I(bx+a)}\right)}{b} - \frac{I d\,\mathrm{polylog}\left(2, e^{2I(bx+a)}\right)}{2b^2}$$

Result(type 4, 214 leaves):

$$-\frac{Idx^2}{2} + Icx - \frac{2c\ln\left(e^{I(bx+a)}\right)}{b} + \frac{c\ln\left(e^{I(bx+a)}-1\right)}{b} + \frac{c\ln\left(e^{I(bx+a)}+1\right)}{b} - \frac{2Idax}{b} - \frac{Ida^2}{b^2} + \frac{d\ln\left(1-e^{I(bx+a)}\right)x}{b} + \frac{d\ln\left(1-e^{I(bx+a)}\right)a}{b^2}$$

$$-\frac{I d \operatorname{polylog}(2, e^{I(bx+a)})}{b^2}+\frac{d\ln(e^{I(bx+a)}+1)x}{b}-\frac{I d \operatorname{polylog}(2, -e^{I(bx+a)})}{b^2}+\frac{2ad\ln(e^{I(bx+a)})}{b^2}-\frac{ad\ln(e^{I(bx+a)}-1)}{b^2}$$

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

$$\int (dx+c)^4\cos(bx+a)\csc(bx+a)^2\,dx$$

Optimal(type 4, 190 leaves, 10 steps):

$$-\frac{8d(dx+c)^3\operatorname{arctanh}(e^{I(bx+a)})}{b^2}-\frac{(dx+c)^4\csc(bx+a)}{b}+\frac{12Id^2(dx+c)^2\operatorname{polylog}(2,-e^{I(bx+a)})}{b^3}-\frac{12Id^2(dx+c)^2\operatorname{polylog}(2,e^{I(bx+a)})}{b^3}-\frac{24d^3(dx+c)\operatorname{polylog}(3,-e^{I(bx+a)})}{b^4}+\frac{24d^3(dx+c)\operatorname{polylog}(3,e^{I(bx+a)})}{b^4}-\frac{24Id^4\operatorname{polylog}(4,-e^{I(bx+a)})}{b^5}+\frac{24Id^4\operatorname{polylog}(4,e^{I(bx+a)})}{b^5}$$

Result(type 4, 715 leaves):

$$-\frac{2I(d^4x^4+4cd^3x^3+6c^2d^2x^2+4c^3dx+c^4)e^{I(bx+a)}}{b(e^{2I(bx+a)}-1)}-\frac{12Id^4\operatorname{polylog}(2,e^{I(bx+a)})x^2}{b^3}+\frac{12Id^4\operatorname{polylog}(2,-e^{I(bx+a)})x^2}{b^3}-\frac{12Id^2c^2\operatorname{polylog}(2,e^{I(bx+a)})}{b^3}+\frac{12Id^2c^2\operatorname{polylog}(2,-e^{I(bx+a)})}{b^3}+\frac{24Id^4\operatorname{polylog}(4,e^{I(bx+a)})}{b^5}-\frac{24Id^3c\operatorname{polylog}(2,e^{I(bx+a)})x}{b^3}+\frac{24Id^3c\operatorname{polylog}(2,-e^{I(bx+a)})x}{b^3}+\frac{24d^4\operatorname{polylog}(3,e^{I(bx+a)})x}{b^4}-\frac{8dc^3\operatorname{arctanh}(e^{I(bx+a)})}{b^2}+\frac{8d^4a^3\operatorname{arctanh}(e^{I(bx+a)})}{b^5}+\frac{24d^3c\operatorname{polylog}(3,e^{I(bx+a)})}{b^4}-\frac{24d^3c\operatorname{polylog}(3,-e^{I(bx+a)})}{b^4}-\frac{24d^4\operatorname{polylog}(3,-e^{I(bx+a)})x}{b^4}-\frac{12d^2c^2\ln(e^{I(bx+a)}+1)x}{b^2}-\frac{12d^2c^2\ln(e^{I(bx+a)}+1)a}{b^3}+\frac{12d^2c^2\ln(1-e^{I(bx+a)})x}{b^2}+\frac{12d^2c^2\ln(1-e^{I(bx+a)})a}{b^3}+\frac{12d^3ca^2\ln(e^{I(bx+a)}+1)}{b^4}-\frac{12d^3ca^2\ln(1-e^{I(bx+a)})}{b^4}+\frac{12d^3c\ln(1-e^{I(bx+a)})x^2}{b^2}-\frac{12d^3c\ln(e^{I(bx+a)}+1)x^2}{b^2}-\frac{4d^4\ln(e^{I(bx+a)}+1)x^3}{b^2}-\frac{4d^4\ln(e^{I(bx+a)}+1)a^3}{b^5}+\frac{4d^4\ln(1-e^{I(bx+a)})x^3}{b^2}+\frac{4d^4\ln(1-e^{I(bx+a)})a^3}{b^5}-\frac{24d^3a^2c\operatorname{arctanh}(e^{I(bx+a)})}{b^4}+\frac{24d^2ac^2\operatorname{arctanh}(e^{I(bx+a)})}{b^3}-\frac{24Id^4\operatorname{polylog}(4,-e^{I(bx+a)})}{b^5}$$

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

$$\int (dx+c)^2\cos(bx+a)\csc(bx+a)^2\,dx$$

Optimal(type 4, 82 leaves, 6 steps):

$$-\frac{4d(dx+c)\operatorname{arctanh}(e^{I(bx+a)})}{b^2}-\frac{(dx+c)^2\csc(bx+a)}{b}+\frac{2Id^2\operatorname{polylog}(2,-e^{I(bx+a)})}{b^3}-\frac{2Id^2\operatorname{polylog}(2,e^{I(bx+a)})}{b^3}$$

Result(type 4, 211 leaves):

$$-\frac{2I(x^2d^2+2cdx+c^2)e^{I(bx+a)}}{b(e^{2I(bx+a)}-1)}-\frac{4dc\operatorname{arctanh}(e^{I(bx+a)})}{b^2}+\frac{2d^2\ln(1-e^{I(bx+a)})x}{b^2}+\frac{2d^2\ln(1-e^{I(bx+a)})a}{b^3}-\frac{2Id^2\operatorname{polylog}(2,e^{I(bx+a)})}{b^3}$$

$$- \frac{2 d^2 \ln(e^{I(bx+a)}+1) x}{b^2} - \frac{2 d^2 \ln(e^{I(bx+a)}+1) a}{b^3} + \frac{2 I d^2 \mathrm{polylog}(2, -e^{I(bx+a)})}{b^3} + \frac{4 d^2 a \,\mathrm{arctanh}(e^{I(bx+a)})}{b^3}$$

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

$$\int (dx+c)^3 \cos(bx+a) \csc(bx+a)^3 \, dx$$

Optimal(type 4, 101 leaves, 6 steps):

$$-\frac{3 I d (dx+c)^2}{2 b^2} - \frac{3 d (dx+c)^2 \cot(bx+a)}{2 b^2} - \frac{(dx+c)^3 \csc(bx+a)^2}{2 b} + \frac{3 d^2 (dx+c) \ln(1-e^{2 I(bx+a)})}{b^3} - \frac{3 I d^3 \mathrm{polylog}(2, e^{2 I(bx+a)})}{2 b^4}$$

Result(type 4, 408 leaves):

$$\frac{1}{b^2 (e^{2 I(bx+a)}-1)^2} \left(2 b d^3 x^3 e^{2 I(bx+a)} - 3 I d^3 x^2 e^{2 I(bx+a)} + 6 b c d^2 x^2 e^{2 I(bx+a)} - 6 I c d^2 x e^{2 I(bx+a)} + 6 b c^2 d x e^{2 I(bx+a)} - 3 I c^2 d e^{2 I(bx+a)} + 3 I d^3 x^2 + 2 b c^3 e^{2 I(bx+a)} + 6 I c d^2 x + 3 I c^2 d\right) - \frac{6 d^2 c \ln(e^{I(bx+a)})}{b^3} + \frac{3 d^2 c \ln(e^{I(bx+a)}-1)}{b^3} + \frac{3 d^2 c \ln(e^{I(bx+a)}+1)}{b^3} - \frac{3 I d^3 x^2}{b^2} - \frac{6 I d^3 a x}{b^3} - \frac{3 I d^3 a^2}{b^4} + \frac{3 d^3 \ln(1-e^{I(bx+a)}) x}{b^3} + \frac{3 d^3 \ln(1-e^{I(bx+a)}) a}{b^4} - \frac{3 I d^3 \mathrm{polylog}(2, e^{I(bx+a)})}{b^4} + \frac{3 d^3 \ln(e^{I(bx+a)}+1) x}{b^3} - \frac{3 I d^3 \mathrm{polylog}(2, -e^{I(bx+a)})}{b^4} + \frac{6 d^3 a \ln(e^{I(bx+a)})}{b^4} - \frac{3 d^3 a \ln(e^{I(bx+a)}-1)}{b^4}$$

Problem 23: Unable to integrate problem.

$$\int (dx+c)^m \cos(bx+a)^2 \sin(bx+a) \, dx$$

Optimal(type 4, 247 leaves, 8 steps):

$$-\frac{e^{I\left(a-\frac{bc}{d}\right)} (dx+c)^m \Gamma\left(1+m, \frac{-I b (dx+c)}{d}\right)}{8 b \left(\frac{-I b (dx+c)}{d}\right)^m} - \frac{(dx+c)^m \Gamma\left(1+m, \frac{I b (dx+c)}{d}\right)}{8 b e^{I\left(a-\frac{bc}{d}\right)} \left(\frac{I b (dx+c)}{d}\right)^m} - \frac{3^{-1-m} e^{3 I\left(a-\frac{bc}{d}\right)} (dx+c)^m \Gamma\left(1+m, \frac{-3 I b (dx+c)}{d}\right)}{8 b \left(\frac{-I b (dx+c)}{d}\right)^m} - \frac{3^{-1-m} (dx+c)^m \Gamma\left(1+m, \frac{3 I b (dx+c)}{d}\right)}{8 b e^{3 I\left(a-\frac{bc}{d}\right)} \left(\frac{I b (dx+c)}{d}\right)^m}$$

Result(type 8, 24 leaves):

$$\int (dx+c)^m \cos(bx+a)^2 \sin(bx+a) \, dx$$

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

$$\int (d x+c)^4 \cos(b x+a)^2 \sin(b x+a)^2\, dx$$

Optimal(type 3, 119 leaves, 7 steps):

$$\frac{(d x+c)^5}{40 d}+\frac{3 d^3 (d x+c) \cos(4 b x+4 a)}{256 b^4}-\frac{d (d x+c)^3 \cos(4 b x+4 a)}{32 b^2}-\frac{3 d^4 \sin(4 b x+4 a)}{1024 b^5}+\frac{3 d^2 (d x+c)^2 \sin(4 b x+4 a)}{128 b^3} -\frac{(d x+c)^4 \sin(4 b x+4 a)}{32 b}$$

Result(type 3, 1914 leaves):

$$\frac{1}{b}\Bigg(\frac{1}{b^4}\Bigg(d^4\Bigg((b x+a)^4\left(-\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)-\frac{(b x+a)^3 \cos(b x+a)^2}{4}+\frac{3 (b x+a)^2\left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)}{4}$$

$$+\frac{3 (b x+a) \cos(b x+a)^2}{32}-\frac{3 \cos(b x+a) \sin(b x+a)}{64}-\frac{21 b x}{256}-\frac{21 a}{256}-\frac{7 (b x+a)^3}{16}-\frac{(b x+a)^5}{10}-(b x+a)^4\Bigg($$

$$-\frac{\left(\sin(b x+a)^3+\frac{3 \sin(b x+a)}{2}\right) \cos(b x+a)}{4}+\frac{3 b x}{8}+\frac{3 a}{8}\Bigg)-\frac{(b x+a)^3 \sin(b x+a)^4}{4}$$

$$+\frac{3 (b x+a)^2\left(-\frac{\left(\sin(b x+a)^3+\frac{3 \sin(b x+a)}{2}\right) \cos(b x+a)}{4}+\frac{3 b x}{8}+\frac{3 a}{8}\right)}{4}+\frac{3 (b x+a) \sin(b x+a)^4}{32}$$

$$+\frac{3\left(\sin(b x+a)^3+\frac{3 \sin(b x+a)}{2}\right) \cos(b x+a)}{128}\Bigg)\Bigg)-\frac{1}{b^4}\Bigg(4 a d^4\Bigg((b x+a)^3\left(-\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)$$

$$-\frac{3 (b x+a)^2 \cos(b x+a)^2}{16}+\frac{3 (b x+a)\left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)}{8}-\frac{21 (b x+a)^2}{128}-\frac{3 \sin(b x+a)^2}{128}-\frac{3 (b x+a)^4}{32}$$

$$-(bx+a)^3\left(-\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4}+\frac{3bx}{8}+\frac{3a}{8}\right)-\frac{3(bx+a)^2\sin(bx+a)^4}{16}$$

$$+\frac{3(bx+a)\left(-\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4}+\frac{3bx}{8}+\frac{3a}{8}\right)}{8}+\frac{3\sin(bx+a)^4}{128}\Bigg)\Bigg)+\frac{1}{b^3}\Bigg(4cd^3\Bigg((bx+a)^3\Bigg($$

$$-\frac{\cos(bx+a)\sin(bx+a)}{2}+\frac{bx}{2}+\frac{a}{2}\Bigg)-\frac{3(bx+a)^2\cos(bx+a)^2}{16}+\frac{3(bx+a)\left(\frac{\cos(bx+a)\sin(bx+a)}{2}+\frac{bx}{2}+\frac{a}{2}\right)}{8}-\frac{21(bx+a)^2}{128}$$

$$-\frac{3\sin(bx+a)^2}{128}-\frac{3(bx+a)^4}{32}-(bx+a)^3\left(-\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4}+\frac{3bx}{8}+\frac{3a}{8}\right)-\frac{3(bx+a)^2\sin(bx+a)^4}{16}$$

$$+\frac{3(bx+a)\left(-\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4}+\frac{3bx}{8}+\frac{3a}{8}\right)}{8}+\frac{3\sin(bx+a)^4}{128}\Bigg)\Bigg)+\frac{1}{b^4}\Bigg(6a^2d^4\Bigg((bx+a)^2\Bigg($$

$$-\frac{\cos(bx+a)\sin(bx+a)}{2}+\frac{bx}{2}+\frac{a}{2}\Bigg)-\frac{(bx+a)\cos(bx+a)^2}{8}+\frac{\cos(bx+a)\sin(bx+a)}{16}+\frac{7bx}{64}+\frac{7a}{64}-\frac{(bx+a)^3}{12}-(bx+a)^2\Bigg($$

$$-\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4}+\frac{3bx}{8}+\frac{3a}{8}\Bigg)-\frac{(bx+a)\sin(bx+a)^4}{8}$$

$$-\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{32}\Bigg)\Bigg)-\frac{1}{b^3}\Bigg(12acd^3\Bigg((bx+a)^2\left(-\frac{\cos(bx+a)\sin(bx+a)}{2}+\frac{bx}{2}+\frac{a}{2}\right)$$

$$-\frac{(bx+a)\cos(bx+a)^2}{8}+\frac{\cos(bx+a)\sin(bx+a)}{16}+\frac{7bx}{64}+\frac{7a}{64}-\frac{(bx+a)^3}{12}-(bx+a)^2\Bigg($$

$$- \frac{\left(\sin(b x + a)^3 + \frac{3 \sin(b x + a)}{2}\right) \cos(b x + a)}{4} + \frac{3 b x}{8} + \frac{3 a}{8} \Bigg) - \frac{(b x + a) \sin(b x + a)^4}{8}$$

$$- \frac{\left(\sin(b x + a)^3 + \frac{3 \sin(b x + a)}{2}\right) \cos(b x + a)}{32} \Bigg) \Bigg) + \frac{1}{b^2} \Bigg(6 c^2 d^2 \Bigg((b x + a)^2 \Big(- \frac{\cos(b x + a) \sin(b x + a)}{2} + \frac{b x}{2} + \frac{a}{2} \Big)$$

$$- \frac{(b x + a) \cos(b x + a)^2}{8} + \frac{\cos(b x + a) \sin(b x + a)}{16} + \frac{7 b x}{64} + \frac{7 a}{64} - \frac{(b x + a)^3}{12} - (b x + a)^2 \Bigg($$

$$- \frac{\left(\sin(b x + a)^3 + \frac{3 \sin(b x + a)}{2}\right) \cos(b x + a)}{4} + \frac{3 b x}{8} + \frac{3 a}{8} \Bigg) - \frac{(b x + a) \sin(b x + a)^4}{8}$$

$$- \frac{\left(\sin(b x + a)^3 + \frac{3 \sin(b x + a)}{2}\right) \cos(b x + a)}{32} \Bigg) \Bigg) - \frac{1}{b^4} \Bigg(4 a^3 d^4 \Bigg((b x + a) \Big(- \frac{\cos(b x + a) \sin(b x + a)}{2} + \frac{b x}{2} + \frac{a}{2} \Big) - \frac{(b x + a)^2}{16}$$

$$+ \frac{\sin(b x + a)^2}{16} - (b x + a) \Bigg(- \frac{\left(\sin(b x + a)^3 + \frac{3 \sin(b x + a)}{2}\right) \cos(b x + a)}{4} + \frac{3 b x}{8} + \frac{3 a}{8} \Bigg) - \frac{\sin(b x + a)^4}{16} \Bigg) \Bigg) + \frac{1}{b^3} \Bigg(12 a^2 c d^3 \Bigg((b x$$

$$+ a) \Big(- \frac{\cos(b x + a) \sin(b x + a)}{2} + \frac{b x}{2} + \frac{a}{2} \Big) - \frac{(b x + a)^2}{16} + \frac{\sin(b x + a)^2}{16} - (b x + a) \Bigg(- \frac{\left(\sin(b x + a)^3 + \frac{3 \sin(b x + a)}{2}\right) \cos(b x + a)}{4}$$

$$+ \frac{3 b x}{8} + \frac{3 a}{8} \Bigg) - \frac{\sin(b x + a)^4}{16} \Bigg) \Bigg) - \frac{1}{b^2} \Bigg(12 a c^2 d^2 \Bigg((b x + a) \Big(- \frac{\cos(b x + a) \sin(b x + a)}{2} + \frac{b x}{2} + \frac{a}{2} \Big) - \frac{(b x + a)^2}{16} + \frac{\sin(b x + a)^2}{16}$$

$$- (b x + a) \Bigg(- \frac{\left(\sin(b x + a)^3 + \frac{3 \sin(b x + a)}{2}\right) \cos(b x + a)}{4} + \frac{3 b x}{8} + \frac{3 a}{8} \Bigg) - \frac{\sin(b x + a)^4}{16} \Bigg) \Bigg) + \frac{1}{b} \Bigg(4 c^3 d \Bigg((b x + a) \Big($$

$$- \frac{\cos(b x + a) \sin(b x + a)}{2} + \frac{b x}{2} + \frac{a}{2} \Big) - \frac{(b x + a)^2}{16} + \frac{\sin(b x + a)^2}{16} - (b x + a) \Bigg(- \frac{\left(\sin(b x + a)^3 + \frac{3 \sin(b x + a)}{2}\right) \cos(b x + a)}{4} + \frac{3 b x}{8}$$

$$+\frac{3a}{8}\Bigg)-\frac{\sin(bx+a)^4}{16}\Bigg)\Bigg)+\frac{a^4 d^4\left(-\frac{\cos(bx+a)^3\sin(bx+a)}{4}+\frac{\cos(bx+a)\sin(bx+a)}{8}+\frac{bx}{8}+\frac{a}{8}\right)}{b^4}$$

$$-\frac{4a^3 c d^3\left(-\frac{\cos(bx+a)^3\sin(bx+a)}{4}+\frac{\cos(bx+a)\sin(bx+a)}{8}+\frac{bx}{8}+\frac{a}{8}\right)}{b^3}$$

$$+\frac{6a^2c^2d^2\left(-\frac{\cos(bx+a)^3\sin(bx+a)}{4}+\frac{\cos(bx+a)\sin(bx+a)}{8}+\frac{bx}{8}+\frac{a}{8}\right)}{b^2}$$

$$-\frac{4ac^3d\left(-\frac{\cos(bx+a)^3\sin(bx+a)}{4}+\frac{\cos(bx+a)\sin(bx+a)}{8}+\frac{bx}{8}+\frac{a}{8}\right)}{b}+c^4\Bigg(-\frac{\cos(bx+a)^3\sin(bx+a)}{4}+\frac{\cos(bx+a)\sin(bx+a)}{8}$$

$$+\frac{bx}{8}+\frac{a}{8}\Bigg)\Bigg)$$

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

$$\int (dx+c)^3\cos(bx+a)^2\sin(bx+a)^2\,dx$$

Optimal(type 3, 95 leaves, 6 steps):

$$\frac{(dx+c)^4}{32d}+\frac{3d^3\cos(4bx+4a)}{1024b^4}-\frac{3d(dx+c)^2\cos(4bx+4a)}{128b^2}+\frac{3d^2(dx+c)\sin(4bx+4a)}{256b^3}-\frac{(dx+c)^3\sin(4bx+4a)}{32b}$$

Result(type 3, 1073 leaves):

$$\frac{1}{b}\Bigg(\frac{1}{b^3}\Bigg(d^3\Bigg((bx+a)^3\left(-\frac{\cos(bx+a)\sin(bx+a)}{2}+\frac{bx}{2}+\frac{a}{2}\right)-\frac{3(bx+a)^2\cos(bx+a)^2}{16}$$

$$+\frac{3(bx+a)\left(\frac{\cos(bx+a)\sin(bx+a)}{2}+\frac{bx}{2}+\frac{a}{2}\right)}{8}-\frac{21(bx+a)^2}{128}-\frac{3\sin(bx+a)^2}{128}-\frac{3(bx+a)^4}{32}-(bx+a)^3\Bigg($$

$$-\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4}+\frac{3bx}{8}+\frac{3a}{8}\Bigg)-\frac{3(bx+a)^2\sin(bx+a)^4}{16}$$

$$+\frac{3(bx+a)\left(-\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4}+\frac{3bx}{8}+\frac{3a}{8}\right)}{8}+\frac{3\sin(bx+a)^4}{128}\Bigg)\Bigg)-\frac{1}{b^3}\Bigg(3ad^3\Bigg((bx+a)^2\Bigg($$

$$- \frac{\cos(bx+a)\sin(bx+a)}{2} + \frac{bx}{2} + \frac{a}{2}\Bigg) - \frac{(bx+a)\cos(bx+a)^2}{8} + \frac{\cos(bx+a)\sin(bx+a)}{16} + \frac{7bx}{64} + \frac{7a}{64} - \frac{(bx+a)^3}{12} - (bx+a)^2\Bigg($$

$$- \frac{\left(\sin(bx+a)^3 + \frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4} + \frac{3bx}{8} + \frac{3a}{8}\Bigg) - \frac{(bx+a)\sin(bx+a)^4}{8}$$

$$- \frac{\left(\sin(bx+a)^3 + \frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{32}\Bigg)\Bigg) + \frac{1}{b^2}\Bigg(3cd^2\Bigg((bx+a)^2\Bigg(- \frac{\cos(bx+a)\sin(bx+a)}{2} + \frac{bx}{2} + \frac{a}{2}\Bigg)$$

$$- \frac{(bx+a)\cos(bx+a)^2}{8} + \frac{\cos(bx+a)\sin(bx+a)}{16} + \frac{7bx}{64} + \frac{7a}{64} - \frac{(bx+a)^3}{12} - (bx+a)^2\Bigg($$

$$- \frac{\left(\sin(bx+a)^3 + \frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4} + \frac{3bx}{8} + \frac{3a}{8}\Bigg) - \frac{(bx+a)\sin(bx+a)^4}{8}$$

$$- \frac{\left(\sin(bx+a)^3 + \frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{32}\Bigg)\Bigg) + \frac{1}{b^3}\Bigg(3a^2d^3\Bigg((bx+a)\Bigg(- \frac{\cos(bx+a)\sin(bx+a)}{2} + \frac{bx}{2} + \frac{a}{2}\Bigg) - \frac{(bx+a)^2}{16}$$

$$+ \frac{\sin(bx+a)^2}{16} - (bx+a)\Bigg(- \frac{\left(\sin(bx+a)^3 + \frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4} + \frac{3bx}{8} + \frac{3a}{8}\Bigg) - \frac{\sin(bx+a)^4}{16}\Bigg)\Bigg) - \frac{1}{b^2}\Bigg(6acd^2\Bigg((bx$$

$$+a)\Bigg(- \frac{\cos(bx+a)\sin(bx+a)}{2} + \frac{bx}{2} + \frac{a}{2}\Bigg) - \frac{(bx+a)^2}{16} + \frac{\sin(bx+a)^2}{16} - (bx+a)\Bigg(- \frac{\left(\sin(bx+a)^3 + \frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4}$$

$$+ \frac{3bx}{8} + \frac{3a}{8}\Bigg) - \frac{\sin(bx+a)^4}{16}\Bigg)\Bigg) + \frac{1}{b}\Bigg(3c^2d\Bigg((bx+a)\Bigg(- \frac{\cos(bx+a)\sin(bx+a)}{2} + \frac{bx}{2} + \frac{a}{2}\Bigg) - \frac{(bx+a)^2}{16} + \frac{\sin(bx+a)^2}{16} - (bx$$

$$+a)\Bigg(- \frac{\left(\sin(bx+a)^3 + \frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{4} + \frac{3bx}{8} + \frac{3a}{8}\Bigg) - \frac{\sin(bx+a)^4}{16}\Bigg)\Bigg)$$

$$-\frac{a^3 d^3 \left(-\frac{\cos(bx+a)^3 \sin(bx+a)}{4}+\frac{\cos(bx+a)\sin(bx+a)}{8}+\frac{bx}{8}+\frac{a}{8}\right)}{b^3}$$
$$+\frac{3a^2 c d^2 \left(-\frac{\cos(bx+a)^3 \sin(bx+a)}{4}+\frac{\cos(bx+a)\sin(bx+a)}{8}+\frac{bx}{8}+\frac{a}{8}\right)}{b^2}$$
$$-\frac{3a c^2 d \left(-\frac{\cos(bx+a)^3 \sin(bx+a)}{4}+\frac{\cos(bx+a)\sin(bx+a)}{8}+\frac{bx}{8}+\frac{a}{8}\right)}{b}+c^3\left(-\frac{\cos(bx+a)^3 \sin(bx+a)}{4}+\frac{\cos(bx+a)\sin(bx+a)}{8}\right.$$
$$\left.\left.+\frac{bx}{8}+\frac{a}{8}\right)\right)$$

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

$$\int (dx+c)^2\cos(bx+a)^2\sin(bx+a)^3\,dx$$

Optimal(type 3, 166 leaves, 11 steps):

$$\frac{d^2\cos(bx+a)}{4b^3}-\frac{(dx+c)^2\cos(bx+a)}{8b}+\frac{d^2\cos(3bx+3a)}{216b^3}-\frac{(dx+c)^2\cos(3bx+3a)}{48b}-\frac{d^2\cos(5bx+5a)}{1000b^3}+\frac{(dx+c)^2\cos(5bx+5a)}{80b}$$
$$+\frac{d(dx+c)\sin(bx+a)}{4b^2}+\frac{d(dx+c)\sin(3bx+3a)}{72b^2}-\frac{d(dx+c)\sin(5bx+5a)}{200b^2}$$

Result(type 3, 465 leaves):

$$\frac{1}{b}\left(\frac{1}{b^2}\left(d^2\left(-\frac{(bx+a)^2(2+\sin(bx+a)^2)\cos(bx+a)}{3}+\frac{4\cos(bx+a)}{15}+\frac{4\sin(bx+a)(bx+a)}{15}+\frac{2(bx+a)\sin(bx+a)^3}{45}\right.\right.\right.$$
$$+\frac{2(2+\sin(bx+a)^2)\cos(bx+a)}{135}+\frac{(bx+a)^2\left(\frac{8}{3}+\sin(bx+a)^4+\frac{4\sin(bx+a)^2}{3}\right)\cos(bx+a)}{5}-\frac{2(bx+a)\sin(bx+a)^5}{25}$$
$$\left.\left.-\frac{2\left(\frac{8}{3}+\sin(bx+a)^4+\frac{4\sin(bx+a)^2}{3}\right)\cos(bx+a)}{125}\right)\right)-\frac{1}{b^2}\left(2ad^2\left(-\frac{(bx+a)(2+\sin(bx+a)^2)\cos(bx+a)}{3}+\frac{\sin(bx+a)^3}{45}\right.\right.$$
$$\left.\left.+\frac{2\sin(bx+a)}{15}+\frac{(bx+a)\left(\frac{8}{3}+\sin(bx+a)^4+\frac{4\sin(bx+a)^2}{3}\right)\cos(bx+a)}{5}-\frac{\sin(bx+a)^5}{25}\right)\right)+\frac{1}{b}\left(2cd\left(\right.\right.$$

$$- \frac{(bx+a)\,(2+\sin(bx+a)^2)\cos(bx+a)}{3} + \frac{\sin(bx+a)^3}{45} + \frac{2\sin(bx+a)}{15} + \frac{(bx+a)\left(\frac{8}{3} + \sin(bx+a)^4 + \frac{4\sin(bx+a)^2}{3}\right)\cos(bx+a)}{5}$$

$$- \frac{\sin(bx+a)^5}{25}\Bigg)\Bigg) + \frac{a^2 d^2\left(-\frac{\cos(bx+a)^3\sin(bx+a)^2}{5} - \frac{2\cos(bx+a)^3}{15}\right)}{b^2} - \frac{2acd\left(-\frac{\cos(bx+a)^3\sin(bx+a)^2}{5} - \frac{2\cos(bx+a)^3}{15}\right)}{b}$$

$$+ c^2\left(-\frac{\cos(bx+a)^3\sin(bx+a)^2}{5} - \frac{2\cos(bx+a)^3}{15}\right)\Bigg)$$

```
Problem 28: Result more than twice size of optimal antiderivative.
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$$\int (dx+c)^2\cos(bx+a)\cot(bx+a)\,dx$$

```
Optimal(type 4, 159 leaves, 11 steps):
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$$- \frac{2(dx+c)^2\operatorname{arctanh}(e^{I(bx+a)})}{b} - \frac{2d^2\cos(bx+a)}{b^3} + \frac{(dx+c)^2\cos(bx+a)}{b} + \frac{2Id(dx+c)\operatorname{polylog}(2, -e^{I(bx+a)})}{b^2}$$

$$- \frac{2Id(dx+c)\operatorname{polylog}(2, e^{I(bx+a)})}{b^2} - \frac{2d^2\operatorname{polylog}(3, -e^{I(bx+a)})}{b^3} + \frac{2d^2\operatorname{polylog}(3, e^{I(bx+a)})}{b^3} - \frac{2d(dx+c)\sin(bx+a)}{b^2}$$

```
Result(type 4, 478 leaves):
```

$$\frac{(d^2x^2b^2 + 2b^2cdx + b^2c^2 + 2Ibd^2x - 2d^2 + 2Ibcd)\,e^{I(bx+a)}}{2b^3} + \frac{(d^2x^2b^2 + 2b^2cdx + b^2c^2 - 2Ibd^2x - 2d^2 - 2Ibcd)\,e^{-I(bx+a)}}{2b^3}$$

$$- \frac{2a^2d^2\operatorname{arctanh}(e^{I(bx+a)})}{b^3} + \frac{2Icd\operatorname{polylog}(2, -e^{I(bx+a)})}{b^2} + \frac{2d^2\operatorname{polylog}(3, e^{I(bx+a)})}{b^3} - \frac{2d^2\operatorname{polylog}(3, -e^{I(bx+a)})}{b^3} - \frac{2cd\ln(e^{I(bx+a)}+1)\,x}{b}$$

$$- \frac{2cd\ln(e^{I(bx+a)}+1)\,a}{b^2} + \frac{2cd\ln(1-e^{I(bx+a)})\,x}{b} + \frac{2cd\ln(1-e^{I(bx+a)})\,a}{b^2} + \frac{d^2\ln(1-e^{I(bx+a)})\,x^2}{b} - \frac{d^2\ln(1-e^{I(bx+a)})\,a^2}{b^3}$$

$$+ \frac{2Id^2\operatorname{polylog}(2, -e^{I(bx+a)})\,x}{b^2} - \frac{d^2\ln(e^{I(bx+a)}+1)\,x^2}{b} + \frac{d^2\ln(e^{I(bx+a)}+1)\,a^2}{b^3} - \frac{2Id^2\operatorname{polylog}(2, e^{I(bx+a)})\,x}{b^2} - \frac{2c^2\operatorname{arctanh}(e^{I(bx+a)})}{b}$$

$$+ \frac{4acd\operatorname{arctanh}(e^{I(bx+a)})}{b^2} - \frac{2Icd\operatorname{polylog}(2, e^{I(bx+a)})}{b^2}$$

```
Problem 29: Result more than twice size of optimal antiderivative.
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$$\int (dx+c)\cos(bx+a)\cot(bx+a)\,dx$$

```
Optimal(type 4, 86 leaves, 8 steps):
```

$$- \frac{2(dx+c)\operatorname{arctanh}(e^{I(bx+a)})}{b} + \frac{(dx+c)\cos(bx+a)}{b} + \frac{Id\operatorname{polylog}(2, -e^{I(bx+a)})}{b^2} - \frac{Id\operatorname{polylog}(2, e^{I(bx+a)})}{b^2} - \frac{d\sin(bx+a)}{b^2}$$

Result(type 4, 202 leaves):

$$\frac{(b d x+c b+I d) e^{I(b x+a)}}{2 b^2}+\frac{(b d x+c b-I d) e^{-I(b x+a)}}{2 b^2}-\frac{2 c \operatorname{arctanh}(e^{I(b x+a)})}{b}+\frac{d \ln(1-e^{I(b x+a)}) x}{b}+\frac{d \ln(1-e^{I(b x+a)}) a}{b^2}$$
$$-\frac{I d \operatorname{polylog}(2, e^{I(b x+a)})}{b^2}-\frac{d \ln(e^{I(b x+a)}+1) x}{b}-\frac{d \ln(e^{I(b x+a)}+1) a}{b^2}+\frac{I d \operatorname{polylog}(2,-e^{I(b x+a)})}{b^2}+\frac{2 a d \operatorname{arctanh}(e^{I(b x+a)})}{b^2}$$

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

$$\int (d x+c)^3 \cot(b x+a)^2 \csc(b x+a)\, dx$$

Optimal(type 4, 274 leaves, 25 steps):

$$-\frac{6 d^2 (d x+c) \operatorname{arctanh}(e^{I(b x+a)})}{b^3}+\frac{(d x+c)^3 \operatorname{arctanh}(e^{I(b x+a)})}{b}-\frac{3 d (d x+c)^2 \csc(b x+a)}{2 b^2}-\frac{(d x+c)^3 \cot(b x+a) \csc(b x+a)}{2 b}$$
$$+\frac{3 I d^3 \operatorname{polylog}(2,-e^{I(b x+a)})}{b^4}-\frac{3 I d (d x+c)^2 \operatorname{polylog}(2,-e^{I(b x+a)})}{2 b^2}-\frac{3 I d^3 \operatorname{polylog}(2, e^{I(b x+a)})}{b^4}+\frac{3 I d (d x+c)^2 \operatorname{polylog}(2, e^{I(b x+a)})}{2 b^2}$$
$$+\frac{3 d^2 (d x+c) \operatorname{polylog}(3,-e^{I(b x+a)})}{b^3}-\frac{3 d^2 (d x+c) \operatorname{polylog}(3, e^{I(b x+a)})}{b^3}+\frac{3 I d^3 \operatorname{polylog}(4,-e^{I(b x+a)})}{b^4}-\frac{3 I d^3 \operatorname{polylog}(4, e^{I(b x+a)})}{b^4}$$

Result(type 4, 1055 leaves):

$$\frac{3 I d^3 \operatorname{polylog}(2,-e^{I(b x+a)})}{b^4}-\frac{3 \ln(1-e^{I(b x+a)}) c^2 d x}{2 b}-\frac{3 \ln(1-e^{I(b x+a)}) a c^2 d}{2 b^2}-\frac{3 c^2 d a \operatorname{arctanh}(e^{I(b x+a)})}{b^2}+\frac{d^3 \ln(e^{I(b x+a)}+1) x^3}{2 b}$$
$$+\frac{d^3 \ln(e^{I(b x+a)}+1) a^3}{2 b^4}-\frac{d^3 \ln(1-e^{I(b x+a)}) x^3}{2 b}-\frac{d^3 \ln(1-e^{I(b x+a)}) a^3}{2 b^4}+\frac{3 c d^2 a^2 \operatorname{arctanh}(e^{I(b x+a)})}{b^3}+\frac{3 \ln(e^{I(b x+a)}+1) c^2 d x}{2 b}$$
$$+\frac{3 \ln(e^{I(b x+a)}+1) a c^2 d}{2 b^2}-\frac{3 \ln(1-e^{I(b x+a)}) c d^2 x^2}{2 b}+\frac{3 \ln(e^{I(b x+a)}+1) c d^2 x^2}{2 b}+\frac{3 \ln(1-e^{I(b x+a)}) a^2 c d^2}{2 b^3}-\frac{3 \ln(e^{I(b x+a)}+1) a^2 c d^2}{2 b^3}$$
$$+\frac{3 I c^2 d \operatorname{polylog}(2, e^{I(b x+a)})}{2 b^2}-\frac{3 I c^2 d \operatorname{polylog}(2,-e^{I(b x+a)})}{2 b^2}+\frac{3 I d^3 \operatorname{polylog}(2, e^{I(b x+a)}) x^2}{2 b^2}-\frac{3 I d^3 \operatorname{polylog}(2,-e^{I(b x+a)}) x^2}{2 b^2}$$
$$+\frac{3 d^3 \ln(1-e^{I(b x+a)}) x}{b^3}+\frac{3 d^3 \ln(1-e^{I(b x+a)}) a}{b^4}-\frac{3 d^3 \ln(e^{I(b x+a)}+1) x}{b^3}-\frac{3 d^3 \ln(e^{I(b x+a)}+1) a}{b^4}+\frac{3 I d^3 \operatorname{polylog}(4,-e^{I(b x+a)})}{b^4}$$
$$+\frac{3 I \operatorname{polylog}(2, e^{I(b x+a)}) c d^2 x}{b^2}-\frac{3 I \operatorname{polylog}(2,-e^{I(b x+a)}) c d^2 x}{b^2}-\frac{3 I d^3 \operatorname{polylog}(2, e^{I(b x+a)})}{b^4}-\frac{3 I d^3 \operatorname{polylog}(4, e^{I(b x+a)})}{b^4}$$
$$+\frac{3 d^3 \operatorname{polylog}(3,-e^{I(b x+a)}) x}{b^3}-\frac{3 d^3 \operatorname{polylog}(3, e^{I(b x+a)}) x}{b^3}-\frac{6 c d^2 \operatorname{arctanh}(e^{I(b x+a)})}{b^3}-\frac{3 c d^2 \operatorname{polylog}(3, e^{I(b x+a)})}{b^3}+\frac{3 c d^2 \operatorname{polylog}(3,-e^{I(b x+a)})}{b^3}$$
$$+\frac{6 d^3 a \operatorname{arctanh}(e^{I(b x+a)})}{b^4}-\frac{d^3 a^3 \operatorname{arctanh}(e^{I(b x+a)})}{b^4}+\frac{c^3 \operatorname{arctanh}(e^{I(b x+a)})}{b}+\frac{1}{b^2 (e^{2 I(b x+a)}-1)^2}\left(x^3 d^3 b e^{3 I(b x+a)}+3 c d^2 x^2 b e^{3 I(b x+a)}\right.$$
$$+3 c^2 d x b e^{3 I(b x+a)}+x^3 d^3 b e^{I(b x+a)}+c^3 b e^{3 I(b x+a)}+3 c d^2 x^2 b e^{I(b x+a)}-3 I d^3 x^2 e^{3 I(b x+a)}+3 c^2 d x b e^{I(b x+a)}-6 I c d^2 x e^{3 I(b x+a)}+c^3 b e^{I(b x+a)}$$
$$\left.-3 I c^2 d e^{3 I(b x+a)}+3 I d^3 x^2 e^{I(b x+a)}+6 I c d^2 x e^{I(b x+a)}+3 I c^2 d e^{I(b x+a)}\right)$$

Problem 42: Result more than twice size of optimal antiderivative.

$$\int (d x+c)^3 \cos(b x+a)^3 \sin(b x+a)^2\, dx$$

Optimal(type 3, 235 leaves, 14 steps):

$$-\frac{3 d^3 \cos(b x+a)}{4 b^4}+\frac{3 d (d x+c)^2 \cos(b x+a)}{8 b^2}+\frac{d^3 \cos(3 b x+3 a)}{216 b^4}-\frac{d (d x+c)^2 \cos(3 b x+3 a)}{48 b^2}+\frac{3 d^3 \cos(5 b x+5 a)}{5000 b^4}$$
$$-\frac{3 d (d x+c)^2 \cos(5 b x+5 a)}{400 b^2}-\frac{3 d^2 (d x+c) \sin(b x+a)}{4 b^3}+\frac{(d x+c)^3 \sin(b x+a)}{8 b}+\frac{d^2 (d x+c) \sin(3 b x+3 a)}{72 b^3}$$
$$-\frac{(d x+c)^3 \sin(3 b x+3 a)}{48 b}+\frac{3 d^2 (d x+c) \sin(5 b x+5 a)}{1000 b^3}-\frac{(d x+c)^3 \sin(5 b x+5 a)}{80 b}$$

Result(type 3, 1015 leaves):

$$\frac{1}{b}\left(\frac{1}{b^3}\left(d^3\left(\frac{(b x+a)^3 \left(2+\cos(b x+a)^2\right) \sin(b x+a)}{3}+\frac{2 (b x+a)^2 \cos(b x+a)}{5}-\frac{856 \cos(b x+a)}{1125}-\frac{4 \sin(b x+a) (b x+a)}{5}\right.\right.\right.$$
$$+\frac{(b x+a)^2 \cos(b x+a)^3}{15}-\frac{2 (b x+a) \left(2+\cos(b x+a)^2\right) \sin(b x+a)}{45}+\frac{22 \cos(b x+a)^3}{3375}$$
$$-\frac{(b x+a)^3 \left(\frac{8}{3}+\cos(b x+a)^4+\frac{4 \cos(b x+a)^2}{3}\right) \sin(b x+a)}{5}-\frac{3 (b x+a)^2 \cos(b x+a)^5}{25}$$
$$\left.\left.+\frac{6 (b x+a) \left(\frac{8}{3}+\cos(b x+a)^4+\frac{4 \cos(b x+a)^2}{3}\right) \sin(b x+a)}{125}+\frac{6 \cos(b x+a)^5}{625}\right)\right)$$
$$-\frac{1}{b^3}\left(3 a d^3\left(\frac{(b x+a)^2 \left(2+\cos(b x+a)^2\right) \sin(b x+a)}{3}-\frac{4 \sin(b x+a)}{15}+\frac{4 (b x+a) \cos(b x+a)}{15}+\frac{2 (b x+a) \cos(b x+a)^3}{45}\right.\right.$$
$$-\frac{2 \left(2+\cos(b x+a)^2\right) \sin(b x+a)}{135}-\frac{(b x+a)^2 \left(\frac{8}{3}+\cos(b x+a)^4+\frac{4 \cos(b x+a)^2}{3}\right) \sin(b x+a)}{5}-\frac{2 (b x+a) \cos(b x+a)^5}{25}$$

$$+\frac{2\left(\frac{8}{3}+\cos(bx+a)^4+\frac{4\cos(bx+a)^2}{3}\right)\sin(bx+a)}{125}\Bigg)\Bigg)+\frac{1}{b^2}\Bigg(3\,c\,d^2\Bigg(\frac{(bx+a)^2\,(2+\cos(bx+a)^2)\sin(bx+a)}{3}-\frac{4\sin(bx+a)}{15}$$

$$+\frac{4\,(bx+a)\cos(bx+a)}{15}+\frac{2\,(bx+a)\cos(bx+a)^3}{45}-\frac{2\,(2+\cos(bx+a)^2)\sin(bx+a)}{135}$$

$$-\frac{(bx+a)^2\left(\frac{8}{3}+\cos(bx+a)^4+\frac{4\cos(bx+a)^2}{3}\right)\sin(bx+a)}{5}-\frac{2\,(bx+a)\cos(bx+a)^5}{25}$$

$$+\frac{2\left(\frac{8}{3}+\cos(bx+a)^4+\frac{4\cos(bx+a)^2}{3}\right)\sin(bx+a)}{125}\Bigg)\Bigg)+\frac{1}{b^3}\Bigg(3\,a^2\,d^3\Bigg(\frac{(bx+a)\,(2+\cos(bx+a)^2)\sin(bx+a)}{3}+\frac{\cos(bx+a)^3}{45}$$

$$+\frac{2\cos(bx+a)}{15}-\frac{(bx+a)\left(\frac{8}{3}+\cos(bx+a)^4+\frac{4\cos(bx+a)^2}{3}\right)\sin(bx+a)}{5}-\frac{\cos(bx+a)^5}{25}\Bigg)\Bigg)$$

$$-\frac{1}{b^2}\Bigg(6\,a\,c\,d^2\Bigg(\frac{(bx+a)\,(2+\cos(bx+a)^2)\sin(bx+a)}{3}+\frac{\cos(bx+a)^3}{45}+\frac{2\cos(bx+a)}{15}$$

$$-\frac{(bx+a)\left(\frac{8}{3}+\cos(bx+a)^4+\frac{4\cos(bx+a)^2}{3}\right)\sin(bx+a)}{5}-\frac{\cos(bx+a)^5}{25}\Bigg)\Bigg)$$

$$+\frac{1}{b}\Bigg(3\,c^2\,d\Bigg(\frac{(bx+a)\,(2+\cos(bx+a)^2)\sin(bx+a)}{3}+\frac{\cos(bx+a)^3}{45}+\frac{2\cos(bx+a)}{15}$$

$$-\frac{(bx+a)\left(\frac{8}{3}+\cos(bx+a)^4+\frac{4\cos(bx+a)^2}{3}\right)\sin(bx+a)}{5}-\frac{\cos(bx+a)^5}{25}\Bigg)\Bigg)$$

$$-\frac{a^3\,d^3\left(-\frac{\sin(bx+a)\cos(bx+a)^4}{5}+\frac{(2+\cos(bx+a)^2)\sin(bx+a)}{15}\right)}{b^3}$$

$$+\frac{3a^2cd^2\left(-\frac{\sin(bx+a)\cos(bx+a)^4}{5}+\frac{(2+\cos(bx+a)^2)\sin(bx+a)}{15}\right)}{b^2}$$

$$-\frac{3ac^2d\left(-\frac{\sin(bx+a)\cos(bx+a)^4}{5}+\frac{(2+\cos(bx+a)^2)\sin(bx+a)}{15}\right)}{b}+c^3\left(-\frac{\sin(bx+a)\cos(bx+a)^4}{5}\right.$$

$$\left.\left.+\frac{(2+\cos(bx+a)^2)\sin(bx+a)}{15}\right)\right)$$

Problem 43: Result more than twice size of optimal antiderivative.

$$\int (dx+c)^2\cos(bx+a)^3\sin(bx+a)^2\,dx$$

Optimal(type 3, 166 leaves, 11 steps):

$$\frac{d(dx+c)\cos(bx+a)}{4b^2}-\frac{d(dx+c)\cos(3bx+3a)}{72b^2}-\frac{d(dx+c)\cos(5bx+5a)}{200b^2}-\frac{d^2\sin(bx+a)}{4b^3}+\frac{(dx+c)^2\sin(bx+a)}{8b}+\frac{d^2\sin(3bx+3a)}{216b^3}$$

$$-\frac{(dx+c)^2\sin(3bx+3a)}{48b}+\frac{d^2\sin(5bx+5a)}{1000b^3}-\frac{(dx+c)^2\sin(5bx+5a)}{80b}$$

Result(type 3, 483 leaves):

$$\frac{1}{b}\left(\frac{1}{b^2}\left(d^2\left(\frac{(bx+a)^2(2+\cos(bx+a)^2)\sin(bx+a)}{3}-\frac{4\sin(bx+a)}{15}+\frac{4(bx+a)\cos(bx+a)}{15}+\frac{2(bx+a)\cos(bx+a)^3}{45}\right.\right.\right.$$

$$-\frac{2(2+\cos(bx+a)^2)\sin(bx+a)}{135}-\frac{(bx+a)^2\left(\frac{8}{3}+\cos(bx+a)^4+\frac{4\cos(bx+a)^2}{3}\right)\sin(bx+a)}{5}-\frac{2(bx+a)\cos(bx+a)^5}{25}$$

$$\left.\left.+\frac{2\left(\frac{8}{3}+\cos(bx+a)^4+\frac{4\cos(bx+a)^2}{3}\right)\sin(bx+a)}{125}\right)\right)-\frac{1}{b^2}\left(2ad^2\left(\frac{(bx+a)(2+\cos(bx+a)^2)\sin(bx+a)}{3}+\frac{\cos(bx+a)^3}{45}\right.\right.$$

$$\left.\left.+\frac{2\cos(bx+a)}{15}-\frac{(bx+a)\left(\frac{8}{3}+\cos(bx+a)^4+\frac{4\cos(bx+a)^2}{3}\right)\sin(bx+a)}{5}-\frac{\cos(bx+a)^5}{25}\right)\right)$$

$$+\frac{1}{b}\left(2cd\left(\frac{(bx+a)(2+\cos(bx+a)^2)\sin(bx+a)}{3}+\frac{\cos(bx+a)^3}{45}+\frac{2\cos(bx+a)}{15}\right.\right.$$

$$- \frac{(b x + a) \left(\frac{8}{3} + \cos(b x + a)^4 + \frac{4 \cos(b x + a)^2}{3} \right) \sin(b x + a)}{5} - \frac{\cos(b x + a)^5}{25} \Bigg) \Bigg)$$

$$+ \frac{a^2 d^2 \left(- \frac{\sin(b x + a) \cos(b x + a)^4}{5} + \frac{\left(2 + \cos(b x + a)^2\right) \sin(b x + a)}{15} \right)}{b^2}$$

$$- \frac{2 a c d \left(- \frac{\sin(b x + a) \cos(b x + a)^4}{5} + \frac{\left(2 + \cos(b x + a)^2\right) \sin(b x + a)}{15} \right)}{b} + c^2 \Bigg(- \frac{\sin(b x + a) \cos(b x + a)^4}{5}$$

$$+ \frac{\left(2 + \cos(b x + a)^2\right) \sin(b x + a)}{15} \Bigg) \Bigg)$$

Problem 45: Result more than twice size of optimal antiderivative.

$$\int (d x + c)^4 \cos(b x + a)^3 \sin(b x + a)^3 \, dx$$

Optimal(type 3, 213 leaves, 12 steps):

$$- \frac{9 d^4 \cos(2 b x + 2 a)}{128 b^5} + \frac{9 d^2 (d x + c)^2 \cos(2 b x + 2 a)}{64 b^3} - \frac{3 (d x + c)^4 \cos(2 b x + 2 a)}{64 b} + \frac{d^4 \cos(6 b x + 6 a)}{10368 b^5} - \frac{d^2 (d x + c)^2 \cos(6 b x + 6 a)}{576 b^3}$$

$$+ \frac{(d x + c)^4 \cos(6 b x + 6 a)}{192 b} - \frac{9 d^3 (d x + c) \sin(2 b x + 2 a)}{64 b^4} + \frac{3 d (d x + c)^3 \sin(2 b x + 2 a)}{32 b^2} + \frac{d^3 (d x + c) \sin(6 b x + 6 a)}{1728 b^4}$$

$$- \frac{d (d x + c)^3 \sin(6 b x + 6 a)}{288 b^2}$$

Result(type ?, 2060 leaves): Display of huge result suppressed!

Problem 46: Result more than twice size of optimal antiderivative.

$$\int (d x + c)^3 \cos(b x + a)^3 \sin(b x + a)^3 \, dx$$

Optimal(type 3, 165 leaves, 10 steps):

$$\frac{9 d^2 (d x + c) \cos(2 b x + 2 a)}{128 b^3} - \frac{3 (d x + c)^3 \cos(2 b x + 2 a)}{64 b} - \frac{d^2 (d x + c) \cos(6 b x + 6 a)}{1152 b^3} + \frac{(d x + c)^3 \cos(6 b x + 6 a)}{192 b} - \frac{9 d^3 \sin(2 b x + 2 a)}{256 b^4}$$

$$+ \frac{9 d (d x + c)^2 \sin(2 b x + 2 a)}{128 b^2} + \frac{d^3 \sin(6 b x + 6 a)}{6912 b^4} - \frac{d (d x + c)^2 \sin(6 b x + 6 a)}{384 b^2}$$

Result(type 3, 1099 leaves):

$$\frac{1}{b}\Bigg(\frac{1}{b^3}\Bigg(d^3\Bigg(\frac{(b x+a)^3 \sin(b x+a)^4}{4}-\frac{3\,(b x+a)^2\left(-\frac{\left(\sin(b x+a)^3+\frac{3 \sin(b x+a)}{2}\right)\cos(b x+a)}{4}+\frac{3 b x}{8}+\frac{3 a}{8}\right)}{4}-\frac{(b x+a)\,\sin(b x+a)^4}{24}$$

$$-\frac{\left(\sin(b x+a)^3+\frac{3 \sin(b x+a)}{2}\right)\cos(b x+a)}{96}-\frac{b x}{18}-\frac{a}{18}+\frac{(b x+a)\,\cos(b x+a)^2}{8}-\frac{\cos(b x+a)\,\sin(b x+a)}{16}+\frac{(b x+a)^3}{12}$$

$$-\frac{(b x+a)^3 \sin(b x+a)^6}{6}+\frac{(b x+a)^2\left(-\frac{\left(\sin(b x+a)^5+\frac{5 \sin(b x+a)^3}{4}+\frac{15 \sin(b x+a)}{8}\right)\cos(b x+a)}{6}+\frac{5 b x}{16}+\frac{5 a}{16}\right)}{2}$$

$$+\frac{(b x+a)\,\sin(b x+a)^6}{36}+\frac{\left(\sin(b x+a)^5+\frac{5 \sin(b x+a)^3}{4}+\frac{15 \sin(b x+a)}{8}\right)\cos(b x+a)}{216}\Bigg)\Bigg)-\frac{1}{b^3}\Bigg(3\,a\,d^3\Bigg(\frac{(b x+a)^2 \sin(b x+a)^4}{4}$$

$$-\frac{(b x+a)\left(-\frac{\left(\sin(b x+a)^3+\frac{3 \sin(b x+a)}{2}\right)\cos(b x+a)}{4}+\frac{3 b x}{8}+\frac{3 a}{8}\right)}{2}+\frac{(b x+a)^2}{24}-\frac{\sin(b x+a)^4}{72}-\frac{\sin(b x+a)^2}{24}$$

$$-\frac{(b x+a)^2 \sin(b x+a)^6}{6}+\frac{(b x+a)\left(-\frac{\left(\sin(b x+a)^5+\frac{5 \sin(b x+a)^3}{4}+\frac{15 \sin(b x+a)}{8}\right)\cos(b x+a)}{6}+\frac{5 b x}{16}+\frac{5 a}{16}\right)}{3}+\frac{\sin(b x+a)^6}{108}\Bigg)\Bigg)$$

$$+\frac{1}{b^2}\Bigg(3\,c\,d^2\Bigg(\frac{(b x+a)^2 \sin(b x+a)^4}{4}-\frac{(b x+a)\left(-\frac{\left(\sin(b x+a)^3+\frac{3 \sin(b x+a)}{2}\right)\cos(b x+a)}{4}+\frac{3 b x}{8}+\frac{3 a}{8}\right)}{2}+\frac{(b x+a)^2}{24}$$

$$-\frac{\sin(b x+a)^4}{72}-\frac{\sin(b x+a)^2}{24}-\frac{(b x+a)^2 \sin(b x+a)^6}{6}$$

$$+\frac{(bx+a)\left(-\frac{\left(\sin(bx+a)^5+\frac{5\sin(bx+a)^3}{4}+\frac{15\sin(bx+a)}{8}\right)\cos(bx+a)}{6}+\frac{5bx}{16}+\frac{5a}{16}\right)}{3}+\frac{\sin(bx+a)^6}{108}\Bigg)\Bigg)$$

$$+\frac{1}{b^3}\Bigg(3a^2d^3\Bigg(\frac{(bx+a)\sin(bx+a)^4}{4}+\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{16}-\frac{bx}{24}-\frac{a}{24}-\frac{(bx+a)\sin(bx+a)^6}{6}$$

$$-\frac{\left(\sin(bx+a)^5+\frac{5\sin(bx+a)^3}{4}+\frac{15\sin(bx+a)}{8}\right)\cos(bx+a)}{36}\Bigg)\Bigg)-\frac{1}{b^2}\Bigg(6acd^2\Bigg(\frac{(bx+a)\sin(bx+a)^4}{4}$$

$$+\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{16}-\frac{bx}{24}-\frac{a}{24}-\frac{(bx+a)\sin(bx+a)^6}{6}$$

$$-\frac{\left(\sin(bx+a)^5+\frac{5\sin(bx+a)^3}{4}+\frac{15\sin(bx+a)}{8}\right)\cos(bx+a)}{36}\Bigg)\Bigg)+\frac{1}{b}\Bigg(3c^2d\Bigg(\frac{(bx+a)\sin(bx+a)^4}{4}$$

$$+\frac{\left(\sin(bx+a)^3+\frac{3\sin(bx+a)}{2}\right)\cos(bx+a)}{16}-\frac{bx}{24}-\frac{a}{24}-\frac{(bx+a)\sin(bx+a)^6}{6}$$

$$-\frac{\left(\sin(bx+a)^5+\frac{5\sin(bx+a)^3}{4}+\frac{15\sin(bx+a)}{8}\right)\cos(bx+a)}{36}\Bigg)\Bigg)-\frac{a^3d^3\left(-\frac{\sin(bx+a)^2\cos(bx+a)^4}{6}-\frac{\cos(bx+a)^4}{12}\right)}{b^3}$$

$$+\frac{3a^2cd^2\left(-\frac{\sin(bx+a)^2\cos(bx+a)^4}{6}-\frac{\cos(bx+a)^4}{12}\right)}{b^2}-\frac{3ac^2d\left(-\frac{\sin(bx+a)^2\cos(bx+a)^4}{6}-\frac{\cos(bx+a)^4}{12}\right)}{b}+c^3\Bigg($$

$$-\frac{\sin(bx+a)^2\cos(bx+a)^4}{6}-\frac{\cos(bx+a)^4}{12}\Bigg)\Bigg)$$

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

$$\int (dx+c)^3\cos(bx+a)^2\cot(bx+a)\,dx$$

Optimal(type 4, 215 leaves, 12 steps):

$$-\frac{3d^3x}{8b^3}+\frac{(dx+c)^3}{4b}-\frac{I\,(dx+c)^4}{4d}+\frac{(dx+c)^3\ln\left(1-e^{2I(bx+a)}\right)}{b}-\frac{3Id\,(dx+c)^2\operatorname{polylog}\left(2,e^{2I(bx+a)}\right)}{2b^2}+\frac{3d^2\,(dx+c)\operatorname{polylog}\left(3,e^{2I(bx+a)}\right)}{2b^3}$$

$$+\frac{3 I d^3 \operatorname{polylog}(4, e^{2 I (b x+a)})}{4 b^4}+\frac{3 d^3 \cos(b x+a) \sin(b x+a)}{8 b^4}-\frac{3 d (d x+c)^2 \cos(b x+a) \sin(b x+a)}{4 b^2}+\frac{3 d^2 (d x+c) \sin(b x+a)^2}{4 b^3}$$
$$-\frac{(d x+c)^3 \sin(b x+a)^2}{2 b}$$

Result(type 4, 1000 leaves):

$$\frac{(4 d^3 x^3 b^3+6 I b^2 d^3 x^2+12 b^3 c d^2 x^2+12 I b^2 c d^2 x+12 b^3 c^2 d x+6 I c^2 d b^2+4 b^3 c^3-6 b d^3 x-3 I d^3-6 c d^2 b) e^{2 I (b x+a)}}{32 b^4}$$
$$+\frac{(4 d^3 x^3 b^3-6 I b^2 d^3 x^2+12 b^3 c d^2 x^2-12 I b^2 c d^2 x+12 b^3 c^2 d x-6 I c^2 d b^2+4 b^3 c^3-6 b d^3 x+3 I d^3-6 c d^2 b) e^{-2 I (b x+a)}}{32 b^4}+I c^3 x$$
$$+\frac{6 a c^2 d \ln(e^{I (b x+a)})}{b^2}-\frac{3 a c^2 d \ln(e^{I (b x+a)}-1)}{b^2}-\frac{6 a^2 c d^2 \ln(e^{I (b x+a)})}{b^3}+\frac{3 a^2 c d^2 \ln(e^{I (b x+a)}-1)}{b^3}-\frac{I d^3 x^4}{4}-\frac{2 c^3 \ln(e^{I (b x+a)})}{b}$$
$$+\frac{c^3 \ln(e^{I (b x+a)}-1)}{b}+\frac{c^3 \ln(e^{I (b x+a)}+1)}{b}-I c d^2 x^3-\frac{3 I c^2 d x^2}{2}+\frac{3 \ln(1-e^{I (b x+a)}) c^2 d x}{b}+\frac{3 \ln(1-e^{I (b x+a)}) a c^2 d}{b^2}+\frac{d^3 \ln(e^{I (b x+a)}+1) x^3}{b}$$
$$+\frac{d^3 \ln(1-e^{I (b x+a)}) x^3}{b}+\frac{d^3 \ln(1-e^{I (b x+a)}) a^3}{b^4}+\frac{3 \ln(e^{I (b x+a)}+1) c^2 d x}{b}+\frac{3 \ln(1-e^{I (b x+a)}) c d^2 x^2}{b}+\frac{3 \ln(e^{I (b x+a)}+1) c d^2 x^2}{b}$$
$$-\frac{3 \ln(1-e^{I (b x+a)}) a^2 c d^2}{b^3}+\frac{6 I d^3 \operatorname{polylog}(4, e^{I (b x+a)})}{b^4}+\frac{2 a^3 d^3 \ln(e^{I (b x+a)})}{b^4}-\frac{a^3 d^3 \ln(e^{I (b x+a)}-1)}{b^4}-\frac{3 I a^4 d^3}{2 b^4}+\frac{6 I d^3 \operatorname{polylog}(4, -e^{I (b x+a)})}{b^4}$$
$$-\frac{3 I c^2 d \operatorname{polylog}(2, e^{I (b x+a)})}{b^2}-\frac{3 I c^2 d \operatorname{polylog}(2, -e^{I (b x+a)})}{b^2}-\frac{3 I c^2 d a^2}{b^2}-\frac{3 I d^3 \operatorname{polylog}(2, e^{I (b x+a)}) x^2}{b^2}-\frac{3 I d^3 \operatorname{polylog}(2, -e^{I (b x+a)}) x^2}{b^2}$$
$$+\frac{4 I c d^2 a^3}{b^3}-\frac{2 I d^3 a^3 x}{b^3}-\frac{6 I c d^2 \operatorname{polylog}(2, e^{I (b x+a)}) x}{b^2}+\frac{6 I c d^2 a^2 x}{b^2}-\frac{6 I c d^2 \operatorname{polylog}(2, -e^{I (b x+a)}) x}{b^2}-\frac{6 I c^2 d a x}{b}$$
$$+\frac{6 d^3 \operatorname{polylog}(3, -e^{I (b x+a)}) x}{b^3}+\frac{6 d^3 \operatorname{polylog}(3, e^{I (b x+a)}) x}{b^3}+\frac{6 c d^2 \operatorname{polylog}(3, e^{I (b x+a)})}{b^3}+\frac{6 c d^2 \operatorname{polylog}(3, -e^{I (b x+a)})}{b^3}$$

Problem 48: Result more than twice size of optimal antiderivative.

$$\int (d x+c) \cos(b x+a)^2 \cot(b x+a)\, dx$$

Optimal(type 4, 98 leaves, 8 steps):

$$\frac{d x}{4 b}-\frac{I (d x+c)^2}{2 d}+\frac{(d x+c) \ln(1-e^{2 I (b x+a)})}{b}-\frac{I d \operatorname{polylog}(2, e^{2 I (b x+a)})}{2 b^2}-\frac{d \cos(b x+a) \sin(b x+a)}{4 b^2}-\frac{(d x+c) \sin(b x+a)^2}{2 b}$$

Result(type 4, 270 leaves):

$$-\frac{I d x^2}{2}-\frac{2 I d a x}{b}+\frac{(2 b d x+I d+2 c b) e^{2 I (b x+a)}}{16 b^2}+\frac{(2 b d x-I d+2 c b) e^{-2 I (b x+a)}}{16 b^2}-\frac{2 c \ln(e^{I (b x+a)})}{b}+\frac{c \ln(e^{I (b x+a)}-1)}{b}+\frac{c \ln(e^{I (b x+a)}+1)}{b}$$
$$-\frac{I d \operatorname{polylog}(2, e^{I (b x+a)})}{b^2}-\frac{I d a^2}{b^2}-\frac{I d \operatorname{polylog}(2, -e^{I (b x+a)})}{b^2}+\frac{d \ln(1-e^{I (b x+a)}) x}{b}+\frac{d \ln(1-e^{I (b x+a)}) a}{b^2}+I c x+\frac{d \ln(e^{I (b x+a)}+1) x}{b}$$

$$+\frac{2 a d \ln\left(e^{I (b x+a)}\right)}{b^2}-\frac{a d \ln\left(e^{I (b x+a)}-1\right)}{b^2}$$

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

$$\int (d x+c)^2 \sec(b x+a) \sin(b x+a)^2 \, dx$$

Optimal(type 4, 169 leaves, 11 steps):

$$-\frac{2 I (d x+c)^2 \arctan\left(e^{I (b x+a)}\right)}{b}-\frac{2 d (d x+c) \cos(b x+a)}{b^2}+\frac{2 I d (d x+c) \operatorname{polylog}\left(2,-I e^{I (b x+a)}\right)}{b^2}-\frac{2 I d (d x+c) \operatorname{polylog}\left(2, I e^{I (b x+a)}\right)}{b^2}$$
$$-\frac{2 d^2 \operatorname{polylog}\left(3,-I e^{I (b x+a)}\right)}{b^3}+\frac{2 d^2 \operatorname{polylog}\left(3, I e^{I (b x+a)}\right)}{b^3}+\frac{2 d^2 \sin(b x+a)}{b^3}-\frac{(d x+c)^2 \sin(b x+a)}{b}$$

Result(type 4, 511 leaves):

$$\frac{2 I c d \operatorname{polylog}\left(2,-I e^{I (b x+a)}\right)}{b^2}+\frac{2 I d^2 \operatorname{polylog}\left(2,-I e^{I (b x+a)}\right) x}{b^2}-\frac{a^2 d^2 \ln\left(1-I e^{I (b x+a)}\right)}{b^3}+\frac{2 c d \ln\left(1-I e^{I (b x+a)}\right) a}{b^2}+\frac{a^2 d^2 \ln\left(1+I e^{I (b x+a)}\right)}{b^3}$$
$$+\frac{d^2 \ln\left(1-I e^{I (b x+a)}\right) x^2}{b}-\frac{2 d^2 \operatorname{polylog}\left(3,-I e^{I (b x+a)}\right)}{b^3}-\frac{2 c d \ln\left(1+I e^{I (b x+a)}\right) a}{b^2}+\frac{4 I a c d \arctan\left(e^{I (b x+a)}\right)}{b^2}-\frac{2 I d^2 \operatorname{polylog}\left(2, I e^{I (b x+a)}\right) x}{b^2}$$
$$-\frac{2 c d \ln\left(1+I e^{I (b x+a)}\right) x}{b}-\frac{2 I c d \operatorname{polylog}\left(2, I e^{I (b x+a)}\right)}{b^2}-\frac{2 I a^2 d^2 \arctan\left(e^{I (b x+a)}\right)}{b^3}-\frac{2 I c^2 \arctan\left(e^{I (b x+a)}\right)}{b}+\frac{2 d^2 \operatorname{polylog}\left(3, I e^{I (b x+a)}\right)}{b^3}$$
$$+\frac{2 c d \ln\left(1-I e^{I (b x+a)}\right) x}{b}-\frac{I \left(d^2 x^2 b^2+2 b^2 c d x+b^2 c^2-2 I b d^2 x-2 d^2-2 I b c d\right) e^{-I (b x+a)}}{2 b^3}-\frac{d^2 \ln\left(1+I e^{I (b x+a)}\right) x^2}{b}$$
$$+\frac{I \left(d^2 x^2 b^2+2 b^2 c d x+b^2 c^2+2 I b d^2 x-2 d^2+2 I b c d\right) e^{I (b x+a)}}{2 b^3}$$

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

$$\int (d x+c)^4 \csc(b x+a) \sec(b x+a) \, dx$$

Optimal(type 4, 221 leaves, 12 steps):

$$-\frac{2 (d x+c)^4 \operatorname{arctanh}\left(e^{2 I (b x+a)}\right)}{b}+\frac{2 I d (d x+c)^3 \operatorname{polylog}\left(2,-e^{2 I (b x+a)}\right)}{b^2}-\frac{2 I d (d x+c)^3 \operatorname{polylog}\left(2, e^{2 I (b x+a)}\right)}{b^2}$$
$$-\frac{3 d^2 (d x+c)^2 \operatorname{polylog}\left(3,-e^{2 I (b x+a)}\right)}{b^3}+\frac{3 d^2 (d x+c)^2 \operatorname{polylog}\left(3, e^{2 I (b x+a)}\right)}{b^3}-\frac{3 I d^3 (d x+c) \operatorname{polylog}\left(4,-e^{2 I (b x+a)}\right)}{b^4}$$
$$+\frac{3 I d^3 (d x+c) \operatorname{polylog}\left(4, e^{2 I (b x+a)}\right)}{b^4}+\frac{3 d^4 \operatorname{polylog}\left(5,-e^{2 I (b x+a)}\right)}{2 b^5}-\frac{3 d^4 \operatorname{polylog}\left(5, e^{2 I (b x+a)}\right)}{2 b^5}$$

Result(type 4, 1241 leaves):

$$\frac{4 c^3 d \ln\left(1-e^{I (b x+a)}\right) x}{b}+\frac{6 a^2 c^2 d^2 \ln\left(e^{I (b x+a)}-1\right)}{b^3}-\frac{4 a c^3 d \ln\left(e^{I (b x+a)}-1\right)}{b^2}-\frac{4 a^3 c d^3 \ln\left(e^{I (b x+a)}-1\right)}{b^4}+\frac{d^4 \ln\left(e^{I (b x+a)}+1\right) x^4}{b}$$

$$- \frac{d^4 \ln(e^{2 I (b x+a)}+1) x^4}{b} + \frac{d^4 \ln(1-e^{I (b x+a)}) x^4}{b} - \frac{4 c d^3 \ln(e^{2 I (b x+a)}+1) x^3}{b} + \frac{4 c d^3 \ln(e^{I (b x+a)}+1) x^3}{b} + \frac{4 c d^3 \ln(1-e^{I (b x+a)}) x^3}{b}$$

$$+ \frac{4 c d^3 \ln(1-e^{I (b x+a)}) a^3}{b^4} + \frac{3 d^4 \operatorname{polylog}(5, -e^{2 I (b x+a)})}{2 b^5} - \frac{3 I c d^3 \operatorname{polylog}(4, -e^{2 I (b x+a)})}{b^4} + \frac{24 I c d^3 \operatorname{polylog}(4, -e^{I (b x+a)})}{b^4}$$

$$- \frac{4 I d^4 \operatorname{polylog}(2, e^{I (b x+a)}) x^3}{b^2} - \frac{4 I d^4 \operatorname{polylog}(2, -e^{I (b x+a)}) x^3}{b^2} - \frac{4 I c^3 d \operatorname{polylog}(2, -e^{I (b x+a)})}{b^2} + \frac{2 I c^3 d \operatorname{polylog}(2, -e^{2 I (b x+a)})}{b^2}$$

$$- \frac{4 I c^3 d \operatorname{polylog}(2, e^{I (b x+a)})}{b^2} + \frac{24 I d^4 \operatorname{polylog}(4, -e^{I (b x+a)}) x}{b^4} + \frac{24 I d^4 \operatorname{polylog}(4, e^{I (b x+a)}) x}{b^4} + \frac{2 I d^4 \operatorname{polylog}(2, -e^{2 I (b x+a)}) x^3}{b^2}$$

$$- \frac{3 I d^4 \operatorname{polylog}(4, -e^{2 I (b x+a)}) x}{b^4} + \frac{24 I c d^3 \operatorname{polylog}(4, e^{I (b x+a)})}{b^4} + \frac{6 I c^2 d^2 \operatorname{polylog}(2, -e^{2 I (b x+a)}) x}{b^2} - \frac{12 I c^2 d^2 \operatorname{polylog}(2, -e^{I (b x+a)}) x}{b^2}$$

$$+ \frac{6 I c d^3 \operatorname{polylog}(2, -e^{2 I (b x+a)}) x^2}{b^2} - \frac{12 I c d^3 \operatorname{polylog}(2, -e^{I (b x+a)}) x^2}{b^2} - \frac{12 I c d^3 \operatorname{polylog}(2, e^{I (b x+a)}) x^2}{b^2} - \frac{12 I c^2 d^2 \operatorname{polylog}(2, e^{I (b x+a)}) x}{b^2}$$

$$- \frac{d^4 a^4 \ln(1-e^{I (b x+a)})}{b^5} + \frac{12 d^4 \operatorname{polylog}(3, -e^{I (b x+a)}) x^2}{b^3} + \frac{12 d^4 \operatorname{polylog}(3, e^{I (b x+a)}) x^2}{b^3} - \frac{3 d^4 \operatorname{polylog}(3, -e^{2 I (b x+a)}) x^2}{b^3} + \frac{a^4 d^4 \ln(e^{I (b x+a)}-1)}{b^5}$$

$$+ \frac{12 c^2 d^2 \operatorname{polylog}(3, e^{I (b x+a)})}{b^3} - \frac{3 c^2 d^2 \operatorname{polylog}(3, -e^{2 I (b x+a)})}{b^3} + \frac{12 c^2 d^2 \operatorname{polylog}(3, -e^{I (b x+a)})}{b^3} - \frac{24 d^4 \operatorname{polylog}(5, e^{I (b x+a)})}{b^5}$$

$$- \frac{24 d^4 \operatorname{polylog}(5, -e^{I (b x+a)})}{b^5} - \frac{c^4 \ln(e^{2 I (b x+a)}+1)}{b} + \frac{c^4 \ln(e^{I (b x+a)}-1)}{b} + \frac{c^4 \ln(e^{I (b x+a)}+1)}{b} + \frac{4 c^3 d \ln(1-e^{I (b x+a)}) a}{b^2}$$

$$+ \frac{6 c^2 d^2 \ln(e^{I (b x+a)}+1) x^2}{b} - \frac{6 c d^3 \operatorname{polylog}(3, -e^{2 I (b x+a)}) x}{b^3} + \frac{4 c^3 d \ln(e^{I (b x+a)}+1) x}{b} - \frac{6 c^2 d^2 a^2 \ln(1-e^{I (b x+a)})}{b^3}$$

$$+ \frac{24 c d^3 \operatorname{polylog}(3, -e^{I (b x+a)}) x}{b^3} + \frac{6 c^2 d^2 \ln(1-e^{I (b x+a)}) x^2}{b} - \frac{6 c^2 d^2 \ln(e^{2 I (b x+a)}+1) x^2}{b} - \frac{4 c^3 d \ln(e^{2 I (b x+a)}+1) x}{b}$$

$$+ \frac{24 c d^3 \operatorname{polylog}(3, e^{I (b x+a)}) x}{b^3}$$

Problem 61: Result more than twice size of optimal antiderivative.

$$\int (d x+c)^2 \csc(b x+a) \sec(b x+a)\, dx$$

Optimal(type 4, 111 leaves, 8 steps):

$$- \frac{2 (d x+c)^2 \operatorname{arctanh}(e^{2 I (b x+a)})}{b} + \frac{I d (d x+c) \operatorname{polylog}(2, -e^{2 I (b x+a)})}{b^2} - \frac{I d (d x+c) \operatorname{polylog}(2, e^{2 I (b x+a)})}{b^2} - \frac{d^2 \operatorname{polylog}(3, -e^{2 I (b x+a)})}{2 b^3}$$

$$+ \frac{d^2 \operatorname{polylog}(3, e^{2 I (b x+a)})}{2 b^3}$$

Result(type 4, 468 leaves):

$$- \frac{d^2 \operatorname{polylog}(3, -e^{2 I (b x+a)})}{2 b^3} + \frac{2 c d \ln(e^{I (b x+a)}+1) x}{b} + \frac{2 c d \ln(1-e^{I (b x+a)}) x}{b} + \frac{2 c d \ln(1-e^{I (b x+a)}) a}{b^2} + \frac{I d^2 \operatorname{polylog}(2, -e^{2 I (b x+a)}) x}{b^2}$$

$$- \frac{2 I d^2 \operatorname{polylog}(2, -e^{I(bx+a)}) x}{b^2} + \frac{a^2 d^2 \ln(e^{I(bx+a)} - 1)}{b^3} - \frac{d^2 \ln(e^{2I(bx+a)} + 1) x^2}{b} + \frac{2 d^2 \operatorname{polylog}(3, -e^{I(bx+a)})}{b^3} + \frac{2 d^2 \operatorname{polylog}(3, e^{I(bx+a)})}{b^3}$$

$$+ \frac{d^2 \ln(1 - e^{I(bx+a)}) x^2}{b} - \frac{d^2 \ln(1 - e^{I(bx+a)}) a^2}{b^3} + \frac{d^2 \ln(e^{I(bx+a)} + 1) x^2}{b} - \frac{2 c d \ln(e^{2I(bx+a)} + 1) x}{b} - \frac{2 a c d \ln(e^{I(bx+a)} - 1)}{b^2}$$

$$- \frac{2 I c d \operatorname{polylog}(2, -e^{I(bx+a)})}{b^2} - \frac{2 I d^2 \operatorname{polylog}(2, e^{I(bx+a)}) x}{b^2} - \frac{c^2 \ln(e^{2I(bx+a)} + 1)}{b} + \frac{c^2 \ln(e^{I(bx+a)} - 1)}{b} + \frac{c^2 \ln(e^{I(bx+a)} + 1)}{b}$$

$$- \frac{2 I c d \operatorname{polylog}(2, e^{I(bx+a)})}{b^2} + \frac{I c d \operatorname{polylog}(2, -e^{2I(bx+a)})}{b^2}$$

Problem 62: Result more than twice size of optimal antiderivative.

$$\int (dx + c) \csc(bx + a) \sec(bx + a) \, dx$$

Optimal(type 4, 59 leaves, 6 steps):

$$- \frac{2 (dx + c) \operatorname{arctanh}(e^{2I(bx+a)})}{b} + \frac{I d \operatorname{polylog}(2, -e^{2I(bx+a)})}{2 b^2} - \frac{I d \operatorname{polylog}(2, e^{2I(bx+a)})}{2 b^2}$$

Result(type 4, 207 leaves):

$$- \frac{c \ln(e^{2I(bx+a)} + 1)}{b} + \frac{c \ln(e^{I(bx+a)} - 1)}{b} + \frac{c \ln(e^{I(bx+a)} + 1)}{b} + \frac{d \ln(1 - e^{I(bx+a)}) x}{b} + \frac{d \ln(1 - e^{I(bx+a)}) a}{b^2} - \frac{I d \operatorname{polylog}(2, e^{I(bx+a)})}{b^2}$$

$$- \frac{d \ln(e^{2I(bx+a)} + 1) x}{b} + \frac{I d \operatorname{polylog}(2, -e^{2I(bx+a)})}{2 b^2} + \frac{d \ln(e^{I(bx+a)} + 1) x}{b} - \frac{I d \operatorname{polylog}(2, -e^{I(bx+a)})}{b^2} - \frac{a d \ln(e^{I(bx+a)} - 1)}{b^2}$$

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

$$\int (dx + c)^2 \csc(bx + a)^3 \sec(bx + a) \, dx$$

Optimal(type 4, 181 leaves, 17 steps):

$$- \frac{c d x}{b} - \frac{d^2 x^2}{2 b} - \frac{2 (dx + c)^2 \operatorname{arctanh}(e^{2I(bx+a)})}{b} - \frac{d (dx + c) \cot(bx + a)}{b^2} - \frac{(dx + c)^2 \cot(bx + a)^2}{2 b} + \frac{d^2 \ln(\sin(bx + a))}{b^3}$$

$$+ \frac{I d (dx + c) \operatorname{polylog}(2, -e^{2I(bx+a)})}{b^2} - \frac{I d (dx + c) \operatorname{polylog}(2, e^{2I(bx+a)})}{b^2} - \frac{d^2 \operatorname{polylog}(3, -e^{2I(bx+a)})}{2 b^3} + \frac{d^2 \operatorname{polylog}(3, e^{2I(bx+a)})}{2 b^3}$$

Result(type 4, 631 leaves):

$$- \frac{d^2 \operatorname{polylog}(3, -e^{2I(bx+a)})}{2 b^3} + \frac{2 c d \ln(e^{I(bx+a)} + 1) x}{b} + \frac{2 c d \ln(1 - e^{I(bx+a)}) x}{b} + \frac{2 c d \ln(1 - e^{I(bx+a)}) a}{b^2} - \frac{2 I d^2 \operatorname{polylog}(2, e^{I(bx+a)}) x}{b^2}$$

$$- \frac{2 I c d \operatorname{polylog}(2, e^{I(bx+a)})}{b^2} + \frac{a^2 d^2 \ln(e^{I(bx+a)} - 1)}{b^3} - \frac{d^2 \ln(e^{2I(bx+a)} + 1) x^2}{b} + \frac{d^2 \ln(e^{I(bx+a)} + 1)}{b^3} - \frac{2 d^2 \ln(e^{I(bx+a)})}{b^3}$$

$$+ \frac{d^2 \ln(e^{I(bx+a)} - 1)}{b^3} + \frac{2 d^2 \operatorname{polylog}(3, -e^{I(bx+a)})}{b^3} + \frac{2 d^2 \operatorname{polylog}(3, e^{I(bx+a)})}{b^3} + \frac{d^2 \ln(1 - e^{I(bx+a)}) x^2}{b} - \frac{d^2 \ln(1 - e^{I(bx+a)}) a^2}{b^3}$$

$$+\frac{d^2\ln(e^{I(bx+a)}+1)x^2}{b}-\frac{2cd\ln(e^{2I(bx+a)}+1)x}{b}-\frac{2acd\ln(e^{I(bx+a)}-1)}{b^2}+\frac{Icd\,\mathrm{polylog}(2,-e^{2I(bx+a)})}{b^2}+\frac{Id^2\,\mathrm{polylog}(2,-e^{2I(bx+a)})x}{b^2}$$
$$+\frac{2\left(bd^2x^2e^{2I(bx+a)}+2bcdxe^{2I(bx+a)}+bc^2e^{2I(bx+a)}-Id^2xe^{2I(bx+a)}-Icde^{2I(bx+a)}+Id^2x+Icd\right)}{b^2\left(e^{2I(bx+a)}-1\right)^2}-\frac{c^2\ln(e^{2I(bx+a)}+1)}{b}$$
$$+\frac{c^2\ln(e^{I(bx+a)}-1)}{b}+\frac{c^2\ln(e^{I(bx+a)}+1)}{b}-\frac{2Icd\,\mathrm{polylog}(2,-e^{I(bx+a)})}{b^2}-\frac{2Id^2\,\mathrm{polylog}(2,-e^{I(bx+a)})x}{b^2}$$

Problem 67: Result more than twice size of optimal antiderivative.

$$\int(dx+c)\csc(bx+a)^3\sec(bx+a)\,dx$$

Optimal(type 4, 123 leaves, 11 steps):

$$-\frac{dx}{2b}-\frac{2dx\,\mathrm{arctanh}(e^{2I(bx+a)})}{b}-\frac{d\cot(bx+a)}{2b^2}-\frac{(dx+c)\cot(bx+a)^2}{2b}-\frac{dx\ln(\tan(bx+a))}{b}+\frac{(dx+c)\ln(\tan(bx+a))}{b}$$
$$+\frac{Id\,\mathrm{polylog}(2,-e^{2I(bx+a)})}{2b^2}-\frac{Id\,\mathrm{polylog}(2,e^{2I(bx+a)})}{2b^2}$$

Result(type 4, 269 leaves):

$$\frac{2e^{2I(bx+a)}bdx-Ide^{2I(bx+a)}+2e^{2I(bx+a)}bc+Id}{b^2\left(e^{2I(bx+a)}-1\right)^2}-\frac{c\ln(e^{2I(bx+a)}+1)}{b}+\frac{c\ln(e^{I(bx+a)}-1)}{b}+\frac{c\ln(e^{I(bx+a)}+1)}{b}+\frac{d\ln(1-e^{I(bx+a)})x}{b}$$
$$+\frac{d\ln(1-e^{I(bx+a)})a}{b^2}-\frac{Id\,\mathrm{polylog}(2,e^{I(bx+a)})}{b^2}-\frac{d\ln(e^{2I(bx+a)}+1)x}{b}+\frac{Id\,\mathrm{polylog}(2,-e^{2I(bx+a)})}{2b^2}+\frac{d\ln(e^{I(bx+a)}+1)x}{b}$$
$$-\frac{Id\,\mathrm{polylog}(2,-e^{I(bx+a)})}{b^2}-\frac{ad\ln(e^{I(bx+a)}-1)}{b^2}$$

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

$$\int(dx+c)^4\sec(bx+a)\tan(bx+a)\,dx$$

Optimal(type 4, 202 leaves, 10 steps):

$$\frac{8Id(dx+c)^3\arctan(e^{I(bx+a)})}{b^2}-\frac{12Id^2(dx+c)^2\,\mathrm{polylog}(2,-Ie^{I(bx+a)})}{b^3}+\frac{12Id^2(dx+c)^2\,\mathrm{polylog}(2,Ie^{I(bx+a)})}{b^3}$$
$$+\frac{24d^3(dx+c)\,\mathrm{polylog}(3,-Ie^{I(bx+a)})}{b^4}-\frac{24d^3(dx+c)\,\mathrm{polylog}(3,Ie^{I(bx+a)})}{b^4}+\frac{24Id^4\,\mathrm{polylog}(4,-Ie^{I(bx+a)})}{b^5}-\frac{24Id^4\,\mathrm{polylog}(4,Ie^{I(bx+a)})}{b^5}$$
$$+\frac{(dx+c)^4\sec(bx+a)}{b}$$

Result(type 4, 766 leaves):

$$-\frac{24Id^4\,\mathrm{polylog}(4,Ie^{I(bx+a)})}{b^5}-\frac{24Id^3c\,\mathrm{polylog}(2,-Ie^{I(bx+a)})x}{b^3}+\frac{24Id^3c\,\mathrm{polylog}(2,Ie^{I(bx+a)})x}{b^3}+\frac{24Id^3a^2c\arctan(e^{I(bx+a)})}{b^4}$$

$$- \frac{24 I d^2 a c^2 \arctan(e^{I(bx+a)})}{b^3} + \frac{24 I d^4 \operatorname{polylog}(4, -I e^{I(bx+a)})}{b^5} + \frac{2 e^{I(bx+a)} (d^4 x^4 + 4 c d^3 x^3 + 6 c^2 d^2 x^2 + 4 c^3 d x + c^4)}{(e^{2 I(bx+a)} + 1) b}$$
$$- \frac{24 d^4 \operatorname{polylog}(3, I e^{I(bx+a)}) x}{b^4} - \frac{4 d^4 a^3 \ln(1 - I e^{I(bx+a)})}{b^5} + \frac{24 d^3 c \operatorname{polylog}(3, -I e^{I(bx+a)})}{b^4} + \frac{24 d^4 \operatorname{polylog}(3, -I e^{I(bx+a)}) x}{b^4}$$
$$+ \frac{4 d^4 a^3 \ln(1 + I e^{I(bx+a)})}{b^5} + \frac{4 d^4 \ln(1 + I e^{I(bx+a)}) x^3}{b^2} - \frac{4 d^4 \ln(1 - I e^{I(bx+a)}) x^3}{b^2} - \frac{24 d^3 c \operatorname{polylog}(3, I e^{I(bx+a)})}{b^4} + \frac{12 d^2 c^2 \ln(1 + I e^{I(bx+a)}) x}{b^2}$$
$$+ \frac{12 d^2 c^2 \ln(1 + I e^{I(bx+a)}) a}{b^3} - \frac{12 d^2 c^2 \ln(1 - I e^{I(bx+a)}) x}{b^2} - \frac{12 d^2 c^2 \ln(1 - I e^{I(bx+a)}) a}{b^3} - \frac{12 d^3 a^2 c \ln(1 + I e^{I(bx+a)})}{b^4}$$
$$+ \frac{12 d^3 a^2 c \ln(1 - I e^{I(bx+a)})}{b^4} + \frac{12 d^3 c \ln(1 + I e^{I(bx+a)}) x^2}{b^2} - \frac{12 d^3 c \ln(1 - I e^{I(bx+a)}) x^2}{b^2} - \frac{12 I d^2 c^2 \operatorname{polylog}(2, -I e^{I(bx+a)})}{b^3}$$
$$+ \frac{12 I d^2 c^2 \operatorname{polylog}(2, I e^{I(bx+a)})}{b^3} + \frac{8 I d c^3 \arctan(e^{I(bx+a)})}{b^2} - \frac{8 I d^4 a^3 \arctan(e^{I(bx+a)})}{b^5} - \frac{12 I d^4 \operatorname{polylog}(2, -I e^{I(bx+a)}) x^2}{b^3}$$
$$+ \frac{12 I d^4 \operatorname{polylog}(2, I e^{I(bx+a)}) x^2}{b^3}$$

Problem 73: Result more than twice size of optimal antiderivative.

$$\int (dx + c)^3 \csc(bx + a) \sec(bx + a)^2 \, dx$$

Optimal(type 4, 308 leaves, 23 steps):

$$\frac{6 I d (dx + c)^2 \arctan(e^{I(bx+a)})}{b^2} - \frac{2 (dx + c)^3 \operatorname{arctanh}(e^{I(bx+a)})}{b} + \frac{3 I d (dx + c)^2 \operatorname{polylog}(2, -e^{I(bx+a)})}{b^2} - \frac{6 I d^2 (dx + c) \operatorname{polylog}(2, -I e^{I(bx+a)})}{b^3}$$
$$+ \frac{6 I d^2 (dx + c) \operatorname{polylog}(2, I e^{I(bx+a)})}{b^3} - \frac{3 I d (dx + c)^2 \operatorname{polylog}(2, e^{I(bx+a)})}{b^2} - \frac{6 d^2 (dx + c) \operatorname{polylog}(3, -e^{I(bx+a)})}{b^3} + \frac{6 d^3 \operatorname{polylog}(3, -I e^{I(bx+a)})}{b^4}$$
$$- \frac{6 d^3 \operatorname{polylog}(3, I e^{I(bx+a)})}{b^4} + \frac{6 d^2 (dx + c) \operatorname{polylog}(3, e^{I(bx+a)})}{b^3} - \frac{6 I d^3 \operatorname{polylog}(4, -e^{I(bx+a)})}{b^4} + \frac{6 I d^3 \operatorname{polylog}(4, e^{I(bx+a)})}{b^4}$$
$$+ \frac{(dx + c)^3 \sec(bx + a)}{b}$$

Result(type 4, 1151 leaves):

$$- \frac{3 a c^2 d \ln(e^{I(bx+a)} - 1)}{b^2} + \frac{3 a^2 c d^2 \ln(e^{I(bx+a)} - 1)}{b^3} + \frac{c^3 \ln(e^{I(bx+a)} - 1)}{b} - \frac{c^3 \ln(e^{I(bx+a)} + 1)}{b} - \frac{6 I d^3 \operatorname{polylog}(4, -e^{I(bx+a)})}{b^4}$$
$$- \frac{12 I c d^2 a \arctan(e^{I(bx+a)})}{b^3} + \frac{6 I c d^2 \operatorname{polylog}(2, -e^{I(bx+a)}) x}{b^2} + \frac{6 c d^2 \ln(1 + I e^{I(bx+a)}) a}{b^3} - \frac{6 c d^2 \ln(1 - I e^{I(bx+a)}) a}{b^3}$$
$$+ \frac{6 c d^2 \ln(1 + I e^{I(bx+a)}) x}{b^2} - \frac{6 c d^2 \ln(1 - I e^{I(bx+a)}) x}{b^2} + \frac{3 I c^2 d \operatorname{polylog}(2, -e^{I(bx+a)})}{b^2} + \frac{6 I d^3 a^2 \arctan(e^{I(bx+a)})}{b^4} + \frac{6 I d^3 \operatorname{polylog}(2, I e^{I(bx+a)}) x}{b^3}$$
$$+ \frac{6 I d^3 \operatorname{polylog}(2, I e^{I(bx+a)}) a}{b^4} - \frac{6 I d^3 \operatorname{polylog}(2, -I e^{I(bx+a)}) x}{b^3} - \frac{6 I d^3 \operatorname{polylog}(2, -I e^{I(bx+a)}) a}{b^4} + \frac{6 I c^2 d \arctan(e^{I(bx+a)})}{b^2}$$

$$+\frac{6 I a d^3 \operatorname{dilog}(1+I e^{I(bx+a)})}{b^4}-\frac{6 I a d^3 \operatorname{dilog}(1-I e^{I(bx+a)})}{b^4}-\frac{6 I c d^2 \operatorname{dilog}(1+I e^{I(bx+a)})}{b^3}+\frac{6 I c d^2 \operatorname{dilog}(1-I e^{I(bx+a)})}{b^3}$$
$$+\frac{3 I d^3 \operatorname{polylog}(2, -e^{I(bx+a)}) x^2}{b^2}+\frac{3 d^3 \ln(1-I e^{I(bx+a)}) a^2}{b^4}-\frac{3 d^3 \ln(1+I e^{I(bx+a)}) a^2}{b^4}-\frac{3 d^3 \ln(1-I e^{I(bx+a)}) x^2}{b^2}+\frac{3 d^3 \ln(1+I e^{I(bx+a)}) x^2}{b^2}$$
$$+\frac{3 \ln(1-e^{I(bx+a)}) c^2 d x}{b}+\frac{3 \ln(1-e^{I(bx+a)}) a c^2 d}{b^2}-\frac{d^3 \ln(e^{I(bx+a)}+1) x^3}{b}+\frac{d^3 \ln(1-e^{I(bx+a)}) x^3}{b}+\frac{d^3 \ln(1-e^{I(bx+a)}) a^3}{b^4}$$
$$-\frac{3 \ln(e^{I(bx+a)}+1) c^2 d x}{b}+\frac{3 \ln(1-e^{I(bx+a)}) c d^2 x^2}{b}-\frac{3 \ln(e^{I(bx+a)}+1) c d^2 x^2}{b}-\frac{3 \ln(1-e^{I(bx+a)}) a^2 c d^2}{b^3}+\frac{6 I d^3 \operatorname{polylog}(4, e^{I(bx+a)})}{b^4}$$
$$+\frac{2 e^{I(bx+a)} (d^3 x^3+3 c d^2 x^2+3 c^2 d x+c^3)}{(e^{2 I(bx+a)}+1) b}-\frac{a^3 d^3 \ln(e^{I(bx+a)}-1)}{b^4}-\frac{3 I c^2 d \operatorname{polylog}(2, e^{I(bx+a)})}{b^2}-\frac{3 I d^3 \operatorname{polylog}(2, e^{I(bx+a)}) x^2}{b^2}$$
$$-\frac{6 I c d^2 \operatorname{polylog}(2, e^{I(bx+a)}) x}{b^2}-\frac{6 d^3 \operatorname{polylog}(3, -e^{I(bx+a)}) x}{b^3}+\frac{6 d^3 \operatorname{polylog}(3, e^{I(bx+a)}) x}{b^3}+\frac{6 c d^2 \operatorname{polylog}(3, e^{I(bx+a)})}{b^3}$$
$$-\frac{6 c d^2 \operatorname{polylog}(3, -e^{I(bx+a)})}{b^3}+\frac{6 d^3 \operatorname{polylog}(3, -I e^{I(bx+a)})}{b^4}-\frac{6 d^3 \operatorname{polylog}(3, I e^{I(bx+a)})}{b^4}$$

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Problem 80: Result more than twice size of optimal antiderivative.
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$$\int (dx+c)^2 \sec(bx+a) \tan(bx+a)^2 \, dx$$

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Optimal(type 4, 174 leaves, 17 steps):
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$$\frac{I (dx+c)^2 \arctan(e^{I(bx+a)})}{b}+\frac{d^2 \operatorname{arctanh}(\sin(bx+a))}{b^3}-\frac{I d (dx+c) \operatorname{polylog}(2, -I e^{I(bx+a)})}{b^2}+\frac{I d (dx+c) \operatorname{polylog}(2, I e^{I(bx+a)})}{b^2}$$
$$+\frac{d^2 \operatorname{polylog}(3, -I e^{I(bx+a)})}{b^3}-\frac{d^2 \operatorname{polylog}(3, I e^{I(bx+a)})}{b^3}-\frac{d (dx+c) \sec(bx+a)}{b^2}+\frac{(dx+c)^2 \sec(bx+a) \tan(bx+a)}{2 b}$$

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Result(type 4, 583 leaves):
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$$-\frac{I c d \operatorname{polylog}(2, -I e^{I(bx+a)})}{b^2}-\frac{d^2 \ln(1-I e^{I(bx+a)}) x^2}{2 b}-\frac{a^2 d^2 \ln(1+I e^{I(bx+a)})}{2 b^3}+\frac{d^2 \operatorname{polylog}(3, -I e^{I(bx+a)})}{b^3}+\frac{a^2 d^2 \ln(1-I e^{I(bx+a)})}{2 b^3}$$
$$-\frac{2 I d^2 \arctan(e^{I(bx+a)})}{b^3}-\frac{I d^2 \operatorname{polylog}(2, -I e^{I(bx+a)}) x}{b^2}-\frac{2 I a c d \arctan(e^{I(bx+a)})}{b^2}+\frac{I d^2 \operatorname{polylog}(2, I e^{I(bx+a)}) x}{b^2}+\frac{I c d \operatorname{polylog}(2, I e^{I(bx+a)})}{b^2}$$
$$-\frac{c d \ln(1-I e^{I(bx+a)}) x}{b}-\frac{1}{(e^{2 I(bx+a)}+1)^2 b^2}\Big(I \big(x^2 d^2 b e^{3 I(bx+a)}+2 c d x b e^{3 I(bx+a)}+c^2 b e^{3 I(bx+a)}-x^2 d^2 b e^{I(bx+a)}-2 c d x b e^{I(bx+a)}$$
$$-2 I d^2 x e^{3 I(bx+a)}-c^2 b e^{I(bx+a)}-2 I c d e^{3 I(bx+a)}-2 I d^2 x e^{I(bx+a)}-2 I c d e^{I(bx+a)}\big)\Big)+\frac{I c^2 \arctan(e^{I(bx+a)})}{b}+\frac{I a^2 d^2 \arctan(e^{I(bx+a)})}{b^3}$$
$$+\frac{c d \ln(1+I e^{I(bx+a)}) a}{b^2}-\frac{c d \ln(1-I e^{I(bx+a)}) a}{b^2}+\frac{d^2 \ln(1+I e^{I(bx+a)}) x^2}{2 b}-\frac{d^2 \operatorname{polylog}(3, I e^{I(bx+a)})}{b^3}+\frac{c d \ln(1+I e^{I(bx+a)}) x}{b}$$

Problem 83: Result more than twice size of optimal antiderivative.

$$\int (dx+c)^2 \csc(bx+a) \sec(bx+a)^3 \, dx$$

Optimal(type 4, 181 leaves, 17 steps):

$$\frac{c\,d\,x}{b}+\frac{d^2x^2}{2\,b}-\frac{2\,(dx+c)^2\,\mathrm{arctanh}\left(\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}\right)}{b}-\frac{d^2\ln(\cos(bx+a))}{b^3}+\frac{\mathrm{I}\,d\,(dx+c)\,\mathrm{polylog}\left(2,-\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}\right)}{b^2}-\frac{\mathrm{I}\,d\,(dx+c)\,\mathrm{polylog}\left(2,\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}\right)}{b^2}$$
$$-\frac{d^2\,\mathrm{polylog}\left(3,-\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}\right)}{2\,b^3}+\frac{d^2\,\mathrm{polylog}\left(3,\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}\right)}{2\,b^3}-\frac{d\,(dx+c)\tan(bx+a)}{b^2}+\frac{(dx+c)^2\tan(bx+a)^2}{2\,b}$$

Result(type 4, 613 leaves):

$$-\frac{d^2\,\mathrm{polylog}\left(3,-\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}\right)}{2\,b^3}+\frac{2\,c\,d\ln\left(\mathrm{e}^{\mathrm{I}\,(bx+a)}+1\right)x}{b}+\frac{2\,c\,d\ln\left(1-\mathrm{e}^{\mathrm{I}\,(bx+a)}\right)x}{b}+\frac{2\,c\,d\ln\left(1-\mathrm{e}^{\mathrm{I}\,(bx+a)}\right)a}{b^2}-\frac{2\,\mathrm{I}\,d^2\,\mathrm{polylog}\left(2,\mathrm{e}^{\mathrm{I}\,(bx+a)}\right)x}{b^2}$$
$$-\frac{2\,\mathrm{I}\,c\,d\,\mathrm{polylog}\left(2,\mathrm{e}^{\mathrm{I}\,(bx+a)}\right)}{b^2}-\frac{d^2\ln\left(\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}+1\right)}{b^3}+\frac{a^2d^2\ln\left(\mathrm{e}^{\mathrm{I}\,(bx+a)}-1\right)}{b^3}-\frac{d^2\ln\left(\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}+1\right)x^2}{b}+\frac{2\,d^2\ln\left(\mathrm{e}^{\mathrm{I}\,(bx+a)}\right)}{b^3}$$
$$+\frac{2\,d^2\,\mathrm{polylog}\left(3,-\mathrm{e}^{\mathrm{I}\,(bx+a)}\right)}{b^3}+\frac{2\,d^2\,\mathrm{polylog}\left(3,\mathrm{e}^{\mathrm{I}\,(bx+a)}\right)}{b^3}+\frac{d^2\ln\left(1-\mathrm{e}^{\mathrm{I}\,(bx+a)}\right)x^2}{b}-\frac{d^2\ln\left(1-\mathrm{e}^{\mathrm{I}\,(bx+a)}\right)a^2}{b^3}+\frac{d^2\ln\left(\mathrm{e}^{\mathrm{I}\,(bx+a)}+1\right)x^2}{b}$$
$$-\frac{2\,c\,d\ln\left(\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}+1\right)x}{b}-\frac{2\,a\,c\,d\ln\left(\mathrm{e}^{\mathrm{I}\,(bx+a)}-1\right)}{b^2}+\frac{\mathrm{I}\,c\,d\,\mathrm{polylog}\left(2,-\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}\right)}{b^2}+\frac{\mathrm{I}\,d^2\,\mathrm{polylog}\left(2,-\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}\right)x}{b^2}-\frac{c^2\ln\left(\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}+1\right)}{b}$$
$$+\frac{c^2\ln\left(\mathrm{e}^{\mathrm{I}\,(bx+a)}-1\right)}{b}+\frac{c^2\ln\left(\mathrm{e}^{\mathrm{I}\,(bx+a)}+1\right)}{b}$$
$$+\frac{2\left(b\,d^2x^2\,\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}+2\,b\,c\,d\,x\,\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}+b\,c^2\,\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}-\mathrm{I}\,d^2x\,\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}-\mathrm{I}\,c\,d\,\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}-\mathrm{I}\,d^2x-\mathrm{I}\,c\,d\right)}{\left(\mathrm{e}^{2\,\mathrm{I}\,(bx+a)}+1\right)^2b^2}-\frac{2\,\mathrm{I}\,c\,d\,\mathrm{polylog}\left(2,-\mathrm{e}^{\mathrm{I}\,(bx+a)}\right)}{b^2}$$
$$-\frac{2\,\mathrm{I}\,d^2\,\mathrm{polylog}\left(2,-\mathrm{e}^{\mathrm{I}\,(bx+a)}\right)x}{b^2}$$

Problem 86: Unable to integrate problem.

$$\int x\sin(bx+a)\sqrt{\cos(bx+a)}\,dx$$

Optimal(type 4, 76 leaves, 3 steps):

$$-\frac{2\,x\cos(bx+a)^{3/2}}{3\,b}+\frac{4\sqrt{\cos\left(\frac{bx}{2}+\frac{a}{2}\right)^2}\,\mathrm{EllipticF}\left(\sin\left(\frac{bx}{2}+\frac{a}{2}\right),\sqrt{2}\right)}{9\cos\left(\frac{bx}{2}+\frac{a}{2}\right)b^2}+\frac{4\sin(bx+a)\sqrt{\cos(bx+a)}}{9\,b^2}$$

Result(type 8, 18 leaves):

$$\int x\sin(bx+a)\sqrt{\cos(bx+a)}\,dx$$

Problem 87: Unable to integrate problem.

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

Optimal(type 4, 57 leaves, 2 steps):

$$-\frac{4\sqrt{\cos\left(\frac{bx}{2}+\frac{a}{2}\right)^2}\ \mathrm{EllipticF}\left(\sin\left(\frac{bx}{2}+\frac{a}{2}\right),\sqrt{2}\right)}{\cos\left(\frac{bx}{2}+\frac{a}{2}\right)b^2}+\frac{2x}{b\sqrt{\cos(bx+a)}}$$

Result(type 8, 18 leaves):

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

Problem 88: Unable to integrate problem.

$$\int \frac{x \sin(bx+a)}{\cos(bx+a)^{5/2}}\, dx$$

Optimal(type 4, 76 leaves, 3 steps):

$$\frac{2x}{3b\cos(bx+a)^{3/2}}+\frac{4\sqrt{\cos\left(\frac{bx}{2}+\frac{a}{2}\right)^2}\ \mathrm{EllipticE}\left(\sin\left(\frac{bx}{2}+\frac{a}{2}\right),\sqrt{2}\right)}{3\cos\left(\frac{bx}{2}+\frac{a}{2}\right)b^2}-\frac{4\sin(bx+a)}{3b^2\sqrt{\cos(bx+a)}}$$

Result(type 8, 18 leaves):

$$\int \frac{x \sin(bx+a)}{\cos(bx+a)^{5/2}}\, dx$$

Problem 89: Unable to integrate problem.

$$\int \frac{x \sin(bx+a)}{\cos(bx+a)^{9/2}}\, dx$$

Optimal(type 4, 95 leaves, 4 steps):

$$\frac{2x}{7b\cos(bx+a)^{7/2}}+\frac{12\sqrt{\cos\left(\frac{bx}{2}+\frac{a}{2}\right)^2}\ \mathrm{EllipticE}\left(\sin\left(\frac{bx}{2}+\frac{a}{2}\right),\sqrt{2}\right)}{35\cos\left(\frac{bx}{2}+\frac{a}{2}\right)b^2}-\frac{4\sin(bx+a)}{35b^2\cos(bx+a)^{5/2}}-\frac{12\sin(bx+a)}{35b^2\sqrt{\cos(bx+a)}}$$

Result(type 8, 18 leaves):

$$\int \frac{x \sin(bx+a)}{\cos(bx+a)^{9/2}}\, dx$$

Problem 90: Unable to integrate problem.

$$\int x \sec(bx+a)^{7/2} \sin(bx+a)\, dx$$

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

$$\frac{2 x \sec(bx+a)^{5/2}}{5 b} - \frac{4 \sec(bx+a)^{3/2} \sin(bx+a)}{15 b^2} - \frac{4 \sqrt{\cos\left(\frac{bx}{2}+\frac{a}{2}\right)^2}\, \mathrm{EllipticF}\left(\sin\left(\frac{bx}{2}+\frac{a}{2}\right), \sqrt{2}\right) \sqrt{\cos(bx+a)}\, \sqrt{\sec(bx+a)}}{15 \cos\left(\frac{bx}{2}+\frac{a}{2}\right) b^2}$$

Result(type 8, 18 leaves):

$$\int x \sec(bx+a)^{7/2} \sin(bx+a)\, dx$$

Problem 91: Unable to integrate problem.

$$\int x \sec(bx+a)^{3/2} \sin(bx+a)\, dx$$

Optimal(type 4, 73 leaves, 3 steps):

$$\frac{2 x \sqrt{\sec(bx+a)}}{b} - \frac{4 \sqrt{\cos\left(\frac{bx}{2}+\frac{a}{2}\right)^2}\, \mathrm{EllipticF}\left(\sin\left(\frac{bx}{2}+\frac{a}{2}\right), \sqrt{2}\right) \sqrt{\cos(bx+a)}\, \sqrt{\sec(bx+a)}}{\cos\left(\frac{bx}{2}+\frac{a}{2}\right) b^2}$$

Result(type 8, 18 leaves):

$$\int x \sec(bx+a)^{3/2} \sin(bx+a)\, dx$$

Problem 92: Unable to integrate problem.

$$\int \frac{x \sin(bx+a)}{\sec(bx+a)^{5/2}}\, dx$$

Optimal(type 4, 111 leaves, 5 steps):

$$-\frac{2 x}{7 b \sec(bx+a)^{7/2}} + \frac{4 \sin(bx+a)}{49 b^2 \sec(bx+a)^{5/2}} + \frac{20 \sin(bx+a)}{147 b^2 \sqrt{\sec(bx+a)}}$$
$$+ \frac{20 \sqrt{\cos\left(\frac{bx}{2}+\frac{a}{2}\right)^2}\, \mathrm{EllipticF}\left(\sin\left(\frac{bx}{2}+\frac{a}{2}\right), \sqrt{2}\right) \sqrt{\cos(bx+a)}\, \sqrt{\sec(bx+a)}}{147 \cos\left(\frac{bx}{2}+\frac{a}{2}\right) b^2}$$

Result(type 8, 18 leaves):

$$\int \frac{x \sin(bx+a)}{\sec(bx+a)^{5/2}}\, dx$$

Problem 93: Unable to integrate problem.

$$\int x \cos(bx+a) \sin(bx+a)^{3/2}\, dx$$

Optimal(type 4, 85 leaves, 3 steps):

$$\frac{12 \sqrt{\sin\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right)^2}\, \mathrm{EllipticE}\left(\cos\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right), \sqrt{2}\right)}{25 \sin\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right) b^2} + \frac{4 \cos(bx+a) \sin(bx+a)^{3/2}}{25 b^2} + \frac{2 x \sin(bx+a)^{5/2}}{5 b}$$

Result(type 8, 18 leaves):

$$\int x \cos(bx+a) \sin(bx+a)^{3/2}\, dx$$

Problem 94: Result more than twice size of optimal antiderivative.

$$\int \frac{x \cos(bx+a)}{\sqrt{\sin(bx+a)}}\, dx$$

Optimal(type 4, 66 leaves, 2 steps):

$$\frac{4 \sqrt{\sin\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right)^2}\, \mathrm{EllipticE}\left(\cos\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right), \sqrt{2}\right)}{\sin\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right) b^2} + \frac{2 x \sqrt{\sin(bx+a)}}{b}$$

Result(type 4, 307 leaves):

$$-\frac{\mathrm{I}\,(bx+2\,\mathrm{I})\left(\left(\mathrm{e}^{\mathrm{I}(bx+a)}\right)^2-1\right)\sqrt{2}}{b^2\sqrt{\frac{-\mathrm{I}\left(\left(\mathrm{e}^{\mathrm{I}(bx+a)}\right)^2-1\right)}{\mathrm{e}^{\mathrm{I}(bx+a)}}}\,\mathrm{e}^{\mathrm{I}(bx+a)}} - \frac{1}{b^2\sqrt{\frac{-\mathrm{I}\left(\left(\mathrm{e}^{\mathrm{I}(bx+a)}\right)^2-1\right)}{\mathrm{e}^{\mathrm{I}(bx+a)}}}\,\mathrm{e}^{\mathrm{I}(bx+a)}}\Bigg(2\Bigg(\frac{2\,\mathrm{I}\left(\mathrm{I}-\mathrm{I}\left(\mathrm{e}^{\mathrm{I}(bx+a)}\right)^2\right)}{\sqrt{\mathrm{e}^{\mathrm{I}(bx+a)}\left(\mathrm{I}-\mathrm{I}\left(\mathrm{e}^{\mathrm{I}(bx+a)}\right)^2\right)}}$$
$$-\frac{\sqrt{\mathrm{e}^{\mathrm{I}(bx+a)}+1}\,\sqrt{-2\,\mathrm{e}^{\mathrm{I}(bx+a)}+2}\,\sqrt{-\mathrm{e}^{\mathrm{I}(bx+a)}}\left(-2\,\mathrm{EllipticE}\left(\sqrt{\mathrm{e}^{\mathrm{I}(bx+a)}+1}, \frac{\sqrt{2}}{2}\right)+\mathrm{EllipticF}\left(\sqrt{\mathrm{e}^{\mathrm{I}(bx+a)}+1}, \frac{\sqrt{2}}{2}\right)\right)}{\sqrt{-\mathrm{I}\left(\mathrm{e}^{\mathrm{I}(bx+a)}\right)^3+\mathrm{I}\,\mathrm{e}^{\mathrm{I}(bx+a)}}}\Bigg)$$
$$\sqrt{2}\sqrt{-\mathrm{I}\left(\left(\mathrm{e}^{\mathrm{I}(bx+a)}\right)^2-1\right)\mathrm{e}^{\mathrm{I}(bx+a)}}\Bigg)$$

Problem 95: Unable to integrate problem.

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

Optimal(type 4, 66 leaves, 2 steps):

$$-\frac{4\sqrt{\sin\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right)^2}\,\mathrm{EllipticF}\left(\cos\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right),\sqrt{2}\right)}{\sin\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right)b^2}-\frac{2x}{b\sqrt{\sin(bx+a)}}$$

Result(type 8, 18 leaves):

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

Problem 96: Unable to integrate problem.

$$\int\frac{x\cos(bx+a)}{\sin(bx+a)^{5/2}}\,dx$$

Optimal(type 4, 85 leaves, 3 steps):

$$\frac{4\sqrt{\sin\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right)^2}\,\mathrm{EllipticE}\left(\cos\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right),\sqrt{2}\right)}{3\sin\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right)b^2}-\frac{2x}{3b\sin(bx+a)^{3/2}}-\frac{4\cos(bx+a)}{3b^2\sqrt{\sin(bx+a)}}$$

Result(type 8, 18 leaves):

$$\int\frac{x\cos(bx+a)}{\sin(bx+a)^{5/2}}\,dx$$

Problem 97: Unable to integrate problem.

$$\int x\cos(bx+a)\csc(bx+a)^{5/2}\,dx$$

Optimal(type 4, 101 leaves, 4 steps):

$$-\frac{2x\csc(bx+a)^{3/2}}{3b}-\frac{4\cos(bx+a)\sqrt{\csc(bx+a)}}{3b^2}+\frac{4\sqrt{\sin\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right)^2}\,\mathrm{EllipticE}\left(\cos\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right),\sqrt{2}\right)\sqrt{\csc(bx+a)}\sqrt{\sin(bx+a)}}{3\sin\left(\frac{a}{2}+\frac{\pi}{4}+\frac{bx}{2}\right)b^2}$$

Result(type 8, 18 leaves):

$$\int x\cos(bx+a)\csc(bx+a)^{5/2}\,dx$$

Problem 100: Result more than twice size of optimal antiderivative.

$$\int(dx+c)^3\csc(bx+a)\sin(3bx+3a)\,dx$$

Optimal(type 3, 157 leaves, 10 steps):

$$-\frac{3 c d^2 x}{2 b^2}-\frac{3 d^3 x^2}{4 b^2}+\frac{(d x+c)^4}{4 d}-\frac{9 d^3 \cos(b x+a)^2}{8 b^4}+\frac{9 d (d x+c)^2 \cos(b x+a)^2}{4 b^2}-\frac{3 d^2 (d x+c) \cos(b x+a) \sin(b x+a)}{b^3}+\frac{2 (d x+c)^3 \cos(b x+a) \sin(b x+a)}{b}+\frac{3 d^3 \sin(b x+a)^2}{8 b^4}-\frac{3 d (d x+c)^2 \sin(b x+a)^2}{4 b^2}$$

Result(type 3, 579 leaves):

$$-c^3 x-\frac{d^3 x^4}{4}+\frac{4 c^3 \left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)}{b}-\frac{3 c^2 d x^2}{2}-c d^2 x^3+\frac{1}{b^4}\Bigg(4 d^3 \Bigg((b x+a)^3 \left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)+\frac{3 (b x+a)^2 \cos(b x+a)^2}{4}-\frac{3 (b x+a) \left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)}{2}+\frac{3 (b x+a)^2}{8}+\frac{3 \sin(b x+a)^2}{8}-\frac{3 (b x+a)^4}{8}-3 a \left((b x+a)^2\left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)+\frac{(b x+a) \cos(b x+a)^2}{2}-\frac{\cos(b x+a) \sin(b x+a)}{4}-\frac{b x}{4}-\frac{a}{4}-\frac{(b x+a)^3}{3}\right)+3 a^2 \left((b x+a) \left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)-\frac{(b x+a)^2}{4}-\frac{\sin(b x+a)^2}{4}\right)-a^3 \left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)\Bigg)\Bigg)+\frac{12 c^2 d \left((b x+a) \left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)-\frac{(b x+a)^2}{4}-\frac{\sin(b x+a)^2}{4}-a \left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)\right)}{b^2}+\frac{1}{b^3}\Bigg(12 c d^2 \Bigg((b x+a)^2 \left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)+\frac{(b x+a) \cos(b x+a)^2}{2}-\frac{\cos(b x+a) \sin(b x+a)}{4}-\frac{b x}{4}-\frac{a}{4}-\frac{(b x+a)^3}{3}-2 a \left((b x+a) \left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)-\frac{(b x+a)^2}{4}-\frac{\sin(b x+a)^2}{4}\right)+a^2 \left(\frac{\cos(b x+a) \sin(b x+a)}{2}+\frac{b x}{2}+\frac{a}{2}\right)\Bigg)\Bigg)$$

Problem 103: Result more than twice size of optimal antiderivative.

$$\int (d x+c)^4 \sec(b x+a) \sin(3 b x+3 a)\, dx$$

Optimal(type 4, 282 leaves, 20 steps):

$$\frac{6 c d^3 x}{b^3}+\frac{3 d^4 x^2}{b^3}-\frac{(d x+c)^4}{b}-\frac{\mathrm{I} (d x+c)^5}{5 d}+\frac{(d x+c)^4 \ln(\mathrm{e}^{2 \mathrm{I} (b x+a)}+1)}{b}-\frac{2 \mathrm{I} d (d x+c)^3 \operatorname{polylog}(2, -\mathrm{e}^{2 \mathrm{I} (b x+a)})}{b^2}+\frac{3 d^2 (d x+c)^2 \operatorname{polylog}(3, -\mathrm{e}^{2 \mathrm{I} (b x+a)})}{b^3}+\frac{3 \mathrm{I} d^3 (d x+c) \operatorname{polylog}(4, -\mathrm{e}^{2 \mathrm{I} (b x+a)})}{b^4}-\frac{3 d^4 \operatorname{polylog}(5, -\mathrm{e}^{2 \mathrm{I} (b x+a)})}{2 b^5}-\frac{6 d^3 (d x+c) \cos(b x+a) \sin(b x+a)}{b^4}+\frac{4 d (d x+c)^3 \cos(b x+a) \sin(b x+a)}{b^2}+\frac{3 d^4 \sin(b x+a)^2}{b^5}-\frac{6 d^2 (d x+c)^2 \sin(b x+a)^2}{b^3}$$

$$+\frac{2 (d x+c)^4 \sin(b x+a)^2}{b}$$

Result(type 4, 955 leaves):

$$\frac{d^4 \ln(e^{2 I (b x+a)}+1) x^4}{b}+\frac{4 c d^3 \ln(e^{2 I (b x+a)}+1) x^3}{b}-\frac{3 d^4 \mathrm{polylog}(5, -e^{2 I (b x+a)})}{2 b^5}-I c d^3 x^4-2 I c^2 d^2 x^3-2 I c^3 d x^2-\frac{I d^4 x^5}{5}+\frac{8 a^3 c d^3 \ln(e^{I (b x+a)})}{b^4}$$
$$-\frac{12 a^2 c^2 d^2 \ln(e^{I (b x+a)})}{b^3}+\frac{8 a c^3 d \ln(e^{I (b x+a)})}{b^2}-\frac{4 I c^3 d a^2}{b^2}-\frac{6 I a^4 c d^3}{b^4}+\frac{8 I c^2 d^2 a^3}{b^3}+\frac{2 I a^4 d^4 x}{b^4}+\frac{3 I c d^3 \mathrm{polylog}(4, -e^{2 I (b x+a)})}{b^4}$$
$$-\frac{2 I c^3 d \mathrm{polylog}(2, -e^{2 I (b x+a)})}{b^2}-\frac{2 I d^4 \mathrm{polylog}(2, -e^{2 I (b x+a)}) x^3}{b^2}+\frac{3 I d^4 \mathrm{polylog}(4, -e^{2 I (b x+a)}) x}{b^4}-\frac{6 I c^2 d^2 \mathrm{polylog}(2, -e^{2 I (b x+a)}) x}{b^2}$$
$$-\frac{6 I c d^3 \mathrm{polylog}(2, -e^{2 I (b x+a)}) x^2}{b^2}-\frac{8 I c^3 d a x}{b}+\frac{12 I c^2 d^2 a^2 x}{b^2}-\frac{8 I c d^3 a^3 x}{b^3}+\frac{3 d^4 \mathrm{polylog}(3, -e^{2 I (b x+a)}) x^2}{b^3}+\frac{3 c^2 d^2 \mathrm{polylog}(3, -e^{2 I (b x+a)})}{b^3}$$
$$+I c^4 x+\frac{c^4 \ln(e^{2 I (b x+a)}+1)}{b}-\frac{2 a^4 d^4 \ln(e^{I (b x+a)})}{b^5}+\frac{8 I d^4 a^5}{5 b^5}-\frac{1}{4 b^5}\Big((2 b^4 d^4 x^4+4 I b^3 d^4 x^3+8 b^4 c d^3 x^3+12 I b^3 c d^3 x^2+12 b^4 c^2 d^2 x^2$$
$$+12 I b^3 c^2 d^2 x+8 b^4 c^3 d x+4 I b^3 c^3 d+2 b^4 c^4-6 b^2 d^4 x^2-6 I b d^4 x-12 b^2 c d^3 x-6 I b c d^3-6 c^2 d^2 b^2+3 d^4) e^{2 I (b x+a)}\Big)-\frac{1}{4 b^5}\Big((2 b^4 d^4 x^4$$
$$-4 I b^3 d^4 x^3+8 b^4 c d^3 x^3-12 I b^3 c d^3 x^2+12 b^4 c^2 d^2 x^2-12 I b^3 c^2 d^2 x+8 b^4 c^3 d x-4 I b^3 c^3 d+2 b^4 c^4-6 b^2 d^4 x^2+6 I b d^4 x-12 b^2 c d^3 x+6 I b c d^3$$
$$-6 c^2 d^2 b^2+3 d^4) e^{-2 I (b x+a)}\Big)+\frac{6 c d^3 \mathrm{polylog}(3, -e^{2 I (b x+a)}) x}{b^3}+\frac{6 c^2 d^2 \ln(e^{2 I (b x+a)}+1) x^2}{b}+\frac{4 c^3 d \ln(e^{2 I (b x+a)}+1) x}{b}-\frac{2 c^4 \ln(e^{I (b x+a)})}{b}$$

Problem 104: Result more than twice size of optimal antiderivative.

$$\int (d x+c)^3 \sec(b x+a) \sin(3 b x+3 a)\, dx$$

Optimal(type 4, 219 leaves, 19 steps):

$$\frac{3 d^3 x}{2 b^3}-\frac{(d x+c)^3}{b}-\frac{I (d x+c)^4}{4 d}+\frac{(d x+c)^3 \ln(e^{2 I (b x+a)}+1)}{b}-\frac{3 I d (d x+c)^2 \mathrm{polylog}(2, -e^{2 I (b x+a)})}{2 b^2}+\frac{3 d^2 (d x+c) \mathrm{polylog}(3, -e^{2 I (b x+a)})}{2 b^3}$$
$$+\frac{3 I d^3 \mathrm{polylog}(4, -e^{2 I (b x+a)})}{4 b^4}-\frac{3 d^3 \cos(b x+a) \sin(b x+a)}{2 b^4}+\frac{3 d (d x+c)^2 \cos(b x+a) \sin(b x+a)}{b^2}-\frac{3 d^2 (d x+c) \sin(b x+a)^2}{b^3}$$
$$+\frac{2 (d x+c)^3 \sin(b x+a)^2}{b}$$

Result(type 4, 638 leaves):

$$-\frac{(4 d^3 x^3 b^3+6 I b^2 d^3 x^2+12 b^3 c d^2 x^2+12 I b^2 c d^2 x+12 b^3 c^2 d x+6 I c^2 d b^2+4 b^3 c^3-6 b d^3 x-3 I d^3-6 c d^2 b) e^{2 I (b x+a)}}{8 b^4}$$
$$-\frac{(4 d^3 x^3 b^3-6 I b^2 d^3 x^2+12 b^3 c d^2 x^2-12 I b^2 c d^2 x+12 b^3 c^2 d x-6 I c^2 d b^2+4 b^3 c^3-6 b d^3 x+3 I d^3-6 c d^2 b) e^{-2 I (b x+a)}}{8 b^4}+I c^3 x$$
$$+\frac{6 a c^2 d \ln(e^{I (b x+a)})}{b^2}-\frac{6 a^2 c d^2 \ln(e^{I (b x+a)})}{b^3}-\frac{I d^3 x^4}{4}-\frac{2 c^3 \ln(e^{I (b x+a)})}{b}-I c d^2 x^3-\frac{3 I c^2 d x^2}{2}-\frac{3 I c d^2 \mathrm{polylog}(2, -e^{2 I (b x+a)}) x}{b^2}$$

$$+\frac{d^3\ln(e^{2I(bx+a)}+1)x^3}{b}+\frac{2a^3d^3\ln(e^{I(bx+a)})}{b^4}-\frac{3Ia^4d^3}{2b^4}-\frac{3Ic^2da^2}{b^2}+\frac{4Icd^2a^3}{b^3}-\frac{2Id^3a^3x}{b^3}+\frac{6Icd^2a^2x}{b^2}-\frac{6Ic^2dax}{b}$$
$$+\frac{3d^3\operatorname{polylog}(3,-e^{2I(bx+a)})x}{2b^3}+\frac{3cd^2\operatorname{polylog}(3,-e^{2I(bx+a)})}{2b^3}+\frac{3Id^3\operatorname{polylog}(4,-e^{2I(bx+a)})}{4b^4}+\frac{c^3\ln(e^{2I(bx+a)}+1)}{b}$$
$$+\frac{3cd^2\ln(e^{2I(bx+a)}+1)x^2}{b}+\frac{3c^2d\ln(e^{2I(bx+a)}+1)x}{b}-\frac{3Ic^2d\operatorname{polylog}(2,-e^{2I(bx+a)})}{2b^2}-\frac{3Id^3\operatorname{polylog}(2,-e^{2I(bx+a)})x^2}{2b^2}$$

Problem 106: Result more than twice size of optimal antiderivative.

$$\int(dx+c)^2\sec(bx+a)^2\sin(3bx+3a)\,dx$$

Optimal(type 4, 136 leaves, 15 steps):

$$-\frac{4Id(dx+c)\arctan(e^{I(bx+a)})}{b^2}+\frac{8d^2\cos(bx+a)}{b^3}-\frac{4(dx+c)^2\cos(bx+a)}{b}+\frac{2Id^2\operatorname{polylog}(2,-Ie^{I(bx+a)})}{b^3}-\frac{2Id^2\operatorname{polylog}(2,Ie^{I(bx+a)})}{b^3}$$
$$-\frac{(dx+c)^2\sec(bx+a)}{b}+\frac{8d(dx+c)\sin(bx+a)}{b^2}$$

Result(type 4, 344 leaves):

$$-\frac{2(d^2x^2b^2+2b^2cdx+b^2c^2+2Ibd^2x-2d^2+2Ibcd)e^{I(bx+a)}}{b^3}-\frac{2(d^2x^2b^2+2b^2cdx+b^2c^2-2Ibd^2x-2d^2-2Ibcd)e^{-I(bx+a)}}{b^3}$$
$$-\frac{2(x^2d^2+2cdx+c^2)e^{I(bx+a)}}{b(e^{2I(bx+a)}+1)}-\frac{4Idc\arctan(e^{I(bx+a)})}{b^2}-\frac{2d^2\ln(1+Ie^{I(bx+a)})x}{b^2}-\frac{2d^2\ln(1+Ie^{I(bx+a)})a}{b^3}+\frac{2d^2\ln(1-Ie^{I(bx+a)})x}{b^2}$$
$$+\frac{2d^2\ln(1-Ie^{I(bx+a)})a}{b^3}+\frac{2Id^2\operatorname{dilog}(1+Ie^{I(bx+a)})}{b^3}-\frac{2Id^2\operatorname{dilog}(1-Ie^{I(bx+a)})}{b^3}+\frac{4Id^2a\arctan(e^{I(bx+a)})}{b^3}$$

Test results for the 3 problems in "4.7.4 x^m (a+b trig^n)^p.txt"

Problem 1: Result is not expressed in closed-form.

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

Optimal(type 4, 153 leaves, 9 steps):

$$-\frac{Ix\ln\left(1-\frac{be^{2Ix}}{2a+b-2\sqrt{a}\sqrt{a+b}}\right)}{2\sqrt{a}\sqrt{a+b}}+\frac{Ix\ln\left(1-\frac{be^{2Ix}}{2a+b+2\sqrt{a}\sqrt{a+b}}\right)}{2\sqrt{a}\sqrt{a+b}}-\frac{\operatorname{polylog}\left(2,\frac{be^{2Ix}}{2a+b-2\sqrt{a}\sqrt{a+b}}\right)}{4\sqrt{a}\sqrt{a+b}}$$
$$+\frac{\operatorname{polylog}\left(2,\frac{be^{2Ix}}{2a+b+2\sqrt{a}\sqrt{a+b}}\right)}{4\sqrt{a}\sqrt{a+b}}$$

Result(type 7, 71 leaves):

$$-\left(\sum_{\_R1=RootOf\left(b\,\_Z^4+(-4\,a-2\,b)\,\_Z^2+b\right)}\frac{I\,x\ln\left(\frac{\_R1-e^{I\,x}}{\_R1}\right)+\mathrm{dilog}\left(\frac{\_R1-e^{I\,x}}{\_R1}\right)}{-\_R1^2\,b+2\,a+b}\right)$$

Problem 2: Unable to integrate problem.

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

Optimal(type 4, 311 leaves, 13 steps):

$$-\frac{I\,x^3\ln\left(1-\frac{b\,e^{2\,I\,x}}{2\,a+b-2\sqrt{a}\,\sqrt{a+b}}\right)}{2\sqrt{a}\,\sqrt{a+b}}+\frac{I\,x^3\ln\left(1-\frac{b\,e^{2\,I\,x}}{2\,a+b+2\sqrt{a}\,\sqrt{a+b}}\right)}{2\sqrt{a}\,\sqrt{a+b}}-\frac{3\,x^2\,\mathrm{polylog}\left(2,\frac{b\,e^{2\,I\,x}}{2\,a+b-2\sqrt{a}\,\sqrt{a+b}}\right)}{4\sqrt{a}\,\sqrt{a+b}}$$
$$+\frac{3\,x^2\,\mathrm{polylog}\left(2,\frac{b\,e^{2\,I\,x}}{2\,a+b+2\sqrt{a}\,\sqrt{a+b}}\right)}{4\sqrt{a}\,\sqrt{a+b}}-\frac{3\,I\,x\,\mathrm{polylog}\left(3,\frac{b\,e^{2\,I\,x}}{2\,a+b-2\sqrt{a}\,\sqrt{a+b}}\right)}{4\sqrt{a}\,\sqrt{a+b}}+\frac{3\,I\,x\,\mathrm{polylog}\left(3,\frac{b\,e^{2\,I\,x}}{2\,a+b+2\sqrt{a}\,\sqrt{a+b}}\right)}{4\sqrt{a}\,\sqrt{a+b}}$$
$$+\frac{3\,\mathrm{polylog}\left(4,\frac{b\,e^{2\,I\,x}}{2\,a+b-2\sqrt{a}\,\sqrt{a+b}}\right)}{8\sqrt{a}\,\sqrt{a+b}}-\frac{3\,\mathrm{polylog}\left(4,\frac{b\,e^{2\,I\,x}}{2\,a+b+2\sqrt{a}\,\sqrt{a+b}}\right)}{8\sqrt{a}\,\sqrt{a+b}}$$

Result(type 8, 16 leaves):

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

Problem 3: Unable to integrate problem.

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

Optimal(type 4, 235 leaves, 11 steps):

$$-\frac{I\,x^2\ln\left(1+\frac{b\,e^{2\,I\,x}}{2\,a+b-2\sqrt{a}\,\sqrt{a+b}}\right)}{2\sqrt{a}\,\sqrt{a+b}}+\frac{I\,x^2\ln\left(1+\frac{b\,e^{2\,I\,x}}{2\,a+b+2\sqrt{a}\,\sqrt{a+b}}\right)}{2\sqrt{a}\,\sqrt{a+b}}-\frac{x\,\mathrm{polylog}\left(2,-\frac{b\,e^{2\,I\,x}}{2\,a+b-2\sqrt{a}\,\sqrt{a+b}}\right)}{2\sqrt{a}\,\sqrt{a+b}}$$
$$+\frac{x\,\mathrm{polylog}\left(2,-\frac{b\,e^{2\,I\,x}}{2\,a+b+2\sqrt{a}\,\sqrt{a+b}}\right)}{2\sqrt{a}\,\sqrt{a+b}}-\frac{I\,\mathrm{polylog}\left(3,-\frac{b\,e^{2\,I\,x}}{2\,a+b-2\sqrt{a}\,\sqrt{a+b}}\right)}{4\sqrt{a}\,\sqrt{a+b}}+\frac{I\,\mathrm{polylog}\left(3,-\frac{b\,e^{2\,I\,x}}{2\,a+b+2\sqrt{a}\,\sqrt{a+b}}\right)}{4\sqrt{a}\,\sqrt{a+b}}$$

Result(type 8, 16 leaves):

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

Test results for the 86 problems in "4.7.5 x^m trig(a+b log(c x^n))^p.txt"

Problem 1: Unable to integrate problem.

$$\int x^2 \sin(a + b\ln(c x^n))\, dx$$

Optimal(type 3, 57 leaves, 1 step):

$$-\frac{b n x^3 \cos(a + b\ln(c x^n))}{b^2 n^2 + 9} + \frac{3 x^3 \sin(a + b\ln(c x^n))}{b^2 n^2 + 9}$$

Result(type 8, 17 leaves):

$$\int x^2 \sin(a + b\ln(c x^n))\, dx$$

Problem 2: Unable to integrate problem.

$$\int \sin(a + b\ln(c x^n))\, dx$$

Optimal(type 3, 52 leaves, 1 step):

$$-\frac{b n x \cos(a + b\ln(c x^n))}{b^2 n^2 + 1} + \frac{x \sin(a + b\ln(c x^n))}{b^2 n^2 + 1}$$

Result(type 8, 13 leaves):

$$\int \sin(a + b\ln(c x^n))\, dx$$

Problem 3: Unable to integrate problem.

$$\int x^2 \sin(a + b\ln(c x^n))^2\, dx$$

Optimal(type 3, 95 leaves, 2 steps):

$$\frac{2 b^2 n^2 x^3}{3 (4 b^2 n^2 + 9)} - \frac{2 b n x^3 \cos(a + b\ln(c x^n)) \sin(a + b\ln(c x^n))}{4 b^2 n^2 + 9} + \frac{3 x^3 \sin(a + b\ln(c x^n))^2}{4 b^2 n^2 + 9}$$

Result(type 8, 19 leaves):

$$\int x^2 \sin(a + b\ln(c x^n))^2\, dx$$

Problem 5: Unable to integrate problem.

$$\int \sin(a + b\ln(c x^n))^3\, dx$$

Optimal(type 3, 149 leaves, 2 steps):

$$-\frac{6 b^3 n^3 x \cos(a+b\ln(c x^n))}{9 b^4 n^4+10 b^2 n^2+1}+\frac{6 b^2 n^2 x \sin(a+b\ln(c x^n))}{9 b^4 n^4+10 b^2 n^2+1}-\frac{3 b n x \cos(a+b\ln(c x^n)) \sin(a+b\ln(c x^n))^2}{9 b^2 n^2+1}+\frac{x \sin(a+b\ln(c x^n))^3}{9 b^2 n^2+1}$$

Result(type 8, 15 leaves):

$$\int \sin(a+b\ln(c x^n))^3 \, dx$$

Problem 7: Unable to integrate problem.

$$\int \frac{\sin(a+b\ln(c x^n))^3}{x^2} \, dx$$

Optimal(type 3, 158 leaves, 2 steps):

$$-\frac{6 b^3 n^3 \cos(a+b\ln(c x^n))}{(9 b^4 n^4+10 b^2 n^2+1) x}-\frac{6 b^2 n^2 \sin(a+b\ln(c x^n))}{(9 b^4 n^4+10 b^2 n^2+1) x}-\frac{3 b n \cos(a+b\ln(c x^n)) \sin(a+b\ln(c x^n))^2}{(9 b^2 n^2+1) x}-\frac{\sin(a+b\ln(c x^n))^3}{(9 b^2 n^2+1) x}$$

Result(type 8, 19 leaves):

$$\int \frac{\sin(a+b\ln(c x^n))^3}{x^2} \, dx$$

Problem 8: Unable to integrate problem.

$$\int \frac{\sin(a+b\ln(c x^n))^3}{x^3} \, dx$$

Optimal(type 3, 158 leaves, 2 steps):

$$-\frac{6 b^3 n^3 \cos(a+b\ln(c x^n))}{(9 b^4 n^4+40 b^2 n^2+16) x^2}-\frac{12 b^2 n^2 \sin(a+b\ln(c x^n))}{(9 b^4 n^4+40 b^2 n^2+16) x^2}-\frac{3 b n \cos(a+b\ln(c x^n)) \sin(a+b\ln(c x^n))^2}{(9 b^2 n^2+4) x^2}-\frac{2 \sin(a+b\ln(c x^n))^3}{(9 b^2 n^2+4) x^2}$$

Result(type 8, 19 leaves):

$$\int \frac{\sin(a+b\ln(c x^n))^3}{x^3} \, dx$$

Problem 9: Unable to integrate problem.

$$\int x^2 \sin(a+b\ln(c x^n))^4 \, dx$$

Optimal(type 3, 202 leaves, 3 steps):

$$\frac{8 b^4 n^4 x^3}{64 b^4 n^4+180 b^2 n^2+81}-\frac{24 b^3 n^3 x^3 \cos(a+b\ln(c x^n)) \sin(a+b\ln(c x^n))}{64 b^4 n^4+180 b^2 n^2+81}+\frac{36 b^2 n^2 x^3 \sin(a+b\ln(c x^n))^2}{64 b^4 n^4+180 b^2 n^2+81}$$

$$-\frac{4 b n x^3 \cos(a + b\ln(c x^n)) \sin(a + b\ln(c x^n))^3}{16 b^2 n^2 + 9} + \frac{3 x^3 \sin(a + b\ln(c x^n))^4}{16 b^2 n^2 + 9}$$

Result(type 8, 19 leaves):

$$\int x^2 \sin(a + b\ln(c x^n))^4 \, dx$$

Problem 10: Unable to integrate problem.

$$\int \frac{\sin(a + b\ln(c x^n))^4}{x^2} \, dx$$

Optimal(type 3, 202 leaves, 3 steps):

$$-\frac{24 b^4 n^4}{(64 b^4 n^4 + 20 b^2 n^2 + 1) x} - \frac{24 b^3 n^3 \cos(a + b\ln(c x^n)) \sin(a + b\ln(c x^n))}{(64 b^4 n^4 + 20 b^2 n^2 + 1) x} - \frac{12 b^2 n^2 \sin(a + b\ln(c x^n))^2}{(64 b^4 n^4 + 20 b^2 n^2 + 1) x}$$
$$- \frac{4 b n \cos(a + b\ln(c x^n)) \sin(a + b\ln(c x^n))^3}{(16 b^2 n^2 + 1) x} - \frac{\sin(a + b\ln(c x^n))^4}{(16 b^2 n^2 + 1) x}$$

Result(type 8, 19 leaves):

$$\int \frac{\sin(a + b\ln(c x^n))^4}{x^2} \, dx$$

Problem 11: Unable to integrate problem.

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

Optimal(type 3, 69 leaves, 3 steps):

$$\frac{n x (c x^n)^{\frac{1}{n}} \sqrt{-\frac{1}{n^2}}}{4 e^{a n \sqrt{-\frac{1}{n^2}}}} - \frac{e^{a n \sqrt{-\frac{1}{n^2}}} n x \ln(x) \sqrt{-\frac{1}{n^2}}}{2 (c x^n)^{\frac{1}{n}}}$$

Result(type 8, 19 leaves):

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

Problem 12: Unable to integrate problem.

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

Optimal(type 3, 68 leaves, 3 steps):

$$\frac{x^2}{4}-\frac{x^2 (c x^n)^{\frac{2}{n}}}{16 e^{2 a n \sqrt{-\frac{1}{n^2}}}}-\frac{e^{2 a n \sqrt{-\frac{1}{n^2}}} x^2 \ln(x)}{4 (c x^n)^{\frac{2}{n}}}$$

Result(type 8, 23 leaves):

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

Problem 13: Unable to integrate problem.

$$\int \frac{\sin\left(a+\ln(c x^n) \sqrt{-\frac{1}{n^2}}\right)^2}{x^3} dx$$

Optimal(type 3, 68 leaves, 3 steps):

$$-\frac{1}{4 x^2}+\frac{e^{2 a n \sqrt{-\frac{1}{n^2}}}}{16 x^2 (c x^n)^{\frac{2}{n}}}-\frac{(c x^n)^{\frac{2}{n}} \ln(x)}{4 e^{2 a n \sqrt{-\frac{1}{n^2}}} x^2}$$

Result(type 8, 25 leaves):

$$\int \frac{\sin\left(a+\ln(c x^n) \sqrt{-\frac{1}{n^2}}\right)^2}{x^3} dx$$

Problem 14: Unable to integrate problem.

$$\int x^2 \sin\left(a+\ln(c x^n) \sqrt{-\frac{1}{n^2}}\right)^3 dx$$

Optimal(type 3, 149 leaves, 3 steps):

$$-\frac{3 e^{a n \sqrt{-\frac{1}{n^2}}} n x^3 \sqrt{-\frac{1}{n^2}}}{16 (c x^n)^{\frac{1}{n}}}+\frac{3 n x^3 (c x^n)^{\frac{1}{n}} \sqrt{-\frac{1}{n^2}}}{32 e^{a n \sqrt{-\frac{1}{n^2}}}}-\frac{n x^3 (c x^n)^{\frac{3}{n}} \sqrt{-\frac{1}{n^2}}}{48 e^{3 a n \sqrt{-\frac{1}{n^2}}}}+\frac{e^{3 a n \sqrt{-\frac{1}{n^2}}} n x^3 \ln(x) \sqrt{-\frac{1}{n^2}}}{8 (c x^n)^{\frac{3}{n}}}$$

Result(type 8, 25 leaves):

$$\int x^2 \sin\left(a+\ln(c x^n)\sqrt{-\frac{1}{n^2}}\right)^3 dx$$

Problem 15: Unable to integrate problem.

$$\int \frac{\sin\left(a+\frac{\ln(c x^n)\sqrt{-\frac{1}{n^2}}}{3}\right)^3}{x^2} dx$$

Optimal(type 3, 149 leaves, 3 steps):

$$-\frac{e^{3 a n\sqrt{-\frac{1}{n^2}}}\, n\sqrt{-\frac{1}{n^2}}}{16 x (c x^n)^{\frac{1}{n}}}+\frac{9 e^{a n\sqrt{-\frac{1}{n^2}}}\, n\sqrt{-\frac{1}{n^2}}}{32 x (c x^n)^{\frac{1}{3 n}}}-\frac{9 n (c x^n)^{\frac{1}{3 n}}\sqrt{-\frac{1}{n^2}}}{16 e^{a n\sqrt{-\frac{1}{n^2}}}\, x}-\frac{n (c x^n)^{\frac{1}{n}}\ln(x)\sqrt{-\frac{1}{n^2}}}{8 e^{3 a n\sqrt{-\frac{1}{n^2}}}\, x}$$

Result(type 8, 26 leaves):

$$\int \frac{\sin\left(a+\frac{\ln(c x^n)\sqrt{-\frac{1}{n^2}}}{3}\right)^3}{x^2} dx$$

Problem 16: Unable to integrate problem.

$$\int x^m \sin\left(a+\frac{\ln(c x^2)\sqrt{-(1+m)^2}}{2}\right) dx$$

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

$$-\frac{e^{\frac{a(1+m)}{\sqrt{-(1+m)^2}}}\, x^{1+m} (c x^2)^{\frac{1}{2}+\frac{m}{2}}}{4\sqrt{-(1+m)^2}}+\frac{e^{\frac{a\sqrt{-(1+m)^2}}{1+m}}\,(1+m)\, x^{1+m} (c x^2)^{-\frac{1}{2}-\frac{m}{2}}\ln(x)}{2\sqrt{-(1+m)^2}}$$

Result(type 8, 26 leaves):

$$\int x^m \sin\left(a+\frac{\ln(c x^2)\sqrt{-(1+m)^2}}{2}\right) dx$$

Problem 17: Unable to integrate problem.

$$\int x^m \sin\left(a+\frac{\ln(c x^2)\sqrt{-(1+m)^2}}{4}\right)^2 dx$$

Optimal(type 3, 90 leaves, 3 steps):

$$\frac{x^{1+m}}{2(1+m)}-\frac{e^{\frac{2a(1+m)}{\sqrt{-(1+m)^2}}}x^{1+m}(c x^2)^{\frac{1}{2}+\frac{m}{2}}}{8(1+m)}-\frac{x^{1+m}(c x^2)^{-\frac{1}{2}-\frac{m}{2}}\ln(x)}{4\,e^{\frac{2a(1+m)}{\sqrt{-(1+m)^2}}}}$$

Result(type 8, 28 leaves):

$$\int x^m \sin\left(a+\frac{\ln(c x^2)\sqrt{-(1+m)^2}}{4}\right)^2 dx$$

Problem 18: Unable to integrate problem.

$$\int \frac{\sqrt{\sin(a+b\ln(c x^n))}}{x^2}\, dx$$

Optimal(type 5, 90 leaves, 3 steps):

$$-\frac{2\,\mathrm{hypergeom}\left(\left[-\frac{1}{2},-\frac{1}{4}+\frac{I}{2bn}\right],\left[\frac{3}{4}+\frac{I}{2bn}\right],e^{2Ia}(c x^n)^{2Ib}\right)\sqrt{\sin(a+b\ln(c x^n))}}{(2+Ibn)\,x\sqrt{1-e^{2Ia}(c x^n)^{2Ib}}}$$

Result(type 8, 19 leaves):

$$\int \frac{\sqrt{\sin(a+b\ln(c x^n))}}{x^2}\, dx$$

Problem 19: Unable to integrate problem.

$$\int \sin(a+b\ln(c x^n))^{3/2}\, dx$$

Optimal(type 5, 88 leaves, 3 steps):

$$\frac{2x\,\mathrm{hypergeom}\left(\left[-\frac{3}{2},-\frac{3}{4}-\frac{I}{2bn}\right],\left[\frac{1}{4}-\frac{I}{2bn}\right],e^{2Ia}(c x^n)^{2Ib}\right)\sin(a+b\ln(c x^n))^{3/2}}{(2-3Ibn)\left(1-e^{2Ia}(c x^n)^{2Ib}\right)^{3/2}}$$

Result(type 8, 15 leaves):

$$\int \sin(a+b\ln(c x^n))^{3/2}\, dx$$

Problem 21: Unable to integrate problem.

$$\int \frac{1}{\sin(a+b\ln(c\,x^n))^{3/2}}\,dx$$

Optimal(type 5, 88 leaves, 3 steps):

$$\frac{2\,x\left(1-e^{2\,I\,a}\,(c\,x^n)^{2\,I\,b}\right)^{3/2}\text{hypergeom}\left(\left[\frac{3}{2},\frac{3}{4}-\frac{I}{2\,b\,n}\right],\left[\frac{7}{4}-\frac{I}{2\,b\,n}\right],e^{2\,I\,a}\,(c\,x^n)^{2\,I\,b}\right)}{(2+3\,I\,b\,n)\,\sin(a+b\ln(c\,x^n))^{3/2}}$$

Result(type 8, 15 leaves):

$$\int \frac{1}{\sin(a+b\ln(c\,x^n))^{3/2}}\,dx$$

Problem 23: Unable to integrate problem.

$$\int (e\,x)^m \sin(d\,(a+b\ln(c\,x^n)))^4\,dx$$

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

$$\frac{24\,b^4\,d^4\,n^4\,(e\,x)^{1+m}}{e\,(1+m)\,\left((1+m)^2+4\,b^2\,d^2\,n^2\right)\,\left((1+m)^2+16\,b^2\,d^2\,n^2\right)}-\frac{24\,b^3\,d^3\,n^3\,(e\,x)^{1+m}\cos(d\,(a+b\ln(c\,x^n)))\,\sin(d\,(a+b\ln(c\,x^n)))}{e\,\left((1+m)^2+4\,b^2\,d^2\,n^2\right)\,\left((1+m)^2+16\,b^2\,d^2\,n^2\right)}$$
$$+\frac{12\,b^2\,d^2\,(1+m)\,n^2\,(e\,x)^{1+m}\sin(d\,(a+b\ln(c\,x^n)))^2}{e\,\left((1+m)^2+4\,b^2\,d^2\,n^2\right)\,\left((1+m)^2+16\,b^2\,d^2\,n^2\right)}-\frac{4\,b\,d\,n\,(e\,x)^{1+m}\cos(d\,(a+b\ln(c\,x^n)))\,\sin(d\,(a+b\ln(c\,x^n)))^3}{e\,\left((1+m)^2+16\,b^2\,d^2\,n^2\right)}$$
$$+\frac{(1+m)\,(e\,x)^{1+m}\sin(d\,(a+b\ln(c\,x^n)))^4}{e\,\left((1+m)^2+16\,b^2\,d^2\,n^2\right)}$$

Result(type 8, 23 leaves):

$$\int (e\,x)^m \sin(d\,(a+b\ln(c\,x^n)))^4\,dx$$

Problem 24: Unable to integrate problem.

$$\int x^2 \sin(a+b\ln(c\,x^n))^p\,dx$$

Optimal(type 5, 102 leaves, 3 steps):

$$\frac{x^3\,\text{hypergeom}\left(\left[-p,\frac{-3\,I-b\,n\,p}{2\,b\,n}\right],\left[1-\frac{3\,I}{2\,b\,n}-\frac{p}{2}\right],e^{2\,I\,a}\,(c\,x^n)^{2\,I\,b}\right)\sin(a+b\ln(c\,x^n))^p}{(3-I\,b\,n\,p)\,\left(1-e^{2\,I\,a}\,(c\,x^n)^{2\,I\,b}\right)^p}$$

Result(type 8, 19 leaves):

$$\int x^2 \sin(a+b\ln(c\,x^n))^p\,dx$$

Problem 25: Unable to integrate problem.

$$\int x \sin(a+b\ln(c x^n))^p \, dx$$

Optimal(type 5, 99 leaves, 3 steps):

$$\frac{x^2 \operatorname{hypergeom}\left(\left[-p, -\frac{I}{b n}-\frac{p}{2}\right], \left[1-\frac{I}{b n}-\frac{p}{2}\right], e^{2 I a} (c x^n)^{2 I b}\right) \sin(a+b\ln(c x^n))^p}{(2-I b n p) \left(1-e^{2 I a} (c x^n)^{2 I b}\right)^p}$$

Result(type 8, 17 leaves):

$$\int x \sin(a+b\ln(c x^n))^p \, dx$$

Problem 26: Unable to integrate problem.

$$\int x^2 \cos(a+b\ln(c x^n))^2 \, dx$$

Optimal(type 3, 95 leaves, 2 steps):

$$\frac{2 b^2 n^2 x^3}{3 (4 b^2 n^2+9)}+\frac{3 x^3 \cos(a+b\ln(c x^n))^2}{4 b^2 n^2+9}+\frac{2 b n x^3 \cos(a+b\ln(c x^n)) \sin(a+b\ln(c x^n))}{4 b^2 n^2+9}$$

Result(type 8, 19 leaves):

$$\int x^2 \cos(a+b\ln(c x^n))^2 \, dx$$

Problem 27: Unable to integrate problem.

$$\int x \cos(a+b\ln(c x^n))^2 \, dx$$

Optimal(type 3, 92 leaves, 2 steps):

$$\frac{b^2 n^2 x^2}{4 (b^2 n^2+1)}+\frac{x^2 \cos(a+b\ln(c x^n))^2}{2 (b^2 n^2+1)}+\frac{b n x^2 \cos(a+b\ln(c x^n)) \sin(a+b\ln(c x^n))}{2 (b^2 n^2+1)}$$

Result(type 8, 17 leaves):

$$\int x \cos(a+b\ln(c x^n))^2 \, dx$$

Problem 28: Unable to integrate problem.

$$\int \frac{\cos(a+b\ln(c x^n))^3}{x^2} \, dx$$

Optimal(type 3, 158 leaves, 2 steps):

$$-\frac{6 b^2 n^2 \cos(a+b\ln(c x^n))}{(9 b^4 n^4+10 b^2 n^2+1) x}-\frac{\cos(a+b\ln(c x^n))^3}{(9 b^2 n^2+1) x}+\frac{6 b^3 n^3 \sin(a+b\ln(c x^n))}{(9 b^4 n^4+10 b^2 n^2+1) x}+\frac{3 b n \cos(a+b\ln(c x^n))^2 \sin(a+b\ln(c x^n))}{(9 b^2 n^2+1) x}$$

Result(type 8, 19 leaves):

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

Problem 29: Unable to integrate problem.

$$\int \cos\left(a+b\ln\left(c\,x^n\right)\right)^4\,dx$$

Optimal(type 3, 191 leaves, 3 steps):

$$\frac{24\,b^4\,n^4\,x}{64\,b^4\,n^4+20\,b^2\,n^2+1}+\frac{12\,b^2\,n^2\,x\cos\left(a+b\ln\left(c\,x^n\right)\right)^2}{64\,b^4\,n^4+20\,b^2\,n^2+1}+\frac{x\cos\left(a+b\ln\left(c\,x^n\right)\right)^4}{16\,b^2\,n^2+1}+\frac{24\,b^3\,n^3\,x\cos\left(a+b\ln\left(c\,x^n\right)\right)\sin\left(a+b\ln\left(c\,x^n\right)\right)}{64\,b^4\,n^4+20\,b^2\,n^2+1}$$
$$+\frac{4\,b\,n\,x\cos\left(a+b\ln\left(c\,x^n\right)\right)^3\sin\left(a+b\ln\left(c\,x^n\right)\right)}{16\,b^2\,n^2+1}$$

Result(type 8, 15 leaves):

$$\int \cos\left(a+b\ln\left(c\,x^n\right)\right)^4\,dx$$

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

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

Optimal(type 4, 93 leaves, 3 steps):

$$\frac{2\sqrt{\cos\left(\frac{a}{2}+\frac{b\ln\left(c\,x^n\right)}{2}\right)^2}\,\mathrm{EllipticF}\left(\sin\left(\frac{a}{2}+\frac{b\ln\left(c\,x^n\right)}{2}\right),\sqrt{2}\right)}{3\cos\left(\frac{a}{2}+\frac{b\ln\left(c\,x^n\right)}{2}\right)b\,n}+\frac{2\sin\left(a+b\ln\left(c\,x^n\right)\right)\sqrt{\cos\left(a+b\ln\left(c\,x^n\right)\right)}}{3\,b\,n}$$

Result(type 4, 246 leaves):

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

Problem 32: Result unnecessarily involves higher level functions.

$$\int \frac{1}{x\sqrt{\cos(a+b\ln(c x^n))}}\, dx$$

Optimal(type 4, 60 leaves, 2 steps):

$$\frac{2\sqrt{\cos\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right)^2}\,\mathrm{EllipticF}\left(\sin\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right),\sqrt{2}\right)}{\cos\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right) b\, n}$$

Result(type 5, 25 leaves):

$$\frac{2\,\mathrm{InverseJacobiAM}\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2},\sqrt{2}\right)}{b\, n}$$

Problem 33: Unable to integrate problem.

$$\int \frac{1}{\cos(a+b\ln(c x^n))^{3/2}}\, dx$$

Optimal(type 5, 88 leaves, 3 steps):

$$\frac{2x\left(1+e^{2 I a}(c x^n)^{2 I b}\right)^{3/2}\mathrm{hypergeom}\left(\left[\frac{3}{2},\frac{3}{4}-\frac{I}{2 b n}\right],\left[\frac{7}{4}-\frac{I}{2 b n}\right],-e^{2 I a}(c x^n)^{2 I b}\right)}{(2+3 I b n)\cos(a+b\ln(c x^n))^{3/2}}$$

Result(type 8, 15 leaves):

$$\int \frac{1}{\cos(a+b\ln(c x^n))^{3/2}}\, dx$$

Problem 35: Unable to integrate problem.

$$\int \frac{1}{\cos(a+b\ln(c x^n))^{5/2}}\, dx$$

Optimal(type 5, 88 leaves, 3 steps):

$$\frac{2x\left(1+e^{2 I a}(c x^n)^{2 I b}\right)^{5/2}\mathrm{hypergeom}\left(\left[\frac{5}{2},\frac{5}{4}-\frac{I}{2 b n}\right],\left[\frac{9}{4}-\frac{I}{2 b n}\right],-e^{2 I a}(c x^n)^{2 I b}\right)}{(2+5 I b n)\cos(a+b\ln(c x^n))^{5/2}}$$

Result(type 8, 15 leaves):

$$\int \frac{1}{\cos(a+b\ln(c x^n))^{5/2}}\, dx$$

Problem 36: Unable to integrate problem.

$$\int \frac{1}{\cos(a-2\,I\ln(c\,x))^{3/2}}\,dx$$

Optimal(type 3, 42 leaves, 3 steps):

$$\frac{-1-c^4\,e^{2\,I\,a}\,x^4}{2\,c^4\,e^{2\,I\,a}\,x^3\cos(a-2\,I\ln(c\,x))^{3/2}}$$

Result(type 8, 14 leaves):

$$\int \frac{1}{\cos(a-2\,I\ln(c\,x))^{3/2}}\,dx$$

Problem 37: Unable to integrate problem.

$$\int x^m\cos\left(a+b\ln\left(c\,x^n\right)\right)^3\,dx$$

Optimal(type 3, 201 leaves, 2 steps):

$$\frac{6\,b^2\,(1+m)\,n^2\,x^{1+m}\cos\left(a+b\ln\left(c\,x^n\right)\right)}{\left((1+m)^2+b^2\,n^2\right)\left((1+m)^2+9\,b^2\,n^2\right)}+\frac{(1+m)\,x^{1+m}\cos\left(a+b\ln\left(c\,x^n\right)\right)^3}{(1+m)^2+9\,b^2\,n^2}+\frac{6\,b^3\,n^3\,x^{1+m}\sin\left(a+b\ln\left(c\,x^n\right)\right)}{\left((1+m)^2+b^2\,n^2\right)\left((1+m)^2+9\,b^2\,n^2\right)}$$
$$+\frac{3\,b\,n\,x^{1+m}\cos\left(a+b\ln\left(c\,x^n\right)\right)^2\sin\left(a+b\ln\left(c\,x^n\right)\right)}{(1+m)^2+9\,b^2\,n^2}$$

Result(type 8, 19 leaves):

$$\int x^m\cos\left(a+b\ln\left(c\,x^n\right)\right)^3\,dx$$

Problem 38: Unable to integrate problem.

$$\int x^m\cos\left(a+b\ln\left(c\,x^n\right)\right)\,dx$$

Optimal(type 3, 70 leaves, 1 step):

$$\frac{(1+m)\,x^{1+m}\cos\left(a+b\ln\left(c\,x^n\right)\right)}{(1+m)^2+b^2\,n^2}+\frac{b\,n\,x^{1+m}\sin\left(a+b\ln\left(c\,x^n\right)\right)}{(1+m)^2+b^2\,n^2}$$

Result(type 8, 17 leaves):

$$\int x^m\cos\left(a+b\ln\left(c\,x^n\right)\right)\,dx$$

Problem 39: Unable to integrate problem.

$$\int \frac{x^m}{\cos\left(a+b\ln\left(c\,x^n\right)\right)^{5/2}}\,dx$$

Optimal(type 5, 111 leaves, 3 steps):

$$\frac{2 x^{1+m} \left(1+e^{2 I a} (c x^n)^{2 I b}\right)^{5/2} \mathrm{hypergeom}\left(\left[\frac{5}{2}, \frac{-2 I-2 I m+5 b n}{4 b n}\right], \left[\frac{-2 I-2 I m+9 b n}{4 b n}\right], -e^{2 I a} (c x^n)^{2 I b}\right)}{(2+2 m+5 I b n) \cos(a+b \ln(c x^n))^{5/2}}$$

Result(type 8, 19 leaves):

$$\int \frac{x^m}{\cos(a+b \ln(c x^n))^{5/2}} \, dx$$

Problem 40: Unable to integrate problem.

$$\int x \cos(a+b \ln(c x^n))^p \, dx$$

Optimal(type 5, 99 leaves, 3 steps):

$$\frac{x^2 \cos(a+b \ln(c x^n))^p \mathrm{hypergeom}\left(\left[-p, -\frac{I}{b n}-\frac{p}{2}\right], \left[1-\frac{I}{b n}-\frac{p}{2}\right], -e^{2 I a} (c x^n)^{2 I b}\right)}{(2-I b n p) \left(1+e^{2 I a} (c x^n)^{2 I b}\right)^p}$$

Result(type 8, 17 leaves):

$$\int x \cos(a+b \ln(c x^n))^p \, dx$$

Problem 41: Unable to integrate problem.

$$\int \frac{\tan(a+I \ln(x))}{x^4} \, dx$$

Optimal(type 3, 40 leaves, 5 steps):

$$\frac{I}{3 x^3} - \frac{2 I}{e^{2 I a} x} - \frac{2 I \arctan\left(\frac{x}{e^{I a}}\right)}{e^{3 I a}}$$

Result(type 8, 34 leaves):

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

Problem 43: Unable to integrate problem.

$$\int \frac{\tan(a+I \ln(x))^2}{x^2} \, dx$$

Optimal(type 3, 54 leaves, 5 steps):

$$\frac{e^{2 I a}}{x (e^{2 I a}+x^2)} + \frac{3 x}{e^{2 I a}+x^2} + \frac{2 \arctan\left(\frac{x}{e^{I a}}\right)}{e^{I a}}$$

Result(type 8, 52 leaves):

$$\frac{1}{x}+\frac{2}{\left(\left(e^{I(a+I\ln(x))}\right)^2+1\right)x}-\left(\int -\frac{2}{\left(\left(e^{I(a+I\ln(x))}\right)^2+1\right)x^2}\,dx\right)$$

Problem 44: Unable to integrate problem.

$$\int (ex)^m \tan(a+I\ln(x))^3\,dx$$

Optimal(type 5, 156 leaves, 6 steps):

$$-\frac{I(1-m)\,m\,x\,(ex)^m}{2(1+m)}+\frac{I\left(1-\frac{e^{2Ia}}{x^2}\right)^2 x\,(ex)^m}{2\left(1+\frac{e^{2Ia}}{x^2}\right)^2}+\frac{I\left(e^{2Ia}(3+m)+\frac{e^{4Ia}(1-m)}{x^2}\right)x\,(ex)^m}{2\,e^{2Ia}\left(1+\frac{e^{2Ia}}{x^2}\right)}$$

$$-\frac{I\left(m^2+2m+3\right)x\,(ex)^m \operatorname{hypergeom}\left(\left[1,-\frac{1}{2}-\frac{m}{2}\right],\left[\frac{1}{2}-\frac{m}{2}\right],-\frac{e^{2Ia}}{x^2}\right)}{1+m}$$

Result(type 8, 18 leaves):

$$\int (ex)^m \tan(a+I\ln(x))^3\,dx$$

Problem 45: Unable to integrate problem.

$$\int \tan(a+\ln(x))^p\,dx$$

Optimal(type 6, 96 leaves, 4 steps):

$$\frac{\left(\frac{I\left(1-e^{2Ia}x^{2I}\right)}{1+e^{2Ia}x^{2I}}\right)^p\left(1+e^{2Ia}x^{2I}\right)^p x\,\mathit{AppellF1}\left(-\frac{I}{2},-p,p,1-\frac{I}{2},e^{2Ia}x^{2I},-e^{2Ia}x^{2I}\right)}{\left(1-e^{2Ia}x^{2I}\right)^p}$$

Result(type 8, 9 leaves):

$$\int \tan(a+\ln(x))^p\,dx$$

Problem 46: Unable to integrate problem.

$$\int \tan(a+2\ln(x))^p\,dx$$

Optimal(type 6, 96 leaves, 4 steps):

$$\frac{\left(\frac{I\left(1-e^{2Ia}x^{4I}\right)}{1+e^{2Ia}x^{4I}}\right)^p\left(1+e^{2Ia}x^{4I}\right)^p x\,\mathit{AppellF1}\left(-\frac{I}{4},-p,p,1-\frac{I}{4},e^{2Ia}x^{4I},-e^{2Ia}x^{4I}\right)}{\left(1-e^{2Ia}x^{4I}\right)^p}$$

Result(type 8, 11 leaves):

$$\int \tan(a + 2\ln(x))^p \, dx$$

Problem 47: Unable to integrate problem.

$$\int x^3 \tan(d(a + b\ln(c x^n)))^2 \, dx$$

Optimal(type 5, 145 leaves, 5 steps):

$$\frac{(4 I - b d n) x^4}{4 b d n} + \frac{I x^4 \left(1 - e^{2 I a d} (c x^n)^{2 I b d}\right)}{b d n \left(1 + e^{2 I a d} (c x^n)^{2 I b d}\right)} - \frac{2 I x^4 \operatorname{hypergeom}\left(\left[1, \frac{-2 I}{b d n}\right], \left[1 - \frac{2 I}{b d n}\right], -e^{2 I a d} (c x^n)^{2 I b d}\right)}{b d n}$$

Result(type 8, 196 leaves):

$$-\frac{x^4}{4} + \frac{2 I x^4}{d b n \left(\left(e^{I d \left(a + b\left(\ln(c) + \ln(e^{n \ln(x)}) - \frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^2 + 1\right)} - \left(\int \frac{8 I x^3}{d b n \left(\left(e^{I d \left(a + b\left(\ln(c) + \ln(e^{n \ln(x)}) - \frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^2 + 1\right)} \, dx \right)$$

Problem 48: Unable to integrate problem.

$$\int x \tan(d(a + b\ln(c x^n)))^2 \, dx$$

Optimal(type 5, 145 leaves, 5 steps):

$$\frac{(2 I - b d n) x^2}{2 b d n} + \frac{I x^2 \left(1 - e^{2 I a d} (c x^n)^{2 I b d}\right)}{b d n \left(1 + e^{2 I a d} (c x^n)^{2 I b d}\right)} - \frac{2 I x^2 \operatorname{hypergeom}\left(\left[1, \frac{-I}{b d n}\right], \left[1 - \frac{I}{b d n}\right], -e^{2 I a d} (c x^n)^{2 I b d}\right)}{b d n}$$

Result(type 8, 194 leaves):

$$-\frac{x^2}{2} + \frac{2 I x^2}{d b n \left(\left(e^{I d \left(a + b\left(\ln(c) + \ln(e^{n \ln(x)}) - \frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^2 + 1\right)} - \left(\int \frac{4 I x}{d b n \left(\left(e^{I d \left(a + b\left(\ln(c) + \ln(e^{n \ln(x)}) - \frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^2 + 1\right)} \, dx \right)$$

Problem 53: Unable to integrate problem.

$$\int (e x)^m \cot(a + b\ln(x))^p \, dx$$

Optimal(type 6, 137 leaves, 4 steps):

$$\frac{(ex)^{1+m}\left(1-e^{2 I a} x^{2 I b}\right)^p \left(\frac{-I\left(1+e^{2 I a} x^{2 I b}\right)}{1-e^{2 I a} x^{2 I b}}\right)^p AppellF1\left(\frac{-\frac{I}{2}(1+m)}{b}, p, -p, 1-\frac{I(1+m)}{2 b}, e^{2 I a} x^{2 I b}, -e^{2 I a} x^{2 I b}\right)}{e(1+m)\left(1+e^{2 I a} x^{2 I b}\right)^p}$$

Result(type 8, 17 leaves):

$$\int (e x)^m \cot(a + b\ln(x))^p \, dx$$

Problem 54: Unable to integrate problem.

$$\int \cot(a + 2\ln(x))^p \, dx$$

Optimal(type 6, 96 leaves, 4 steps):

$$\frac{\left(1-e^{2 I a} x^{4 I}\right)^p \left(\frac{-I\left(1+e^{2 I a} x^{4 I}\right)}{1-e^{2 I a} x^{4 I}}\right)^p x\, AppellF1\left(-\frac{I}{4}, p, -p, 1-\frac{I}{4}, e^{2 I a} x^{4 I}, -e^{2 I a} x^{4 I}\right)}{\left(1+e^{2 I a} x^{4 I}\right)^p}$$

Result(type 8, 11 leaves):

$$\int \cot(a + 2\ln(x))^p \, dx$$

Problem 55: Unable to integrate problem.

$$\int \cot(a + 3\ln(x))^p \, dx$$

Optimal(type 6, 96 leaves, 4 steps):

$$\frac{\left(1-e^{2 I a} x^{6 I}\right)^p \left(\frac{-I\left(1+e^{2 I a} x^{6 I}\right)}{1-e^{2 I a} x^{6 I}}\right)^p x\, AppellF1\left(-\frac{I}{6}, p, -p, 1-\frac{I}{6}, e^{2 I a} x^{6 I}, -e^{2 I a} x^{6 I}\right)}{\left(1+e^{2 I a} x^{6 I}\right)^p}$$

Result(type 8, 11 leaves):

$$\int \cot(a + 3\ln(x))^p \, dx$$

Problem 56: Unable to integrate problem.

$$\int x^2 \cot\left(d\left(a + b\ln\left(c x^n\right)\right)\right)^2 \, dx$$

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

$$\frac{(3 I - b d n) x^3}{3 b d n} + \frac{I x^3 \left(1 + e^{2 I a d} (c x^n)^{2 I b d}\right)}{b d n \left(1 - e^{2 I a d} (c x^n)^{2 I b d}\right)} - \frac{2 I x^3 \operatorname{hypergeom}\left(\left[1, \frac{-\frac{3 I}{2}}{b d n}\right], \left[1 - \frac{3 I}{2 b d n}\right], e^{2 I a d} (c x^n)^{2 I b d}\right)}{b d n}$$

Result(type 8, 196 leaves):

$$-\frac{x^3}{3} - \frac{2 I x^3}{d b n \left(\left(e^{I d \left(a + b \left(\ln(c) + \ln(e^{n \ln(x)}) - \frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^2 - 1\right)} - \left(\int \frac{-6 I x^2}{d b n \left(\left(e^{I d \left(a + b \left(\ln(c) + \ln(e^{n \ln(x)}) - \frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^2 - 1\right)} dx\right)$$

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

$$\int \frac{\cot(d (a + b \ln(c x^n)))^2}{x} dx$$

Optimal(type 3, 30 leaves, 3 steps):

$$-\frac{\cot(a d + b d \ln(c x^n))}{b d n} - \ln(x)$$

Result(type 3, 62 leaves):

$$-\frac{\cot(d (a + b \ln(c x^n)))}{b d n} + \frac{\pi}{2 b d n} - \frac{\operatorname{arccot}(\cot(d (a + b \ln(c x^n))))}{b d n}$$

Problem 58: Unable to integrate problem.

$$\int \frac{\cot(d (a + b \ln(c x^n)))^2}{x^2} dx$$

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

$$\frac{1 + \frac{I}{b d n}}{x} + \frac{I \left(1 + e^{2 I a d} (c x^n)^{2 I b d}\right)}{b d n x \left(1 - e^{2 I a d} (c x^n)^{2 I b d}\right)} - \frac{2 I \operatorname{hypergeom}\left(\left[1, \frac{\frac{I}{2}}{b d n}\right], \left[1 + \frac{I}{2 b d n}\right], e^{2 I a d} (c x^n)^{2 I b d}\right)}{b d n x}$$

Result(type 8, 194 leaves):

$$\frac{1}{x} - \frac{2 I}{d b n x \left(\left(e^{I d \left(a + b \left(\ln(c) + \ln(e^{n \ln(x)}) - \frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)}) + \operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^2 - 1\right)} - \Bigg($$

$$\int \frac{2 I}{x^{2} b d n \left(\left(e^{I d \left(a+b \left(\ln(c)+\ln(e^{n \ln(x)})-\frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)})+\operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)})+\operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^{2}-1\right)} dx\right)$$

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Problem 60: Unable to integrate problem.
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$$\int (e x)^{m} \cot\left(d \left(a+b \ln(c x^{n})\right)\right)^{3} dx$$

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Optimal(type 5, 317 leaves, 6 steps):
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$$\frac{\left(I (1+m)-b d n\right) (1+m+2 I b d n) (e x)^{1+m}}{2 b^{2} d^{2} e (1+m) n^{2}}+\frac{(e x)^{1+m} \left(1+e^{2 I a d} (c x^{n})^{2 I b d}\right)^{2}}{2 b d e n \left(1-e^{2 I a d} (c x^{n})^{2 I b d}\right)^{2}}$$
$$+\frac{I (e x)^{1+m} \left(\frac{e^{2 I a d} (1+m-2 I b d n)}{n}+\frac{e^{4 I a d} (1+m+2 I b d n) (c x^{n})^{2 I b d}}{n}\right)}{2 b^{2} d^{2} e e^{2 I a d} n \left(1-e^{2 I a d} (c x^{n})^{2 I b d}\right)}$$
$$-\frac{I \left(-2 b^{2} d^{2} n^{2}+m^{2}+2 m+1\right) (e x)^{1+m} \operatorname{hypergeom}\left(\left[1, \frac{-\frac{I}{2} (1+m)}{b d n}\right], \left[1-\frac{I (1+m)}{2 b d n}\right], e^{2 I a d} (c x^{n})^{2 I b d}\right)}{b^{2} d^{2} e (1+m) n^{2}}$$

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Result(type 8, 587 leaves):
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$$-\frac{I x e^{m \left(\ln(e)+\ln(x)-\frac{I \pi \operatorname{csgn}(I e x) (-\operatorname{csgn}(I e x)+\operatorname{csgn}(I e)) (-\operatorname{csgn}(I e x)+\operatorname{csgn}(I x))}{2}\right)}}{1+m}$$
$$-\left(I x e^{m \left(\ln(e)+\ln(x)-\frac{I \pi \operatorname{csgn}(I e x) (-\operatorname{csgn}(I e x)+\operatorname{csgn}(I e)) (-\operatorname{csgn}(I e x)+\operatorname{csgn}(I x))}{2}\right)} \left(2 I \left(e^{I d \left(a+b \left(\ln(c)+\ln(e^{n \ln(x)})-\frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)})+\operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)})+\operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^{2}\right.\right.$$
$$+m \left(e^{I d \left(a+b \left(\ln(c)+\ln(e^{n \ln(x)})-\frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)})+\operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)})+\operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^{2}$$
$$\left.\left.+\left(e^{I d \left(a+b \left(\ln(c)+\ln(e^{n \ln(x)})-\frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)})+\operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)})+\operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^{2}-m-1\right)\right) \Big/$$
$$\left(d^{2} b^{2} n^{2} \left(\left(e^{I d \left(a+b \left(\ln(c)+\ln(e^{n \ln(x)})-\frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)})+\operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)})+\operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^{2}-1\right)^{2}\right)-I \left(\int\right.$$
$$\left.-\frac{e^{m \left(\ln(e)+\ln(x)-\frac{I \pi \operatorname{csgn}(I e x) (-\operatorname{csgn}(I e x)+\operatorname{csgn}(I e)) (-\operatorname{csgn}(I e x)+\operatorname{csgn}(I x))}{2}\right)} \left(-2 b^{2} d^{2} n^{2}+m^{2}+2 m+1\right)}{d^{2} b^{2} n^{2} \left(\left(e^{I d \left(a+b \left(\ln(c)+\ln(e^{n \ln(x)})-\frac{I \pi \operatorname{csgn}(I c e^{n \ln(x)}) (-\operatorname{csgn}(I c e^{n \ln(x)})+\operatorname{csgn}(I c)) (-\operatorname{csgn}(I c e^{n \ln(x)})+\operatorname{csgn}(I e^{n \ln(x)}))}{2}\right)\right)}\right)^{2}-1\right)} dx\right)$$

Problem 61: Unable to integrate problem.

$$\int (e x)^m \cot\left(d \left(a+b \ln\left(c x^n\right)\right)\right)^p \, dx$$

Optimal(type 6, 185 leaves, 5 steps):

$$\frac{(e x)^{1+m} \left(1-e^{2 I a d} \left(c x^n\right)^{2 I b d}\right)^p \left(\frac{-I \left(1+e^{2 I a d} \left(c x^n\right)^{2 I b d}\right)}{1-e^{2 I a d} \left(c x^n\right)^{2 I b d}}\right)^p \mathit{AppellF1}\left(\frac{-\frac{I}{2} (1+m)}{b d n}, p, -p, 1-\frac{I (1+m)}{2 b d n}, e^{2 I a d} \left(c x^n\right)^{2 I b d}, -e^{2 I a d} \left(c x^n\right)^{2 I b d}\right)}{e (1+m) \left(1+e^{2 I a d} \left(c x^n\right)^{2 I b d}\right)^p}$$

Result(type 8, 23 leaves):

$$\int (e x)^m \cot\left(d \left(a+b \ln\left(c x^n\right)\right)\right)^p \, dx$$

Problem 64: Unable to integrate problem.

$$\int x \sec\left(a+b \ln\left(c x^n\right)\right) \, dx$$

Optimal(type 5, 72 leaves, 3 steps):

$$\frac{2 e^{I a} x^2 \left(c x^n\right)^{I b} \operatorname{hypergeom}\left(\left[1, \frac{1}{2}-\frac{I}{b n}\right], \left[\frac{3}{2}-\frac{I}{b n}\right], -e^{2 I a} \left(c x^n\right)^{2 I b}\right)}{2+I b n}$$

Result(type 8, 15 leaves):

$$\int x \sec\left(a+b \ln\left(c x^n\right)\right) \, dx$$

Problem 65: Unable to integrate problem.

$$\int \sec\left(a+b \ln\left(c x^n\right)\right) \, dx$$

Optimal(type 5, 70 leaves, 3 steps):

$$\frac{2 e^{I a} x \left(c x^n\right)^{I b} \operatorname{hypergeom}\left(\left[1, \frac{1}{2}-\frac{I}{2 b n}\right], \left[\frac{3}{2}-\frac{I}{2 b n}\right], -e^{2 I a} \left(c x^n\right)^{2 I b}\right)}{1+I b n}$$

Result(type 8, 13 leaves):

$$\int \sec\left(a+b \ln\left(c x^n\right)\right) \, dx$$

Problem 66: Unable to integrate problem.

$$\int \frac{\sec\left(a+b \ln\left(c x^n\right)\right)}{x^3} \, dx$$

Optimal(type 5, 72 leaves, 3 steps):

$$-\frac{2\,\mathrm{e}^{\mathrm{I}\,a}\,\left(c\,x^{n}\right)^{\mathrm{I}\,b}\,\mathrm{hypergeom}\left(\left[1,\frac{1}{2}+\frac{\mathrm{I}}{b\,n}\right],\left[\frac{3}{2}+\frac{\mathrm{I}}{b\,n}\right],-\mathrm{e}^{2\,\mathrm{I}\,a}\,\left(c\,x^{n}\right)^{2\,\mathrm{I}\,b}\right)}{\left(2-\mathrm{I}\,b\,n\right)\,x^{2}}$$

Result(type 8, 17 leaves):

$$\int \frac{\sec\left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{3}}\,\mathrm{d}x$$

Problem 67: Unable to integrate problem.

$$\int x^{2}\sec\left(a+b\ln\left(c\,x^{n}\right)\right)^{2}\,\mathrm{d}x$$

Optimal(type 5, 72 leaves, 3 steps):

$$\frac{4\,\mathrm{e}^{2\,\mathrm{I}\,a}\,x^{3}\,\left(c\,x^{n}\right)^{2\,\mathrm{I}\,b}\,\mathrm{hypergeom}\left(\left[2,1-\frac{3\,\mathrm{I}}{2\,b\,n}\right],\left[2-\frac{3\,\mathrm{I}}{2\,b\,n}\right],-\mathrm{e}^{2\,\mathrm{I}\,a}\,\left(c\,x^{n}\right)^{2\,\mathrm{I}\,b}\right)}{3+2\,\mathrm{I}\,b\,n}$$

Result(type 8, 183 leaves):

$$\frac{2\,\mathrm{I}\,x^{3}}{b\,n\left(\left(\mathrm{e}^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{\mathrm{I}\,\pi\,\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})\,\left(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c)\right)\,\left(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,\mathrm{e}^{n\ln(x)})\right)}{2}\right)\right)}\right)^{2}+1\right)}+4\Bigg($$

$$\int \frac{-\frac{3\,\mathrm{I}}{2}\,x^{2}}{b\,n\left(\left(\mathrm{e}^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{\mathrm{I}\,\pi\,\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})\,\left(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c)\right)\,\left(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,\mathrm{e}^{n\ln(x)})\right)}{2}\right)\right)}\right)^{2}+1\right)}\,\mathrm{d}x\Bigg)$$

Problem 68: Unable to integrate problem.

$$\int \frac{\sec\left(a+b\ln\left(c\,x^{n}\right)\right)^{2}}{x^{2}}\,\mathrm{d}x$$

Optimal(type 5, 72 leaves, 3 steps):

$$-\frac{4\,\mathrm{e}^{2\,\mathrm{I}\,a}\,\left(c\,x^{n}\right)^{2\,\mathrm{I}\,b}\,\mathrm{hypergeom}\left(\left[2,1+\frac{\mathrm{I}}{2\,b\,n}\right],\left[2+\frac{\mathrm{I}}{2\,b\,n}\right],-\mathrm{e}^{2\,\mathrm{I}\,a}\,\left(c\,x^{n}\right)^{2\,\mathrm{I}\,b}\right)}{\left(1-2\,\mathrm{I}\,b\,n\right)\,x}$$

Result(type 8, 183 leaves):

$$\frac{2\,\mathrm{I}}{b\,n\,x\left(\left(\mathrm{e}^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{\mathrm{I}\,\pi\,\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})\,\left(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c)\right)\,\left(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,\mathrm{e}^{n\ln(x)})\right)}{2}\right)\right)}\right)^{2}+1\right)}+4\Bigg($$

$$\left.\int \frac{\frac{\mathrm{I}}{2}}{x^2\, b\, n \left(\left(e^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(e^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,e^{n\ln(x)}))}{2}\right)\right)}\right)^2+1\right)}\,dx\right)$$

Problem 69: Unable to integrate problem.

$$\int \sec(a+b\ln(c\,x^n))^3\,dx$$

Optimal(type 5, 70 leaves, 3 steps):

$$\frac{8\,e^{3\,\mathrm{I}\,a}\,x\,(c\,x^n)^{3\,\mathrm{I}\,b}\,\mathrm{hypergeom}\left(\left[3, \frac{3}{2}-\frac{\mathrm{I}}{2\,b\,n}\right], \left[\frac{5}{2}-\frac{\mathrm{I}}{2\,b\,n}\right], -e^{2\,\mathrm{I}\,a}\,(c\,x^n)^{2\,\mathrm{I}\,b}\right)}{1+3\,\mathrm{I}\,b\,n}$$

Result(type 8, 487 leaves):

$$-\left(\mathrm{I}\,x\,e^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(e^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,e^{n\ln(x)}))}{2}\right)\right)}\right.$$

$$\left(\left(e^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(e^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,e^{n\ln(x)}))}{2}\right)\right)}\right)^2 b\,n-b\,n\right.$$

$$\left.\left.-\mathrm{I}\left(e^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(e^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,e^{n\ln(x)}))}{2}\right)\right)}\right)^2-\mathrm{I}\right)\right)\Big/$$

$$\left(b^2\,n^2\left(\left(e^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(e^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,e^{n\ln(x)}))}{2}\right)\right)}\right)^2+1\right)^2\right)+8\left(\vphantom{\int}\right.$$

$$\left.\int\frac{e^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(e^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,e^{n\ln(x)}))}{2}\right)\right)}\,(b^2\,n^2+1)}{8\,b^2\,n^2\left(\left(e^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(e^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,e^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,e^{n\ln(x)}))}{2}\right)\right)}\right)^2+1\right)}\,dx\right)$$

Problem 70: Unable to integrate problem.

$$\int \frac{\sec(a+b\ln(c\,x^n))^4}{x^3}\,dx$$

Optimal(type 5, 72 leaves, 3 steps):

$$-\frac{8\,e^{4\,\mathrm{I}\,a}\,(c\,x^n)^{4\,\mathrm{I}\,b}\,\mathrm{hypergeom}\left(\left[4, 2+\frac{\mathrm{I}}{b\,n}\right], \left[3+\frac{\mathrm{I}}{b\,n}\right], -e^{2\,\mathrm{I}\,a}\,(c\,x^n)^{2\,\mathrm{I}\,b}\right)}{(1-2\,\mathrm{I}\,b\,n)\,x^2}$$

Result(type 8, 589 leaves):

$$\left(4\left(3\,I\,b^2 n^2\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I c))\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\right)^2\right.\right.$$

$$+\,b\,n\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I c))\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\right)^4+I\,b^2 n^2$$

$$+\,I\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I c))\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\right)^4$$

$$+\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I c))\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\right)^2 b\,n$$

$$\left.\left.+\,2\,I\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I c))\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\right)^2+I\right)\right)\Big/$$

$$\left(3\,b^3 n^3 x^2\left(\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I c))\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\right)^2+1\right)^3\right)+16\,\Bigg($$

$$\int\frac{\frac{I}{6}\left(b^2n^2+1\right)}{b^3n^3x^3\left(\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I c))\,(-\mathrm{csgn}(I c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\right)^2+1\right)}\,dx\Bigg)$$

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Problem 71: Result more than twice size of optimal antiderivative.
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$$\int\left(-\left(b^2n^2+1\right)\sec\left(a+b\ln\left(c\,x^n\right)\right)+2\,b^2n^2\sec\left(a+b\ln\left(c\,x^n\right)\right)^3\right)dx$$

```
Optimal(type 3, 41 leaves, ? steps):
```

$$-x\sec\left(a+b\ln\left(c\,x^n\right)\right)+b\,n\,x\sec\left(a+b\ln\left(c\,x^n\right)\right)\tan\left(a+b\ln\left(c\,x^n\right)\right)$$

```
Result(type 3, 536 leaves):
```

$$\left(-2\,I\,x\left(\left((x^n)^{I b}\right)^3\left(c^{I b}\right)^3 b\,n\,\mathrm{e}^{\frac{3\,b\,\mathrm{csgn}(I c x^n)^3\pi}{2}}\,\mathrm{e}^{-\frac{3\,b\,\mathrm{csgn}(I c x^n)^2\,\mathrm{csgn}(I x^n)\,\pi}{2}}\,\mathrm{e}^{-\frac{3\,b\,\mathrm{csgn}(I c x^n)^2\,\pi\,\mathrm{csgn}(I c)}{2}}\,\mathrm{e}^{\frac{3\,b\,\mathrm{csgn}(I c x^n)\,\mathrm{csgn}(I x^n)\,\pi\,\mathrm{csgn}(I c)}{2}}\,\mathrm{e}^{3 I a}\right.\right.$$

$$-\,(x^n)^{I b}\,c^{I b}\,b\,n\,\mathrm{e}^{\frac{b\,\mathrm{csgn}(I c x^n)^3\pi}{2}}\,\mathrm{e}^{-\frac{b\,\mathrm{csgn}(I c x^n)^2\,\mathrm{csgn}(I x^n)\,\pi}{2}}\,\mathrm{e}^{-\frac{b\,\mathrm{csgn}(I c x^n)^2\,\pi\,\mathrm{csgn}(I c)}{2}}\,\mathrm{e}^{\frac{b\,\mathrm{csgn}(I c x^n)\,\mathrm{csgn}(I x^n)\,\pi\,\mathrm{csgn}(I c)}{2}}\,\mathrm{e}^{I a}$$

$$-\,I\left((x^n)^{I b}\right)^3\left(c^{I b}\right)^3\mathrm{e}^{\frac{3\,b\,\mathrm{csgn}(I c x^n)^3\pi}{2}}\,\mathrm{e}^{-\frac{3\,b\,\mathrm{csgn}(I c x^n)^2\,\mathrm{csgn}(I x^n)\,\pi}{2}}\,\mathrm{e}^{-\frac{3\,b\,\mathrm{csgn}(I c x^n)^2\,\pi\,\mathrm{csgn}(I c)}{2}}\,\mathrm{e}^{\frac{3\,b\,\mathrm{csgn}(I c x^n)\,\mathrm{csgn}(I x^n)\,\pi\,\mathrm{csgn}(I c)}{2}}\,\mathrm{e}^{3 I a}$$

$$\left.\left.-\,I\,(x^n)^{I b}\,c^{I b}\,\mathrm{e}^{\frac{b\,\mathrm{csgn}(I c x^n)^3\pi}{2}}\,\mathrm{e}^{-\frac{b\,\mathrm{csgn}(I c x^n)^2\,\mathrm{csgn}(I x^n)\,\pi}{2}}\,\mathrm{e}^{-\frac{b\,\mathrm{csgn}(I c x^n)^2\,\pi\,\mathrm{csgn}(I c)}{2}}\,\mathrm{e}^{\frac{b\,\mathrm{csgn}(I c x^n)\,\mathrm{csgn}(I x^n)\,\pi\,\mathrm{csgn}(I c)}{2}}\,\mathrm{e}^{I a}\right)\right)\Big/$$

$$\left(\mathrm{e}^{-I\left(I\,b\,\mathrm{csgn}(I c x^n)^3\pi-I\,b\,\mathrm{csgn}(I c x^n)^2\,\mathrm{csgn}(I x^n)\,\pi-I\,b\,\mathrm{csgn}(I c x^n)^2\,\pi\,\mathrm{csgn}(I c)+I\,b\,\mathrm{csgn}(I c x^n)\,\mathrm{csgn}(I x^n)\,\pi\,\mathrm{csgn}(I c)-2\,b\ln(x^n)-2\,b\ln(c)-2\,a\right)}+1\right)^2$$

Problem 72: Unable to integrate problem.

$$\int \sec\left(a+\frac{I\ln(c x^n)}{n(-2+p)}\right)^p dx$$

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

$$\frac{(2-p)\,x\left(1+e^{2Ia}\,(c x^n)^{\frac{2}{n(2-p)}}\right)\sec\left(a-\frac{I\ln(c x^n)}{n(2-p)}\right)^p}{2\,e^{2Ia}\,(1-p)\,(c x^n)^{\frac{2}{n(2-p)}}}$$

Result(type 8, 24 leaves):

$$\int \sec\left(a+\frac{I\ln(c x^n)}{n(-2+p)}\right)^p dx$$

Problem 73: Result more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\sec(a+b\ln(c x^n))}}{x}\,dx$$

Optimal(type 4, 86 leaves, 3 steps):

$$\frac{2\sqrt{\cos\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right)^2}\ \mathrm{EllipticF}\left(\sin\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right),\sqrt{2}\right)\sqrt{\cos(a+b\ln(c x^n))}\ \sqrt{\sec(a+b\ln(c x^n))}}{\cos\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right)b\,n}$$

Result(type 4, 180 leaves):

$$-\left(2\sqrt{\left(2\cos\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right)^2-1\right)\sin\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right)^2}\ \sqrt{\sin\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right)^2}\ \sqrt{-2\cos\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right)^2+1}\ \mathrm{EllipticF}\left(\cos\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right),\sqrt{2}\right)\right)\Big/\left(n\sqrt{-2\sin\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right)^4+\sin\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right)^2}\ \sin\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right)\sqrt{2\cos\left(\frac{a}{2}+\frac{b\ln(c x^n)}{2}\right)^2-1}\ b\right)$$

Problem 74: Unable to integrate problem.

$$\int x^m \sec(a+b\ln(c x^n))^3\,dx$$

Optimal(type 5, 91 leaves, 3 steps):

$$\frac{8\,e^{3Ia}\,x^{1+m}\,(c x^n)^{3Ib}\,\mathrm{hypergeom}\left(\left[3,\frac{-I(1+m)+3bn}{2bn}\right],\left[\frac{-I(1+m)+5bn}{2bn}\right],-e^{2Ia}\,(c x^n)^{2Ib}\right)}{1+m+3Ibn}$$

Result(type 8, 577 leaves):

$$-\left(x\,\mathrm{e}^{m\ln(x)}\,\mathrm{e}^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\left(\mathrm{I}\right.\right.$$

$$\left(\mathrm{e}^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\right)^2 b\,n-\mathrm{I}\,b\,n$$

$$+m\left(\mathrm{e}^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\right)^2$$

$$\left.\left.+\left(\mathrm{e}^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\right)^2+m+1\right)\right)\bigg/$$

$$\left(b^2 n^2\left(\left(\mathrm{e}^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\right)^2+1\right)^2\right)+8\left(\right.$$

$$\left.\int\frac{\mathrm{e}^{m\ln(x)}\,\mathrm{e}^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\,(b^2 n^2+m^2+2\,m+1)}{8\,b^2 n^2\left(\left(\mathrm{e}^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{\mathrm{I}\pi\,\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c))\,(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,\mathrm{e}^{n\ln(x)}))}{2}\right)\right)}\right)^2+1\right)}\,\mathrm{d}x\right)$$

Problem 75: Unable to integrate problem.

$$\int x^m \sec(a+b\ln(c\,x^n))^{5/2}\,\mathrm{d}x$$

Optimal(type 5, 111 leaves, 3 steps):

$$\frac{2\,x^{1+m}\left(1+\mathrm{e}^{2\,\mathrm{I}\,a}\,(c\,x^n)^{2\,\mathrm{I}\,b}\right)^{5/2}\mathrm{hypergeom}\left(\left[\frac{5}{2},\frac{-2\,\mathrm{I}-2\,\mathrm{I}\,m+5\,b\,n}{4\,b\,n}\right],\left[\frac{-2\,\mathrm{I}-2\,\mathrm{I}\,m+9\,b\,n}{4\,b\,n}\right],-\mathrm{e}^{2\,\mathrm{I}\,a}\,(c\,x^n)^{2\,\mathrm{I}\,b}\right)\sec(a+b\ln(c\,x^n))^{5/2}}{2+2\,m+5\,\mathrm{I}\,b\,n}$$

Result(type 8, 19 leaves):

$$\int x^m \sec(a+b\ln(c\,x^n))^{5/2}\,\mathrm{d}x$$

Problem 76: Unable to integrate problem.

$$\int x^m \sec(a+b\ln(c\,x^n))^{3/2}\,\mathrm{d}x$$

Optimal(type 5, 111 leaves, 3 steps):

$$\frac{2\,x^{1+m}\left(1+\mathrm{e}^{2\,\mathrm{I}\,a}\,(c\,x^n)^{2\,\mathrm{I}\,b}\right)^{3/2}\mathrm{hypergeom}\left(\left[\frac{3}{2},\frac{-2\,\mathrm{I}-2\,\mathrm{I}\,m+3\,b\,n}{4\,b\,n}\right],\left[\frac{-2\,\mathrm{I}-2\,\mathrm{I}\,m+7\,b\,n}{4\,b\,n}\right],-\mathrm{e}^{2\,\mathrm{I}\,a}\,(c\,x^n)^{2\,\mathrm{I}\,b}\right)\sec(a+b\ln(c\,x^n))^{3/2}}{2+2\,m+3\,\mathrm{I}\,b\,n}$$

Result(type 8, 19 leaves):

$$\int x^m \sec(a+b\ln(c\,x^n))^{3/2}\,\mathrm{d}x$$

Problem 77: Unable to integrate problem.

$$\int \frac{x^m}{\sqrt{\sec\left(a+b\ln\left(c\,x^n\right)\right)}}\,dx$$

Optimal(type 5, 111 leaves, 3 steps):

$$\frac{2\,x^{1+m}\,\text{hypergeom}\left(\left[-\frac{1}{2},\frac{-2\,\mathrm{I}-2\,\mathrm{I}\,m-b\,n}{4\,b\,n}\right],\left[\frac{-2\,\mathrm{I}-2\,\mathrm{I}\,m+3\,b\,n}{4\,b\,n}\right],-\mathrm{e}^{2\,\mathrm{I}\,a}\left(c\,x^n\right)^{2\,\mathrm{I}\,b}\right)}{\left(2+2\,m-\mathrm{I}\,b\,n\right)\sqrt{1+\mathrm{e}^{2\,\mathrm{I}\,a}\left(c\,x^n\right)^{2\,\mathrm{I}\,b}}\,\sqrt{\sec\left(a+b\ln\left(c\,x^n\right)\right)}}$$

Result(type 8, 19 leaves):

$$\int \frac{x^m}{\sqrt{\sec\left(a+b\ln\left(c\,x^n\right)\right)}}\,dx$$

Problem 78: Unable to integrate problem.

$$\int x^2\csc\left(a+b\ln\left(c\,x^n\right)\right)\,dx$$

Optimal(type 5, 71 leaves, 3 steps):

$$\frac{2\,\mathrm{e}^{\mathrm{I}\,a}\,x^3\left(c\,x^n\right)^{\mathrm{I}\,b}\,\text{hypergeom}\left(\left[1,\frac{1}{2}-\frac{3\,\mathrm{I}}{2\,b\,n}\right],\left[\frac{3}{2}-\frac{3\,\mathrm{I}}{2\,b\,n}\right],\mathrm{e}^{2\,\mathrm{I}\,a}\left(c\,x^n\right)^{2\,\mathrm{I}\,b}\right)}{3\,\mathrm{I}-b\,n}$$

Result(type 8, 17 leaves):

$$\int x^2\csc\left(a+b\ln\left(c\,x^n\right)\right)\,dx$$

Problem 79: Unable to integrate problem.

$$\int \csc\left(a+b\ln\left(c\,x^n\right)\right)^2\,dx$$

Optimal(type 5, 69 leaves, 3 steps):

$$-\frac{4\,\mathrm{e}^{2\,\mathrm{I}\,a}\,x\left(c\,x^n\right)^{2\,\mathrm{I}\,b}\,\text{hypergeom}\left(\left[2,1-\frac{\mathrm{I}}{2\,b\,n}\right],\left[2-\frac{\mathrm{I}}{2\,b\,n}\right],\mathrm{e}^{2\,\mathrm{I}\,a}\left(c\,x^n\right)^{2\,\mathrm{I}\,b}\right)}{1+2\,\mathrm{I}\,b\,n}$$

Result(type 8, 178 leaves):

$$-\frac{2\,\mathrm{I}\,x}{b\,n\left(\left(\mathrm{e}^{\mathrm{I}\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{\mathrm{I}\,\pi\,\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})\left(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,c)\right)\left(-\mathrm{csgn}(\mathrm{I}\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(\mathrm{I}\,\mathrm{e}^{n\ln(x)})\right)}{2}\right)\right)}\right)^2-1\right)}-4\Bigg($$

$$\int \frac{-\frac{I}{2}}{b\,n\left(\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,c)\right)\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)})\right)}{2}\right)\right)}\right)^2-1\right)}\,dx\Bigg)$$

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Problem 80: Unable to integrate problem.
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$$\int \csc\left(a+b\ln\left(c\,x^n\right)\right)^4\,dx$$

```
Optimal(type 5, 69 leaves, 3 steps):
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$$\frac{16\,\mathrm{e}^{4Ia}\,x\left(c\,x^n\right)^{4Ib}\,\mathrm{hypergeom}\left(\left[4,2-\frac{I}{2bn}\right],\left[3-\frac{I}{2bn}\right],\mathrm{e}^{2Ia}\left(c\,x^n\right)^{2Ib}\right)}{1+4Ibn}$$

```
Result(type 8, 587 leaves):
```

$$\Bigg(x\Bigg(12\,I\,b^2n^2\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,c)\right)\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)})\right)}{2}\right)\right)}\right)^2$$

$$+2\,b\,n\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,c)\right)\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)})\right)}{2}\right)\right)}\right)^4-4\,I\,b^2n^2$$

$$-I\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,c)\right)\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)})\right)}{2}\right)\right)}\right)^4$$

$$-2\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,c)\right)\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)})\right)}{2}\right)\right)}\right)^2 b\,n$$

$$+2\,I\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,c)\right)\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)})\right)}{2}\right)\right)}\right)^2-I\Bigg)\Bigg)\Bigg/$$

$$\left(3\,b^3n^3\left(\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,c)\right)\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)})\right)}{2}\right)\right)}\right)^2-1\right)^3\right)+16\Bigg($$

$$\int \frac{\frac{I}{48}\left(4\,b^2n^2+1\right)}{b^3n^3\left(\left(\mathrm{e}^{I\left(a+b\left(\ln(c)+\ln(\mathrm{e}^{n\ln(x)})-\frac{I\pi\,\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,c)\right)\left(-\mathrm{csgn}(I\,c\,\mathrm{e}^{n\ln(x)})+\mathrm{csgn}(I\,\mathrm{e}^{n\ln(x)})\right)}{2}\right)\right)}\right)^2-1\right)}\,dx\Bigg)$$

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Problem 81: Unable to integrate problem.
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$$\int x^m\csc\left(a+2\ln\left(c\,x^{\frac{\sqrt{-(1+m)^2}}{2}}\right)\right)^3\,dx$$

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

$$\frac{x^{1+m}\csc\left(a+2\ln\left(c\,x^{\frac{\sqrt{-(1+m)^2}}{2}}\right)\right)}{2\,(1+m)}-\frac{x^{1+m}\cot\left(a+2\ln\left(c\,x^{\frac{\sqrt{-(1+m)^2}}{2}}\right)\right)\csc\left(a+2\ln\left(c\,x^{\frac{\sqrt{-(1+m)^2}}{2}}\right)\right)}{2\sqrt{-(1+m)^2}}$$

Result(type 8, 29 leaves):

$$\int x^m\csc\left(a+2\ln\left(c\,x^{\frac{\sqrt{-(1+m)^2}}{2}}\right)\right)^3\,dx$$

Problem 83: Unable to integrate problem.

$$\int\csc(a+b\ln(c\,x^n))^{5/2}\,dx$$

Optimal(type 5, 88 leaves, 3 steps):

$$\frac{2\,x\left(1-e^{2\,I\,a}\,(c\,x^n)^{2\,I\,b}\right)^{5/2}\csc(a+b\ln(c\,x^n))^{5/2}\,\mathrm{hypergeom}\left(\left[\frac{5}{2},\frac{5}{4}-\frac{I}{2\,b\,n}\right],\left[\frac{9}{4}-\frac{I}{2\,b\,n}\right],e^{2\,I\,a}\,(c\,x^n)^{2\,I\,b}\right)}{2+5\,I\,b\,n}$$

Result(type 8, 15 leaves):

$$\int\csc(a+b\ln(c\,x^n))^{5/2}\,dx$$

Problem 84: Unable to integrate problem.

$$\int\frac{1}{\csc(a+b\ln(c\,x^n))^{3/2}}\,dx$$

Optimal(type 5, 88 leaves, 3 steps):

$$\frac{2\,x\,\mathrm{hypergeom}\left(\left[-\frac{3}{2},-\frac{3}{4}-\frac{I}{2\,b\,n}\right],\left[\frac{1}{4}-\frac{I}{2\,b\,n}\right],e^{2\,I\,a}\,(c\,x^n)^{2\,I\,b}\right)}{(2-3\,I\,b\,n)\left(1-e^{2\,I\,a}\,(c\,x^n)^{2\,I\,b}\right)^{3/2}\csc(a+b\ln(c\,x^n))^{3/2}}$$

Result(type 8, 15 leaves):

$$\int\frac{1}{\csc(a+b\ln(c\,x^n))^{3/2}}\,dx$$

Problem 85: Unable to integrate problem.

$$\int\frac{x^m}{\csc(a+b\ln(c\,x^n))^{3/2}}\,dx$$

Optimal(type 5, 110 leaves, 3 steps):

$$\frac{2 x^{1+m} \operatorname{hypergeom}\left(\left[-\frac{3}{2}, \frac{-2 I-2 I m-3 b n}{4 b n}\right],\left[\frac{-2 I-2 I m+b n}{4 b n}\right], e^{2 I a}\left(c x^{n}\right)^{2 I b}\right)}{(2+2 m-3 I b n)\left(1-e^{2 I a}\left(c x^{n}\right)^{2 I b}\right)^{3/2} \csc\left(a+b \ln\left(c x^{n}\right)\right)^{3/2}}$$

Result(type 8, 19 leaves):

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

Problem 86: Unable to integrate problem.

$$\int \csc\left(a+b \ln\left(c x^{n}\right)\right)^{p} \, dx$$

Optimal(type 5, 95 leaves, 3 steps):

$$\frac{x\left(1-e^{2 I a}\left(c x^{n}\right)^{2 I b}\right)^{p} \csc\left(a+b \ln\left(c x^{n}\right)\right)^{p} \operatorname{hypergeom}\left(\left[p, \frac{-I+b n p}{2 b n}\right],\left[1-\frac{I}{2 b n}+\frac{p}{2}\right], e^{2 I a}\left(c x^{n}\right)^{2 I b}\right)}{1+I b n p}$$

Result(type 8, 15 leaves):

$$\int \csc\left(a+b \ln\left(c x^{n}\right)\right)^{p} \, dx$$

Test results for the 41 problems in "4.7.6 f^(a+b x+c x^2) trig(d+e x+f x^2)^n.txt"

Problem 1: Unable to integrate problem.

$$\int F^{c(b x+a)} \sin(e x+d)^{n} \, dx$$

Optimal(type 5, 97 leaves, 2 steps):

$$-\frac{F^{c(b x+a)} \operatorname{hypergeom}\left(\left[-n, \frac{-e n-I b c \ln(F)}{2 e}\right],\left[1-\frac{n}{2}-\frac{I b c \ln(F)}{2 e}\right], e^{2 I(e x+d)}\right) \sin(e x+d)^{n}}{\left(1-e^{2 I(e x+d)}\right)^{n}(I e n-b c \ln(F))}$$

Result(type 8, 20 leaves):

$$\int F^{c(b x+a)} \sin(e x+d)^{n} \, dx$$

Problem 2: Result more than twice size of optimal antiderivative.

$$\int F^{c(b x+a)} \sin(e x+d)^{2} \, dx$$

Optimal(type 3, 128 leaves, 2 steps):

$$\frac{2 e^{2} F^{c(b x+a)}}{b c \ln(F)\left(4 e^{2}+b^{2} c^{2} \ln(F)^{2}\right)}-\frac{2 e F^{c(b x+a)} \cos(e x+d) \sin(e x+d)}{4 e^{2}+b^{2} c^{2} \ln(F)^{2}}+\frac{b c F^{c(b x+a)} \ln(F) \sin(e x+d)^{2}}{4 e^{2}+b^{2} c^{2} \ln(F)^{2}}$$

Result(type 3, 267 leaves):

$$\frac{1}{\left(1+\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2\right)^2}\left(-\frac{4\,e\,e^{c\,(b\,x+a)\,\ln(F)}\tan\left(\frac{ex}{2}+\frac{d}{2}\right)}{4\,e^2+b^2\,c^2\ln(F)^2}+\frac{4\,e\,e^{c\,(b\,x+a)\,\ln(F)}\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^3}{4\,e^2+b^2\,c^2\ln(F)^2}+\frac{2\,e^2\,e^{c\,(b\,x+a)\,\ln(F)}}{b\,c\ln(F)\,\left(4\,e^2+b^2\,c^2\ln(F)^2\right)}\right.$$
$$\left.+\frac{2\,e^2\,e^{c\,(b\,x+a)\,\ln(F)}\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^4}{b\,c\ln(F)\,\left(4\,e^2+b^2\,c^2\ln(F)^2\right)}+\frac{4\,\left(e^2+b^2\,c^2\ln(F)^2\right)e^{c\,(b\,x+a)\,\ln(F)}\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2}{b\,c\ln(F)\,\left(4\,e^2+b^2\,c^2\ln(F)^2\right)}\right)$$

Problem 3: Unable to integrate problem.

$$\int F^{c\,(b\,x+a)}\csc(e\,x+d)^3\,dx$$

Optimal(type 5, 122 leaves, 2 steps):

$$-\frac{F^{c\,(b\,x+a)}\cot(e\,x+d)\csc(e\,x+d)}{2\,e}-\frac{b\,c\,F^{c\,(b\,x+a)}\csc(e\,x+d)\ln(F)}{2\,e^2}$$
$$-\frac{e^{I\,(e\,x+d)}\,F^{c\,(b\,x+a)}\,\mathrm{hypergeom}\left(\left[1,\frac{e-I\,b\,c\ln(F)}{2\,e}\right],\left[\frac{3}{2}-\frac{I\,b\,c\ln(F)}{2\,e}\right],e^{2\,I\,(e\,x+d)}\right)\left(e+I\,b\,c\ln(F)\right)}{e^2}$$

Result(type 8, 142 leaves):

$$-\frac{I\,e^{c\,(b\,x+a)\,\ln(F)}\,e^{I\,(e\,x+d)}\left(\ln(F)\,b\,c\left(e^{I\,(e\,x+d)}\right)^2+I\left(e^{I\,(e\,x+d)}\right)^2e-b\,c\ln(F)+I\,e\right)}{e^2\left(\left(e^{I\,(e\,x+d)}\right)^2-1\right)^2}-8\,I\left(\int-\frac{e^{c\,(b\,x+a)\,\ln(F)}\,e^{I\,(e\,x+d)}\left(e^2+b^2\,c^2\ln(F)^2\right)}{8\,e^2\left(\left(e^{I\,(e\,x+d)}\right)^2-1\right)}\,dx\right)$$

Problem 4: Unable to integrate problem.

$$\int F^{c\,(b\,x+a)}\cos(e\,x+d)^n\,dx$$

Optimal(type 5, 97 leaves, 2 steps):

$$-\frac{F^{c\,(b\,x+a)}\cos(e\,x+d)^n\,\mathrm{hypergeom}\left(\left[-n,\frac{-e\,n-I\,b\,c\ln(F)}{2\,e}\right],\left[1-\frac{n}{2}-\frac{I\,b\,c\ln(F)}{2\,e}\right],-e^{2\,I\,(e\,x+d)}\right)}{\left(1+e^{2\,I\,(e\,x+d)}\right)^n\left(I\,e\,n-b\,c\ln(F)\right)}$$

Result(type 8, 20 leaves):

$$\int F^{c\,(b\,x+a)}\cos(e\,x+d)^n\,dx$$

Problem 5: Unable to integrate problem.

$$\int F^{c\,(b\,x+a)}\sec(e\,x+d)^2\,dx$$

Optimal(type 5, 71 leaves, 1 step):

$$\frac{4\,e^{2 I (e x+d)} F^{c (b x+a)} \operatorname{hypergeom}\left(\left[2, 1-\frac{I b c \ln(F)}{2 e}\right], \left[2-\frac{I b c \ln(F)}{2 e}\right], -e^{2 I (e x+d)}\right)}{2 I e+b c \ln(F)}$$

Result(type 8, 71 leaves):

$$\frac{2 I e^{c (b x+a) \ln(F)}}{e\left(\left(e^{I (e x+d)}\right)^2+1\right)}+4\left(\int \frac{-\frac{I}{2} b c \ln(F)\, e^{c (b x+a) \ln(F)}}{e\left(\left(e^{I (e x+d)}\right)^2+1\right)} dx\right)$$

Problem 6: Unable to integrate problem.

$$\int F^{c (b x+a)} \sec(e x+d)^3\, dx$$

Optimal(type 5, 126 leaves, 2 steps):

$$-\frac{e^{I (e x+d)} F^{c (b x+a)} \operatorname{hypergeom}\left(\left[1, \frac{e-I b c \ln(F)}{2 e}\right], \left[\frac{3}{2}-\frac{I b c \ln(F)}{2 e}\right], -e^{2 I (e x+d)}\right) (I e-b c \ln(F))}{e^2}-\frac{b c F^{c (b x+a)} \ln(F) \sec(e x+d)}{2 e^2}$$
$$+\frac{F^{c (b x+a)} \sec(e x+d) \tan(e x+d)}{2 e}$$

Result(type 8, 139 leaves):

$$-\frac{e^{c (b x+a) \ln(F)} e^{I (e x+d)} \left(\ln(F) b c \left(e^{I (e x+d)}\right)^2+I\left(e^{I (e x+d)}\right)^2 e+b c \ln(F)-I e\right)}{e^2\left(\left(e^{I (e x+d)}\right)^2+1\right)^2}+8\left(\int \frac{e^{c (b x+a) \ln(F)} e^{I (e x+d)}\left(e^2+b^2 c^2 \ln(F)^2\right)}{8 e^2\left(\left(e^{I (e x+d)}\right)^2+1\right)} dx\right)$$

Problem 7: Unable to integrate problem.

$$\int F^{c (b x+a)} \sec(e x+d)^4\, dx$$

Optimal(type 5, 128 leaves, 2 steps):

$$-\frac{2\,e^{2 I (e x+d)} F^{c (b x+a)} \operatorname{hypergeom}\left(\left[2, 1-\frac{I b c \ln(F)}{2 e}\right], \left[2-\frac{I b c \ln(F)}{2 e}\right], -e^{2 I (e x+d)}\right) (2 I e-b c \ln(F))}{3 e^2}-\frac{b c F^{c (b x+a)} \ln(F) \sec(e x+d)^2}{6 e^2}$$
$$+\frac{F^{c (b x+a)} \sec(e x+d)^2 \tan(e x+d)}{3 e}$$

Result(type 8, 204 leaves):

$$\frac{1}{3 e^3\left(\left(e^{I (e x+d)}\right)^2+1\right)^3}\left(I e^{c (b x+a) \ln(F)}\left(\ln(F)^2 b^2 c^2\left(e^{I (e x+d)}\right)^4+2 \ln(F)^2 b^2 c^2\left(e^{I (e x+d)}\right)^2+2 I \ln(F) b c e\left(e^{I (e x+d)}\right)^4+b^2 c^2 \ln(F)^2\right.\right.$$
$$\left.\left.+2 I \ln(F) b c e\left(e^{I (e x+d)}\right)^2+12 e^2\left(e^{I (e x+d)}\right)^2+4 e^2\right)\right)+16\left(\int \frac{-\frac{I}{48} e^{c (b x+a) \ln(F)} b c \ln(F)\left(4 e^2+b^2 c^2 \ln(F)^2\right)}{e^3\left(\left(e^{I (e x+d)}\right)^2+1\right)} dx\right)$$

Problem 9: Unable to integrate problem.

$$\int e^{c (b x+a)} \tan(e x+d)^3\, dx$$

Optimal(type 5, 168 leaves, 6 steps):

$$\frac{I e^{c (b x+a)}}{c b} - \frac{6 I e^{c (b x+a)} \operatorname{hypergeom}\left(\left[1, \frac{-\frac{I}{2} b c}{e}\right], \left[1 - \frac{I b c}{2 e}\right], -e^{2 I (e x+d)}\right)}{c b} + \frac{12 I e^{c (b x+a)} \operatorname{hypergeom}\left(\left[2, \frac{-\frac{I}{2} b c}{e}\right], \left[1 - \frac{I b c}{2 e}\right], -e^{2 I (e x+d)}\right)}{c b}$$
$$- \frac{8 I e^{c (b x+a)} \operatorname{hypergeom}\left(\left[3, \frac{-\frac{I}{2} b c}{e}\right], \left[1 - \frac{I b c}{2 e}\right], -e^{2 I (e x+d)}\right)}{c b}$$

Result(type 8, 127 leaves):

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

Problem 10: Unable to integrate problem.

$$\int e^{c (b x+a)} \cot(e x+d)^2\, dx$$

Optimal(type 5, 111 leaves, 5 steps):

$$-\frac{e^{c (b x+a)}}{c b} + \frac{4 e^{c (b x+a)} \operatorname{hypergeom}\left(\left[1, \frac{-\frac{I}{2} b c}{e}\right], \left[1 - \frac{I b c}{2 e}\right], e^{2 I (e x+d)}\right)}{c b} - \frac{4 e^{c (b x+a)} \operatorname{hypergeom}\left(\left[2, \frac{-\frac{I}{2} b c}{e}\right], \left[1 - \frac{I b c}{2 e}\right], e^{2 I (e x+d)}\right)}{c b}$$

Result(type 8, 81 leaves):

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

Problem 13: Unable to integrate problem.

$$\int F^{c (b x+a)} \left(f - f\cos(e x+d)\right)^n\, dx$$

Optimal(type 5, 101 leaves, 3 steps):

$$-\frac{F^{c (b x+a)} \left(f - f\cos(e x+d)\right)^n \operatorname{hypergeom}\left(\left[-2 n, -n - \frac{I b c \ln(F)}{e}\right], \left[1 - n - \frac{I b c \ln(F)}{e}\right], e^{I (e x+d)}\right)}{\left(1 - e^{I (e x+d)}\right)^{2 n} \left(I e n - b c \ln(F)\right)}$$

Result(type 8, 25 leaves):

$$\int F^{c (b x+a)} \left(f - f\cos(e x+d)\right)^n\, dx$$

Problem 15: Result more than twice size of optimal antiderivative.

$$\int \frac{F^{c(bx+a)}(fx)^m(ex\cos(ex+d)+(m+bcx\ln(F))\sin(ex+d))}{x}\,dx$$

Optimal(type 3, 22 leaves, 7 steps):

$$F^{bcx+ac}(fx)^m\sin(ex+d)$$

Result(type 3, 198 leaves):

$$-\frac{I}{2}F^{c(bx+a)}\left(f^m x^m e^{Iex}e^{Id}e^{-\frac{I}{2}\pi\operatorname{csgn}(Ifx)^3 m}e^{\frac{I}{2}\pi\operatorname{csgn}(Ifx)^2\operatorname{csgn}(If)m}e^{\frac{I}{2}\pi\operatorname{csgn}(Ifx)^2\operatorname{csgn}(Ix)m}e^{-\frac{I}{2}\pi\operatorname{csgn}(Ifx)\operatorname{csgn}(If)\operatorname{csgn}(Ix)m}\right.$$
$$\left.-f^m x^m e^{-Iex}e^{-Id}e^{-\frac{I}{2}\pi\operatorname{csgn}(Ifx)^3 m}e^{\frac{I}{2}\pi\operatorname{csgn}(Ifx)^2\operatorname{csgn}(If)m}e^{\frac{I}{2}\pi\operatorname{csgn}(Ifx)^2\operatorname{csgn}(Ix)m}e^{-\frac{I}{2}\pi\operatorname{csgn}(Ifx)\operatorname{csgn}(If)\operatorname{csgn}(Ix)m}\right)$$

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

$$\int F^{c(bx+a)}(e\cos(ex+d)+bc\ln(F)\sin(ex+d))\,dx$$

Optimal(type 3, 16 leaves, 1 step):

$$F^{c(bx+a)}\sin(ex+d)$$

Result(type 3, 292 leaves):

$$\frac{\frac{ebc\ln(F)\,e^{(bcx+ac)\ln(F)}}{e^2+b^2c^2\ln(F)^2}+\frac{2e^2\,e^{(bcx+ac)\ln(F)}\tan\left(\frac{ex}{2}+\frac{d}{2}\right)}{e^2+b^2c^2\ln(F)^2}-\frac{ebc\ln(F)\,e^{(bcx+ac)\ln(F)}\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2}{e^2+b^2c^2\ln(F)^2}}{1+\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2}$$
$$+\frac{\frac{ebc\ln(F)\,e^{(bcx+ac)\ln(F)}\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2}{e^2+b^2c^2\ln(F)^2}+\frac{2b^2c^2\ln(F)^2\,e^{(bcx+ac)\ln(F)}\tan\left(\frac{ex}{2}+\frac{d}{2}\right)}{e^2+b^2c^2\ln(F)^2}-\frac{ebc\ln(F)\,e^{(bcx+ac)\ln(F)}}{e^2+b^2c^2\ln(F)^2}}{1+\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2}$$

Problem 21: Unable to integrate problem.

$$\int \frac{F^{bx+a}\cos(dx+c)}{e+e\sin(dx+c)}\,dx$$

Optimal(type 5, 77 leaves, 5 steps):

$$\frac{I F^{bx+a}}{be\ln(F)}-\frac{2IF^{bx+a}\,\mathrm{hypergeom}\left(\left[1,\frac{-Ib\ln(F)}{d}\right],\left[1-\frac{Ib\ln(F)}{d}\right],Ie^{I(dx+c)}\right)}{be\ln(F)}$$

Result(type 8, 53 leaves):

$$\frac{\mathrm{I}\,\mathrm{e}^{(b x+a) \ln(F)}}{e b \ln(F)}+\int \frac{2\,\mathrm{e}^{(b x+a) \ln(F)}}{e\left(\mathrm{e}^{\mathrm{I}(d x+c)}+\mathrm{I}\right)}\, \mathrm{d}x$$

Problem 22: Unable to integrate problem.

$$\int \frac{F^{b x+a} \cos(d x+c)}{e-e \sin(d x+c)}\, \mathrm{d}x$$

Optimal(type 5, 77 leaves, 5 steps):

$$-\frac{\mathrm{I}\, F^{b x+a}}{b e \ln(F)}+\frac{2\,\mathrm{I}\, F^{b x+a} \operatorname{hypergeom}\left(\left[1, \frac{-\mathrm{I}\, b \ln(F)}{d}\right],\left[1-\frac{\mathrm{I}\, b \ln(F)}{d}\right],-\mathrm{I}\,\mathrm{e}^{\mathrm{I}(d x+c)}\right)}{b e \ln(F)}$$

Result(type 8, 53 leaves):

$$-\frac{\mathrm{I}\,\mathrm{e}^{(b x+a) \ln(F)}}{e b \ln(F)}+\int \frac{2\,\mathrm{e}^{(b x+a) \ln(F)}}{e\left(\mathrm{e}^{\mathrm{I}(d x+c)}-\mathrm{I}\right)}\, \mathrm{d}x$$

Test results for the 247 problems in "4.7.7 Trig functions.txt"

Problem 13: Unable to integrate problem.

$$\int \frac{\sin\left(\frac{\sqrt{-a x+1}}{\sqrt{a x+1}}\right)^{3}}{-a^{2} x^{2}+1}\, \mathrm{d}x$$

Optimal(type 4, 46 leaves, 5 steps):

$$-\frac{3 \operatorname{Si}\left(\frac{\sqrt{-a x+1}}{\sqrt{a x+1}}\right)}{4 a}+\frac{\operatorname{Si}\left(\frac{3 \sqrt{-a x+1}}{\sqrt{a x+1}}\right)}{4 a}$$

Result(type 8, 34 leaves):

$$\int \frac{\sin\left(\frac{\sqrt{-a x+1}}{\sqrt{a x+1}}\right)^{3}}{-a^{2} x^{2}+1}\, \mathrm{d}x$$

Problem 14: Unable to integrate problem.

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

Optimal(type 4, 22 leaves, 2 steps):

$$-\frac{\mathrm{Si}\left(\frac{\sqrt{-a x + 1}}{\sqrt{a x + 1}}\right)}{a}$$

Result(type 8, 32 leaves):

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

Problem 41: Result more than twice size of optimal antiderivative.

$$\int -\cot(b x - c) \cot(b x + a)\, dx$$

Optimal(type 3, 37 leaves, 4 steps):

$$x - \frac{\cot(a + c) \ln(-\sin(b x - c))}{b} + \frac{\cot(a + c) \ln(\sin(b x + a))}{b}$$

Result(type 3, 148 leaves):

$$x + \frac{\mathrm{I} \ln\left(\mathrm{e}^{2 \mathrm{I} (b x + a)} - 1\right) \mathrm{e}^{2 \mathrm{I} (a + c)}}{b \left(\mathrm{e}^{2 \mathrm{I} (a + c)} - 1\right)} + \frac{\mathrm{I} \ln\left(\mathrm{e}^{2 \mathrm{I} (b x + a)} - 1\right)}{b \left(\mathrm{e}^{2 \mathrm{I} (a + c)} - 1\right)} - \frac{\mathrm{I} \ln\left(-\mathrm{e}^{2 \mathrm{I} (a + c)} + \mathrm{e}^{2 \mathrm{I} (b x + a)}\right) \mathrm{e}^{2 \mathrm{I} (a + c)}}{b \left(\mathrm{e}^{2 \mathrm{I} (a + c)} - 1\right)} - \frac{\mathrm{I} \ln\left(-\mathrm{e}^{2 \mathrm{I} (a + c)} + \mathrm{e}^{2 \mathrm{I} (b x + a)}\right)}{b \left(\mathrm{e}^{2 \mathrm{I} (a + c)} - 1\right)}$$

Problem 42: Result more than twice size of optimal antiderivative.

$$\int \sqrt{\sin(x) \tan(x)}\, dx$$

Optimal(type 3, 11 leaves, 2 steps):

$$-2 \cot(x) \sqrt{\sin(x) \tan(x)}$$

Result(type 3, 176 leaves):

$$\frac{1}{4 \sqrt{-\frac{\cos(x)}{(1 + \cos(x))^2}} \sin(x)^3} \left(\sqrt{4} (\cos(x) - 1) \left(4 \cos(x) \sqrt{-\frac{\cos(x)}{(1 + \cos(x))^2}} + 4 \sqrt{-\frac{\cos(x)}{(1 + \cos(x))^2}} + \ln\left(\right.\right.\right.$$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)-\ln\Bigg($$

$$-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\Bigg)\Bigg)\cos(x)\sqrt{-\frac{\cos(x)^2-1}{\cos(x)}}\Bigg)$$

Problem 43: Result more than twice size of optimal antiderivative.

$$\int(\sin(x)\tan(x))^{3/2}\,dx$$

Optimal(type 3, 23 leaves, 3 steps):

$$\frac{8\csc(x)\sqrt{\sin(x)\tan(x)}}{3}-\frac{2\sin(x)\sqrt{\sin(x)\tan(x)}}{3}$$

Result(type 3, 586 leaves):

$$\frac{1}{12\sin(x)^7}\Bigg(\sqrt{4}\,(\cos(x)-1)^2\Bigg(3\cos(x)^3\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\ln\Bigg($$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)-3\cos(x)^3\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\ln\Bigg($$

$$-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\Bigg)+9\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\cos(x)^2\ln\Bigg($$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)-9\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\cos(x)^2\ln\Bigg($$

$$-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\Bigg)+9\cos(x)\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\ln\Bigg($$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)-9\cos(x)\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\ln\Bigg($$

$$-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\Bigg)+3\ln\Bigg($$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\,\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}-3\ln\Bigg($$

$$-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\,\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\Bigg)\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}+4\cos(x)^3+12\cos(x)\Bigg)\Big(1$$

$$+\cos(x)\Big)^2\left(-\frac{\cos(x)^2-1}{\cos(x)}\right)^{3/2}\Bigg)$$

Problem 45: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 49 leaves, 3 steps):

$$\frac{x}{b\,(a+b\cos(x))}-\frac{2\arctan\left(\frac{\sqrt{a-b}\,\tan\left(\frac{x}{2}\right)}{\sqrt{a+b}}\right)}{b\sqrt{a-b}\,\sqrt{a+b}}$$

Result(type 3, 153 leaves):

$$\frac{2\,x\,e^{Ix}}{b\left(b\,e^{2\,Ix}+2\,a\,e^{Ix}+b\right)}-\frac{I\ln\left(e^{Ix}+\frac{a\sqrt{a^2-b^2}+a^2-b^2}{\sqrt{a^2-b^2}\,b}\right)}{\sqrt{a^2-b^2}\,b}+\frac{I\ln\left(e^{Ix}+\frac{a\sqrt{a^2-b^2}-a^2+b^2}{\sqrt{a^2-b^2}\,b}\right)}{\sqrt{a^2-b^2}\,b}$$

Problem 46: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 74 leaves, 5 steps):

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

Result(type 3, 249 leaves):

$$\frac{I\left(-2 I a^2 x e^{2 I x}+2 I b^2 x e^{2 I x}+a b e^{3 I x}+2 a^2 e^{2 I x}+b^2 e^{2 I x}+3 a b e^{I x}+b^2\right)}{b\left(b e^{2 I x}+2 a e^{I x}+b\right)^2\left(a^2-b^2\right)}-\frac{I a \ln\left(e^{I x}+\frac{a\sqrt{a^2-b^2}+a^2-b^2}{\sqrt{a^2-b^2}\, b}\right)}{2\sqrt{a^2-b^2}\,(a+b)\,(a-b)\, b}$$
$$+\frac{I a \ln\left(e^{I x}+\frac{a\sqrt{a^2-b^2}-a^2+b^2}{\sqrt{a^2-b^2}\, b}\right)}{2\sqrt{a^2-b^2}\,(a+b)\,(a-b)\, b}$$

Problem 47: Unable to integrate problem.

$$\int x^3\sqrt{a-a\sin(fx+e)}\,\sqrt{c+c\sin(fx+e)}\,\mathrm{d}x$$

Optimal(type 3, 139 leaves, 5 steps):

$$-\frac{6\sqrt{a-a\sin(fx+e)}\,\sqrt{c+c\sin(fx+e)}}{f^4}+\frac{3x^2\sqrt{a-a\sin(fx+e)}\,\sqrt{c+c\sin(fx+e)}}{f^2}-\frac{6x\sqrt{a-a\sin(fx+e)}\,\sqrt{c+c\sin(fx+e)}\,\tan(fx+e)}{f^3}$$
$$+\frac{x^3\sqrt{a-a\sin(fx+e)}\,\sqrt{c+c\sin(fx+e)}\,\tan(fx+e)}{f}$$

Result(type 8, 31 leaves):

$$\int x^3\sqrt{a-a\sin(fx+e)}\,\sqrt{c+c\sin(fx+e)}\,\mathrm{d}x$$

Problem 48: Unable to integrate problem.

$$\int x\sqrt{a-a\sin(fx+e)}\,\sqrt{c+c\sin(fx+e)}\,\mathrm{d}x$$

Optimal(type 3, 66 leaves, 3 steps):

$$\frac{\sqrt{a-a\sin(fx+e)}\,\sqrt{c+c\sin(fx+e)}}{f^2}+\frac{x\sqrt{a-a\sin(fx+e)}\,\sqrt{c+c\sin(fx+e)}\,\tan(fx+e)}{f}$$

Result(type 8, 29 leaves):

$$\int x\sqrt{a-a\sin(fx+e)}\,\sqrt{c+c\sin(fx+e)}\,\mathrm{d}x$$

Problem 51: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\sec(x)}{(a+a\cos(x))^{3/2}}\,\mathrm{d}x$$

Optimal(type 3, 71 leaves, 7 steps):

$$\frac{2 B \operatorname{arctanh}\left(\frac{\sin(x)\sqrt{a}}{\sqrt{a+a\cos(x)}}\right)}{a^{3/2}} + \frac{(A-B)\sin(x)}{2\,(a+a\cos(x))^{3/2}} + \frac{(A-5B)\operatorname{arctanh}\left(\frac{\sin(x)\sqrt{a}\sqrt{2}}{2\sqrt{a+a\cos(x)}}\right)\sqrt{2}}{4\,a^{3/2}}$$

Result(type 3, 269 leaves):

$$\frac{1}{4\,a^{5/2}\cos\left(\frac{x}{2}\right)\sin\left(\frac{x}{2}\right)\sqrt{a\cos\left(\frac{x}{2}\right)^2}}\left(\sqrt{a\sin\left(\frac{x}{2}\right)^2}\left(A\sqrt{2}\ln\left(\frac{2\left(2\sqrt{a}\sqrt{a\sin\left(\frac{x}{2}\right)^2}+2a\right)}{\cos\left(\frac{x}{2}\right)}\right)\cos\left(\frac{x}{2}\right)^2 a\right.\right.$$
$$-5B\sqrt{2}\ln\left(\frac{2\left(2\sqrt{a}\sqrt{a\sin\left(\frac{x}{2}\right)^2}+2a\right)}{\cos\left(\frac{x}{2}\right)}\right)\cos\left(\frac{x}{2}\right)^2 a + 4B\ln\left(-\frac{4\left(a\sqrt{2}\cos\left(\frac{x}{2}\right)-\sqrt{a}\sqrt{2}\sqrt{a\sin\left(\frac{x}{2}\right)^2}-2a\right)}{2\cos\left(\frac{x}{2}\right)-\sqrt{2}}\right)\cos\left(\frac{x}{2}\right)^2 a$$
$$\left.\left.+4B\ln\left(\frac{4\left(a\sqrt{2}\cos\left(\frac{x}{2}\right)+\sqrt{a}\sqrt{2}\sqrt{a\sin\left(\frac{x}{2}\right)^2}+2a\right)}{2\cos\left(\frac{x}{2}\right)+\sqrt{2}}\right)\cos\left(\frac{x}{2}\right)^2 a + A\sqrt{2}\sqrt{a\sin\left(\frac{x}{2}\right)^2}\sqrt{a} - B\sqrt{2}\sqrt{a\sin\left(\frac{x}{2}\right)^2}\sqrt{a}\right)\right)$$

Problem 52: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 24 leaves, 3 steps):

$$\frac{\ln(a+b\cos(x))}{b} + \frac{x\sin(x)}{a+b\cos(x)}$$

Result(type 3, 90 leaves):

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

Problem 53: Result more than twice size of optimal antiderivative.

$$\int \frac{-1+\frac{c^2}{d^2}+\sin(x)^2}{c+d\cos(x)}\,dx$$

Optimal(type 3, 14 leaves, 4 steps):

$$\frac{c x}{d^2} - \frac{\sin(x)}{d}$$

Result(type 3, 31 leaves):

$$-\frac{2 \tan\left(\frac{x}{2}\right)}{d \left(\tan\left(\frac{x}{2}\right)^2 + 1\right)} + \frac{2 c \arctan\left(\tan\left(\frac{x}{2}\right)\right)}{d^2}$$

Problem 56: Unable to integrate problem.

$$\int (a \cos(d x + c) + b \sin(d x + c))^n \, dx$$

Optimal(type 5, 128 leaves, 2 steps):

$$-\frac{1}{d (n+1) \left(\frac{a \cos(d x + c) + b \sin(d x + c)}{\sqrt{a^2 + b^2}}\right)^n \sqrt{\sin(c + d x - \arctan(a, b))^2}} \Bigg(\cos(c + d x - \arctan(a, b))^{n+1} \operatorname{hypergeom}\left(\left[\frac{1}{2}, \frac{n}{2} + \frac{1}{2}\right], \left[\frac{3}{2} + \frac{n}{2}\right], \cos(c + d x - \arctan(a, b))^2\right) (a \cos(d x + c) + b \sin(d x + c))^n \sin(c + d x - \arctan(a, b))\Bigg)$$

Result(type 8, 21 leaves):

$$\int (a \cos(d x + c) + b \sin(d x + c))^n \, dx$$

Problem 61: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{(a \cos(d x + c) + b \sin(d x + c))^5} \, dx$$

Optimal(type 3, 146 leaves, 4 steps):

$$-\frac{3 \operatorname{arctanh}\left(\frac{b \cos(d x + c) - a \sin(d x + c)}{\sqrt{a^2 + b^2}}\right)}{8 (a^2 + b^2)^{5/2} d} + \frac{-b \cos(d x + c) + a \sin(d x + c)}{4 (a^2 + b^2) d (a \cos(d x + c) + b \sin(d x + c))^4} - \frac{3 (b \cos(d x + c) - a \sin(d x + c))}{8 (a^2 + b^2)^2 d (a \cos(d x + c) + b \sin(d x + c))^2}$$

Result(type 3, 513 leaves):

$$\frac{1}{d} \Bigg(-\frac{1}{\left(\tan\left(\frac{d x}{2} + \frac{c}{2}\right)^2 a - 2 \tan\left(\frac{d x}{2} + \frac{c}{2}\right) b - a\right)^4} \Bigg(2 \Bigg(-\frac{(5 a^4 + 16 a^2 b^2 + 8 b^4) \tan\left(\frac{d x}{2} + \frac{c}{2}\right)^7}{8 a (a^4 + 2 a^2 b^2 + b^4)} + \frac{3 b (a^4 + 16 a^2 b^2 + 8 b^4) \tan\left(\frac{d x}{2} + \frac{c}{2}\right)^6}{8 a^2 (a^4 + 2 a^2 b^2 + b^4)}$$

$$-\frac{\left(3 a^{6}-36 a^{4} b^{2}+56 a^{2} b^{4}+32 b^{6}\right) \tan\left(\frac{d x}{2}+\frac{c}{2}\right)^{5}}{8 a^{3} \left(a^{4}+2 a^{2} b^{2}+b^{4}\right)}+\frac{b \left(15 a^{6}-114 a^{4} b^{2}-8 a^{2} b^{4}+16 b^{6}\right) \tan\left(\frac{d x}{2}+\frac{c}{2}\right)^{4}}{8 a^{4} \left(a^{4}+2 a^{2} b^{2}+b^{4}\right)}$$

$$-\frac{\left(3 a^{6}+84 a^{4} b^{2}-56 a^{2} b^{4}-32 b^{6}\right) \tan\left(\frac{d x}{2}+\frac{c}{2}\right)^{3}}{8 a^{3} \left(a^{4}+2 a^{2} b^{2}+b^{4}\right)}-\frac{b \left(23 a^{4}-64 a^{2} b^{2}-24 b^{4}\right) \tan\left(\frac{d x}{2}+\frac{c}{2}\right)^{2}}{8 a^{2} \left(a^{4}+2 a^{2} b^{2}+b^{4}\right)}-\frac{\left(5 a^{4}-24 a^{2} b^{2}-8 b^{4}\right) \tan\left(\frac{d x}{2}+\frac{c}{2}\right)}{8 a \left(a^{4}+2 a^{2} b^{2}+b^{4}\right)}$$

$$\left.\left.\left.+\frac{b \left(5 a^{2}+2 b^{2}\right)}{8 \left(a^{4}+2 a^{2} b^{2}+b^{4}\right)}\right)\right)+\frac{3 \operatorname{arctanh}\left(\frac{2 a \tan\left(\frac{d x}{2}+\frac{c}{2}\right)-2 b}{2 \sqrt{a^{2}+b^{2}}}\right)}{4 \left(a^{4}+2 a^{2} b^{2}+b^{4}\right) \sqrt{a^{2}+b^{2}}}\right)$$

Problem 69: Result more than twice size of optimal antiderivative.

$$\int \left(a \cos(d x+c)+I a \sin(d x+c)\right)^{3} dx$$

Optimal(type 3, 27 leaves, 1 step):

$$\frac{-\frac{I}{3} \left(a \cos(d x+c)+I a \sin(d x+c)\right)^{3}}{d}$$

Result(type 3, 75 leaves):

$$\frac{\frac{I a^{3} \left(2+\sin(d x+c)^{2}\right) \cos(d x+c)}{3}-a^{3} \sin(d x+c)^{3}-I a^{3} \cos(d x+c)^{3}+\frac{a^{3} \left(2+\cos(d x+c)^{2}\right) \sin(d x+c)}{3}}{d}$$

Problem 79: Result more than twice size of optimal antiderivative.

$$\int \left(\cot(x)+\csc(x)\right)^{3} dx$$

Optimal(type 3, 20 leaves, 4 steps):

$$-\frac{2}{1-\cos(x)}-\ln(1-\cos(x))$$

Result(type 3, 48 leaves):

$$-\frac{\cot(x)^{2}}{2}-\ln(\sin(x))-\frac{3 \cos(x)^{3}}{2 \sin(x)^{2}}-\frac{3 \cos(x)}{2}-\ln(\csc(x)-\cot(x))-\frac{3}{2 \sin(x)^{2}}-\frac{\cot(x) \csc(x)}{2}$$

Problem 88: Result more than twice size of optimal antiderivative.

$$\int \left(-\cos(x)+\sec(x)\right)^{7/2}\, dx$$

Optimal(type 3, 57 leaves, 6 steps):

$$-\frac{256\csc(x)\sqrt{\sin(x)\tan(x)}}{35}+\frac{64\sec(x)\sqrt{\sin(x)\tan(x)}\,\tan(x)}{35}-\frac{8\sin(x)\sqrt{\sin(x)\tan(x)}\,\tan(x)^2}{7}-\frac{2\sin(x)^3\sqrt{\sin(x)\tan(x)}\,\tan(x)^2}{7}$$

Result(type 3, 602 leaves):

$$-\frac{1}{70\sin(x)^{11}}\Bigg((\cos(x)-1)^2\Bigg(105\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\cos(x)^4\ln\Bigg($$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)-105\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\cos(x)^4\ln\Bigg($$

$$-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\Bigg)+315\cos(x)^3\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\ln\Bigg($$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)-315\cos(x)^3\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\ln\Bigg($$

$$-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\Bigg)+315\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\cos(x)^2\ln\Bigg($$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)-315\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\cos(x)^2\ln\Bigg($$

$$-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\Bigg)-20\cos(x)^6+105\cos(x)\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\ln\Bigg($$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)-105\cos(x)\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\ln\Bigg($$

$$-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\Bigg)+140\cos(x)^4+420\cos(x)^2-28\Bigg)\cos(x)\,(1+\cos(x))^2\Bigg($$

$$-\frac{\cos(x)^2-1}{\cos(x)}\Big)^{7/2}\Big)$$

Problem 89: Result more than twice size of optimal antiderivative.

$$\int(-\cos(x)+\sec(x))^{3/2}\,dx$$

Optimal(type 3, 23 leaves, 4 steps):

$$\frac{8\csc(x)\sqrt{\sin(x)\tan(x)}}{3}-\frac{2\sin(x)\sqrt{\sin(x)\tan(x)}}{3}$$

Result(type 3, 583 leaves):

$$\frac{1}{6\sin(x)^7}\Bigg((\cos(x)-1)^2\Bigg(3\cos(x)^3\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\ln\Bigg($$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)-3\cos(x)^3\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\ln\Bigg($$

$$-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\Bigg)+9\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\cos(x)^2\ln\Bigg($$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)-9\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\cos(x)^2\ln\Bigg($$

$$-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\Bigg)+9\cos(x)\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\ln\Bigg($$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)-9\cos(x)\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\ln\Bigg($$

$$-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\Bigg)+3\ln\Bigg($$

$$-\frac{2\left(2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1\right)}{\sin(x)^2}\Bigg)\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}-3\ln\Bigg($$

$$- \frac{2 \sqrt{- \frac{\cos(x)}{(1+\cos(x))^2}}\, \cos(x)^2 - \cos(x)^2 - 2 \sqrt{- \frac{\cos(x)}{(1+\cos(x))^2}} + 2\cos(x) - 1}{\sin(x)^2} \Bigg) \left(\left(- \frac{\cos(x)}{(1+\cos(x))^2} \right)^{3/2} + 4\cos(x)^3 + 12\cos(x) \right) (1$$

$$+ \cos(x))^2 \left(- \frac{\cos(x)^2 - 1}{\cos(x)} \right)^{3/2} \Bigg)$$

Problem 90: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\sqrt{-\cos(x) + \sec(x)}}\, dx$$

Optimal(type 3, 40 leaves, 8 steps):

$$\frac{\arctan\left(\sqrt{\cos(x)}\right) \sin(x)}{\sqrt{\cos(x)}\, \sqrt{\sin(x) \tan(x)}} - \frac{\operatorname{arctanh}\left(\sqrt{\cos(x)}\right) \sin(x)}{\sqrt{\cos(x)}\, \sqrt{\sin(x) \tan(x)}}$$

Result(type 3, 104 leaves):

$$- \frac{1}{2 \sin(x)} \left(\left(\arctan\left(\frac{1}{2 \sqrt{- \frac{\cos(x)}{(1+\cos(x))^2}}} \right) + \ln\left(- \frac{2 \sqrt{- \frac{\cos(x)}{(1+\cos(x))^2}}\, \cos(x)^2 - \cos(x)^2 - 2 \sqrt{- \frac{\cos(x)}{(1+\cos(x))^2}} + 2\cos(x) - 1}{\sin(x)^2} \right) \right) (1 \right.$$

$$\left. + \cos(x)) \sqrt{- \frac{\cos(x)}{(1+\cos(x))^2}}\, \sqrt{\frac{1 - \cos(x)^2}{\cos(x)}} \right)$$

Problem 91: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{(-\cos(x) + \sec(x))^{5/2}}\, dx$$

Optimal(type 3, 67 leaves, 10 steps):

$$\frac{3 \cot(x)}{16 \sqrt{\sin(x) \tan(x)}} - \frac{\cot(x) \csc(x)^2}{4 \sqrt{\sin(x) \tan(x)}} - \frac{3 \arctan\left(\sqrt{\cos(x)}\right) \sin(x)}{32 \sqrt{\cos(x)}\, \sqrt{\sin(x) \tan(x)}} + \frac{3 \operatorname{arctanh}\left(\sqrt{\cos(x)}\right) \sin(x)}{32 \sqrt{\cos(x)}\, \sqrt{\sin(x) \tan(x)}}$$

Result(type 3, 453 leaves):

$$\frac{1}{64\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\left(-\frac{\cos(x)^2-1}{\cos(x)}\right)^{5/2}\cos(x)^2}\Bigg(\Bigg(24\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\cos(x)^3+40\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\cos(x)^2+8\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}\cos(x)$$

$$-12\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^3-3\arctan\left(\frac{1}{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}}\right)\cos(x)^3-3\cos(x)^3\ln\left(-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\right)$$

$$-8\left(-\frac{\cos(x)}{(1+\cos(x))^2}\right)^{3/2}+24\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2+3\arctan\left(\frac{1}{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}}\right)\cos(x)^2+3\cos(x)^2\ln\left(-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\right)$$

$$-12\cos(x)\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+3\cos(x)\arctan\left(\frac{1}{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}}\right)+3\cos(x)\ln\left(-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\right)$$

$$-3\arctan\left(\frac{1}{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}}\right)-3\ln\left(-\frac{2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}\cos(x)^2-\cos(x)^2-2\sqrt{-\frac{\cos(x)}{(1+\cos(x))^2}}+2\cos(x)-1}{\sin(x)^2}\right)\Bigg)\sin(x)\Bigg)$$

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Problem 96: Result more than twice size of optimal antiderivative.
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$$\int \frac{A+C\sin(x)}{b\cos(x)+c\sin(x)}\,dx$$

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Optimal(type 3, 70 leaves, 3 steps):
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$$\frac{c\,C x}{b^2+c^2}-\frac{b\,C\ln(b\cos(x)+c\sin(x))}{b^2+c^2}-\frac{A\,\mathrm{arctanh}\left(\frac{c\cos(x)-b\sin(x)}{\sqrt{b^2+c^2}}\right)}{\sqrt{b^2+c^2}}$$

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Result(type 3, 149 leaves):
```

$$\frac{C\,b\ln\left(\tan\left(\frac{x}{2}\right)^2+1\right)}{b^2+c^2}+\frac{2\,C\,c\arctan\left(\tan\left(\frac{x}{2}\right)\right)}{b^2+c^2}-\frac{C\,b\ln\left(\tan\left(\frac{x}{2}\right)^2 b-2\tan\left(\frac{x}{2}\right)c-b\right)}{b^2+c^2}+\frac{2\,\mathrm{arctanh}\left(\frac{2\tan\left(\frac{x}{2}\right)b-2\,c}{2\sqrt{b^2+c^2}}\right)A\,b^2}{(b^2+c^2)^{3/2}}$$
$$+\frac{2\,\mathrm{arctanh}\left(\frac{2\tan\left(\frac{x}{2}\right)b-2\,c}{2\sqrt{b^2+c^2}}\right)A\,c^2}{(b^2+c^2)^{3/2}}$$

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Problem 102: Result more than twice size of optimal antiderivative.
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$$\int\frac{1}{(2\,a-2\,a\cos(e x+d)+2\,c\sin(e x+d))^4}\,dx$$

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Optimal(type 3, 202 leaves, 5 steps):
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$$\frac{a\,(5\,a^2+3\,c^2)\ln\left(a+c\cot\left(\frac{e x}{2}+\frac{d}{2}\right)\right)}{32\,c^7 e}+\frac{-c\cos(e x+d)-a\sin(e x+d)}{48\,c^2 e\,(a-a\cos(e x+d)+c\sin(e x+d))^3}+\frac{5\,(a\,c\cos(e x+d)+a^2\sin(e x+d))}{96\,c^4 e\,(a-a\cos(e x+d)+c\sin(e x+d))^2}$$
$$+\frac{-c\,(15\,a^2+4\,c^2)\cos(e x+d)-a\,(15\,a^2+4\,c^2)\sin(e x+d)}{96\,c^6 e\,(a-a\cos(e x+d)+c\sin(e x+d))}$$

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Result(type 3, 415 leaves):
```

$$-\frac{1}{384\,e\,c^4\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^3}-\frac{5\,a^2}{64\,e\,c^6\tan\left(\frac{e x}{2}+\frac{d}{2}\right)}-\frac{3}{128\,e\,c^4\tan\left(\frac{e x}{2}+\frac{d}{2}\right)}+\frac{a}{64\,e\,c^5\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2}-\frac{5\,a^3\ln\left(\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)}{32\,e\,c^7}$$
$$-\frac{3\,a\ln\left(\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)}{32\,e\,c^5}-\frac{a^3}{64\,e\,c^5\left(c+a\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)^2}-\frac{3\,a}{128\,e\,c^3\left(c+a\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)^2}+\frac{c}{128\,e\,a^3\left(c+a\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)^2}$$
$$-\frac{5\,a^3}{64\,e\,c^6\left(c+a\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)}-\frac{9\,a}{128\,e\,c^4\left(c+a\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)}-\frac{1}{128\,e\,a^3\left(c+a\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)}-\frac{a^3}{384\,e\,c^4\left(c+a\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)^3}$$

$$-\frac{a}{128\,e\,c^{2}\left(c+a\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)^{3}}-\frac{1}{128\,e\,a\left(c+a\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)^{3}}-\frac{c^{2}}{384\,e\,a^{3}\left(c+a\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)^{3}}+\frac{5\,a^{3}\ln\left(c+a\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)}{32\,e\,c^{7}}$$
$$+\frac{3\,a\ln\left(c+a\tan\left(\frac{e x}{2}+\frac{d}{2}\right)\right)}{32\,e\,c^{5}}$$

```
Problem 107: Result more than twice size of optimal antiderivative.
```

$$\int\frac{1}{(2\,a+2\,b\cos(e x+d)-2\,a\sin(e x+d))^{2}}\,dx$$

```
Optimal(type 3, 73 leaves, 4 steps):
```

$$-\frac{a\ln\left(a+b\tan\left(\frac{d}{2}+\frac{\pi}{4}+\frac{e x}{2}\right)\right)}{4\,b^{3}\,e}+\frac{a\cos(e x+d)+b\sin(e x+d)}{4\,b^{2}\,e\,(a+b\cos(e x+d)-a\sin(e x+d))}$$

```
Result(type 3, 177 leaves):
```

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

```
Problem 108: Result more than twice size of optimal antiderivative.
```

$$\int\frac{1}{(a+b\cos(e x+d)+c\sin(e x+d))^{2}}\,dx$$

```
Optimal(type 3, 116 leaves, 3 steps):
```

$$\frac{2\,a\arctan\left(\frac{c+(a-b)\tan\left(\frac{e x}{2}+\frac{d}{2}\right)}{\sqrt{a^{2}-b^{2}-c^{2}}}\right)}{(a^{2}-b^{2}-c^{2})^{3/2}\,e}+\frac{c\cos(e x+d)-b\sin(e x+d)}{(a^{2}-b^{2}-c^{2})\,e\,(a+b\cos(e x+d)+c\sin(e x+d))}$$

```
Result(type 3, 423 leaves):
```

$$-\frac{2\tan\left(\frac{e x}{2}+\frac{d}{2}\right)a\,b}{e\left(\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^{2}a-\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^{2}b+2\,c\tan\left(\frac{e x}{2}+\frac{d}{2}\right)+a+b\right)(a^{3}-a^{2}b-a\,b^{2}-a\,c^{2}+b^{3}+c^{2}b)}$$

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

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

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

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

```
Problem 109: Result more than twice size of optimal antiderivative.
```

$$\int\sqrt{2+3\cos(e x+d)+5\sin(e x+d)}\,dx$$

```
Optimal(type 4, 69 leaves, 2 steps):
```

$$\frac{2\sqrt{\cos\left(\frac{d}{2}+\frac{e x}{2}-\frac{\arctan\left(\frac{5}{3}\right)}{2}\right)^{2}}\,\operatorname{EllipticE}\left(\sin\left(\frac{d}{2}+\frac{e x}{2}-\frac{\arctan\left(\frac{5}{3}\right)}{2}\right),\frac{\sqrt{510-30\sqrt{34}}}{15}\right)\sqrt{2+\sqrt{34}}}{\cos\left(\frac{d}{2}+\frac{e x}{2}-\frac{\arctan\left(\frac{5}{3}\right)}{2}\right) e}$$

```
Result(type 4, 454 leaves):
```

$$\frac{1}{17\cos\left(e x+d+\arctan\left(\frac{3}{5}\right)\right)\sqrt{\sqrt{34}\,\sin\left(e x+d+\arctan\left(\frac{3}{5}\right)\right)+2}\; e}\left(2\sqrt{17}\sqrt{\frac{\sin\left(e x+d+\arctan\left(\frac{3}{5}\right)\right)+1}{-\sqrt{34}+17}}\right.$$

$$\sqrt{-\frac{17\left(\sin\left(e x+d+\arctan\left(\frac{3}{5}\right)\right)-1\right)}{\sqrt{34}+17}}\left(2\sqrt{-\frac{17\sin\left(e x+d+\arctan\left(\frac{3}{5}\right)\right)+\sqrt{34}}{-\sqrt{34}+17}}\;\operatorname{EllipticF}\left(\sqrt{-\frac{17\sin\left(e x+d+\arctan\left(\frac{3}{5}\right)\right)+\sqrt{34}}{-\sqrt{34}+17}},\right.\right.$$

$$\left.I\sqrt{\frac{-\sqrt{34}+17}{\sqrt{34}+17}}\right)\sqrt{34}+15\sqrt{34}\sqrt{\frac{17\sin\left(e x+d+\arctan\left(\frac{3}{5}\right)\right)+\sqrt{34}}{\sqrt{34}+17}}\;\operatorname{EllipticE}\left(\sqrt{\frac{17\sin\left(e x+d+\arctan\left(\frac{3}{5}\right)\right)+\sqrt{34}}{\sqrt{34}+17}},\right.$$

$$I\sqrt{\frac{\sqrt{34}+17}{-\sqrt{34}+17}}\Bigg) - 17\sqrt{34}\sqrt{\frac{17\sin\left(ex+d+\arctan\left(\frac{3}{5}\right)\right)+\sqrt{34}}{\sqrt{34}+17}}\,\mathrm{EllipticF}\left(\sqrt{\frac{17\sin\left(ex+d+\arctan\left(\frac{3}{5}\right)\right)+\sqrt{34}}{\sqrt{34}+17}}, I\sqrt{\frac{\sqrt{34}+17}{-\sqrt{34}+17}}\right)$$

$$-34\sqrt{-\frac{17\sin\left(ex+d+\arctan\left(\frac{3}{5}\right)\right)+\sqrt{34}}{-\sqrt{34}+17}}\,\mathrm{EllipticF}\left(\sqrt{-\frac{17\sin\left(ex+d+\arctan\left(\frac{3}{5}\right)\right)+\sqrt{34}}{-\sqrt{34}+17}}, I\sqrt{\frac{-\sqrt{34}+17}{\sqrt{34}+17}}\right)$$

$$-34\sqrt{\frac{17\sin\left(ex+d+\arctan\left(\frac{3}{5}\right)\right)+\sqrt{34}}{\sqrt{34}+17}}\,\mathrm{EllipticF}\left(\sqrt{\frac{17\sin\left(ex+d+\arctan\left(\frac{3}{5}\right)\right)+\sqrt{34}}{\sqrt{34}+17}}, I\sqrt{\frac{\sqrt{34}+17}{-\sqrt{34}+17}}\right)\Bigg)\Bigg)$$

Problem 110: Result more than twice size of optimal antiderivative.

$$\int\frac{1}{\sqrt{a+b\cos(ex+d)+c\sin(ex+d)}}\,dx$$

Optimal(type 4, 137 leaves, 2 steps):

$$\frac{2\sqrt{\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(b,c)}{2}\right)^2}\,\mathrm{EllipticF}\left(\sin\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(b,c)}{2}\right),\sqrt{2}\sqrt{\frac{\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\right)\sqrt{\frac{a+b\cos(ex+d)+c\sin(ex+d)}{a+\sqrt{b^2+c^2}}}}{\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(b,c)}{2}\right)e\sqrt{a+b\cos(ex+d)+c\sin(ex+d)}}$$

Result(type 4, 302 leaves):

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

$$\sqrt{-\frac{\sin(ex+d-\arctan(-b,c))\sqrt{b^2+c^2}+a}{-a+\sqrt{b^2+c^2}}}\sqrt{-\frac{(\sin(ex+d-\arctan(-b,c))-1)\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\sqrt{\frac{(\sin(ex+d-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{-a+\sqrt{b^2+c^2}}}$$

$$\mathrm{EllipticF}\left(\sqrt{-\frac{\sin(ex+d-\arctan(-b,c))\sqrt{b^2+c^2}+a}{-a+\sqrt{b^2+c^2}}},\sqrt{-\frac{-a+\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\right)\Bigg)\Bigg/\Bigg(\sqrt{b^2+c^2}\cos(ex+d-\arctan(-b,$$

$$c))\sqrt{\frac{b^2\sin(ex+d-\arctan(-b,c))+c^2\sin(ex+d-\arctan(-b,c))+a\sqrt{b^2+c^2}}{\sqrt{b^2+c^2}}}\,e\Bigg)$$

Problem 111: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\left(a+b\cos(e x+d)+c\sin(e x+d)\right)^{5/2}}\, dx$$

Optimal(type 4, 428 leaves, 7 steps):

$$\frac{2\left(c\cos(e x+d)-b\sin(e x+d)\right)}{3\left(a^2-b^2-c^2\right) e\left(a+b\cos(e x+d)+c\sin(e x+d)\right)^{3/2}}+\frac{8\left(a c\cos(e x+d)-a b\sin(e x+d)\right)}{3\left(a^2-b^2-c^2\right)^2 e\sqrt{a+b\cos(e x+d)+c\sin(e x+d)}}$$

$$+\frac{8 a\sqrt{\cos\left(\frac{d}{2}+\frac{e x}{2}-\frac{\arctan(b,c)}{2}\right)^2}\,\mathrm{EllipticE}\left(\sin\left(\frac{d}{2}+\frac{e x}{2}-\frac{\arctan(b,c)}{2}\right),\sqrt{2}\sqrt{\frac{\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\right)\sqrt{a+b\cos(e x+d)+c\sin(e x+d)}}{3\cos\left(\frac{d}{2}+\frac{e x}{2}-\frac{\arctan(b,c)}{2}\right)\left(a^2-b^2-c^2\right)^2 e\sqrt{\frac{a+b\cos(e x+d)+c\sin(e x+d)}{a+\sqrt{b^2+c^2}}}}$$

$$-\frac{2\sqrt{\cos\left(\frac{d}{2}+\frac{e x}{2}-\frac{\arctan(b,c)}{2}\right)^2}\,\mathrm{EllipticF}\left(\sin\left(\frac{d}{2}+\frac{e x}{2}-\frac{\arctan(b,c)}{2}\right),\sqrt{2}\sqrt{\frac{\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\right)\sqrt{\frac{a+b\cos(e x+d)+c\sin(e x+d)}{a+\sqrt{b^2+c^2}}}}{3\cos\left(\frac{d}{2}+\frac{e x}{2}-\frac{\arctan(b,c)}{2}\right)\left(a^2-b^2-c^2\right) e\sqrt{a+b\cos(e x+d)+c\sin(e x+d)}}$$

Result(type ?, 2966 leaves): Display of huge result suppressed!

Problem 117: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\sqrt{b\cos(e x+d)+c\sin(e x+d)+\sqrt{b^2+c^2}}}\, dx$$

Optimal(type 3, 75 leaves, 3 steps):

$$\frac{\mathrm{arctanh}\left(\frac{\left(b^2+c^2\right)^{1/4}\sin\left(d+e x-\arctan(b,c)\right)\sqrt{2}}{2\sqrt{\sqrt{b^2+c^2}+\cos\left(d+e x-\arctan(b,c)\right)\sqrt{b^2+c^2}}}\right)\sqrt{2}}{\left(b^2+c^2\right)^{1/4} e}$$

Result(type 3, 171 leaves):

$$-\frac{\left(\sin(e x+d-\arctan(-b,c))+1\right)\sqrt{-\sqrt{b^2+c^2}\left(\sin(e x+d-\arctan(-b,c))-1\right)}\sqrt{2}\,\mathrm{arctanh}\left(\frac{\sqrt{-\sqrt{b^2+c^2}\left(\sin(e x+d-\arctan(-b,c))-1\right)}\sqrt{2}}{2\left(b^2+c^2\right)^{1/4}}\right)}{\left(b^2+c^2\right)^{1/4}\cos(e x+d-\arctan(-b,c))\sqrt{\frac{b^2\sin(e x+d-\arctan(-b,c))+c^2\sin(e x+d-\arctan(-b,c))+b^2+c^2}{\sqrt{b^2+c^2}}}\, e}$$

Problem 118: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\left(b\cos(ex+d)+c\sin(ex+d)+\sqrt{b^2+c^2}\right)^{3/2}}\,dx$$

Optimal(type 3, 137 leaves, 4 steps):

$$\frac{\operatorname{arctanh}\left(\frac{(b^2+c^2)^{1/4}\sin(d+ex-\arctan(b,c))\sqrt{2}}{2\sqrt{\sqrt{b^2+c^2}+\cos(d+ex-\arctan(b,c))\sqrt{b^2+c^2}}}\right)\sqrt{2}}{4\,(b^2+c^2)^{3/4}\,e}+\frac{-c\cos(ex+d)+b\sin(ex+d)}{2e\sqrt{b^2+c^2}\left(b\cos(ex+d)+c\sin(ex+d)+\sqrt{b^2+c^2}\right)^{3/2}}$$

Result(type 3, 349 leaves):

$$-\Bigg(\Bigg(\sin(ex+d-\arctan(-b,c))\operatorname{arctanh}\left(\frac{\sqrt{-\sin(ex+d-\arctan(-b,c))\sqrt{b^2+c^2}+\sqrt{b^2+c^2}}\,\sqrt{2}}{2\,(b^2+c^2)^{1/4}}\right)\sqrt{2}\,(b^2+c^2)$$
$$+2\sqrt{-\sin(ex+d-\arctan(-b,c))\sqrt{b^2+c^2}+\sqrt{b^2+c^2}}\,(b^2+c^2)^{3/4}+\operatorname{arctanh}\left(\frac{\sqrt{-\sin(ex+d-\arctan(-b,c))\sqrt{b^2+c^2}+\sqrt{b^2+c^2}}\,\sqrt{2}}{2\,(b^2+c^2)^{1/4}}\right)\sqrt{2}\,b^2$$
$$+\operatorname{arctanh}\left(\frac{\sqrt{-\sin(ex+d-\arctan(-b,c))\sqrt{b^2+c^2}+\sqrt{b^2+c^2}}\,\sqrt{2}}{2\,(b^2+c^2)^{1/4}}\right)\sqrt{2}\,c^2\Bigg)\sqrt{-\sqrt{b^2+c^2}\,(\sin(ex+d-\arctan(-b,c))-1)}\Bigg)\Bigg/\Bigg(4\,(b^2$$
$$+c^2)^{7/4}\cos(ex+d-\arctan(-b,c))\sqrt{\frac{b^2\sin(ex+d-\arctan(-b,c))+c^2\sin(ex+d-\arctan(-b,c))+b^2+c^2}{\sqrt{b^2+c^2}}}\;e\Bigg)$$

Problem 121: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{a+c\sec(x)+\tan(x)\,b}\,dx$$

Optimal(type 3, 91 leaves, 5 steps):

$$\frac{ax}{a^2+b^2}+\frac{b\ln(c+a\cos(x)+b\sin(x))}{a^2+b^2}+\frac{2ac\operatorname{arctanh}\left(\frac{b-(a-c)\tan\left(\frac{x}{2}\right)}{\sqrt{a^2+b^2-c^2}}\right)}{(a^2+b^2)\sqrt{a^2+b^2-c^2}}$$

Result(type 3, 413 leaves):

$$-\frac{b\ln\left(\tan\left(\frac{x}{2}\right)^2+1\right)}{a^2+b^2}+\frac{2a\arctan\left(\tan\left(\frac{x}{2}\right)\right)}{a^2+b^2}+\frac{\ln\left(\tan\left(\frac{x}{2}\right)^2a-c\tan\left(\frac{x}{2}\right)^2-2\tan\left(\frac{x}{2}\right)b-a-c\right)ab}{(a^2+b^2)\,(a-c)}$$

$$-\frac{\ln\left(\tan\left(\frac{x}{2}\right)^2 a-c\tan\left(\frac{x}{2}\right)^2-2\tan\left(\frac{x}{2}\right)b-a-c\right)cb}{(a^2+b^2)(a-c)}+\frac{2\arctan\left(\frac{2(a-c)\tan\left(\frac{x}{2}\right)-2b}{2\sqrt{-a^2-b^2+c^2}}\right)ac}{(a^2+b^2)\sqrt{-a^2-b^2+c^2}}-\frac{2\arctan\left(\frac{2(a-c)\tan\left(\frac{x}{2}\right)-2b}{2\sqrt{-a^2-b^2+c^2}}\right)b^2}{(a^2+b^2)\sqrt{-a^2-b^2+c^2}}$$

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

```
Problem 122: Result more than twice size of optimal antiderivative.
```

$$\int\frac{\sqrt{\sec(ex+d)}}{\sqrt{a+b\sec(ex+d)+c\tan(ex+d)}}\,dx$$

```
Optimal(type 4, 145 leaves, 3 steps):
```

$$\frac{1}{\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(a,c)}{2}\right)e\sqrt{a+b\sec(ex+d)+c\tan(ex+d)}}\left(2\sqrt{\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(a,c)}{2}\right)^2}\,\mathrm{EllipticF}\left(\sin\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(a,c)}{2}\right),\right.\right.$$

$$\left.\left.\sqrt{2}\sqrt{\frac{\sqrt{a^2+c^2}}{b+\sqrt{a^2+c^2}}}\right)\sqrt{\sec(ex+d)}\sqrt{\frac{b+a\cos(ex+d)+c\sin(ex+d)}{b+\sqrt{a^2+c^2}}}\right)$$

```
Result(type 4, 715 leaves):
```

$$\left(-4\,\mathrm{I}\,\mathrm{EllipticF}\left(\sqrt{-\frac{\left(-\mathrm{I}a+\mathrm{I}b+\sqrt{a^2-b^2+c^2}-c\right)(\mathrm{I}\sin(ex+d)+\cos(ex+d))}{\mathrm{I}a-\mathrm{I}b+\sqrt{a^2-b^2+c^2}-c}},\right.\right.$$

$$\left.\sqrt{\frac{\left(\mathrm{I}a-\mathrm{I}b+\sqrt{a^2-b^2+c^2}-c\right)\left(\mathrm{I}a-\mathrm{I}b+\sqrt{a^2-b^2+c^2}+c\right)}{\left(-\mathrm{I}a+\mathrm{I}b+\sqrt{a^2-b^2+c^2}-c\right)\left(-\mathrm{I}a+\mathrm{I}b+\sqrt{a^2-b^2+c^2}+c\right)}}\right)$$

$$\sqrt{\frac{1}{\cos(ex+d)}}\sqrt{\frac{b+a\cos(ex+d)+c\sin(ex+d)}{\cos(ex+d)}}$$

$$\sqrt{\frac{\mathrm{I}\left(\sqrt{a^2-b^2+c^2}\cos(ex+d)+c\cos(ex+d)-a\sin(ex+d)+b\sin(ex+d)+\sqrt{a^2-b^2+c^2}+c\right)}{\left(-\mathrm{I}a+\mathrm{I}b+\sqrt{a^2-b^2+c^2}+c\right)(\mathrm{I}\cos(ex+d)+\sin(ex+d)+\mathrm{I})}}$$

$$\sqrt{\frac{\mathrm{I}\left(a\sin(ex+d)-b\sin(ex+d)+\sqrt{a^2-b^2+c^2}\cos(ex+d)-c\cos(ex+d)+\sqrt{a^2-b^2+c^2}-c\right)}{\left(\mathrm{I}a-\mathrm{I}b+\sqrt{a^2-b^2+c^2}-c\right)(\mathrm{I}\cos(ex+d)+\sin(ex+d)+\mathrm{I})}}$$

$$\sqrt{-\frac{\left(-\mathrm{I}a+\mathrm{I}b+\sqrt{a^2-b^2+c^2}-c\right)\,(\mathrm{I}\sin(ex+d)+\cos(ex+d))}{\mathrm{I}a-\mathrm{I}b+\sqrt{a^2-b^2+c^2}-c}}\,(\cos(ex+d)+1)^2\cos(ex+d)\,(\cos(ex+d)-1)^2\left(\mathrm{I}\sqrt{a^2-b^2+c^2}\sin(ex+d)-\mathrm{I}a\cos(ex+d)+\mathrm{I}b\cos(ex+d)-\mathrm{I}c\sin(ex+d)-\sqrt{a^2-b^2+c^2}\cos(ex+d)+c\cos(ex+d)-a\sin(ex+d)+b\sin(ex+d)\right)\Bigg/\left(e\left(-\mathrm{I}a+\mathrm{I}b+\sqrt{a^2-b^2+c^2}-c\right)\sin(ex+d)^4\,(b+a\cos(ex+d)+c\sin(ex+d))\right)$$

```
Problem 123: Result more than twice size of optimal antiderivative.
```

$$\int\frac{\sec(ex+d)^{3/2}}{(a+b\sec(ex+d)+c\tan(ex+d))^{3/2}}\,dx$$

```
Optimal(type 4, 263 leaves, 4 steps):
```

$$-\frac{2\sec(ex+d)^{3/2}\,(c\cos(ex+d)-a\sin(ex+d))\,(b+a\cos(ex+d)+c\sin(ex+d))}{(a^2-b^2+c^2)\,e\,(a+b\sec(ex+d)+c\tan(ex+d))^{3/2}}-\left(2\sqrt{\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(a,c)}{2}\right)^2}\,\mathrm{EllipticE}\left(\sin\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(a,c)}{2}\right),\sqrt{2}\sqrt{\frac{\sqrt{a^2+c^2}}{b+\sqrt{a^2+c^2}}}\right)\sec(ex+d)^{3/2}\,(b+a\cos(ex+d)+c\sin(ex+d))^2\right)\Bigg/\left(\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(a,c)}{2}\right)(a^2-b^2+c^2)\,e\sqrt{\frac{b+a\cos(ex+d)+c\sin(ex+d)}{b+\sqrt{a^2+c^2}}}\,(a+b\sec(ex+d)+c\tan(ex+d))^{3/2}\right)$$

```
Result(type ?, 12426 leaves): Display of huge result suppressed!
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Problem 124: Result more than twice size of optimal antiderivative.
```

$$\int\frac{1}{a+b\cot(x)+c\csc(x)}\,dx$$

```
Optimal(type 3, 92 leaves, 5 steps):
```

$$\frac{ax}{a^2+b^2}-\frac{b\ln(c+b\cos(x)+a\sin(x))}{a^2+b^2}+\frac{2ac\,\mathrm{arctanh}\left(\frac{a-(b-c)\tan\left(\frac{x}{2}\right)}{\sqrt{a^2+b^2-c^2}}\right)}{(a^2+b^2)\sqrt{a^2+b^2-c^2}}$$

```
Result(type 3, 445 leaves):
```

$$\frac{2b\ln\left(\tan\left(\frac{x}{2}\right)^2+1\right)}{2a^2+2b^2}+\frac{4a\arctan\left(\tan\left(\frac{x}{2}\right)\right)}{2a^2+2b^2}-\frac{2\ln\left(\tan\left(\frac{x}{2}\right)^2b-c\tan\left(\frac{x}{2}\right)^2-2a\tan\left(\frac{x}{2}\right)-b-c\right)b^2}{(2a^2+2b^2)\,(b-c)}$$

$$+\frac{2\ln\left(\tan\left(\frac{x}{2}\right)^2 b-c\tan\left(\frac{x}{2}\right)^2-2a\tan\left(\frac{x}{2}\right)-b-c\right)cb}{(2a^2+2b^2)(b-c)}+\frac{4\arctan\left(\frac{2(b-c)\tan\left(\frac{x}{2}\right)-2a}{2\sqrt{-a^2-b^2+c^2}}\right)ab}{(2a^2+2b^2)\sqrt{-a^2-b^2+c^2}}+\frac{4\arctan\left(\frac{2(b-c)\tan\left(\frac{x}{2}\right)-2a}{2\sqrt{-a^2-b^2+c^2}}\right)ac}{(2a^2+2b^2)\sqrt{-a^2-b^2+c^2}}$$

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

```
Problem 127: Result more than twice size of optimal antiderivative.
```

$$\int \frac{\csc(ex+d)^{3/2}}{(a+c\cot(ex+d)+b\csc(ex+d))^{3/2}}\,dx$$

```
Optimal(type 4, 263 leaves, 4 steps):
```

$$-\frac{2\csc(ex+d)^{3/2}(b+c\cos(ex+d)+a\sin(ex+d))(a\cos(ex+d)-c\sin(ex+d))}{(a^2-b^2+c^2)e(a+c\cot(ex+d)+b\csc(ex+d))^{3/2}}-\left(2\csc(ex+d)^{3/2}\sqrt{\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(c,a)}{2}\right)^2}\,\mathrm{EllipticE}\left(\sin\right|\right.$$

$$\left.+d))^2\right)\Bigg/\left(\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(c,a)}{2}\right)(a^2-b^2+c^2)e(a+c\cot(ex+d)+b\csc(ex+d))^{3/2}\sqrt{\frac{b+c\cos(ex+d)+a\sin(ex+d)}{b+\sqrt{a^2+c^2}}}\right)$$

```
Result(type ?, 12233 leaves): Display of huge result suppressed!
```

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Problem 128: Humongous result has more than 20000 leaves.
```

$$\int \frac{\csc(ex+d)^{5/2}}{(a+c\cot(ex+d)+b\csc(ex+d))^{5/2}}\,dx$$

```
Optimal(type 4, 530 leaves, 8 steps):
```

$$-\frac{2\csc(ex+d)^{5/2}(b+c\cos(ex+d)+a\sin(ex+d))(a\cos(ex+d)-c\sin(ex+d))}{3(a^2-b^2+c^2)e(a+c\cot(ex+d)+b\csc(ex+d))^{5/2}}$$

$$+\frac{8\csc(ex+d)^{5/2}(b+c\cos(ex+d)+a\sin(ex+d))^2(ab\cos(ex+d)-bc\sin(ex+d))}{3(a^2-b^2+c^2)^2e(a+c\cot(ex+d)+b\csc(ex+d))^{5/2}}+\left(8b\csc(ex+d)^{5/2}\sqrt{\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(c,a)}{2}\right)^2}\,\mathrm{El}\right.$$

$$\left.+c\cot(ex+d)+b\csc(ex+d))^{5/2}\sqrt{\frac{b+c\cos(ex+d)+a\sin(ex+d)}{b+\sqrt{a^2+c^2}}}\right)+\left(2\csc(ex+d)^{5/2}\sqrt{\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(c,a)}{2}\right)^2}\,\mathrm{EllipticF}\left(\sin\left(\frac{d}{2}+\right.\right.\right.$$

$$\left.{}^2\right)$$

```
Result(type ?, 62958 leaves): Display of huge result suppressed!
```

Problem 129: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\sqrt{a+c\cot(ex+d)+b\csc(ex+d)}\,\sqrt{\sin(ex+d)}}\,dx$$

Optimal(type 4, 145 leaves, 3 steps):

$$\frac{2\sqrt{\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(c,a)}{2}\right)^2}\,\mathrm{EllipticF}\left(\sin\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(c,a)}{2}\right),\sqrt{2}\sqrt{\frac{\sqrt{a^2+c^2}}{b+\sqrt{a^2+c^2}}}\right)\sqrt{\frac{b+c\cos(ex+d)+a\sin(ex+d)}{b+\sqrt{a^2+c^2}}}}{\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(c,a)}{2}\right)e\sqrt{a+c\cot(ex+d)+b\csc(ex+d)}\,\sqrt{\sin(ex+d)}}$$

Result(type 4, 690 leaves):

$$\Bigg(-4\,\mathrm{I}\sqrt{\frac{b+c\cos(ex+d)+a\sin(ex+d)}{\sin(ex+d)}}\sqrt{\frac{\mathrm{I}\left(\sqrt{a^2-b^2+c^2}\cos(ex+d)-b\sin(ex+d)+c\sin(ex+d)-a\cos(ex+d)+\sqrt{a^2-b^2+c^2}-a\right)}{\left(-\mathrm{I}b+\mathrm{I}c+\sqrt{a^2-b^2+c^2}-a\right)(\mathrm{I}\cos(ex+d)+\sin(ex+d)+\mathrm{I})}}$$
$$\sqrt{\frac{\mathrm{I}\left(b\sin(ex+d)-c\sin(ex+d)+\sqrt{a^2-b^2+c^2}\cos(ex+d)+a\cos(ex+d)+\sqrt{a^2-b^2+c^2}+a\right)}{\left(\mathrm{I}b-\mathrm{I}c+\sqrt{a^2-b^2+c^2}+a\right)(\mathrm{I}\cos(ex+d)+\sin(ex+d)+\mathrm{I})}}$$
$$\sqrt{-\frac{\left(-\mathrm{I}b+\mathrm{I}c+\sqrt{a^2-b^2+c^2}+a\right)(\mathrm{I}\sin(ex+d)+\cos(ex+d))}{\mathrm{I}b-\mathrm{I}c+\sqrt{a^2-b^2+c^2}+a}}\,(\cos(ex+d)$$
$$+1)^2\,\mathrm{EllipticF}\left(\sqrt{-\frac{\left(-\mathrm{I}b+\mathrm{I}c+\sqrt{a^2-b^2+c^2}+a\right)(\mathrm{I}\sin(ex+d)+\cos(ex+d))}{\mathrm{I}b-\mathrm{I}c+\sqrt{a^2-b^2+c^2}+a}},\right.$$
$$\left.\sqrt{\frac{\left(\mathrm{I}b-\mathrm{I}c+\sqrt{a^2-b^2+c^2}+a\right)\left(\mathrm{I}b-\mathrm{I}c+\sqrt{a^2-b^2+c^2}-a\right)}{\left(-\mathrm{I}b+\mathrm{I}c+\sqrt{a^2-b^2+c^2}+a\right)\left(-\mathrm{I}b+\mathrm{I}c+\sqrt{a^2-b^2+c^2}-a\right)}}\right)(\cos(ex+d)-1)^2\left(\mathrm{I}\sqrt{a^2-b^2+c^2}\sin(ex+d)-\mathrm{I}b\cos(ex+d)\right.$$
$$\left.+\mathrm{I}\cos(ex+d)\,c+\mathrm{I}\sin(ex+d)\,a-\sqrt{a^2-b^2+c^2}\cos(ex+d)-a\cos(ex+d)-b\sin(ex+d)+c\sin(ex+d)\right)\Bigg)\Bigg/\Bigg(e\left(-\mathrm{I}b+\mathrm{I}c\right.$$
$$\left.+\sqrt{a^2-b^2+c^2}+a\right)\sin(ex+d)^{7/2}(b+c\cos(ex+d)+a\sin(ex+d))\Bigg)$$

Problem 130: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{(a+c\cot(ex+d)+b\csc(ex+d))^{3/2}\sin(ex+d)^{3/2}}\,dx$$

Optimal(type 4, 263 leaves, 4 steps):

$$-\frac{2\left(b+c\cos(ex+d)+a\sin(ex+d)\right)\left(a\cos(ex+d)-c\sin(ex+d)\right)}{\left(a^2-b^2+c^2\right)e\left(a+c\cot(ex+d)+b\csc(ex+d)\right)^{3/2}\sin(ex+d)^{3/2}}$$

$$-\frac{2\sqrt{\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(c,a)}{2}\right)^2}\,\mathrm{EllipticE}\left(\sin\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(c,a)}{2}\right),\sqrt{2}\sqrt{\frac{\sqrt{a^2+c^2}}{b+\sqrt{a^2+c^2}}}\right)\left(b+c\cos(ex+d)+a\sin(ex+d)\right)^2}{\cos\left(\frac{d}{2}+\frac{ex}{2}-\frac{\arctan(c,a)}{2}\right)\left(a^2-b^2+c^2\right)e\left(a+c\cot(ex+d)+b\csc(ex+d)\right)^{3/2}\sin(ex+d)^{3/2}\sqrt{\frac{b+c\cos(ex+d)+a\sin(ex+d)}{b+\sqrt{a^2+c^2}}}}$$

Result(type ?, 12223 leaves): Display of huge result suppressed!

Problem 134: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{1}{\left(\sec(x)^2-\tan(x)^2\right)^3}\,dx$$

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

$$x$$

Result(type 3, 3 leaves):

$$\arctan(\tan(x))$$

Problem 137: Result more than twice size of optimal antiderivative.

$$\int\frac{d+e\sin(x)}{a+b\sin(x)+c\sin(x)^2}\,dx$$

Optimal(type 3, 206 leaves, 7 steps):

$$\frac{\arctan\left(\frac{\left(2c+\left(b-\sqrt{-4ac+b^2}\right)\tan\left(\frac{x}{2}\right)\right)\sqrt{2}}{2\sqrt{b^2-2c(a+c)-b\sqrt{-4ac+b^2}}}\right)\sqrt{2}\left(e+\frac{-be+2cd}{\sqrt{-4ac+b^2}}\right)}{\sqrt{b^2-2c(a+c)-b\sqrt{-4ac+b^2}}}$$

$$+\frac{\arctan\left(\frac{\left(2c+\left(b+\sqrt{-4ac+b^2}\right)\tan\left(\frac{x}{2}\right)\right)\sqrt{2}}{2\sqrt{b^2-2c(a+c)+b\sqrt{-4ac+b^2}}}\right)\sqrt{2}\left(e+\frac{be-2cd}{\sqrt{-4ac+b^2}}\right)}{\sqrt{b^2-2c(a+c)+b\sqrt{-4ac+b^2}}}$$

Result(type 3, 831 leaves):

$$\frac{8\,a \arctan\left(\frac{2\,a\tan\left(\frac{x}{2}\right)+b+\sqrt{-4\,a\,c+b^2}}{\sqrt{4\,a\,c-2\,b^2-2\,b\sqrt{-4\,a\,c+b^2}+4\,a^2}}\right) d\,c}{(4\,a\,c-b^2)\sqrt{4\,a\,c-2\,b^2-2\,b\sqrt{-4\,a\,c+b^2}+4\,a^2}} - \frac{2\arctan\left(\frac{2\,a\tan\left(\frac{x}{2}\right)+b+\sqrt{-4\,a\,c+b^2}}{\sqrt{4\,a\,c-2\,b^2-2\,b\sqrt{-4\,a\,c+b^2}+4\,a^2}}\right) d\,b^2}{(4\,a\,c-b^2)\sqrt{4\,a\,c-2\,b^2-2\,b\sqrt{-4\,a\,c+b^2}+4\,a^2}}$$

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

$$- \frac{8\,a \arctan\left(\frac{-2\,a\tan\left(\frac{x}{2}\right)+\sqrt{-4\,a\,c+b^2}-b}{\sqrt{4\,a\,c-2\,b^2+2\,b\sqrt{-4\,a\,c+b^2}+4\,a^2}}\right) d\,c}{(4\,a\,c-b^2)\sqrt{4\,a\,c-2\,b^2+2\,b\sqrt{-4\,a\,c+b^2}+4\,a^2}} + \frac{2\arctan\left(\frac{-2\,a\tan\left(\frac{x}{2}\right)+\sqrt{-4\,a\,c+b^2}-b}{\sqrt{4\,a\,c-2\,b^2+2\,b\sqrt{-4\,a\,c+b^2}+4\,a^2}}\right) d\,b^2}{(4\,a\,c-b^2)\sqrt{4\,a\,c-2\,b^2+2\,b\sqrt{-4\,a\,c+b^2}+4\,a^2}}$$

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

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Problem 138: Result more than twice size of optimal antiderivative.
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$$\int \frac{a+b\sin(e\,x+d)}{\left(b^2+2\,a\,b\sin(e\,x+d)+a^2\sin(e\,x+d)^2\right)^{3/2}}\,dx$$

```
Optimal(type 3, 224 leaves, 8 steps):
```

$$-\frac{\cos(e\,x+d)\,(b+a\sin(e\,x+d))}{2\,e\,(b^2+2\,a\,b\sin(e\,x+d)+a^2\sin(e\,x+d)^2)^{3/2}} - \frac{\operatorname{arctanh}\left(\frac{a+b\tan\left(\frac{e\,x}{2}+\frac{d}{2}\right)}{\sqrt{a^2-b^2}}\right)(a\,b+a^2\sin(e\,x+d))^3}{a^2\,(a^2-b^2)^{3/2}\,e\,(b^2+2\,a\,b\sin(e\,x+d)+a^2\sin(e\,x+d)^2)^{3/2}}$$

$$+ \frac{b\cos(e\,x+d)\,(a\,b+a^2\sin(e\,x+d))^3}{2\,(a^2-b^2)\,e\,(a^3\,b+a^4\sin(e\,x+d))\,(b^2+2\,a\,b\sin(e\,x+d)+a^2\sin(e\,x+d)^2)^{3/2}}$$

```
Result(type 3, 737 leaves):
```

$$-\Bigg(-2\arctan\left(\frac{b\cos(e\,x+d)-a\sin(e\,x+d)-b}{\sqrt{-a^2+b^2}\,\sin(e\,x+d)}\right)\cos(e\,x+d)^2\sin(e\,x+d)\,a^4\,b^2+\sqrt{-a^2+b^2}\cos(e\,x+d)^3\,a^2\,b^3-\sqrt{-a^2+b^2}\cos(e\,x+d)^2\sin(e\,x$$

$$+d)\,a^5+2\sqrt{-a^2+b^2}\cos(e\,x+d)^2\sin(e\,x+d)\,a^3\,b^2-6\arctan\left(\frac{b\cos(e\,x+d)-a\sin(e\,x+d)-b}{\sqrt{-a^2+b^2}\,\sin(e\,x+d)}\right)\cos(e\,x+d)^2\,a^3\,b^3-3\sqrt{-a^2+b^2}\cos(e\,x$$

$+ d)^2 a^4 b + 6\sqrt{-a^2+b^2}\cos(ex+d)^2 a^2 b^3 + \sqrt{-a^2+b^2}\cos(ex+d)\sin(ex+d) a^3 b^2 - 3\sqrt{-a^2+b^2}\cos(ex+d)\sin(ex+d) a b^4$

$+ 2\arctan\left(\frac{b\cos(ex+d) - a\sin(ex+d) - b}{\sqrt{-a^2+b^2}\sin(ex+d)}\right)\sin(ex+d) a^4 b^2 + 6\arctan\left(\frac{b\cos(ex+d) - a\sin(ex+d) - b}{\sqrt{-a^2+b^2}\sin(ex+d)}\right)\sin(ex+d) a^2 b^4$

$- 2\sqrt{-a^2+b^2}\cos(ex+d) b^5 + \sqrt{-a^2+b^2}\sin(ex+d) a^5 + \sqrt{-a^2+b^2}\sin(ex+d) a^3 b^2 - 6\sqrt{-a^2+b^2}\sin(ex+d) a b^4$

$+ 6\arctan\left(\frac{b\cos(ex+d) - a\sin(ex+d) - b}{\sqrt{-a^2+b^2}\sin(ex+d)}\right) a^3 b^3 + 2\arctan\left(\frac{b\cos(ex+d) - a\sin(ex+d) - b}{\sqrt{-a^2+b^2}\sin(ex+d)}\right) a b^5 + 3\sqrt{-a^2+b^2} a^4 b - 5\sqrt{-a^2+b^2} a^2 b^3$

$- 2\sqrt{-a^2+b^2} b^5\Big) \Big/ \Big(2e\sqrt{-a^2+b^2}(a^2-b^2) b^2 (-a^2\cos(ex+d)^2 + 2ab\sin(ex+d) + a^2 + b^2)^{3/2}\Big)$

Problem 140: Result more than twice size of optimal antiderivative.

$$\int \frac{a + b\sec(ex+d)}{(b^2 + 2ab\sec(ex+d) + a^2\sec(ex+d)^2)^2}\, dx$$

Optimal(type 3, 215 leaves, 8 steps):

$$\frac{ax}{b^4} - \frac{(a^2-2b^2)(2a^4-a^2b^2+b^4)\arctan\left(\frac{\sqrt{a-b}\tan\left(\frac{ex}{2}+\frac{d}{2}\right)}{\sqrt{a+b}}\right)}{(a-b)^{5/2} b^4 (a+b)^{5/2} e} - \frac{a(3a^2-5b^2)\tan(ex+d)}{6b^2(a^2-b^2) e (b+a\sec(ex+d))^2}$$
$$- \frac{a(6a^4-11a^2b^2+11b^4)\tan(ex+d)}{6b^3(a^2-b^2)^2 e (b+a\sec(ex+d))} - \frac{a^4\tan(ex+d)}{3be(ab+a^2\sec(ex+d))^3}$$

Result(type 3, 1117 leaves):

$$\frac{2a\arctan\left(\tan\left(\frac{ex}{2}+\frac{d}{2}\right)\right)}{eb^4} - \frac{2a^5\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^5}{eb^3\left(\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2 a - \tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2 b + a + b\right)^3 (a^2+2ab+b^2)}$$
$$+ \frac{a^4\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^5}{eb^2\left(\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2 a - \tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2 b + a + b\right)^3 (a^2+2ab+b^2)}$$
$$+ \frac{4a^3\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^5}{eb\left(\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2 a - \tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2 b + a + b\right)^3 (a^2+2ab+b^2)} - \frac{3a^2\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^5}{e\left(\tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2 a - \tan\left(\frac{ex}{2}+\frac{d}{2}\right)^2 b + a + b\right)^3 (a^2+2ab+b^2)}$$

$$-\frac{6 b a \tan\left(\frac{e x}{2}+\frac{d}{2}\right)^5}{e\left(\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 a-\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 b+a+b\right)^3 (a^2+2ab+b^2)}-\frac{4 a^5 \tan\left(\frac{e x}{2}+\frac{d}{2}\right)^3}{e b^3\left(\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 a-\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 b+a+b\right)^3 (a-b)(a+b)}$$

$$+\frac{32 a^3 \tan\left(\frac{e x}{2}+\frac{d}{2}\right)^3}{3 e b\left(\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 a-\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 b+a+b\right)^3 (a-b)(a+b)}-\frac{12 b a \tan\left(\frac{e x}{2}+\frac{d}{2}\right)^3}{e\left(\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 a-\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 b+a+b\right)^3 (a-b)(a+b)}$$

$$-\frac{2 a^5 \tan\left(\frac{e x}{2}+\frac{d}{2}\right)}{e b^3\left(\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 a-\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 b+a+b\right)^3 (a^2-2ab+b^2)}$$

$$-\frac{a^4 \tan\left(\frac{e x}{2}+\frac{d}{2}\right)}{e b^2\left(\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 a-\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 b+a+b\right)^3 (a^2-2ab+b^2)}$$

$$+\frac{4 a^3 \tan\left(\frac{e x}{2}+\frac{d}{2}\right)}{e b\left(\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 a-\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 b+a+b\right)^3 (a^2-2ab+b^2)}+\frac{3 a^2 \tan\left(\frac{e x}{2}+\frac{d}{2}\right)}{e\left(\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 a-\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 b+a+b\right)^3 (a^2-2ab+b^2)}$$

$$-\frac{6 b a \tan\left(\frac{e x}{2}+\frac{d}{2}\right)}{e\left(\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 a-\tan\left(\frac{e x}{2}+\frac{d}{2}\right)^2 b+a+b\right)^3 (a^2-2ab+b^2)}-\frac{2 \arctan\left(\frac{\tan\left(\frac{e x}{2}+\frac{d}{2}\right)(a-b)}{\sqrt{(a-b)(a+b)}}\right) a^6}{e b^4 (a^4-2a^2b^2+b^4)\sqrt{(a-b)(a+b)}}$$

$$+\frac{5 \arctan\left(\frac{\tan\left(\frac{e x}{2}+\frac{d}{2}\right)(a-b)}{\sqrt{(a-b)(a+b)}}\right) a^4}{e b^2 (a^4-2a^2b^2+b^4)\sqrt{(a-b)(a+b)}}-\frac{3 \arctan\left(\frac{\tan\left(\frac{e x}{2}+\frac{d}{2}\right)(a-b)}{\sqrt{(a-b)(a+b)}}\right) a^2}{e (a^4-2a^2b^2+b^4)\sqrt{(a-b)(a+b)}}+\frac{2 b^2 \arctan\left(\frac{\tan\left(\frac{e x}{2}+\frac{d}{2}\right)(a-b)}{\sqrt{(a-b)(a+b)}}\right)}{e (a^4-2a^2b^2+b^4)\sqrt{(a-b)(a+b)}}$$

Problem 144: Result more than twice size of optimal antiderivative.

$$\int \frac{A+B\cos(x)}{a+b\cos(x)+\mathrm{I}\, b\sin(x)}\, dx$$

Optimal(type 3, 73 leaves, 1 step):

$$\frac{(2aA-bB)x}{2a^2}+\frac{\mathrm{I}\, B\cos(x)}{2a}+\frac{\mathrm{I}\left(2aAb-Ba^2-Bb^2\right)\ln(a+b\cos(x)+\mathrm{I}\, b\sin(x))}{2a^2 b}+\frac{B\sin(x)}{2a}$$

Result(type 3, 152 leaves):

$$-\frac{I\ln\left(\tan\left(\frac{x}{2}\right)-I\right)A}{a}+\frac{I\ln\left(\tan\left(\frac{x}{2}\right)-I\right)bB}{2a^2}+\frac{B}{a\left(\tan\left(\frac{x}{2}\right)-I\right)}+\frac{IB\ln\left(\tan\left(\frac{x}{2}\right)+I\right)}{2b}+\frac{I\ln\left(Ia+Ib+a\tan\left(\frac{x}{2}\right)-\tan\left(\frac{x}{2}\right)b\right)A}{a}$$
$$-\frac{I\ln\left(Ia+Ib+a\tan\left(\frac{x}{2}\right)-\tan\left(\frac{x}{2}\right)b\right)B}{2b}-\frac{Ib\ln\left(Ia+Ib+a\tan\left(\frac{x}{2}\right)-\tan\left(\frac{x}{2}\right)b\right)B}{2a^2}$$

```
Problem 145: Result more than twice size of optimal antiderivative.
```

$$\int\frac{A+B\cos(x)}{a+b\cos(x)-Ib\sin(x)}\,dx$$

```
Optimal(type 3, 73 leaves, 1 step):
```

$$\frac{(2aA-bB)x}{2a^2}-\frac{IB\cos(x)}{2a}-\frac{I\left(2aAb-Ba^2-Bb^2\right)\ln(a+b\cos(x)-Ib\sin(x))}{2a^2b}+\frac{B\sin(x)}{2a}$$

```
Result(type 3, 283 leaves):
```

$$-\frac{IB\ln\left(\tan\left(\frac{x}{2}\right)-I\right)}{2b}+\frac{I\ln\left(Ia+Ib-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)A}{-a+b}-\frac{Ib\ln\left(Ia+Ib-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)A}{a(-a+b)}$$
$$-\frac{Ia\ln\left(Ia+Ib-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)B}{2b(-a+b)}+\frac{I\ln\left(Ia+Ib-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)B}{2(-a+b)}-\frac{Ib\ln\left(Ia+Ib-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)B}{2a(-a+b)}$$
$$+\frac{Ib^2\ln\left(Ia+Ib-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)B}{2a^2(-a+b)}+\frac{I\ln\left(\tan\left(\frac{x}{2}\right)+I\right)A}{a}-\frac{I\ln\left(\tan\left(\frac{x}{2}\right)+I\right)bB}{2a^2}+\frac{B}{a\left(\tan\left(\frac{x}{2}\right)+I\right)}$$

```
Problem 146: Result more than twice size of optimal antiderivative.
```

$$\int\frac{B\cos(x)+C\sin(x)}{a+b\cos(x)+c\sin(x)}\,dx$$

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

$$\frac{(bB+Cc)x}{b^2+c^2}+\frac{(Bc-bC)\ln(a+b\cos(x)+c\sin(x))}{b^2+c^2}-\frac{2a(bB+Cc)\arctan\left(\frac{c+(a-b)\tan\left(\frac{x}{2}\right)}{\sqrt{a^2-b^2-c^2}}\right)}{\left(b^2+c^2\right)\sqrt{a^2-b^2-c^2}}$$

```
Result(type 3, 823 leaves):
```

$$\frac{\ln\left(\tan\left(\frac{x}{2}\right)^2a-\tan\left(\frac{x}{2}\right)^2b+2\tan\left(\frac{x}{2}\right)c+a+b\right)Bac}{\left(b^2+c^2\right)(a-b)}-\frac{\ln\left(\tan\left(\frac{x}{2}\right)^2a-\tan\left(\frac{x}{2}\right)^2b+2\tan\left(\frac{x}{2}\right)c+a+b\right)Bbc}{\left(b^2+c^2\right)(a-b)}$$

$$- \frac{\ln\left(\tan\left(\frac{x}{2}\right)^2 a - \tan\left(\frac{x}{2}\right)^2 b + 2\tan\left(\frac{x}{2}\right) c + a + b\right) C a b}{(b^2+c^2)\,(a-b)} + \frac{\ln\left(\tan\left(\frac{x}{2}\right)^2 a - \tan\left(\frac{x}{2}\right)^2 b + 2\tan\left(\frac{x}{2}\right) c + a + b\right) C b^2}{(b^2+c^2)\,(a-b)}$$

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

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

$$+ \frac{2\arctan\left(\frac{2\,(a-b)\tan\left(\frac{x}{2}\right)+2c}{2\sqrt{a^2-b^2-c^2}}\right) c C a b}{(b^2+c^2)\sqrt{a^2-b^2-c^2}\,(a-b)} - \frac{2\arctan\left(\frac{2\,(a-b)\tan\left(\frac{x}{2}\right)+2c}{2\sqrt{a^2-b^2-c^2}}\right) c C b^2}{(b^2+c^2)\sqrt{a^2-b^2-c^2}\,(a-b)} - \frac{\ln\left(\tan\left(\frac{x}{2}\right)^2+1\right) B c}{b^2+c^2} + \frac{C b \ln\left(\tan\left(\frac{x}{2}\right)^2+1\right)}{b^2+c^2}$$

$$+ \frac{2 B \arctan\left(\tan\left(\frac{x}{2}\right)\right) b}{b^2+c^2} + \frac{2 C c \arctan\left(\tan\left(\frac{x}{2}\right)\right)}{b^2+c^2}$$

Problem 147: Result more than twice size of optimal antiderivative.

$$\int \frac{A + B\cos(x) + C\sin(x)}{(a + b\cos(x) + c\sin(x))^2}\, dx$$

Optimal(type 3, 121 leaves, 4 steps):

$$\frac{2\,(aA - bB - Cc)\arctan\left(\frac{c + (a-b)\tan\left(\frac{x}{2}\right)}{\sqrt{a^2-b^2-c^2}}\right)}{(a^2-b^2-c^2)^{3/2}} + \frac{Bc - bC + (Ac - Ca)\cos(x) - (Ab - Ba)\sin(x)}{(a^2-b^2-c^2)\,(a + b\cos(x) + c\sin(x))}$$

Result(type 3, 328 leaves):

$$\frac{2\left(-\frac{(aAb - Ab^2 - Ac^2 - Ba^2 + Bab + Bc^2 + Cac - Cbc)\tan\left(\frac{x}{2}\right)}{a^3 - a^2 b - a b^2 - a c^2 + b^3 + c^2 b} + \frac{Aac - Bbc - Ca^2 + Cb^2}{a^3 - a^2 b - a b^2 - a c^2 + b^3 + c^2 b}\right)}{\tan\left(\frac{x}{2}\right)^2 a - \tan\left(\frac{x}{2}\right)^2 b + 2\tan\left(\frac{x}{2}\right) c + a + b}$$

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

```
Problem 148: Result more than twice size of optimal antiderivative.
```

$$\int\frac{A+B\cos(x)+C\sin(x)}{a+b\cos(x)-\mathrm{I}\,b\sin(x)}\,dx$$

```
Optimal(type 3, 90 leaves, 1 step):
```

$$\frac{(2aA-bB+\mathrm{I}\,bC)\,x}{2a^2}-\frac{\mathrm{I}\left(2aAb-b^2\,(B-\mathrm{I}\,C)-a^2\,(B+\mathrm{I}\,C)\right)\ln(a+b\cos(x)-\mathrm{I}\,b\sin(x))}{2a^2b}-\frac{(\mathrm{I}\,B+C)\,(\cos(x)+\mathrm{I}\sin(x))}{2a}$$

```
Result(type 3, 474 leaves):
```

$$\frac{\ln\left(\tan\left(\frac{x}{2}\right)-\mathrm{I}\right)C}{2b}-\frac{\mathrm{I}\ln\left(\tan\left(\frac{x}{2}\right)+\mathrm{I}\right)bB}{2a^2}+\frac{a\ln\left(\mathrm{I}\,a+\mathrm{I}\,b-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)C}{2b\,(-a+b)}-\frac{\ln\left(\mathrm{I}\,a+\mathrm{I}\,b-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)C}{2\,(-a+b)}$$
$$-\frac{b\ln\left(\mathrm{I}\,a+\mathrm{I}\,b-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)C}{2a\,(-a+b)}+\frac{b^2\ln\left(\mathrm{I}\,a+\mathrm{I}\,b-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)C}{2a^2\,(-a+b)}-\frac{\mathrm{I}\,C}{a\left(\tan\left(\frac{x}{2}\right)+\mathrm{I}\right)}$$
$$+\frac{\mathrm{I}\,b^2\ln\left(\mathrm{I}\,a+\mathrm{I}\,b-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)B}{2a^2\,(-a+b)}+\frac{\mathrm{I}\ln\left(\mathrm{I}\,a+\mathrm{I}\,b-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)A}{-a+b}-\frac{\mathrm{I}\,B\ln\left(\tan\left(\frac{x}{2}\right)-\mathrm{I}\right)}{2b}+\frac{\mathrm{I}\ln\left(\tan\left(\frac{x}{2}\right)+\mathrm{I}\right)A}{a}$$
$$+\frac{\mathrm{I}\ln\left(\mathrm{I}\,a+\mathrm{I}\,b-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)B}{2\,(-a+b)}-\frac{\mathrm{I}\,a\ln\left(\mathrm{I}\,a+\mathrm{I}\,b-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)B}{2b\,(-a+b)}+\frac{B}{a\left(\tan\left(\frac{x}{2}\right)+\mathrm{I}\right)}$$
$$-\frac{\mathrm{I}\,b\ln\left(\mathrm{I}\,a+\mathrm{I}\,b-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)A}{a\,(-a+b)}-\frac{\mathrm{I}\,b\ln\left(\mathrm{I}\,a+\mathrm{I}\,b-a\tan\left(\frac{x}{2}\right)+\tan\left(\frac{x}{2}\right)b\right)B}{2a\,(-a+b)}-\frac{\ln\left(\tan\left(\frac{x}{2}\right)+\mathrm{I}\right)bC}{2a^2}$$

```
Problem 149: Result more than twice size of optimal antiderivative.
```

$$\int\frac{b^2+c^2+ab\cos(x)+ac\sin(x)}{(a+b\cos(x)+c\sin(x))^2}\,dx$$

```
Optimal(type 3, 23 leaves, 1 step):
```

$$\frac{-c\cos(x)+b\sin(x)}{a+b\cos(x)+c\sin(x)}$$

```
Result(type 3, 69 leaves):
```

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

Problem 150: Result more than twice size of optimal antiderivative.

$$\int (a+b\cos(x)+c\sin(x))^{5/2}(d+b e\cos(x)+c e\sin(x))\,dx$$

Optimal(type 4, 414 leaves, 8 steps):

$$-\frac{2(a+b\cos(x)+c\sin(x))^{5/2}(c e\cos(x)-b e\sin(x))}{7}-\frac{2(a+b\cos(x)+c\sin(x))^{3/2}(c(5 a e+7 d)\cos(x)-b(5 a e+7 d)\sin(x))}{35}$$
$$-\frac{2\left(c\left(56 a d+15 a^2 e+25\left(b^2+c^2\right)e\right)\cos(x)-b\left(56 a d+15 a^2 e+25\left(b^2+c^2\right)e\right)\sin(x)\right)\sqrt{a+b\cos(x)+c\sin(x)}}{105}$$
$$+\frac{1}{105\cos\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right)\sqrt{\frac{a+b\cos(x)+c\sin(x)}{a+\sqrt{b^2+c^2}}}}\left(2\left(161 a^2 d+63\left(b^2+c^2\right)d+15 a^3 e+145 a\left(b^2\right.\right.\right.$$
$$\left.\left.\left.+c^2\right)e\right)\sqrt{\cos\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right)^2}\,\mathrm{EllipticE}\left(\sin\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right),\sqrt{2}\sqrt{\frac{\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\right)\sqrt{a+b\cos(x)+c\sin(x)}\right)$$
$$-\frac{1}{105\cos\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right)\sqrt{a+b\cos(x)+c\sin(x)}}\left(2\left(a^2-b^2-c^2\right)\left(56 a d+15 a^2 e+25\left(b^2\right.\right.\right.$$
$$\left.\left.\left.+c^2\right)e\right)\sqrt{\cos\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right)^2}\,\mathrm{EllipticF}\left(\sin\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right),\sqrt{2}\sqrt{\frac{\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\right)\sqrt{\frac{a+b\cos(x)+c\sin(x)}{a+\sqrt{b^2+c^2}}}\right)$$

Result(type ?, 3501 leaves): Display of huge result suppressed!

Problem 151: Result more than twice size of optimal antiderivative.

$$\int \sqrt{a+b\cos(x)+c\sin(x)}\,(d+b e\cos(x)+c e\sin(x))\,dx$$

Optimal(type 4, 261 leaves, 6 steps):

$$-\frac{2(c e\cos(x)-b e\sin(x))\sqrt{a+b\cos(x)+c\sin(x)}}{3}$$

$$+\frac{2\,(a e+3 d)\sqrt{\cos\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right)^{2}}\,\mathrm{EllipticE}\left(\sin\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right),\sqrt{2}\sqrt{\frac{\sqrt{b^{2}+c^{2}}}{a+\sqrt{b^{2}+c^{2}}}}\right)\sqrt{a+b\cos(x)+c\sin(x)}}{3\cos\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right)\sqrt{\frac{a+b\cos(x)+c\sin(x)}{a+\sqrt{b^{2}+c^{2}}}}}$$

$$-\frac{2\,(a^{2}-b^{2}-c^{2})\,e\sqrt{\cos\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right)^{2}}\,\mathrm{EllipticF}\left(\sin\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right),\sqrt{2}\sqrt{\frac{\sqrt{b^{2}+c^{2}}}{a+\sqrt{b^{2}+c^{2}}}}\right)\sqrt{\frac{a+b\cos(x)+c\sin(x)}{a+\sqrt{b^{2}+c^{2}}}}}{3\cos\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right)\sqrt{a+b\cos(x)+c\sin(x)}}$$

```
Result(type 4, 1459 leaves):
```

$$\left(\sqrt{-\frac{\left(-b^{2}\sin(x-\arctan(-b,c))-c^{2}\sin(x-\arctan(-b,c))-a\sqrt{b^{2}+c^{2}}\right)\cos(x-\arctan(-b,c))^{2}}{\sqrt{b^{2}+c^{2}}}}\left(\left(\sqrt{b^{2}+c^{2}}\,b^{2}e+\sqrt{b^{2}+c^{2}}\,c^{2}e\right)\right(\right.\right.$$

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

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

$$\left.-1\right)$$

$$\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}}\sqrt{\frac{(-\sin(x-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\sqrt{\frac{(\sin(x-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{-a+\sqrt{b^2+c^2}}}\,\mathrm{EllipticF}\Bigg($$

$$\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}},\sqrt{\frac{a-\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\Bigg)\Bigg)$$

$$-\frac{1}{3\sqrt{b^2+c^2}\sqrt{\cos(x-\arctan(-b,c))^2\left(\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}+a\right)}}\Bigg(4a\left(\frac{a}{\sqrt{b^2+c^2}}\right.$$

$$\left.-1\right)\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}}\sqrt{\frac{(-\sin(x-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\sqrt{\frac{(\sin(x-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{-a+\sqrt{b^2+c^2}}}\Bigg(\Bigg($$

$$-\frac{a}{\sqrt{b^2+c^2}}-1\Bigg)\mathrm{EllipticE}\left(\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}},\sqrt{\frac{a-\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\right)+\mathrm{EllipticF}\Bigg(\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}},$$

$$\sqrt{\frac{a-\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\Bigg)\Bigg)\Bigg)\Bigg)+\frac{1}{\sqrt{\cos(x-\arctan(-b,c))^2\left(\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}+a\right)}}\Bigg(2\left(ab^2e+ac^2e+b^2d+c^2d\right)\left(\frac{a}{\sqrt{b^2+c^2}}\right.$$

$$-1\Big)\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}}\sqrt{\frac{(-\sin(x-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\sqrt{\frac{(\sin(x-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{-a+\sqrt{b^2+c^2}}}\Bigg(\Bigg($$

$$-\frac{a}{\sqrt{b^2+c^2}}-1\Big)\operatorname{EllipticE}\left(\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}},\sqrt{\frac{a-\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\right)+\operatorname{EllipticF}\left(\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}},\right.$$

$$\left.\sqrt{\frac{a-\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\right)\Bigg)\Bigg)\Bigg)+\Bigg(2\,a\,d\sqrt{b^2+c^2}\left(\frac{a}{\sqrt{b^2+c^2}}\right.$$

$$\left.-1\right)$$

$$\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}}\sqrt{\frac{(-\sin(x-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\sqrt{\frac{(\sin(x-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{-a+\sqrt{b^2+c^2}}}\operatorname{EllipticF}\Bigg($$

$$\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}},\sqrt{\frac{a-\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\Bigg)\Bigg)\Bigg/$$

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

$$c))\sqrt{\frac{b^2\sin(x-\arctan(-b,c))+c^2\sin(x-\arctan(-b,c))+a\sqrt{b^2+c^2}}{\sqrt{b^2+c^2}}}\Bigg)$$

Problem 152: Result more than twice size of optimal antiderivative.

$$\int\frac{d+b\,e\cos(x)+c\,e\sin(x)}{\sqrt{a+b\cos(x)+c\sin(x)}}\,dx$$

Optimal(type 4, 220 leaves, 5 steps):

$$\frac{2\,e\sqrt{\cos\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right)^2}\,\mathrm{EllipticE}\left(\sin\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right),\sqrt{2}\,\sqrt{\frac{\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\right)\sqrt{a+b\cos(x)+c\sin(x)}}{\cos\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right)\sqrt{\frac{a+b\cos(x)+c\sin(x)}{a+\sqrt{b^2+c^2}}}}$$

$$+\frac{2\,(-a\,e+d)\sqrt{\cos\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right)^2}\,\mathrm{EllipticF}\left(\sin\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right),\sqrt{2}\,\sqrt{\frac{\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\right)\sqrt{\frac{a+b\cos(x)+c\sin(x)}{a+\sqrt{b^2+c^2}}}}{\cos\left(\frac{x}{2}-\frac{\arctan(b,c)}{2}\right)\sqrt{a+b\cos(x)+c\sin(x)}}$$

Result(type 4, 776 leaves):

$$\left(\sqrt{-\frac{\left(-b^2\sin(x-\arctan(-b,c))-c^2\sin(x-\arctan(-b,c))-a\sqrt{b^2+c^2}\right)\cos(x-\arctan(-b,c))^2}{\sqrt{b^2+c^2}}}\,\left(\left(2\,d\sqrt{b^2+c^2}\left(\frac{a}{\sqrt{b^2+c^2}}\right.\right.\right.\right.$$

$$\left.-1\right)$$

$$\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}}\,\sqrt{\frac{(-\sin(x-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\,\sqrt{\frac{(\sin(x-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{-a+\sqrt{b^2+c^2}}}\,\mathrm{EllipticF}\left(\right.$$

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

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

$$+\frac{1}{\sqrt{\cos(x-\arctan(-b,c))^2\left(\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}+a\right)}}\left(2\,(b^2e+c^2e)\left(\frac{a}{\sqrt{b^2+c^2}}\right.\right.$$

$$-1\Bigg)\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}}\sqrt{\frac{(-\sin(x-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\sqrt{\frac{(\sin(x-\arctan(-b,c))+1)\sqrt{b^2+c^2}}{-a+\sqrt{b^2+c^2}}}\Bigg(\Bigg($$

$$-\frac{a}{\sqrt{b^2+c^2}}-1\Bigg)\operatorname{EllipticE}\left(\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}},\sqrt{\frac{a-\sqrt{b^2+c^2}}{a+\sqrt{b^2+c^2}}}\right)+\operatorname{EllipticF}\Bigg(\sqrt{\frac{-\sin(x-\arctan(-b,c))\sqrt{b^2+c^2}-a}{-a+\sqrt{b^2+c^2}}},$$

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

Problem 153: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\cos(ex+d)+C\sin(ex+d)}{(a+c\sin(ex+d))^4}\,dx$$

Optimal(type 3, 245 leaves, 10 steps):

$$\frac{(2Aa^3+3Aac^2-4Ca^2c-Cc^3)\arctan\left(\frac{c+a\tan\left(\frac{ex}{2}+\frac{d}{2}\right)}{\sqrt{a^2-c^2}}\right)}{(a^2-c^2)^{7/2}e}-\frac{B}{3ce(a+c\sin(ex+d))^3}+\frac{(Ac-Ca)\cos(ex+d)}{3(a^2-c^2)e(a+c\sin(ex+d))^3}$$

$$+\frac{(5Aac-2Ca^2-3Cc^2)\cos(ex+d)}{6(a^2-c^2)^2e(a+c\sin(ex+d))^2}+\frac{(11Aa^2c+4Ac^3-2Ca^3-13Cac^2)\cos(ex+d)}{6(a^2-c^2)^3e(a+c\sin(ex+d))}$$

Result(type ?, 5050 leaves): Display of huge result suppressed!

Problem 155: Result more than twice size of optimal antiderivative.

$$\int\frac{1}{(a+\cos(dx+c)\sin(dx+c)b)^{3/2}}\,dx$$

Optimal(type 4, 161 leaves, 5 steps):

$$\frac{2b\cos(2dx+2c)\sqrt{2}}{(4a^2-b^2)d\sqrt{2a+b\sin(2dx+2c)}}-\frac{2\sqrt{\sin\left(c+\frac{\pi}{4}+dx\right)^2}\operatorname{EllipticE}\left(\cos\left(c+\frac{\pi}{4}+dx\right),\sqrt{2}\sqrt{\frac{b}{2a+b}}\right)\sqrt{2}\sqrt{2a+b\sin(2dx+2c)}}{\sin\left(c+\frac{\pi}{4}+dx\right)(4a^2-b^2)d\sqrt{\frac{2a+b\sin(2dx+2c)}{2a+b}}}$$

Result(type 4, 569 leaves):

$$\frac{1}{b(4a^2-b^2)\cos(2dx+2c)\sqrt{4a+2b\sin(2dx+2c)}\,d}\Bigg(4\Bigg(4a^2\sqrt{\frac{2a+b\sin(2dx+2c)}{2a-b}}\sqrt{-\frac{(\sin(2dx+2c)-1)b}{2a+b}}\sqrt{-\frac{(\sin(2dx+2c)+1)b}{2a-b}}$$

$$\mathrm{EllipticF}\left(\sqrt{\frac{2a+b\sin(2dx+2c)}{2a-b}}, \sqrt{\frac{2a-b}{2a+b}}\right)$$
$$-\sqrt{\frac{2a+b\sin(2dx+2c)}{2a-b}}\sqrt{-\frac{(\sin(2dx+2c)-1)b}{2a+b}}\sqrt{-\frac{(\sin(2dx+2c)+1)b}{2a-b}}\,\mathrm{EllipticF}\left(\sqrt{\frac{2a+b\sin(2dx+2c)}{2a-b}}, \sqrt{\frac{2a-b}{2a+b}}\right)b^2$$
$$-4\sqrt{\frac{2a+b\sin(2dx+2c)}{2a-b}}\sqrt{-\frac{(\sin(2dx+2c)-1)b}{2a+b}}\sqrt{-\frac{(\sin(2dx+2c)+1)b}{2a-b}}\,\mathrm{EllipticE}\left(\sqrt{\frac{2a+b\sin(2dx+2c)}{2a-b}}, \sqrt{\frac{2a-b}{2a+b}}\right)a^2$$
$$+\sqrt{\frac{2a+b\sin(2dx+2c)}{2a-b}}\sqrt{-\frac{(\sin(2dx+2c)-1)b}{2a+b}}\sqrt{-\frac{(\sin(2dx+2c)+1)b}{2a-b}}\,\mathrm{EllipticE}\left(\sqrt{\frac{2a+b\sin(2dx+2c)}{2a-b}}, \sqrt{\frac{2a-b}{2a+b}}\right)b^2$$
$$\left.\left.-b^2\sin(2dx+2c)^2+b^2\right)\right)$$

```
Problem 158: Attempted integration timed out after 120 seconds.
```

$$\int \frac{\cos(ax)^4}{x^2(\cos(ax)+ax\sin(ax))^2}\,dx$$

```
Optimal(type 4, 80 leaves, 6 steps):
```

$$\frac{1}{x}+\frac{\cos(ax)^2}{a^2x^3}-\frac{2\cos(ax)^2}{x}-2a\,\mathrm{Si}(2ax)-\frac{\cos(ax)\sin(ax)}{ax^2}-\frac{\cos(ax)^3}{a^2x^3(\cos(ax)+ax\sin(ax))}$$

```
Result(type 1, 1 leaves):???
```

```
Problem 163: Result more than twice size of optimal antiderivative.
```

$$\int \sqrt{c\tan(bx+a)\tan(2bx+2a)}\,dx$$

```
Optimal(type 3, 39 leaves, 3 steps):
```

$$-\frac{\operatorname{arctanh}\left(\frac{\sqrt{c}\tan(2bx+2a)}{\sqrt{-c+c\sec(2bx+2a)}}\right)\sqrt{c}}{b}$$

```
Result(type 3, 135 leaves):
```

$$-\frac{\sqrt{4}\sqrt{\frac{c(1-\cos(bx+a)^2)}{2\cos(bx+a)^2-1}}\sin(bx+a)\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\cos(bx+a)\sqrt{4}(-1+\cos(bx+a))}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)}{2b(-1+\cos(bx+a))}$$

```
Problem 165: Result more than twice size of optimal antiderivative.
```

$$\int (c\tan(bx+a)\tan(2bx+2a))^{3/2}\,dx$$

```
Optimal(type 3, 72 leaves, 5 steps):
```

$$\frac{c^{3/2}\operatorname{arctanh}\left(\frac{\sqrt{c}\,\tan(2bx+2a)}{\sqrt{-c+c\sec(2bx+2a)}}\right)}{b}+\frac{c^2\tan(2bx+2a)}{b\sqrt{-c+c\sec(2bx+2a)}}$$

```
Result(type 3, 252 leaves):
```

$$\frac{1}{b\left(2+\sqrt{2}\right)\left(\sqrt{2}-2\right)\sin(bx+a)^3}\left(\sqrt{2}\left(2\cos(bx+a)^2-1\right)\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\sqrt{2}\cos(bx+a)\operatorname{arctanh}\left(\frac{\sqrt{2}\cos(bx+a)\sqrt{4}\,(-1+\cos(bx+a))}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)+\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\cos(bx+a)\sqrt{4}\,(-1+\cos(bx+a))}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\sqrt{2}-2\cos(bx+a)\right)\left(\frac{c\sin(bx+a)^2}{2\cos(bx+a)^2-1}\right)^{3/2}\right)$$

```
Problem 166: Result more than twice size of optimal antiderivative.
```

$$\int\cos(2bx+2a)\,(c\tan(bx+a)\tan(2bx+2a))^{3/2}\,dx$$

```
Optimal(type 3, 74 leaves, 6 steps):
```

$$-\frac{3c^{3/2}\operatorname{arctanh}\left(\frac{\sqrt{c}\,\tan(2bx+2a)}{\sqrt{-c+c\sec(2bx+2a)}}\right)}{2b}+\frac{c^2\sin(2bx+2a)}{2b\sqrt{-c+c\sec(2bx+2a)}}$$

```
Result(type 3, 517 leaves):
```

$$-\frac{1}{b\left(2+\sqrt{2}\right)\left(\sqrt{2}-2\right)\sin(bx+a)^3}\left(\sqrt{2}\left(2\cos(bx+a)^2-1\right)\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\sqrt{2}\cos(bx+a)\operatorname{arctanh}\left(\frac{\sqrt{2}\cos(bx+a)\sqrt{4}\,(-1+\cos(bx+a))}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)+\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\cos(bx+a)\sqrt{4}\,(-1+\cos(bx+a))}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\sqrt{2}-2\cos(bx+a)\right)\left(\frac{c\sin(bx+a)^2}{2\cos(bx+a)^2-1}\right)^{3/2}\right)-\frac{1}{b\left(2+\sqrt{2}\right)^3\left(\sqrt{2}-2\right)^3\sin(bx+a)^3}\left(2\sqrt{2}\left(2\cos(bx+a)^2\right.\right.$$

$$-1)\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\sqrt{2}\cos(bx+a)\operatorname{arctanh}\left(\frac{\sqrt{2}\cos(bx+a)\sqrt{4}(-1+\cos(bx+a))}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\right.$$

$$+\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\operatorname{arctanh}\left(\frac{\sqrt{2}\cos(bx+a)\sqrt{4}(-1+\cos(bx+a))}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\sqrt{2}+4\cos(bx+a)^3+2\cos(bx+a)\Bigg)$$

$$\left.\left(\frac{c\sin(bx+a)^2}{2\cos(bx+a)^2-1}\right)^{3/2}\right)$$

Problem 167: Result more than twice size of optimal antiderivative.

$$\int\frac{\sec(2bx+2a)^4}{\sqrt{c\tan(bx+a)\tan(2bx+2a)}}\,dx$$

Optimal(type 3, 154 leaves, 6 steps):

$$-\frac{\operatorname{arctanh}\left(\frac{\sqrt{c}\tan(2bx+2a)\sqrt{2}}{2\sqrt{-c+c\sec(2bx+2a)}}\right)\sqrt{2}}{2b\sqrt{c}}+\frac{14\tan(2bx+2a)}{15b\sqrt{-c+c\sec(2bx+2a)}}+\frac{\sec(2bx+2a)^2\tan(2bx+2a)}{5b\sqrt{-c+c\sec(2bx+2a)}}$$

$$+\frac{\sqrt{-c+c\sec(2bx+2a)}\tan(2bx+2a)}{15cb}$$

Result(type 3, 979 leaves):

$$\left(\sqrt{2}\sqrt{4}(-1+\cos(bx+a))\left(208\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^6+120\operatorname{arctanh}\left(\frac{\sqrt{4}\left(2\cos(bx+a)^2-3\cos(bx+a)+1\right)}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\cos(bx+a)^6\right.\right.$$

$$+120\ln\left(-\frac{2\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^2-2\cos(bx+a)^2-\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+\cos(bx+a)+1\right)}{\sin(bx+a)^2}\right)\cos(bx+a)^6$$

$$+208\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^5-200\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^4$$

$$-180\operatorname{arctanh}\left(\frac{\sqrt{4}\,(2\cos(bx+a)^2-3\cos(bx+a)+1)}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\cos(bx+a)^4-180\ln\Bigg($$

$$-\frac{2\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^2-2\cos(bx+a)^2-\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+\cos(bx+a)+1\right)}{\sin(bx+a)^2}\Bigg)\cos(bx+a)^4$$

$$-200\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^3+60\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^2$$

$$+90\operatorname{arctanh}\left(\frac{\sqrt{4}\,(2\cos(bx+a)^2-3\cos(bx+a)+1)}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\cos(bx+a)^2+90\ln\Bigg($$

$$-\frac{2\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^2-2\cos(bx+a)^2-\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+\cos(bx+a)+1\right)}{\sin(bx+a)^2}\Bigg)\cos(bx+a)^2+60\cos(bx$$

$$+a)\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}-15\operatorname{arctanh}\left(\frac{\sqrt{4}\,(2\cos(bx+a)^2-3\cos(bx+a)+1)}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)-15\ln\Bigg($$

$$-\frac{2\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^2-2\cos(bx+a)^2-\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+\cos(bx+a)+1\right)}{\sin(bx+a)^2}\Bigg)\Bigg)\Bigg)\Bigg/\Bigg(120\,b\,\big(-3$$

$$+2\sqrt{2}\big)^3\left(3+2\sqrt{2}\right)^3(2\cos(bx+a)^2-1)^3\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\sqrt{\frac{c\sin(bx+a)^2}{2\cos(bx+a)^2-1}}\sin(bx+a)\Bigg)$$

Problem 168: Result more than twice size of optimal antiderivative.

$$\int \frac{\sec(2bx+2a)^3}{\sqrt{c\tan(bx+a)\tan(2bx+2a)}}\,dx$$

```
Optimal(type 3, 112 leaves, 5 steps):
```

$$-\frac{\operatorname{arctanh}\left(\frac{\sqrt{c}\tan(2bx+2a)\sqrt{2}}{2\sqrt{-c+c\sec(2bx+2a)}}\right)\sqrt{2}}{2b\sqrt{c}}+\frac{2\tan(2bx+2a)}{3b\sqrt{-c+c\sec(2bx+2a)}}+\frac{\sqrt{-c+c\sec(2bx+2a)}\tan(2bx+2a)}{3cb}$$

```
Result(type 3, 672 leaves):
```

$$-\left(\sqrt{2}\sqrt{4}(-1+\cos(bx+a))\left(8\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^4+12\operatorname{arctanh}\left(\frac{\sqrt{4}(2\cos(bx+a)^2-3\cos(bx+a)+1)}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\cos(bx+a)^4\right.\right.$$

$$+12\ln\left(-\frac{2\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^2-2\cos(bx+a)^2-\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+\cos(bx+a)+1\right)}{\sin(bx+a)^2}\right)\cos(bx+a)^4$$

$$+8\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^3-12\operatorname{arctanh}\left(\frac{\sqrt{4}(2\cos(bx+a)^2-3\cos(bx+a)+1)}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\cos(bx+a)^2-12\ln\left(\right.$$

$$\left.-\frac{2\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^2-2\cos(bx+a)^2-\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+\cos(bx+a)+1\right)}{\sin(bx+a)^2}\right)\cos(bx+a)^2$$

$$+3\operatorname{arctanh}\left(\frac{\sqrt{4}(2\cos(bx+a)^2-3\cos(bx+a)+1)}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)+3\ln\left(\right.$$

$$\left.\left.\left.-\frac{2\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^2-2\cos(bx+a)^2-\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+\cos(bx+a)+1\right)}{\sin(bx+a)^2}\right)\right)\right)\Bigg/\left(24b(-3\right.$$

$$+2\sqrt{2}\Big)^2 \left(3+2\sqrt{2}\right)^2 \left(2\cos(bx+a)^2-1\right)^2 \sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\sqrt{\frac{c\sin(bx+a)^2}{2\cos(bx+a)^2-1}}\sin(bx+a)\Bigg)$$

Problem 169: Result more than twice size of optimal antiderivative.

$$\int \frac{\sec(2bx+2a)^2}{\sqrt{c\tan(bx+a)\tan(2bx+2a)}}\,dx$$

Optimal(type 3, 77 leaves, 4 steps):

$$-\frac{\operatorname{arctanh}\left(\frac{\sqrt{c}\tan(2bx+2a)\sqrt{2}}{2\sqrt{-c+c\sec(2bx+2a)}}\right)\sqrt{2}}{2b\sqrt{c}}+\frac{\tan(2bx+2a)}{b\sqrt{-c+c\sec(2bx+2a)}}$$

Result(type 3, 477 leaves):

$$\frac{1}{4b\sqrt{\frac{c\sin(bx+a)^2}{2\cos(bx+a)^2-1}}\left(2\cos(bx+a)^2-1\right)}\Bigg(\sqrt{2}\Bigg(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\operatorname{arctanh}\left(\frac{\sqrt{4}\left(2\cos(bx+a)^2-3\cos(bx+a)+1\right)}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\cos(bx+a)$$

$$+\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\ln\Bigg($$

$$-\frac{2\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^2-2\cos(bx+a)^2-\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+\cos(bx+a)+1\right)}{\sin(bx+a)^2}\Bigg)\cos(bx+a)$$

$$+\operatorname{arctanh}\left(\frac{\sqrt{4}\left(2\cos(bx+a)^2-3\cos(bx+a)+1\right)}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+\ln\Bigg($$

$$-\frac{2\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^2-2\cos(bx+a)^2-\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+\cos(bx+a)+1\right)}{\sin(bx+a)^2}\Bigg)\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+4\cos(bx$$

$$+ a)\Big) \sin(b x + a)\Big)$$

Problem 170: Result more than twice size of optimal antiderivative.

$$\int \frac{\sec(2 b x + 2 a)}{\sqrt{c \tan(b x + a) \tan(2 b x + 2 a)}}\, dx$$

Optimal(type 3, 46 leaves, 3 steps):

$$-\frac{\operatorname{arctanh}\left(\frac{\sqrt{c}\, \tan(2 b x + 2 a) \sqrt{2}}{2 \sqrt{-c + c \sec(2 b x + 2 a)}}\right) \sqrt{2}}{2 b \sqrt{c}}$$

Result(type 3, 235 leaves):

$$\frac{1}{8 b \sin(b x + a)\, c} \Bigg(\sqrt{2} \sqrt{4}\, (\cos(b x + a)$$

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

$$-\frac{2 \left(\sqrt{\frac{2 \cos(b x + a)^2 - 1}{(\cos(b x + a) + 1)^2}} \cos(b x + a)^2 - 2 \cos(b x + a)^2 - \sqrt{\frac{2 \cos(b x + a)^2 - 1}{(\cos(b x + a) + 1)^2}} + \cos(b x + a) + 1\right)}{\sin(b x + a)^2}\Bigg)\Bigg)\Bigg)$$

Problem 171: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 117 leaves, 7 steps):

$$-\frac{\operatorname{arctanh}\left(\frac{\sqrt{c}\, \tan(2 b x + 2 a)}{\sqrt{-c + c \sec(2 b x + 2 a)}}\right)}{b c^{3/2}} + \frac{5 \operatorname{arctanh}\left(\frac{\sqrt{c}\, \tan(2 b x + 2 a) \sqrt{2}}{2 \sqrt{-c + c \sec(2 b x + 2 a)}}\right) \sqrt{2}}{8 b c^{3/2}} - \frac{\tan(2 b x + 2 a)}{4 b\, (-c + c \sec(2 b x + 2 a))^{3/2}}$$

Result(type 3, 560 leaves):

$$
-\frac{1}{32\,b\left(\frac{c\sin(bx+a)^2}{2\cos(bx+a)^2-1}\right)^{3/2}\sin(bx+a)^3\left(\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}\right)^{3/2}}\Bigg(\sqrt{2}\,\sqrt{4}\,(-1+\cos(bx+a))^2\Bigg(8\sqrt{2}\,\cos(bx
$$

$$
+a)\,\mathrm{arctanh}\left(\frac{\sqrt{2}\,\cos(bx+a)\,\sqrt{4}\,(-1+\cos(bx+a))}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)+2\cos(bx+a)\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}
$$

$$
-5\,\mathrm{arctanh}\left(\frac{\sqrt{4}\,\left(2\cos(bx+a)^2-3\cos(bx+a)+1\right)}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\cos(bx+a)-5\ln\Bigg(
$$

$$
-\frac{2\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^2-2\cos(bx+a)^2-\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+\cos(bx+a)+1\right)}{\sin(bx+a)^2}\Bigg)\cos(bx+a)
$$

$$
-8\,\mathrm{arctanh}\left(\frac{\sqrt{2}\,\cos(bx+a)\,\sqrt{4}\,(-1+\cos(bx+a))}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)\sqrt{2}+5\,\mathrm{arctanh}\left(\frac{\sqrt{4}\,\left(2\cos(bx+a)^2-3\cos(bx+a)+1\right)}{2\sin(bx+a)^2\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}}\right)+5\ln\Bigg(
$$

$$
-\frac{2\left(\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}\cos(bx+a)^2-2\cos(bx+a)^2-\sqrt{\frac{2\cos(bx+a)^2-1}{(\cos(bx+a)+1)^2}}+\cos(bx+a)+1\right)}{\sin(bx+a)^2}\Bigg)\Bigg)\Bigg)
$$

Problem 196: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal(type 3, 8 leaves, 2 steps):

$$
\arcsin\left(\frac{\tan(x)\sqrt{3}}{3}\right)
$$

Result(type 4, 102 leaves):

$$-\frac{\sqrt{3}\,\sqrt{2}\,\sqrt{\frac{2\cos(x)-1}{1+\cos(x)}}\,\sqrt{6}\,\sqrt{\frac{2\cos(x)+1}{1+\cos(x)}}\left(\mathrm{EllipticF}\left(\frac{\sqrt{3}\,(\cos(x)-1)}{\sin(x)},\frac{1}{3}\right)-2\,\mathrm{EllipticPi}\left(\frac{\sqrt{3}\,(\cos(x)-1)}{\sin(x)},\frac{1}{3},\frac{1}{3}\right)\right)\sin(x)^2}{9\sqrt{\frac{4\cos(x)^2-1}{\cos(x)^2}}\,\cos(x)\,(\cos(x)-1)}$$

Problem 199: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+b\cot(x))^3\csc(x)^2}{c+d\cot(x)}\,dx$$

Optimal(type 3, 74 leaves, 3 steps):

$$-\frac{b\,(-a\,d+c\,b)^2\cot(x)}{d^3}+\frac{(-a\,d+c\,b)\,(a+b\cot(x))^2}{2\,d^2}-\frac{(a+b\cot(x))^3}{3\,d}+\frac{(-a\,d+c\,b)^3\ln(c+d\cot(x))}{d^4}$$

Result(type 3, 201 leaves):

$$-\frac{\ln(\tan(x)\,c+d)\,a^3}{d}+\frac{3\ln(\tan(x)\,c+d)\,a^2\,b\,c}{d^2}-\frac{3\ln(\tan(x)\,c+d)\,a\,b^2\,c^2}{d^3}+\frac{\ln(\tan(x)\,c+d)\,b^3\,c^3}{d^4}-\frac{b^3}{3\,d\tan(x)^3}+\frac{\ln(\tan(x))\,a^3}{d}$$
$$-\frac{3\ln(\tan(x))\,a^2\,b\,c}{d^2}+\frac{3\ln(\tan(x))\,a\,b^2\,c^2}{d^3}-\frac{\ln(\tan(x))\,b^3\,c^3}{d^4}-\frac{3\,b\,a^2}{d\tan(x)}+\frac{3\,b^2\,a\,c}{d^2\tan(x)}-\frac{b^3\,c^2}{d^3\tan(x)}-\frac{3\,b^2\,a}{2\,d\tan(x)^2}+\frac{b^3\,c}{2\,d^2\tan(x)^2}$$

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

$$\int e^{n\sin(b\,x+a)}\sin(2\,b\,x+2\,a)\,dx$$

Optimal(type 3, 41 leaves, 4 steps):

$$-\frac{2\,e^{n\sin(b\,x+a)}}{b\,n^2}+\frac{2\,e^{n\sin(b\,x+a)}\sin(b\,x+a)}{b\,n}$$

Result(type 3, 103 leaves):

$$-\frac{I\,e^{n\sin(b\,x)\cos(a)+n\cos(b\,x)\sin(a)}\,e^{I\,b\,x}\,e^{I\,a}}{b\,n}+\frac{I\,e^{n\sin(b\,x)\cos(a)+n\cos(b\,x)\sin(a)}\,e^{-I\,b\,x}\,e^{-I\,a}}{b\,n}-\frac{2\,e^{n\,(\sin(b\,x)\cos(a)+\cos(b\,x)\sin(a))}}{b\,n^2}$$

Problem 231: Result more than twice size of optimal antiderivative.

$$\int \cot(x)^3\csc(x)\sqrt{1+\csc(x)}\,dx$$

Optimal(type 3, 17 leaves, 6 steps):

$$\frac{4\,(1+\csc(x))^{5/2}}{5}-\frac{2\,(1+\csc(x))^{7/2}}{7}$$

Result(type 3, 37 leaves):

$$-\frac{2\sqrt{\frac{1+\sin(x)}{\sin(x)}}\,\left(9\cos(x)^2\sin(x)+13\cos(x)^2-8\sin(x)-8\right)}{35\sin(x)^3}$$

```
Problem 232: Unable to integrate problem.
```

$$\int\sqrt{\csc(x)}\,\left(\cos(x)\,x-4\sec(x)\tan(x)\right)\,dx$$

```
Optimal(type 3, 16 leaves, 8 steps):
```

$$-\frac{4\sec(x)}{\csc(x)^{3/2}}+\frac{2x}{\sqrt{\csc(x)}}$$

```
Result(type 8, 18 leaves):
```

$$\int\sqrt{\csc(x)}\,\left(\cos(x)\,x-4\sec(x)\tan(x)\right)\,dx$$

```
Problem 234: Unable to integrate problem.
```

$$\int x^3\csc(x)\sec(x)\sqrt{a\sec(x)^2}\,dx$$

```
Optimal(type 4, 280 leaves, 21 steps):
```

$$x^3\sqrt{a\sec(x)^2}+6\,\mathrm{I}\,x^2\arctan\left(e^{\mathrm{I}x}\right)\cos(x)\sqrt{a\sec(x)^2}-2x^3\operatorname{arctanh}\left(e^{\mathrm{I}x}\right)\cos(x)\sqrt{a\sec(x)^2}+3\,\mathrm{I}\,x^2\cos(x)\operatorname{polylog}\left(2,-e^{\mathrm{I}x}\right)\sqrt{a\sec(x)^2}$$
$$-6\,\mathrm{I}\,x\cos(x)\operatorname{polylog}\left(2,-\mathrm{I}\,e^{\mathrm{I}x}\right)\sqrt{a\sec(x)^2}+6\,\mathrm{I}\,x\cos(x)\operatorname{polylog}\left(2,\mathrm{I}\,e^{\mathrm{I}x}\right)\sqrt{a\sec(x)^2}-3\,\mathrm{I}\,x^2\cos(x)\operatorname{polylog}\left(2,e^{\mathrm{I}x}\right)\sqrt{a\sec(x)^2}-6x\cos(x)\operatorname{polylog}\left(3,\right.$$
$$\left.-e^{\mathrm{I}x}\right)\sqrt{a\sec(x)^2}+6\cos(x)\operatorname{polylog}\left(3,-\mathrm{I}\,e^{\mathrm{I}x}\right)\sqrt{a\sec(x)^2}-6\cos(x)\operatorname{polylog}\left(3,\mathrm{I}\,e^{\mathrm{I}x}\right)\sqrt{a\sec(x)^2}+6x\cos(x)\operatorname{polylog}\left(3,e^{\mathrm{I}x}\right)\sqrt{a\sec(x)^2}$$
$$-6\,\mathrm{I}\cos(x)\operatorname{polylog}\left(4,-e^{\mathrm{I}x}\right)\sqrt{a\sec(x)^2}+6\,\mathrm{I}\cos(x)\operatorname{polylog}\left(4,e^{\mathrm{I}x}\right)\sqrt{a\sec(x)^2}$$

```
Result(type 8, 126 leaves):
```

$$2x^3\sqrt{\frac{a\left(e^{\mathrm{I}x}\right)^2}{\left(\left(e^{\mathrm{I}x}\right)^2+1\right)^2}}+\frac{8\,\mathrm{I}\left(\int\frac{x^2 e^{\mathrm{I}x}\left(3\,\mathrm{I}\left(e^{\mathrm{I}x}\right)^2+x\left(e^{\mathrm{I}x}\right)^2-3\,\mathrm{I}+x\right)}{4\left(\left(e^{\mathrm{I}x}\right)^2-1\right)\left(\left(e^{\mathrm{I}x}\right)^2+1\right)}\,dx\right)\sqrt{\frac{a\left(e^{\mathrm{I}x}\right)^2}{\left(\left(e^{\mathrm{I}x}\right)^2+1\right)^2}}\left(\left(e^{\mathrm{I}x}\right)^2+1\right)}{e^{\mathrm{I}x}}$$

```
Problem 244: Result more than twice size of optimal antiderivative.
```

$$\int f^{bx+a}\left(\cos(dx+c)+\mathrm{I}\sin(dx+c)\right)^n\,dx$$

```
Optimal(type 3, 31 leaves, 4 steps):
```

$$\frac{\left(e^{\mathrm{I}(dx+c)}\right)^n f^{bx+a}}{\mathrm{I}\,d\,n+b\ln(f)}$$

```
Result(type 3, 85 leaves):
```

$$\frac{e^{(bx+a)\ln(f)}\, e^{n \ln\left(\frac{2\,I\tan\left(\frac{dx}{2}+\frac{c}{2}\right)}{1+\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2}+\frac{1-\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2}{1+\tan\left(\frac{dx}{2}+\frac{c}{2}\right)^2}\right)}}{I\,d\,n+b\ln(f)}$$

Test results for the 3 problems in "dog.txt"

Problem 1: Unable to integrate problem.

$$\int F^{c(bx+a)}\,(f+f\sin(ex+d))^n\,dx$$

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

$$-\frac{F^{c(bx+a)}\,\mathrm{hypergeom}\left(\left[-2n,\,-n-\frac{I\,b\,c\ln(F)}{e}\right],\left[1-n-\frac{I\,b\,c\ln(F)}{e}\right],I\,e^{I(ex+d)}\right)(f+f\sin(ex+d))^n}{\left(1+e^{\frac{I}{2}(2ex-\pi+2d)}\right)^{2n}(I\,e\,n-b\,c\ln(F))}$$

Result(type 8, 24 leaves):

$$\int F^{c(bx+a)}\,(f+f\sin(ex+d))^n\,dx$$

Problem 2: Unable to integrate problem.

$$\int F^{c(bx+a)}\,(f+f\cos(ex+d))^n\,dx$$

Optimal(type 5, 100 leaves, 3 steps):

$$-\frac{F^{c(bx+a)}\,(f+f\cos(ex+d))^n\,\mathrm{hypergeom}\left(\left[-2n,\,-n-\frac{I\,b\,c\ln(F)}{e}\right],\left[1-n-\frac{I\,b\,c\ln(F)}{e}\right],-e^{I(ex+d)}\right)}{\left(e^{I(ex+d)}+1\right)^{2n}(I\,e\,n-b\,c\ln(F))}$$

Result(type 8, 24 leaves):

$$\int F^{c(bx+a)}\,(f+f\cos(ex+d))^n\,dx$$

Problem 3: Unable to integrate problem.

$$\int F^{c(bx+a)}\,(f+f\cosh(ex+d))^n\,dx$$

Optimal(type 5, 88 leaves, 3 steps):

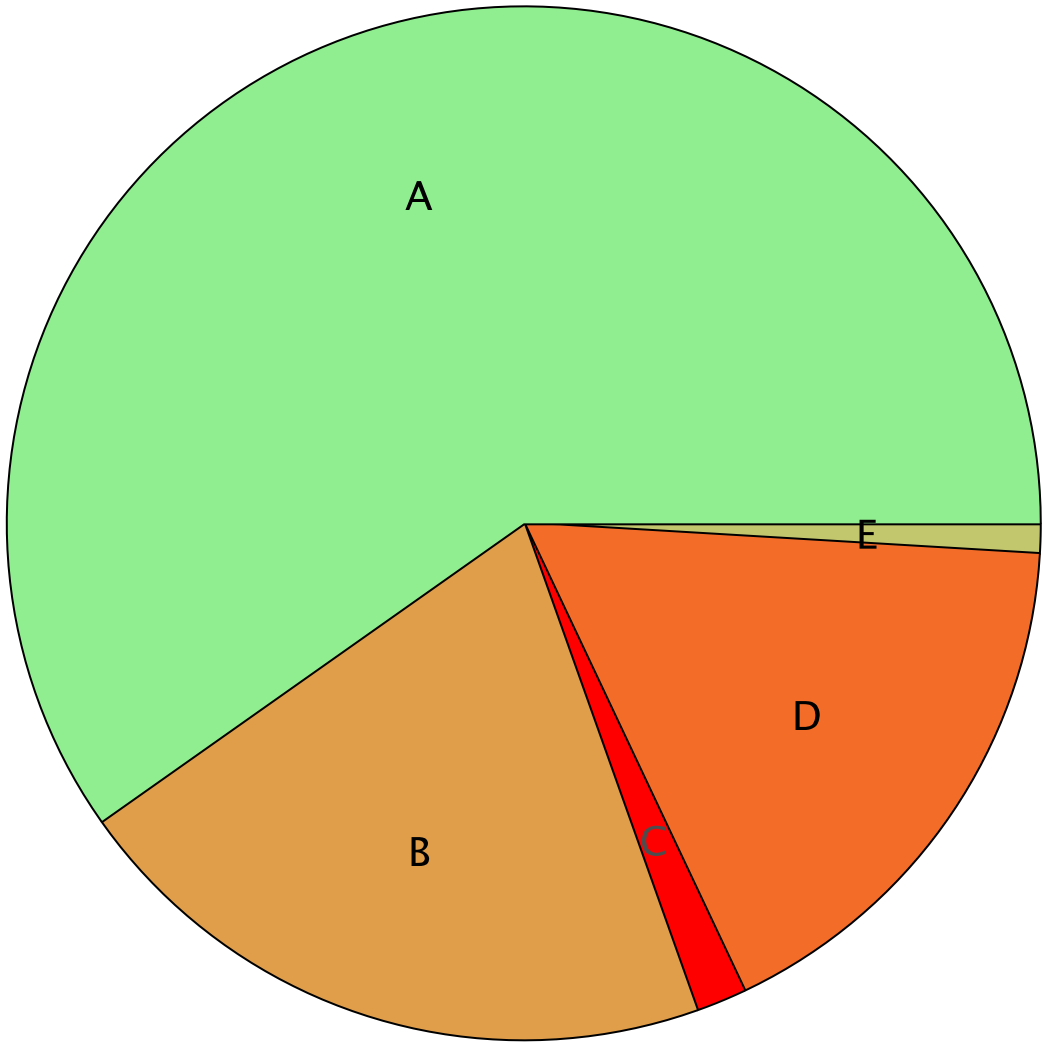
$$-\frac{F^{c(bx+a)}\,(f+f\cosh(ex+d))^n\,\mathrm{hypergeom}\left(\left[-2n,\,-n+\frac{b\,c\ln(F)}{e}\right],\left[1-n+\frac{b\,c\ln(F)}{e}\right],-e^{ex+d}\right)}{\left(1+e^{ex+d}\right)^{2n}(e\,n-b\,c\ln(F))}$$

Result(type 8, 24 leaves):

$$\int F^{c\,(b\,x+a)}\,(f+f\cosh(e\,x+d))^{n}\,\mathrm{d}x$$

Summary of Integration Test Results

634 integration problems



A - 379 optimal antiderivatives
B - 131 more than twice size of optimal antiderivatives
C - 10 unnecessarily complex antiderivatives
D - 108 unable to integrate problems
E - 6 integration timeouts