

Mr. C. Sdoutz

Unit 5: Logarithmic, Exponential, & Inverse Trigonometric Functions**5.1 Natural Log & Differentiation**

recall:

$$\log_b x = y \leftrightarrow b^y = x$$

ex. $\log_2 8 =$

Common logarithms are base 10 logarithms and written without the base: $\log 100 =$

Natural logarithms are base e logarithms ($e \cong 2.71828\ 18284\ 59045\ 23536\ \dots$) and are denoted $\ln$:

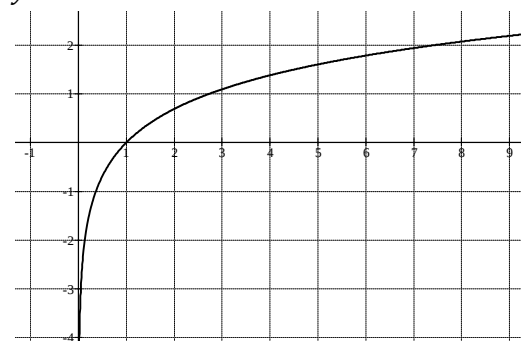
ie. $\log_e x = \ln x$

thus $\ln x = y \leftrightarrow e^y = x$

graphically like all log functions:

ex.

$$y = \ln x$$



Domain:

Range:

Same properties as logarithms:

1. $\ln 1 =$

2. $\ln(ab) =$

3. $\ln \frac{a}{b} =$

4. $\ln a^n =$

ex. $\ln \frac{x^2(x-2)}{x+5} =$

Differentiation

ex.

$$\frac{d}{dx} [\ln 2x]$$

$$\frac{d}{dx} [\ln x] = \frac{1}{x}; x > 0$$

ex. $f(x) = \ln(x^2 + 1)$

ex. $y = x \ln x$

ex. $f(x) = (\ln x)^3$

ex.
 $\frac{d}{dx} [\ln|\cos x|]$

Use logarithm properties to split up complicated log functions to aid the differentiation.

ex. $f(x) = \ln \sqrt{x+1}$

ex. $f(x) = \ln \frac{x(x^2+1)^2}{\sqrt{2x^3-1}}$

Practice Questions

Pg. 318/# 13 – 30, 37 – 55, 67 – 70, 73 – 78



This document was created with the Win2PDF "print to PDF" printer available at
<http://www.win2pdf.com>

This version of Win2PDF 10 is for evaluation and non-commercial use only.

This page will not be added after purchasing Win2PDF.

<http://www.win2pdf.com/purchase/>