

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. $\log_5 \sqrt{5}$
32. $e^{2 \ln 7}$
33. $\log 25 + \log 4$
34. $\log_3 \sqrt{243}$
35. $\log_2 16^{23}$
36. $\log_5 250 - \log_5 2$
37. $\log_8 6 - \log_8 3 + \log_8 2$
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. $\ln\left(\frac{\sqrt[3]{x^4+12}}{(x+16)\sqrt{x-3}}\right)$

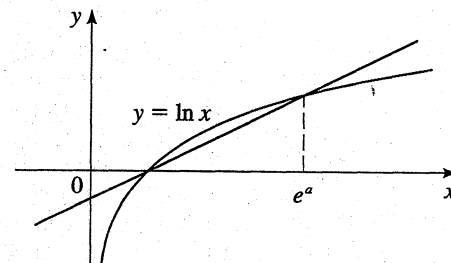
45-50 ■ Rewrite the expression as a single logarithm.

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. $x^2e^{2x} + 2xe^{2x} = 8e^{2x}$
60. $2^{3^x} = 5$

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.