

Integration by substitution

Most of the following integrals can be found by substitution. Solve each integral by "guessing", then verify/adjust your answer via differentiation (chain rule). For those integrals where substitution does not work, adjust the problem to enable substitution, then solve it.

1.

$$\int (3x - 2)^4 dx$$

2.

$$\int \sqrt{\frac{9}{5} - \frac{4}{9}x} dx$$

3.

$$\int \sqrt[3]{1 - \frac{1}{3} \left(\frac{1}{2} - 2x \right)} dx$$

4.

$$\int \cos(x) e^{\sin(x)} dx$$

5.

$$\int \frac{2}{5} x e^{\frac{3}{4}x^3} dx$$

6.

$$\int x \sin(x^2) e^{\cos(x^2)} dx$$

7.

$$\int \sin(x) e^{\cos^2(x)} dx$$

8.

$$\int \frac{x - 2}{x^2 - 4x + 7} dx$$

9.

$$\int \frac{x^2}{(x^3 - 1)^2} dx$$

10.

$$\int \frac{\sin(x)}{\cos^2(x)} dx$$

11.

$$\int \frac{\cos(x)}{\sqrt[3]{\sin^2(x) - 1}} dx$$

12.

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

13.

$$\int \frac{\ln(x)}{x} dx \quad \int \frac{\ln(x^2)}{x} dx \quad \int \frac{1}{x \ln(x)} dx$$