

Basic Differentiation Formulas

In the table below, $f = f(x)$ and $g = g(x)$ represent differentiable functions of x .

Derivative of a constant $\frac{dc}{dx} = 0$

Derivative of a constant multiple $\frac{d}{dx}(cf) = c\frac{df}{dx}$

Derivative of a sum or difference $\frac{d}{dx}(f \pm g) = \frac{df}{dx} \pm \frac{dg}{dx}$

Product Rule $\frac{d}{dx}(fg) = \frac{df}{dx}g + f\frac{dg}{dx}$

Quotient Rule $\frac{d}{dx}\left(\frac{f}{g}\right) = \frac{g\frac{df}{dx} - f\frac{dg}{dx}}{g^2}$

Chain Rule $\frac{d}{dx}(f(g(x))) = \frac{df}{dg}\frac{dg}{dx}$

$$\frac{d}{dx}x^n = nx^{n-1}$$

$$\frac{d}{dx}\sin x = \cos x$$

$$\frac{d}{dx}\cos x = -\sin x$$

$$\frac{d}{dx}\tan x = \sec^2 x$$

$$\frac{d}{dx}\cot x = -\csc^2 x$$

$$\frac{d}{dx}\sec x = \sec x \tan x$$

$$\frac{d}{dx}\csc x = -\csc x \cot x$$