

## Integration Rules You Should Know!

**Integral of a constant:**  $\int k dx = kx + C$

**Rule for a constant multiple:**  $\int k \cdot f(x) dx = k \int f(x) dx$

**Integral of a sum or difference:**  $\int [f(x) + g(x)] dx = \int f(x) dx + \int g(x) dx$

**Power Rule:**  $\int u^n du = \frac{u^{n+1}}{n+1} + C$  for  $n \neq -1$ .

**Integrals of Trig Functions:**

$$\int \cos u du = \sin u + C \qquad \int \sin u du = -\cos u + C$$

$$\int \sec^2 u du = \tan u + C \qquad \int \csc^2 u du = -\cot u + C$$

$$\int \sec u \tan u du = \sec u + C \qquad \int \csc u \cot u du = -\csc u + C$$

**Integral Exponential Functions:**

$$\int a^u du = a^u \cdot \frac{1}{\ln a} + C \qquad \int e^u du = e^u + C$$

**Some Special Integration Rules:**

$$\int \frac{1}{u} du = \ln |u| + C$$

$$\int \frac{du}{\sqrt{1-u^2}} = \sin^{-1} u + C \text{ or } \arcsin u + C$$

$$\int \frac{du}{1+u^2} = \tan^{-1} u + C \text{ or } \arctan u + C$$

**Integration of a Definite Integral:**  $\int_a^b f(x) dx = F(x) \Big|_a^b = F(b) - F(a)$

Where  $F(x)$  is an antiderivative of  $f(x)$ .