Mathematica 11.3 Integration Test Results

Test results for the 311 problems in "8.1 Error functions.m"

Problem 26: Unable to integrate problem.

$$\int \frac{\text{Erf}[b\,x]^2}{x^3}\,dx$$

Optimal (type 4, 67 leaves, 5 steps):

$$-\frac{2\,b\,e^{-b^2 x^2}\,\text{Erf}[b\,x]}{\sqrt{\pi}\,x} - b^2\,\text{Erf}[b\,x]^2 - \frac{\text{Erf}[b\,x]^2}{2\,x^2} + \frac{2\,b^2\,\text{ExpIntegralEi}\left[-2\,b^2\,x^2\right]}{\pi}$$

Result (type 8, 12 leaves):

$$\int \frac{\text{Erf}[b\,x]^2}{x^3}\,dx$$

Problem 27: Unable to integrate problem.

$$\int \frac{\text{Erf}[b\,x]^2}{x^5}\,dx$$

Optimal (type 4, 125 leaves, 8 steps):

$$-\frac{b^2\,e^{-2\,b^2 x^2}}{3\,\pi\,x^2} - \frac{b\,e^{-b^2 x^2}\,\text{Erf}[b\,x]}{3\,\sqrt{\pi}\,x^3} + \frac{2\,b^3\,e^{-b^2 x^2}\,\text{Erf}[b\,x]}{3\,\sqrt{\pi}\,x} + \frac{1}{3}\,b^4\,\text{Erf}[b\,x]^2 - \frac{\text{Erf}[b\,x]^2}{4\,x^4} - \frac{4\,b^4\,\text{ExpIntegralEi}\left[-2\,b^2\,x^2\right]}{3\,\pi}$$

Result (type 8, 12 leaves):

$$\int \frac{\text{Erf}[b\,x]^2}{x^5}\,dx$$

Problem 28: Unable to integrate problem.

$$\int \frac{\text{Erf}[b\,x]^2}{x^7}\,dx$$

Optimal (type 4, 177 leaves, 12 steps):

$$-\frac{b^2\, e^{-2 b^2 x^2}}{15\,\pi\, x^4}+\frac{2\, b^4\, e^{-2 b^2 x^2}}{9\,\pi\, x^2}-\frac{2\, b\, e^{-b^2 x^2}\, \text{Erf}[b\, x]}{15\,\sqrt{\pi}\, x^5}+\frac{4\, b^3\, e^{-b^2 x^2}\, \text{Erf}[b\, x]}{45\,\sqrt{\pi}\, x^3}-$$
$$\frac{8\, b^5\, e^{-b^2 x^2}\, \text{Erf}[b\, x]}{45\,\sqrt{\pi}\, x}-\frac{4}{45}\, b^6\, \text{Erf}[b\, x]^2-\frac{\text{Erf}[b\, x]^2}{6\, x^6}+\frac{28\, b^6\, \text{ExpIntegralEi}\left[-2\, b^2 x^2\right]}{45\,\pi}$$

Result (type 8, 12 leaves):

$$\int \frac{\text{Erf}[b\, x]^2}{x^7}\, dx$$

Problem 72: Unable to integrate problem.

$$\int e^{c+b^2 x^2}\, \text{Erf}[b\, x]\, dx$$

Optimal (type 5, 29 leaves, 1 step):

$$\frac{b\, e^c\, x^2\, \text{HypergeometricPFQ}\left[\{1, 1\}, \left\{\frac{3}{2}, 2\right\}, b^2 x^2\right]}{\sqrt{\pi}}$$

Result (type 8, 18 leaves):

$$\int e^{c+b^2 x^2}\, \text{Erf}[b\, x]\, dx$$

Problem 98: Unable to integrate problem.

$$\int \text{Cos}\left[c+i\, b^2 x^2\right]\, \text{Erf}[b\, x]\, dx$$

Optimal (type 5, 62 leaves, 4 steps):

$$\frac{e^{i\, c}\, \sqrt{\pi}\, \text{Erf}[b\, x]^2}{8\, b}+\frac{b\, e^{-i\, c}\, x^2\, \text{HypergeometricPFQ}\left[\{1, 1\}, \left\{\frac{3}{2}, 2\right\}, b^2 x^2\right]}{2\,\sqrt{\pi}}$$

Result (type 8, 20 leaves):

$$\int \text{Cos}\left[c+i\, b^2 x^2\right]\, \text{Erf}[b\, x]\, dx$$

Problem 99: Unable to integrate problem.

$$\int \text{Cos}\left[c-i\, b^2 x^2\right]\, \text{Erf}[b\, x]\, dx$$

Optimal (type 5, 62 leaves, 4 steps):

$$\frac{e^{-i\, c}\, \sqrt{\pi}\, \text{Erf}[b\, x]^2}{8\, b}+\frac{b\, e^{i\, c}\, x^2\, \text{HypergeometricPFQ}\left[\{1, 1\}, \left\{\frac{3}{2}, 2\right\}, b^2 x^2\right]}{2\,\sqrt{\pi}}$$

Result (type 8, 20 leaves):

$$\int \text{Cos}\left[c - i\, b^2\, x^2\right]\, \text{Erf}[b\, x]\, dx$$

Problem 129: Unable to integrate problem.

$$\int \frac{\text{Erfc}[b\, x]^2}{x^3}\, dx$$

Optimal (type 4, 67 leaves, 5 steps):

$$\frac{2\, b\, e^{-b^2\, x^2}\, \text{Erfc}[b\, x]}{\sqrt{\pi}\, x} - b^2\, \text{Erfc}[b\, x]^2 - \frac{\text{Erfc}[b\, x]^2}{2\, x^2} + \frac{2\, b^2\, \text{ExpIntegralEi}\left[-2\, b^2\, x^2\right]}{\pi}$$

Result (type 8, 12 leaves):

$$\int \frac{\text{Erfc}[b\, x]^2}{x^3}\, dx$$

Problem 130: Unable to integrate problem.

$$\int \frac{\text{Erfc}[b\, x]^2}{x^5}\, dx$$

Optimal (type 4, 125 leaves, 8 steps):

$$-\frac{b^2\, e^{-2\, b^2\, x^2}}{3\, \pi\, x^2} + \frac{b\, e^{-b^2\, x^2}\, \text{Erfc}[b\, x]}{3\, \sqrt{\pi}\, x^3} - \frac{2\, b^3\, e^{-b^2\, x^2}\, \text{Erfc}[b\, x]}{3\, \sqrt{\pi}\, x} +$$
$$\frac{1}{3}\, b^4\, \text{Erfc}[b\, x]^2 - \frac{\text{Erfc}[b\, x]^2}{4\, x^4} - \frac{4\, b^4\, \text{ExpIntegralEi}\left[-2\, b^2\, x^2\right]}{3\, \pi}$$

Result (type 8, 12 leaves):

$$\int \frac{\text{Erfc}[b\, x]^2}{x^5}\, dx$$

Problem 131: Unable to integrate problem.

$$\int \frac{\text{Erfc}[b\, x]^2}{x^7}\, dx$$

Optimal (type 4, 177 leaves, 12 steps):

$$-\frac{b^2\, e^{-2\, b^2\, x^2}}{15\, \pi\, x^4} + \frac{2\, b^4\, e^{-2\, b^2\, x^2}}{9\, \pi\, x^2} + \frac{2\, b\, e^{-b^2\, x^2}\, \text{Erfc}[b\, x]}{15\, \sqrt{\pi}\, x^5} - \frac{4\, b^3\, e^{-b^2\, x^2}\, \text{Erfc}[b\, x]}{45\, \sqrt{\pi}\, x^3} +$$
$$\frac{8\, b^5\, e^{-b^2\, x^2}\, \text{Erfc}[b\, x]}{45\, \sqrt{\pi}\, x} - \frac{4}{45}\, b^6\, \text{Erfc}[b\, x]^2 - \frac{\text{Erfc}[b\, x]^2}{6\, x^6} + \frac{28\, b^6\, \text{ExpIntegralEi}\left[-2\, b^2\, x^2\right]}{45\, \pi}$$

Result (type 8, 12 leaves):

$$\int \frac{\text{Erfc}[b\, x]^2}{x^7}\, dx$$

Problem 138: Unable to integrate problem.

$$\int (c+d\,x)^2\,\text{Erfc}[a+b\,x]^2\,dx$$

Optimal (type 4, 375 leaves, 16 steps):

$$\frac{d\,(b\,c-a\,d)\,e^{-2\,(a+b\,x)^2}}{b^3\,\pi}+\frac{d^2\,e^{-2\,(a+b\,x)^2}\,(a+b\,x)}{3\,b^3\,\pi}-\frac{(b\,c-a\,d)^2\,\sqrt{\frac{2}{\pi}}\,\text{Erf}\left[\sqrt{2}\,(a+b\,x)\right]}{b^3}-$$
$$\frac{5\,d^2\,\text{Erf}\left[\sqrt{2}\,(a+b\,x)\right]}{6\,b^3\,\sqrt{2\,\pi}}-\frac{2\,d^2\,e^{-(a+b\,x)^2}\,\text{Erfc}[a+b\,x]}{3\,b^3\,\sqrt{\pi}}-\frac{2\,(b\,c-a\,d)^2\,e^{-(a+b\,x)^2}\,\text{Erfc}[a+b\,x]}{b^3\,\sqrt{\pi}}-$$
$$\frac{2\,d\,(b\,c-a\,d)\,e^{-(a+b\,x)^2}\,(a+b\,x)\,\text{Erfc}[a+b\,x]}{b^3\,\sqrt{\pi}}-\frac{2\,d^2\,e^{-(a+b\,x)^2}\,(a+b\,x)^2\,\text{Erfc}[a+b\,x]}{3\,b^3\,\sqrt{\pi}}-$$
$$\frac{d\,(b\,c-a\,d)\,\text{Erfc}[a+b\,x]^2}{2\,b^3}+\frac{(b\,c-a\,d)^2\,(a+b\,x)\,\text{Erfc}[a+b\,x]^2}{b^3}+$$
$$\frac{d\,(b\,c-a\,d)\,(a+b\,x)^2\,\text{Erfc}[a+b\,x]^2}{b^3}+\frac{d^2\,(a+b\,x)^3\,\text{Erfc}[a+b\,x]^2}{3\,b^3}$$

Result (type 8, 18 leaves):

$$\int (c+d\,x)^2\,\text{Erfc}[a+b\,x]^2\,dx$$

Problem 175: Unable to integrate problem.

$$\int e^{c+b^2\,x^2}\,\text{Erfc}[b\,x]\,dx$$

Optimal (type 5, 50 leaves, 3 steps):

$$\frac{e^c\,\sqrt{\pi}\,\text{Erfi}[b\,x]}{2\,b}-\frac{b\,e^c\,x^2\,\text{HypergeometricPFQ}\left[\{1,1\},\left\{\frac{3}{2},2\right\},b^2\,x^2\right]}{\sqrt{\pi}}$$

Result (type 8, 18 leaves):

$$\int e^{c+b^2\,x^2}\,\text{Erfc}[b\,x]\,dx$$

Problem 201: Unable to integrate problem.

$$\int \text{Cos}\left[c+i\,b^2\,x^2\right]\,\text{Erfc}[b\,x]\,dx$$

Optimal (type 5, 85 leaves, 6 steps):

$$-\frac{e^{i\,c}\,\sqrt{\pi}\,\text{Erfc}[b\,x]^2}{8\,b}+\frac{e^{-i\,c}\,\sqrt{\pi}\,\text{Erfi}[b\,x]}{4\,b}-\frac{b\,e^{-i\,c}\,x^2\,\text{HypergeometricPFQ}\left[\{1,1\},\left\{\frac{3}{2},2\right\},b^2\,x^2\right]}{2\,\sqrt{\pi}}$$

Result (type 8, 20 leaves):

$$\int \text{Cos}\left[c + i\, b^2\, x^2\right]\, \text{Erfc}[b\, x]\, dx$$

Problem 202: Unable to integrate problem.

$$\int \text{Cos}\left[c - i\, b^2\, x^2\right]\, \text{Erfc}[b\, x]\, dx$$

Optimal (type 5, 85 leaves, 6 steps):

$$-\frac{e^{-i\,c}\,\sqrt{\pi}\,\text{Erfc}[b\,x]^2}{8\,b} + \frac{e^{i\,c}\,\sqrt{\pi}\,\text{Erfi}[b\,x]}{4\,b} - \frac{b\,e^{i\,c}\,x^2\,\text{HypergeometricPFQ}\left[\{1,1\},\left\{\frac{3}{2},2\right\},b^2\,x^2\right]}{2\,\sqrt{\pi}}$$

Result (type 8, 20 leaves):

$$\int \text{Cos}\left[c - i\, b^2\, x^2\right]\, \text{Erfc}[b\, x]\, dx$$

Problem 228: Unable to integrate problem.

$$\int x^5\, \text{Erfi}[b\, x]^2\, dx$$

Optimal (type 4, 175 leaves, 12 steps):

$$\frac{11\,e^{2\,b^2\,x^2}}{12\,b^6\,\pi} - \frac{7\,e^{2\,b^2\,x^2}\,x^2}{12\,b^4\,\pi} + \frac{e^{2\,b^2\,x^2}\,x^4}{6\,b^2\,\pi} - \frac{5\,e^{b^2\,x^2}\,x\,\text{Erfi}[b\,x]}{4\,b^5\,\sqrt{\pi}} +$$
$$\frac{5\,e^{b^2\,x^2}\,x^3\,\text{Erfi}[b\,x]}{6\,b^3\,\sqrt{\pi}} - \frac{e^{b^2\,x^2}\,x^5\,\text{Erfi}[b\,x]}{3\,b\,\sqrt{\pi}} + \frac{5\,\text{Erfi}[b\,x]^2}{16\,b^6} + \frac{1}{6}\,x^6\,\text{Erfi}[b\,x]^2$$

Result (type 8, 12 leaves):

$$\int x^5\, \text{Erfi}[b\, x]^2\, dx$$

Problem 229: Unable to integrate problem.

$$\int x^3\, \text{Erfi}[b\, x]^2\, dx$$

Optimal (type 4, 124 leaves, 8 steps):

$$-\frac{e^{2\,b^2\,x^2}}{2\,b^4\,\pi} + \frac{e^{2\,b^2\,x^2}\,x^2}{4\,b^2\,\pi} + \frac{3\,e^{b^2\,x^2}\,x\,\text{Erfi}[b\,x]}{4\,b^3\,\sqrt{\pi}} - \frac{e^{b^2\,x^2}\,x^3\,\text{Erfi}[b\,x]}{2\,b\,\sqrt{\pi}} - \frac{3\,\text{Erfi}[b\,x]^2}{16\,b^4} + \frac{1}{4}\,x^4\,\text{Erfi}[b\,x]^2$$

Result (type 8, 12 leaves):

$$\int x^3\, \text{Erfi}[b\, x]^2\, dx$$

Problem 230: Unable to integrate problem.

$$\int x\,\text{Erfi}[b\,x]^2\,dx$$

Optimal (type 4, 71 leaves, 5 steps):

$$\frac{e^{2\,b^2\,x^2}}{2\,b^2\,\pi}-\frac{e^{b^2\,x^2}\,x\,\text{Erfi}[b\,x]}{b\,\sqrt{\pi}}+\frac{\text{Erfi}[b\,x]^2}{4\,b^2}+\frac{1}{2}\,x^2\,\text{Erfi}[b\,x]^2$$

Result (type 8, 10 leaves):

$$\int x\,\text{Erfi}[b\,x]^2\,dx$$

Problem 232: Unable to integrate problem.

$$\int\frac{\text{Erfi}[b\,x]^2}{x^3}\,dx$$

Optimal (type 4, 65 leaves, 5 steps):

$$-\frac{2\,b\,e^{b^2\,x^2}\,\text{Erfi}[b\,x]}{\sqrt{\pi}\,x}+b^2\,\text{Erfi}[b\,x]^2-\frac{\text{Erfi}[b\,x]^2}{2\,x^2}+\frac{2\,b^2\,\text{ExpIntegralEi}\left[2\,b^2\,x^2\right]}{\pi}$$

Result (type 8, 12 leaves):

$$\int\frac{\text{Erfi}[b\,x]^2}{x^3}\,dx$$

Problem 233: Unable to integrate problem.

$$\int\frac{\text{Erfi}[b\,x]^2}{x^5}\,dx$$

Optimal (type 4, 123 leaves, 8 steps):

$$-\frac{b^2\,e^{2\,b^2\,x^2}}{3\,\pi\,x^2}-\frac{b\,e^{b^2\,x^2}\,\text{Erfi}[b\,x]}{3\,\sqrt{\pi}\,x^3}-\frac{2\,b^3\,e^{b^2\,x^2}\,\text{Erfi}[b\,x]}{3\,\sqrt{\pi}\,x}+$$
$$\frac{1}{3}\,b^4\,\text{Erfi}[b\,x]^2-\frac{\text{Erfi}[b\,x]^2}{4\,x^4}+\frac{4\,b^4\,\text{ExpIntegralEi}\left[2\,b^2\,x^2\right]}{3\,\pi}$$

Result (type 8, 12 leaves):

$$\int\frac{\text{Erfi}[b\,x]^2}{x^5}\,dx$$

Problem 234: Unable to integrate problem.

$$\int\frac{\text{Erfi}[b\,x]^2}{x^7}\,dx$$

Optimal (type 4, 174 leaves, 12 steps):

$$-\frac{b^2\, e^{2\,b^2\,x^2}}{15\,\pi\,x^4}-\frac{2\,b^4\, e^{2\,b^2\,x^2}}{9\,\pi\,x^2}-\frac{2\,b\, e^{b^2\,x^2}\,\text{Erfi}[b\,x]}{15\,\sqrt{\pi}\,x^5}-\frac{4\,b^3\, e^{b^2\,x^2}\,\text{Erfi}[b\,x]}{45\,\sqrt{\pi}\,x^3}-$$
$$\frac{8\,b^5\, e^{b^2\,x^2}\,\text{Erfi}[b\,x]}{45\,\sqrt{\pi}\,x}+\frac{4}{45}\,b^6\,\text{Erfi}[b\,x]^2-\frac{\text{Erfi}[b\,x]^2}{6\,x^6}+\frac{28\,b^6\,\text{ExpIntegralEi}\left[2\,b^2\,x^2\right]}{45\,\pi}$$

Result (type 8, 12 leaves):

$$\int\frac{\text{Erfi}[b\,x]^2}{x^7}\,dx$$

Problem 241: Unable to integrate problem.

$$\int(c+d\,x)^2\,\text{Erfi}[a+b\,x]^2\,dx$$

Optimal (type 4, 366 leaves, 16 steps):

$$\frac{d\,(b\,c-a\,d)\, e^{2\,(a+b\,x)^2}}{b^3\,\pi}+\frac{d^2\, e^{2\,(a+b\,x)^2}\,(a+b\,x)}{3\,b^3\,\pi}+\frac{2\,d^2\, e^{(a+b\,x)^2}\,\text{Erfi}[a+b\,x]}{3\,b^3\,\sqrt{\pi}}-$$
$$\frac{2\,(b\,c-a\,d)^2\, e^{(a+b\,x)^2}\,\text{Erfi}[a+b\,x]}{b^3\,\sqrt{\pi}}-\frac{2\,d\,(b\,c-a\,d)\, e^{(a+b\,x)^2}\,(a+b\,x)\,\text{Erfi}[a+b\,x]}{b^3\,\sqrt{\pi}}-$$
$$\frac{2\,d^2\, e^{(a+b\,x)^2}\,(a+b\,x)^2\,\text{Erfi}[a+b\,x]}{3\,b^3\,\sqrt{\pi}}+\frac{d\,(b\,c-a\,d)\,\text{Erfi}[a+b\,x]^2}{2\,b^3}+$$
$$\frac{(b\,c-a\,d)^2\,(a+b\,x)\,\text{Erfi}[a+b\,x]^2}{b^3}+\frac{d\,(b\,c-a\,d)\,(a+b\,x)^2\,\text{Erfi}[a+b\,x]^2}{b^3}+$$
$$\frac{d^2\,(a+b\,x)^3\,\text{Erfi}[a+b\,x]^2}{3\,b^3}+\frac{(b\,c-a\,d)^2\,\sqrt{\frac{2}{\pi}}\,\text{Erfi}\left[\sqrt{2}\,(a+b\,x)\right]}{b^3}-\frac{5\,d^2\,\text{Erfi}\left[\sqrt{2}\,(a+b\,x)\right]}{6\,b^3\,\sqrt{2\,\pi}}$$

Result (type 8, 18 leaves):

$$\int(c+d\,x)^2\,\text{Erfi}[a+b\,x]^2\,dx$$

Problem 242: Result unnecessarily involves imaginary or complex numbers.

$$\int(c+d\,x)\,\text{Erfi}[a+b\,x]^2\,dx$$

Optimal (type 4, 184 leaves, 10 steps):

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

Result (type 4, 189 leaves):

$$\frac{1}{4\,b^2\,\pi}$$
$$\Big(\left(4\,a\,b\,c+d-2\,a^2\,d\right)\pi\,\text{Erfc}\left[-i\,(a+b\,x)\right]\text{Erfc}\left[i\,(a+b\,x)\right] + 2\Big(d\,e^{2\,(a+b\,x)^2} + 4\,a\,b\,c\,\pi + d\,\pi - 2\,a^2\,d\,\pi +$$
$$2\,i\,b\,c\,\sqrt{2\,\pi} - 2\,i\,a\,d\,\sqrt{2\,\pi} - 2\,e^{(a+b\,x)^2}\,\sqrt{\pi}\,\left(2\,b\,c-a\,d+b\,d\,x\right)\text{Erfi}[a+b\,x] +$$
$$b^2\,\pi\,x\,(2\,c+d\,x)\,\text{Erfi}[a+b\,x]^2 + 2\,(b\,c-a\,d)\,\sqrt{2\,\pi}\,\text{Erfi}\left[\sqrt{2}\,(a+b\,x)\right]\Big)\Big)$$

Problem 280: Unable to integrate problem.

$$\int \frac{e^{-b^2\,x^2}\,\text{Erfi}[b\,x]}{x^2}\,dx$$

Optimal (type 5, 60 leaves, 3 steps):

$$-\frac{e^{-b^2\,x^2}\,\text{Erfi}[b\,x]}{x} - \frac{2\,b^3\,x^2\,\text{HypergeometricPFQ}\left[\{1,1\},\left\{\frac{3}{2},2\right\},-b^2\,x^2\right]}{\sqrt{\pi}} + \frac{2\,b\,\text{Log}[x]}{\sqrt{\pi}}$$

Result (type 9, 26 leaves):

$$-\frac{1}{2}\,b\,\text{MeijerG}\left[\{\{0\},\{1\}\},\left\{\{0,0\},\left\{-\frac{1}{2}\right\}\right\},b^2\,x^2\right]$$

Problem 281: Unable to integrate problem.

$$\int \frac{e^{-b^2\,x^2}\,\text{Erfi}[b\,x]}{x^4}\,dx$$

Optimal (type 5, 105 leaves, 5 steps):

$$-\frac{b}{3\,\sqrt{\pi}\,x^2} - \frac{e^{-b^2\,x^2}\,\text{Erfi}[b\,x]}{3\,x^3} + \frac{2\,b^2\,e^{-b^2\,x^2}\,\text{Erfi}[b\,x]}{3\,x} +$$
$$\frac{4\,b^5\,x^2\,\text{HypergeometricPFQ}\left[\{1,1\},\left\{\frac{3}{2},2\right\},-b^2\,x^2\right]}{3\,\sqrt{\pi}} - \frac{4\,b^3\,\text{Log}[x]}{3\,\sqrt{\pi}}$$

Result (type 9, 29 leaves):

$$-\frac{b\,\text{MeijerG}\left[\{\{0\},\{2\}\},\left\{\{0,1\},\left\{-\frac{1}{2}\right\}\right\},b^2\,x^2\right]}{2\,x^2}$$

Problem 282: Unable to integrate problem.

$$\int \frac{e^{-b^2 x^2}\, \text{Erfi}[b x]}{x^6}\, dx$$

Optimal (type 5, 144 leaves, 7 steps):

$$-\frac{b}{10\sqrt{\pi}\, x^4}+\frac{2 b^3}{15\sqrt{\pi}\, x^2}-\frac{e^{-b^2 x^2}\, \text{Erfi}[b x]}{5 x^5}+\frac{2 b^2 e^{-b^2 x^2}\, \text{Erfi}[b x]}{15 x^3}-$$
$$\frac{4 b^4 e^{-b^2 x^2}\, \text{Erfi}[b x]}{15 x}-\frac{8 b^7 x^2\, \text{HypergeometricPFQ}\left[\{1,1\},\left\{\frac{3}{2},2\right\},-b^2 x^2\right]}{15\sqrt{\pi}}+\frac{8 b^5 \text{Log}[x]}{15\sqrt{\pi}}$$

Result (type 9, 29 leaves):

$$-\frac{b\, \text{MeijerG}\left[\{\{0\},\{3\}\},\left\{\{0,2\},\left\{-\frac{1}{2}\right\}\right\},b^2 x^2\right]}{2 x^4}$$

Problem 304: Unable to integrate problem.

$$\int \text{Erfi}[b x]\, \text{Sin}\left[c+i b^2 x^2\right]\, dx$$

Optimal (type 5, 67 leaves, 4 steps):

$$\frac{i e^{-i c}\sqrt{\pi}\, \text{Erfi}[b x]^2}{8 b}-\frac{i b e^{i c} x^2\, \text{HypergeometricPFQ}\left[\{1,1\},\left\{\frac{3}{2},2\right\},-b^2 x^2\right]}{2\sqrt{\pi}}$$

Result (type 8, 20 leaves):

$$\int \text{Erfi}[b x]\, \text{Sin}\left[c+i b^2 x^2\right]\, dx$$

Problem 305: Unable to integrate problem.

$$\int \text{Erfi}[b x]\, \text{Sin}\left[c-i b^2 x^2\right]\, dx$$

Optimal (type 5, 67 leaves, 4 steps):

$$-\frac{i e^{i c}\sqrt{\pi}\, \text{Erfi}[b x]^2}{8 b}+\frac{i b e^{-i c} x^2\, \text{HypergeometricPFQ}\left[\{1,1\},\left\{\frac{3}{2},2\right\},-b^2 x^2\right]}{2\sqrt{\pi}}$$

Result (type 8, 20 leaves):

$$\int \text{Erfi}[b x]\, \text{Sin}\left[c-i b^2 x^2\right]\, dx$$

Problem 306: Unable to integrate problem.

$$\int \text{Cos}\left[c+i b^2 x^2\right]\, \text{Erfi}[b x]\, dx$$

Optimal (type 5, 63 leaves, 4 steps):

$$\frac{e^{-i c} \sqrt{\pi}\, \text{Erfi}[b x]^2}{8 b} + \frac{b e^{i c} x^2\, \text{HypergeometricPFQ}\left[\{1, 1\}, \left\{\frac{3}{2}, 2\right\}, -b^2 x^2\right]}{2 \sqrt{\pi}}$$

Result (type 8, 20 leaves):

$$\int \text{Cos}\left[c + i b^2 x^2\right] \text{Erfi}[b x]\, dx$$

Problem 307: Unable to integrate problem.

$$\int \text{Cos}\left[c - i b^2 x^2\right] \text{Erfi}[b x]\, dx$$

Optimal (type 5, 63 leaves, 4 steps):

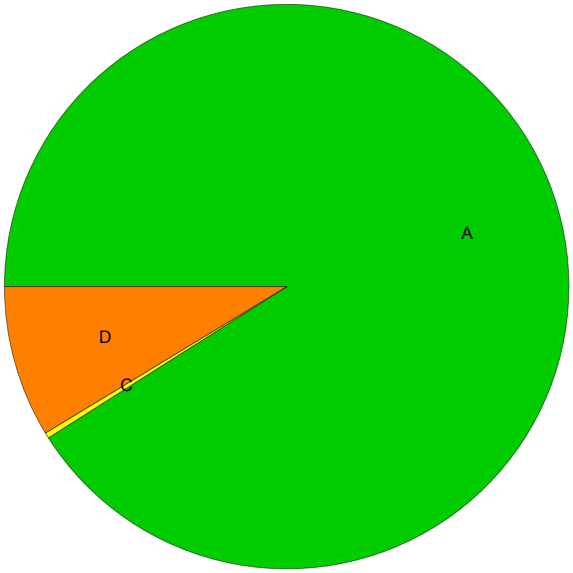
$$\frac{e^{i c} \sqrt{\pi}\, \text{Erfi}[b x]^2}{8 b} + \frac{b e^{-i c} x^2\, \text{HypergeometricPFQ}\left[\{1, 1\}, \left\{\frac{3}{2}, 2\right\}, -b^2 x^2\right]}{2 \sqrt{\pi}}$$

Result (type 8, 20 leaves):

$$\int \text{Cos}\left[c - i b^2 x^2\right] \text{Erfi}[b x]\, dx$$

Summary of Integration Test Results

311 integration problems



A - 283 optimal antiderivatives

B - 0 more than twice size of optimal antiderivatives

C - 1 unnecessarily complex antiderivatives

D - 27 unable to integrate problems

E - 0 integration timeouts