

1–12 ■ Sketch the graph of the function. State the domain, range, and asymptote.

1.  $f(x) = \frac{1}{2^x}$

2.  $g(x) = 3^{x-2}$

3.  $y = 5 - 10^x$

4.  $y = 1 + 5^{-x}$

5.  $f(x) = \log_3(x - 1)$

6.  $g(x) = \log(-x)$

7.  $y = 2 - \log_2 x$

8.  $y = 3 + \log_5(x + 4)$

9.  $F(x) = e^x - 1$

10.  $G(x) = \frac{1}{2} e^{x-1}$

11.  $y = 2 \ln x$

12.  $y = \ln(x^2)$

13–14 ■ Find the domain of the function.

13.  $f(x) = 10^{x^2} + \log(1 - 2x)$

14.  $g(x) = \ln(2 + x - x^2)$

15–18 ■ Write the equation in exponential form.

15.  $\log_2 1024 = 10$

16.  $\log_6 37 = x$

17.  $\log x = y$

18.  $\ln c = 17$

19–22 ■ Write the equation in logarithmic form.

19.  $2^6 = 64$

20.  $49^{-1/2} = \frac{1}{7}$

21.  $10^x = 74$

22.  $e^k = m$

23–38 ■ Evaluate the expression without using a calculator.

23.  $\log_2 128$

24.  $\log_8 1$

25.  $10^{\log 45}$

26.  $\log 0.000001$

27.  $\ln(e^6)$

28.  $\log_4 8$

29.  $\log_3\left(\frac{1}{27}\right)$

30.  $2^{\log_2 13}$

31.  $\log_5 \sqrt{5}$

33.  $\log 25 + \log 4$

35.  $\log_2 16^{23}$

37.  $\log_8 6 - \log_8 3 + \log_8 2$

32.  $e^{2 \ln 7}$

34.  $\log_3 \sqrt{243}$

36.  $\log_5 250 - \log_5 2$

38.  $\log \log 10^{100}$

39–44 ■ Rewrite the expression in a form with no logarithms of products, quotients, or powers.

39.  $\log(AB^2C^3)$

40.  $\log_2(x\sqrt{x^2+1})$

41.  $\ln \sqrt{\frac{x^2-1}{x^2+1}}$

42.  $\log\left(\frac{4x^3}{y^2(x-1)^5}\right)$

43.  $\log_5\left(\frac{x^2(1-5x)^{3/2}}{\sqrt{x^3-x}}\right)$

44.  $\ln\left(\frac{\sqrt[3]{x^4+12}}{(x+16)\sqrt{x-3}}\right)$

45–50 ■ Rewrite the expression as a single logarithm.

45.  $\log 6 + 4 \log 2$

46.  $\log x + \log(x^2y) + 3 \log y$

47.  $\frac{3}{2} \log_2(x-y) - 2 \log_2(x^2+y^2)$

48.  $\log_5 2 + \log_5(x+1) - \frac{1}{3} \log_5(3x+7)$

49.  $\log(x-2) + \log(x+2) - \frac{1}{2} \log(x^2+4)$

50.  $\frac{1}{2} [\ln(x-4) + 5 \ln(x^2+4x)]$

51–60 ■ Use a calculator to find the solution of the equation, correct to two decimal places.

51.  $\log_2(1-x) = 4$

52.  $2^{3x-5} = 7$

53.  $5^{5-3x} = 26$

54.  $\ln(2x-3) = 14$

55.  $e^{3x/4} = 10$

56.  $2^{1-x} = 3^{2x+5}$

57.  $\log x + \log(x+1) = \log 12$

58.  $\log_8(x+5) - \log_8(x-2) = 1$

59.  $x^2 e^{2x} + 2x e^{2x} = 8e^{2x}$

60.  $2^{3^x} = 5$

61–64 ■ Use a calculator to find the solution of the equation, correct to six decimal places.

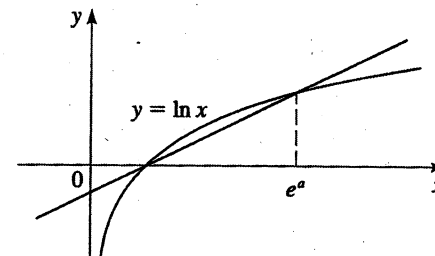
61.  $5^{-2x/3} = 0.63$

62.  $2^{3x-5} = 7$

63.  $5^{2x+1} = 3^{4x-1}$

64.  $e^{-15k} = 10,000$

74. Find an equation of the line shown in the figure.



75. Evaluate  $\log_4 15$ , correct to six decimal places.

76. Solve the inequality:  $0.2 \leq \log x < 2$

77. Which is larger,  $\log_4 258$  or  $\log_5 620$ ?

78. Find the inverse of the function  $f(x) = 2^{3^x}$  and state its domain and range.