

Section 5.3 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.

Course Number

Instructor

Date

I. Change of Base (Page 403)

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 :

$$\log_a x = \underline{\hspace{4cm}}$$

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

What you should learn

How to rewrite logarithmic functions with a different base

II. Properties of Logarithms (Page 404)

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. $\log_a (uv) = \underline{\hspace{4cm}}$

2. $\log_a \frac{u}{v} = \underline{\hspace{4cm}}$

3. $\log_a u^n = \underline{\hspace{4cm}}$

What you should learn

How to use properties of logarithms to evaluate or rewrite logarithmic expressions

III. Rewriting Logarithmic Expressions (Page 405)

To expand a logarithmic expression means to

What you should learn

How to use properties of logarithms to expand or condense logarithmic expressions

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 406)

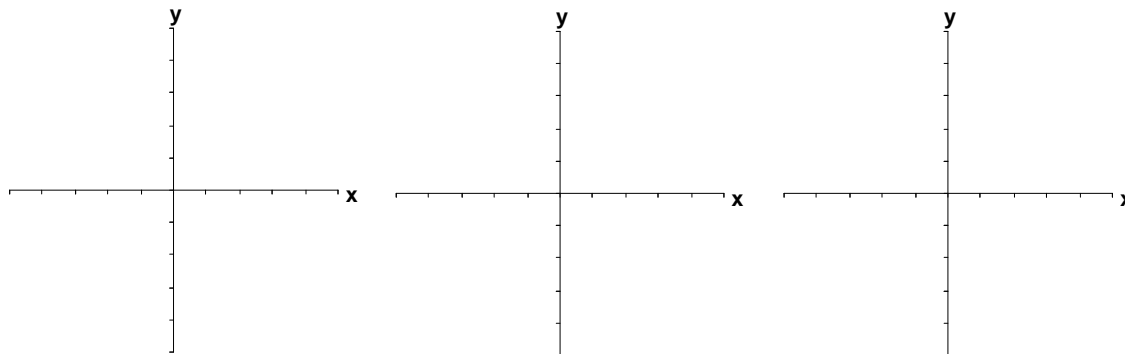
One way of finding a model for a set of nonlinear data is to take the natural log of each of the x -values and y -values of the data set. If the points are graphed and fall on a straight line, then the x -values and the y -values are related by the equation:

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

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

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