

Section 3.3 Properties of Logarithms

Objective: In this lesson you learned how to use the change-of-base formula to rewrite and evaluate logarithmic expressions and how to use properties of logarithms to evaluate, rewrite, expand, or condense logarithmic expressions.

Course Number

Instructor

Date

I. Change of Base (Page 239)

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 :

$$\log_a x = \underline{\hspace{2cm}}$$

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

What you should learn

How to use the change-of-base formula to rewrite and evaluate logarithmic expressions

II. Properties of Logarithms (Page 240)

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. $\log_a (uv) = \underline{\hspace{2cm}}$

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

3. $\log_a u^n = \underline{\hspace{2cm}}$

What you should learn

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

III. Rewriting Logarithmic Expressions (Page 241)

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 242)

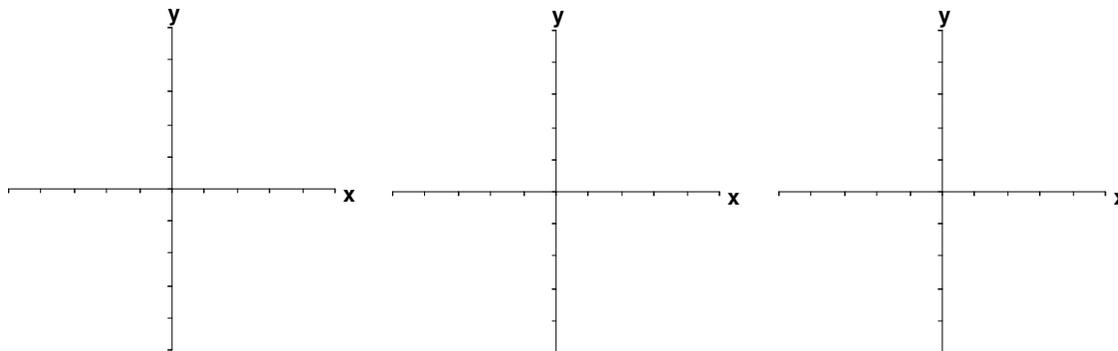
One way of finding a model for a set of nonlinear data is to take the natural logarithm of each of the x -values and y -values of the data set. If the points are graphed and fall on a straight line, then the x -values and the y -values are related by the equation:

_____ , 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