5.6 The Derivatives of Logarithms

We will consider two "types" of logarithms: The Natural Logarithm (with base *e*), and The General Logarithm (with base *b*). We'll begin with…

The Derivative of The Natural Logarithm

Given $y = \ln(x)$, determine $\frac{dy}{dx} = y'$

Note: It's always a good idea to **work with things you already know about**. For example we know a lot about the derivative of the **natural exponential function**!

The Chain Rule:

Given $f(x) = \ln(g(x))$, then

Example 5.6.1

a) Differentiate $y = \ln\left(\sin\left(x\right)\right)$

b) Differentiate $f\left(x\right) = \left(\ln\left(x\right)\right)^3$

c) Differentiate $y = \ln\left(x^3\right)$

The Derivative of The General Logarithm

Given $y = \log_b\left(x\right)$, determine $\frac{dy}{dx}$.

Example 5.6.2

Differentiate $g(t) = \log_5(3t^2)$

Class/Homework for Section 5.6

Pg. 575 #3abc, 4def, 5, 6, 10