

Calculus AB

5-1

The Natural Logarithm: Differentiation

Algebraic Definition of Logarithm -

Given: $x^b = y \Rightarrow$

Definition of the Number e -

Algebraic Definition of the Natural Logarithm -

Calculus Definition of the Natural Logarithm Function -

Laws of Exponents

Laws of Logarithms -

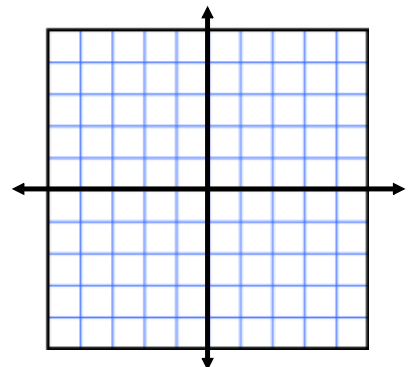
1) $x^m \cdot x^n =$	1)
2) $\frac{x^m}{x^n} =$	2)
3) $(x^m)^n =$	3)

Function Properties: $f(x) = \ln(x)$

Domain:

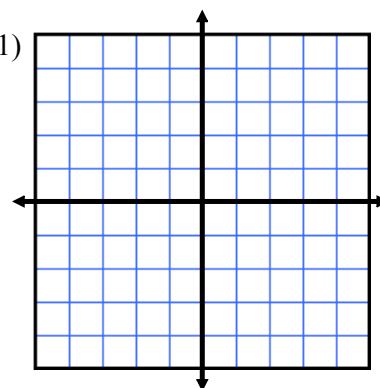
Range:

Asymptotes:



Sketch the graph of the function and state its domain. (pg 331)

12) $f(x) = -2 \ln(x)$



Use the properties of logarithms to expand the logarithmic expression.

22) $\ln \sqrt{x^5}$

24) $\ln(xyz)$

*) $\ln \sqrt[3]{a^2 + 1}$

Write the expression as a logarithm of a single quantity.

30) $\ln x + 2 \ln y - 4 \ln z$

34) $2[\ln x - \ln(x + 1) - \ln(x - 1)]$

Find the limit.

40) $\lim_{x \rightarrow 6^-} \ln(6 - x)$

Derivative of the Natural Logarithm Function -

Assignment

Day 1

pg 331

7-17 odd,

21-35 odd

39-75 odd

Find the derivative of the function.

50) $h(x) = \ln(2x^2 + 1)$

56) $y = \ln \frac{2x}{x + 3}$

70) $y = \ln |\csc x|$

Find an equation of the tangent line to the graph of f at the indicated point.

78) $f(x) = 4 - x^2 - \ln\left(\frac{1}{2}x + 1\right)$, $(0, 4)$

Show that the function is a solution of the differential equation.

90) $x \ln x - 4x$; $x + y - xy' = 0$

Locate any relative extrema and inflection points.

92) $y = x - \ln x$

Assignment Day 2 83 - 95 odd
