Linear Functions

$$y = mx + b$$

Point-Slope Formula

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

Powers

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

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

Basic Derivative Rules

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

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

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

Power Rule

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

Product Rule

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

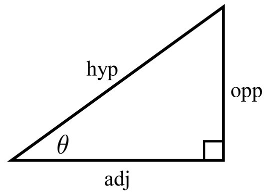
Quotient Rule

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

Chain Rule

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

Triangle Trigonometry



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

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

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

Relationships

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

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

Radians

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

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

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

Trigonometric Derivatives

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

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

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

Inverse Trigonometric Derivatives

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

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

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

Exponential Functions

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

Logarithm Rules

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

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

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

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

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

Exponential Derivatives

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

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

Logarithmic Derivatives

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

Power Rule for Integrals

$$\int_a^b x^n\,dx = \left[\frac{1}{n+1}x^{n+1}\right]_a^b \qquad (\text{for } n \neq -1)$$

Fundamental Theorem of Calculus

$$\int_a^b f'(x)\,dx = f(b) - f(a)$$

$$\frac{d}{dx}\left[\int_a^x f(t)\,dt\right] = f(x)$$