

BASIC INTEGRATION RULES

Differentiation Formula

$$\begin{aligned}\frac{d}{dx}[C] &= 0 \\ \frac{d}{dx}[kx] &= k \\ \frac{d}{dx}[kf(x)] &= kf'(x) \\ \frac{d}{dx}[f(x) \pm g(x)] &= f'(x) \pm g'(x) \\ \frac{d}{dx}[x^n] &= nx^{n-1} \\ \frac{d}{dx}[\sin x] &= \cos x \\ \frac{d}{dx}[\cos x] &= -\sin x \\ \frac{d}{dx}[\tan x] &= \sec^2 x \\ \frac{d}{dx}[\sec x] &= \sec x \tan x \\ \frac{d}{dx}[\cot x] &= -\csc^2 x \\ \frac{d}{dx}[\csc x] &= -\csc x \cot x\end{aligned}$$

Integration Formula

$$\begin{aligned}\int 0 \, dx &= C \\ \int k \, dx &= kx + C \\ \int kf(x) \, dx &= k \int f(x) \, dx \\ \int [f(x) \pm g(x)] \, dx &= \int f(x) \, dx \pm \int g(x) \, dx \\ \int x^n \, dx &= \frac{x^{n+1}}{n+1} + C, \quad n \neq -1 \quad \text{Power Rule} \\ \int \cos x \, dx &= \sin x + C \\ \int \sin x \, dx &= -\cos x + C \\ \int \sec^2 x \, dx &= \tan x + C \\ \int \sec x \tan x \, dx &= \sec x + C \\ \int \csc^2 x \, dx &= -\cot x + C \\ \int \csc x \cot x \, dx &= -\csc x + C\end{aligned}$$

NOTE Note that the Power Rule for Integration has the restriction that $n \neq -1$.