

Calculus: Derivative Rules

Trig

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

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

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

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

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

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

Quotient

$$\frac{d}{dx} (f/g) = \frac{f'g - g'f}{g^2}$$

Product

$$\frac{d}{dx} (fg) = f'g + g'f$$

Constant

$$\frac{d}{dx} C = C$$

Power

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

Sum
Difference

$$\frac{d}{dx} (f+g) = f' + g'$$

$$\frac{d}{dx} (f-g) = f' - g'$$

(Exponential)

$$\frac{d}{dx} (e^x) = e^x$$

$$\frac{d}{dx} a^b = a^b \ln(a)$$

$$\frac{d}{dx} e^u = \frac{du}{dx} (e^u)$$

Log

$$\frac{d}{dx} \log_b f(x) = \frac{f'}{\ln(b) \cdot f}$$

Chain Rule

$$\frac{d}{dx} f(g(x)) = f'(g(x)) \cdot g'$$

Calculus: Derivative Rules pt.2

Inverse
Trig

$$\frac{d}{dx} \sin^{-1}x = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \tan^{-1}x = \frac{1}{x^2+1}$$

$$\frac{d}{dx} \sec^{-1}x = \frac{1}{|x|\sqrt{x^2-1}}$$

$$\frac{d}{dx} \cos^{-1}x = -\frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \cot^{-1}x = -\frac{1}{x^2+1}$$

$$\frac{d}{dx} \csc^{-1}x = -\frac{1}{|x|\sqrt{x^2-1}}$$