Chapter # 1 HW Section:_____, Date:_____Name_____

Find the domain and range of the function.

1) $f(x) = 1 - x^2$

A) D: $(-\infty, 1]$, R: $(-\infty, \infty)$
B) D: $(-\infty, \infty)$, R: $(-\infty, \infty)$
C) D: $(-\infty, \infty)$, R: $(-\infty, 1]$
D) D: $(-\infty, \infty)$, R: $[1, \infty)$

2) $g(z) = 3 - \sqrt{z}$

A) D: $[0,\infty)$, R: $(-\infty,3]$
B) D: $(-\infty, \infty)$, R: $(-\infty,3]$
C) D: $(-\infty,3]$, R: $(-\infty, \infty)$
D) D: $(-\infty,0]$, R: $[3,\infty)$

3) $g(z) = \dfrac{-8}{\sqrt{z+1}}$

A) D: $(-1,\infty)$, R: $(-\infty,0)$
B) D: $[1,\infty)$, R: $(-\infty,\infty)$
C) D: $[0,\infty)$, R: $(-\infty,\infty)$
D) D: $(-\infty,-1)$, R: $(0,\infty)$

4) $g(z) = \sqrt{9 - z^2}$

A) D: $[-3,3]$, R: $[0,3]$
B) D: $(-\infty,\infty)$, R: $(0, 3)$
C) D: $(-3,3)$, R: $(-3,3)$
D) D: $[0,\infty)$, R: $(-\infty,\infty)$

Determine an appropriate domain of the function. Identify the independent and dependent variables.

5) A cylindrical water tank with a radius of 6 feet and a height of 55 feet is filled to a height of h. The volume V of water (in cubic feet) is given by the function $g(h) = 36\pi h$.

A) D = [0, 55]
The independent variable is V.
The dependent variable is h.
B) D = [0, 55]
The independent variable is h.
The dependent variable is V.
C) D = $[0, 1980\pi]$
The independent variable is V.
The dependent variable is h.
D) D = [0, 36]
The independent variable is h.
The dependent variable is V.

Solve the problem.

6) If $f(x) = 4x + 9$ and $g(x) = 3x - 1$, find f(g(x)).

A) $12x + 26$
B) $12x + 13$
C) $12x + 5$
D) $12x + 8$

7) If $f(x) = -6x + 7$ and $g(x) = 4x + 6$, find g(f(x)).

A) $-24x + 43$
B) $-24x - 22$
C) $24x + 34$
D) $-24x + 34$

8) If $f(x) = \dfrac{x - 2}{9}$ and $g(x) = 9x + 2$, find g(f(x)).

A) $x + 4$
B) x
C) $9x + 16$
D) $-\dfrac{2}{9}$

9) If $f(x) = \sqrt{x + 5}$ and $g(x) = 8x - 9$, find f(g(x)).

A) $2\sqrt{2x - 1}$
B) $2\sqrt{2x + 1}$
C) $8\sqrt{x - 4}$
D) $8\sqrt{x + 5} - 9$

10) If $f(x) = 4x^2 + 3x + 8$ and $g(x) = 3x - 6$, find g(f(x)).

A) $4x^2 + 3x + 2$
B) $12x^2 + 9x + 18$
C) $4x^2 + 9x + 18$
D) $12x^2 + 9x + 30$

11) If $f(x) = \dfrac{1}{x}$ and $g(x) = 3x^2$, find g(f(x)).

A) $\dfrac{1}{x^2}$
B) $\dfrac{3}{x}$
C) $\dfrac{3}{x^2}$
D) $\dfrac{1}{3x^2}$

12) If $f(x) = 6x + 9$ and $g(x) = 5x^2 - 7x - 2$, find g(f(-4)).

A) 45 B) 1228 C) 28 D) 645

13) If $f(x) = -7x - 6$ and $g(x) = -8x^2 - 4x + 3$, find g(f(−3)).

A) -1857 B) -177 C) 393 D) -279

14) Use the tables to evaluate the given composition.
g(f(8))

x	4	6	8
f(x)	16	36	64

x	36	64	25	16	49
g(x)	20	48	9	0	33

A) 3 B) 48 C) 20 D) 36

Express the given function as a composite of functions f and g such that y = f(g(x)).

15) $y = \frac{1}{x^2 - 9}$

A) $f(x) = \frac{1}{x^2}$, $g(x) = x - 9$ B) $f(x) = \frac{1}{x^2}$, $g(x) = -\frac{1}{9}$

C) $f(x) = \frac{1}{x}$, $g(x) = x^2 - 9$ D) $f(x) = \frac{1}{9}$, $g(x) = x^2 - 9$

16) $y = |2x + 5|$

A) $f(x) = |x|$, $g(x) = 2x + 5$ B) $f(x) = x$, $g(x) = 2x + 5$

C) $f(x) = -|x|$, $g(x) = 2x + 5$ D) $f(x) = |-x|$, $g(x) = 2x - 5$

Solve the problem.

17) Let $f(x) = \frac{x}{x - 3}$. Find a function y = g(x) so that $(f \circ g)(x) = x$.

A) $g(x) = x(x - 3)$ B) $g(x) = \frac{x - 3}{3}$ C) $g(x) = \frac{1}{x - 3}$ D) $g(x) = \frac{3x}{x - 1}$

18) Let $f(x) = \sqrt{x - 2}$. Find a function y = g(x) so that $(f \circ g)(x) = \sqrt{x^2 - 2}$.

A) $g(x) = 2x$ B) $g(x) = x^2$ C) $g(x) = x^2 + 2$ D) $g(x) = x^2 - 2$

Simplify the difference quotients $\frac{f(x + h) - f(x)}{h}$ and $\frac{f(x) - f(a)}{x - a}$ for the following function. Rationalize the numerator when necessary.

19) $f(x) = 4x - 5$

A) $4x - 4h$; $4x - 4a$ B) 4; $4x - 4a$ C) 4; 4 D) 4h; 4a

20) $f(x) = \frac{4}{x}$

A) $\frac{8}{x(x + h)}; \frac{8}{ax}$ B) $-\frac{4}{x + h}; -\frac{4}{x - a}$ C) $\frac{8}{x + h}; \frac{8}{x - a}$ D) $-\frac{4}{x(x + h)}; -\frac{4}{ax}$

21) $f(x) = 3x^3$

A) $3x^2 + 3xh + 3h^2; 9x^2 + 9ax + 9a^2$
B) $3x^2 + 3xh + 3h^2; 3x^2 + 9ax + 9a^2$
C) $9x^2 - 9x - 3h; 3x^2 - 3ax - 3a^2$
D) $9x^2 + 9xh + 3h^2; 3x^2 + 3ax + 3a^2$

22) $f(x) = 3x^2 + 5x + 3$

A) $6x^2 + h; 9x + 9a + 5$
B) $6x + 6h + 5; 3x - 3a - 5$
C) $6x + 5h + 3; 6x + 6a + 5$
D) $6x + 3h + 5; 3x + 3a + 5$

23) $f(x) = \dfrac{x}{x + 6}$

A) $-\dfrac{h + 6}{(x + 6)(x + h + 6)}; -\dfrac{a + 6}{(x + 6)(a + 6)}$
B) $\dfrac{6}{(x + 6)(x + h + 6)}; \dfrac{6}{(x + 6)(a + 6)}$
C) $-\dfrac{6}{(6 - x)(6 - x - h)}; -\dfrac{6}{(6 - x)(6 - a)}$
D) $\dfrac{1}{(6 - x)(6 - x - h)}; \dfrac{1}{(6 - x)(6 - a)}$

24) $f(x) = \sqrt{1 - 5x}$

A) $\dfrac{1}{\sqrt{5x + 5h + 1} - \sqrt{5x + 1}}; \dfrac{1}{\sqrt{5x + 1} - \sqrt{5a + 1}}$
B) $\dfrac{5}{\sqrt{1 - 5x - 5h} + \sqrt{1 - 5x}}; \dfrac{5}{\sqrt{5x - 1} + \sqrt{5a - 1}}$
C) $-\dfrac{5}{\sqrt{1 - 5x - 5h} + \sqrt{1 - 5x}}; -\dfrac{5}{\sqrt{1 - 5x} + \sqrt{1 - 5a}}$
D) $-\dfrac{1}{\sqrt{1 - 5x - 5h} - \sqrt{1 - 5x}}; -\dfrac{1}{\sqrt{1 - 5x} - \sqrt{1 - 5a}}$

25) $f(x) = -\dfrac{8}{\sqrt{x}}$

A) $\dfrac{8}{\sqrt{x}(x + h) - x\sqrt{x + h}}; \dfrac{8}{x\sqrt{a} - a\sqrt{x}}$
B) $\dfrac{8}{x\sqrt{x + h} - \sqrt{x}(x + h)}; \dfrac{8}{a\sqrt{x} - x\sqrt{a}}$
C) $\dfrac{8}{\sqrt{x}(x + h) + x\sqrt{x + h}}; \dfrac{8}{x\sqrt{a} + a\sqrt{x}}$
D) $-\dfrac{8}{\sqrt{x}(x + h) + x\sqrt{x + h}}; -\dfrac{8}{x\sqrt{a} + a\sqrt{x}}$

Solve the problem.

26) The distance D in feet that an object has fallen after t seconds is given by $D(t) = 16t^2$.
(i) Evaluate D(3) and D(4).
(ii) Calculate the slope of the secant line through D(3) and D(4) on the graph of D and interpret the answer in terms of an average rate of change of D from 3 to 4.

A) (i) 48, 64
(ii) 112; the object's average speed from 3 to 4 seconds is 112 ft/sec.
B) (i) 144, 256
(ii) 112; the object's average speed from 3 to 4 seconds is 112 ft/sec.
C) (i) 144, 256
(ii) 16; the object's average speed from 3 to 4 seconds is 16 ft/sec.
D) (i) 48, 64
(ii) 16; the object's average speed from 3 to 4 seconds is 16 ft/sec.

27) Northwest Molded molds plastic handles which cost $1.00 per handle to mold. The fixed cost to run the molding machine is $3402 per week. If the company sells the handles for $3.00 each, how many handles must be molded weekly to break even (zero profit)?

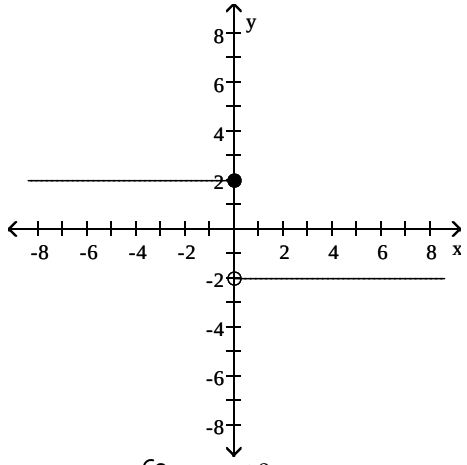
A) 1134 handles
B) 1701 handles
C) 3402 handles
D) 850 handles

28) A lumber yard has fixed costs of $2954.00 a day and variable costs of $1.00 per board–foot produced. The company gets $3.00 per board–foot sold. How many board–feet must be produced daily to break even (zero profit)?

A) 984 board–feet B) 1477 board–feet C) 2954 board–feet D) 738 board–feet

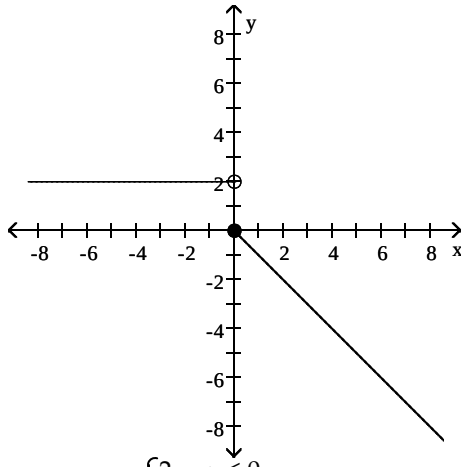
Find a formula for the function graphed.

29)



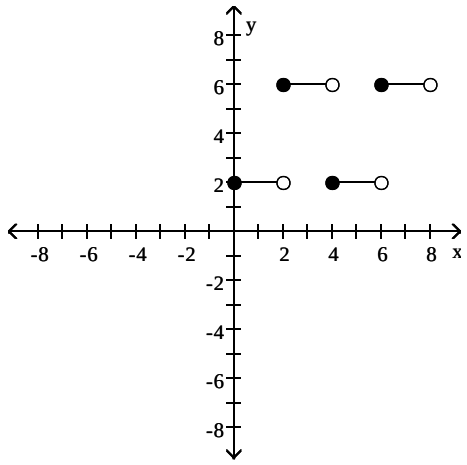
A) $f(x) = \begin{cases} 2x, & x \le 0 \\ -2x, & x > 0 \end{cases}$ B) $f(x) = \begin{cases} 2, & x \le 0 \\ -2, & x > 0 \end{cases}$ C) $f(x) = \begin{cases} 2, & x < 0 \\ -2, & x \ge 0 \end{cases}$ D) $f(x) = \begin{cases} -2, & x \le 0 \\ 2, & x > 0 \end{cases}$

30)



A) $f(x) = \begin{cases} 2, & x \le 0 \\ -x, & x > 0 \end{cases}$ B) $f(x) = \begin{cases} 2, & x < 0 \\ x, & x \ge 0 \end{cases}$ C) $f(x) = \begin{cases} 2, & x < 0 \\ -2x, & x \ge 0 \end{cases}$ D) $f(x) = \begin{cases} 2, & x < 0 \\ -x, & x \ge 0 \end{cases}$

31)



A) $f(x) = \begin{cases} 6, & 0 \le x < 6 \\ 2, & 2 \le x < 8 \end{cases}$

B) $f(x) = \begin{cases} 2, & 0 \le x < 2 \\ 6, & 2 \le x < 4 \\ 2, & 4 \le x < 6 \\ 6, & 6 \le x < 8 \end{cases}$

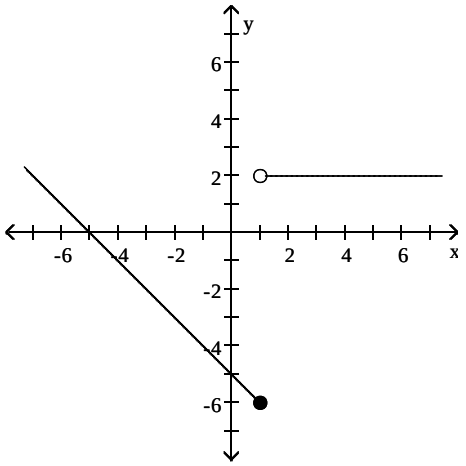
C) $f(x) = \begin{cases} 2, & 0 \le x < 6 \\ 6, & 2 \le x < 8 \end{cases}$

D) $f(x) = \begin{cases} 2, & 0 \le x \le 2 \\ 6, & 2 < x \le 4 \\ 2, & 4 < x \le 6 \\ 6, & 6 < x \le 8 \end{cases}$

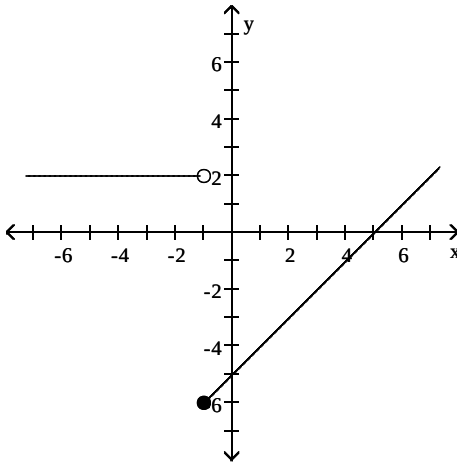
Graph the function.

32) $f(x) = \begin{cases} -5 - x, & x < 1 \\ 2, & x \ge 1 \end{cases}$

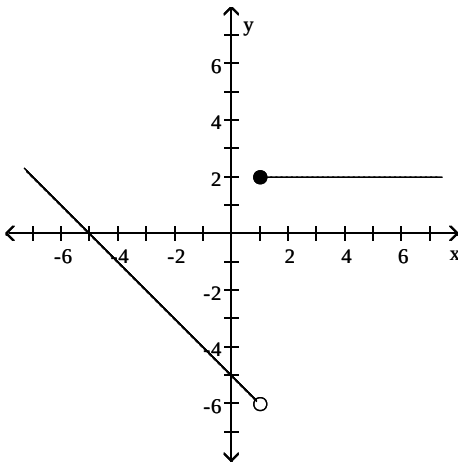
A)



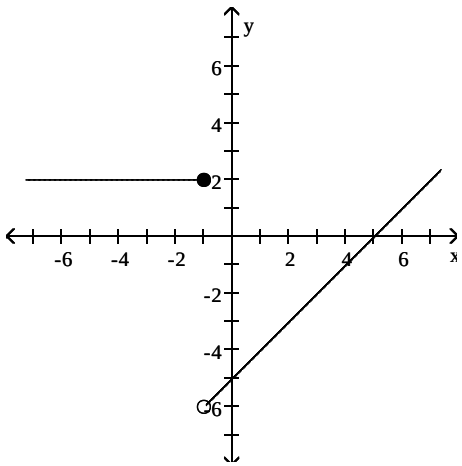
B)



C)

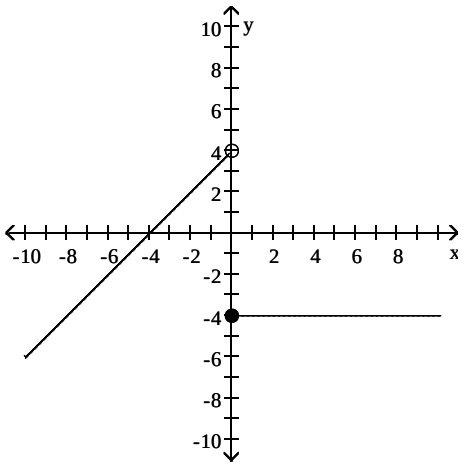


D)

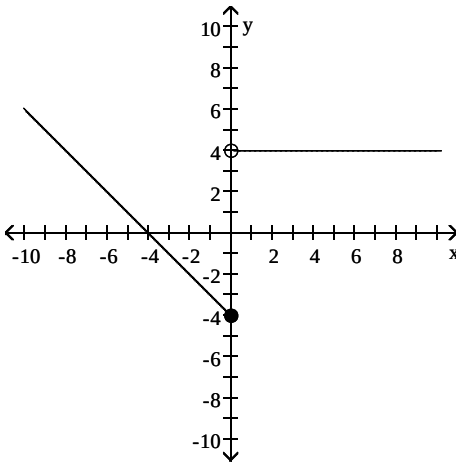


33) $G(x) = \begin{cases} |x| - 4, & x < 0 \\ -4, & x \geq 0 \end{cases}$

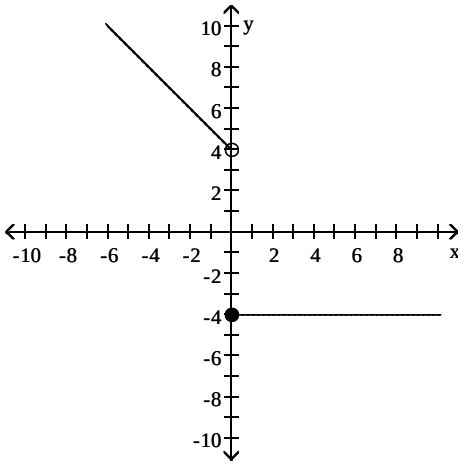
A)



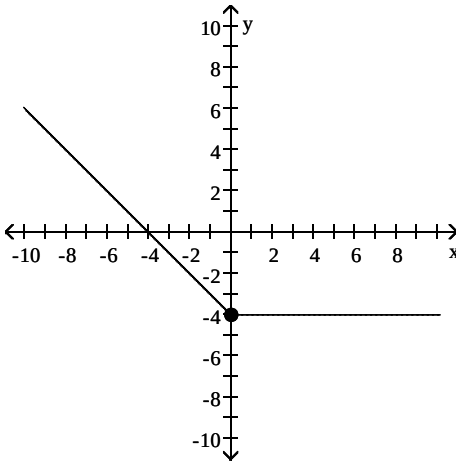
B)



C)

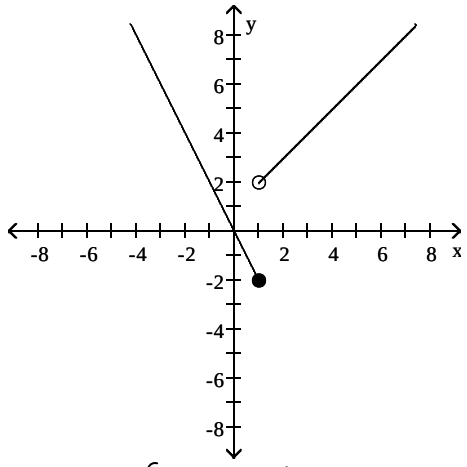


D)



Find a formula for the function graphed.

34)



A) $f(x) = \begin{cases} x, & x \le 1 \\ 2x + 1, & x > 1 \end{cases}$

B) $f(x) = \begin{cases} -2x, & x \le 1 \\ x + 2, & x > 1 \end{cases}$

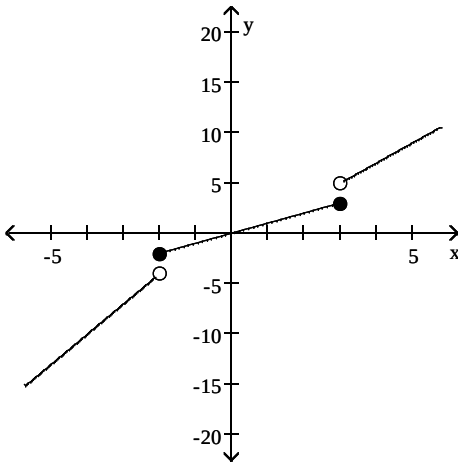
C) $f(x) = \begin{cases} 2x, & x \le 1 \\ x + 1, & x > 1 \end{cases}$

D) $f(x) = \begin{cases} -2x, & x \le 1 \\ x + 1, & x > 1 \end{cases}$

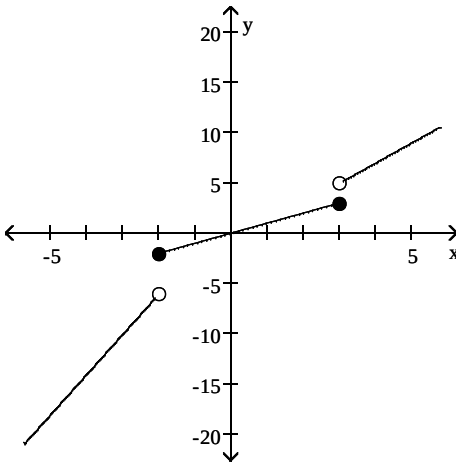
Graph the function.

35) $f(x) = \begin{cases} 3x + 2, & x < -2 \\ x, & -2 \le x \le 3 \\ 2x - 1, & x > 3 \end{cases}$

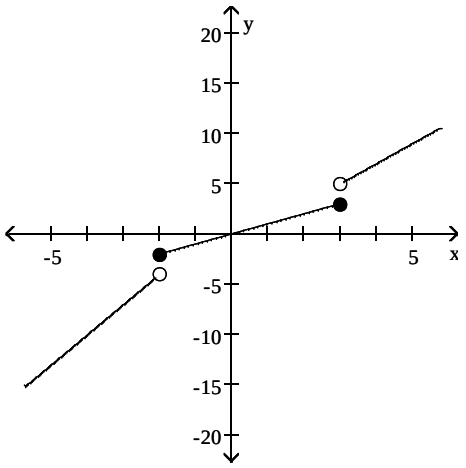
A)



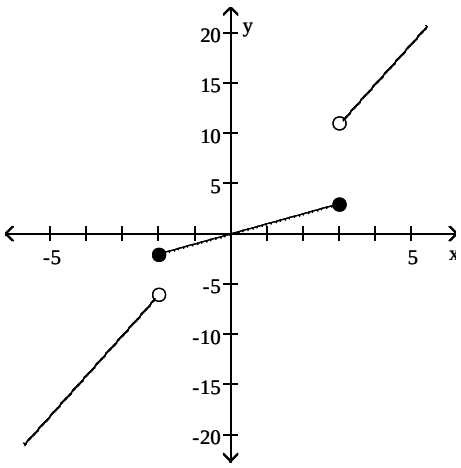
B)



C)



D)



Find the domain and range of the inverse of the given function.

36) $f(x) = 3.9 + 0.65x$

A) Domain and range: all real numbers
B) Domain: all real numbers; range: $(-\infty, 3.9]$
C) Domain: $[3.9, \infty)$; range: all real numbers
D) Domain: all real numbers; range: $[3.9, \infty)$

37) $f(x) = x^3 - 5$

A) Domain: all real numbers; range: $[-5, \infty)$
B) Domain: $[-5, \infty)$; range: all real numbers
C) Domain: $[0, \infty)$; range: $[0, \infty)$
D) Domain and range: all real numbers

38) $f(x) = -\frac{3}{x}$

A) Domain and range: all real numbers
B) Domain and range: $(-\infty, 0) \cup (0, \infty)$
C) Domain: $(0, \infty)$; range: $(-\infty, 0)$
D) Domain: $(-\infty, 0) \cup (0, \infty)$; range: $(-\infty, 0)$

Find the inverse of the function.

39) $f(x) = 8x - 3$

A) Not a one–to–one function

B) $f^{-1}(x) = \frac{x - 3}{8}$

C) $f^{-1}(x) = \frac{x + 3}{8}$

D) $f^{-1}(x) = \frac{x}{8} + 3$

40) $f(x) = x^3 - 5$

A) $f^{-1}(x) = \sqrt[3]{x + 5}$

B) $f^{-1}(x) = \sqrt[3]{x} + 5$

C) $f^{-1}(x) = \sqrt[3]{x - 5}$

D) Not a one–to–one function

41) $f(x) = 5x^3 - 1$

A) $f^{-1}(x) = \sqrt[3]{\frac{x - 1}{5}}$

B) $f^{-1}(x) = \sqrt[3]{\frac{x + 1}{5}}$

C) Not a one–to–one function

D) $f^{-1}(x) = \sqrt[3]{\frac{x}{5}} + 1$

42) $f(x) = \sqrt{x + 9}$, $x \geq -9$

A) $f^{-1}(x) = x^2 - 81$, $x \geq 0$

B) Not a one–to–one function

C) $f^{-1}(x) = x^2 - 9$, $x \geq 0$

D) $f^{-1}(x) = -x^2 + 9$, $x \geq 0$

Solve the equation.

43) $\log_3 x = 4$

A) $x = 3 \cdot 4$

B) $x = 3^4$

C) $x = \frac{4}{\log_3 4}$

D) $x = 4^3$

44) $\log_2 x = 5$

A) $x = 2.32$

B) $x = 10$

C) $x = 32$

D) $x = 25$

45) $\log x = -2$

A) $x = \frac{1}{2^{10}}$

B) $x = 20$

C) $x = \frac{1}{100}$

D) $x = -20$

Evaluate.

46) Let $\log_b A = 3.420$ and $\log_b B = 0.357$. Find $\log_b AB$.

A) 1.221

B) 3.777

C) 9.580

D) 3.063

47) Let $\log_b A = 1.824$ and $\log_b B = 0.21$. Find $\log_b \frac{A}{B}$.

A) 1.614

B) 0.383

C) 1.824

D) 2.034

48) Given that $\log x = 6$ and $\log y = 2$, find $\log xy^4$.

A) 48

B) 32

C) 96

D) 14

Solve the equation.

49) $2^{(10\ -\ 2x)} = 4$

A) $x = 5$ B) $x = 2$ C) $x = 4$ D) $x = -4$

50) $4^{(7\ -\ 3x)} = \frac{1}{16}$

A) $x = 4$ B) $x = -3$ C) $x = \frac{1}{4}$ D) $x = 3$

Solve the problem.

51) How long will it take for prices in the economy to double at a 9% annual inflation rate? Round the answer to the nearest hundredth.

A) 8.04 yr B) 7.27 yr C) 12.75 yr D) 23.45 yr

52) Suppose the consumption of electricity grows at 6.3% per year, compounded continuously. Find the number of years before the use of electricity has tripled. Round the answer to the nearest hundredth.

A) 17.44 yr B) 1.74 yr C) 0.17 yr D) 47.62 yr

Find the exact value of the trigonometric function. Do not use a calculator or tables.

53) $\cos\left(\frac{\pi}{6}\right)$

A) $\frac{\sqrt{2}}{2}$ B) $\frac{2\sqrt{3}}{3}$ C) $\sqrt{3}$ D) $\frac{\sqrt{3}}{2}$

54) $\sin\left(\frac{\pi}{4}\right)$

A) $\sqrt{2}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{1}{2}$ D) $\frac{\sqrt{2}}{2}$

55) $\sin\left(\frac{7\pi}{6}\right)$

A) $-\frac{1}{2}$ B) $-\frac{\sqrt{3}}{2}$ C) $\frac{1}{2}$ D) $\frac{\sqrt{3}}{2}$

56) $\tan\left(\frac{5\pi}{6}\right)$

A) $-\sqrt{3}$ B) $-\frac{\sqrt{3}}{3}$ C) $\frac{2\sqrt{3}}{3}$ D) $\frac{\sqrt{3}}{2}$

57) $\tan\left(\frac{\pi}{2}\right)$

A) –1 B) 0 C) 1 D) Undefined

58) $\csc(-\pi)$

A) 0 B) –1 C) 1 D) Undefined

Solve for the angle θ, where $0 \le \theta \le 2\pi$

59) $\sin^2\theta = \frac{1}{4}$

A) $\theta = 0, \pi, 2\pi$

B) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

C) $\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

D) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

60) $\sin^2\theta = \frac{3}{4}$

A) $\theta = 0, \pi, 2\pi$

B) $\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

C) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

D) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

61) $\cos^2\theta = \frac{3}{4}$

A) $\theta = 0, \pi, 2\pi$

B) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

C) $\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

D) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

62) $\sin 2\theta - \cos\theta = 0$

A) $\frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{6}, \frac{11\pi}{6}$

B) $0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$

C) $\theta = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$

D) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

63) $\sin 2\theta + \cos\theta = 0$

A) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

B) $\frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{6}, \frac{11\pi}{6}$

C) $\theta = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$

D) $\theta = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$

Find the exact function value.

64) $\sin^{-1}(0)$

A) 0

B) π

C) $-\frac{\pi}{2}$

D) $\frac{\pi}{2}$

65) $\cos^{-1}(0)$

A) 0

B) $\frac{\pi}{4}$

C) $\frac{2}{\pi}$

D) $\frac{\pi}{2}$

66) $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

A) $\frac{3\pi}{4}$

B) $\frac{\pi}{3}$

C) $\frac{2\pi}{3}$

D) $\frac{\pi}{4}$

67) $\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

A) $-\frac{\pi}{4}$ B) $-\frac{\pi}{3}$ C) $-\frac{\pi}{2}$ D) $\frac{\pi}{3}$

68) $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

A) $\frac{\pi}{6}$ B) $\frac{11\pi}{6}$ C) $\frac{\pi}{4}$ D) $\frac{7\pi}{4}$

69) $\cos^{-1}(0)$

A) 0 B) $\frac{\pi}{4}$ C) $\frac{\pi}{2}$ D) $\frac{\pi}{5}$

Evaluate or simplify the given expression.

70) $\cos(2 \sin^{-1} x)$

A) $2x^2 + 1$ B) $1 - 2x^2$ C) 1 D) $1 - x^2$

71) $\sin(3 \sin^{-1} x)$

A) $2 + x - 2x^2 - 2x^3$ B) $1 - 2x - 2x^2 - 2x^3$ C) $3x - 3x^3$ D) $3x - 4x^3$

72) $\cos(2 \cos^{-1} x)$

A) $2x^2 - 1$ B) 1 C) -1 D) $2x^2 + 1$

73) $\sin(2 \sin^{-1} x)$

A) $2x - 2x^3$ B) $2x\sqrt{x^2 + 1}$ C) $x\sqrt{1 - x^2}$ D) $2x\sqrt{1 - x^2}$

74) $\cot(\csc^{-1} 2x)$

A) $\sqrt{2x^2 - 1}$ B) $\frac{1}{\sqrt{4x^2 - 1}}$ C) $4x^2 - 1$ D) $\sqrt{4x^2 - 1}$

75) $\sin(2 \tan^{-1} 3x)$

A) $\frac{3x}{\sqrt{9x^2 + 1}}$ B) $\frac{6x}{\sqrt{9x^2 + 1}}$ C) $\frac{3x}{9x^2 + 1}$ D) $\frac{6x}{9x^2 + 1}$

76) $\cos^{-1}\left(\cos\frac{4\pi}{3}\right)$

A) $\frac{\pi}{3}$ B) $\frac{\pi}{6}$ C) $\frac{7\pi}{6}$ D) $\frac{2\pi}{3}$

Solve the problem.

77) The equation $\theta = \cos^{-1}(R/Z)$ gives the phase angle between R and Z in an AC circuit. Find θ if R = 50 ohms and Z = 70 ohms.

A) 135.6° B) 0.7° C) 44.4° D) 45.6°

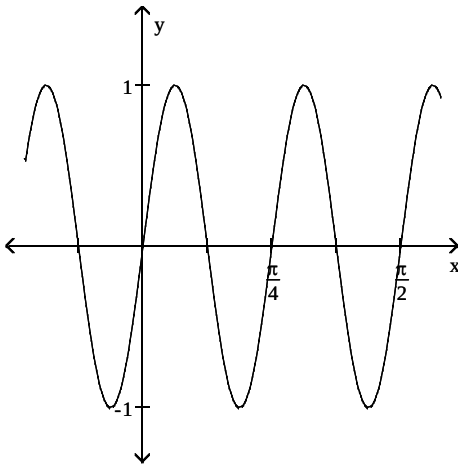
78) A rotating beacon is located a distance d from a long wall. The distance d is given by $d = 9 \tan 2\pi t$, where t is the time measured in seconds since the beacon started rotating. Solve the equation for t.

A) $t = \frac{1}{2\pi} \tan^{-1} \frac{d}{9}$ B) $t = 2\pi \tan \frac{d}{9}$ C) $t = \frac{1}{2\pi} \tan \frac{d}{9}$ D) $t = 2\pi \tan^{-1} \frac{d}{9}$

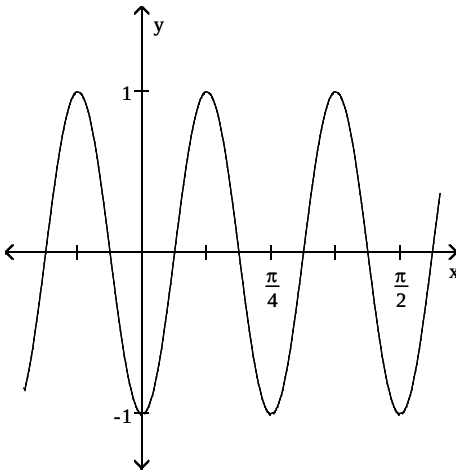
State the period of the function and graph.

79) $\sin 8x$

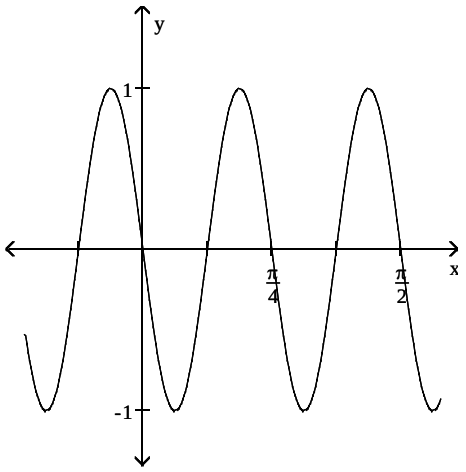
A) Period $\frac{\pi}{4}$



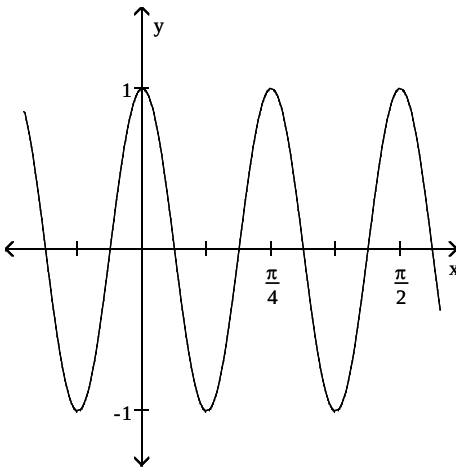
B) Period $\frac{\pi}{4}$



C) Period $\frac{\pi}{4}$



D) Period $\frac{\pi}{4}$



Find an equation of the line that satisfies the conditions. Write the equation in standard form.

80) Through (6, –7); horizontal

A) $x = 7$ B) $x = 6$ C) $y = -7$ D) $y = -6$

81) Through (–6, 3); undefined slope

A) $y = 3$ B) $x = -6$ C) $y = -6$ D) $x = 3$

Find an equation of the line passing through the two points. Write the equation in standard form.

82) (–2, 2) and (1, 10)

A) $-8x - 3y = -22$ B) $-4x - 9y = -86$ C) $4x + 9y = -86$ D) $8x - 3y = -22$

Find an equation of the line satisfying the conditions. Write the equation in slope–intercept form.

83) Through (–6, 5); parallel to $-7x + 5y = 57$

A) $y = \frac{5}{7}x + \frac{30}{7}$ B) $y = -\frac{7}{5}x - \frac{67}{5}$ C) $y = \frac{7}{5}x + \frac{67}{5}$ D) $y = -\frac{5}{7}x - \frac{30}{7}$

84) Through (–5, –2); perpendicular to $-5x - 2y = 27$

A) $y = \frac{5}{2}x + \frac{21}{2}$ B) $y = \frac{2}{5}x$ C) $y = -\frac{5}{2}x - \frac{29}{2}$ D) $y = -\frac{2}{5}x - 4$

Solve the equation by factoring.

85) $x(x - 11) + 30 = 0$

A) {5, –6} B) {5, 6} C) {–5, –6} D) {–5, 6}

86) $25x^2 - 90x + 81 = 0$

A) $\{-\frac{9}{5}\}$ B) $\{\frac{9}{5}\}$ C) $\{-\frac{5}{9}\}$ D) $\{\frac{5}{9}\}$

87) $24x + \frac{25}{x} = -50$

A) $\{-\frac{6}{5}, \frac{5}{4}\}$ B) $\{\frac{5}{6}, \frac{5}{4}\}$ C) $\{-\frac{5}{6}, -\frac{5}{4}\}$ D) $\{24, \frac{4}{5}\}$

Solve the equation by the Square Root Method.

88) $(2x - 3)^2 = 9$

A) {0, –3} B) {3, 0} C) {0, –6} D) {6, 0}

Find the real solutions, if any, of the equation. Use the quadratic formula.

89) $4x^2 + 28x + 49 = 0$

A) $\{\frac{7}{2}\}$ B) $\{-\frac{7}{2}\}$ C) $\{-\frac{7}{2}, 14\}$ D) no real solution

Solve the problem.

90) The surface area A of a right circular cylinder is $A = 2\pi r^2 + 2\pi rh$, where r is the radius and h is the height. Find the radius of a right circular cylinder whose surface area is 95.36π square inches and whose height is 11.7 inches.

91) An open box is to be constructed from a square sheet of plastic by removing a square of side 2 inches from each corner, and then turning up the sides. If the box must have a volume of 242 cubic inches, find the length of one side of the open box.

A) 10 in. B) 13 in. C) 15 in. D) 11 in.

92) As part of a physics experiment, Ming drops a baseball from the top of a 345–foot building. To the nearest tenth of a second, for how many seconds will the baseball fall? (Hint: Use the formula $h = 16t^2$, which gives the distance h, in feet, that a free–falling object travels in t seconds.)

A) 4.6 sec B) 21.6 sec C) 86.3 sec D) 1.2 sec

93) The net income y (in millions of dollars) of Pet Products Unlimited from 1997 to 1999 is given by the equation $y = 9x^2 + 15x + 52$, where x represents the number of years after 1997. Assume this trend continues and predict the year in which Pet Products Unlimited's net income will be \$352 million.

A) 2001 B) 2003 C) 2004 D) 2002

For the function, find the average rate of change of f from 1 to x:

$\frac{f(x) - f(1)}{x - 1}$, $x \neq 1$

94) $f(x) = -9x$

A) -10 B) $\frac{-9}{x - 1}$ C) -9 D) 0

95) $f(x) = x^3 + x$

A) $x^2 + 2$ B) 1 C) $x^2 + x + 2$ D) $\frac{x^3 + x + 2}{x - 1}$

Simplify the difference quotients $\frac{f(x + h) - f(x)}{h}$ and $\frac{f(x) - f(a)}{x - a}$ for the following function. Rationalize the numerator when necessary.

96) $f(x) = 9x - 4$

A) 9; 9 B) 9h; 9a C) 9; 9x – 9a D) 9x – 9h; 9x – 9a

97) $f(x) = \frac{6}{x}$

A) $-\frac{6}{x(x + h)}; -\frac{6}{ax}$ B) $\frac{12}{x + h}; \frac{12}{x - a}$ C) $\frac{12}{x(x + h)}; \frac{12}{ax}$ D) $-\frac{6}{x + h}; -\frac{6}{x - a}$

98) $f(x) = \frac{x}{x + 3}$

A) $\frac{1}{(3 - x)(3 - x - h)}; \frac{1}{(3 - x)(3 - a)}$

B) $-\frac{3}{(3 - x)(3 - x - h)}; -\frac{3}{(3 - x)(3 - a)}$

C) $\frac{3}{(x + 3)(x + h + 3)}; \frac{3}{(x + 3)(a + 3)}$

D) $-\frac{h + 3}{(x + 3)(x + h + 3)}; -\frac{a + 3}{(x + 3)(a + 3)}$

99) $f(x) = 3x^2 + 2x + 1$

A) $6x + 6h + 2; 3x - 3a - 2$

B) $6x + 3h + 2; 3x + 3a + 2$

C) $6x^2 + h; 9x + 9a + 2$

D) $6x + 2h + 1; 6x + 6a + 2$

Solve the problem.

100) A construction company buys a truck for \$40,000. The truck is expected to last 15 years, at which time it will be worth \$4000. Write a function v(x) that describes the value of the truck at any time during its lifetime. Be sure to state the domain of the function.

A) $v(x) = 40{,}000 - 2400t$, with domain $0 \leq t \leq 15$

B) $v(x) = 40{,}000 + 2400t$, with domain $0 \leq t \leq 15$

C) $v(x) = 40{,}000 - 2300t$, with domain $0 \leq t \leq 15$

D) $v(x) = 40{,}000 - 2500t$, with domain $0 \leq t \leq 15$