

Derivatives of trig functions

$$\checkmark \frac{d}{dx} [\sin(x)] = \cos(x)$$

$$\checkmark \frac{d}{dx} [\tan(x)] = \sec^2(x)$$

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

$$\checkmark \frac{d}{dx} [\cos(x)] = -\sin(x)$$

$$\checkmark \frac{d}{dx} [\cot(x)] = -\csc^2(x)$$

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

Derivatives of inverse trig functions

$$\checkmark \frac{d}{dx} [\sin^{-1}(x)] = \frac{1}{\sqrt{1-x^2}}$$

$$\checkmark \frac{d}{dx} [\sec^{-1}(x)] = \frac{1}{|x|\sqrt{x^2-1}}$$

$$\checkmark \frac{d}{dx} [\tan^{-1}(x)] = \frac{1}{1+x^2}$$

$$\checkmark \frac{d}{dx} [\cos^{-1}(x)] = \frac{-1}{\sqrt{1-x^2}}$$

$$\checkmark \frac{d}{dx} [\csc^{-1}(x)] = \frac{-1}{|x|\sqrt{x^2-1}}$$

$$\checkmark \frac{d}{dx} [\cot^{-1}(x)] = \frac{-1}{1+x^2}$$

Derivatives of logarithmic and exponential functions

With a as a positive constant,

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

$$\checkmark \frac{d}{dx} [\log_a(x)] = \frac{1}{x \ln(a)}$$

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

$$\checkmark \frac{d}{dx} [a^x] = a^x \cdot \ln(a)$$

Derivatives of logarithmic and exponential functions

$$\checkmark \text{ If } g(x) \text{ is the inverse of } f(x), \text{ meaning that } f(g(x)) = x = g(f(x)), \text{ then } \frac{d}{dx} [g(x)] = \frac{1}{f'(g(x))}$$