

Derivatives of Log Func

3.6
1/1

This is an app. of implicit diff.

ex1: Differentiate $y = \ln x$. We want $\frac{dy}{dx}$.

$$\text{we know } y = \ln x \Leftrightarrow x = e^y$$

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

$$\Rightarrow 1 = e^y \cdot \frac{d}{dx}(y)$$

$$\Rightarrow \frac{1}{e^y} = \frac{dy}{dx}$$

$$\Rightarrow \frac{dy}{dx} = \frac{1}{x}$$

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

ex2: $\frac{d}{dx} \ln(\sin^2 x)$.

ex3: $\frac{d}{dr} r^2 \ln(2r+1)$

ex4: ~~$\frac{d}{dx} e^{-x}$~~ Find $\frac{dy}{dx}$ of $y = \frac{e^{-x} \cos^2 x}{x^2 + x + 1}$

ex5: Differentiate $y = \sqrt{x} e^{-x^2 - x} (x+1)^{2/3}$

ex6: Differentiate $y = x^{\cos x}$

ex7: Differentiate $y = (\ln x)^{\cos x}$.