

# Table of Integrals

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$$\int u^n du = \begin{cases} \frac{u^{n+1}}{n+1} + C & , \quad n \neq -1 \\ \ln |u| + C & , \quad n = -1 \end{cases} \quad (1)$$

$$\int \frac{dx}{[(x-a)^2 + b^2]^{3/2}} = \frac{1}{b^2} \frac{x-a}{[(x-a)^2 + b^2]^{1/2}} + C \quad (2)$$

$$\int_{-\infty}^{\infty} e^{-(x/a)^2} dx = a\sqrt{\pi} \quad (3)$$

$$\int_{-\infty}^{\infty} x^2 e^{-(x/a)^2} dx = a^3 \frac{\sqrt{\pi}}{2} \quad (4)$$

$$\int x e^{ax} dx = \left( \frac{x}{a} - \frac{1}{a^2} \right) e^{ax} + C \quad (5)$$

$$\int x^2 e^{ax} dx = \left( \frac{x^2}{a} - \frac{2x}{a^2} + \frac{2}{a^3} \right) e^{ax} + C \quad (6)$$

$$\int \sin(ax) dx = -\frac{\cos(ax)}{a} + C \quad (7)$$

$$\int \cos(ax) dx = \frac{\sin(ax)}{a} + C \quad (8)$$

$$\int x \sin(ax) dx = \frac{\sin(ax)}{a^2} - \frac{x \cos(ax)}{a} + C \quad (9)$$

$$\int x \cos(ax) dx = \frac{\cos(ax)}{a^2} + \frac{x \sin(ax)}{a} + C \quad (10)$$

$$\int x^2 \sin(ax) dx = \frac{2 \cos(ax)}{a^3} + \frac{2x \sin(ax)}{a^2} - \frac{x^2 \cos(ax)}{a} + C \quad (11)$$

$$\int x^2 \cos(ax) dx = -\frac{2 \sin(ax)}{a^3} + \frac{2x \cos(ax)}{a^2} + \frac{x^2 \sin(ax)}{a} + C \quad (12)$$

$$\int \sin^2(ax) dx = \frac{x}{2} - \frac{\sin(2ax)}{4a} + C \quad (13)$$

$$\int \cos^2(ax) dx = \frac{x}{2} + \frac{\sin(2ax)}{4a} + C \quad (14)$$

$$\int x \sin^2(ax) dx = \frac{x^2}{4} - \frac{x \sin(2ax)}{4a} - \frac{\cos(2ax)}{8a^2} + C \quad (15)$$

$$\int x \cos^2(ax) dx = \frac{x^2}{4} + \frac{x \sin(2ax)}{4a} + \frac{\cos(2ax)}{8a^2} + C \quad (16)$$

$$\int x^2 \sin^2(ax) dx = \frac{x^3}{6} - \frac{x^2 \sin(2ax)}{4a} - \frac{x \cos(2ax)}{4a^2} + \frac{\sin(2ax)}{8a^3} + C \quad (17)$$

$$\int x^2 \cos^2(ax) dx = \frac{x^3}{6} + \frac{x^2 \sin(2ax)}{4a} + \frac{x \cos(2ax)}{4a^2} - \frac{\sin(2ax)}{8a^3} + C \quad (18)$$