Calculus Ch. 5.1 Natural Log Function

Natural Log graph: Domain: _____ Range: _____

Graph characteristics: _____

Ex. 1: Sketch graph of ln(x – 3) and state domain:

Ex. 2 Draw the function and answer the examples.

a) $\lim_{x\to 0^+} \ln(x) =$ b) $\lim_{x\to 0^-} \ln(x) =$ c) $\lim_{x\to 0} \ln(x) =$ d) $\lim_{x\to \infty} \ln(x) =$

Properties: $\ln(1) = 0$ $\ln(a^n) = n\ln(a)$ $\ln(e) = 1$

$\ln(ab) = \ln(a) + \ln(b)$ $\ln\left(\frac{a}{b}\right) = \ln(a) - \ln(b)$

Ex. 3 Expand $\ln 3e^2$

Properties: $\ln(1) = 0$ $\ln(a^n) = n\ln(a)$ $\ln(e) = 1$

$\ln(ab) = \ln(a) + \ln(b)$ $\ln(a/b) = \ln(a) - \ln(b)$

Ex. 4 condense $2(\ln(x) - \ln(x + 1) - \ln(x - 1))$

Derivative of the Natural Logarithmic Function:

$$\frac{d}{dx}[\ln u] = \frac{u'}{u}$$

Ex. 5: If $y = \ln(x)$, find y'

Ex. 6: if $y = \ln(x^2 - 5)$, find y'

Ex. 7: if $y = \ln\left(\frac{x^2}{\sqrt{2x^3}}\right)$, find y' (always simplify logs before taking the derivative)