

FUNDAMENTALS DERIVATIVES FORMULAS

Derivatives Formulas

$$1. \quad \frac{d}{dx}(c) = 0 \quad , \quad 'c' \text{ is any constant}$$

$$2. \quad \frac{d}{dx}(x) = 1$$

$$3. \quad \frac{d}{dx}(x^n) = nx^{n-1} \quad (\text{The Power Rule})$$

$$4. \quad \frac{d}{dx}[f(x)g(x)] = \left(\frac{d}{dx}f(x)\right)g(x) + f(x)\left(\frac{d}{dx}g(x)\right) \left\{ \begin{array}{l} \text{The} \\ \text{Product} \\ \text{Rule} \end{array} \right\}$$

$$5. \quad \frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{g(x)\left(\frac{d}{dx}f(x)\right) - f(x)\left(\frac{d}{dx}g(x)\right)}{[g(x)]^2} \left\{ \begin{array}{l} \text{The} \\ \text{Quotient} \\ \text{Rule} \end{array} \right\}$$

$$6. \quad \left\{ \begin{array}{l} \text{i.} \quad \frac{dy}{dx} = \frac{dy}{dt} \times \frac{dt}{dx} \\ \text{ii.} \quad \frac{dy}{dx} = \frac{dy}{d\theta} \times \frac{d\theta}{dx} \\ \text{iii.} \quad \frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx} \\ \text{iv.} \quad \frac{dy}{dt} = \frac{dy}{dx} \times \frac{dx}{dt} \end{array} \right. \quad (\text{The Chain Rules})$$