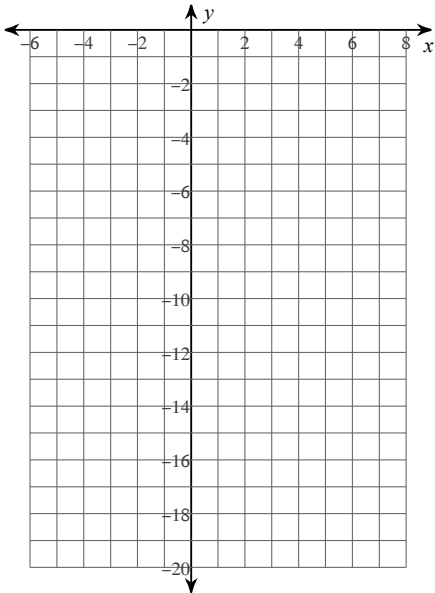


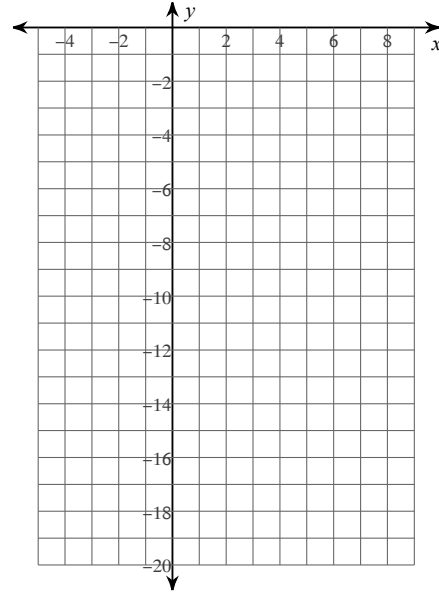
Chapter 8: Exponential and Logarithmic Equations Date _____ Period _____

Sketch the graph of each function.

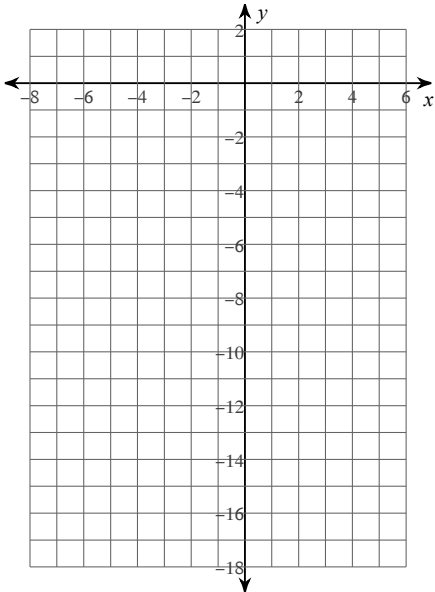
1) $f(x) = -5 \cdot 2^{x-1} - 2$



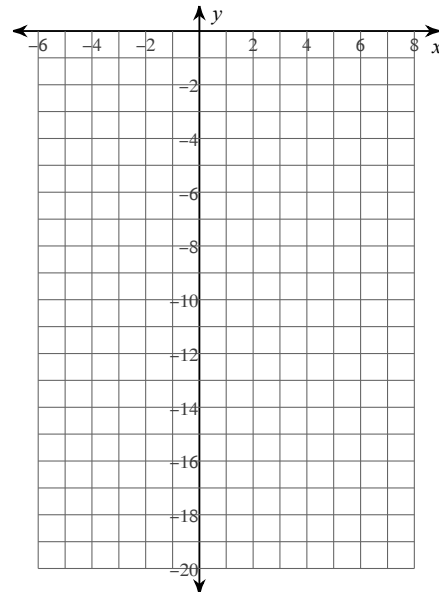
2) $f(x) = -\frac{1}{2} \cdot \left(\frac{1}{2}\right)^{x-2} - 2$



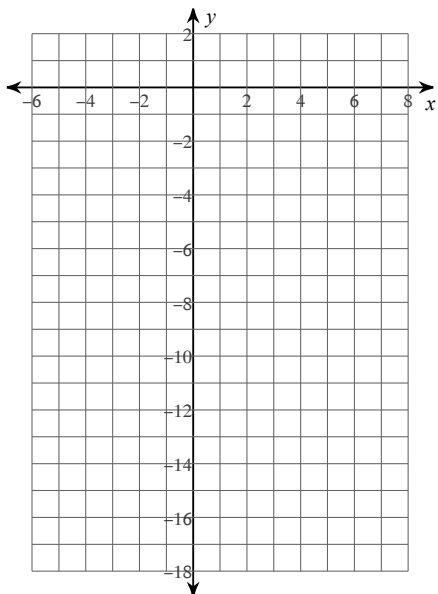
3) $f(x) = -3 \cdot 2^{x+1} + 2$



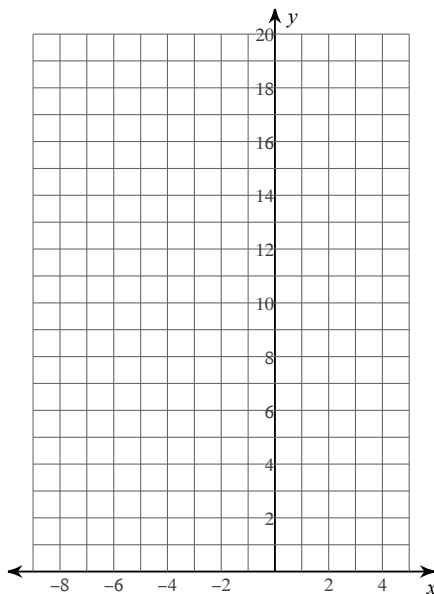
4) $f(x) = -\frac{1}{4} \cdot \left(\frac{1}{2}\right)^{x-1} - 1$



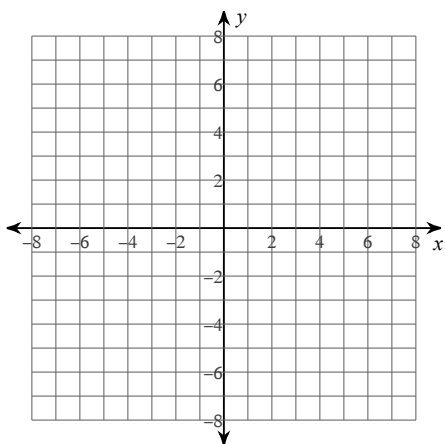
$$5) f(x) = -2 \cdot \left(\frac{1}{2}\right)^{x-1} + 2$$



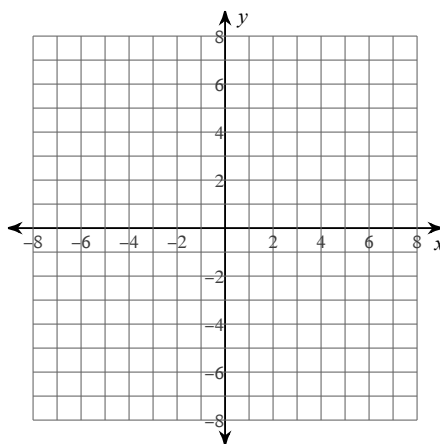
$$6) f(x) = \frac{1}{2} \cdot \left(\frac{1}{3}\right)^{x+2} + 1$$



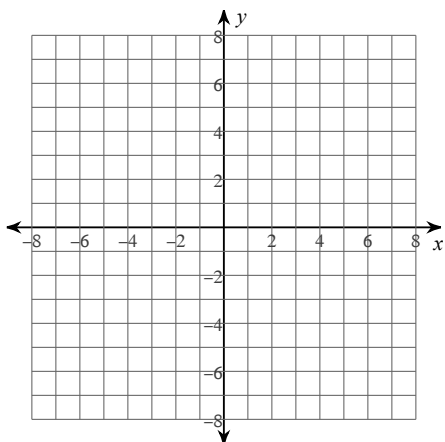
$$7) f(x) = \log_6(x - 1) + 3$$



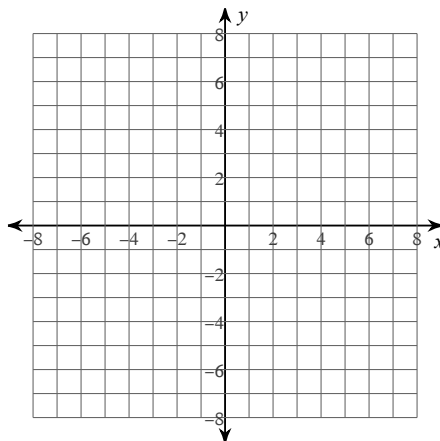
$$8) f(x) = \log_4(x + 2)$$



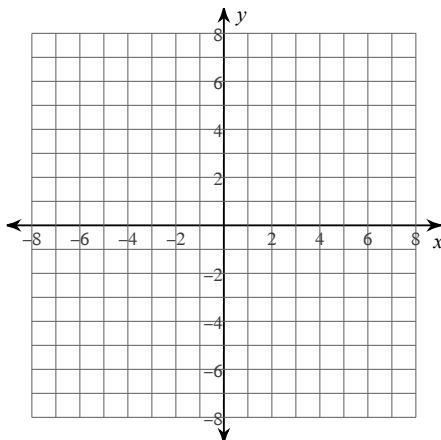
$$9) f(x) = \log_{\frac{1}{5}}(x + 5) + 5$$



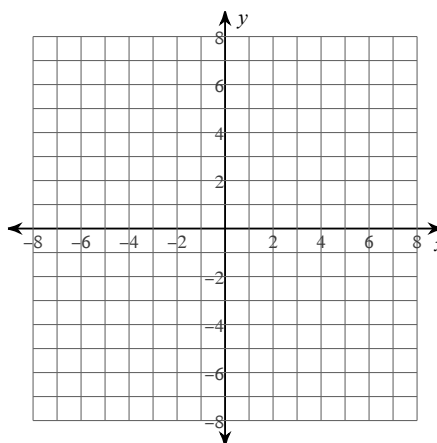
$$10) f(x) = \log_5(x - 1) - 4$$



$$11) f(x) = \log_{\frac{1}{2}}(x - 1) + 4$$



$$12) f(x) = \log_5(x + 2)$$



Condense each expression to a single logarithm.

$$13) 20\log_3 x + 5\log_3 y$$

$$14) 6\log_7 2 + \frac{\log_7 3}{2}$$

$$15) \frac{\log_9 10}{2} + \frac{\log_9 11}{2} + \frac{\log_9 7}{2}$$

$$16) \log_7 w + \frac{\log_7 u}{2} + \frac{\log_7 v}{2}$$

$$17) \ln x + \ln y + 6\ln z$$

$$18) 3\log_7 11 + \frac{\log_7 5}{3}$$

Expand each logarithm.

$$19) \log_3 (z^5 \sqrt[3]{x})$$

$$20) \log_2 (ab^6)^6$$

$$21) \log (8 \cdot 3^6)^4$$

$$22) \log_8 \sqrt[3]{7 \cdot 12 \cdot 11}$$

$$23) \log_5 (z\sqrt{x \cdot y})$$

$$24) \log (11^4 \sqrt[3]{12})$$

Use a calculator to approximate each to the nearest thousandth.

25) $\log_3 22$

26) $\log_5 2.9$

27) $\log_4 59$

28) $\log_2 39$

29) $\log_6 7$

30) $\log_4 4.7$

Solve each equation.

31) $4^{2a} = 4^{3-3a}$

32) $64^{-3m} = 8$

33) $\left(\frac{1}{8}\right)^{2v} = 32$

34) $36^{-x} = 216^{-2x-2}$

35) $4^{3b} = 64$

36) $125^{-3x} = 25$

Solve each equation. Round your answers to the nearest ten-thousandth.

37) $-5 \cdot 2^{m-4} = -61$

38) $9 \cdot 2^{a-8.9} = 8$

39) $5.1 \cdot 13^{3.7n} = 4$

40) $3 \cdot 8^{9x} = 56$

41) $4^{k-10} + 1 = 10$

42) $9 \cdot 13^{8m} = 81.9$

Solve each equation.

43) $\log_{16} (5n - 6) = \log_{16} (2n + 3)$

44) $\log_{20} (2b + 8) = \log_{20} (6 - 4b)$

45) $\ln (6 - x) = \ln (-3x - 1)$

46) $\log_{19} (-3a - 2) = \log_{19} (3 - 2a)$

47) $\log_{15} (-3a - 10) = \log_{15} (-2a - 5)$

48) $\ln (2b + 5) = \ln (4b + 9)$

49) $\log_{19} (80 + 3n) = \log_{19} (n^2 + n)$

50) $\log_{11} (8r + 3) = \log_{11} (r^2 - 17)$

51) $\log_{20} (x^2 - x) = \log_{20} (60 + 3x)$

52) $\log_{16} (48 - 2n) = \log_{16} (n^2 - 4n)$

53) $\ln 2x^2 = \ln (100 + x^2)$

54) $\log (2r^2 - 5r) = \log (36 + r^2)$

$$55) \log_9 (x - 6) - \log_9 x = 1$$

$$56) \log_3 (x^2 - 7) + \log_3 2 = 2$$

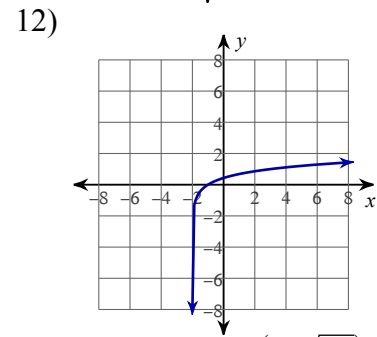
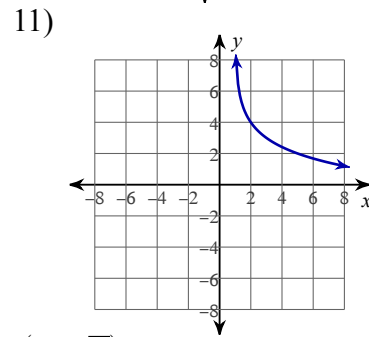
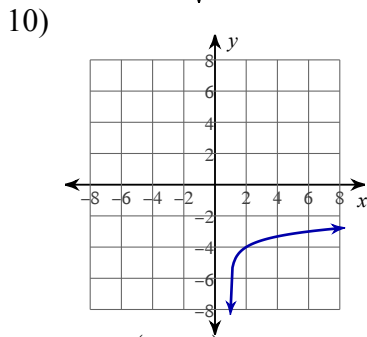
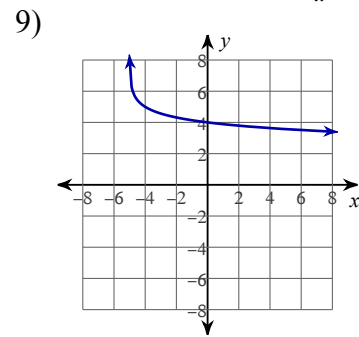
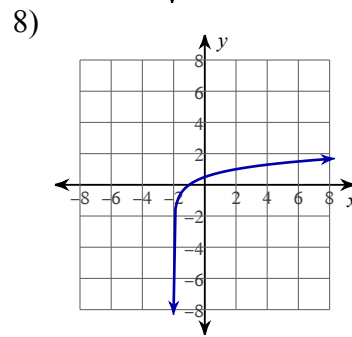
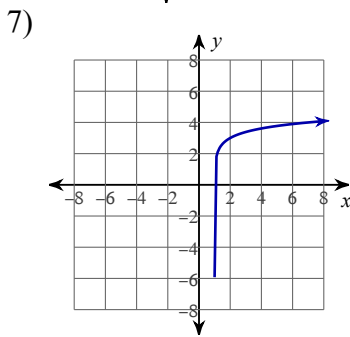
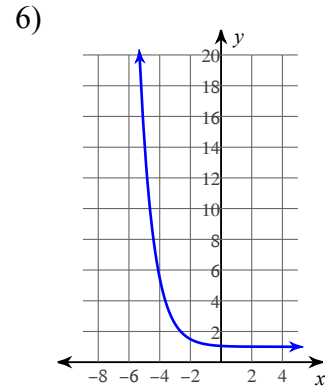
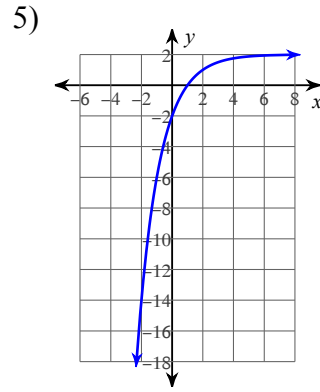
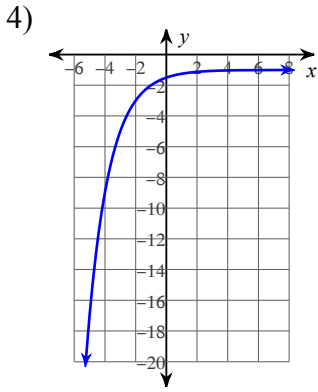
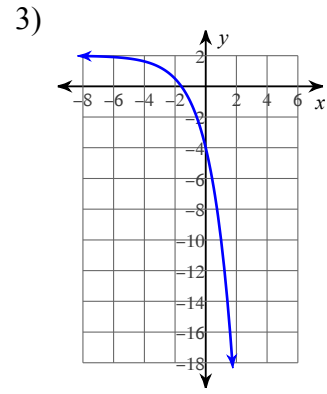
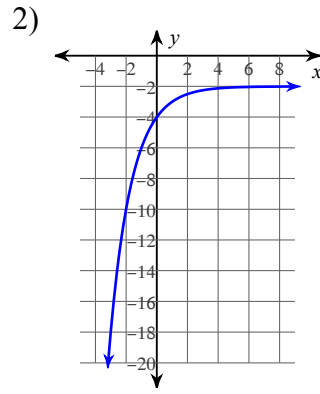
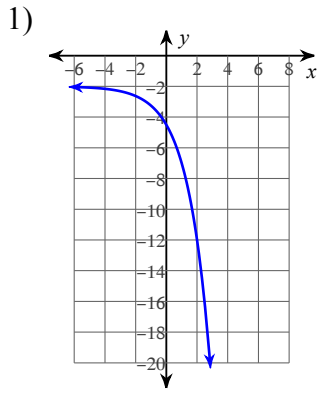
$$57) \log_5 2 + \log_5 -x = 2$$

$$58) \log_9 7 - \log_9 -2x = 1$$

$$59) \log_8 4 - \log_8 -5x = 1$$

$$60) \log_4 9 + \log_4 (x^2 + 7) = 5$$

Answers to Chapter 8: Exponential and Logarithmic Equations (ID: 1)



13) $\log_3 (y^5 x^{20})$

14) $\log_7 (2^6 \sqrt{3})$

15) $\log_9 \sqrt{770}$

16) $\log_7 (w\sqrt{vu})$

17) $\ln (yxz^6)$

18) $\log_7 (11^3 \sqrt[3]{5})$

19) $5 \log_3 z + \frac{\log_3 x}{3}$

20) $6 \log_2 a + 36 \log_2 b$

21) $4 \log 8 + 24 \log 3$

22) $\frac{\log_8 7}{3} + \frac{\log_8 12}{3} + \frac{\log_8 11}{3}$

23) $\log_5 z + \frac{\log_5 x}{2} + \frac{\log_5 y}{2}$

24) $4 \log 11 + \frac{\log 12}{3}$

25) 2.814

26) 0.662

27) 2.941

28) 5.285

29) 1.086

30) 1.116

31) $\left\{ \frac{3}{5} \right\}$

32) $\left\{-\frac{1}{6}\right\}$

36) $\left\{-\frac{2}{9}\right\}$

40) 0.1564

44) $\left\{-\frac{1}{3}\right\}$

48) $\{-2\}$

52) $\{-6, 8\}$

56) $\left\{\frac{\sqrt{46}}{2}, -\frac{\sqrt{46}}{2}\right\}$

60) $\left\{\frac{31}{3}, -\frac{31}{3}\right\}$

33) $\left\{-\frac{5}{6}\right\}$

37) 7.6088

41) 11.585

45) $\left\{-\frac{7}{2}\right\}$

49) $\{10, -8\}$

53) $\{10, -10\}$

57) $\left\{-\frac{25}{2}\right\}$

34) $\left\{-\frac{3}{2}\right\}$

38) 8.7301

42) 0.1076

46) $\{-5\}$

50) $\{10\}$

54) $\{-4, 9\}$

58) $\left\{-\frac{7}{18}\right\}$

35) $\{1\}$

39) -0.0256

43) $\{3\}$

47) $\{-5\}$

51) $\{-6, 10\}$

55) No solution.

59) $\left\{-\frac{1}{10}\right\}$