Chapter 6 Review

1 Find the *y*-intercept of the equation. $y = -3 \cdot 7^x$

   A   4
   B   −21
   C   −3
   D   7

2 Use the formula $R = \log_{10} I$, where *R* is the measurement of the Richter scale and *I* is the intensity, to find the Richter scale measurement of an earthquake with intensity 12,000,000.

   F   0.70792
   G   16.3004
   H   7.0792
   J   1.63004

3 The number of bacteria present in a culture after *t* minutes is given as $B = 1000e^{kt}$. If there are 4901 bacteria present after 7 minutes, find *k*.

   A   1.589
   B   0.215
   C   0.227
   D   11.126

4 How does changing the value of *b* affect the graph of an exponential equation of the form $y = ab^x$?

5 The projected worth (in millions of dollars) of a large company is modeled by the equation $y = 271(1.07)^x$. The variable *x* represents the number of years since 1997. What is the projected annual percent of growth, and what should the company be worth be in 2008?

6 Write an exponential function to model the situation. Then estimate the value of the function after 5 years (to the nearest whole number).
A population of 290 animals that increases at an annual rate of 9%.

7 Find the value of $1000 deposited for 10 years in an account paying 6% annual interest compounded monthly.
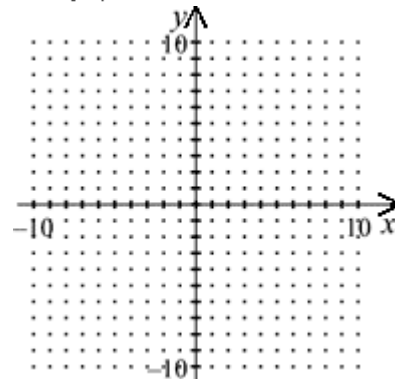
8 Sketch the graph of $f(x) = 3 - 2^x$, and identify the domain, range, and asymptote(s).
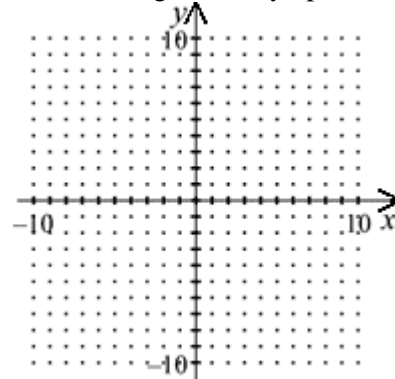
9 A piece of equipment costs $85,000 new but depreciates 15% per year in each succeeding year. Find its value after 10 years.

Sketch the graph of the function, and identify the domain, range, and asymptote(s).

10 $y = \left(\dfrac{1}{3}\right)^{x+5}$

Simplify the expression.

11 $e^x \cdot 6e^{3x-1}$

12 $\sqrt[3]{125e^{12x}}$

15 Is $f(x) = 7e^{-2t}$ an example of exponential growth or decay? Explain your answer.

16 Marion decides to invest $1000 at 5% interest compounded continuously. Find the value of the investment after two years.

17 Write the equation $\log_{16} 8 = \dfrac{3}{4}$ in exponential form.

18 Evaluate the expression. $\log_{1/5} 125$
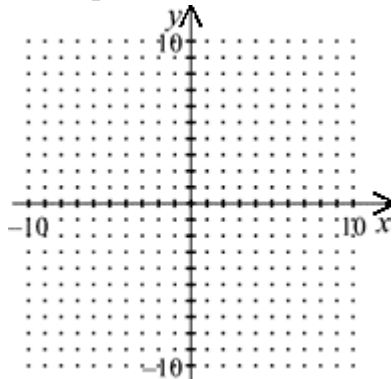
19 Evaluate $\ln e^{-4}$.

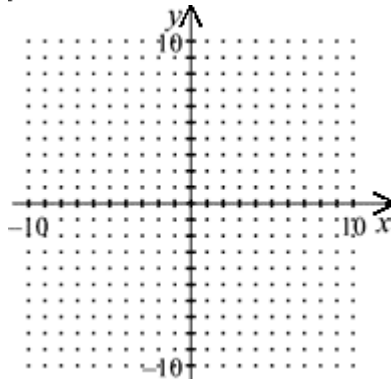Find the inverse of the function.

20 $y = \log_8 x$

21 $y = e^{x-1}$

Graph the functions. State the domain, range, and asymptote(s) of each.

22 $y = \log_2(x + 1)$

23 $y = \ln x + 4$

24 Condense the expression.
$\dfrac{1}{2} \log_5 16 - 3\log_5 x + 4\log_5 y$

25 Expand the expression. $\ln \dfrac{2x}{y^4}$

26 Evaluate $\log_{12} 782$ to three decimal places.

27 Solve for x. Round to four decimal places:
$e^{-3x} = 1.8$

28 Solve. $6^{-0.2x} - 3 = 7$

Solve the equation. Check for extraneous solutions.

29 $\log_4(x + 3) = -2$

30 $\log_4(x + 6) + \log_4 x = 2$

Solve the equation. Check for extraneous solutions.

31 $\ln(x + 7) = \ln(3x - 5)$

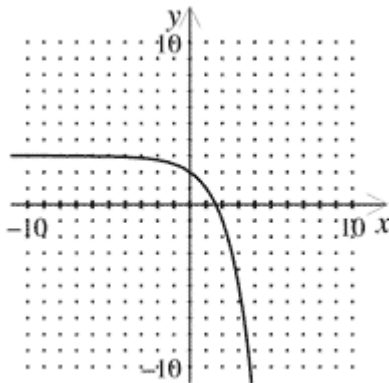**32** $7\log_s(x) - 3 = 15$

3

Answer Section

1 C

2 H

3 C

4 Sample answer: For $b > 0$, as the value of b increases, the curve slopes upward faster; that is, the value of y increases at a faster rate. For $0 < b < 1$, as the value of b increases, the curve slopes downward slower; that is, the value of y decreases at a slower rate.
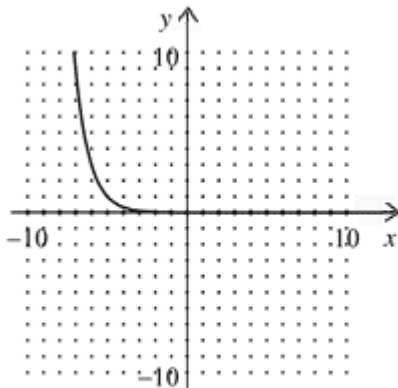
5 7%; $570.41 million

6 $f(x) = 290(1.09)^x$; 446

7 $1819.40

8

9 $16,734.32

10 _____
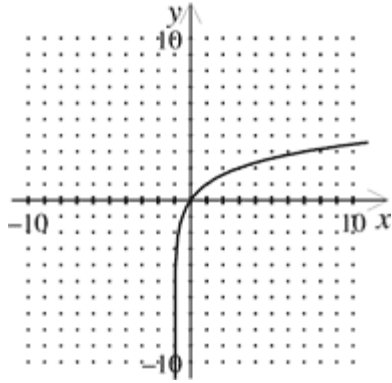
11 $6e^{4x-1}$

12 $5e^{4x}$
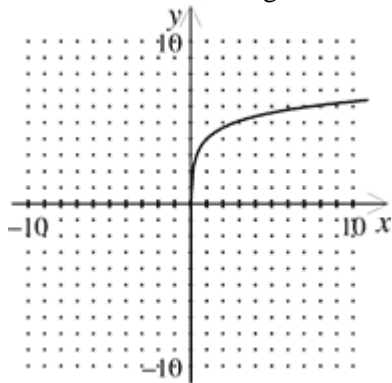
15 Decay

16 $1105.17

17 $16^{3/4} = 8$

18 -3

19 -4

20 $y = 8^x$

21 $y = \ln x + 1$

22

Domain: $x > -1$; Range: all real numbers

23

Domain: $x > 0$; Range: all real numbers

24 $\log_5 \dfrac{4y^4}{x^3}$

25 $\ln 2 + \ln x - 4\ln y$

26 2.681

27 –0.1959

28 $x = -6.425$

29 $-\dfrac{47}{16}$

30 2

31 $x = 6$

32 62.712