Course Number

Instructor

Date

Section 3.3 Properties of Logarithms

Objective: In this lesson you learned how to rewrite logarithmic functions with a different base and how to use properties of logarithms to evaluate, rewrite, expand, or condense logarithmic expressions.

I. Change of Base (Page 311)

What you should learn
How to rewrite logarithmic functions with a different base

Let a, b, and x be positive real numbers such that $a \neq 1$ and $b \neq 1$.

Use the Change-of-Base Formula to rewrite $\log_a x$ using base b:

$\log_a x =$ _____

Explain how to use a calculator to evaluate $\log_8 20$.

II. Properties of Logarithms (Page 312)

What you should learn
How to use properties of logarithms to evaluate or rewrite logarithmic expressions

Let a be a positive number such that $a \neq 1$; let n be a real number; and let u and v be positive real numbers. Complete the following properties of logarithms:

1. $\log_a(uv) =$ _____

2. $\log_a \frac{u}{v} =$ _____

3. $\log_a u^n =$ _____

III. Rewriting Logarithmic Expressions (Page 313)

What you should learn
How to use properties of logarithms to expand or condense logarithmic expressions

To expand a logarithmic expression means to . . . .

Example 1: Expand the logarithmic expression $\ln \frac{xy^4}{2}$.

To condense a logarithmic expression means to . . . .

Example 2: Condense the logarithmic expression $3\log x + 4\log(x-1)$.

IV. Applications of Properties of Logarithms (Page 314)

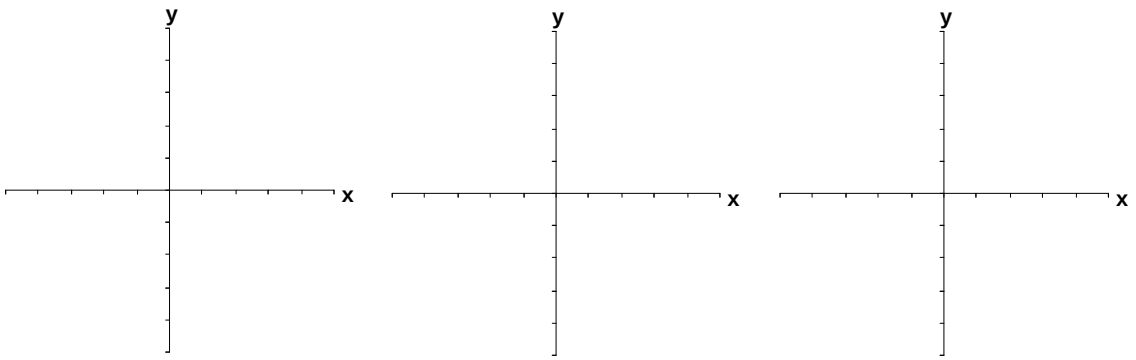
What you should learn
How to use logarithmic functions to model and solve real-life applications

One way of finding a model for a set of nonlinear data is to take the natural log of each of the *x*-values and *y*-values of the data set. If the points are graphed and fall on a straight line, then the *x*-values and the *y*-values are related by the equation:

_____, where *m* is the slope of the straight line.

Example 3: Find a natural logarithmic equation for the following data that expresses *y* as a function of *x*.

x	2.718	7.389	20.086	54.598
y	7.389	54.598	403.429	2980.958



Homework Assignment

Page(s)

Exercises