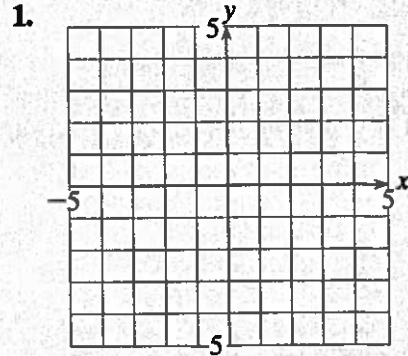


**3 Chapter Test**

Directions: Show all work where appropriate. A graphing calculator may be necessary to answer some questions.

1. Graph the function  $y = 3^{-x}$ .



2. (a) Solve for  $x$ :  $\log_3 81 = x$

(b) Solve for  $x$ :  $\log_x 8 = \frac{3}{2}$

3. A single-cell amoeba doubles every 3 days. How long would it take one amoeba to produce a population of about 10,000 amoebae?

4. What is the natural logarithmic regression equation for the following data? Estimate the  $y$ -value for  $x = 18$ . Express answers to the nearest hundredth.

$x$	3	5	9	12
$y$	4	7	10	11

5. Show that  $f(x) = \frac{1}{5} \ln x$  and  $g(x) = e^{5x}$  are inverse functions.

6. For the function  $f(x) = \frac{6}{1 + 2e^{-3x}}$ :

(a) Find the horizontal asymptotes.

(b) Find the domain and range

(c) Describe the end behavior.

7. Describe the transformations that can be used to transform the graph of  $y = \log_2 x$  to  $y = -\log_2(x + 4)$ . Plot the graph of  $y = \log_2(x + 4)$ .

2. (a) \_\_\_\_\_

(b) \_\_\_\_\_

3. \_\_\_\_\_

4. Equation: \_\_\_\_\_

$y$ -value: \_\_\_\_\_

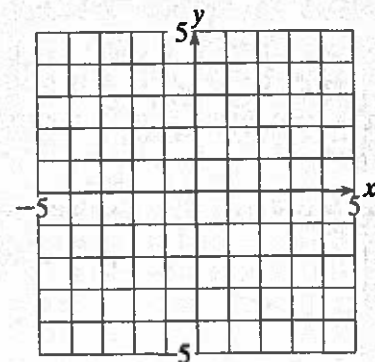
5. \_\_\_\_\_

6. (a) \_\_\_\_\_

(b) \_\_\_\_\_

(c) \_\_\_\_\_

7. \_\_\_\_\_



**3 Chapter Test** *(continued)*

NAME \_\_\_\_\_

8. Solve the equation  $7 - 4 \log x = 10$ . Give an exact answer as well as its decimal approximation (to the nearest hundredth). 8. \_\_\_\_\_
9. Solve the equation  $\log(x - 4) + \log(x + 5) = 1$  algebraically. List any extraneous solutions and explain. If there are no extraneous solutions, explain why not. 9. Solutions: \_\_\_\_\_  
Extraneous: \_\_\_\_\_  
\_\_\_\_\_
10. Solve for  $x$ :  $3^{2x-1} = 27$  10. \_\_\_\_\_
11. A casserole is removed from an oven at  $375^\circ\text{F}$  and cools to  $190^\circ\text{F}$  after 25 minutes in a room at  $68^\circ\text{F}$ . How long (from the time it is removed from the oven) will it take the casserole to cool to  $105^\circ\text{F}$ ? 11. \_\_\_\_\_
12. Let  $S = a(1.06)^t$ . Solve for  $t$ . 12. \_\_\_\_\_
- A.  $\frac{\ln a - \ln S}{\ln 1.06}$       B.  $\frac{\ln(1.06)}{\ln a + \ln S}$
- C.  $\ln a + \ln 1.06$       D.  $\frac{\ln(S/a)}{\ln 1.06}$
- E.  $\ln \frac{(S/a)}{1.06}$
13. When Kara was born, her grandmother deposited \$10,500 into an account paying 6.4% interest, compounded quarterly. How much money will be available to use for college tuition 18 years later? 13. \_\_\_\_\_
14. A certain company estimates that the computer they plan to buy in 30 months will cost \$5,250. How much money should be deposited now into an account paying 6.25% interest, compounded monthly so there will be enough money to pay cash for the computer in 30 months? 14. \_\_\_\_\_
15. Juan deposits \$200 each month into a retirement account that pays 9.00% APR (0.75% per month). What is the value of this annuity after 30 years? 15. \_\_\_\_\_
16. To finance their new home, the Tiballis have agreed to an \$80,000 mortgage loan at 8.75% APR. What will their monthly payments be if the loan has a term of 20 years? 16. \_\_\_\_\_
- A. \$8608.14      B. \$7000.00  
C. \$706.97      D. \$362.50  
E. \$4313.29