

Inverse Functions

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

$$\frac{d}{dx} \log_a x = \frac{1}{x \ln a}$$

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

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

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

Ex. $y = \ln(5x - 2e^x)$

$$y' = \frac{1}{5x - 2e^x} (5 - 2e^x)$$

Ex. $f(x) = 2^{\sin^{-1} x}$

$$f'(x) = 2^{\sin^{-1} x} \ln 2 \cdot \frac{1}{\sqrt{1-x^2}}$$

Ex. $y = \sec^{-1}(x^4)$

$$y' = \frac{1}{x^4 \sqrt{(x^4)^2 - 1}} \cdot 4x^3$$

Pract. $y = \sin(\ln x)$

$$y' = \cos(\ln x) \cdot \frac{1}{x}$$

Pract. $f(x) = (\tan^{-1} x)^3$

$$f'(x) = 3(\tan^{-1} x)^2 \cdot \frac{1}{1+x^2}$$

Ex. $f(x) = e^{\ln(x^{10})} = x^{10}$

$$f'(x) = 10x^9$$

Ex. If $f(x) = \ln(5x - 2)$, find $f'(2)$ on the calculator.

.625