2017 Integration Bee

Society for Undergraduate Mathematics Students

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Figure: May the odds be ever in your favor

Integral Calisthenics

$$\int \sin x + \cos x + \csc x + \sec x \, dx$$

$$\int \frac{(9^3 + 10^3)x^{1728}}{\sin^2 x + \cos^2 x} \, dx$$

$$\int \frac{x+1}{x^2 + 2x + 3} \, dx$$

$$\int \frac{x^{2017} \, dx}{(x^{2018} + \pi^{2018})}$$

$$\int e^{e^x} e^x \, dx$$

$$\int \sin(\sin x) \cos x \ dx$$

$$\int \sin(x) \cos(x) \cot(x) \tan(x) \ dx$$

$$\int 5x\sqrt{49 - 4x^2}\, dx$$

$$\int \cos^3(x) \sin(x)\, dx$$

$$\int \sin^2(\sin(x)) \cos(x) \, dx$$

$$\int \frac{4x + 6}{2x^2 + 5x - 3} \, dx$$

$$\int \frac{\cos(\ln(x))}{x} \, dx$$

$$\int \sin^2(x)\, dx$$

$$\int xe^x \, dx$$

$$\int \frac{2x^2 + 3}{x - 2} \, dx$$

$$\int x \ln(x)\, dx$$

$$\int \frac{\ln(x)\,dx}{x^2}$$

$$\int_{-\pi}^{\pi} x \sin(x)\, dx$$

$$\int \frac{\cos(x)}{\sqrt{1 + 16\sin^2(x)}}\, dx$$

$$\int \frac{x}{\sqrt{1+x^2}} \, dx$$

Intermediate Integrals

$$\int \frac{2x + 6}{x^2 + 3x + 2} \, dx$$

$$\int e^{12x} \sqrt{e^{12x} - \pi} \, dx$$

$$\int \frac{\ln(\ln(x))}{x} \, dx$$

$$\int x^3 \cos(2x)\, dx$$

$$\int \frac{14 - 7x}{2x^2 + 5x - 3} \, dx$$

$$\int \sin\left(\sqrt{x}\right)$$

$$\int \tanh x \, dx$$

$$\int \sec^8 x \tan x \, dx$$

$$\int x\sqrt{x+1}\,dx$$

$$\int \sin^2(x) \cos^2(x) \, dx$$

$$\int \pi^x \, dx$$

$$\int x^2 \ln(x)\, dx$$

Spicy Integrals

$$\int \cos x \sqrt{\sin^2 x + 1}\, dx$$

$$\int \cosh^{-1}(x)\, dx$$

$$\int \frac{x^2}{1 + x^2}$$

$$\int \frac{1 + \sin x}{1 + \cos x}$$

$$\int \frac{1}{1 - x + x^2}$$

$$\int_{-2017}^{2017} \sin\left(\sqrt[3]{x}\right) dx$$

$$\int \frac{1}{1 + e^x} \, dx$$

$$\int (1 + 2x^2) e^{x^2} \, dx$$

$$\int \frac{e^{ix}}{x^2 + 1} \, dx$$

$$\int x(1-x)^{2017}$$

$$\int_{-\pi}^{\pi} \frac{x^3 - 2x}{\sqrt{x^4 + 1}}$$

$$\int \frac{1}{x(x^5 + 1)} \, dx$$

Challenge

$$\int \sinh x \sin x \, dx$$

$$\int_{-\infty}^{\infty} \frac{1}{x^4 + 4}\, dx$$

$$\int \frac{\ln x \cos x - \frac{1}{x} \sin x}{\ln^2 x} \, dx$$

$$\int_{-\infty}^{\infty} \frac{1}{1+x^2} \, dx$$

$$\int_0^\infty \frac{3\sqrt{3}}{1+x^3}\, dx$$