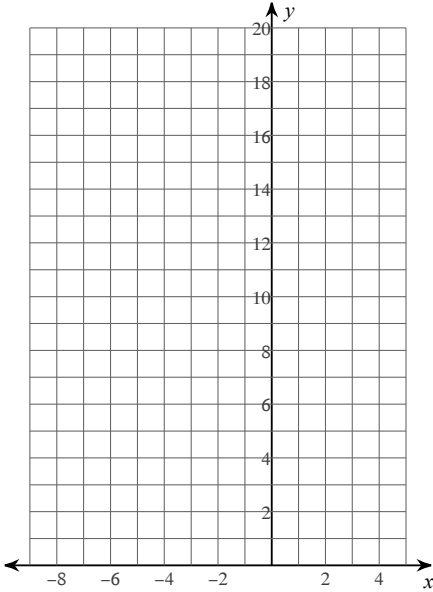


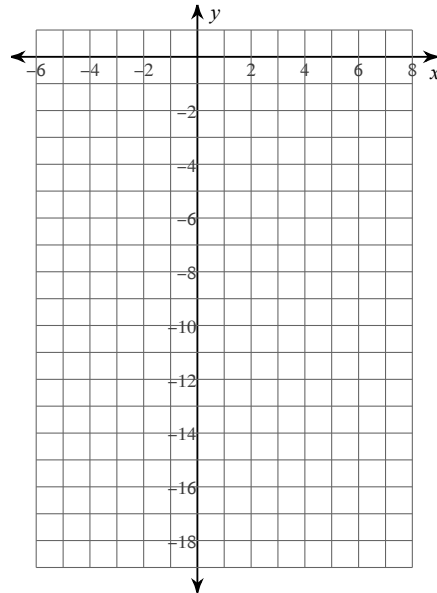
## Chapter 8: Exponential and Logarithmic Equations Date \_\_\_\_\_ Period \_\_\_\_\_

Sketch the graph of each function.

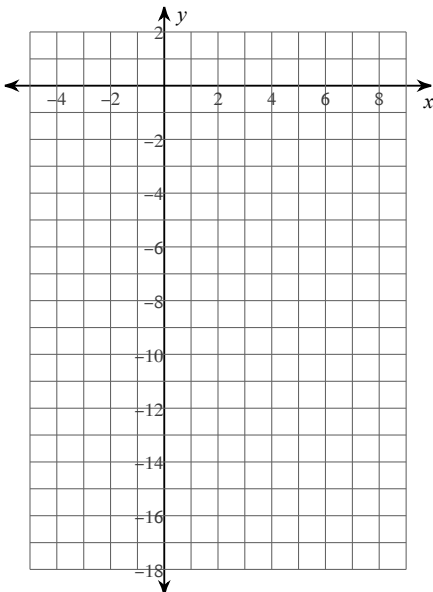
1)  $f(x) = 2 \cdot \left(\frac{1}{2}\right)^{x+2} + 1$



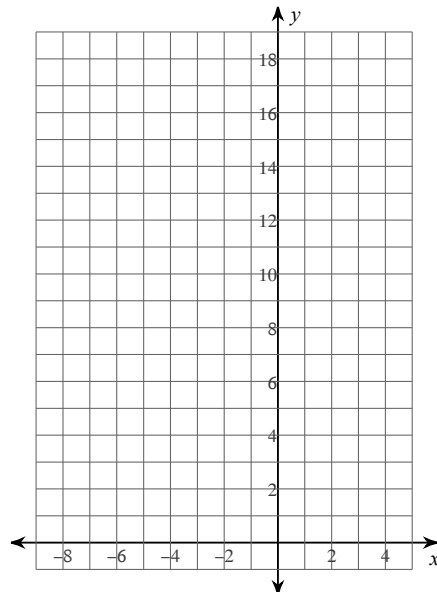
2)  $f(x) = -4 \cdot 2^{x-1} + 1$



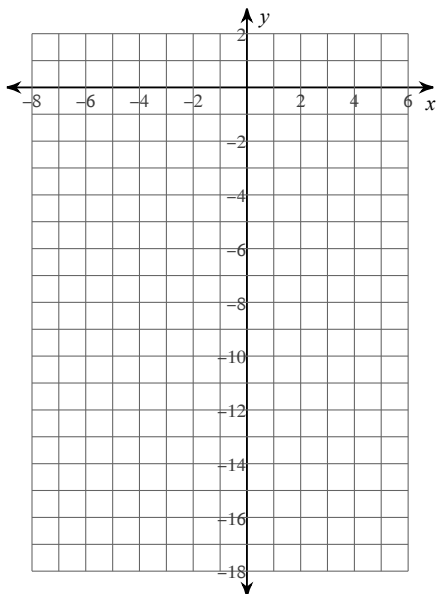
3)  $f(x) = -\frac{1}{4} \cdot \left(\frac{1}{2}\right)^{x-2} + 2$



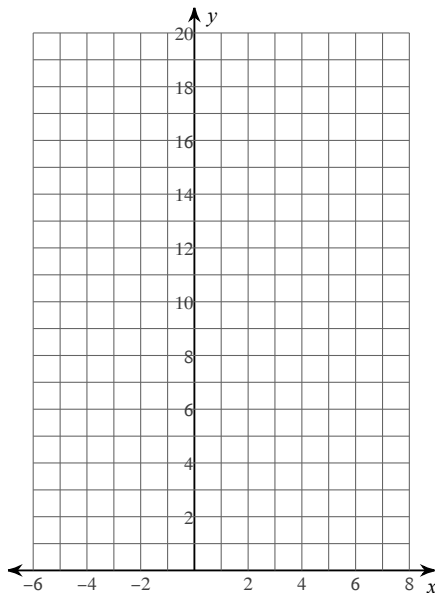
4)  $f(x) = \frac{1}{2} \cdot 4^{x+2} - 1$



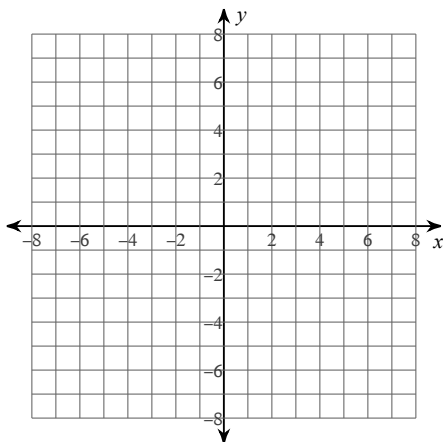
$$5) f(x) = -4 \cdot \left(\frac{1}{2}\right)^{x+1} + 2$$



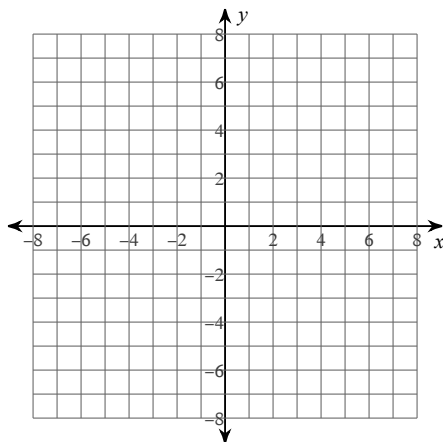
$$6) f(x) = \frac{1}{4} \cdot 2^{x-1} + 1$$



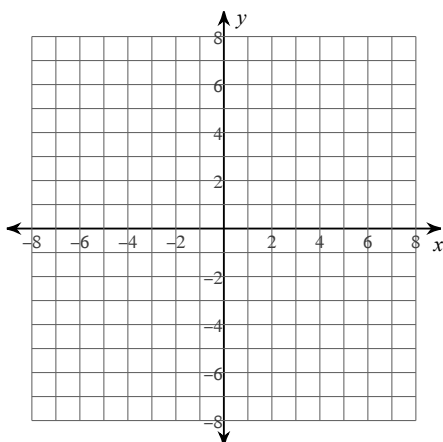
$$7) f(x) = \log_3(x + 5) - 3$$



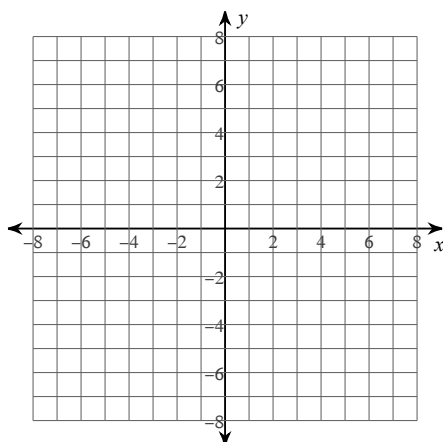
$$8) f(x) = \log_5(x + 5) - 5$$



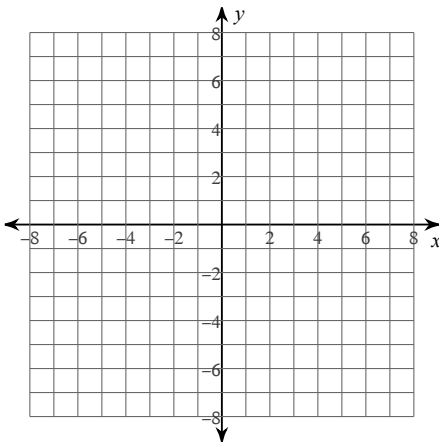
$$9) f(x) = \log_6(x + 2) + 4$$



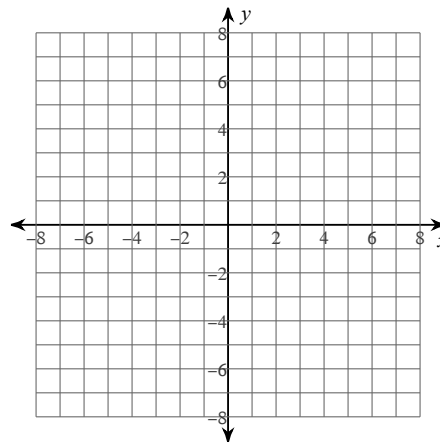
$$10) f(x) = \log_5(x + 4) + 2$$



$$11) f(x) = \log_2(x + 6) - 3$$



$$12) f(x) = \log(x + 1) - 2$$



**Condense each expression to a single logarithm.**

$$13) \frac{\log_6 x}{3} + \frac{\log_6 y}{3} + \frac{\log_6 z}{3}$$

$$14) \log_8 2 + \frac{\log_8 5}{3} + \frac{\log_8 7}{3}$$

$$15) 2\log_9 u + 10\log_9 v$$

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

$$17) 24\log 8 + 6\log 5$$

$$18) 2\log_7 x + 12\log_7 y$$

**Expand each logarithm.**

$$19) \log_3(c^5 \sqrt[3]{a})$$

$$20) \log_4\left(\frac{x}{y^5}\right)^6$$

$$21) \log_9(z^6 \sqrt{x})$$

$$22) \log_9(uv^4)^2$$

$$23) \log_7(x^6 y^6)$$

$$24) \log_3 \sqrt{x \cdot y \cdot z}$$

Use a calculator to approximate each to the nearest thousandth.

25)  $\log_6 63$

26)  $\log_6 30$

27)  $\log_6 5$

28)  $\log_4 1.284$

29)  $\ln 2.8$

30)  $\log_3 2.1$

Solve each equation.

31)  $36^{-2m-3} = 216^{-m}$

32)  $36^{b-2} = 216$

33)  $4^{2r} = 16$

34)  $243^{2x} = \left(\frac{1}{3}\right)^{-x-3}$

35)  $16^{3x} = 64^{2x-3}$

36)  $2^{2x} = 1$

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

37)  $5^{x+6} - 6 = -1$

38)  $2.4 \cdot 16^{3m} = 15$

39)  $4^{-2.5x} + 4 = 95$

40)  $-6 \cdot 5^{x+1} = -70$

41)  $14^{10a} + 6 = 93$

42)  $16^{n+7} - 3 = 92$

Solve each equation.

43)  $\log_{17} (10 - k) = \log_{17} (k + 6)$

44)  $\log_7 (3n - 8) = \log_7 (4n + 10)$

45)  $\log_{15} 5x = \log_{15} (3x + 4)$

46)  $\log_{11} (-3n - 4) = \log_{11} (-4n - 7)$

47)  $\log_{20} (-2a - 4) = \log_{20} (1 - 3a)$

48)  $\log_{13} 22 = \log_{13} (2n - 10)$

49)  $\log_8 (4x^2 + 12x) = \log_8 (-35 + 3x^2)$

50)  $\log_{14} (18 + 3n) = \log_{14} n^2$

51)  $\log_9 (k^2 - 44) = \log_9 (k - 2)$

52)  $\log_{20} (11x - 1) = \log_{20} (x^2 + 29)$

53)  $\log_7 (9n - 3) = \log_7 (n^2 + 5)$

54)  $\log_{17} (9 - m) = \log_{17} (m^2 - 9m)$

$$55) \log_9 7 - \log_9 (x + 10) = 1$$

$$56) \log_9 7 - \log_9 4x = 1$$

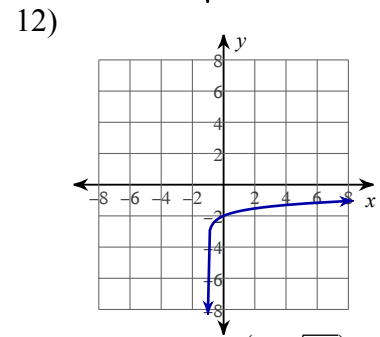
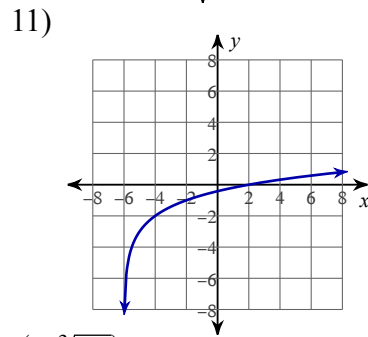
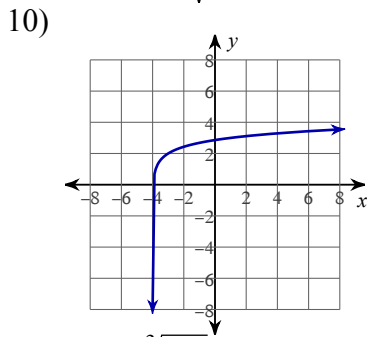
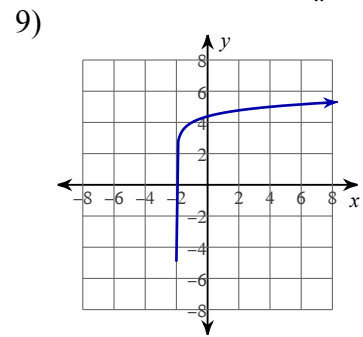
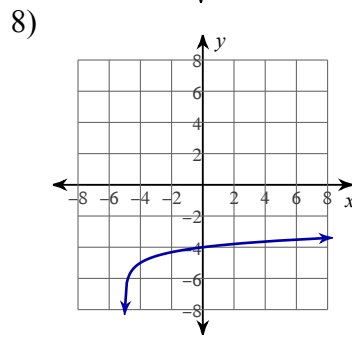
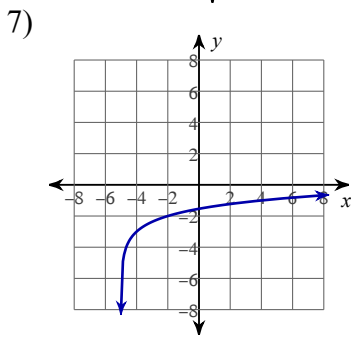
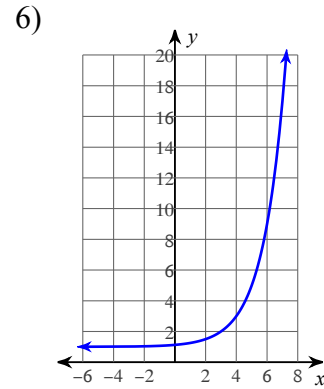
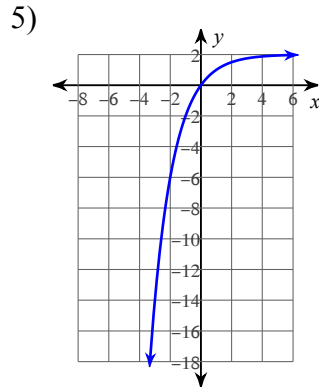
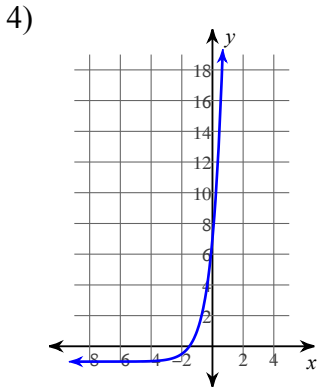
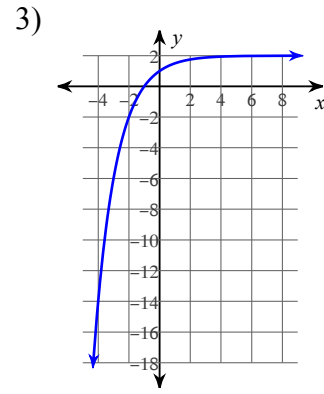
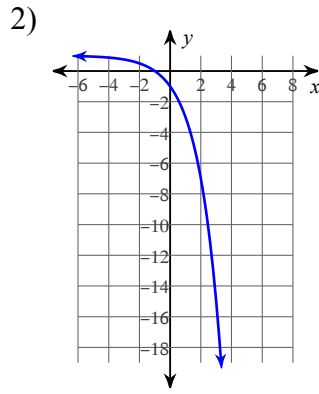
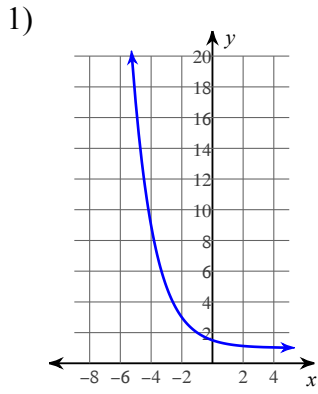
$$57) \log_4 6 - \log_4 2x = 1$$

$$58) \log_2 (x + 6) + \log_2 x = 4$$

$$59) \log 4x^2 + \log 4 = 4$$

$$60) \log_5 -2x - \log_5 6 = 1$$

# Answers to Chapter 8: Exponential and Logarithmic Equations (ID: 2)



13)  $\log_6 \sqrt[3]{zyx}$

14)  $\log_8 (2\sqrt[3]{35})$

15)  $\log_9 (v^{10}u^2)$

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

17)  $\log (5^6 \cdot 8^{24})$

18)  $\log_7 (y^{12}x^2)$

19)  $5\log_3 c + \frac{\log_3 a}{3}$

20)  $6\log_4 x - 30\log_4 y$

21)  $6\log_9 z + \frac{\log_9 x}{2}$

22)  $2\log_9 u + 8\log_9 v$

23)  $6\log_7 x + 6\log_7 y$

24)  $\frac{\log_3 x}{2} + \frac{\log_3 y}{2} + \frac{\log_3 z}{2}$

25) 2.312

26) 1.898

27) 0.898

28) 0.18

29) 1.03

30) 0.675

31)  $\{-6\}$

32)  $\left\{\frac{7}{2}\right\}$

33)  $\{1\}$

- 34)  $\left\{\frac{1}{3}\right\}$   
38) 0.2203  
42) -5.3575  
46)  $\{-3\}$   
50)  $\{6, -3\}$   
54)  $\{-1\}$   
58)  $\{2\}$
- 35) No solution.  
39) -1.3016  
43)  $\{2\}$   
47) No solution.  
51)  $\{7\}$   
55)  $\left\{-\frac{83}{9}\right\}$   
59)  $\{25, -25\}$
- 36)  $\{0\}$   
40) 0.5265  
44) No solution.  
48)  $\{16\}$   
52)  $\{6, 5\}$   
56)  $\left\{\frac{7}{36}\right\}$   
60)  $\{-15\}$
- 37) -5  
41) 0.1692  
45)  $\{2\}$   
49)  $\{-5, -7\}$   
53)  $\{8, 1\}$   
57)  $\left\{\frac{3}{4}\right\}$