

Name:

### 5-A Exponential Functions

1. Give an equation for the population after  $t$  days of a bacteria colony starting with 9000 and changing as stated.  
a) increases by 8% per day      b) increases by 300% per day      c) triples each day      d) decreases by 0.148% per day

2. Give a rough sketch for each of the following functions. Label the  $y$ -intercept.

a)  $a(x) = 3^x$

b)  $b(x) = 0.92^x$

### 5-B Logarithmic Functions

3. Simplify.

a)  $\log_7 7^{5x}$

b)  $\log 10^{4x-1}$

c)  $\ln e^8$

d)  $e^{\ln 2x}$

4. Rewrite in exponential form, and identify the value of  $x$ .

a)  $x = \log_6 36$

b)  $x = \log_2 \frac{1}{8}$

c)  $x = \log_{12} 1$

d)  $x = \log_8 2$

5. Evaluate.

a)  $\log 10$

b)  $\log 20$

c)  $\ln 9800$

d)  $\ln 0.14$

6. Give a rough sketch for each of the following functions. Label the  $x$ -intercept.

a)  $a(x) = \log_3 x$

b)  $b(x) = \log_{0.92} x$

### 5-C Properties of Logarithms

7. Simplify.

a)  $\log_9 x + \log_9 4x$

b)  $\log x - \log 4$

c)  $\ln x + \ln 8x$

d)  $\log_2 8^x$

8. Evaluate.

a)  $\log 40$

b)  $\log_2 40$

c)  $\log_{40} 2$

d)  $\log_6 1$

## 5-D Exponential Equations

9. Solve.

a)  $6^{x-5} = 280$

b)  $6^{x-5} = 280^x$

10. Solve without a calculator.

a)  $25^x = 125^{4x-9}$

## 5-E Exponential Situations

11. In 2010 there were 3.8 million people in Oregon. The population has been increasing at an annual rate of 1.11%. Use this growth rate to estimate the following.

a) How many Oregonians were there in 1999?

b) In what year will the population of Oregon reach 5 million?

## 5-F Logarithmic Equations

12. Solve. Show all steps, including exponentiation.

a)  $\log_9 x = 2$

b)  $\log_5 10x + \log_5 2x = 4$

c)  $\log_7 2x = \log_{49} 5x$

d)  $2 \log_2 4x + \log_2 6x - \log_2 2x = 4$