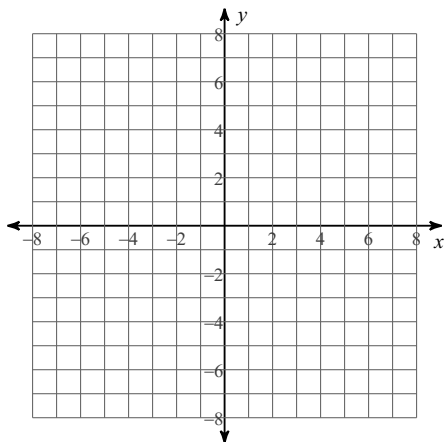


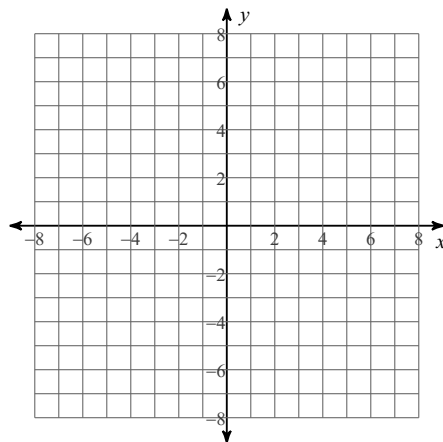
Unit Review

Identify the domain and range of each. Then sketch the graph.

1) $y = \log_5 (x - 1) + 2$



2) $y = \log_6 (x - 1) - 3$



Solve each equation.

3) $5^{3x+2} \cdot 5^{2x} = 625$

4) $4^{-m} = \frac{1}{4}$

5) $36^{-3m} \cdot 216^{-2m} = 216^{-3m-2}$

6) $\left(\frac{1}{2}\right)^{-2x} \cdot 8^{2x} = \frac{1}{2}$

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

7) $20^{-2k} + 6 = 62$

8) $16^{x-5} + 9 = 59$

9) $15^{n+9} + 1 = 75$

10) $-6 \cdot 20^{-2p} = -100$

11) $5e^{7-6k} - 8 = 36$

12) $6e^{9m-6} + 8.9 = 13$

Solve each equation.

13) $-\log -v = -1$

14) $6 \log_{11} (m + 7) = 24$

15) $-5 \log_7 -3m = 10$

16) $-7 \log_{12} 2n = -21$

17) $\log_4 8 - \log_4 (x + 2) = 1$

18) $\log_7 6 + \log_7 3x^2 = 4$

19) $\log_8 10 + \log_8 (x + 2) = 2$

20) $\log_7 (x + 1) - \log_7 x = \log_7 38$

Evaluate each expression.

21) $\log_3 81$

22) $\log_5 25$

23) $\log_2 64$

24) $\log_6 216$

Expand each logarithm.

25) $\log_4 (z\sqrt[3]{x \cdot y})$

26) $\log_2 (z\sqrt{x \cdot y})$

Condense each expression to a single logarithm.

27) $12\log_4 7 + 12\log_4 10 - 6\log_4 11$

28) $3\log_7 z + 6\log_7 x + 3\log_7 y$

Solve each equation.

29) $\log_3 (x^2 + 16) = \log_3 (11x - 2)$

30) $\log_{13} (-3 + 2v) = \log_{13} (v^2 - 2v)$

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

31) $\log x - \log 2 = \log 73$

32) $\log 7 + \log x = 2$

Solve each equation.

33) $\log_5 6 - \log_5 (x + 1) = 2$

34) $\log_8 (x + 7) - \log_8 3 = 2$

Evaluate each expression.

35) $\log_6 216$

36) $\log_3 27$

Expand each logarithm.

37) $\log_5 \sqrt[3]{x \cdot y \cdot z}$

38) $\log_5 \left(\frac{10}{11^5} \right)^5$

Find the inverse of each function.

39) $y = \log_4 (x - 4)$

40) $y = \log_2 4^x$

Expand each logarithm.

41) $\log_7 \sqrt{11 \cdot 6 \cdot 5}$

42) $\log_6 \left(\frac{3^6}{5}\right)^5$

Rewrite each equation in exponential form.

43) $\log_{15} 225 = 2$

44) $\log_9 81 = 2$

Rewrite each equation in logarithmic form.

45) $18^2 = 324$

46) $v^{-\frac{9}{5}} = u$

Use the properties of logarithms and the values below to find the logarithm indicated. Do not use a calculator to evaluate the logs.

47) $\log_9 6 \approx 0.8$

$\log_9 11 \approx 1.1$

$\log_9 8 \approx 0.9$

Find $\log_9 \frac{32}{3}$

48) $\log_7 12 \approx 1.3$

$\log_7 9 \approx 1.1$

$\log_7 11 \approx 1.2$

Find $\log_7 \frac{108}{7}$

49) $\log_4 6 \approx 1.3$

$\log_4 5 \approx 1.2$

$\log_4 9 \approx 1.6$

Find $\log_4 \frac{81}{5}$

50) $\log_9 6 \approx 0.8$

$\log_9 11 \approx 1.1$

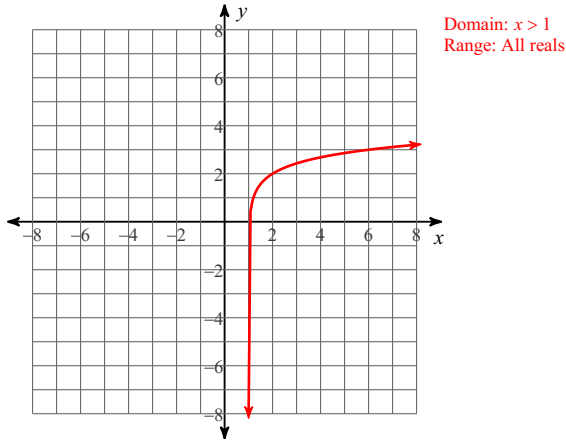
$\log_9 4 \approx 0.6$

Find $\log_9 \frac{8}{3}$

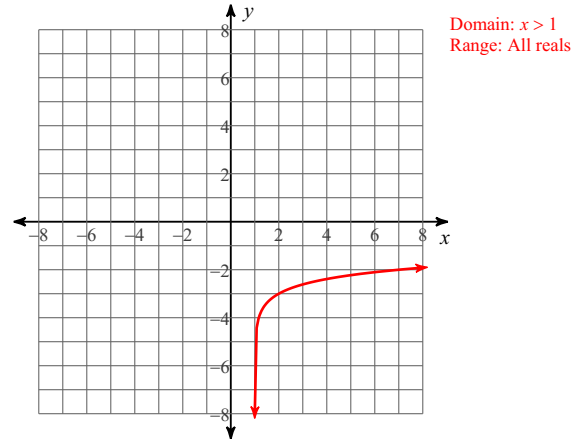
Unit Review

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2) $y = \log_6 (x - 1) - 3$



Solve each equation.

3) $5^{3x+2} \cdot 5^{2x} = 625$ $\left\{ \frac{2}{5} \right\}$

4) $4^{-m} = \frac{1}{4}$

$\{1\}$

5) $36^{-3m} \cdot 216^{-2m} = 216^{-3m-2}$
 $\{2\}$

6) $\left(\frac{1}{2}\right)^{-2x} \cdot 8^{2x} = \frac{1}{2} \left\{ -\frac{1}{8} \right\}$

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

7) $20^{-2k} + 6 = 62$
 -0.6718

8) $16^{x-5} + 9 = 59$
 6.411

9) $15^{n+9} + 1 = 75$
 -7.4106

10) $-6 \cdot 20^{-2p} = -100$
 -0.4696

11) $5e^{7-6k} - 8 = 36$
 0.8042

12) $6e^{9m-6} + 8.9 = 13$
 0.6244

Solve each equation.

13) $-\log -v = -1$
 $\{-10\}$

14) $6 \log_{11} (m + 7) = 24$
 $\{14634\}$

15) $-5 \log_7 -3m = 10$ $\left\{ -\frac{1}{147} \right\}$

16) $-7 \log_{12} 2n = -21$
 $\{864\}$

17) $\log_4 8 - \log_4 (x + 2) = 1$
 $\{0\}$

18) $\log_7 6 + \log_7 3x^2 = 4$ $\left\{ \frac{49\sqrt{2}}{6}, -\frac{49\sqrt{2}}{6} \right\}$

$$19) \log_8 10 + \log_8 (x + 2) = 2 \left\{ \frac{22}{5} \right\}$$

$$20) \log_7 (x + 1) - \log_7 x = \log_7 38 \left\{ \frac{1}{37} \right\}$$

Evaluate each expression.

$$21) \log_3 81$$

4

$$22) \log_5 25$$

2

$$23) \log_2 64$$

6

$$24) \log_6 216$$

3

Expand each logarithm.

$$25) \log_4 (z\sqrt[3]{x \cdot y})$$

$$\log_4 z + \frac{\log_4 x}{3} + \frac{\log_4 y}{3}$$

$$26) \log_2 (z\sqrt{x \cdot y})$$

$$\log_2 z + \frac{\log_2 x}{2} + \frac{\log_2 y}{2}$$

Condense each expression to a single logarithm.

$$27) 12\log_4 7 + 12\log_4 10 - 6\log_4 11$$

$$\log_4 \frac{7^{12} \cdot 10^{12}}{11^6}$$

$$28) 3\log_7 z + 6\log_7 x + 3\log_7 y$$

$$\log_7 (z^3 y^3 x^6)$$

Solve each equation.

$$29) \log_3 (x^2 + 16) = \log_3 (11x - 2)$$

{9, 2}

$$30) \log_{13} (-3 + 2v) = \log_{13} (v^2 - 2v)$$

{3}

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

$$31) \log x - \log 2 = \log 73$$

{146}

$$32) \log 7 + \log x = 2$$

{14.2857}

Solve each equation.

$$33) \log_5 6 - \log_5 (x + 1) = 2 \left\{ -\frac{19}{25} \right\}$$

$$34) \log_8 (x + 7) - \log_8 3 = 2$$

{185}

Evaluate each expression.

$$35) \log_6 216$$

3

$$36) \log_3 27$$

3

Expand each logarithm.

$$37) \log_5 \sqrt[3]{x \cdot y \cdot z}$$

$$\frac{\log_5 x}{3} + \frac{\log_5 y}{3} + \frac{\log_5 z}{3}$$

$$38) \log_5 \left(\frac{10}{11^5} \right)^5$$

$$5\log_5 10 - 25\log_5 11$$

Find the inverse of each function.

$$39) y = \log_4 (x - 4)$$

$$y = 4^x + 4$$

$$40) y = \log_2 4^x$$

$$y = \log_4 2^x$$

Expand each logarithm.

$$41) \log_7 \sqrt{11 \cdot 6 \cdot 5}$$

$$\frac{\log_7 11}{2} + \frac{\log_7 6}{2} + \frac{\log_7 5}{2}$$

$$42) \log_6 \left(\frac{3^6}{5} \right)^5$$

$$30 \log_6 3 - 5 \log_6 5$$

Rewrite each equation in exponential form.

$$43) \log_{15} 225 = 2$$

$$15^2 = 225$$

$$44) \log_9 81 = 2$$

$$9^2 = 81$$

Rewrite each equation in logarithmic form.

$$45) 18^2 = 324$$

$$\log_{18} 324 = 2$$

$$46) v^{-\frac{9}{5}} = u \quad \log_v u = -\frac{9}{5}$$

Use the properties of logarithms and the values below to find the logarithm indicated. Do not use a calculator to evaluate the logs.

$$47) \log_9 6 \approx 0.8$$

$$\log_9 11 \approx 1.1$$

$$\log_9 8 \approx 0.9$$

$$\text{Find } \log_9 \frac{32}{3}$$

1

$$48) \log_7 12 \approx 1.3$$

$$\log_7 9 \approx 1.1$$

$$\log_7 11 \approx 1.2$$

$$\text{Find } \log_7 \frac{108}{7}$$

1.4

$$49) \log_4 6 \approx 1.3$$

$$\log_4 5 \approx 1.2$$

$$\log_4 9 \approx 1.6$$

$$\text{Find } \log_4 \frac{81}{5}$$

2

$$50) \log_9 6 \approx 0.8$$

$$\log_9 11 \approx 1.1$$

$$\log_9 4 \approx 0.6$$

$$\text{Find } \log_9 \frac{8}{3}$$

0.4