

## Logarithmic Functions

Graph the following logarithmic functions.

1.  $y = \log_2(x)$

2.  $y = \log_3(x)$

3.  $y = \log_4(x)$

4.  $y = \log_5(x)$

5.  $y = \log_{10}(x)$

6.  $y = \log_8(x)$

7.  $y = \log_e(x)$

8.  $y = \ln(x)$

Evaluate the following logs.

9.  $\log_{10}(100)$

10.  $\log_{10}(1000)$

11.  $\log_7(49)$

12.  $\log_2(8)$

13.  $\log_8\left(\frac{1}{8}\right)$

14.  $\log_5\left(\frac{1}{25}\right)$

15.  $\log_9(1)$

16.  $\log_6(1)$

17.  $\log_5(5)$

18.  $\log_7(7)$

19.  $\log_{16}(4)$

20.  $\log_9(27)$

21.  $\log_8(16)$

22.  $\log_4(32)$

23.  $\log_3(81)$

24.  $\log_3(27)$

Determine the value of x.

25.  $\log_6(x) = 2$

26.  $\log_4(x) = 3$

27.  $\log_3(x) = -2$

28.  $\log_2(x) = -1$

29.  $\log_{16}(x) = \frac{1}{2}$

30.  $\log_4(x) = \frac{1}{2}$

31.  $\log_2(x) = -3$

32.  $\log_2(x) = -1$

33.  $\log_4(x) = 0$

34.  $\log_5(x) = 0$

35.  $\log_{16}(x - 1) = \frac{1}{2}$

36.  $\log_4(x + 1) = 3$

37.  $\log_6(x + 3) = 2$

38.  $\log_6(x - 3) = 2$

39.  $\log_8(x - 1) = 1$

40.  $\log_{10}(2x) = 2$

41.  $\log_{100}(x - 4) = \frac{1}{2}$

42.  $\log_{100}(x + 4) = \frac{1}{2}$

Use properties of logs to express as a sum or difference of logs.

43.  $\log_2(x^3y)$

44.  $\log_2(x^2y)$

45.  $\log_5(x^3y^2)$

46.  $\log_5(x^2y^3)$

47.  $\log\left(\frac{x^4}{z^2}\right)$

48.  $\log\left(\frac{x^2}{z^3}\right)$

49.  $\ln\left(\frac{\sqrt{x}}{y^3}\right)$

50.  $\ln\left(\frac{\sqrt{x}}{y^2}\right)$

Use properties of logs to write as a single log.

51.  $2\log(3) + 3\log(2)$

52.  $2\log(3) - 3\log(2)$

53.  $2\log(5) - 3\log(2)$

54.  $\log(3) - 2\log(4)$

55.  $\frac{1}{2}\ln(9) + 4\ln(1)$

56.  $\frac{1}{2}\ln(16) + 4\ln(1)$

57.  $\log(x) + \log(x - 1)$

58.  $\log(x) + \log(x + 1)$

59.  $\log(x) - \log(x + 3)$

60.  $\log(x) - \log(x - 4)$

61.  $\ln(x - 5) + 2\ln(x)$

62.  $\ln(x + 3) - 3\ln(x)$

63.  $4\log_5(x) - \log_5(x + 2)$

64.  $3\log_5(x) - \log_5(x - 2)$