

Linear Functions

$$y = mx + b$$

Point-Slope Formula

$$y = y_0 + m(x - x_0)$$

Powers

$$\sqrt[n]{x} = x^{1/n} \quad \sqrt[b]{x^a} = (\sqrt[b]{x})^a = x^{a/b}$$

$$\frac{1}{x} = x^{-1} \quad \frac{1}{x^n} = x^{-n}$$

Basic Derivative Rules

$$\frac{d}{dx}[c] = 0 \quad (c \text{ constant})$$

$$\frac{d}{dx}[cA] = c \frac{dA}{dx} \quad (c \text{ constant})$$

$$\frac{d}{dx}(A + B) = \frac{dA}{dx} + \frac{dB}{dx}$$

Power Rule

$$\frac{d}{dx}[x^n] = nx^{n-1} \quad (n \text{ constant})$$

Product Rule

$$\frac{d}{dx}[AB] = B \frac{dA}{dx} + A \frac{dB}{dx}$$

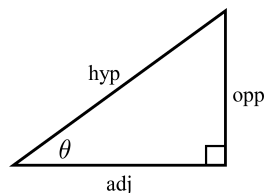
Quotient Rule

$$\frac{d}{dx} \left[\frac{A}{B} \right] = \frac{B \frac{dA}{dx} - A \frac{dB}{dx}}{B^2}$$

Chain Rule

$$\frac{d}{dx}[f(A)] = f'(A) \frac{dA}{dx}$$

Triangle Trigonometry



$$\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \csc \theta = \frac{\text{hyp}}{\text{opp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \sec \theta = \frac{\text{hyp}}{\text{adj}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}} \quad \cot \theta = \frac{\text{adj}}{\text{opp}}$$

Relationships

$$\sec \theta = \frac{1}{\cos \theta} \quad \csc \theta = \frac{1}{\sin \theta}$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta} \quad \cot \theta = \frac{\cos \theta}{\sin \theta} = \frac{1}{\tan \theta}$$

Radians

$$1 \text{ circle} = 360^\circ = 2\pi \text{ radians}$$

$$1 \text{ radian} = \frac{360^\circ}{2\pi} = 57.2958^\circ$$

$$1^\circ = \frac{2\pi \text{ radians}}{360} = 0.0174533 \text{ radians}$$

Trigonometric Derivatives

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

$$\frac{d}{dx}[\tan x] = \sec^2 x \quad \frac{d}{dx}[\cot x] = -\csc^2 x$$

$$\frac{d}{dx}[\sec x] = \sec x \tan x \quad \frac{d}{dx}[\csc x] = -\csc x \cot x$$

Inverse Trigonometric Derivatives

$$\frac{d}{dx}[\sin^{-1} x] = \frac{1}{\sqrt{1-x^2}} \quad \frac{d}{dx}[\cos^{-1} x] = \frac{-1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}[\tan^{-1} x] = \frac{1}{1+x^2} \quad \frac{d}{dx}[\cot^{-1} x] = \frac{-1}{1+x^2}$$

$$\frac{d}{dx}[\sec^{-1} x] = \frac{1}{x\sqrt{x^2-1}} \quad \frac{d}{dx}[\csc^{-1} x] = \frac{-1}{x\sqrt{x^2-1}}$$

Exponential Functions

$$y = be^{kx} \quad e \approx 2.718282$$

Logarithm Rules

$$\ln(ab) = \ln(a) + \ln(b) \quad \ln(a^n) = n \ln(a)$$

$$\ln\left(\frac{a}{b}\right) = \ln(a) - \ln(b) \quad \ln\left(\frac{1}{a}\right) = -\ln(a)$$

$$\ln(1) = 0 \quad \ln(e) = 1$$

$$\ln(e^x) = x \quad e^{\ln(x)} = x$$

$$a^b = e^{b \ln(a)}$$

Exponential Derivatives

$$\frac{d}{dx}[e^x] = e^x$$

$$\frac{d}{dx}[a^x] = a^x \ln a \quad (a \text{ constant})$$

Logarithmic Derivatives

$$\frac{d}{dx}[\ln x] = \frac{1}{x}$$