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.

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

   a. Draw a scatter plot of the data pairs $(\ln x, \ln y)$.

   b. 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.