NAME _____ DATE _____ PERIOD _____

8-3 Word Problem Practice

Logarithms and Logarithmic Functions

1. CHEMISTRY The pH of a solution is found by the formula $\text{pH} = -\log H$, where H stands for the hydrogen ion concentration in the formula. What is the pH of a solution to the nearest hundredth when H is 1356?

2. FIND THE ERROR Michio wanted to find the value of x in the equation $2(3)^x = 34$. He first converted the equation to $\log_3 2x = 17$. Next he wrote $2x = 3^{17}$ and used a calculator to find $x = 64{,}570{,}081$. Was his answer correct? If not, what was his mistake and what is the right answer?

3. SOUND The decibel level L of a sound is determined by the formula $L = 10 \log_{10} \frac{I}{M}$. Find I in terms of M for a noise with a decibel level of 120.

4. EARTHQUAKES The intensity of an earthquake can be measured on the Richter scale using the formula $y = 10^{R-1}$, where y is the absolute intensity of the earthquake and R is its Richter scale measurement.

Richter Scale Number	Absolute Intensity
1	1
2	10
3	100
4	1000
5	10,000

An earthquake in San Francisco in 1906 had an absolute intensity of 6,000,000. What was that earthquake's measurement on the Richter scale?

5. GAMES Julio and Natalia decided to play a game in which they each selected a logarithmic function and compare their functions to see which gave larger values. Julio selected the function $f(x) = 10 \log_2 x$ and Natalia selected the function $2 \log_{10} x$.

a. Which of the functions has a larger value when $x = 7$?

b. Which of their functions has a larger value when $x = 1$?

c. Do you think the base or the multiplier is more important in determining the value of a logarithmic function?

Lesson 8-3