

# Renert School: Integration Bee 2023–2024

**Problem 1.**

$$\int_1^{\text{mower}} \frac{1}{u} du$$

Problems 2-17 are great review.

**Problem 2.**

$$\int_{-8}^{-1} \left( \frac{2}{x^{1/3}} + 4x \right) dx$$

**Problem 3.**

$$\int \frac{\sqrt{r} - 5}{\sqrt{r}} dr$$

**Problem 4.**

$$\int s(\sqrt{s} + 1) ds$$

**Problem 5.**

$$\int_{\pi/6}^{\pi/3} \sin(2x) dx$$

**Problem 6.**

$$\int x^3 e^{x^4} dx$$

**Problem 7.**

$$\int (2x - 1) \sin(4x) dx$$

**Problem 8.**

$$\int \frac{\sec \theta \tan \theta}{\sqrt{\sec \theta + 1}} d\theta$$

**Problem 9.**

$$\int \ln x^3 dx$$

**Problem 10.**

$$\int \frac{1}{t^2 - 6t + 10} dt$$

**Problem 11.**

$$\int_{-1}^1 \frac{1}{x^3} dx$$

**Problem 12.**

$$\int \frac{8x^2 - 2x + 3}{2x - 1} dx$$

**Problem 13.**

$$\int x^2 e^{2x} dx$$

**Problem 14.**

$$\int_e^{e^2} \frac{1}{x \ln x} dx$$

**Problem 15.**

$$\int_0^4 \sqrt{3x+4} dx$$

**Problem 16.**

$$\int \frac{x+1}{x(2x+1)} dx$$

**Problem 17.**

$$\int_0^2 \frac{1}{\sqrt{2-x}} dx$$