

Mathematica 11.3 Integration Test Results

Test results for the 97 problems in "8.10 Formal derivatives.m"

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

$$\int \frac{g[x] f'[x] + f[x] g'[x]}{1 - f[x]^2 g[x]^2} dx$$

Optimal (type 9, 6 leaves, 2 steps):

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

Result (type 9, 26 leaves):

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

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

$$\int \frac{-g[x] f'[x] + f[x] g'[x]}{f[x]^2 - g[x]^2} dx$$

Optimal (type 9, 8 leaves, 2 steps):

$$\text{ArcTanh}\left[\frac{f[x]}{g[x]}\right]$$

Result (type 9, 23 leaves):

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

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

$$\int \frac{f[x]^{-1+m} g[x]^{-1+n} (m g[x] f'[x] + n f[x] g'[x])}{1 - f[x]^{2m} g[x]^{2n}} dx$$

Optimal (type 9, 10 leaves, 2 steps):

$$\text{ArcTanh}[f[x]^m g[x]^n]$$

Result (type 9, 34 leaves):

$$-\frac{1}{2} \text{Log}[1 - f[x]^m g[x]^n] + \frac{1}{2} \text{Log}[1 + f[x]^m g[x]^n]$$

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

$$\int \frac{f[x]^{-1+m} g[x]^{-1+n} (-m g[x] f'[x] + n f[x] g'[x])}{f[x]^{2m} - g[x]^{2n}} dx$$

Optimal (type 9, 12 leaves, 3 steps):

$$\text{ArcTanh}[f[x]^{-m} g[x]^n]$$

Result (type 9, 31 leaves):

$$-\frac{1}{2} \text{Log}[f[x]^m - g[x]^n] + \frac{1}{2} \text{Log}[f[x]^m + g[x]^n]$$

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

$$\int \frac{f[x]^{-1+m} g[x]^{-1-n} (-m g[x] f'[x] - n f[x] g'[x])}{f[x]^{2m} - g[x]^{-2n}} dx$$

Optimal (type 9, 14 leaves, 3 steps):

$$\text{ArcTanh}[f[x]^{-m} g[x]^{-n}]$$

Result (type 9, 34 leaves):

$$-\frac{1}{2} \text{Log}[1 - f[x]^m g[x]^n] + \frac{1}{2} \text{Log}[1 + f[x]^m g[x]^n]$$

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

$$\int (\text{Cos}[x] g[e^x] f'[\text{Sin}[x]] + e^x f[\text{Sin}[x]] g'[e^x]) dx$$

Optimal (type 9, 8 leaves, ? steps):

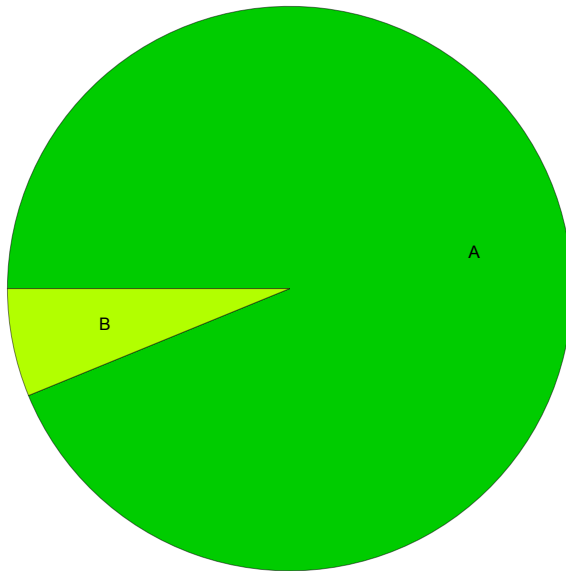
$$f[\text{Sin}[x]] g[e^x]$$

Result (type 9, 28 leaves):

$$\int (\text{Cos}[x] g[e^x] f'[\text{Sin}[x]] + e^x f[\text{Sin}[x]] g'[e^x]) dx$$

Summary of Integration Test Results

97 integration problems



A - 91 optimal antiderivatives

B - 6 more than twice size of optimal antiderivatives

C - 0 unnecessarily complex antiderivatives

D - 0 unable to integrate problems

E - 0 integration timeouts