

## Derivative of and Inverse Trig Function

Find the derivative of each of the following:

$$\frac{d}{dx} \sin^{-1}(u) = \frac{u'}{\sqrt{1-u^2}}$$

$$\frac{d}{dx} \cos^{-1}(u) = \frac{-u'}{\sqrt{1-u^2}}$$

$$\frac{d}{dx} \tan^{-1}(u) = \frac{u'}{1+u^2}$$

$$\frac{d}{dx} \csc^{-1}(u) = \frac{-u'}{|u|\sqrt{u^2-1}}$$

$$\frac{d}{dx} \sec^{-1}(u) = \frac{u'}{|u|\sqrt{u^2-1}}$$

$$\frac{d}{dx} \cot^{-1}(u) = \frac{-u'}{1+u^2}$$

Ex:  $y = \sin^{-1}(x^3)$

Ex:  $y = \tan^{-1}(e^x)$

Ex:  $y = \cos^{-1}(\ln x)$

Ex:  $y = \tan^{-1}(\sqrt{x})$

Ex:  $y = \sin^{-1}\left(\frac{1}{x}\right)$

Ex:  $y = x \tan^{-1}(x^2)$

Ex:  $y = \ln(\tan^{-1}(x))$

Ex:  $y = \frac{\tan^{-1}(x)}{x^2+1}$

Ex:  $y = 3^{\sin^{-1}(x^3)}$