Maple 2018.2 Integration Test Results
on the problems in "6 Hyperbolic functions/6.6 Hyperbolic cosecant"

Test results for the 11 problems in "6.6.1 (c+d x)^m (a+b csch)^n.txt"

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

$$\int (d x + c)^3 \operatorname{csch}(b x + a)\, dx$$

Optimal(type 4, 142 leaves, 9 steps):

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

Result(type 4, 540 leaves):

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

Problem 4: Result more than twice size of optimal antiderivative.

$$\int (d x + c)^2 \operatorname{csch}(b x + a)^3\, dx$$

Optimal(type 4, 147 leaves, 9 steps):

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

Result(type 4, 443 leaves):

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

Problem 5: Unable to integrate problem.

$$\int\left(\frac{x}{\mathrm{csch}(x)^{7/2}}-\frac{5x\sqrt{\mathrm{csch}(x)}}{21}\right)dx$$

Optimal(type 3, 31 leaves, 5 steps):

$$-\frac{4}{49\,\mathrm{csch}(x)^{7/2}}+\frac{2x\cosh(x)}{7\,\mathrm{csch}(x)^{5/2}}+\frac{20}{63\,\mathrm{csch}(x)^{3/2}}-\frac{10x\cosh(x)}{21\sqrt{\mathrm{csch}(x)}}$$

Result(type 8, 16 leaves):

$$\int\left(\frac{x}{\mathrm{csch}(x)^{7/2}}-\frac{5x\sqrt{\mathrm{csch}(x)}}{21}\right)dx$$

Problem 6: Unable to integrate problem.

$$\int\left(\frac{x^2}{\mathrm{csch}(x)^{3/2}}+\frac{x^2\sqrt{\mathrm{csch}(x)}}{3}\right)dx$$

Optimal(type 4, 78 leaves, 7 steps):

$$-\frac{8x}{9\,\mathrm{csch}(x)^{3/2}}+\frac{16\cosh(x)}{27\sqrt{\mathrm{csch}(x)}}+\frac{2x^2\cosh(x)}{3\sqrt{\mathrm{csch}(x)}}-\frac{16\,\mathrm{I}\sqrt{\sin\left(\frac{\pi}{4}+\frac{\mathrm{I}x}{2}\right)^2}\,\mathrm{EllipticF}\left(\cos\left(\frac{\pi}{4}+\frac{\mathrm{I}x}{2}\right),\sqrt{2}\right)\sqrt{\mathrm{csch}(x)}\sqrt{\mathrm{I}\sinh(x)}}{27\sin\left(\frac{\pi}{4}+\frac{\mathrm{I}x}{2}\right)}$$

Result(type 8, 20 leaves):

$$\int\left(\frac{x^2}{\mathrm{csch}(x)^{3/2}}+\frac{x^2\sqrt{\mathrm{csch}(x)}}{3}\right)dx$$

Problem 7: Unable to integrate problem.

$$\int\frac{(fx+e)^3\cosh(dx+c)}{a+b\,\mathrm{csch}(dx+c)}\,dx$$

Optimal(type 4, 422 leaves, 17 steps):

$$\frac{b\,(fx+e)^4}{4a^2 f}-\frac{6f^3\cosh(dx+c)}{a\,d^4}-\frac{3f(fx+e)^2\cosh(dx+c)}{a\,d^2}-\frac{b\,(fx+e)^3\ln\left(1+\frac{a\,e^{dx+c}}{b-\sqrt{a^2+b^2}}\right)}{a^2 d}-\frac{b\,(fx+e)^3\ln\left(1+\frac{a\,e^{dx+c}}{b+\sqrt{a^2+b^2}}\right)}{a^2 d}$$
$$-\frac{3bf(fx+e)^2\operatorname{polylog}\left(2,-\frac{a\,e^{dx+c}}{b-\sqrt{a^2+b^2}}\right)}{a^2d^2}-\frac{3bf(fx+e)^2\operatorname{polylog}\left(2,-\frac{a\,e^{dx+c}}{b+\sqrt{a^2+b^2}}\right)}{a^2d^2}+\frac{6bf^2\,(fx+e)\operatorname{polylog}\left(3,-\frac{a\,e^{dx+c}}{b-\sqrt{a^2+b^2}}\right)}{a^2d^3}$$
$$+\frac{6bf^2\,(fx+e)\operatorname{polylog}\left(3,-\frac{a\,e^{dx+c}}{b+\sqrt{a^2+b^2}}\right)}{a^2d^3}-\frac{6bf^3\operatorname{polylog}\left(4,-\frac{a\,e^{dx+c}}{b-\sqrt{a^2+b^2}}\right)}{a^2d^4}-\frac{6bf^3\operatorname{polylog}\left(4,-\frac{a\,e^{dx+c}}{b+\sqrt{a^2+b^2}}\right)}{a^2d^4}$$
$$+\frac{6f^2\,(fx+e)\sinh(dx+c)}{a\,d^3}+\frac{(fx+e)^3\sinh(dx+c)}{a\,d}$$

Result(type 8, 368 leaves):

$$-\frac{b\left(\frac{1}{4}f^3x^4+ef^2x^3+\frac{3}{2}e^2fx^2+e^3x\right)}{a^2}+\frac{(f^3x^3d^3+3d^3ef^2x^2+3d^3e^2fx-3d^2f^3x^2+d^3e^3-6d^2ef^2x-3e^2fd^2+6df^3x+6ef^2d-6f^3)\,e^{dx+c}}{2a\,d^4}$$
$$-\frac{f^3x^3d^3+3d^3ef^2x^2+3d^3e^2fx+3d^2f^3x^2+d^3e^3+6d^2ef^2x+3e^2fd^2+6df^3x+6ef^2d+6f^3}{2a\,d^4\,e^{dx+c}}+\int$$
$$-\frac{2b\,(-bf^3x^3e^{dx+c}+af^3x^3-3bef^2x^2e^{dx+c}+3aef^2x^2-3be^2fx\,e^{dx+c}+3ae^2fx-be^3e^{dx+c}+ae^3)}{\left(a\,(e^{dx+c})^2+2b\,e^{dx+c}-a\right)a^2}\,dx$$

Problem 8: Unable to integrate problem.

$$\int\frac{(fx+e)^2\cosh(dx+c)}{a+b\operatorname{csch}(dx+c)}\,dx$$

Optimal(type 4, 310 leaves, 14 steps):

$$\frac{b\,(fx+e)^3}{3a^2f}-\frac{2f(fx+e)\cosh(dx+c)}{a\,d^2}-\frac{b\,(fx+e)^2\ln\left(1+\frac{a\,e^{dx+c}}{b-\sqrt{a^2+b^2}}\right)}{a^2d}-\frac{b\,(fx+e)^2\ln\left(1+\frac{a\,e^{dx+c}}{b+\sqrt{a^2+b^2}}\right)}{a^2d}$$
$$-\frac{2bf(fx+e)\operatorname{polylog}\left(2,-\frac{a\,e^{dx+c}}{b-\sqrt{a^2+b^2}}\right)}{a^2d^2}-\frac{2bf(fx+e)\operatorname{polylog}\left(2,-\frac{a\,e^{dx+c}}{b+\sqrt{a^2+b^2}}\right)}{a^2d^2}+\frac{2bf^2\operatorname{polylog}\left(3,-\frac{a\,e^{dx+c}}{b-\sqrt{a^2+b^2}}\right)}{a^2d^3}$$
$$+\frac{2bf^2\operatorname{polylog}\left(3,-\frac{a\,e^{dx+c}}{b+\sqrt{a^2+b^2}}\right)}{a^2d^3}+\frac{2f^2\sinh(dx+c)}{a\,d^3}+\frac{(fx+e)^2\sinh(dx+c)}{a\,d}$$

Result(type 8, 235 leaves):

$$-\frac{b\left(\frac{1}{3}f^2x^3+fex^2+e^2x\right)}{a^2}+\frac{\left(f^2x^2d^2+2d^2efx+d^2e^2-2df^2x-2efd+2f^2\right)e^{dx+c}}{2ad^3}-\frac{f^2x^2d^2+2d^2efx+d^2e^2+2df^2x+2efd+2f^2}{2ad^3e^{dx+c}}+\int -\frac{2b\left(-bf^2x^2e^{dx+c}+af^2x^2-2befxe^{dx+c}+2aefx-be^2e^{dx+c}+ae^2\right)}{\left(a\left(e^{dx+c}\right)^2+2be^{dx+c}-a\right)a^2}\,dx$$

Problem 9: Result more than twice size of optimal antiderivative.

$$\int\frac{(fx+e)\cosh(dx+c)}{a+b\,\mathrm{csch}(dx+c)}\,dx$$

Optimal(type 4, 198 leaves, 11 steps):

$$\frac{b(fx+e)^2}{2a^2f}-\frac{f\cosh(dx+c)}{ad^2}-\frac{b(fx+e)\ln\left(1+\frac{ae^{dx+c}}{b-\sqrt{a^2+b^2}}\right)}{a^2d}-\frac{b(fx+e)\ln\left(1+\frac{ae^{dx+c}}{b+\sqrt{a^2+b^2}}\right)}{a^2d}-\frac{bf\,\mathrm{polylog}\left(2,-\frac{ae^{dx+c}}{b-\sqrt{a^2+b^2}}\right)}{a^2d^2}-\frac{bf\,\mathrm{polylog}\left(2,-\frac{ae^{dx+c}}{b+\sqrt{a^2+b^2}}\right)}{a^2d^2}+\frac{(fx+e)\sinh(dx+c)}{ad}$$

Result(type 4, 482 leaves):

$$\frac{bfx^2}{2a^2}-\frac{bex}{a^2}+\frac{(fxd+ed-f)e^{dx+c}}{2d^2a}-\frac{(fxd+ed+f)e^{-dx-c}}{2d^2a}-\frac{be\ln\left(ae^{2dx+2c}+2be^{dx+c}-a\right)}{a^2d}+\frac{2be\ln\left(e^{dx+c}\right)}{a^2d}-\frac{bf\ln\left(\frac{-ae^{dx+c}+\sqrt{a^2+b^2}-b}{-b+\sqrt{a^2+b^2}}\right)x}{a^2d}-\frac{bf\ln\left(\frac{-ae^{dx+c}+\sqrt{a^2+b^2}-b}{-b+\sqrt{a^2+b^2}}\right)c}{a^2d^2}-\frac{bf\ln\left(\frac{ae^{dx+c}+\sqrt{a^2+b^2}+b}{b+\sqrt{a^2+b^2}}\right)x}{a^2d}-\frac{bf\ln\left(\frac{ae^{dx+c}+\sqrt{a^2+b^2}+b}{b+\sqrt{a^2+b^2}}\right)c}{a^2d^2}-\frac{bf\,\mathrm{dilog}\left(\frac{ae^{dx+c}+\sqrt{a^2+b^2}+b}{b+\sqrt{a^2+b^2}}\right)}{a^2d^2}-\frac{bf\,\mathrm{dilog}\left(\frac{-ae^{dx+c}+\sqrt{a^2+b^2}-b}{-b+\sqrt{a^2+b^2}}\right)}{a^2d^2}+\frac{2bfcx}{a^2d}+\frac{bfc^2}{a^2d^2}+\frac{bfc\ln\left(ae^{2dx+2c}+2be^{dx+c}-a\right)}{a^2d^2}-\frac{2bfc\ln\left(e^{dx+c}\right)}{a^2d^2}$$

Problem 10: Unable to integrate problem.

$$\int\frac{(fx+e)^2\cosh(dx+c)^2}{a+b\,\mathrm{csch}(dx+c)}\,dx$$

Optimal(type 4, 468 leaves, 21 steps):

$$\frac{f^2 x}{4 a d^2} + \frac{(fx+e)^3}{6 a f} + \frac{b^2 (fx+e)^3}{3 a^3 f} - \frac{2 b f^2 \cosh(dx+c)}{a^2 d^3} - \frac{b (fx+e)^2 \cosh(dx+c)}{a^2 d} - \frac{f(fx+e)\cosh(dx+c)^2}{2 a d^2} + \frac{2 b f (fx+e)\sinh(dx+c)}{a^2 d^2}$$
$$+ \frac{f^2 \cosh(dx+c)\sinh(dx+c)}{4 a d^3} + \frac{(fx+e)^2\cosh(dx+c)\sinh(dx+c)}{2 a d} - \frac{b (fx+e)^2 \ln\left(1 + \frac{a e^{dx+c}}{b - \sqrt{a^2+b^2}}\right)\sqrt{a^2+b^2}}{a^3 d}$$
$$+ \frac{b (fx+e)^2 \ln\left(1 + \frac{a e^{dx+c}}{b + \sqrt{a^2+b^2}}\right)\sqrt{a^2+b^2}}{a^3 d} - \frac{2 b f (fx+e)\,\mathrm{polylog}\left(2, -\frac{a e^{dx+c}}{b - \sqrt{a^2+b^2}}\right)\sqrt{a^2+b^2}}{a^3 d^2}$$
$$+ \frac{2 b f (fx+e)\,\mathrm{polylog}\left(2, -\frac{a e^{dx+c}}{b + \sqrt{a^2+b^2}}\right)\sqrt{a^2+b^2}}{a^3 d^2} + \frac{2 b f^2\,\mathrm{polylog}\left(3, -\frac{a e^{dx+c}}{b - \sqrt{a^2+b^2}}\right)\sqrt{a^2+b^2}}{a^3 d^3}$$
$$- \frac{2 b f^2\,\mathrm{polylog}\left(3, -\frac{a e^{dx+c}}{b + \sqrt{a^2+b^2}}\right)\sqrt{a^2+b^2}}{a^3 d^3}$$

Result(type 8, 391 leaves):

$$\frac{\frac{1}{3} a^2 f^2 x^3 + \frac{2}{3} b^2 f^2 x^3 + a^2 e f x^2 + 2 b^2 e f x^2 + a^2 e^2 x + 2 b^2 e^2 x}{2 a^3} + \frac{\left(2 f^2 x^2 d^2 + 4 d^2 e f x + 2 d^2 e^2 - 2 d f^2 x - 2 e f d + f^2\right)\left(e^{dx+c}\right)^2}{16 d^3 a}$$
$$- \frac{b\left(f^2 x^2 d^2 + 2 d^2 e f x + d^2 e^2 - 2 d f^2 x - 2 e f d + 2 f^2\right) e^{dx+c}}{2 a^2 d^3} - \frac{b\left(f^2 x^2 d^2 + 2 d^2 e f x + d^2 e^2 + 2 d f^2 x + 2 e f d + 2 f^2\right)}{2 a^2 d^3 e^{dx+c}}$$
$$- \frac{2 f^2 x^2 d^2 + 4 d^2 e f x + 2 d^2 e^2 + 2 d f^2 x + 2 e f d + f^2}{16 d^3 a \left(e^{dx+c}\right)^2} + \int -\frac{2 b\left(a^2 f^2 x^2 + b^2 f^2 x^2 + 2 a^2 e f x + 2 b^2 e f x + a^2 e^2 + b^2 e^2\right) e^{dx+c}}{\left(a\left(e^{dx+c}\right)^2 + 2 b e^{dx+c} - a\right) a^3}\, dx$$

Problem 11: Result more than twice size of optimal antiderivative.

$$\int \frac{\cosh(dx+c)^3}{a + b\,\mathrm{csch}(dx+c)}\, dx$$

Optimal(type 3, 81 leaves, 5 steps):

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

Result(type 3, 427 leaves):

$$-\frac{1}{3 d a\left(\tanh\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)^3} - \frac{b}{2 d a^2\left(\tanh\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)^2} - \frac{1}{2 d a\left(\tanh\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)^2} - \frac{1}{d a\left(\tanh\left(\frac{dx}{2}+\frac{c}{2}\right)-1\right)}$$

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

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

$$+\frac{1}{2 d a \left(\tanh\left(\frac{d x}{2}+\frac{c}{2}\right)+1\right)^2}-\frac{b}{2 d a^2 \left(\tanh\left(\frac{d x}{2}+\frac{c}{2}\right)+1\right)^2}-\frac{1}{d a \left(\tanh\left(\frac{d x}{2}+\frac{c}{2}\right)+1\right)}+\frac{b}{2 d a^2 \left(\tanh\left(\frac{d x}{2}+\frac{c}{2}\right)+1\right)}$$

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

Test results for the 25 problems in "6.6.2 (e x)^m (a+b csch(c+d x^n))^p.txt"

Problem 1: Unable to integrate problem.

$$\int x^5 \left(a+b \operatorname{csch}\left(d x^2+c\right)\right) dx$$

Optimal(type 4, 97 leaves, 10 steps):

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

Result(type 8, 37 leaves):

$$\frac{a x^6}{6}+\int \frac{2 e^{d x^2+c} b x^5}{\left(e^{d x^2+c}\right)^2-1} dx$$

Problem 2: Unable to integrate problem.

$$\int x^3 \left(a+b \operatorname{csch}\left(d x^2+c\right)\right) dx$$

Optimal(type 4, 59 leaves, 8 steps):

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

Result(type 8, 37 leaves):

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

Problem 4: Unable to integrate problem.

$$\int x^3 \left(a + b \operatorname{csch}\left(d x^2 + c\right)\right)^2 dx$$

Optimal(type 4, 99 leaves, 10 steps):

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

Result(type 8, 74 leaves):

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

Problem 6: Unable to integrate problem.

$$\int \frac{x^5}{a + b \operatorname{csch}\left(d x^2 + c\right)} dx$$

Optimal(type 4, 289 leaves, 13 steps):

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

Result(type 8, 57 leaves):

$$\frac{x^6}{6 a} + \int -\frac{2 e^{d x^2 + c} b x^5}{a \left(a \left(e^{d x^2 + c}\right)^2 + 2 b e^{d x^2 + c} - a\right)} dx$$

Problem 8: Unable to integrate problem.

$$\int \frac{x^3}{a + b \operatorname{csch}\left(d x^2 + c\right)} dx$$

Optimal(type 4, 195 leaves, 11 steps):

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

Result(type 8, 57 leaves):

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

Problem 10: Unable to integrate problem.

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

Optimal(type 4, 840 leaves, 31 steps):

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

Result(type 8, 177 leaves):

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

Problem 14: Unable to integrate problem.

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

Optimal(type 4, 767 leaves, 23 steps):

$$\frac{x^4}{4a} - \frac{2 b x^{7/2} \ln\left(1 + \frac{a e^{c+d\sqrt{x}}}{b - \sqrt{a^2+b^2}}\right)}{a d \sqrt{a^2+b^2}} + \frac{2 b x^{7/2} \ln\left(1 + \frac{a e^{c+d\sqrt{x}}}{b + \sqrt{a^2+b^2}}\right)}{a d \sqrt{a^2+b^2}} - \frac{14 b x^3 \operatorname{polylog}\left(2, -\frac{a e^{c+d\sqrt{x}}}{b - \sqrt{a^2+b^2}}\right)}{a d^2 \sqrt{a^2+b^2}}$$

$$+ \frac{14 b x^3 \operatorname{polylog}\left(2, -\frac{a e^{c+d\sqrt{x}}}{b + \sqrt{a^2+b^2}}\right)}{a d^2 \sqrt{a^2+b^2}} + \frac{84 b x^{5/2} \operatorname{polylog}\left(3, -\frac{a e^{c+d\sqrt{x}}}{b - \sqrt{a^2+b^2}}\right)}{a d^3 \sqrt{a^2+b^2}} - \frac{84 b x^{5/2} \operatorname{polylog}\left(3, -\frac{a e^{c+d\sqrt{x}}}{b + \sqrt{a^2+b^2}}\right)}{a d^3 \sqrt{a^2+b^2}}$$

$$- \frac{420 b x^2 \operatorname{polylog}\left(4, -\frac{a e^{c+d\sqrt{x}}}{b - \sqrt{a^2+b^2}}\right)}{a d^4 \sqrt{a^2+b^2}} + \frac{420 b x^2 \operatorname{polylog}\left(4, -\frac{a e^{c+d\sqrt{x}}}{b + \sqrt{a^2+b^2}}\right)}{a d^4 \sqrt{a^2+b^2}} + \frac{1680 b x^{3/2} \operatorname{polylog}\left(5, -\frac{a e^{c+d\sqrt{x}}}{b - \sqrt{a^2+b^2}}\right)}{a d^5 \sqrt{a^2+b^2}}$$

$$- \frac{1680 b x^{3/2} \operatorname{polylog}\left(5, -\frac{a e^{c+d\sqrt{x}}}{b + \sqrt{a^2+b^2}}\right)}{a d^5 \sqrt{a^2+b^2}} - \frac{5040 b x \operatorname{polylog}\left(6, -\frac{a e^{c+d\sqrt{x}}}{b - \sqrt{a^2+b^2}}\right)}{a d^6 \sqrt{a^2+b^2}} + \frac{5040 b x \operatorname{polylog}\left(6, -\frac{a e^{c+d\sqrt{x}}}{b + \sqrt{a^2+b^2}}\right)}{a d^6 \sqrt{a^2+b^2}}$$

$$- \frac{10080 b \operatorname{polylog}\left(8, -\frac{a e^{c+d\sqrt{x}}}{b - \sqrt{a^2+b^2}}\right)}{a d^8 \sqrt{a^2+b^2}} + \frac{10080 b \operatorname{polylog}\left(8, -\frac{a e^{c+d\sqrt{x}}}{b + \sqrt{a^2+b^2}}\right)}{a d^8 \sqrt{a^2+b^2}} + \frac{10080 b \operatorname{polylog}\left(7, -\frac{a e^{c+d\sqrt{x}}}{b - \sqrt{a^2+b^2}}\right)\sqrt{x}}{a d^7 \sqrt{a^2+b^2}}$$

$$- \frac{10080 b \operatorname{polylog}\left(7, -\frac{a e^{c+d\sqrt{x}}}{b + \sqrt{a^2+b^2}}\right)\sqrt{x}}{a d^7 \sqrt{a^2+b^2}}$$

Result(type 8, 20 leaves):

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

Problem 16: Unable to integrate problem.

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

Optimal(type 4, 1723 leaves, 49 steps):

$$-\frac{240 b^2 \operatorname{polylog}\left(5, -\frac{a e^{c+d\sqrt{x}}}{b - \sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2) d^6} - \frac{240 b^2 \operatorname{polylog}\left(5, -\frac{a e^{c+d\sqrt{x}}}{b + \sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2) d^6} + \frac{240 b^3 \operatorname{polylog}\left(6, -\frac{a e^{c+d\sqrt{x}}}{b - \sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2)^{3/2} d^6}$$

$$- \frac{240 b^3 \operatorname{polylog}\left(6, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2)^{3/2} d^6} - \frac{480 b \operatorname{polylog}\left(6, -\frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 d^6 \sqrt{a^2+b^2}} + \frac{480 b \operatorname{polylog}\left(6, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 d^6 \sqrt{a^2+b^2}} - \frac{2 b^2 x^{5/2}}{a^2 (a^2+b^2) d} + \frac{x^3}{3 a^2}$$

$$+ \frac{40 b^2 x^{3/2} \operatorname{polylog}\left(2, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2) d^3} - \frac{10 b^3 x^2 \operatorname{polylog}\left(2, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2)^{3/2} d^2} - \frac{120 b^2 x \operatorname{polylog}\left(3, -\frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2) d^4}$$

$$- \frac{40 b^3 x^{3/2} \operatorname{polylog}\left(3, -\frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2)^{3/2} d^3} - \frac{120 b^2 x \operatorname{polylog}\left(3, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2) d^4} + \frac{40 b^3 x^{3/2} \operatorname{polylog}\left(3, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2)^{3/2} d^3}$$

$$+ \frac{120 b^3 x \operatorname{polylog}\left(4, -\frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2)^{3/2} d^4} - \frac{120 b^3 x \operatorname{polylog}\left(4, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2)^{3/2} d^4} - \frac{4 b x^{5/2} \ln\left(1 + \frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 d \sqrt{a^2+b^2}}$$

$$+ \frac{4 b x^{5/2} \ln\left(1 + \frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 d \sqrt{a^2+b^2}} - \frac{20 b x^2 \operatorname{polylog}\left(2, -\frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 d^2 \sqrt{a^2+b^2}} + \frac{20 b x^2 \operatorname{polylog}\left(2, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 d^2 \sqrt{a^2+b^2}}$$

$$+ \frac{80 b x^{3/2} \operatorname{polylog}\left(3, -\frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 d^3 \sqrt{a^2+b^2}} - \frac{80 b x^{3/2} \operatorname{polylog}\left(3, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 d^3 \sqrt{a^2+b^2}} - \frac{240 b x \operatorname{polylog}\left(4, -\frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 d^4 \sqrt{a^2+b^2}}$$

$$+ \frac{240 b x \operatorname{polylog}\left(4, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 d^4 \sqrt{a^2+b^2}} + \frac{240 b^2 \operatorname{polylog}\left(4, -\frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right) \sqrt{x}}{a^2 (a^2+b^2) d^5} + \frac{240 b^2 \operatorname{polylog}\left(4, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right) \sqrt{x}}{a^2 (a^2+b^2) d^5}$$

$$- \frac{240 b^3 \operatorname{polylog}\left(5, -\frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right) \sqrt{x}}{a^2 (a^2+b^2)^{3/2} d^5} + \frac{240 b^3 \operatorname{polylog}\left(5, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right) \sqrt{x}}{a^2 (a^2+b^2)^{3/2} d^5} + \frac{480 b \operatorname{polylog}\left(5, -\frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right) \sqrt{x}}{a^2 d^5 \sqrt{a^2+b^2}}$$

$$- \frac{480 b \operatorname{polylog}\left(5, -\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right) \sqrt{x}}{a^2 d^5 \sqrt{a^2+b^2}} + \frac{10 b^2 x^2 \ln\left(1 + \frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2) d^2} + \frac{2 b^3 x^{5/2} \ln\left(1 + \frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2)^{3/2} d}$$

$$+\frac{10 b^2 x^2 \ln\left(1+\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2) d^2}-\frac{2 b^3 x^{5/2} \ln\left(1+\frac{a e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2)^{3/2} d}+\frac{40 b^2 x^{3/2} \operatorname{polylog}\left(2,-\frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2) d^3}$$

$$+\frac{10 b^3 x^2 \operatorname{polylog}\left(2,-\frac{a e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 (a^2+b^2)^{3/2} d^2}-\frac{2 b^2 x^{5/2} \cosh\left(c+d\sqrt{x}\right)}{a (a^2+b^2) d \left(b+a\sinh\left(c+d\sqrt{x}\right)\right)}$$

Result(type 8, 20 leaves):

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

Problem 18: Unable to integrate problem.

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

Optimal(type 4, 310 leaves, 21 steps):

$$-\frac{2 b^2 x^2}{d}+\frac{2 a^2 x^{5/2}}{5}-\frac{8 a b x^2 \operatorname{arctanh}\left(e^{c+d\sqrt{x}}\right)}{d}-\frac{2 b^2 x^2 \coth\left(c+d\sqrt{x}\right)}{d}+\frac{8 b^2 x^{3/2} \ln\left(1-e^{2c+2d\sqrt{x}}\right)}{d^2}-\frac{16 a b x^{3/2} \operatorname{polylog}\left(2,-e^{c+d\sqrt{x}}\right)}{d^2}$$

$$+\frac{16 a b x^{3/2} \operatorname{polylog}\left(2,e^{c+d\sqrt{x}}\right)}{d^2}+\frac{12 b^2 x \operatorname{polylog}\left(2,e^{2c+2d\sqrt{x}}\right)}{d^3}+\frac{48 a b x \operatorname{polylog}\left(3,-e^{c+d\sqrt{x}}\right)}{d^3}-\frac{48 a b x \operatorname{polylog}\left(3,e^{c+d\sqrt{x}}\right)}{d^3}$$

$$+\frac{6 b^2 \operatorname{polylog}\left(4,e^{2c+2d\sqrt{x}}\right)}{d^5}+\frac{96 a b \operatorname{polylog}\left(5,-e^{c+d\sqrt{x}}\right)}{d^5}-\frac{96 a b \operatorname{polylog}\left(5,e^{c+d\sqrt{x}}\right)}{d^5}-\frac{12 b^2 \operatorname{polylog}\left(3,e^{2c+2d\sqrt{x}}\right)\sqrt{x}}{d^4}$$

$$-\frac{96 a b \operatorname{polylog}\left(4,-e^{c+d\sqrt{x}}\right)\sqrt{x}}{d^4}+\frac{96 a b \operatorname{polylog}\left(4,e^{c+d\sqrt{x}}\right)\sqrt{x}}{d^4}$$

Result(type 8, 20 leaves):

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

Problem 22: Unable to integrate problem.

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

Optimal(type 4, 1427 leaves, 43 steps):

$$\frac{96\, b\, \mathrm{polylog}\left(5, -\frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 d^5 \sqrt{a^2+b^2}} - \frac{96\, b\, \mathrm{polylog}\left(5, -\frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 d^5 \sqrt{a^2+b^2}} + \frac{48\, b^2 \mathrm{polylog}\left(4, -\frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right) d^5} + \frac{48\, b^2 \mathrm{polylog}\left(4, -\frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right) d^5}$$

$$- \frac{48\, b^3 \mathrm{polylog}\left(5, -\frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right)^{3/2} d^5} + \frac{48\, b^3 \mathrm{polylog}\left(5, -\frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right)^{3/2} d^5} - \frac{2\, b^2 x^2}{a^2 \left(a^2+b^2\right) d} + \frac{2\, x^{5/2}}{5\, a^2} - \frac{4\, b\, x^2 \ln\left(1 + \frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 d \sqrt{a^2+b^2}}$$

$$+ \frac{4\, b\, x^2 \ln\left(1 + \frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 d \sqrt{a^2+b^2}} - \frac{16\, b\, x^{3/2} \mathrm{polylog}\left(2, -\frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 d^2 \sqrt{a^2+b^2}} + \frac{16\, b\, x^{3/2} \mathrm{polylog}\left(2, -\frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 d^2 \sqrt{a^2+b^2}}$$

$$+ \frac{48\, b\, x\, \mathrm{polylog}\left(3, -\frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 d^3 \sqrt{a^2+b^2}} - \frac{48\, b\, x\, \mathrm{polylog}\left(3, -\frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 d^3 \sqrt{a^2+b^2}} - \frac{48\, b^2 \mathrm{polylog}\left(3, -\frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)\sqrt{x}}{a^2 \left(a^2+b^2\right) d^4}$$

$$- \frac{48\, b^2 \mathrm{polylog}\left(3, -\frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)\sqrt{x}}{a^2 \left(a^2+b^2\right) d^4} + \frac{48\, b^3 \mathrm{polylog}\left(4, -\frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)\sqrt{x}}{a^2 \left(a^2+b^2\right)^{3/2} d^4} - \frac{48\, b^3 \mathrm{polylog}\left(4, -\frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)\sqrt{x}}{a^2 \left(a^2+b^2\right)^{3/2} d^4}$$

$$- \frac{96\, b\, \mathrm{polylog}\left(4, -\frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)\sqrt{x}}{a^2 d^4 \sqrt{a^2+b^2}} + \frac{96\, b\, \mathrm{polylog}\left(4, -\frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)\sqrt{x}}{a^2 d^4 \sqrt{a^2+b^2}} + \frac{8\, b^2 x^{3/2} \ln\left(1 + \frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right) d^2}$$

$$+ \frac{2\, b^3 x^2 \ln\left(1 + \frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right)^{3/2} d} + \frac{8\, b^2 x^{3/2} \ln\left(1 + \frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right) d^2} - \frac{2\, b^3 x^2 \ln\left(1 + \frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right)^{3/2} d} + \frac{24\, b^2 x\, \mathrm{polylog}\left(2, -\frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right) d^3}$$

$$+ \frac{8\, b^3 x^{3/2} \mathrm{polylog}\left(2, -\frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right)^{3/2} d^2} + \frac{24\, b^2 x\, \mathrm{polylog}\left(2, -\frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right) d^3} - \frac{8\, b^3 x^{3/2} \mathrm{polylog}\left(2, -\frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right)^{3/2} d^2}$$

$$- \frac{24\, b^3 x\, \mathrm{polylog}\left(3, -\frac{a\, e^{c+d\sqrt{x}}}{b-\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right)^{3/2} d^3} + \frac{24\, b^3 x\, \mathrm{polylog}\left(3, -\frac{a\, e^{c+d\sqrt{x}}}{b+\sqrt{a^2+b^2}}\right)}{a^2 \left(a^2+b^2\right)^{3/2} d^3} - \frac{2\, b^2 x^2 \cosh\left(c+d\sqrt{x}\right)}{a \left(a^2+b^2\right) d \left(b + a \sinh\left(c+d\sqrt{x}\right)\right)}$$

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Result(type 8, 20 leaves):
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$$\int \frac{x^{3/2}}{\left(a+b\operatorname{csch}\left(c+d\sqrt{x}\right)\right)^2}\,dx$$

Problem 24: Unable to integrate problem.

$$\int \frac{(e x)^{-1+3n}}{a+b\operatorname{csch}(c+d x^n)}\,dx$$

Optimal(type 4, 404 leaves, 14 steps):

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

Result(type 8, 161 leaves):

$$\frac{x\,e^{(-1+3n)\left(\ln(e)+\ln(x)-\frac{I\pi\operatorname{csgn}(I e x)\,(-\operatorname{csgn}(I e x)+\operatorname{csgn}(I e))\,(-\operatorname{csgn}(I e x)+\operatorname{csgn}(I x))}{2}\right)}}{3 a n}+\int -\frac{2 b\,e^{(-1+3n)\left(\ln(e)+\ln(x)-\frac{I\pi\operatorname{csgn}(I e x)\,(-\operatorname{csgn}(I e x)+\operatorname{csgn}(I e))\,(-\operatorname{csgn}(I e x)+\operatorname{csgn}(I x))}{2}\right)}\,e^{c+d\,e^{n\ln(x)}}}{a\left(a\left(e^{c+d\,e^{n\ln(x)}}\right)^2+2 b\,e^{c+d\,e^{n\ln(x)}}-a\right)}\,dx$$

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

$$\int \frac{(e x)^{-1+n}}{\left(a+b\operatorname{csch}(c+d x^n)\right)^2}\,dx$$

Optimal(type 3, 144 leaves, 8 steps):

$$\frac{(e x)^n}{a^2 e n}+\frac{2 b\left(2 a^2+b^2\right)(e x)^n\operatorname{arctanh}\left(\frac{a-b\tanh\left(\frac{c}{2}+\frac{d x^n}{2}\right)}{\sqrt{a^2+b^2}}\right)}{a^2\left(a^2+b^2\right)^{3/2} d e n x^n}-\frac{b^2\,(e x)^n\coth(c+d x^n)}{a\left(a^2+b^2\right) d e n x^n\left(a+b\operatorname{csch}(c+d x^n)\right)}$$

Result(type 3, 489 leaves):

$$\frac{x\,e^{-\frac{(-1+n)\left(I\operatorname{csgn}(I e x)^3\pi-I\operatorname{csgn}(I e x)^2\operatorname{csgn}(I e)\pi-I\operatorname{csgn}(I e x)^2\operatorname{csgn}(I x)\pi+I\operatorname{csgn}(I e x)\operatorname{csgn}(I e)\operatorname{csgn}(I x)\pi-2\ln(x)-2\ln(e)\right)}{2}}}{a^2 n}$$

$$-\frac{2 b^2 e^{-\frac{(-1+n)\left(I \operatorname{csgn}(I e x)^3 \pi - I \operatorname{csgn}(I e x)^2 \operatorname{csgn}(I e) \pi - I \operatorname{csgn}(I e x)^2 \operatorname{csgn}(I x) \pi + I \operatorname{csgn}(I e x) \operatorname{csgn}(I e) \operatorname{csgn}(I x) \pi - 2 \ln(x) - 2 \ln(e)\right)}{2}} x \left(-b e^{c+d x^n} + a\right)}{a^2 (a^2+b^2) d n x^n \left(a e^{2 c+2 d x^n} + 2 b e^{c+d x^n} - a\right)}$$

$$-\frac{1}{a^2 (a^2+b^2) n e d \sqrt{-a^2 e^{2 c} - e^{2 c} b^2}} \left(2 b (2 a^2 + b^2) e^{-\frac{I}{2} \pi n \operatorname{csgn}(I e) \operatorname{csgn}(I x) \operatorname{csgn}(I e x)} e^{\frac{I}{2} \pi n \operatorname{csgn}(I e) \operatorname{csgn}(I e x)^2} e^{\frac{I}{2} \pi n \operatorname{csgn}(I x) \operatorname{csgn}(I e x)^2} e^{-\frac{I}{2} \pi n \operatorname{csgn}(I e x)^3} e^{\frac{I}{2} \pi \operatorname{csgn}(I e) \operatorname{csgn}(I x) \operatorname{csgn}(I e x)} e^{-\frac{I}{2} \pi \operatorname{csgn}(I e) \operatorname{csgn}(I e x)^2} e^{-\frac{I}{2} \pi \operatorname{csgn}(I x) \operatorname{csgn}(I e x)^2} e^{\frac{I}{2} \pi \operatorname{csgn}(I e x)^3} e^n e^c \arctan\left(\frac{2 a e^{2 c+d x^n} + 2 e^c b}{2 \sqrt{-a^2 e^{2 c} - e^{2 c} b^2}}\right)\right)$$

Test results for the 48 problems in "6.6.3 Hyperbolic cosecant functions.txt"

Problem 5: Unable to integrate problem.

$$\int (b \operatorname{csch}(d x + c))^{3/2} dx$$

Optimal(type 4, 105 leaves, 3 steps):

$$-\frac{2 b \cosh(d x + c) \sqrt{b \operatorname{csch}(d x + c)}}{d} + \frac{2 I b^2 \sqrt{\sin\left(\frac{I c}{2} + \frac{\pi}{4} + \frac{I d x}{2}\right)^2} \operatorname{EllipticE}\left(\cos\left(\frac{I c}{2} + \frac{\pi}{4} + \frac{I d x}{2}\right), \sqrt{2}\right)}{\sin\left(\frac{I c}{2} + \frac{\pi}{4} + \frac{I d x}{2}\right) d \sqrt{b \operatorname{csch}(d x + c)} \sqrt{I \sinh(d x + c)}}$$

Result(type 8, 12 leaves):

$$\int (b \operatorname{csch}(d x + c))^{3/2} dx$$

Problem 6: Unable to integrate problem.

$$\int \sqrt{b \operatorname{csch}(d x + c)}\, dx$$

Optimal(type 4, 79 leaves, 2 steps):

$$\frac{2 I \sqrt{\sin\left(\frac{I c}{2} + \frac{\pi}{4} + \frac{I d x}{2}\right)^2} \operatorname{EllipticF}\left(\cos\left(\frac{I c}{2} + \frac{\pi}{4} + \frac{I d x}{2}\right), \sqrt{2}\right) \sqrt{b \operatorname{csch}(d x + c)} \sqrt{I \sinh(d x + c)}}{\sin\left(\frac{I c}{2} + \frac{\pi}{4} + \frac{I d x}{2}\right) d}$$

Result(type 8, 12 leaves):

$$\int \sqrt{b \operatorname{csch}(d x + c)}\, dx$$

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

$$\int \frac{1}{\sqrt{b \operatorname{csch}(d x + c)}}\, dx$$

Optimal(type 4, 79 leaves, 2 steps):

$$\frac{2 I \sqrt{\sin\left(\frac{I c}{2} + \frac{\pi}{4} + \frac{I d x}{2}\right)^2}\, \operatorname{EllipticE}\left(\cos\left(\frac{I c}{2} + \frac{\pi}{4} + \frac{I d x}{2}\right), \sqrt{2}\right)}{\sin\left(\frac{I c}{2} + \frac{\pi}{4} + \frac{I d x}{2}\right) d \sqrt{b \operatorname{csch}(d x + c)}\, \sqrt{I \sinh(d x + c)}}$$

Result(type 4, 226 leaves):

$$\frac{\sqrt{2}}{d \sqrt{\frac{b e^{d x + c}}{(e^{d x + c})^2 - 1}}} - \frac{1}{d \sqrt{\frac{b e^{d x + c}}{(e^{d x + c})^2 - 1}}\, \left((e^{d x + c})^2 - 1\right)} \left(\left(\frac{2\left((e^{d x + c})^2 b - b\right)}{b \sqrt{e^{d x + c}\left((e^{d x + c})^2 b - b\right)}} - \frac{\sqrt{e^{d x + c} + 1}\, \sqrt{-2 e^{d x + c} + 2}\, \sqrt{-e^{d x + c}} \left(-2 \operatorname{EllipticE}\left(\sqrt{e^{d x + c} + 1}, \frac{\sqrt{2}}{2}\right) + \operatorname{EllipticF}\left(\sqrt{e^{d x + c} + 1}, \frac{\sqrt{2}}{2}\right)\right)}{\sqrt{b (e^{d x + c})^3 - b e^{d x + c}}} \right) \sqrt{2} \sqrt{b e^{d x + c}\left((e^{d x + c})^2 - 1\right)} \right)$$

Problem 8: Unable to integrate problem.

$$\int \frac{1}{(b \operatorname{csch}(d x + c))^{3/2}}\, dx$$

Optimal(type 4, 107 leaves, 3 steps):

$$\frac{2 \cosh(d x + c)}{3 b d \sqrt{b \operatorname{csch}(d x + c)}} - \frac{2 I \sqrt{\sin\left(\frac{I c}{2} + \frac{\pi}{4} + \frac{I d x}{2}\right)^2}\, \operatorname{EllipticF}\left(\cos\left(\frac{I c}{2} + \frac{\pi}{4} + \frac{I d x}{2}\right), \sqrt{2}\right) \sqrt{b \operatorname{csch}(d x + c)}\, \sqrt{I \sinh(d x + c)}}{3 \sin\left(\frac{I c}{2} + \frac{\pi}{4} + \frac{I d x}{2}\right) b^2 d}$$

Result(type 8, 12 leaves):

$$\int \frac{1}{(b \operatorname{csch}(d x + c))^{3/2}}\, dx$$

Problem 9: Unable to integrate problem.

$$\int \frac{1}{(b\operatorname{csch}(dx+c))^{5/2}}\,dx$$

Optimal(type 4, 107 leaves, 3 steps):

$$\frac{2\cosh(dx+c)}{5bd\,(b\operatorname{csch}(dx+c))^{3/2}}-\frac{6I\sqrt{\sin\left(\frac{Ic}{2}+\frac{\pi}{4}+\frac{Idx}{2}\right)^2}\,\operatorname{EllipticE}\left(\cos\left(\frac{Ic}{2}+\frac{\pi}{4}+\frac{Idx}{2}\right),\sqrt{2}\right)}{5\sin\left(\frac{Ic}{2}+\frac{\pi}{4}+\frac{Idx}{2}\right)b^2 d\sqrt{b\operatorname{csch}(dx+c)}\,\sqrt{I\sinh(dx+c)}}$$

Result(type 8, 12 leaves):

$$\int \frac{1}{(b\operatorname{csch}(dx+c))^{5/2}}\,dx$$

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

$$\int(-\operatorname{csch}(x)^2)^{3/2}\,dx$$

Optimal(type 3, 18 leaves, 3 steps):

$$\frac{\arcsin(\coth(x))}{2}+\frac{\coth(x)\sqrt{-\operatorname{csch}(x)^2}}{2}$$

Result(type 3, 98 leaves):

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

Problem 11: Result more than twice size of optimal antiderivative.

$$\int(a\operatorname{csch}(x)^2)^{5/2}\,dx$$

Optimal(type 3, 49 leaves, 5 steps):

$$-\frac{3a^{5/2}\operatorname{arctanh}\left(\frac{\coth(x)\sqrt{a}}{\sqrt{a\operatorname{csch}(x)^2}}\right)}{8}-\frac{a\coth(x)\,(a\operatorname{csch}(x)^2)^{3/2}}{4}+\frac{3a^2\coth(x)\sqrt{a\operatorname{csch}(x)^2}}{8}$$

Result(type 3, 122 leaves):

$$\frac{a^2\sqrt{\frac{a\,e^{2x}}{(e^{2x}-1)^2}}\,(3e^{6x}-11e^{4x}-11e^{2x}+3)}{4(e^{2x}-1)^3}-\frac{3a^2e^{-x}(e^{2x}-1)\sqrt{\frac{a\,e^{2x}}{(e^{2x}-1)^2}}\,\ln(1+e^x)}{8}+\frac{3a^2e^{-x}(e^{2x}-1)\sqrt{\frac{a\,e^{2x}}{(e^{2x}-1)^2}}\,\ln(e^x-1)}{8}$$

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

$$\int \frac{1}{\left(a \operatorname{csch}(x)^2\right)^{7/2}}\, dx$$

Optimal(type 3, 58 leaves, 5 steps):

$$\frac{\coth(x)}{7\left(a \operatorname{csch}(x)^2\right)^{7/2}} - \frac{6\coth(x)}{35\, a\left(a \operatorname{csch}(x)^2\right)^{5/2}} + \frac{8\coth(x)}{35\, a^2\left(a \operatorname{csch}(x)^2\right)^{3/2}} - \frac{16\coth(x)}{35\, a^3\sqrt{a \operatorname{csch}(x)^2}}$$

Result(type 3, 261 leaves):

$$\frac{e^{8x}}{896\, a^3\left(e^{2x}-1\right)\sqrt{\frac{a\, e^{2x}}{\left(e^{2x}-1\right)^2}}} - \frac{7\, e^{6x}}{640\, a^3\left(e^{2x}-1\right)\sqrt{\frac{a\, e^{2x}}{\left(e^{2x}-1\right)^2}}} + \frac{7\, e^{4x}}{128\, a^3\left(e^{2x}-1\right)\sqrt{\frac{a\, e^{2x}}{\left(e^{2x}-1\right)^2}}} - \frac{35\, e^{2x}}{128\, a^3\left(e^{2x}-1\right)\sqrt{\frac{a\, e^{2x}}{\left(e^{2x}-1\right)^2}}}$$
$$- \frac{35}{128\, a^3\left(e^{2x}-1\right)\sqrt{\frac{a\, e^{2x}}{\left(e^{2x}-1\right)^2}}} + \frac{7\, e^{-2x}}{128\, a^3\left(e^{2x}-1\right)\sqrt{\frac{a\, e^{2x}}{\left(e^{2x}-1\right)^2}}} - \frac{7\, e^{-4x}}{640\, a^3\left(e^{2x}-1\right)\sqrt{\frac{a\, e^{2x}}{\left(e^{2x}-1\right)^2}}} + \frac{e^{-6x}}{896\, a^3\left(e^{2x}-1\right)\sqrt{\frac{a\, e^{2x}}{\left(e^{2x}-1\right)^2}}}$$

Problem 13: Unable to integrate problem.

$$\int \frac{1}{\sqrt{a \operatorname{csch}(x)^3}}\, dx$$

Optimal(type 4, 72 leaves, 4 steps):

$$\frac{2\coth(x)}{3\sqrt{a \operatorname{csch}(x)^3}} - \frac{2\, I \operatorname{csch}(x)^2 \sqrt{\sin\left(\frac{\pi}{4}+\frac{I x}{2}\right)^2}\ \operatorname{EllipticF}\left(\cos\left(\frac{\pi}{4}+\frac{I x}{2}\right), \sqrt{2}\right)\sqrt{I \sinh(x)}}{3\sin\left(\frac{\pi}{4}+\frac{I x}{2}\right)\sqrt{a \operatorname{csch}(x)^3}}$$

Result(type 8, 10 leaves):

$$\int \frac{1}{\sqrt{a \operatorname{csch}(x)^3}}\, dx$$

Problem 14: Unable to integrate problem.

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

Optimal(type 4, 133 leaves, 7 steps):

$$-\frac{26\coth(x)}{77\, a^2\sqrt{a \operatorname{csch}(x)^3}} + \frac{78\cosh(x)\sinh(x)}{385\, a^2\sqrt{a \operatorname{csch}(x)^3}} - \frac{26\cosh(x)\sinh(x)^3}{165\, a^2\sqrt{a \operatorname{csch}(x)^3}} + \frac{2\cosh(x)\sinh(x)^5}{15\, a^2\sqrt{a \operatorname{csch}(x)^3}}$$

$$+\frac{26 I \operatorname{csch}(x)^2 \sqrt{\sin\left(\frac{\pi}{4}+\frac{I x}{2}\right)^2}\, \operatorname{EllipticF}\left(\cos\left(\frac{\pi}{4}+\frac{I x}{2}\right), \sqrt{2}\right) \sqrt{I \sinh(x)}}{77 \sin\left(\frac{\pi}{4}+\frac{I x}{2}\right) a^2 \sqrt{a \operatorname{csch}(x)^3}}$$

Result(type 8, 10 leaves):

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

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

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

Optimal(type 3, 70 leaves, 5 steps):

$$\frac{5 \coth(x)}{16 a \sqrt{a \operatorname{csch}(x)^4}} - \frac{5 x \operatorname{csch}(x)^2}{16 a \sqrt{a \operatorname{csch}(x)^4}} - \frac{5 \cosh(x) \sinh(x)}{24 a \sqrt{a \operatorname{csch}(x)^4}} + \frac{\cosh(x) \sinh(x)^3}{6 a \sqrt{a \operatorname{csch}(x)^4}}$$

Result(type 3, 229 leaves):

$$-\frac{5 e^{2 x} x}{16 a \left(e^{2 x}-1\right)^2 \sqrt{\frac{a e^{4 x}}{\left(e^{2 x}-1\right)^4}}} + \frac{e^{8 x}}{384 a \left(e^{2 x}-1\right)^2 \sqrt{\frac{a e^{4 x}}{\left(e^{2 x}-1\right)^4}}} - \frac{3 e^{6 x}}{128 a \left(e^{2 x}-1\right)^2 \sqrt{\frac{a e^{4 x}}{\left(e^{2 x}-1\right)^4}}} + \frac{15 e^{4 x}}{128 a \left(e^{2 x}-1\right)^2 \sqrt{\frac{a e^{4 x}}{\left(e^{2 x}-1\right)^4}}}$$
$$- \frac{15}{128 a \left(e^{2 x}-1\right)^2 \sqrt{\frac{a e^{4 x}}{\left(e^{2 x}-1\right)^4}}} + \frac{3 e^{-2 x}}{128 a \left(e^{2 x}-1\right)^2 \sqrt{\frac{a e^{4 x}}{\left(e^{2 x}-1\right)^4}}} - \frac{e^{-4 x}}{384 a \left(e^{2 x}-1\right)^2 \sqrt{\frac{a e^{4 x}}{\left(e^{2 x}-1\right)^4}}}$$

Problem 18: Unable to integrate problem.

$$\int \sqrt{a - I a \operatorname{csch}(d x + c)}\, dx$$

Optimal(type 3, 33 leaves, 2 steps):

$$\frac{2 \operatorname{arctanh}\left(\frac{\coth(d x + c) \sqrt{a}}{\sqrt{a - I a \operatorname{csch}(d x + c)}}\right) \sqrt{a}}{d}$$

Result(type 8, 16 leaves):

$$\int \sqrt{a - I a \operatorname{csch}(d x + c)}\, dx$$

Problem 19: Unable to integrate problem.

$$\int \sqrt{3-3 I \operatorname{csch}(x)}\, dx$$

Optimal(type 3, 18 leaves, 2 steps):

$$2 \operatorname{arctanh}\left(\frac{\coth(x)}{\sqrt{1-I \operatorname{csch}(x)}}\right) \sqrt{3}$$

Result(type 8, 11 leaves):

$$\int \sqrt{3-3 I \operatorname{csch}(x)}\, dx$$

Problem 20: Result more than twice size of optimal antiderivative.

$$\int \frac{\sinh(x)^2}{I+\operatorname{csch}(x)}\, dx$$

Optimal(type 3, 29 leaves, 5 steps):

$$\frac{3 I x}{2}+2 \cosh(x)-\frac{3 I \cosh(x) \sinh(x)}{2}-\frac{\cosh(x) \sinh(x)}{I+\operatorname{csch}(x)}$$

Result(type 3, 95 leaves):

$$-\frac{3 I \ln\left(\tanh\left(\frac{x}{2}\right)-1\right)}{2}-\frac{I}{2\left(\tanh\left(\frac{x}{2}\right)-1\right)^2}-\frac{1}{\tanh\left(\frac{x}{2}\right)-1}-\frac{I}{2\left(\tanh\left(\frac{x}{2}\right)-1\right)}-\frac{2 I}{\tanh\left(\frac{x}{2}\right)-I}+\frac{I}{2\left(\tanh\left(\frac{x}{2}\right)+1\right)^2}$$
$$+\frac{3 I \ln\left(\tanh\left(\frac{x}{2}\right)+1\right)}{2}+\frac{1}{\tanh\left(\frac{x}{2}\right)+1}-\frac{I}{2\left(\tanh\left(\frac{x}{2}\right)+1\right)}$$

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

$$\int \frac{\sinh(x)}{I+\operatorname{csch}(x)}\, dx$$

Optimal(type 3, 18 leaves, 4 steps):

$$x-2 I \cosh(x)-\frac{\cosh(x)}{I+\operatorname{csch}(x)}$$

Result(type 3, 50 leaves):

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

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

$$\int \frac{\operatorname{sech}(x)^4}{I + \operatorname{csch}(x)}\, dx$$

Optimal(type 3, 21 leaves, 7 steps):

$$-\frac{\operatorname{sech}(x)^5}{5} - \frac{I \tanh(x)^3}{3} + \frac{I \tanh(x)^5}{5}$$

Result(type 3, 92 leaves):

$$-\frac{4 I}{3 \left(\tanh\left(\frac{x}{2}\right) - I\right)^3} + \frac{3 I}{8 \left(\tanh\left(\frac{x}{2}\right) - I\right)} + \frac{2 I}{5 \left(\tanh\left(\frac{x}{2}\right) - I\right)^5} + \frac{1}{\left(\tanh\left(\frac{x}{2}\right) - I\right)^4} - \frac{1}{\left(\tanh\left(\frac{x}{2}\right) - I\right)^2} + \frac{I}{6 \left(\tanh\left(\frac{x}{2}\right) + I\right)^3}$$
$$- \frac{3 I}{8 \left(\tanh\left(\frac{x}{2}\right) + I\right)} - \frac{1}{4 \left(\tanh\left(\frac{x}{2}\right) + I\right)^2}$$

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

$$\int \frac{\cosh(x)^5}{a + b \operatorname{csch}(x)}\, dx$$

Optimal(type 3, 94 leaves, 5 steps):

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

Result(type 3, 599 leaves):

$$\frac{b \ln\left(\tanh\left(\frac{x}{2}\right) + 1\right)}{a^2} + \frac{2 b^3 \ln\left(\tanh\left(\frac{x}{2}\right) + 1\right)}{a^4} + \frac{b^5 \ln\left(\tanh\left(\frac{x}{2}\right) + 1\right)}{a^6} - \frac{b \ln\left(\tanh\left(\frac{x}{2}\right)^2 b - 2 a \tanh\left(\frac{x}{2}\right) - b\right)}{a^2}$$
$$- \frac{2 b^3 \ln\left(\tanh\left(\frac{x}{2}\right)^2 b - 2 a \tanh\left(\frac{x}{2}\right) - b\right)}{a^4} - \frac{b^5 \ln\left(\tanh\left(\frac{x}{2}\right)^2 b - 2 a \tanh\left(\frac{x}{2}\right) - b\right)}{a^6} - \frac{b}{4 a^2 \left(\tanh\left(\frac{x}{2}\right) + 1\right)^4} + \frac{b}{2 a^2 \left(\tanh\left(\frac{x}{2}\right) + 1\right)^3}$$
$$- \frac{b^2}{3 a^3 \left(\tanh\left(\frac{x}{2}\right) + 1\right)^3} - \frac{9 b}{8 a^2 \left(\tanh\left(\frac{x}{2}\right) + 1\right)^2} + \frac{b^2}{2 a^3 \left(\tanh\left(\frac{x}{2}\right) + 1\right)^2} - \frac{b^3}{2 a^4 \left(\tanh\left(\frac{x}{2}\right) + 1\right)^2} + \frac{7 b}{8 a^2 \left(\tanh\left(\frac{x}{2}\right) + 1\right)}$$
$$- \frac{2 b^2}{a^3 \left(\tanh\left(\frac{x}{2}\right) + 1\right)} + \frac{b^3}{2 a^4 \left(\tanh\left(\frac{x}{2}\right) + 1\right)} - \frac{b^4}{a^5 \left(\tanh\left(\frac{x}{2}\right) + 1\right)} + \frac{b \ln\left(\tanh\left(\frac{x}{2}\right) - 1\right)}{a^2} + \frac{2 b^3 \ln\left(\tanh\left(\frac{x}{2}\right) - 1\right)}{a^4}$$
$$+ \frac{b^5 \ln\left(\tanh\left(\frac{x}{2}\right) - 1\right)}{a^6} - \frac{7 b}{8 a^2 \left(\tanh\left(\frac{x}{2}\right) - 1\right)} - \frac{2 b^2}{a^3 \left(\tanh\left(\frac{x}{2}\right) - 1\right)} - \frac{b^3}{2 a^4 \left(\tanh\left(\frac{x}{2}\right) - 1\right)} - \frac{b^4}{a^5 \left(\tanh\left(\frac{x}{2}\right) - 1\right)}$$

$$- \frac{9 b}{8 a^{2} \left(\tanh\left(\frac{x}{2}\right) - 1\right)^{2}} - \frac{b^{2}}{2 a^{3} \left(\tanh\left(\frac{x}{2}\right) - 1\right)^{2}} - \frac{b^{3}}{2 a^{4} \left(\tanh\left(\frac{x}{2}\right) - 1\right)^{2}} - \frac{b}{2 a^{2} \left(\tanh\left(\frac{x}{2}\right) - 1\right)^{3}} - \frac{b^{2}}{3 a^{3} \left(\tanh\left(\frac{x}{2}\right) - 1\right)^{3}}$$

$$- \frac{b}{4 a^{2} \left(\tanh\left(\frac{x}{2}\right) - 1\right)^{4}} + \frac{1}{2 a \left(\tanh\left(\frac{x}{2}\right) + 1\right)^{4}} + \frac{7}{8 a \left(\tanh\left(\frac{x}{2}\right) + 1\right)^{2}} - \frac{1}{a \left(\tanh\left(\frac{x}{2}\right) + 1\right)} - \frac{11}{12 a \left(\tanh\left(\frac{x}{2}\right) - 1\right)^{3}}$$

$$- \frac{11}{12 a \left(\tanh\left(\frac{x}{2}\right) + 1\right)^{3}} - \frac{1}{5 a \left(\tanh\left(\frac{x}{2}\right) - 1\right)^{5}} - \frac{1}{5 a \left(\tanh\left(\frac{x}{2}\right) + 1\right)^{5}} - \frac{1}{2 a \left(\tanh\left(\frac{x}{2}\right) - 1\right)^{4}} - \frac{7}{8 a \left(\tanh\left(\frac{x}{2}\right) - 1\right)^{2}}$$

$$- \frac{1}{a \left(\tanh\left(\frac{x}{2}\right) - 1\right)}$$

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

$$\int \frac{\operatorname{sech}(x)^{5}}{a + b \operatorname{csch}(x)} \, dx$$

Optimal(type 3, 135 leaves, 7 steps):

$$- \frac{a (3 I a + b) \ln(I - \sinh(x))}{16 (a - I b)^{3}} + \frac{a (3 a + I b) \ln(I + \sinh(x))}{16 (I a - b)^{3}} - \frac{a^{4} b \ln(b + a \sinh(x))}{(a^{2} + b^{2})^{3}} - \frac{\operatorname{sech}(x)^{4} (b - a \sinh(x))}{4 (a^{2} + b^{2})}$$

$$- \frac{\operatorname{sech}(x)^{2} \left(4 a^{2} b - a (3 a^{2} - b^{2}) \sinh(x)\right)}{8 (a^{2} + b^{2})^{2}}$$

Result(type 3, 1167 leaves):

$$- \frac{a^{4} b \ln\left(\tanh\left(\frac{x}{2}\right)^{2} b - 2 a \tanh\left(\frac{x}{2}\right) - b\right)}{(a^{4} + 2 a^{2} b^{2} + b^{4}) (a^{2} + b^{2})} - \frac{5 \tanh\left(\frac{x}{2}\right)^{7} a^{5}}{4 (a^{4} + 2 a^{2} b^{2} + b^{4}) (a^{2} + b^{2}) \left(\tanh\left(\frac{x}{2}\right)^{2} + 1\right)^{4}} + \frac{2 \tanh\left(\frac{x}{2}\right)^{6} b^{5}}{(a^{4} + 2 a^{2} b^{2} + b^{4}) (a^{2} + b^{2}) \left(\tanh\left(\frac{x}{2}\right)^{2} + 1\right)^{4}}$$

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

$$+ \frac{2 \tanh\left(\frac{x}{2}\right)^{2} b^{5}}{(a^{4} + 2 a^{2} b^{2} + b^{4}) (a^{2} + b^{2}) \left(\tanh\left(\frac{x}{2}\right)^{2} + 1\right)^{4}} + \frac{5 \tanh\left(\frac{x}{2}\right) a^{5}}{4 (a^{4} + 2 a^{2} b^{2} + b^{4}) (a^{2} + b^{2}) \left(\tanh\left(\frac{x}{2}\right)^{2} + 1\right)^{4}} + \frac{a^{4} b \ln\left(\tanh\left(\frac{x}{2}\right)^{2} + 1\right)}{(a^{4} + 2 a^{2} b^{2} + b^{4}) (a^{2} + b^{2})}$$

$$- \frac{3 \arctan\left(\tanh\left(\frac{x}{2}\right)\right) a^{3} b^{2}}{2 (a^{4} + 2 a^{2} b^{2} + b^{4}) (a^{2} + b^{2})} - \frac{\arctan\left(\tanh\left(\frac{x}{2}\right)\right) a b^{4}}{4 (a^{4} + 2 a^{2} b^{2} + b^{4}) (a^{2} + b^{2})} + \frac{3 \arctan\left(\tanh\left(\frac{x}{2}\right)\right) a^{5}}{4 (a^{4} + 2 a^{2} b^{2} + b^{4}) (a^{2} + b^{2})}$$

$$+\frac{4\tanh\left(\frac{x}{2}\right)^{2}a^{4}b}{\left(a^{4}+2a^{2}b^{2}+b^{4}\right)\left(a^{2}+b^{2}\right)\left(\tanh\left(\frac{x}{2}\right)^{2}+1\right)^{4}}+\frac{6\tanh\left(\frac{x}{2}\right)^{2}a^{2}b^{3}}{\left(a^{4}+2a^{2}b^{2}+b^{4}\right)\left(a^{2}+b^{2}\right)\left(\tanh\left(\frac{x}{2}\right)^{2}+1\right)^{4}}$$

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

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

$$+\frac{4\tanh\left(\frac{x}{2}\right)^{6}a^{4}b}{\left(a^{4}+2a^{2}b^{2}+b^{4}\right)\left(a^{2}+b^{2}\right)\left(\tanh\left(\frac{x}{2}\right)^{2}+1\right)^{4}}+\frac{6\tanh\left(\frac{x}{2}\right)^{6}a^{2}b^{3}}{\left(a^{4}+2a^{2}b^{2}+b^{4}\right)\left(a^{2}+b^{2}\right)\left(\tanh\left(\frac{x}{2}\right)^{2}+1\right)^{4}}$$

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

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

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

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

$$\int\frac{\tanh(x)^{5}}{a+b\,\mathrm{csch}(x)}\,\mathrm{d}x$$

Optimal(type 3, 184 leaves, 11 steps):

$$-\frac{b^{5}\arctan(\sinh(x))}{\left(a^{2}+b^{2}\right)^{3}}-\frac{b^{3}\arctan(\sinh(x))}{2\left(a^{2}+b^{2}\right)^{2}}-\frac{3b\arctan(\sinh(x))}{8\left(a^{2}+b^{2}\right)}+\frac{b^{6}\ln(a+b\,\mathrm{csch}(x))}{a\left(a^{2}+b^{2}\right)^{3}}+\frac{\ln(\sinh(x))}{a}-\frac{a\left(a^{4}+3a^{2}b^{2}+3b^{4}\right)\ln(\tanh(x))}{\left(a^{2}+b^{2}\right)^{3}}$$

$$+\frac{3 b \,\mathrm{sech}(x) \tanh(x)}{8 \left(a^2+b^2\right)}-\frac{\left(a \left(a^2+2 b^2\right)-b^3 \,\mathrm{csch}(x)\right) \tanh(x)^2}{2 \left(a^2+b^2\right)^2}-\frac{\left(a-b \,\mathrm{csch}(x)\right) \tanh(x)^4}{4 \left(a^2+b^2\right)}$$

Result(type 3, 1322 leaves):

$$\frac{b^6 \ln\left(\tanh\left(\frac{x}{2}\right)^2 b-2 a \tanh\left(\frac{x}{2}\right)-b\right)}{\left(a^4+2 a^2 b^2+b^4\right) \left(a^2+b^2\right) a}-\frac{3 \arctan\left(\tanh\left(\frac{x}{2}\right)\right) a^4 b}{4 \left(a^4+2 a^2 b^2+b^4\right) \left(a^2+b^2\right)}-\frac{5 \arctan\left(\tanh\left(\frac{x}{2}\right)\right) a^2 b^3}{2 \left(a^4+2 a^2 b^2+b^4\right) \left(a^2+b^2\right)}$$

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

$$-\frac{15 \tanh\left(\frac{x}{2}\right)^5 b^5}{4 \left(a^4+2 a^2 b^2+b^4\right) \left(a^2+b^2\right) \left(\tanh\left(\frac{x}{2}\right)^2+1\right)^4}-\frac{8 \tanh\left(\frac{x}{2}\right)^4 a^5}{\left(a^4+2 a^2 b^2+b^4\right) \left(a^2+b^2\right) \left(\tanh\left(\frac{x}{2}\right)^2+1\right)^4}$$

$$+\frac{15 \tanh\left(\frac{x}{2}\right)^3 b^5}{4 \left(a^4+2 a^2 b^2+b^4\right) \left(a^2+b^2\right) \left(\tanh\left(\frac{x}{2}\right)^2+1\right)^4}-\frac{2 \tanh\left(\frac{x}{2}\right)^2 a^5}{\left(a^4+2 a^2 b^2+b^4\right) \left(a^2+b^2\right) \left(\tanh\left(\frac{x}{2}\right)^2+1\right)^4}$$

$$+\frac{7 \tanh\left(\frac{x}{2}\right) b^5}{4 \left(a^4+2 a^2 b^2+b^4\right) \left(a^2+b^2\right) \left(\tanh\left(\frac{x}{2}\right)^2+1\right)^4}+\frac{3 \ln\left(\tanh\left(\frac{x}{2}\right)^2+1\right) a^3 b^2}{\left(a^4+2 a^2 b^2+b^4\right) \left(a^2+b^2\right)}+\frac{3 \ln\left(\tanh\left(\frac{x}{2}\right)^2+1\right) a b^4}{\left(a^4+2 a^2 b^2+b^4\right) \left(a^2+b^2\right)}$$

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

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

$$-\frac{13 \tanh\left(\frac{x}{2}\right)^5 a^2 b^3}{2 \left(a^4+2 a^2 b^2+b^4\right) \left(a^2+b^2\right) \left(\tanh\left(\frac{x}{2}\right)^2+1\right)^4}-\frac{11 \tanh\left(\frac{x}{2}\right)^5 a^4 b}{4 \left(a^4+2 a^2 b^2+b^4\right) \left(a^2+b^2\right) \left(\tanh\left(\frac{x}{2}\right)^2+1\right)^4}$$

$$- \frac{20 \tanh\left(\frac{x}{2}\right)^4 a^3 b^2}{(a^4+2a^2b^2+b^4)(a^2+b^2)\left(\tanh\left(\frac{x}{2}\right)^2+1\right)^4} - \frac{12 \tanh\left(\frac{x}{2}\right)^4 a b^4}{(a^4+2a^2b^2+b^4)(a^2+b^2)\left(\tanh\left(\frac{x}{2}\right)^2+1\right)^4}$$

$$+ \frac{13 \tanh\left(\frac{x}{2}\right)^3 a^2 b^3}{2(a^4+2a^2b^2+b^4)(a^2+b^2)\left(\tanh\left(\frac{x}{2}\right)^2+1\right)^4} + \frac{11 \tanh\left(\frac{x}{2}\right)^3 a^4 b}{4(a^4+2a^2b^2+b^4)(a^2+b^2)\left(\tanh\left(\frac{x}{2}\right)^2+1\right)^4}$$

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

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

$$- \frac{15 \arctan\left(\tanh\left(\frac{x}{2}\right)\right) b^5}{4(a^4+2a^2b^2+b^4)(a^2+b^2)} - \frac{\ln\left(\tanh\left(\frac{x}{2}\right)-1\right)}{a} - \frac{\ln\left(\tanh\left(\frac{x}{2}\right)+1\right)}{a}$$

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

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

Optimal(type 3, 51 leaves, 8 steps):

$$\frac{x}{a} - \frac{\operatorname{arctanh}(\cosh(x))}{b} + \frac{2 \operatorname{arctanh}\left(\frac{a - b\tanh\left(\frac{x}{2}\right)}{\sqrt{a^2+b^2}}\right)\sqrt{a^2+b^2}}{a\,b}$$

Result(type 3, 109 leaves):

$$-\frac{\ln\left(\tanh\left(\frac{x}{2}\right)-1\right)}{a} - \frac{2 a \operatorname{arctanh}\left(\frac{2 b \tanh\left(\frac{x}{2}\right) - 2a}{2\sqrt{a^2+b^2}}\right)}{b\sqrt{a^2+b^2}} - \frac{2 b \operatorname{arctanh}\left(\frac{2 b \tanh\left(\frac{x}{2}\right) - 2a}{2\sqrt{a^2+b^2}}\right)}{a\sqrt{a^2+b^2}} + \frac{\ln\left(\tanh\left(\frac{x}{2}\right)\right)}{b} + \frac{\ln\left(\tanh\left(\frac{x}{2}\right)+1\right)}{a}$$

Problem 35: Result more than twice size of optimal antiderivative.

$$\int \frac{\coth(x)^3}{a+b\,\mathrm{csch}(x)}\,dx$$

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

$$-\frac{\mathrm{csch}(x)}{b}+\left(\frac{1}{a}+\frac{a}{b^2}\right)\ln(a+b\,\mathrm{csch}(x))+\frac{\ln(\sinh(x))}{a}$$

Result(type 3, 105 leaves):

$$\frac{\tanh\left(\frac{x}{2}\right)}{2\,b}-\frac{\ln\left(\tanh\left(\frac{x}{2}\right)-1\right)}{a}+\frac{a\ln\left(\tanh\left(\frac{x}{2}\right)^2 b-2\,a\tanh\left(\frac{x}{2}\right)-b\right)}{b^2}+\frac{\ln\left(\tanh\left(\frac{x}{2}\right)^2 b-2\,a\tanh\left(\frac{x}{2}\right)-b\right)}{a}-\frac{1}{2\,b\tanh\left(\frac{x}{2}\right)}$$
$$-\frac{a\ln\left(\tanh\left(\frac{x}{2}\right)\right)}{b^2}-\frac{\ln\left(\tanh\left(\frac{x}{2}\right)+1\right)}{a}$$

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

$$\int \frac{\coth(x)^5}{a+b\,\mathrm{csch}(x)}\,dx$$

Optimal(type 3, 66 leaves, 3 steps):

$$-\frac{\left(a^2+2\,b^2\right)\mathrm{csch}(x)}{b^3}+\frac{a\,\mathrm{csch}(x)^2}{2\,b^2}-\frac{\mathrm{csch}(x)^3}{3\,b}+\frac{\left(a^2+b^2\right)^2\ln(a+b\,\mathrm{csch}(x))}{a\,b^4}+\frac{\ln(\sinh(x))}{a}$$

Result(type 3, 218 leaves):

$$\frac{\tanh\left(\frac{x}{2}\right)^3}{24\,b}+\frac{\tanh\left(\frac{x}{2}\right)^2 a}{8\,b^2}+\frac{a^2\tanh\left(\frac{x}{2}\right)}{2\,b^3}+\frac{7\tanh\left(\frac{x}{2}\right)}{8\,b}-\frac{\ln\left(\tanh\left(\frac{x}{2}\right)-1\right)}{a}+\frac{a^3\ln\left(\tanh\left(\frac{x}{2}\right)^2 b-2\,a\tanh\left(\frac{x}{2}\right)-b\right)}{b^4}$$
$$+\frac{2\,a\ln\left(\tanh\left(\frac{x}{2}\right)^2 b-2\,a\tanh\left(\frac{x}{2}\right)-b\right)}{b^2}+\frac{\ln\left(\tanh\left(\frac{x}{2}\right)^2 b-2\,a\tanh\left(\frac{x}{2}\right)-b\right)}{a}-\frac{1}{24\,b\tanh\left(\frac{x}{2}\right)^3}-\frac{a^2}{2\,b^3\tanh\left(\frac{x}{2}\right)}-\frac{7}{8\,b\tanh\left(\frac{x}{2}\right)}$$
$$+\frac{a}{8\,b^2\tanh\left(\frac{x}{2}\right)^2}-\frac{a^3\ln\left(\tanh\left(\frac{x}{2}\right)\right)}{b^4}-\frac{2\,a\ln\left(\tanh\left(\frac{x}{2}\right)\right)}{b^2}-\frac{\ln\left(\tanh\left(\frac{x}{2}\right)+1\right)}{a}$$

Problem 37: Result more than twice size of optimal antiderivative.

$$\int \frac{\coth(x)^7}{a+b\,\mathrm{csch}(x)}\,dx$$

Optimal(type 3, 111 leaves, 3 steps):

$$-\frac{(a^4+3a^2b^2+3b^4)\operatorname{csch}(x)}{b^5}+\frac{a(a^2+3b^2)\operatorname{csch}(x)^2}{2b^4}-\frac{(a^2+3b^2)\operatorname{csch}(x)^3}{3b^3}+\frac{a\operatorname{csch}(x)^4}{4b^2}-\frac{\operatorname{csch}(x)^5}{5b}+\frac{(a^2+b^2)^3\ln(a+b\operatorname{csch}(x))}{a b^6}$$
$$+\frac{\ln(\sinh(x))}{a}$$

Result(type 3, 387 leaves):

$$\frac{a^5\ln\left(\tanh\left(\frac{x}{2}\right)^2 b-2a\tanh\left(\frac{x}{2}\right)-b\right)}{b^6}-\frac{a^2}{24b^3\tanh\left(\frac{x}{2}\right)^3}-\frac{a^4}{2b^5\tanh\left(\frac{x}{2}\right)}+\frac{a^3}{8b^4\tanh\left(\frac{x}{2}\right)^2}-\frac{a^5\ln\left(\tanh\left(\frac{x}{2}\right)\right)}{b^6}+\frac{a}{64b^2\tanh\left(\frac{x}{2}\right)^4}$$
$$+\frac{\tanh\left(\frac{x}{2}\right)^4 a}{64b^2}+\frac{a^2\tanh\left(\frac{x}{2}\right)^3}{24b^3}+\frac{\tanh\left(\frac{x}{2}\right)^2 a^3}{8b^4}+\frac{a^4\tanh\left(\frac{x}{2}\right)}{2b^5}-\frac{1}{160b\tanh\left(\frac{x}{2}\right)^5}+\frac{\tanh\left(\frac{x}{2}\right)^5}{160b}+\frac{5\tanh\left(\frac{x}{2}\right)^2 a}{16b^2}+\frac{11a^2\tanh\left(\frac{x}{2}\right)}{8b^3}$$
$$+\frac{3a^3\ln\left(\tanh\left(\frac{x}{2}\right)^2 b-2a\tanh\left(\frac{x}{2}\right)-b\right)}{b^4}-\frac{11a^2}{8b^3\tanh\left(\frac{x}{2}\right)}+\frac{5a}{16b^2\tanh\left(\frac{x}{2}\right)^2}-\frac{3a^3\ln\left(\tanh\left(\frac{x}{2}\right)\right)}{b^4}$$
$$+\frac{3a\ln\left(\tanh\left(\frac{x}{2}\right)^2 b-2a\tanh\left(\frac{x}{2}\right)-b\right)}{b^2}-\frac{3a\ln\left(\tanh\left(\frac{x}{2}\right)\right)}{b^2}+\frac{19\tanh\left(\frac{x}{2}\right)}{16b}-\frac{19}{16b\tanh\left(\frac{x}{2}\right)}+\frac{3\tanh\left(\frac{x}{2}\right)^3}{32b}-\frac{3}{32b\tanh\left(\frac{x}{2}\right)^3}$$
$$+\frac{\ln\left(\tanh\left(\frac{x}{2}\right)^2 b-2a\tanh\left(\frac{x}{2}\right)-b\right)}{a}-\frac{\ln\left(\tanh\left(\frac{x}{2}\right)-1\right)}{a}-\frac{\ln\left(\tanh\left(\frac{x}{2}\right)+1\right)}{a}$$

Problem 45: Unable to integrate problem.

$$\int\frac{\operatorname{csch}(2\ln(cx))^{3/2}}{x^4}\,dx$$

Optimal(type 3, 59 leaves, 6 steps):

$$-\frac{\left(c^4-\frac{1}{x^4}\right)x\operatorname{csch}(2\ln(cx))^{3/2}}{2}+\frac{c^6\left(1-\frac{1}{c^4x^4}\right)^{3/2}x^3\operatorname{arccsc}(c^2x^2)\operatorname{csch}(2\ln(cx))^{3/2}}{2}$$

Result(type 8, 15 leaves):

$$\int\frac{\operatorname{csch}(2\ln(cx))^{3/2}}{x^4}\,dx$$

Problem 46: Unable to integrate problem.

$$\int \operatorname{csch}\left(a + b \ln\left(c x^n\right)\right) \, dx$$

Optimal(type 5, 57 leaves, 4 steps):

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

Result(type 8, 13 leaves):

$$\int \operatorname{csch}\left(a + b \ln\left(c x^n\right)\right) \, dx$$

Test results for the 10 problems in "6.6.7 (d hyper)^m (a+b (c csch)^n)^p.txt"

Problem 3: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 142 leaves, 6 steps):

$$\frac{x}{a^3} + \frac{b \coth(d x + c)}{4 a (-b + a) d \left(a - b + b \coth(d x + c)^2\right)^2} + \frac{(7 a - 4 b) b \coth(d x + c)}{8 a^2 (-b + a)^2 d \left(a - b + b \coth(d x + c)^2\right)} - \frac{\left(15 a^2 - 20 a b + 8 b^2\right) \arctan\left(\frac{\sqrt{-b + a} \tanh(d x + c)}{\sqrt{b}}\right) \sqrt{b}}{8 a^3 (-b + a)^{5/2} d}$$

Result(type ?, 4583 leaves): Display of huge result suppressed!

Problem 4: Unable to integrate problem.

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

Optimal(type 3, 108 leaves, 7 steps):

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

Result(type 8, 16 leaves):

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

Problem 5: Unable to integrate problem.

$$\int \frac{1}{\left(a + b \operatorname{csch}(d x + c)^2\right)^{7/2}} \, dx$$

Optimal(type 3, 175 leaves, 7 steps):

$$\frac{\operatorname{arctanh}\left(\frac{\coth(d x+c)\sqrt{a}}{\sqrt{a-b+b\coth(d x+c)^2}}\right)}{a^{7/2} d}+\frac{b\coth(d x+c)}{5 a\,(-b+a)\, d\left(a-b+b\coth(d x+c)^2\right)^{5/2}}+\frac{(9 a-5 b)\, b\coth(d x+c)}{15 a^2\,(-b+a)^2 d\left(a-b+b\coth(d x+c)^2\right)^{3/2}}$$
$$+\frac{b\left(33 a^2-40 a b+15 b^2\right)\coth(d x+c)}{15 a^3\,(-b+a)^3 d\sqrt{a-b+b\coth(d x+c)^2}}$$

Result(type 8, 16 leaves):

$$\int\frac{1}{\left(a+b\,\mathrm{csch}(d x+c)^2\right)^{7/2}}\,\mathrm{d}x$$

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

$$\int\left(1+\mathrm{csch}(x)^2\right)^{3/2}\mathrm{d}x$$

Optimal(type 3, 23 leaves, 4 steps):

$$-\frac{\left(\coth(x)^2\right)^{3/2}\tanh(x)}{2}+\ln(\sinh(x))\sqrt{\coth(x)^2}\tanh(x)$$

Result(type 3, 119 leaves):

$$-\frac{\left(e^{2x}-1\right)\sqrt{\frac{\left(e^{2x}+1\right)^2}{\left(e^{2x}-1\right)^2}}\,x}{e^{2x}+1}-\frac{2\sqrt{\frac{\left(e^{2x}+1\right)^2}{\left(e^{2x}-1\right)^2}}\,e^{2x}}{\left(e^{2x}+1\right)\left(e^{2x}-1\right)}+\frac{\left(e^{2x}-1\right)\sqrt{\frac{\left(e^{2x}+1\right)^2}{\left(e^{2x}-1\right)^2}}\ln\left(e^{2x}-1\right)}{e^{2x}+1}$$

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

$$\int\sqrt{1+\mathrm{csch}(x)^2}\,\mathrm{d}x$$

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

$$\ln(\sinh(x))\sqrt{\coth(x)^2}\tanh(x)$$

Result(type 3, 78 leaves):

$$-\frac{\left(e^{2x}-1\right)\sqrt{\frac{\left(e^{2x}+1\right)^2}{\left(e^{2x}-1\right)^2}}\,x}{e^{2x}+1}+\frac{\left(e^{2x}-1\right)\sqrt{\frac{\left(e^{2x}+1\right)^2}{\left(e^{2x}-1\right)^2}}\ln\left(e^{2x}-1\right)}{e^{2x}+1}$$

Problem 8: Result more than twice size of optimal antiderivative.

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

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

$$\frac{\coth(x)\ln(\cosh(x))}{\sqrt{\coth(x)^2}}$$

Result(type 3, 78 leaves):

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

Problem 9: Unable to integrate problem.

$$\int (1-\operatorname{csch}(x)^2)^{3/2}\, dx$$

Optimal(type 3, 39 leaves, 6 steps):

$$2\arcsin\left(\frac{\coth(x)\sqrt{2}}{2}\right)+\operatorname{arctanh}\left(\frac{\coth(x)}{\sqrt{2-\coth(x)^2}}\right)+\frac{\coth(x)\sqrt{2-\coth(x)^2}}{2}$$

Result(type 8, 12 leaves):

$$\int (1-\operatorname{csch}(x)^2)^{3/2}\, dx$$

Problem 10: Unable to integrate problem.

$$\int \sqrt{-1+\operatorname{csch}(x)^2}\, dx$$

Optimal(type 3, 29 leaves, 6 steps):

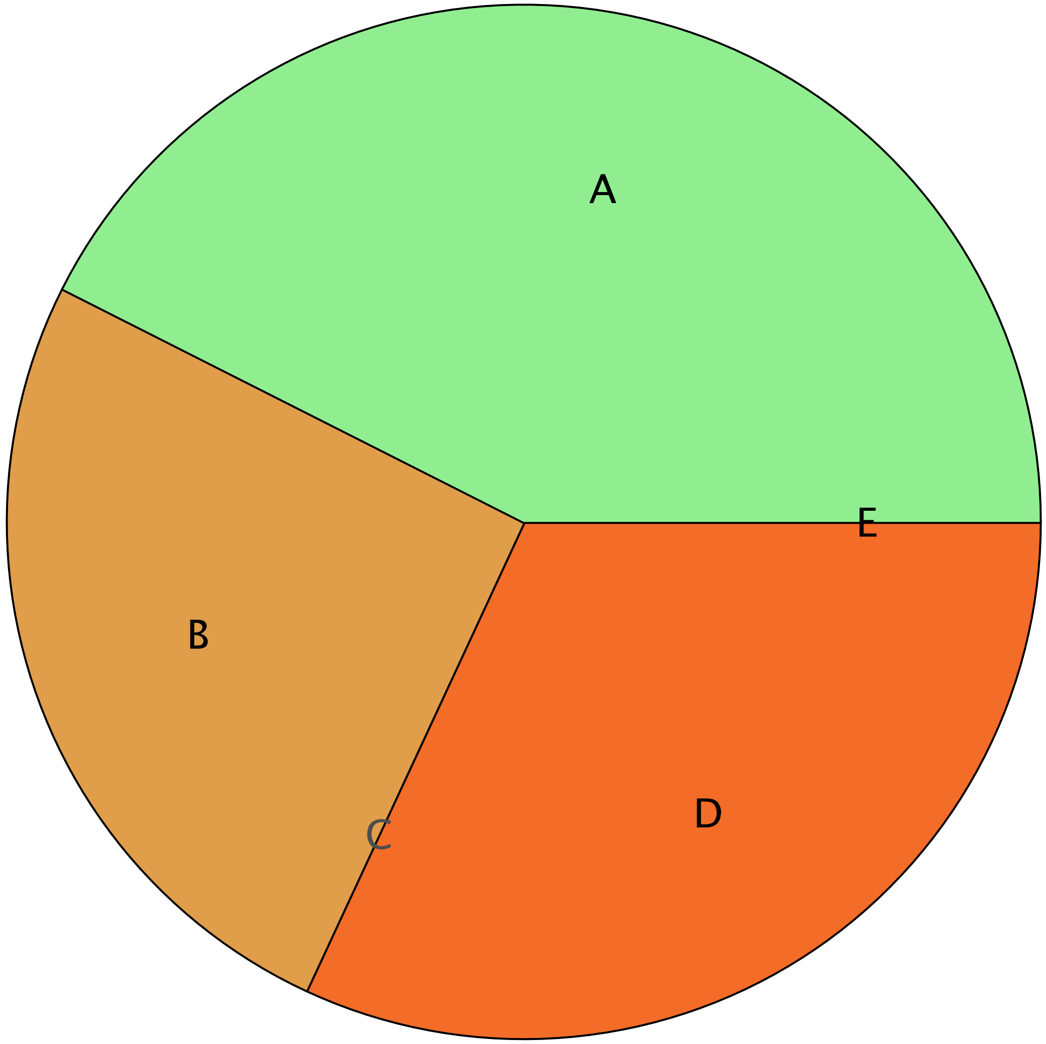
$$-\arctan\left(\frac{\coth(x)}{\sqrt{-2+\coth(x)^2}}\right)-\operatorname{arctanh}\left(\frac{\coth(x)}{\sqrt{-2+\coth(x)^2}}\right)$$

Result(type 8, 10 leaves):

$$\int \sqrt{-1+\operatorname{csch}(x)^2}\, dx$$

Summary of Integration Test Results

94 integration problems



A - 40 optimal antiderivatives
B - 24 more than twice size of optimal antiderivatives
C - 0 unnecessarily complex antiderivatives
D - 30 unable to integrate problems
E - 0 integration timeouts