

## 7

## CHAPTER TEST

**Graph the function. State the domain and range.**

1.  $y = 3^x$

2.  $y = 2 \cdot 4^{x-2}$

3.  $f(x) = -5 \cdot 2^{x+3} + 3$

4.  $y = 4(0.25)^x$

5.  $y = 2\left(\frac{1}{3}\right)^{x+2}$

6.  $g(x) = \left(\frac{2}{3}\right)^x + 2$

7.  $y = \frac{1}{2}e^{-x}$

8.  $y = 2.5e^{-0.5x} + 1$

9.  $h(x) = \frac{1}{3}e^{x-1} - 2$

**Evaluate the logarithm without using a calculator.**

10.  $\log_5 25$

11.  $\log_2 \frac{1}{32}$

12.  $\log_6 1$

**Graph the function. State the domain and range.**

13.  $y = \log_2 x$

14.  $y = \ln x - 3$

15.  $f(x) = \log(x + 3) + 2$

**Condense the expression.**

16.  $2 \ln 7 - 3 \ln 4$

17.  $\log_4 3 + 5 \log_4 2$

18.  $\log 5 + \log x - 2 \log 3$

**Use the change-of-base formula to evaluate the logarithm.**

19.  $\log_5 50$

20.  $\log_6 23$

21.  $\log_9 45$

**Solve the equation. Check for extraneous solutions.**

22.  $7^{2x} = 30$

23.  $3 \log(x - 4) = 6$

24.  $\log_4 x + \log_4(x + 6) = 2$

25. Write an exponential function  $y = ab^x$  whose graph passes through  $(-1, 48)$  and  $(2, 6)$ .

26. Write a power function  $y = ax^b$  whose graph passes through  $(3, 8)$  and  $(6, 15)$ .

27. **LANDSCAPING** From 1996 to 2001, the number of households that purchased lawn and garden products at home gardening centers increased by about 4.85% per year. In 1996, about 62 million households purchased lawn and garden products. Write a function giving the number of households  $H$  (in millions) that purchased lawn and garden products  $t$  years after 1996.

28. **FINANCE** You deposit \$2500 in an account that pays 3.5% annual interest compounded continuously. What is the balance after 8 years?

29. **EARTH SCIENCE** Rivers and streams carry small particles of sediment downstream. The table shows the diameter  $x$  (in millimeters) of several particles of sediment and the speed  $y$  (in meters per second) of the current needed to carry each particle downstream.

- Draw a scatter plot of the data pairs  $(\ln x, \ln y)$ .
- Find a power model for the original data. Estimate the speed of the current needed to carry a particle with a diameter of 120 millimeters downstream.

Type of sediment	$x$	$y$
Mud	0.2	0.10
Gravel	5	0.50
Coarse gravel	11	0.75
Pebbles	20	1.00
Small stones	45	1.50