Derivative of the Logarithm

Goal: • Can take the derivative of $\ln x$ with other derivative rules • Understands how implicit differentiation is useful.
Terminology: • Natural Logarithm
Reminder: • Make-up Test on Thursday March 5th after school

Review: Find $\frac{dy}{dx}$ (note that u is not constant)

$$\frac{e^y}{x} = 2^{u^2+u}$$

The natural thing to ask next is what is the derivative of the inverse of the exponential? What is $\frac{dy}{dx}$ if

$$y = \ln x$$

And if you want to find the derivative of a log with any base …

$$y = \log_b x$$

Example: Find dy/dx if we have the following

$$y = \ln(x \cdot \log 2x)$$

Practice: Find dy/dx if we have the following

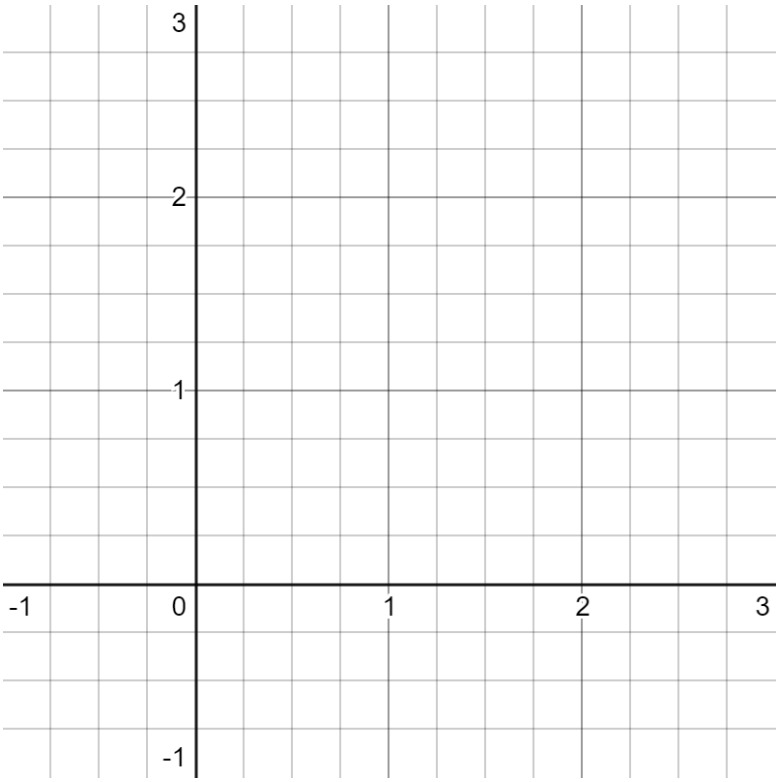
$$y = \ln^3\left(\frac{2x-1}{x^2}\right)$$

Practice Problems: 8.4: # 1 (skip the one with trig), 3, 5-10

In Class Evidence

8. Accurately sketch the graph of

$$y = x \cdot \ln^2 x$$



1 and 3. Differentiate the following:

$$y = \ln \frac{x}{\sqrt{x^2 + 1}}$$

$$y = \log_5(3x - 8)$$

5. Find the equation of the tangfent line to the curve

$$y = \log x$$

At the point $(100, 2)$

6. Find dy/dx if $\ln(x + y) = y - 1$

10. Find the solution to $\ln x = 2 - x$ accurate to 6 decimal places.