

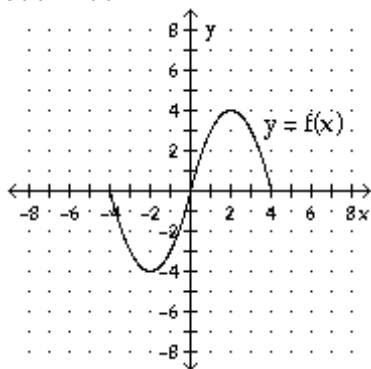
Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

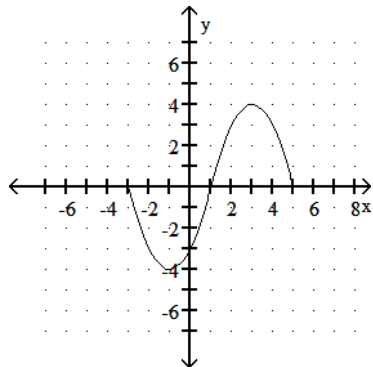
The graph of the function f is shown below. Match the function g with the correct graph.

1) $g(x) = f(x) + 1$

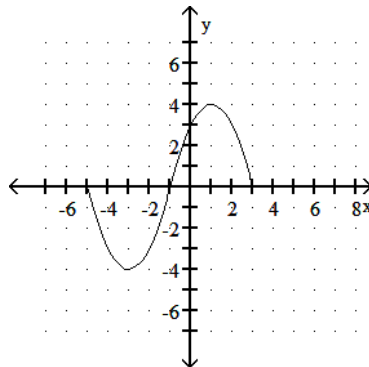
1) _____



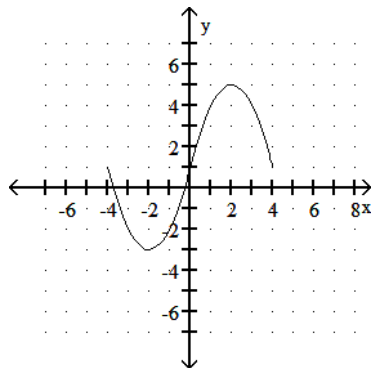
A)



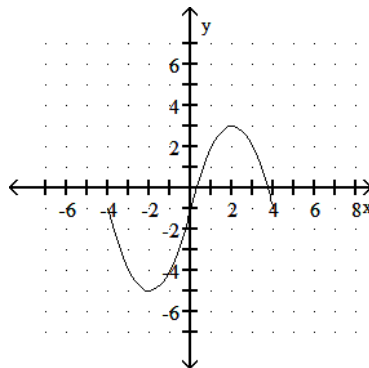
B)



C)



D)

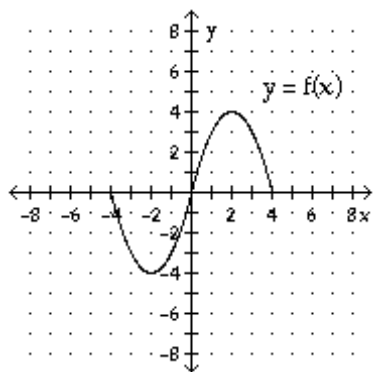


Answer: C

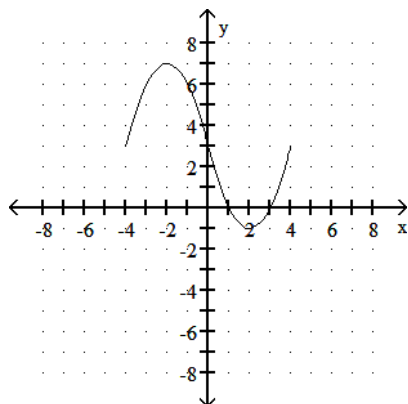
Explanation: A)
B)
C)
D)

2) $g(x) = -f(-x) - 3$

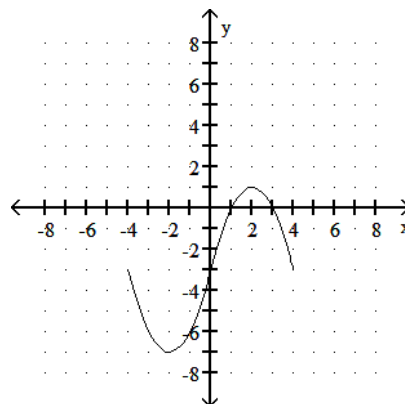
2) _____



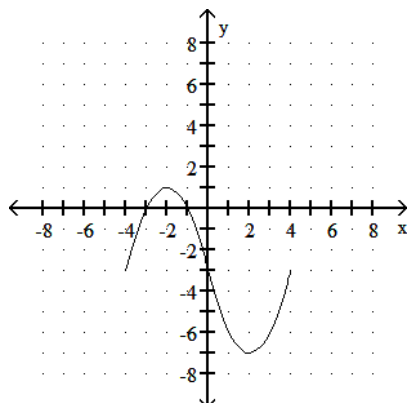
A)



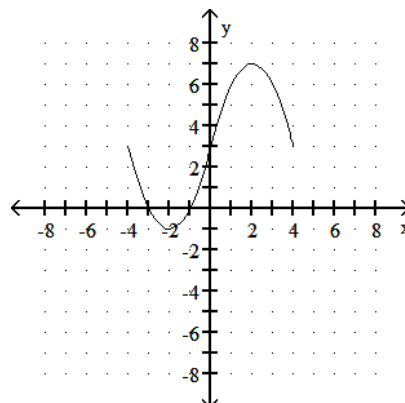
B)



C)



D)

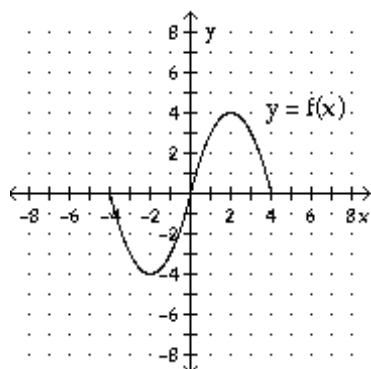


Answer: B

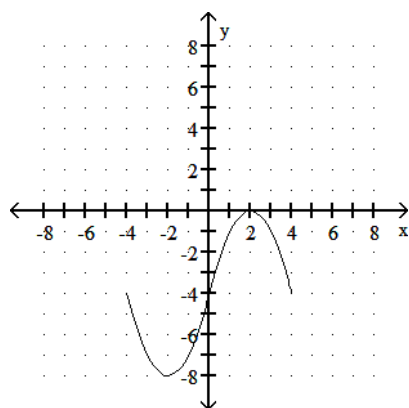
Explanation: A)
B)
C)
D)

3) $g(x) = f(-x) + 4$

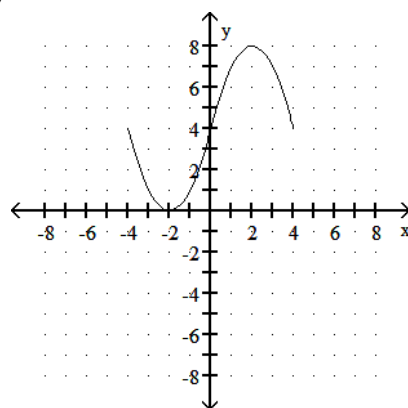
3) _____



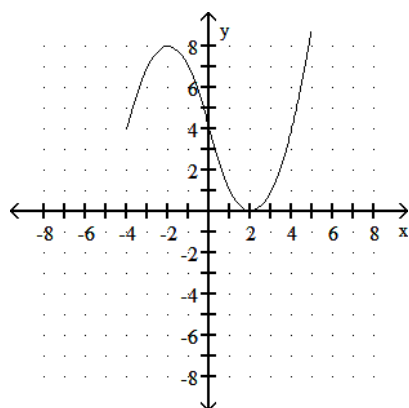
A)



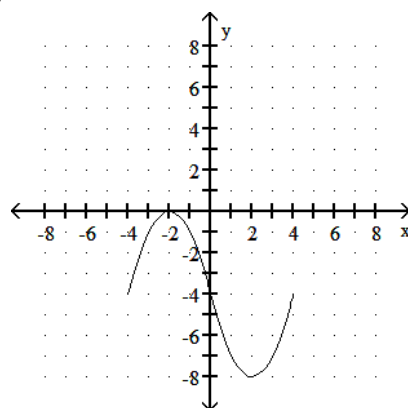
B)



C)



D)

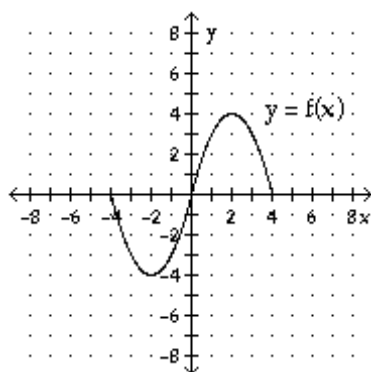


Answer: C

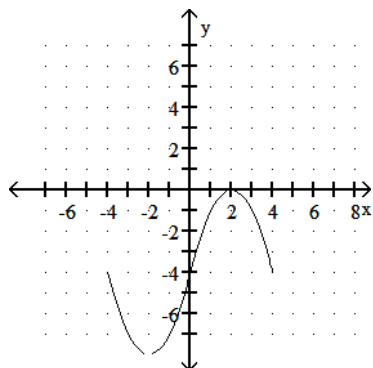
Explanation: A)
B)
C)
D)

4) $g(x) = f(x) - 4$

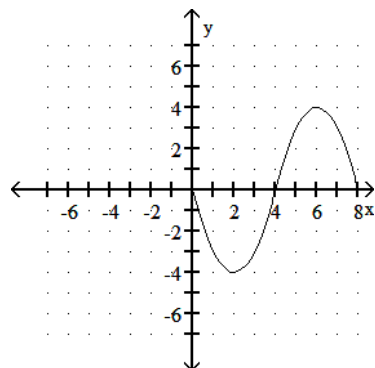
4) _____



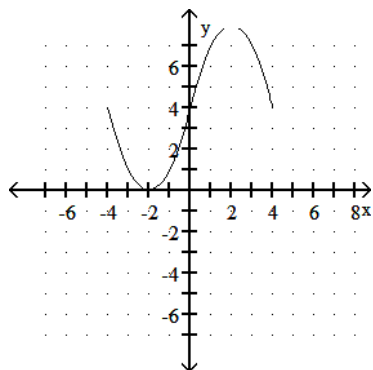
A)



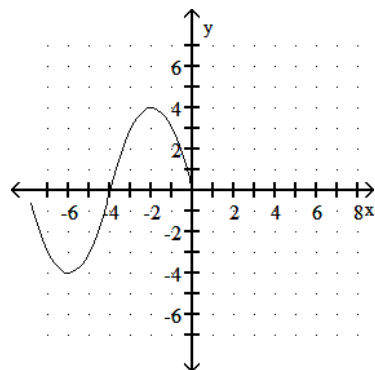
B)



C)



D)

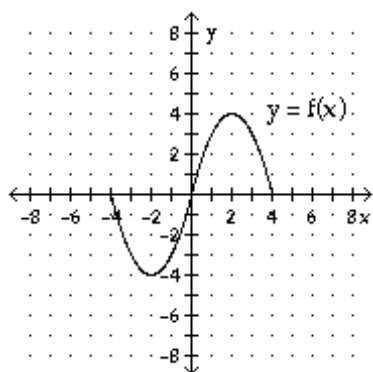


Answer: A

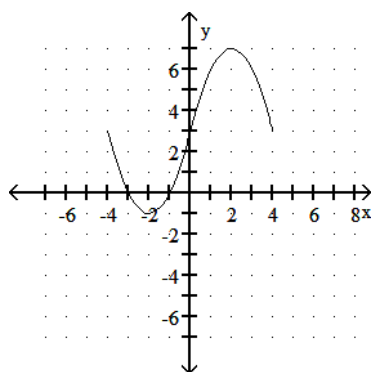
Explanation: A)
B)
C)
D)

5) $g(x) = -f(x) - 3$

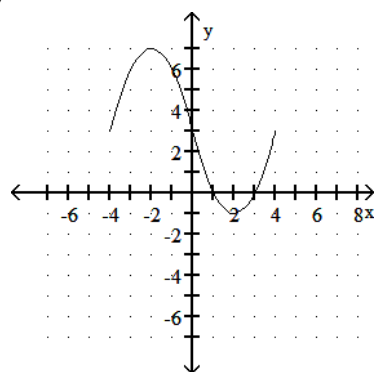
5) _____



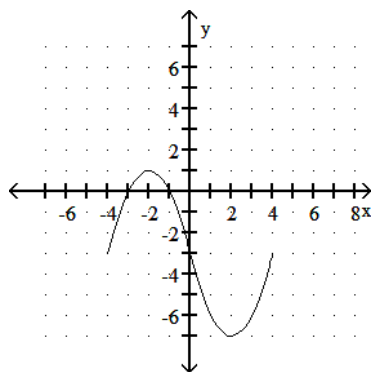
A)



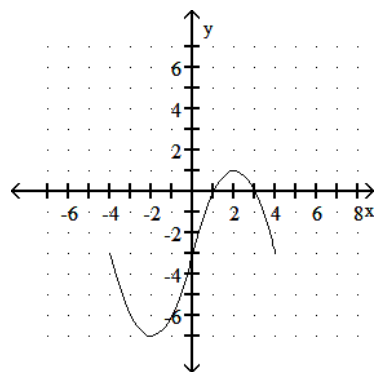
B)



C)



D)

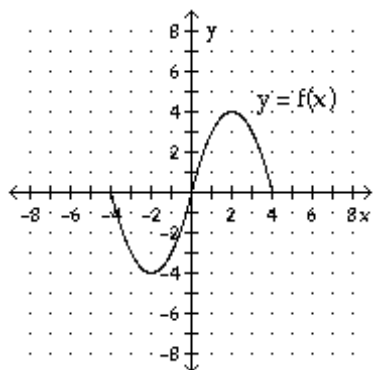


Answer: C

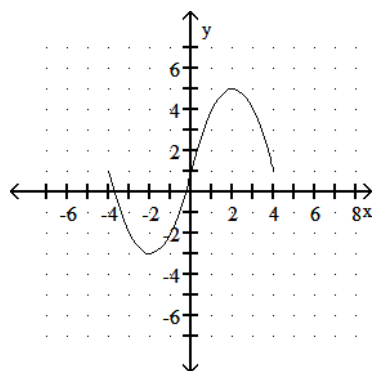
Explanation: A)
B)
C)
D)

6) $g(x) = f(x - 1)$

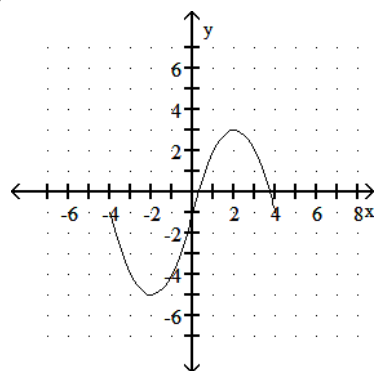
6) _____



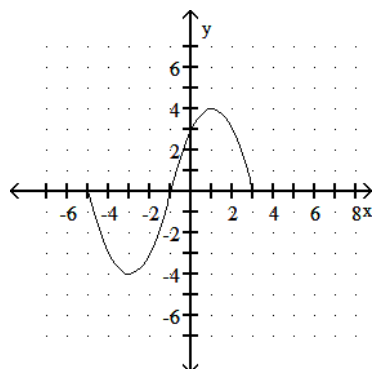
A)



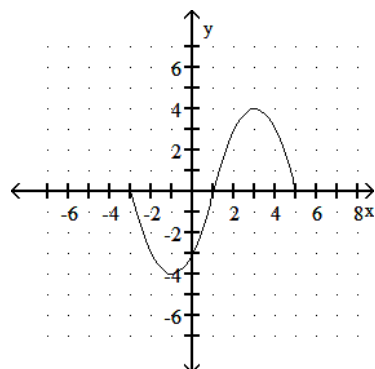
B)



C)



D)



Answer: D

Explanation:

A)

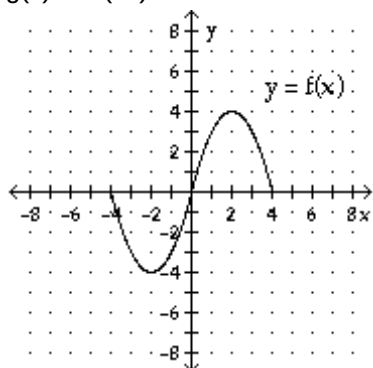
B)

C)

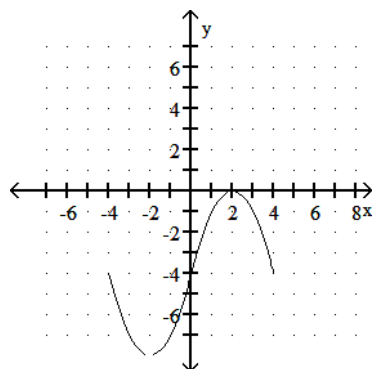
D)

7) $g(x) = -f(-x) + 4$

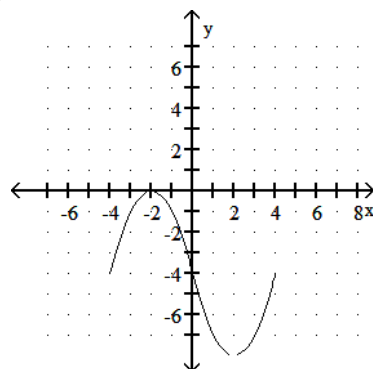
7) _____



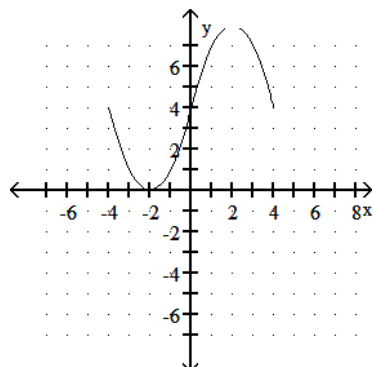
A)



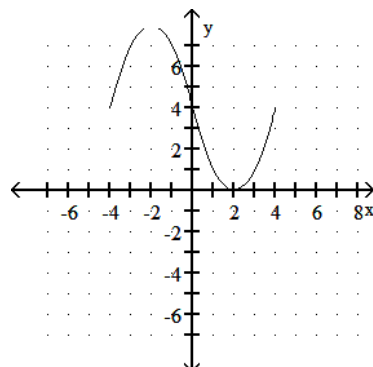
B)



C)



D)

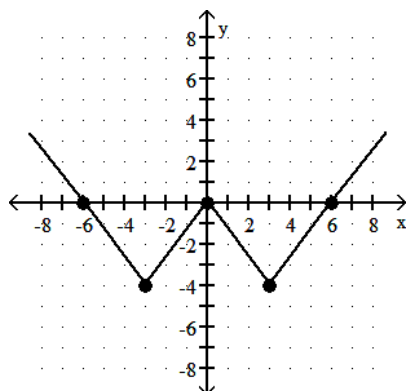


Answer: C

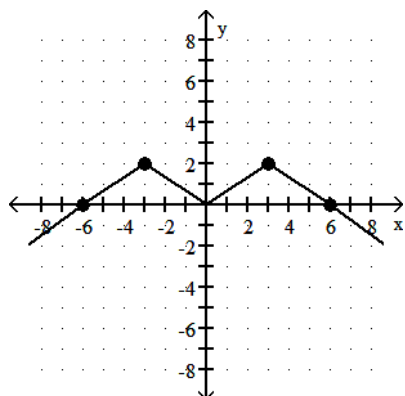
Explanation: A)
B)
C)
D)

8) $g(x) = -\frac{1}{2}f(x)$

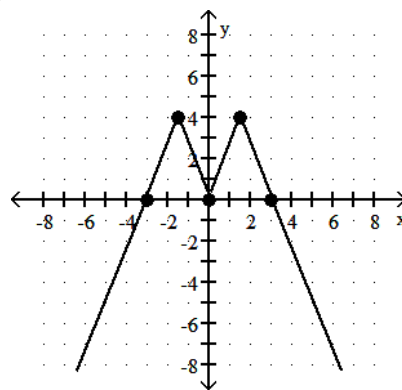
8) _____



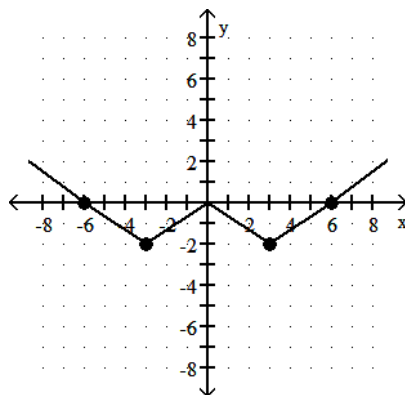
A)



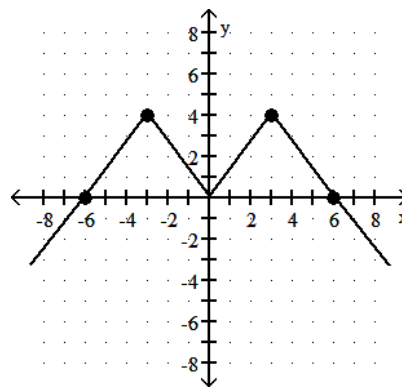
B)



C)



D)

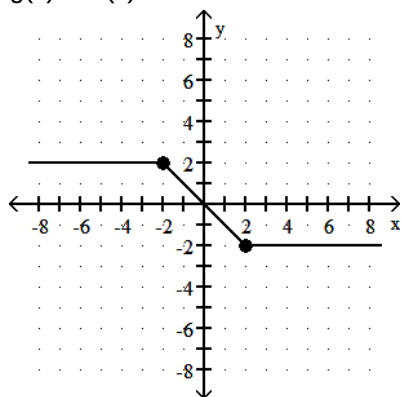


Answer: A

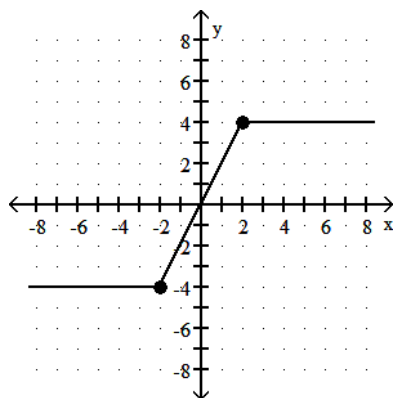
Explanation: A)
B)
C)
D)

9) $g(x) = 2f(x)$

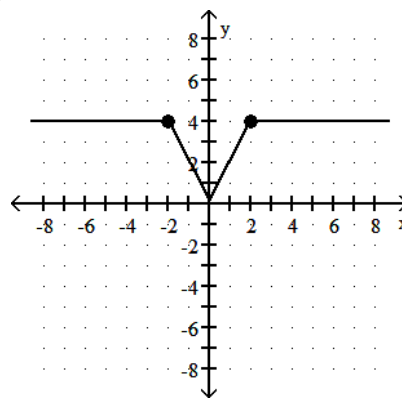
9) _____



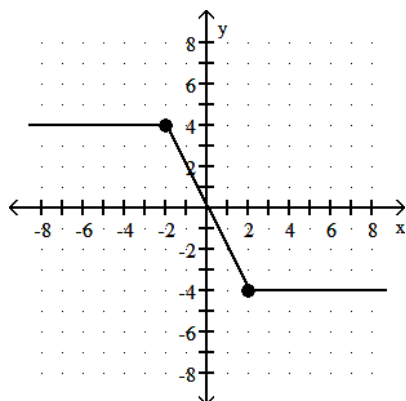
A)



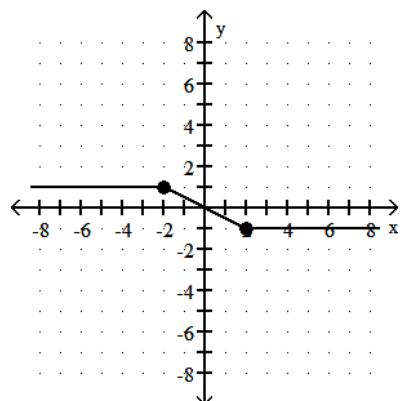
B)



C)



D)



Answer: C

Explanation:

A)

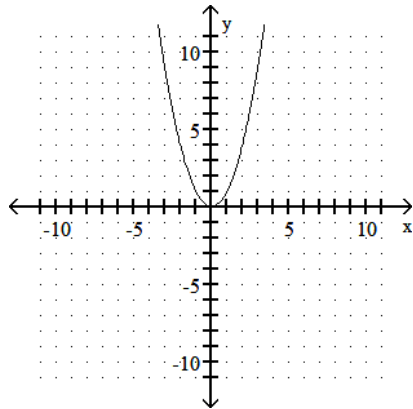
B)

C)

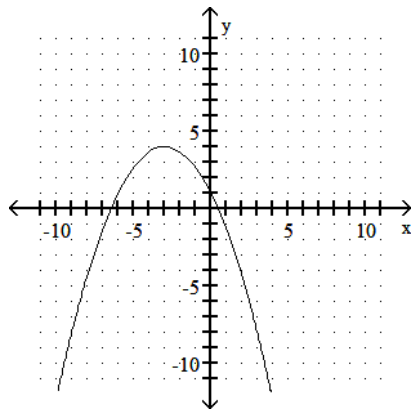
D)

10) $g(x) = -3f(x+3)^2 + 4$

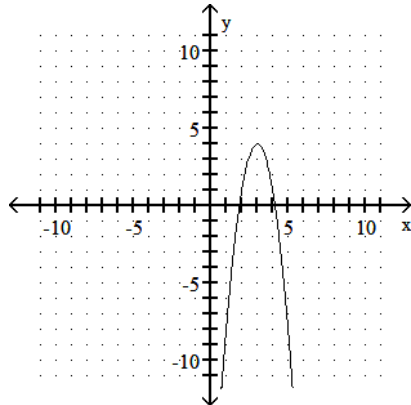
10) _____



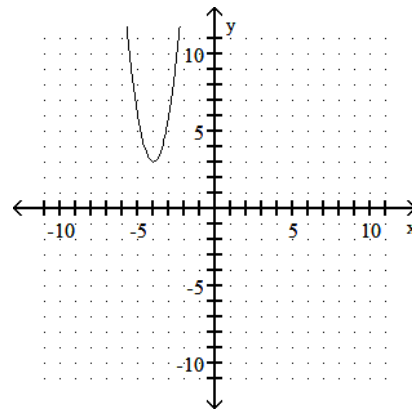
A)



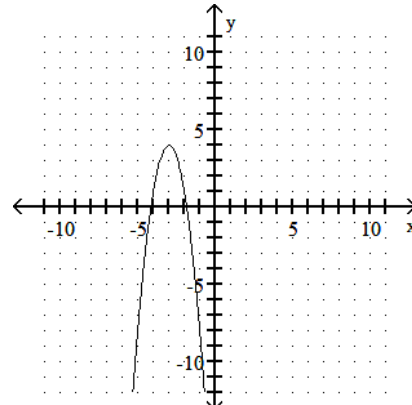
C)



B)



D)

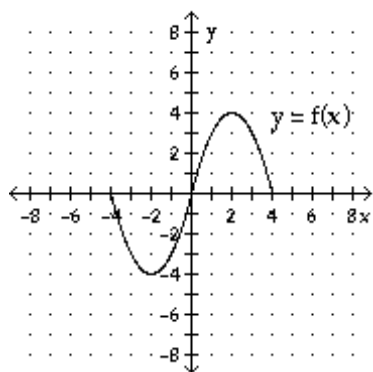


Answer: D

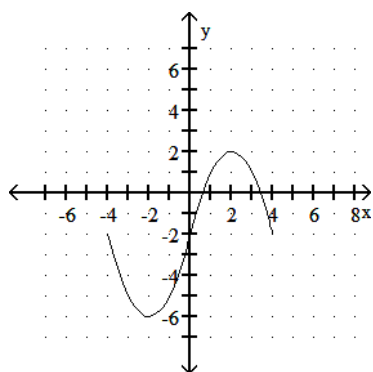
Explanation: A)
B)
C)
D)

11) $g(x) = f(x + 2)$

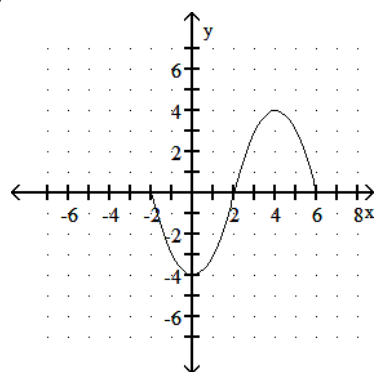
11) _____



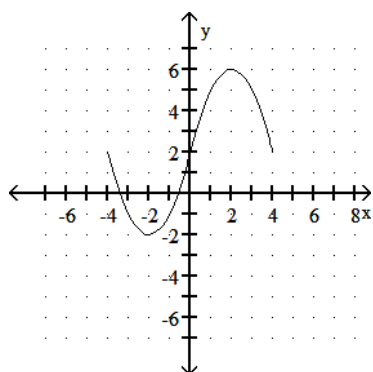
A)



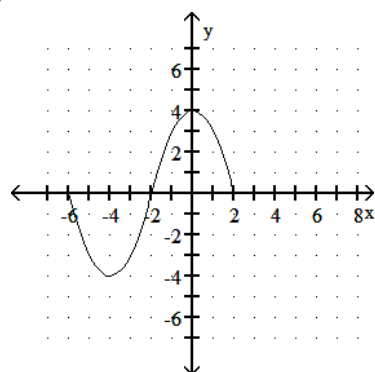
B)



C)



D)



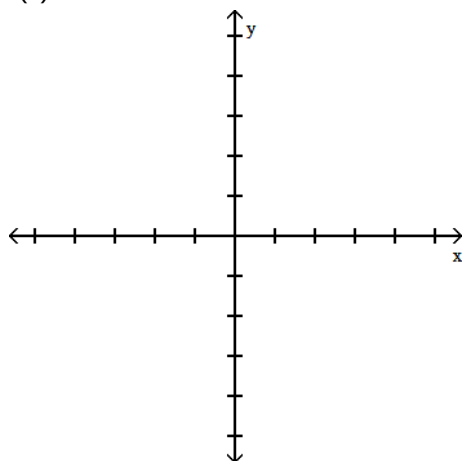
Answer: D

Explanation: A)
B)
C)
D)

Graph the function. Use the graph to find any relative maxima or minima.

12) $f(x) = x^2 - 4$

12) _____



- A) Relative minimum of -4 at $x = 1$
 C) Relative maximum of -4 at $x = 0$

- B) No relative extrema
 D) Relative minimum of -4 at $x = 0$

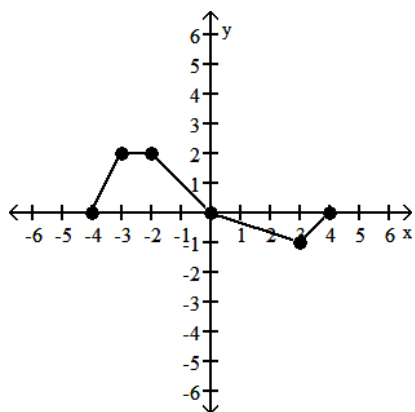
Answer: D

Explanation: A)
 B)
 C)
 D)

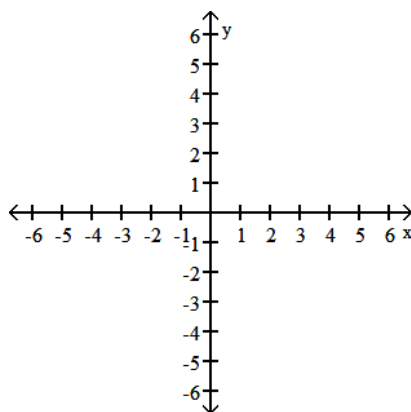
A graph of $y = f(x)$ follows. No formula for f is given. Graph the given equation.

13) $y = f(2x)$

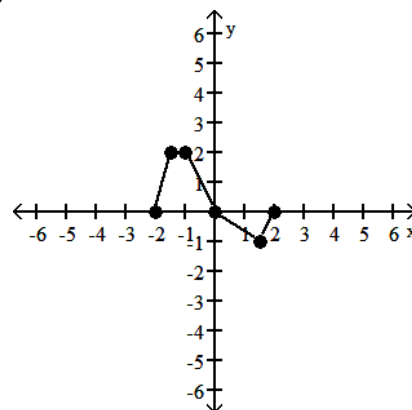
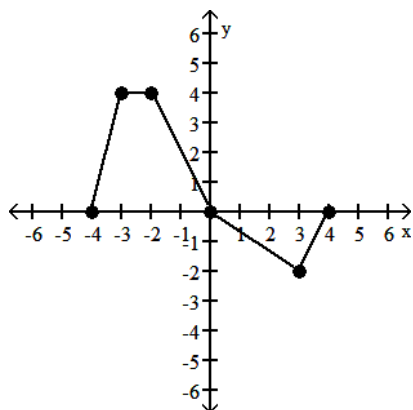
13) _____



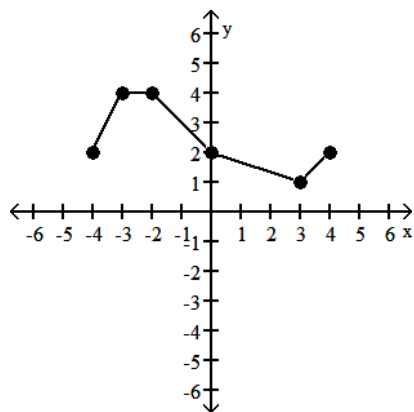
A)



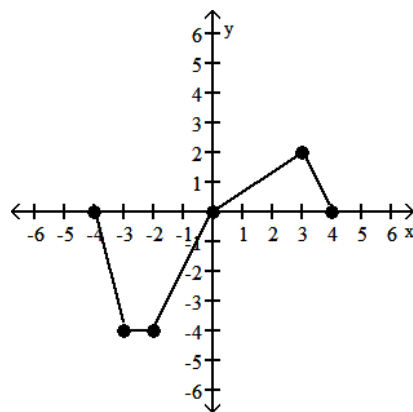
B)



C)



D)



Answer: B

Explanation: A)
B)
C)
D)

Find the point that is symmetric to the given point with respect to the requested axis.

14) Symmetric with respect to the y-axis

(1.5, -1.75)

A) (1.5, -1.5)

B) (-1.75, 1.5)

C) (-1.5, -1.75)

D) (-1.5, 1.75)

Answer: C

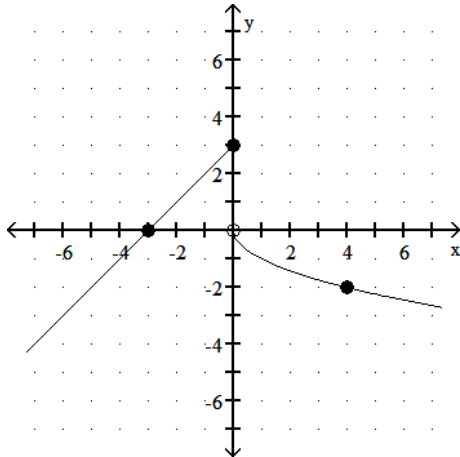
Explanation: A)
B)
C)
D)

14) _____

Write an equation for the piecewise function.

15)

15) _____



A) $f(x) = \begin{cases} x - 3, & \text{for } x \leq 0, \\ -x^2, & \text{for } x > 0 \end{cases}$

B) $f(x) = \begin{cases} x + 3, & \text{for } x \leq 0, \\ \sqrt{x}, & \text{for } x > 0 \end{cases}$

C) $f(x) = \begin{cases} x + 3, & \text{for } x \leq 0, \\ -\sqrt{x}, & \text{for } x > 0 \end{cases}$

D) $f(x) = \begin{cases} -x + 3, & \text{for } x \leq 0, \\ -\sqrt{x}, & \text{for } x > 0 \end{cases}$

Answer: C

Explanation: A)
B)
C)
D)

Solve.

16) The weight of a liquid varies directly as its volume V . If the weight of the liquid in a cubical container 5 cm on a side is 375 g, find the weight of the liquid in a cubical container 3 cm on a side.

16) _____

- A) 9 g B) 81 g C) 27 g D) 12 g

Answer: B

Explanation: A)
B)
C)
D)

The given point is on the graph of $y = f(x)$. Find a point on the graph of $y = g(x)$.

17) $g(x) = f\left(-\frac{1}{4}x\right); (3, -4)$

17) _____

- A) (12, 4) B) (-12, -4) C) $\left(-\frac{3}{4}, -3\right)$ D) $\left(\frac{1}{12}, -3\right)$

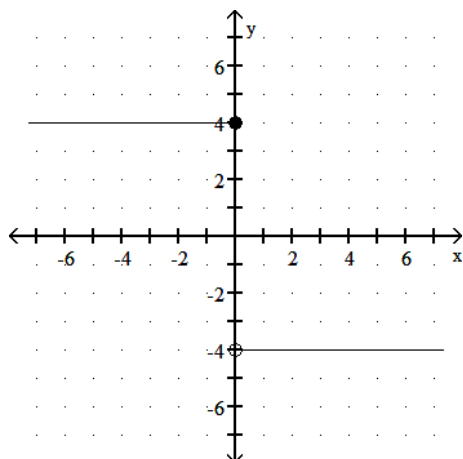
Answer: B

Explanation: A)
B)
C)
D)

Write an equation for the piecewise function.

18)

18) _____



A) $f(x) = \begin{cases} 4, & \text{for } x < 0, \\ -4, & \text{for } x \geq 0 \end{cases}$
 C) $f(x) = \begin{cases} -4, & \text{for } x \leq 0, \\ 4, & \text{for } x > 0 \end{cases}$

B) $f(x) = \begin{cases} 4, & \text{for } x \leq 0, \\ -4, & \text{for } x > 0 \end{cases}$
 D) $f(x) = \begin{cases} 4x, & \text{for } x \leq 0, \\ -4x, & \text{for } x > 0 \end{cases}$

Answer: B

Explanation: A)
 B)
 C)
 D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

19) $f(x) = 2x + 5$, $g(x) = 6x + 8$

19) _____

Find $(fg)(x)$.

A) $12x^2 + 40$

B) $12x^2 + 46x + 40$

C) $12x^2 + 38x + 40$

D) $8x^2 + 46x + 13$

Answer: B

Explanation: A)
 B)
 C)
 D)

Write an equation for a function that has a graph with the given characteristics.

20) The shape of $y = |x|$ is vertically stretched by a factor of 6.2. This graph is then reflected across the x-axis. Finally, the graph is shifted 0.15 units downward.

20) _____

A) $f(x) = 6.2|x| - 0.15$

B) $f(x) = 6.2|x| - 0.15|$

C) $f(x) = 6.2|-x| - 0.15$

D) $f(x) = -6.2|x| - 0.15$

Answer: D

Explanation: A)
 B)
 C)
 D)

Solve.

- 21) Sue wants to put a rectangular garden on her property using 66 meters of fencing. There is a river that runs through her property so she decides to increase the size of the garden by using the river as one side of the rectangle. (Fencing is then needed only on the other three sides.) Let x represent the length of the side of the rectangle along the river. Express the garden's area as a function of x .

21) _____

A) $A(x) = 32x - \frac{1}{4}x^2$

B) $A(x) = 33x - \frac{1}{2}x^2$

C) $A(x) = 33x^2 - x$

D) $A(x) = 34x - 2x^2$

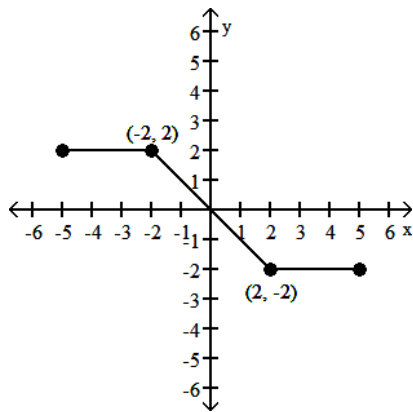
Answer: B

Explanation: A)
B)
C)
D)

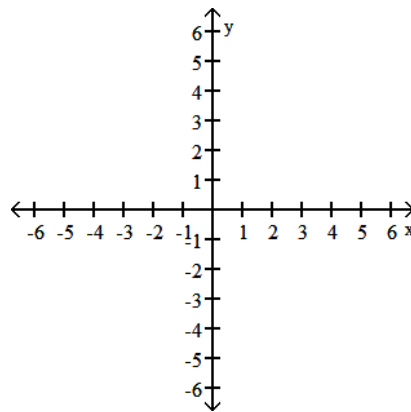
A graph of $y = f(x)$ follows. No formula for f is given. Graph the given equation.

22) $y = 2f(x)$

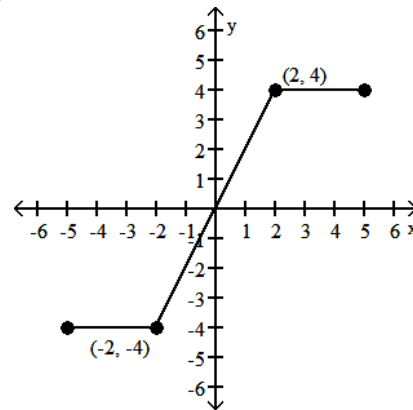
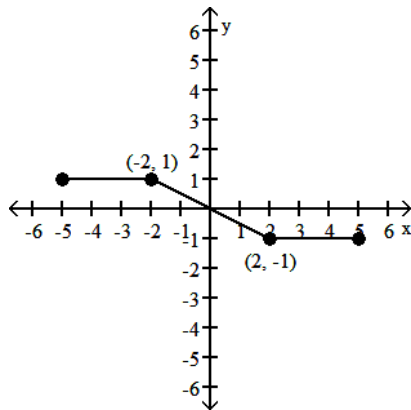
22) _____



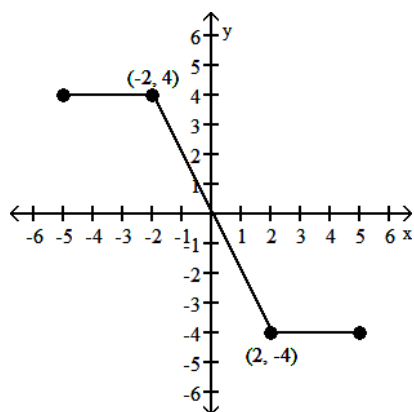
A)



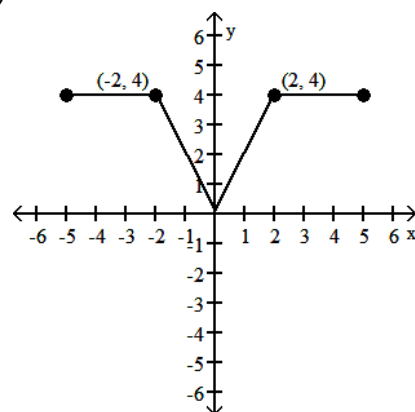
B)



C)



D)

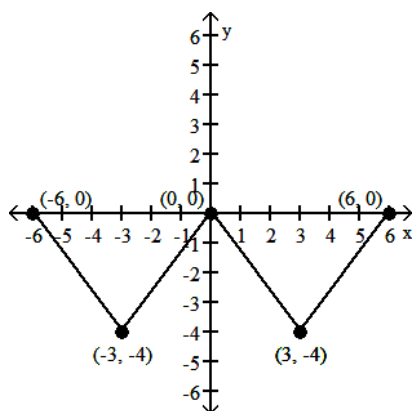


Answer: C

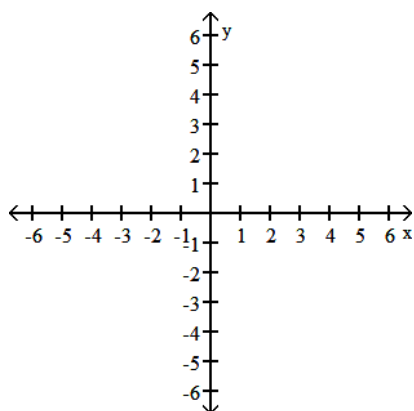
Explanation: A)
B)
C)
D)

23) $y = -\frac{1}{2}f(x)$

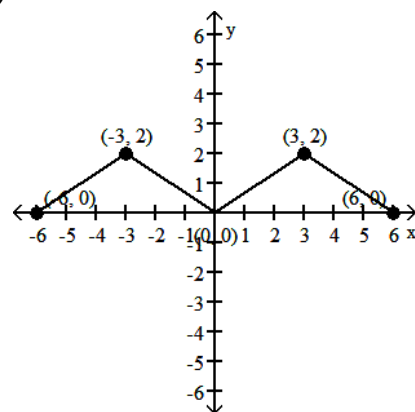
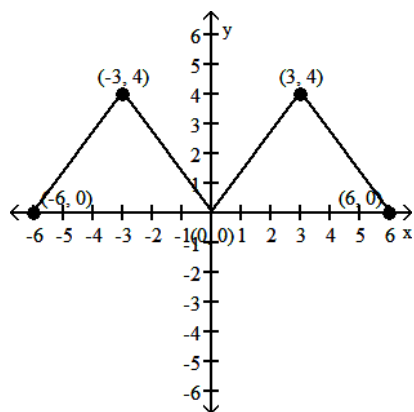
23) _____



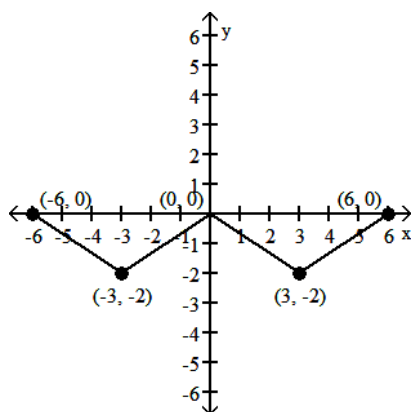
A)



B)



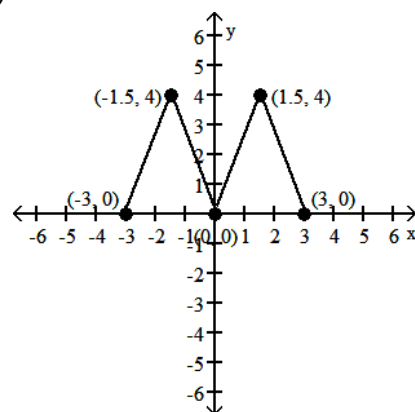
C)



Answer: B

Explanation: A)
B)
C)
D)

D)



The given point is on the graph of $y = f(x)$. Find a point on the graph of $y = g(x)$.

24) $g(x) = f(-4x)$; $(5, -4)$

A) $\left(-\frac{5}{4}, -4\right)$

B) $(20, 4)$

C) $\left(\frac{1}{20}, -5\right)$

D) $(-20, -4)$

24) _____

Answer: A

Explanation: A)
B)
C)
D)

Answer the question.

25) How can the graph of $f(x) = \frac{1}{-x} - 1$ be obtained from the graph of $y = \frac{1}{x}$?

25) _____

- A) Reflect it across the y-axis. Shift it 1 units up.
- B) Reflect it across the x-axis. Shift it 1 units down.
- C) Reflect it across the x-axis. Shift it 1 units up.
- D) Reflect it across the y-axis. Shift it 1 units down.

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

- 26) The speed of a vehicle is inversely proportional to the time it takes to travel a fixed distance. If a vehicle travels a fixed distance at 35 miles per hour in 40 minutes, how fast must it travel to cover the same distance in 50 minutes?

26) _____

A) $\frac{175}{4}$ mph

B) $\frac{4}{175}$ mph

C) 28 mph

D) $\frac{400}{7}$ mph

Answer: C

Explanation: A)
B)
C)
D)

Determine algebraically whether the graph is symmetric with respect to the x-axis, the y-axis, and the origin.

27) $x^2 + 5y^4 = 2$

27) _____

A) x-axis only

B) x-axis, y-axis, origin

C) y-axis only

D) Origin only

Answer: B

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated composition.

28) $f(x) = x^4 + 5$, $g(x) = \sqrt[4]{x - 5}$

28) _____

Find $(g \circ f)(x)$.

A) x

B) x^4

C) $|x|$

D) $-x$

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

29) $f(x) = 16 - x^2$; $g(x) = 4 - x$

29) _____

Find $(f + g)(x)$.

A) $-x^2 - x + 20$

B) $-x^2 + x + 12$

C) $x^3 - 4x^2 - 16x + 64$

D) $4 + x$

Answer: A

Explanation: A)
B)
C)
D)

Write an equation for a function that has a graph with the given characteristics.

30) The shape of $y = \sqrt{x}$ is shifted 6 units to the left. Then the graph is shifted 8 units upward.

30) _____

A) $f(x) = \sqrt{x+8} + 6$

B) $f(x) = \sqrt{x+6} + 8$

C) $f(x) = 8\sqrt{x+6}$

D) $f(x) = \sqrt{x-6} + 8$

Answer: B

Explanation: A)
B)
C)
D)

Determine algebraically whether the graph is symmetric with respect to the x-axis, the y-axis, and the origin.

31) $x^2 + xy^2 = -4$

31) _____

A) x-axis only

B) y-axis only

C) Origin only

D) x-axis, y-axis, origin

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

32) The force needed to keep a car from skidding on a curve varies jointly as the weight of the car and the square of the car's speed, and inversely as the radius of the curve. If a force of 3600 pounds is needed to keep an 1800 pound car traveling at 20 mph from skidding on a curve of radius 600 feet, what force would be required to keep the same car from skidding on a curve of radius 700 feet at 30 mph? Round your answer to the nearest pound of force?

32) _____

A) 7513 lb

B) 6811 lb

C) 6975 lb

D) 6943 lb

Answer: D

Explanation: A)
B)
C)
D)

Write an equation for a function that has a graph with the given characteristics.

33) The shape of $y = |x|$ is reflected across the y-axis. This graph is then vertically stretched by a factor of 8.8. Finally, the graph is shifted 7 units downward.

33) _____

A) $f(x) = 8.8|-x| + 7$

B) $f(x) = 7|-x| - 8.8$

C) $f(x) = 8.8|-x| - 7$

D) $f(x) = -8.8|x| - 7$

Answer: C

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

34) m varies directly as p , and $m = 20$ when $p = 5$.

34) _____

A) $m = 4p$

B) $m = 25p$

C) $m = \frac{1}{4}p$

D) $m = 15p$

Answer: A

Explanation: A)
B)
C)
D)

The given point is on the graph of $y = f(x)$. Find a point on the graph of $y = g(x)$.

35) $g(x) = \frac{1}{4}f(x)$; $(-4, 20)$

35) _____

A) $(-4, -5)$

B) $(1, 5)$

C) $(-4, 5)$

D) $(-1, -5)$

Answer: C

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

36) $f(x) = 2x - 5$, $g(x) = \sqrt{x + 10}$

36) _____

Find the domain of $f + g$.

A) $[0, \infty)$

B) $(-10, 10)$

C) $[10, \infty)$

D) $[-10, \infty)$

Answer: D

Explanation: A)
B)
C)
D)

Solve.

37) A rectangle that is x feet wide is inscribed in a circle of radius 20 feet. Express the area of the rectangle as a function of x . Graph the function and from the graph determine the value of x , to the nearest tenth of a foot, which will maximize the area of the rectangle.

37) _____

A) 28.3 feet

B) 28.7 feet

C) 29.1 feet

D) 27.9 feet

Answer: A

Explanation: A)
B)
C)
D)

Find $f(x)$ and $g(x)$ such that $h(x) = (f \circ g)(x)$.

38) $h(x) = \left(\frac{x^3 + 5}{5 - x^3} \right)^8$

38) _____

A) $f(x) = (x^3 + 5)^8, g(x) = 5 - x^3$

B) $f(x) = \frac{1}{x^8}, g(x) = \frac{x^3 + 5}{5 - x^3}$

C) $f(x) = \frac{x^3 + 5}{5 - x^3}, g(x) = x^8$

D) $f(x) = x^8, g(x) = \frac{x^3 + 5}{5 - x^3}$

Answer: D

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

39) y varies inversely as x and $y = 5.25$ when $x = 0.36$

39) _____

A) $y = \frac{1.89}{x}$

B) $y = \frac{2.29}{x}$

C) $y = \frac{14.58}{x}$

D) $y = 14.58x$

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

40) Ken is 6 feet tall and is walking away from a streetlight. The streetlight has its light bulb 14 feet above the ground, and Ken is walking at the rate of 1.9 feet per second. Find a function, $d(t)$, which gives the distance Ken is from the streetlight in terms of time. Find a function, $S(d)$, which gives the length of Ken's shadow in terms of d . Then find $(S \circ d)(t)$.

40) _____

A) $(S \circ d)(t) = 3.21t$

B) $(S \circ d)(t) = 1.05t$

C) $(S \circ d)(t) = 1.81t$

D) $(S \circ d)(t) = 1.43t$

Answer: D

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

41) $f(x) = 2x - 5, g(x) = \sqrt{x + 6}$

41) _____

Find the domain of $f \circ g$.

A) $(-6, 6)$

B) $[-6, \infty)$

C) $[0, \infty)$

D) $[6, \infty)$

Answer: B

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

42) $f(x) = x + 5$, $g(x) = x - 4$

42) _____

Find $(f + g)(-4)$.

A) -9

B) 1

C) -17

D) -7

Answer: D

Explanation: A)
B)
C)
D)

Find the point that is symmetric to the given point with respect to the requested axis.

43) Symmetric with respect to the x-axis

43) _____

(7, 2)

A) (-7, -2)

B) (2, 7)

C) (7, -2)

D) (-7, 2)

Answer: C

Explanation: A)
B)
C)
D)

For the piecewise function, find the specified function value.

44) $f(x) = \begin{cases} 6x, & \text{for } x \leq -1, \\ x - 5, & \text{for } x > -1 \end{cases}$

44) _____

$f(-7)$

A) 42

B) -12

C) 2

D) -42

Answer: D

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

45) y varies directly as x and inversely as z, and y = 4 when x = 2 and z = 6.

45) _____

A) $y = \frac{11z}{x}$

B) $y = 15xz$

C) $y = \frac{12x}{z}$

D) $y = \frac{16x}{z}$

Answer: C

Explanation: A)
B)
C)
D)

For the function f , construct and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$.

46) $f(x) = \frac{16}{x+14}$

46) _____

A) $-\frac{224}{(x+h+14)(x+14)}$

B) $-\frac{16}{(x+h+14)(x+14)}$

C) $-\frac{16}{(x+16)^2}$

D) $\frac{16}{(x+h+14)(x+14)}$

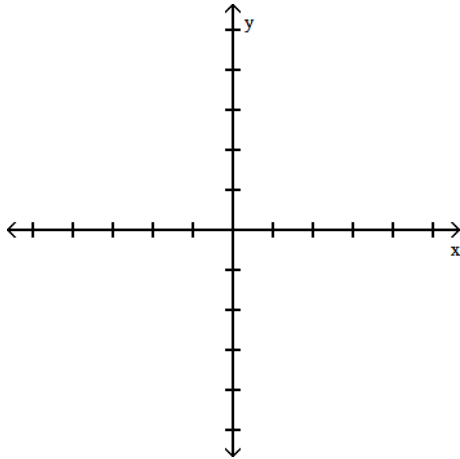
Answer: B

Explanation: A)
B)
C)
D)

Graph the function. Use the graph to find any relative maxima or minima.

47) $f(x) = |x+4| - 1$

47) _____



A) Relative maximum of 1 at $x = -4$

B) Relative minimum of 1.2 at $x = -4$

C) Relative minimum of 0.7 at $x = -4$

D) Relative minimum of -1 at $x = -4$

Answer: D

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

48) $f(x) = 5 + x$, $g(x) = 4|x|$

48) _____

Find $(g/f)(x)$.

A) $4|x| - 5 + x$

B) $\frac{4|x|}{5} + x$

C) $\frac{4|x|}{5+x}$

D) $\frac{5+x}{4|x|}$

Answer: C

Explanation: A)
B)
C)
D)

Solve.

49) AAA Technology finds that the total revenue function associated with producing a new type of computer chip is $R(x) = 80 - 0.3x^2$, and the total cost function is $C(x) = 5x + 18$, where x represents the number of units of chips produced. Find the total profit function, $P(x)$.

49) _____

A) $P(x) = 0.03x^2 + 5x + 64$

B) $P(x) = -0.03x^2 + 5x - 62$

C) $P(x) = -0.03x^2 - 5x + 62$

D) $P(x) = -0.03x^2 + 5x + 98$

Answer: C

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

50) y varies jointly as x and z and inversely as the product of w and p , and $y = \frac{6}{5}$ when $x = 1$, $z = 6$,

50) _____

$w = 20$ and $p = 8$.

A) $y = \frac{32xz}{wp}$

B) $y = \frac{35wp}{xz}$

C) $y = 52pwxz$

D) $y = \frac{192xz}{wp}$

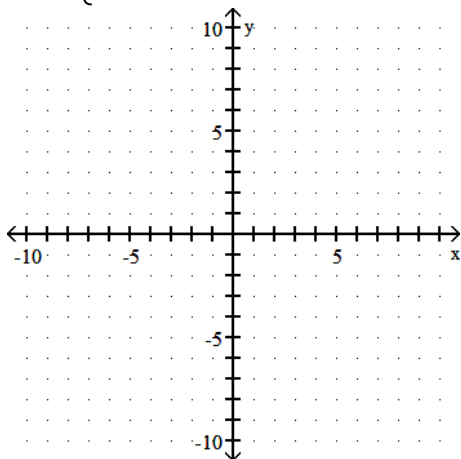
Answer: A

Explanation: A)
B)
C)
D)

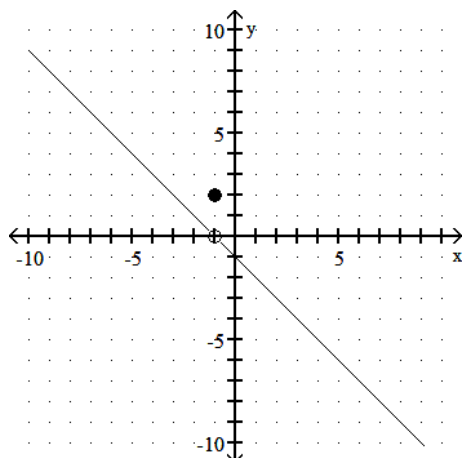
Graph the function.

51) $f(x) = \begin{cases} \frac{x^2 - 1}{x + 1}, & \text{for } x \neq -1, \\ 2, & \text{for } x = -1 \end{cases}$

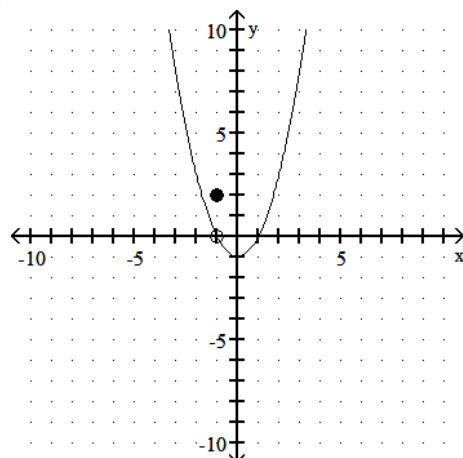
51) _____



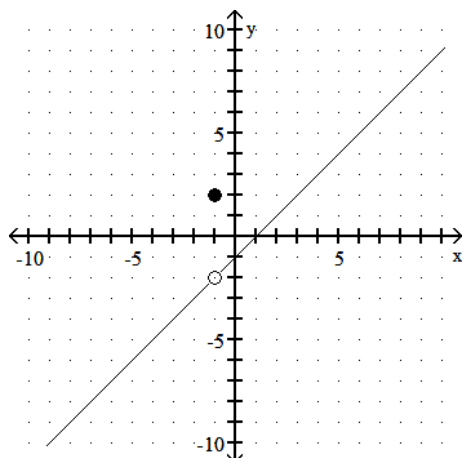
A)



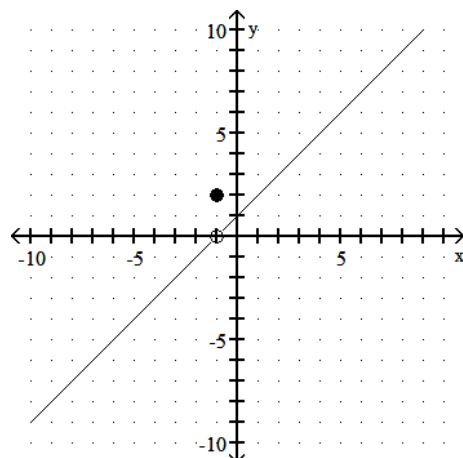
B)



C)



D)



Answer: C

Explanation:

A)

B)

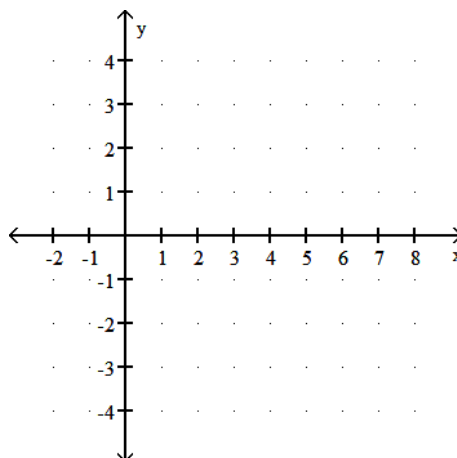
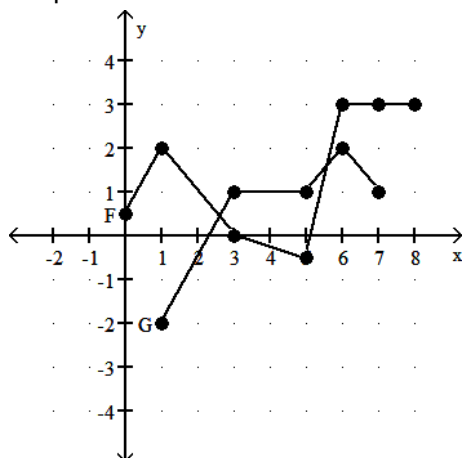
C)

D)

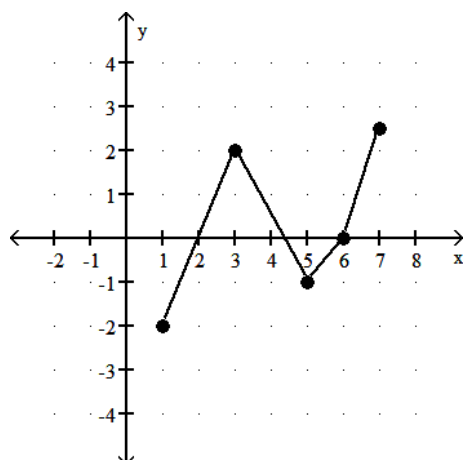
Consider the functions F and G as shown in the graph. Provide an appropriate response.

52) Graph $G - F$.

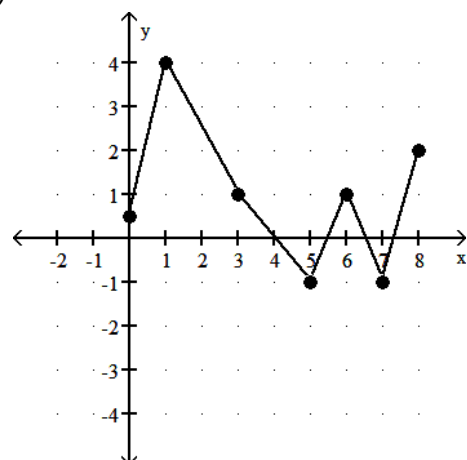
52) _____



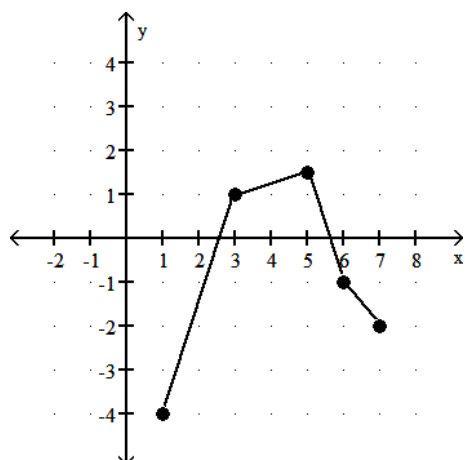
A)



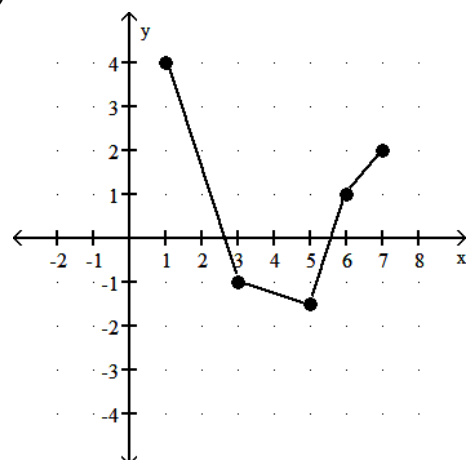
B)



C)



D)



Answer: C

Explanation:

A)

B)

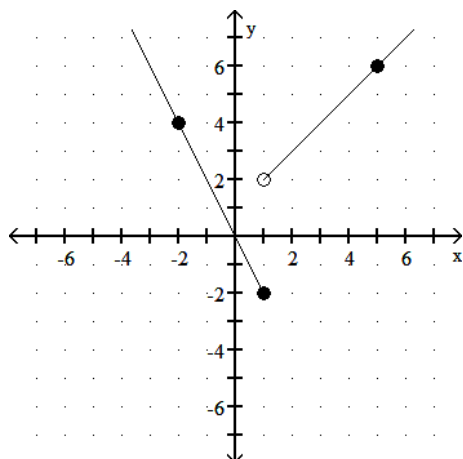
C)

D)

Write an equation for the piecewise function.

53)

53) _____



A) $f(x) = \begin{cases} -2x, & \text{for } x \leq 1, \\ x + 2, & \text{for } x > 1 \end{cases}$

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

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

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

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

54) The intensity of light from a light source varies inversely as the square of the distance from the source. Suppose the intensity is 40 foot-candles at a distance of 10 feet. What will the intensity be at a distance of 23 feet? Round your answer to the tenths place.

54) _____

A) 7.3 foot-candles

B) 7.8 foot-candles

C) 7.0 foot-candles

D) 7.6 foot-candles

Answer: D

Explanation: A)
B)
C)
D)

Answer the question.

55) How can the graph of $f(x) = 0.4(x + 7)^2 - 9$ be obtained from the graph of $y = x^2$?

55) _____

- A) Shift it horizontally 7 units to the right. Shrink it vertically by a factor of 0.4. Shift it 9 units up.
- B) Shift it horizontally 7 units to the left. Shrink it vertically by a factor of 0.4. Shift it 9 units down.
- C) Shift it horizontally 7 units to the left. Shrink it horizontally by a factor of 0.4. Shift it 9 units down.
- D) Shift it horizontally 9 units to the left. Stretch it vertically by a factor of 8. Shift it 7 units down.

Answer: B

Explanation: A)
B)
C)
D)

Write an equation for a function that has a graph with the given characteristics.

56) The shape of $y = x^2$, but upside-down and vertically stretched by a factor of 6.

56) _____

- A) $f(x) = (x - 6)^2$ B) $f(x) = -6x^2$ C) $f(x) = 6x^2$ D) $f(x) = 6(x - 6)x^2$

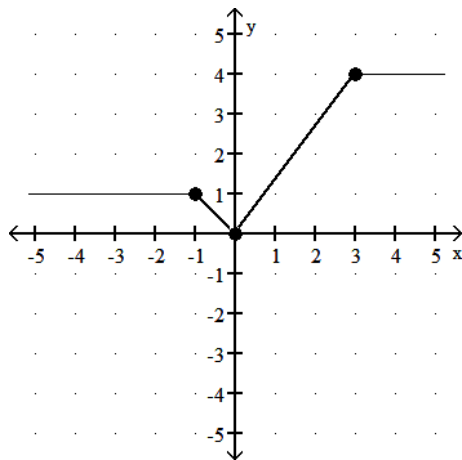
Answer: B

Explanation: A)
B)
C)
D)

Determine the domain and range of the function.

57)

57) _____



- A) domain: $(-\infty, \infty)$; range: $[0, 4]$
C) domain: $(0, 4]$; range: $(-\infty, \infty)$

- B) domain: $(-\infty, \infty)$; range: $(0, 4)$
D) domain: $[0, 4]$; range: $(-\infty, \infty)$

Answer: A

Explanation: A)
B)
C)
D)

Determine algebraically whether the function is even, odd, or neither even nor odd.

58) $f(x) = 3\sqrt[3]{x}$

A) Even

B) Odd

C) Neither

58) _____

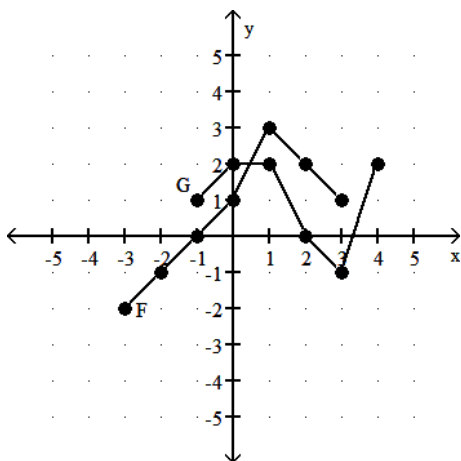
Answer: B

Explanation: A)
B)
C)

Consider the functions F and G as shown in the graph. Provide an appropriate response.

59) Find the domain of $F + G$.

59) _____



A) $[-3, 4]$

B) $[-1, 3]$

C) $[-3, 3]$

D) $[-1, 4]$

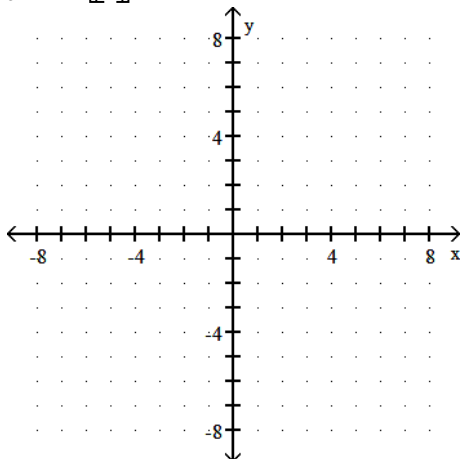
Answer: B

Explanation: A)
B)
C)
D)

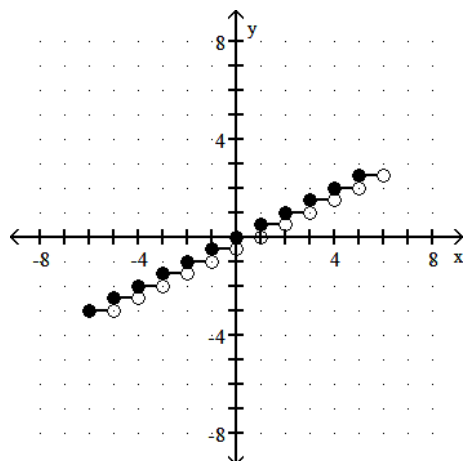
Graph the equation.

60) $y = 3 + \lceil x \rceil$

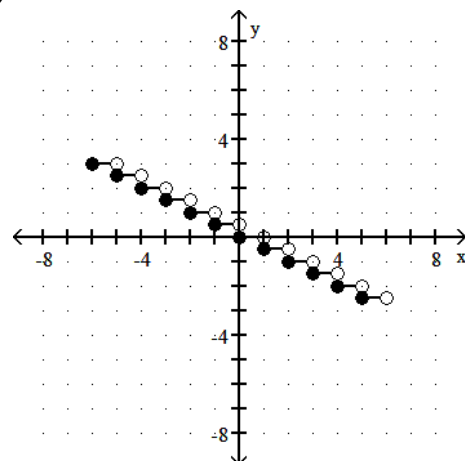
60) _____



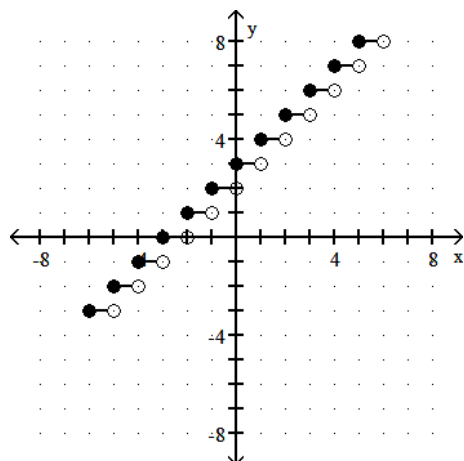
A)



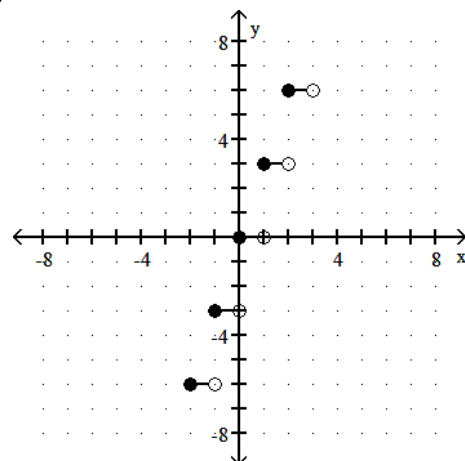
B)



C)



D)



Answer: C

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated composition.

61) $f(x) = 4x + 15$, $g(x) = 3x - 1$

Find $(f \circ g)(x)$.

A) $12x + 44$

B) $12x + 11$

C) $12x + 14$

D) $12x + 19$

Answer: B

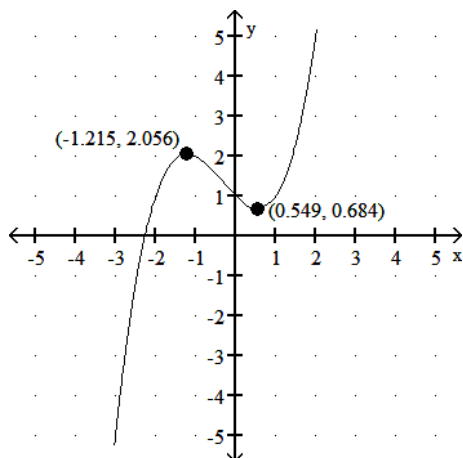
Explanation: A)
B)
C)
D)

61) _____

Using the graph, determine any relative maxima or minima of the function and the intervals on which the function is increasing or decreasing. Round to three decimal places when necessary.

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

62) _____



- A) relative maximum: 2.056 at $x = -1.215$; relative minima: 0.684 at $x = 0.549$ and 1 at $x = 0$; increasing $(-\infty, 0.549)$; decreasing $(-\infty, -1.215), (0.549, \infty)$
 B) relative maximum: 0.684 at $x = 0.549$; relative minimum: 2.056 at $x = -1.215$; increasing $(-\infty, 0.549)$; decreasing $(-\infty, -1.215), (0.549, \infty)$
 C) no relative maxima or minima; increasing $(-\infty, -1.215), (0.549, \infty)$; decreasing $(-1.215, 0.549)$
 D) relative maximum: 2.056 at $x = -1.215$; relative minimum: 0.684 at $x = 0.549$; increasing $(-\infty, -1.215), (0.549, \infty)$; decreasing $(-1.215, 0.549)$

Answer: D

Explanation: A)
 B)
 C)
 D)

Find an equation of variation for the given situation.

63) y varies directly as the square of x , and $y = 8.75$ when $x = 5$.

63) _____

- A) $y = 0.35x^2$ B) $y = 0.39\sqrt{x}$ C) $y = 1.92x^2$ D) $y = 0.4x^2$

Answer: A

Explanation: A)
 B)
 C)
 D)

For the pair of functions, find the indicated composition.

64) $f(x) = \frac{2}{x}$, $g(x) = 7x^4$

64) _____

Find $(g \circ f)(x)$.

- A) $\frac{7x^4}{16}$ B) $\frac{7x^4}{2}$ C) $\frac{112}{x^4}$ D) $\frac{2}{7x^4}$

Answer: C

Explanation: A)
 B)
 C)
 D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

65) $f(x) = x^2 - 1$, $g(x) = 9x + 1$

65) _____

Find $(f/g)\left(-\frac{1}{9}\right)$.

A) $\frac{1}{2}$

B) 0

C) does not exist

D) $-\frac{2}{3}$

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

66) The time it takes to complete a certain job varies inversely as the number of people working on that job. If it takes 36 hours for 11 carpenters to frame a house, then how long will it take 45 carpenters to do the same job?

66) _____

A) 40 hr

B) 13.8 hr

C) 45 hr

D) 8.8 hr

Answer: D

Explanation: A)
B)
C)
D) round answer to the nearest hour

Find an equation of variation for the given situation.

67) r varies directly as s , and $r = 0.3333$ when $s = 1$.

67) _____

A) $r = 2s$

B) $r = 3s$

C) $r = 0.3333s$

D) $r = 4s$

Answer: C

Explanation: A)
B)
C)
D)

Solve.

68) A rectangular box with volume 517 cubic feet is built with a square base and top. The cost is \$1.50 per square foot for the top and the bottom and \$2.00 per square foot for the sides. Let x represent the length of a side of the base in feet. Express the cost of the box as a function of x and then graph this function. From the graph find the value of x , to the nearest hundredth of a foot, which will minimize the cost of the box.

68) _____

A) 8.49 feet

B) 8.83 feet

C) 8.91 feet

D) 8.79 feet

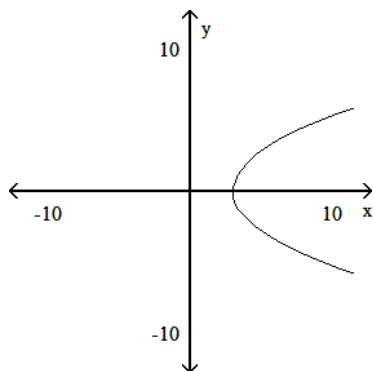
Answer: B

Explanation: A)
B)
C)
D)

Determine if the graph is symmetric with respect to x-axis, y-axis, and/or the origin.

69)

69) _____



A) y-axis

B) Origin

C) x-axis, origin

D) x-axis

Answer: D

Explanation:

- A)
- B)
- C)
- D)

For the function f , construct and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$.

70) $f(x) = 9|x| + 4x$

70) _____

A) $-3h$

B) $\frac{9|x+h| - 4h - 9|x|}{h}$

C) $-5h$

D) $\frac{-9|x+h| - 5h + 9|x|}{h}$

Answer: B

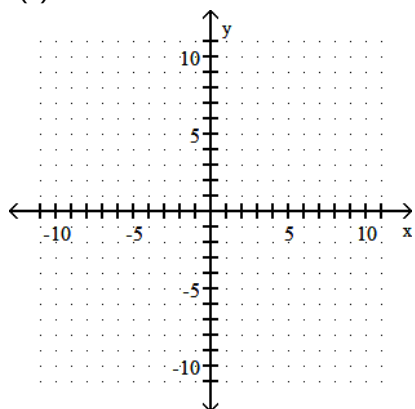
Explanation:

- A)
- B)
- C)
- D)

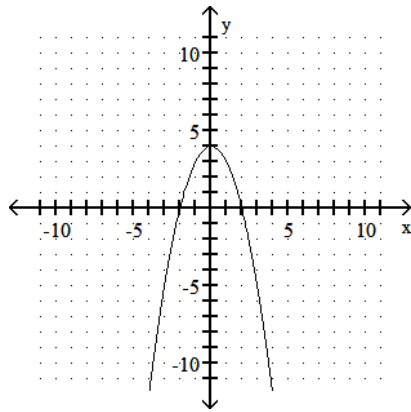
Graph the function.

71) $f(x) = x^2 - 4$

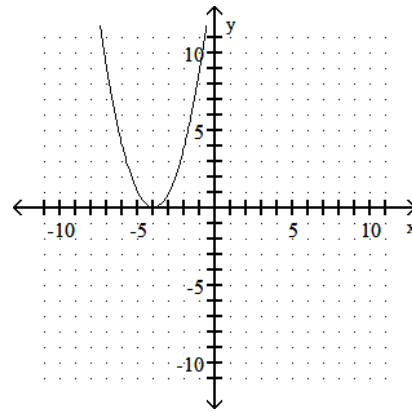
71) _____



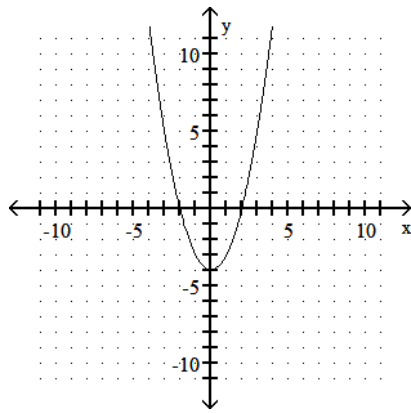
A)



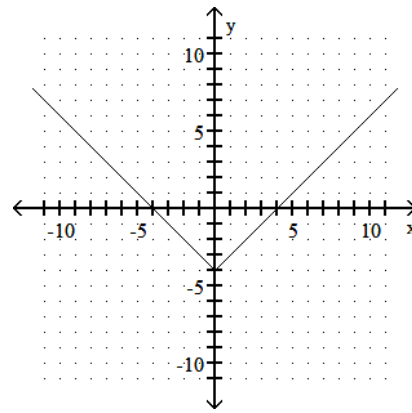
B)



C)



D)



Answer: C

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

72) y varies inversely as x and $y = 0.1$ when $x = 0.5$

A) $y = \frac{0.6}{x}$

B) $y = \frac{0.2}{x}$

C) $y = 0.2x$

D) $y = \frac{0.05}{x}$

72) _____

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

- 73) The volume V of a given mass of gas varies directly as the temperature T and inversely as the pressure P . If $V = 392.0 \text{ in.}^3$ when $T = 420^\circ$ and $P = 15 \text{ lb/in.}^2$, what is the volume when $T = 200^\circ$ and $P = 15 \text{ lb/in.}^2$?

73) _____

- A) 196.7 in^3 B) 166.7 in^3 C) 186.7 in^3 D) 146.7 in^3

Answer: C

Explanation: A)
 B)
 C)
 D)

- 74) The amount of tread left on a tire varies inversely as the number of miles the tire has traveled. A tire that has traveled 93,000 miles has $\frac{5}{32}$ inches of tread left. How much tread will be left on a tire that has traveled 23,000 miles?

74) _____

- A) 595,200 in. B) $\frac{736}{465}$ in. C) $\frac{1}{595200}$ in. D) $\frac{465}{736}$ in.

Answer: D

Explanation: A)
 B)
 C)
 D)

Determine algebraically whether the function is even, odd, or neither even nor odd.

- 75) $f(x) = 14x - 5|x|$

75) _____

- A) Even B) Odd C) Neither

Answer: C

Explanation: A)
 B)
 C)
 D)

Determine algebraically whether the graph is symmetric with respect to the x-axis, the y-axis, and the origin.

- 76) $5x = 3y^2 - 1$

76) _____

- A) y-axis only B) Origin only
C) x-axis, y-axis, origin D) x-axis only

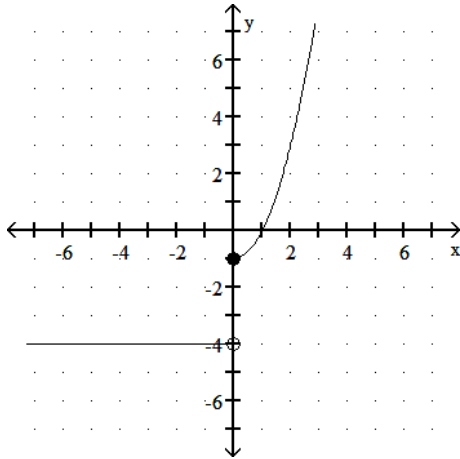
Answer: D

Explanation: A)
 B)
 C)
 D)

Write an equation for the piecewise function.

77)

77) _____



A) $f(x) = \begin{cases} 4, & \text{for } x < 0, \\ x^2, & \text{for } x \geq 0 \end{cases}$

C) $f(x) = \begin{cases} 4, & \text{for } x < 0, \\ |x| - 1, & \text{for } x \geq 0 \end{cases}$

B) $f(x) = \begin{cases} 4, & \text{for } x \leq 0, \\ x^2 - 1, & \text{for } x > 0 \end{cases}$

D) $f(x) = \begin{cases} -4, & \text{for } x < 0, \\ x^2 - 1, & \text{for } x \geq 0 \end{cases}$

Answer: D

Explanation: A)
B)
C)
D)

Find the requested function value.

78) $f(x) = \frac{x-9}{9}$, $g(x) = 4x + 6$

78) _____

Find $(g \circ f)(-9)$.

A) -20

B) $-\frac{13}{3}$

C) 60

D) -2

Answer: D

Explanation: A)
B)
C)
D)

Determine algebraically whether the graph is symmetric with respect to the x-axis, the y-axis, and the origin.

79) $y = |20x|$

79) _____

A) y-axis only

B) x-axis only

C) x-axis, y-axis, origin

D) Origin only

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

80) $f(x) = 4x^2 - 7x$, $g(x) = x^2 - 3x - 28$

80) _____

Find $(f/g)(x)$.

A) $\frac{4x^2 - 7x}{x^2 - 3x - 28}$

B) $\frac{4x - 7}{-3}$

C) $\frac{4x}{x + 1}$

D) $\frac{4 - x}{28}$

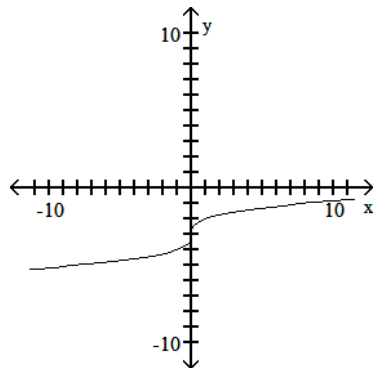
Answer: A

Explanation: A)
B)
C)
D)

Determine the intervals on which the function is increasing, decreasing, and constant.

81)

81) _____



A) Increasing on $(0, \infty)$; Decreasing on $(-\infty, 0)$

B) Decreasing on $(-\infty, \infty)$

C) Increasing on $(-\infty, \infty)$

D) Increasing on $(-\infty, 0)$; Decreasing on $(0, \infty)$

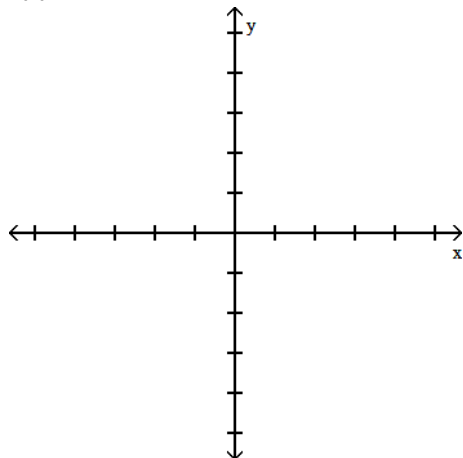
Answer: C

Explanation: A)
B)
C)
D)

Graph the function. Use the graph to find any relative maxima or minima.

82) $f(x) = x^2 + 8x + 14$

82) _____



A) Relative maximum of -2.2 at $x = -4.1$

B) Relative minimum of -2 at $x = -4$

C) Relative maximum of -2 at $x = -4$

D) Relative minimum of -2.2 at $x = -4.1$

Answer: B

Explanation: A)

B)

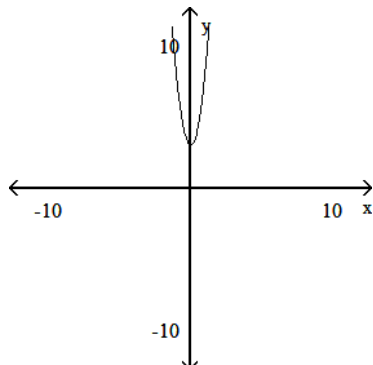
C)

D)

Determine if the graph is symmetric with respect to x-axis, y-axis, and/or the origin.

83)

83) _____



A) y-axis

B) x-axis

C) x-axis, origin

D) Origin

Answer: A

Explanation: A)

B)

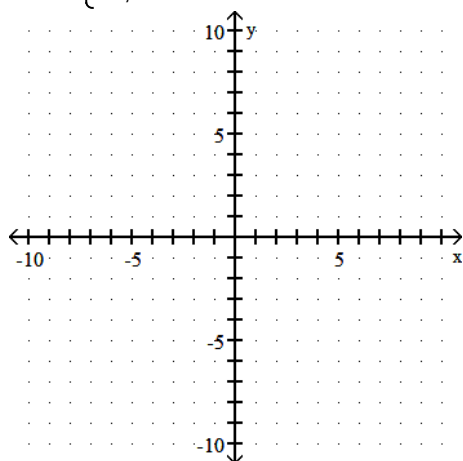
C)

D)

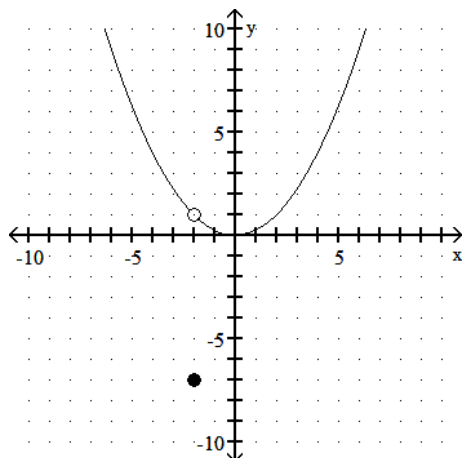
Graph the function.

$$84) f(x) = \begin{cases} \frac{x^2 + 8x + 12}{x + 2}, & \text{for } x \neq -2, \\ -7, & \text{for } x = -2 \end{cases}$$

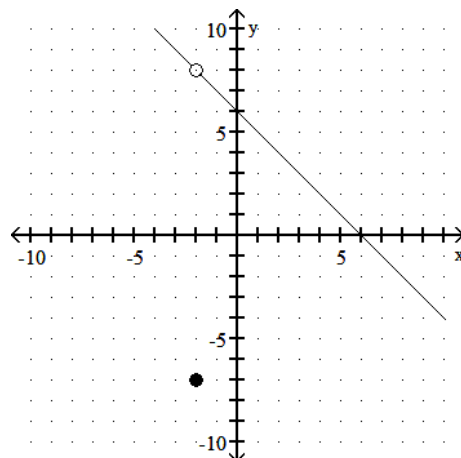
84) _____



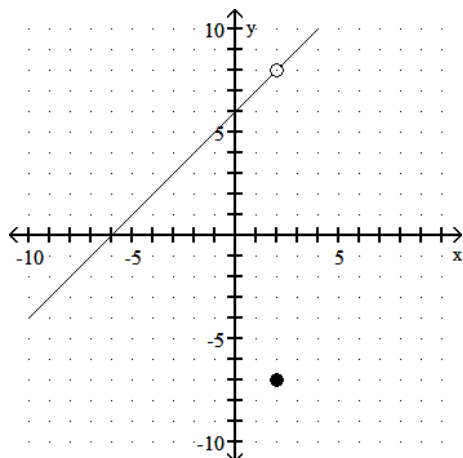
A)



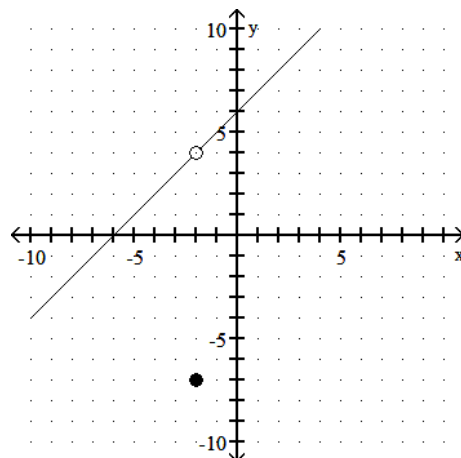
B)



C)



D)



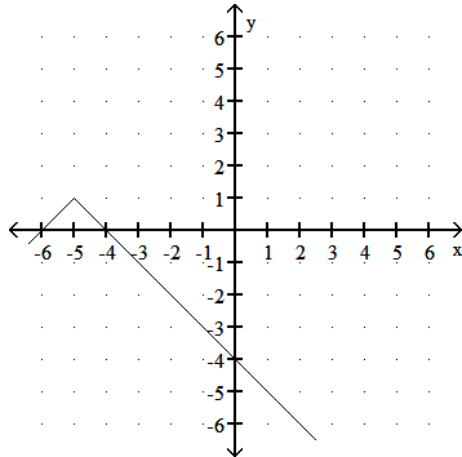
Answer: D

Explanation: A)
B)
C)
D)

Determine the domain and range of the function.

85)

85) _____



- A) domain: $(-\infty, -5]$; range: $(-\infty, 1]$
 B) domain: $(-\infty, \infty)$; range: $(-\infty, 1]$
 C) domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$
 D) domain: $(-\infty, -5) \cup (-5, \infty)$; range: $(-\infty, 1) \cup (1, \infty)$

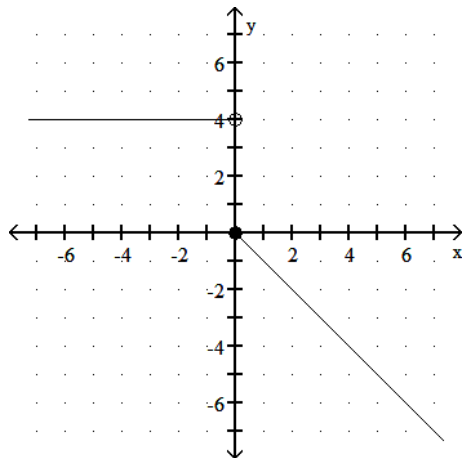
Answer: B

Explanation: A)
 B)
 C)
 D)

Write an equation for the piecewise function.

86)

86) _____



- A) $f(x) = \begin{cases} 4, & \text{for } x < 0, \\ -x, & \text{for } x \geq 0 \end{cases}$
 B) $f(x) = \begin{cases} 4, & \text{for } x \leq 0, \\ -x, & \text{for } x > 0 \end{cases}$
 C) $f(x) = \begin{cases} 4, & \text{for } x < 0, \\ -4x, & \text{for } x \geq 0 \end{cases}$
 D) $f(x) = \begin{cases} 4, & \text{for } x < 0, \\ x, & \text{for } x \geq 0 \end{cases}$

Answer: A

Explanation: A)
 B)
 C)
 D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

87) $f(x) = 2 - 9x$, $g(x) = -5x + 9$

87) _____

Find $(f + g)(x)$.

A) $-3x$

B) $-14x + 11$

C) $-5x + 2$

D) $-4x + 11$

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

88) The weight that a horizontal beam can support varies inversely as the length of the beam. Suppose that a 2-m beam can support 560 kg. How many kilograms can a 2-m beam support?

88) _____

A) 0.0018 kg

B) 560 kg

C) 0.0071 kg

D) 140 kg

Answer: B

Explanation: A)
B)
C)
D)

Solve.

89) The number G of gears a machine can make varies directly as the time T it operates. If it can make 3000 gears in 6 hours, how many gears can it make in 4 hours?

89) _____

A) 2000 gears

B) 3010 gears

C) 500 gears

D) 0.008 gears

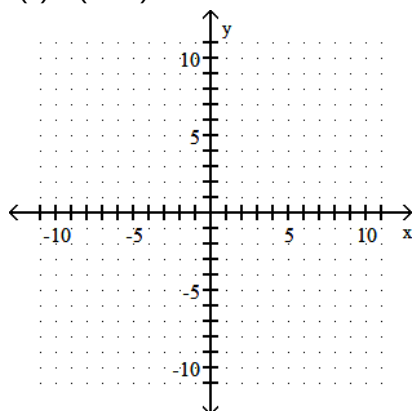
Answer: A

Explanation: A)
B)
C)
D)

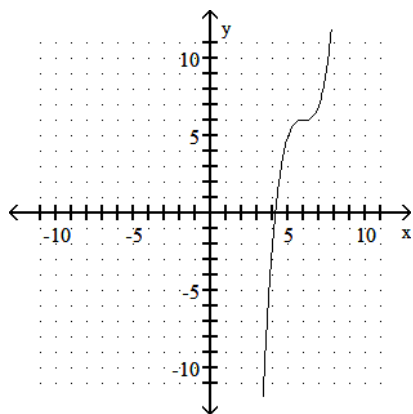
Graph the function.

90) $f(x) = (x - 6)^3 - 6$

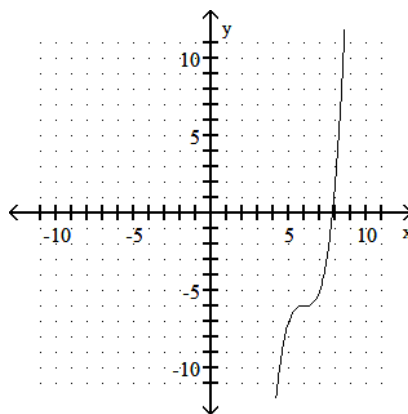
90) _____



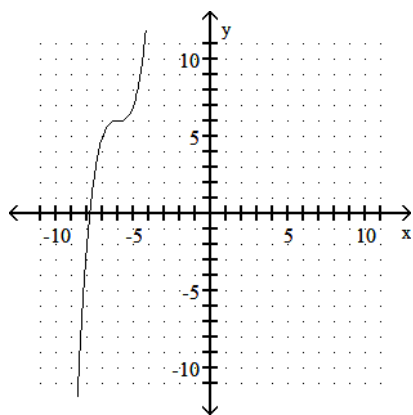
A)



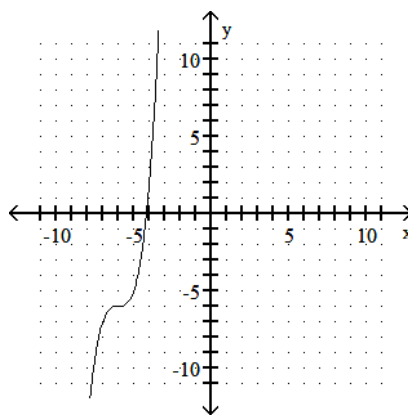
B)



C)



D)



Answer: B

Explanation: A)
B)
C)
D)

Answer the question.

91) How can the graph of $f(x) = -\frac{1}{x} + 6$ be obtained from the graph of $y = \frac{1}{x}$?

91) _____

- A) Reflect it across the x-axis. Shift it 6 units up.
- B) Reflect it across the y-axis. Shift it 6 units up.
- C) Reflect it across the x-axis. Shift it 6 units down.
- D) Reflect it across the y-axis. Shift it 6 units down.

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated composition.

92) $f(x) = 4x^2 + 3x + 8$, $g(x) = 3x - 6$

92) _____

Find $(g \circ f)(x)$.

A) $4x^2 + 3x + 2$

B) $4x^2 + 9x + 18$

C) $12x^2 + 9x + 18$

D) $12x^2 + 9x + 30$

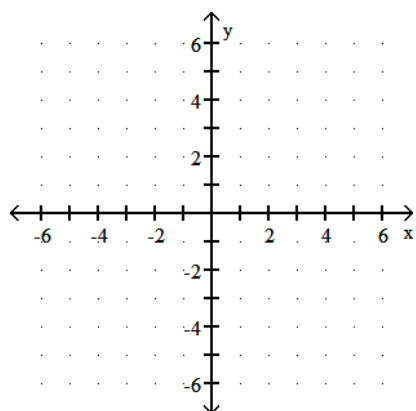
Answer: C

Explanation: A)
B)
C)
D)

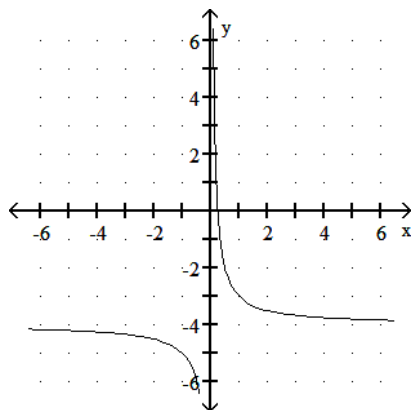
Graph the function.

93) $f(x) = \frac{1}{x} + 4$

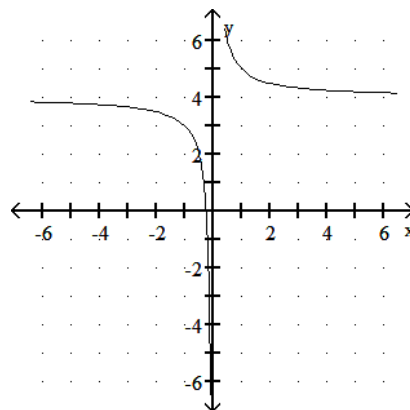
93) _____



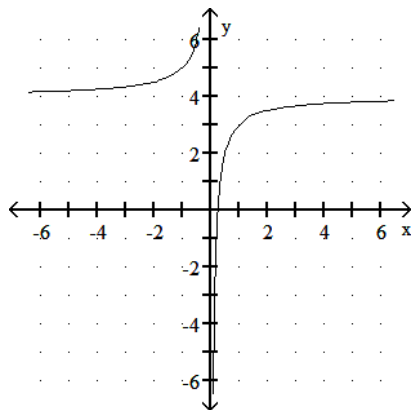
A)



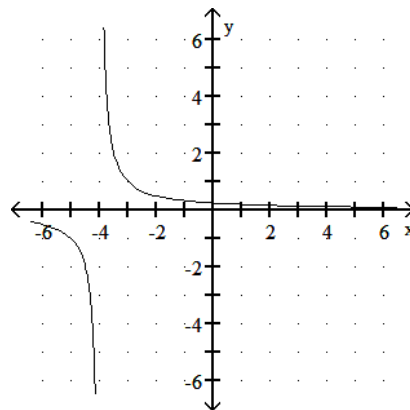
B)



C)



D)



Answer: B

Explanation: A)

Explanation: ~~A)~~
C)
D)

Find an equation of variation for the given situation.

94) y varies jointly as x and the square of z , and $y = 209.9072$ when $x = 0.8$ and $z = 4.6$

94) _____

A) $y = 14.6xz^2$

B) $y = 9.92x^2z^2$

C) $y = 12.4xz^2$

D) $y = 12.9x\sqrt{z}$

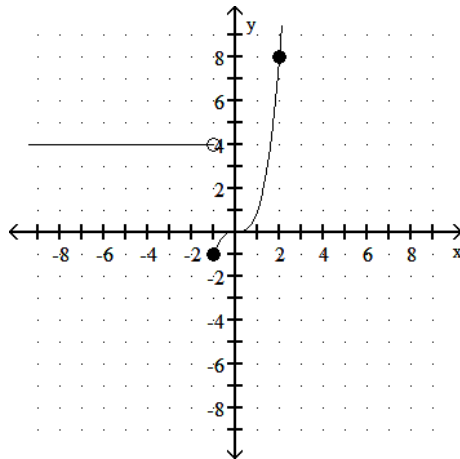
Answer: C

Explanation: A)
B)
C)
D)

Write an equation for the piecewise function.

95)

95) _____



A) $f(x) = \begin{cases} 4, & \text{for } x < -1, \\ x^3, & \text{for } x \geq -1 \end{cases}$

B) $f(x) = \begin{cases} 4, & \text{for } x < -1, \\ x^2 - 1, & \text{for } x \geq -1 \end{cases}$

C) $f(x) = \begin{cases} 4, & \text{for } x < -1, \\ x^3 - 1, & \text{for } x \geq -1 \end{cases}$

D) $f(x) = \begin{cases} 4, & \text{for } x < -1, \\ x^2, & \text{for } x \geq -1 \end{cases}$

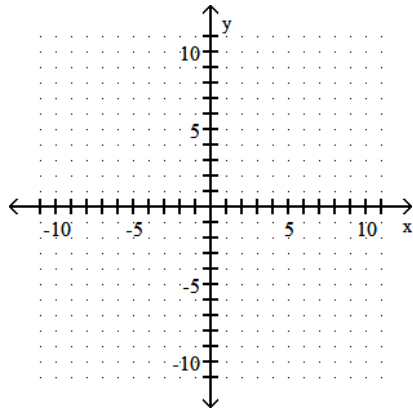
Answer: A

Explanation: A)
B)
C)
D)

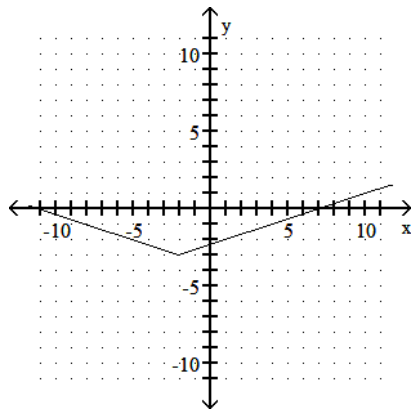
Graph the function.

96) $h(x) = \frac{1}{3}|x + 2| - 3$

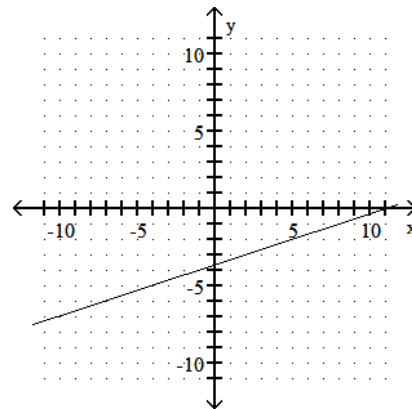
96) _____



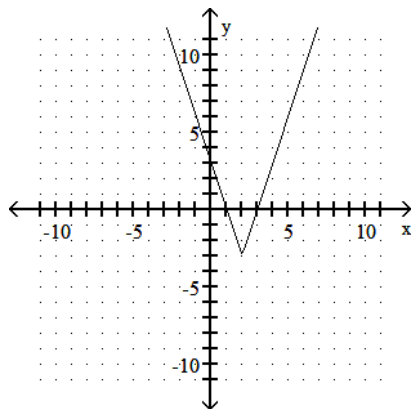
A)



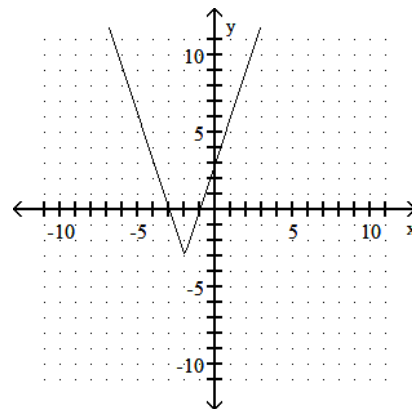
B)



C)



D)



Answer: A

Explanation: A)
B)
C)
D)

Answer the question.

97) How can the graph of $f(x) = -10|x|$ be obtained from the graph of $y = |x|$?

97) _____

- A) Stretch it vertically by multiplying each y-coordinate by -10. Reflect it across the y-axis.
- B) Stretch it vertically by multiplying each y-coordinate by 10. Reflect it across the x-axis.
- C) Stretch it vertically by multiplying each y-coordinate by -10. Reflect it across the x-axis.
- D) Stretch it vertically by multiplying each y-coordinate by 10. Reflect it across the y-axis.

Answer: B

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

98) y varies jointly as x and z, and $y = 18$ when $x = 3$ and $z = 3$

98) _____

A) $y = 6x$

B) $y = 4xz$

C) $y = \frac{18}{xz}$

D) $y = 2xz$

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

99) The weight of a body above the surface of the earth varies inversely as the square of its distance from the center of the earth. What is the effect on the weight when the distance is multiplied by 4?

99) _____

- A) The weight is divided by 4.
- B) The weight is multiplied by 16.
- C) The weight is multiplied by 4.
- D) The weight is divided by 16.

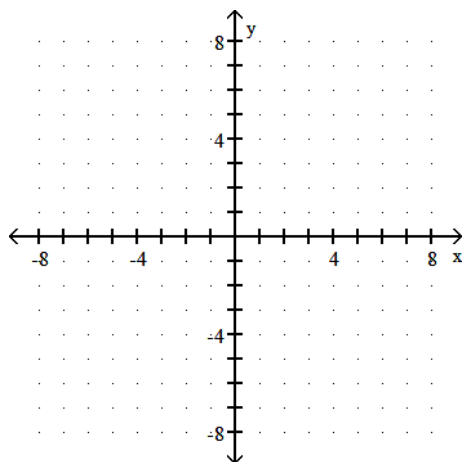
Answer: D

Explanation: A)
B)
C)
D)

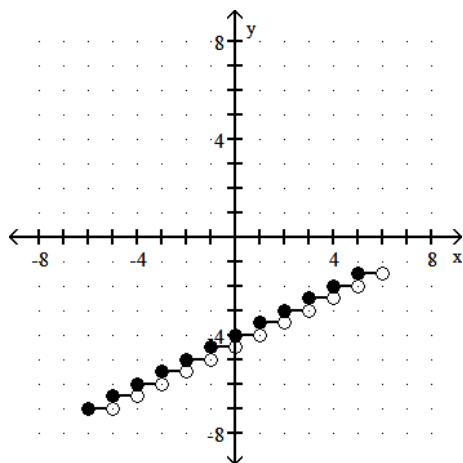
Graph the equation.

100) $y = \frac{1}{2} \lceil x \rceil - 4$

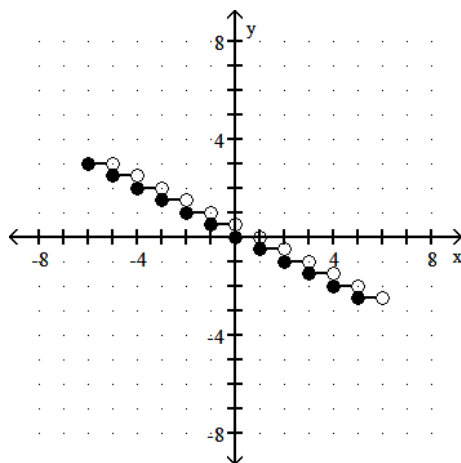
100) _____



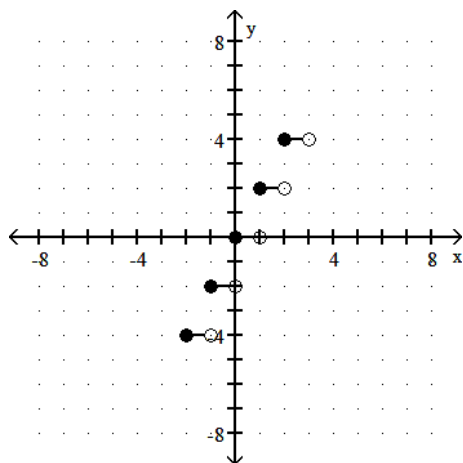
A)



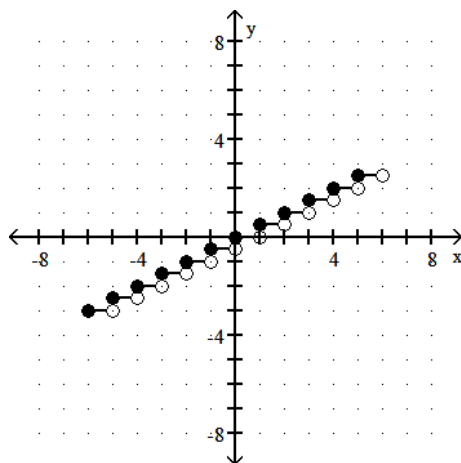
B)



C)



D)



Answer: A

Explanation: A)
B)
C)
D)

Solve.

101) A rectangular box with volume 400 cubic feet is built with a square base and top. The cost is \$1.50 per square foot for the top and the bottom and \$2.00 per square foot for the sides. Let x represent the length of a side of the base. Express the cost the box as a function of x .

A) $C(x) = 4x + \frac{3200}{x^2}$

B) $C(x) = 3x^2 + \frac{3200}{x}$

C) $C(x) = 2x^2 + \frac{3200}{x}$

D) $C(x) = 3x^2 + \frac{1600}{x}$

Answer: B

Explanation: A)
B)
C)
D)

101) _____

Find the point that is symmetric to the given point with respect to the requested axis.

102) Symmetric with respect to the y-axis

102) _____

(1.5, 1.75)

A) (1.5, -1.5)

B) (1.75, 1.5)

C) (-1.5, -1.75)

D) (-1.5, 1.75)

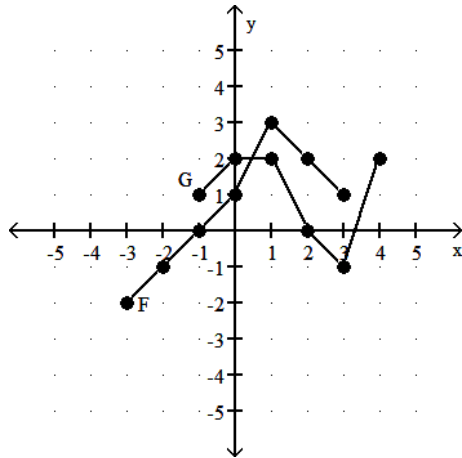
Answer: D

Explanation: A)
B)
C)
D)

Consider the functions F and G as shown in the graph. Provide an appropriate response.

103) Find the domain of FG.

103) _____



A) [-3,4]

B) [-1,3]

C) [-3,3]

D) [-1,4]

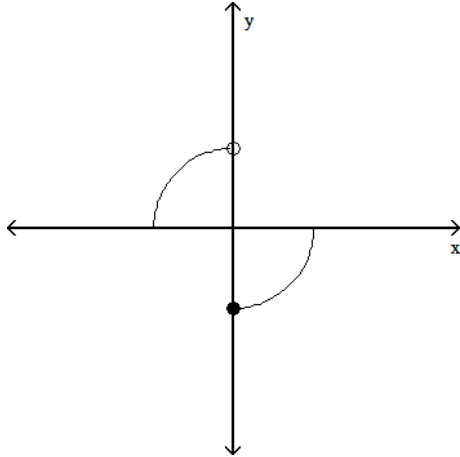
Answer: B

Explanation: A)
B)
C)
D)

Determine whether the given function is even, odd, or neither even nor odd.

104)

104) _____



A) Neither

B) Odd

C) Even

Answer: A

Explanation: A)
B)
C)

For the pair of functions, find the indicated sum, difference, product, or quotient.

105) $f(x) = \sqrt{2x + 4}$, $g(x) = \sqrt{25x - 16}$

105) _____

Find $(fg)(x)$.

A) $(2x + 4)(5x - 4)$

B) $(5x - 4)(\sqrt{2x + 4})$

C) $(\sqrt{2x + 4})(\sqrt{25x - 16})$

D) $(2x + 4)(25x - 16)$

Answer: C

Explanation: A)
B)
C)
D)

For the function f , construct and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$.

106) $f(x) = \frac{x - 19}{x + 3}$

106) _____

A) $\frac{23}{(x+3)(x-3)}$

B) $\frac{22(x+h+3)}{(x+3)}$

C) $\frac{22}{(x+h+3)(x+3)}$

D) $-\frac{22}{x(x+3)}$

Answer: C

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

107) $f(x) = x^2 - 16$, $g(x) = 2x + 3$

107) _____

Find the domain of $g \circ f$.

A) $\left[-\infty, -\frac{3}{2}\right) \cup \left[-\frac{3}{2}, \infty\right)$

B) $(-4, 4)$

C) $[4, \infty)$

D) $(-\infty, \infty)$

Answer: D

Explanation: A)
B)
C)
D)

Determine algebraically whether the graph is symmetric with respect to the x-axis, the y-axis, and the origin.

108) $x^4 + y^4 = 10$

108) _____

A) x-axis only

B) Origin only

C) x-axis, y-axis, origin

D) y-axis only

Answer: C

Explanation: A)
B)
C)
D)

Given the function f , match the function g with a transformation of f .

109) $f(x) = x^2 - 7$, $g(x) = 25x^2 - 7$

109) _____

A) $f(x + 5)$

B) $f(x) + 5$

C) $5f(x)$

D) $f(5x)$

Answer: D

Explanation: A)
B)
C)
D)

For the piecewise function, find the specified function value.

110) $f(x) = \begin{cases} 3x + 1, & \text{for } x < 7, \\ 7x, & \text{for } 7 \leq x \leq 12, \\ 7 - 3x, & \text{for } x > 12 \end{cases}$

110) _____

$f(-7)$

A) 28

B) 22

C) -49

D) -20

Answer: D

Explanation: A)
B)
C)
D)

The given point is on the graph of $y = f(x)$. Find a point on the graph of $y = g(x)$.

111) $g(x) = f(x - 1) + 3$; (4, 13)

A) (5, 10)

B) (14, 10)

C) (5, 16)

D) (14, 16)

111) _____

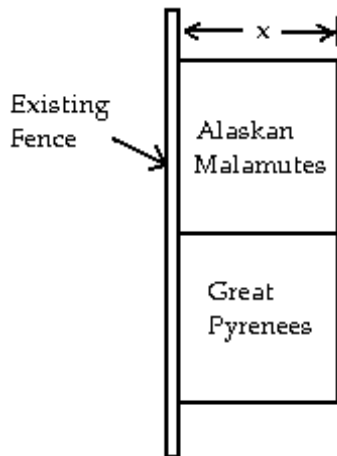
Answer: C

Explanation: A)
B)
C)
D)

Solve.

- 112) Elissa sells two breeds of dogs, Alaskan Malamutes and Great Pyrenees. She has 78 feet of fencing to enclose two adjacent rectangular dog kennels, one for each breed. An existing fence is to form one side of the kennels, as in the drawing below. Let x represent the measurement indicated. Express the total area of the two kennels as a function of x . Graph the function and from the graph determine the value of x , rounded to the hundredths place, that will yield the maximum area.

112) _____



A) 19.50 feet

B) 13.17 feet

C) 13.33 feet

D) 13.00 feet

Answer: D

Explanation: A)
B)
C)
D)

- 113) A rectangle that is x feet wide is inscribed in a circle of radius 32 feet. Express the area of the rectangle as a function of x . Graph the function and from the graph determine the value of x , to the nearest tenth of a foot, which will maximize the area of the rectangle.

113) _____

A) 45.7 feet

B) 44.9 feet

C) 44.5 feet

D) 45.3 feet

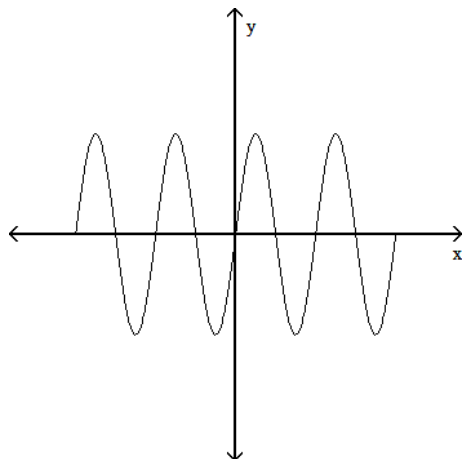
Answer: D

Explanation: A)
B)
C)
D)

Determine whether the given function is even, odd, or neither even nor odd.

114)

114) _____



A) Neither

B) Even

C) Odd

Answer: C

Explanation: A)
B)
C)

Answer the question.

115) How can the graph of $f(x) = -(x - 1)^2 + 6$ be obtained from the graph of $y = x^2$?

115) _____

- A) Shift it horizontally 1 units to the left. Reflect it across the x-axis. Shift it 6 units up.
- B) Shift it horizontally 1 units to the right. Reflect it across the x-axis. Shift it 6 units up.
- C) Shift it horizontally 1 units to the right. Reflect it across the y-axis. Shift it 6 units up.
- D) Shift it horizontally 1 units to the right. Reflect it across the y-axis. Shift it 6 units down.

Answer: B

Explanation: A)
B)
C)
D)

116) How can the graph of $f(x) = -\sqrt[3]{x + 8}$ be obtained from the graph of $y = \sqrt[3]{x}$?

116) _____

- A) Shift it vertically 8 units upward. Reflect it across the x-axis.
- B) Shift it horizontally 8 units to the left. Reflect it across the y-axis.
- C) Shift it horizontally 8 units to the left. Reflect it across the x-axis.
- D) Shift it horizontally 8 units to the right. Reflect it across the x-axis.

Answer: C

Explanation: A)
B)
C)
D)

- 117) How can the graph of $f(x) = (x - 2)^2 - 7$ be obtained from the graph of $y = x^2$?
- A) Shift it 2 units horizontally to the right. Shift it vertically 7 units downward.
 - B) Shift it 2 units horizontally to the left. Shift it vertically 7 units downward.
 - C) Shift it 2 units horizontally to the left. Shift it vertically 7 units upward.
 - D) Shift it 7 units horizontally to the right. Shift it vertically 2 units downward.

117) _____

Answer: A

Explanation: A)
B)
C)
D)

For the function f , construct and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$.

118) $f(x) = \frac{1}{5x}$

118) _____

A) $\frac{-1}{x(x+h)}$

B) $\frac{-1}{5x(x+h)}$

C) $\frac{1}{5x}$

D) 0

Answer: B

Explanation: A)
B)
C)
D)

Solve.

- 119) A rectangular box with volume 468 cubic feet is built with a square base and top. The cost is \$1.50 per square foot for the top and the bottom and \$2.00 per square foot for the sides. Let x represent the length of a side of the base in feet. Express the cost of the box as a function of x and then graph this function. From the graph find the value of x , to the nearest hundredth of a foot, which will minimize the cost of the box.

119) _____

A) 8.63 feet

B) 8.44 feet

C) 7.92 feet

D) 8.55 feet

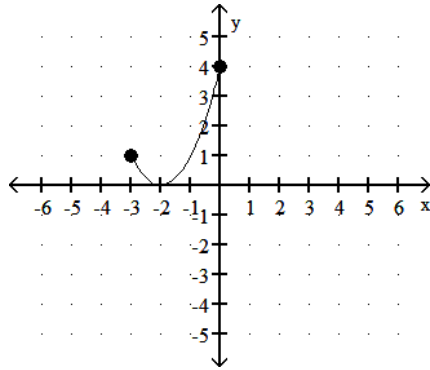
Answer: D

Explanation: A)
B)
C)
D)

Determine the domain and range of the function.

120)

120) _____



A) domain: $[0, 4]$; range: $[-3, 0]$

B) domain: $[-3, 0]$; range: $[0, 4]$

C) domain: $[0, 3]$; range: $(-\infty, 4]$

D) domain: $(-\infty, 4]$; range: $[0, 3]$

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

121) The gravitational attraction A between two masses varies inversely as the square of the distance between them. The force of attraction is 4 lb when the masses are 3 ft apart, what is the attraction when the masses are 6 ft apart?

121) _____

A) 3 lb

B) 1 lb

C) 4 lb

D) 2 lb

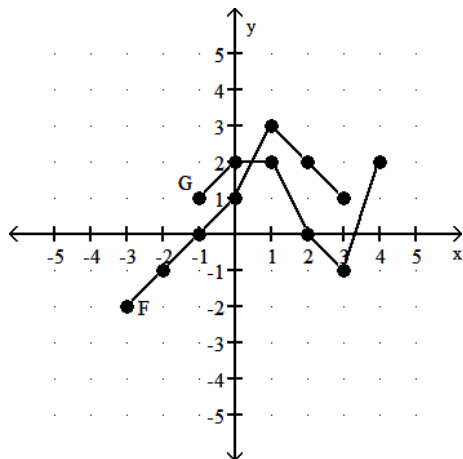
Answer: B

Explanation: A)
B)
C)
D)

Consider the functions F and G as shown in the graph. Provide an appropriate response.

122) Find the domain of G/F .

122) _____



A) $[-1, 2) \cup (2, 3]$

B) $(-1, 3]$

C) $[-3, 4]$

D) $[-3, 3]$

Answer: B

Explanation: A)
B)
C)
D)

The given point is on the graph of $y = f(x)$. Find a point on the graph of $y = g(x)$.

123) $g(x) = f(x - 1)$; $(4, 14)$

123) _____

A) $(4, 15)$

B) $(3, 14)$

C) $(5, 14)$

D) $(4, 13)$

Answer: C

Explanation: A)
B)
C)
D)

Find the requested function value.

124) $f(x) = 5x + 1$, $g(x) = -2x^2 - 3x - 4$

124) _____

Find $(f \circ g)(-5)$.

A) 106

B) -194

C) 116

D) -1084

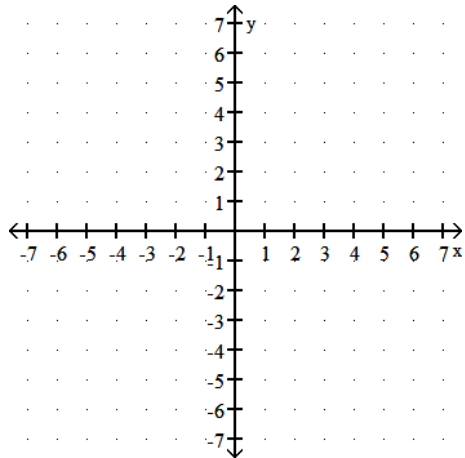
Answer: B

Explanation: A)
B)
C)
D)

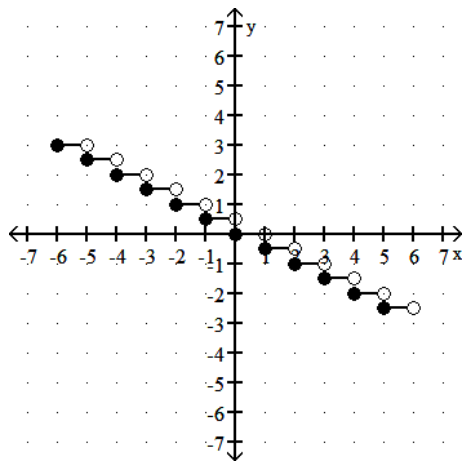
Graph the equation.

125) $y = \frac{1}{2} \llbracket x \rrbracket$

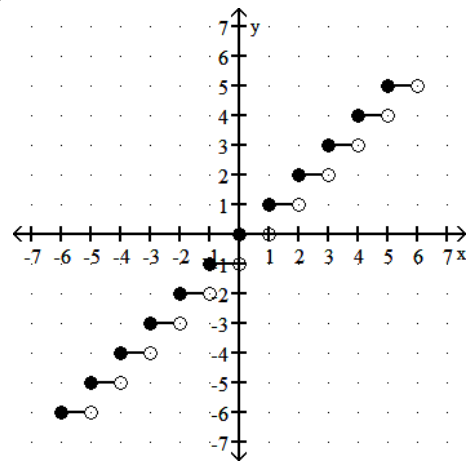
125) _____



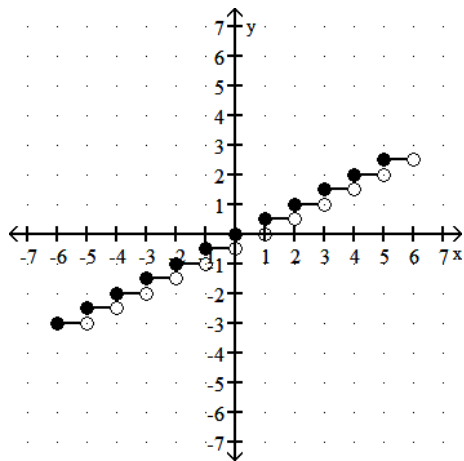
A)



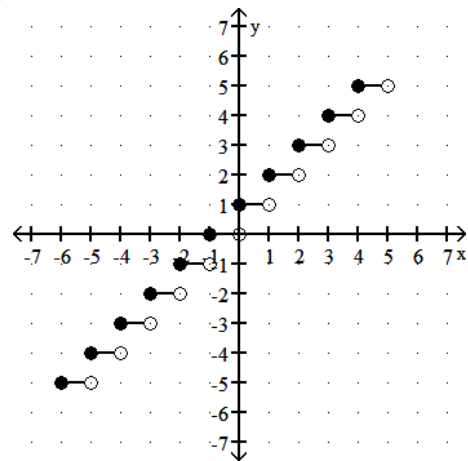
B)



C)



D)



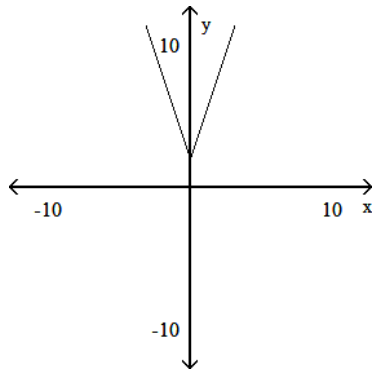
Answer: C

Explanation: A)
B)
C)
D)

Determine if the graph is symmetric with respect to x-axis, y-axis, and/or the origin.

126)

126) _____



A) y-axis

B) Origin

C) x-axis

D) x-axis, origin

Answer: A

Explanation: A)
B)
C)
D)

Solve.

127) Elissa wants to set up a rectangular dog run in her backyard. She has 36 feet of fencing to work with and wants to use it all. If the dog run is to be x feet long, express the area of the dog run as a function of x .

127) _____

A) $A(x) = 17x - x^2$

B) $A(x) = 18x - x^2$

C) $A(x) = 19x - x^2$

D) $A(x) = 20x^2 - x$

Answer: B

Explanation: A)
B)
C)
D)

128) At Allied Electronics, production has begun on the X-15 Computer Chip. The total cost function is given by $C(x) = 7x + 14$ and the total profit function is given by $P(x) = -0.3x^2 + 51x - 14$, where x represents the number of boxes of computer chips produced. The total revenue function, $R(x)$, is such that $R(x) = C(x) + P(x)$. Find $R(x)$.

128) _____

A) $R(x) = 58x + 0.3x^2$

B) $R(x) = 58x - 0.3x^2$

C) $R(x) = 57x - 0.6x^2$

D) $R(x) = 60x - 0.3x^2$

Answer: B

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

129) $f(x) = x - 4$, $g(x) = -4x^2 + 16x - 4$

129) _____

Find $(fg)(3)$.

- A) -53 B) -8 C) -280 D) 56

Answer: B

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

130) $f(x) = 3x - 2$, $g(x) = \frac{3}{x+7}$

130) _____

Find the domain of $f + g$.

- A) $(-\infty, -3)$ or $(-3, \infty)$ B) $(-\infty, \infty)$
C) $(0, \infty)$ D) $(-\infty, -7)$ or $(-7, \infty)$

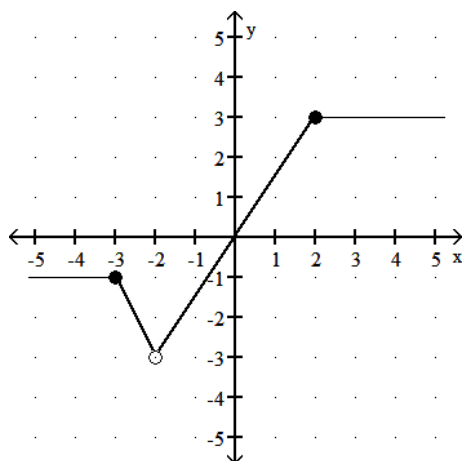
Answer: D

Explanation: A)
B)
C)
D)

Determine the domain and range of the function.

131)

131) _____



- A) domain: $(-\infty, \infty)$; range: $[-3, 3]$ B) domain: $(-3, 3]$; range: $(-\infty, \infty)$
C) domain: $(-\infty, \infty)$; range: $(-3, 3]$ D) domain: $(-\infty, \infty)$; range: $[-3, 3]$

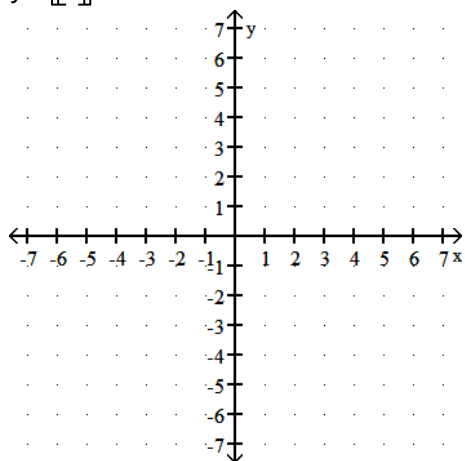
Answer: C

Explanation: A)
B)
C)
D)

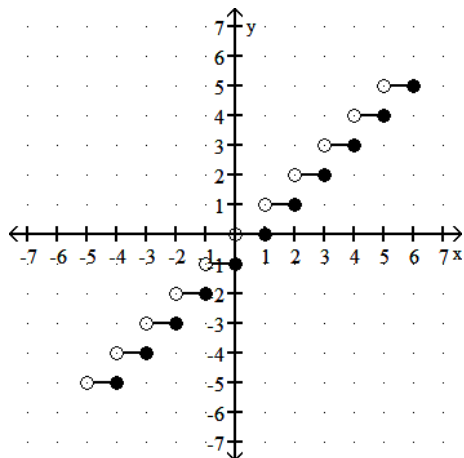
Graph the equation.

132) $y = \lceil x \rceil$

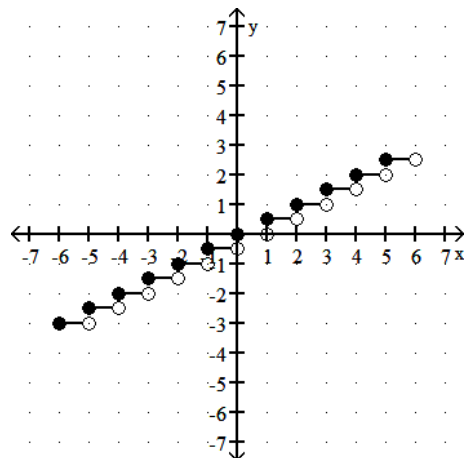
132) _____



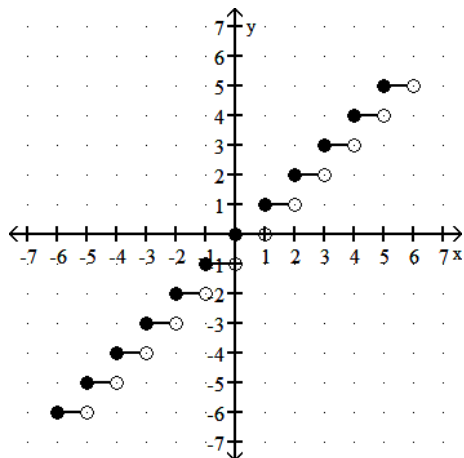
A)



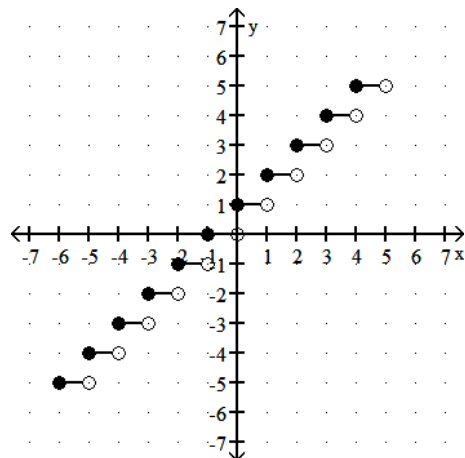
B)



C)



D)



Answer: C

Explanation: A)
B)
C)
D)

Answer the question.

133) How can the graph of $h(x) = 0.1\sqrt[3]{-x}$ be obtained from the graph of $y = \sqrt[3]{x}$?

133) _____

- A) Reflect it across the y-axis. Stretch it vertically by a factor of 1.
- B) Reflect it across the x-axis. Stretch it vertically by a factor of 1.
- C) Reflect it across the x-axis. Shrink it vertically by a factor of 0.1.
- D) Reflect it across the y-axis. Shrink it vertically by a factor of 0.1.

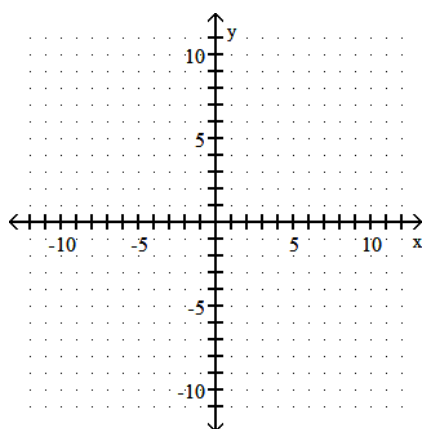
Answer: D

Explanation: A)
B)
C)
D)

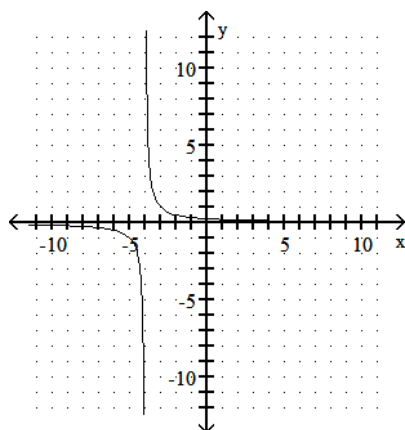
Graph the function.

134) $f(x) = \frac{1}{x-4}$

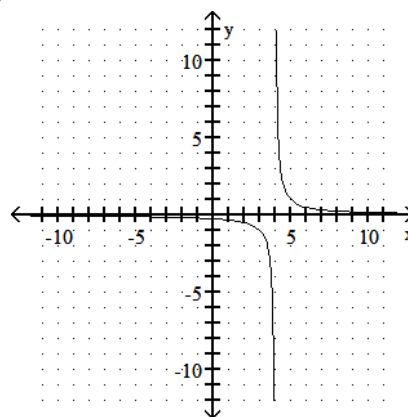
134) _____



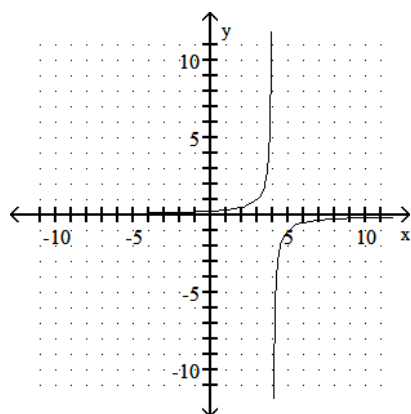
A)



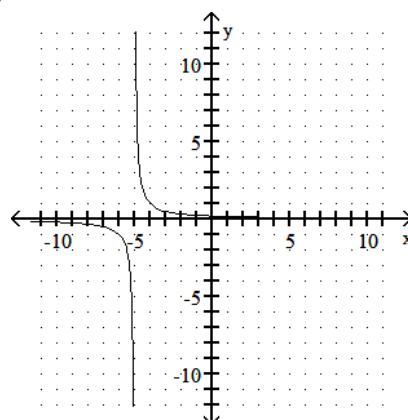
B)



C)



D)



Answer: B

Explanation: A)

B)

C)

D)

Answer the question.

135) How can the graph of $f(x) = \frac{1}{4}\sqrt[3]{x} - 2$ be obtained from the graph of $y = \sqrt[3]{x}$?

135) _____

A) Shrink it vertically by a factor of $\frac{1}{4}$. Shift it vertically 2 units downward.

B) Shrink it vertically by a factor of $\frac{1}{4}$. Shift it horizontally 2 units to the left.

C) Shrink it vertically by a factor of $\frac{1}{4}$. Shift it horizontally 2 units to the right.

D) Stretch it vertically by a factor of 4. Shift it vertically 2 units downward.

Answer: A

Explanation: A)

B)

C)

D)

Solve.

136) A rectangle that is x feet wide is inscribed in a circle of radius 21 feet. Express the area of the rectangle as a function of x .

136) _____

A) $A(x) = x^2\sqrt{882 - x^2}$

B) $A(x) = x\sqrt{1323 - x}$

C) $A(x) = x\sqrt{1764 - x^2}$

D) $A(x) = x(1764 - x^2)$

Answer: C

Explanation: A)

B)

C)

D)

The given point is on the graph of $y = f(x)$. Find a point on the graph of $y = g(x)$.

137) $g(x) = 3f(x)$; $(2, 4)$

A) $(5, 2)$

B) $(2, 6)$

C) $(6, 4)$

D) $(2, 12)$

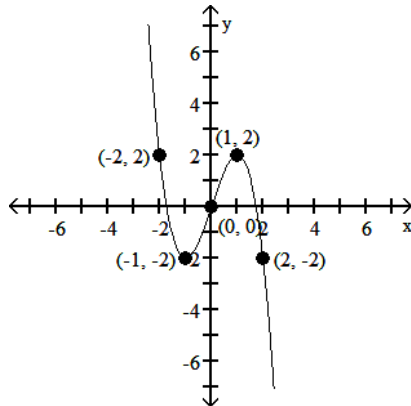
137) _____

Answer: D

Explanation: A)
B)
C)
D)

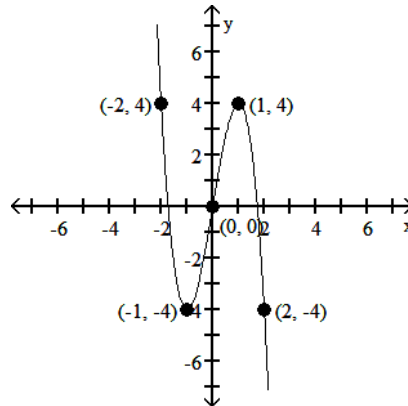
Given the graph of the function $f(x) = -x^3 + 3x$; find a formula for $g(x)$.

138) $f(x) = -x^3 + 3x$



$g(x) =$

138) _____



A) $g(x) = -x^3 + 3x + 2$

B) $g(x) = \frac{1}{2}(-x^3 + 3x)$

C) $g(x) = 2(-x^3 + 3x)$

D) $g(x) = -(x + 2)^3 + 3(x + 2)$

Answer: C

Explanation: A)
B)
C)
D)

Solve.

139) The time T necessary to make an enlargement of a photo negative varies directly as the area A of the enlargement. If 315 seconds are required to make a 5-by-7 enlargement, find the time required for a 6-by-10 enlargement.

A) 480 sec

B) 660 sec

C) 600 sec

D) 540 sec

139) _____

Answer: D

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

140) $f(x) = 2x - 5$, $g(x) = \sqrt{x + 6}$

140) _____

Find the domain of f/g .

A) $[6, \infty)$

B) $(-6, 6)$

C) $[0, \infty)$

D) $(-6, \infty)$

Answer: D

Explanation: A)
B)
C)
D)

Find the requested function value.

141) $f(x) = \frac{x - 7}{6}$, $g(x) = 5x + 4$

141) _____

Find $(g \circ f)(-17)$.

A) -16

B) -36

C) 324

D) $-\frac{44}{3}$

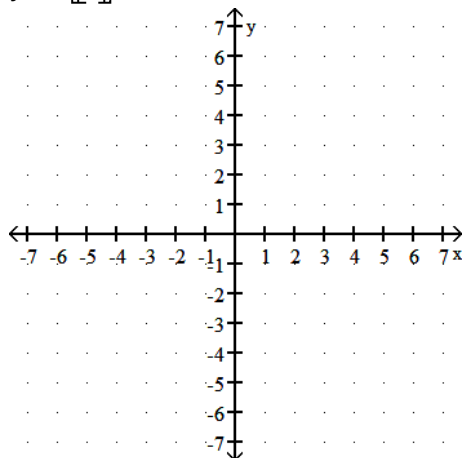
Answer: A

Explanation: A)
B)
C)
D)

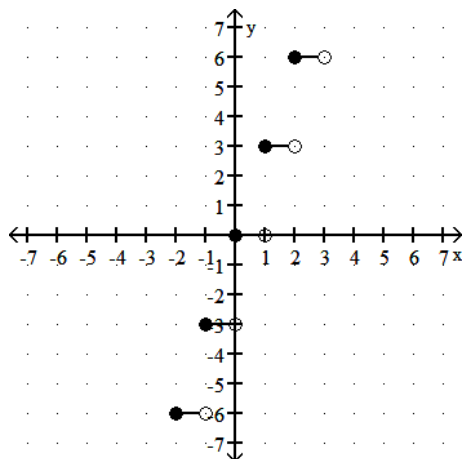
Graph the equation.

142) $y = 2 \llbracket x \rrbracket$

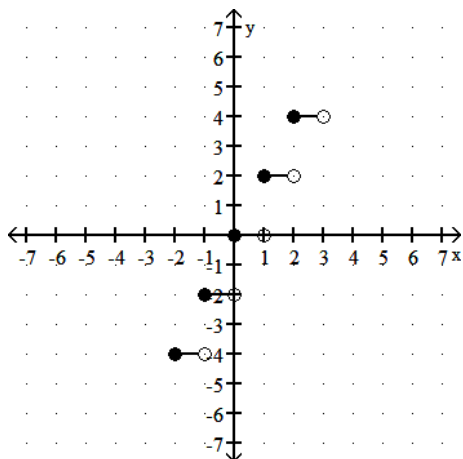
142) _____



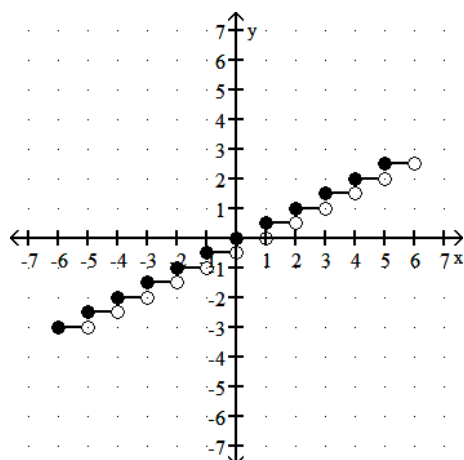
A)



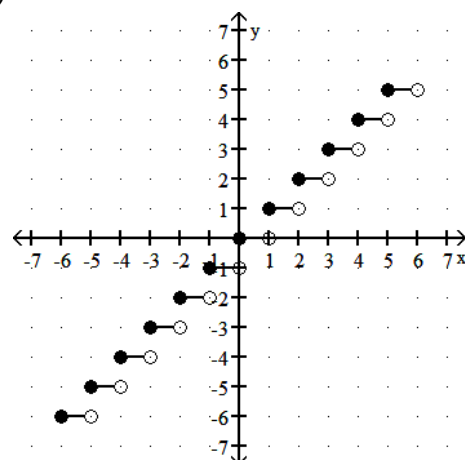
B)



C)



D)



Answer: B

Explanation: A)
B)
C)
D)

Write an equation for a function that has a graph with the given characteristics.

143) The shape of $y = x^3$ is shifted 8.1 units to the right and then vertically shrunk by a factor of 0.4.

143) _____

A) $f(x) = 0.4(x - 8.1)^3$

B) $f(x) = 8.1(x - 0.4)^3$

C) $f(x) = 0.4(x + 8.1)^3$

D) $f(x) = 0.4x^3 + 8.1$

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

144) $f(x) = 2x - 5$, $g(x) = \sqrt{x + 5}$

144) _____

Find the domain of $g \circ f$.

A) $[-\infty, 0)$

B) $[5, \infty)$

C) $[0, \infty)$

D) $(-5, 5)$

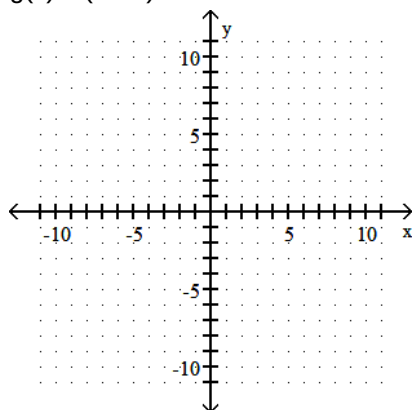
Answer: C

Explanation: A)
B)
C)
D)

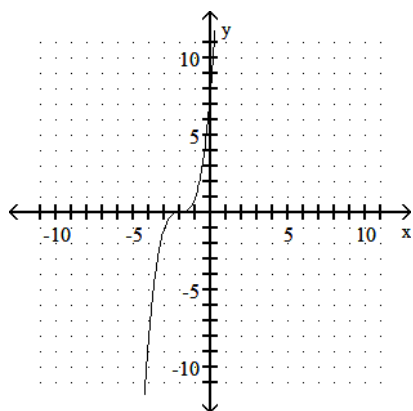
Graph the function.

145) $g(x) = (x + 2)^3$

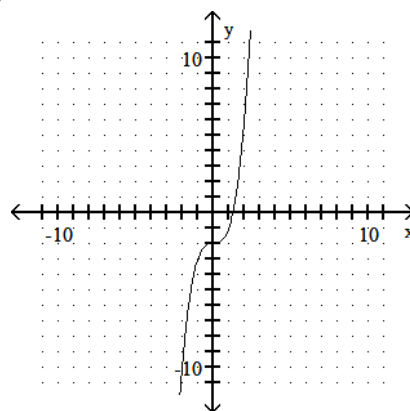
145) _____



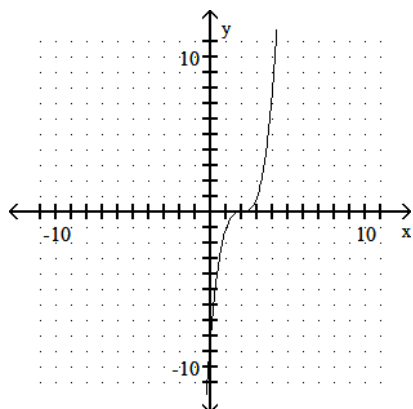
A)



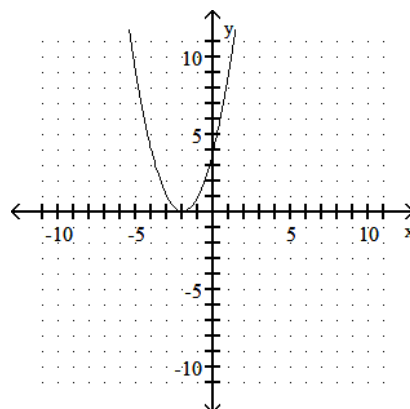
B)



C)



D)



Answer: A

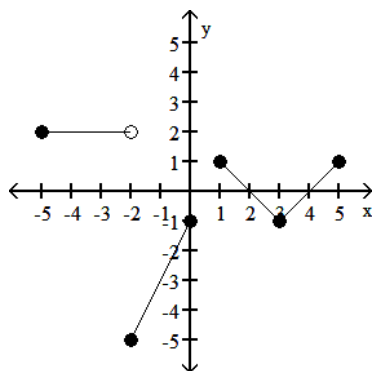
Explanation:

- A)
- B)
- C)
- D)

Determine the intervals on which the function is increasing, decreasing, and constant.

146)

146) _____



- A) Increasing on $(-2, 0)$ and $(3, 4)$; Decreasing on $(-5, -2)$ and $(1, 3)$
- B) Increasing on $(-2, 0)$ and $(3, 5)$; Decreasing on $(1, 3)$; Constant on $(-5, -2)$
- C) Increasing on $(-1, 0)$ and $(3, 5)$; Decreasing on $(0, 3)$; Constant on $(-5, -3)$
- D) Increasing on $(1, 3)$; Decreasing on $(-2, 0)$ and $(3, 5)$; Constant on $(2, 5)$

Answer: B

Explanation: A)
B)
C)
D)

Determine algebraically whether the graph is symmetric with respect to the x-axis, the y-axis, and the origin.

147) $18x = |y|$

147) _____

- A) x-axis only
- B) Origin only
- C) x-axis, y-axis, origin
- D) y-axis only

Answer: A

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

148) p varies directly as q , and $p = 1$ when $q = \frac{1}{3}$.

148) _____

- A) $p = \frac{1}{3}q$
- B) $p = 4q$
- C) $p = 3q$
- D) $p = 2q$

Answer: C

Explanation: A)
B)
C)
D)

149) y varies jointly as x and p and inversely as the square of s , and $y = \frac{1}{2}$ when $x = 1$, $p = 1$, and $s = 2$.

149) _____

A) $y = \frac{4x^2p}{s^2}$

B) $y = \frac{2xp}{s^2}$

C) $y = \frac{6xp^2}{s}$

D) $y = 7xps^2$

Answer: B

Explanation: A)
B)
C)
D)

Answer the question.

150) How can the graph of $f(x) = \frac{7}{x} + 4$ be obtained from the graph of $y = \frac{1}{x}$?

150) _____

A) Shrink it vertically a factor of $\frac{1}{7}$. Shift it 4 units up.

B) Shift it horizontally 7 units to the left. Shift it 4 units down.

C) Shift it horizontally 7 units to the right. Shift it 4 units up.

D) Stretch it vertically by a factor of 7. Shift it 4 units up.

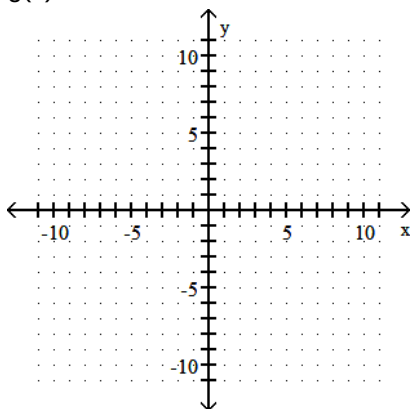
Answer: D

Explanation: A)
B)
C)
D)

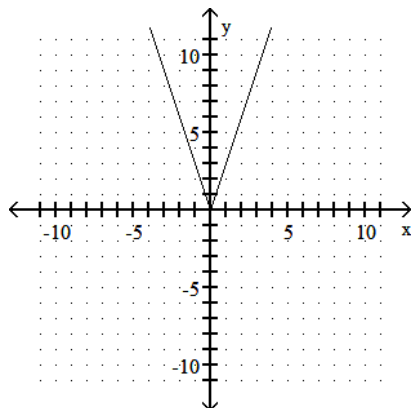
Graph the function.

151) $g(x) = -3|x|$

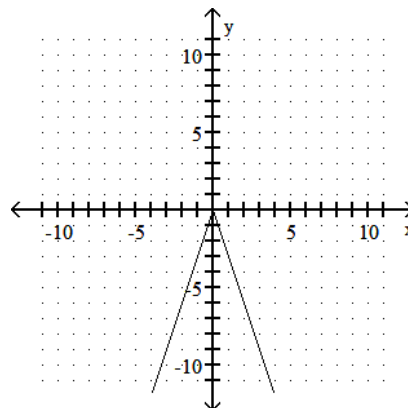
151) _____



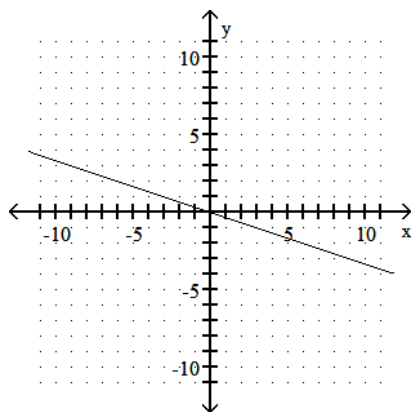
A)



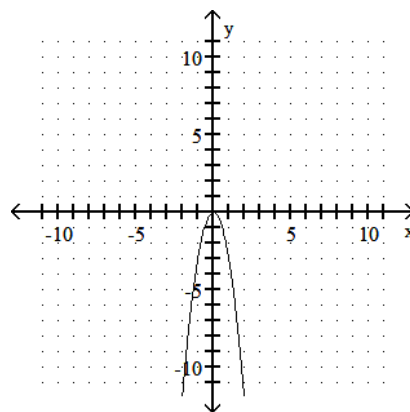
B)



C)



D)

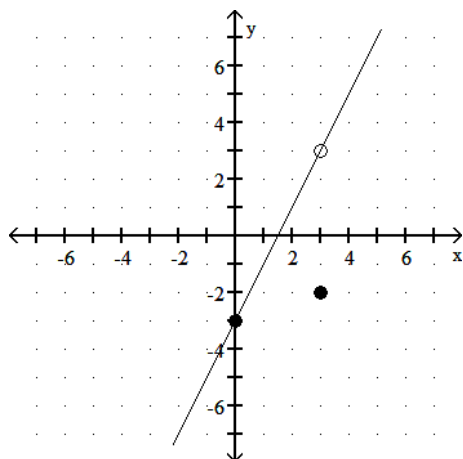


Answer: B

Explanation: A)
B)
C)
D)

Write an equation for the piecewise function.

152)



A) $f(x) = \begin{cases} 2x - 3, & \text{for } x \neq 3, \\ -3, & \text{for } x = 3 \end{cases}$
C) $f(x) = \begin{cases} 2x - 3, & \text{for } x \neq 3, \\ -2, & \text{for } x = 3 \end{cases}$

Answer: C

Explanation: A)
B)
C)
D)

B) $f(x) = \begin{cases} x - 3, & \text{for } x \neq 3, \\ -2, & \text{for } x = 3 \end{cases}$
D) $f(x) = \begin{cases} 2x - 3, & \text{for } x < 3, \\ 2x + 3, & \text{for } x \geq 3 \end{cases}$

152) _____

Find an equation of variation for the given situation.

153) y varies inversely as x and $y = 6$ when $x = \frac{1}{3}$

153) _____

A) $y = \frac{-1}{x}$

B) $y = \frac{5}{x}$

C) $y = \frac{2}{x}$

D) $y = \frac{3}{x}$

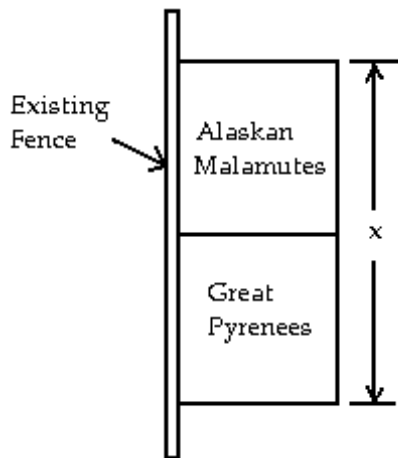
Answer: C

Explanation: A)
B)
C)
D)

Solve.

154) Elissa sells two breeds of dogs, Alaskan Malamutes and Great Pyrenees. She has 108 feet of fencing to enclose two adjacent rectangular dog kennels, one for each breed. An existing fence is to form one side of the kennels, as in the drawing below. Suppose the total length of the two kennels is x feet. Express the total area of the two kennels as a function of x . Graph the function and from the graph determine the value of x that will yield the maximum area.

154) _____



A) $54\frac{1}{2}$ feet

B) 54 feet

C) 56 feet

D) 53 feet

Answer: B

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

155) $f(x) = x^2 - 36$, $g(x) = 2x + 3$

155) _____

Find the domain of $g \circ f$.

A) $\left[-\infty, -\frac{3}{2}\right] \cup \left[-\frac{3}{2}, \infty\right)$

B) $\left[-\frac{3}{2}, \infty\right)$

C) $(-6, 6)$

D) $(-\infty, \infty)$

Answer: D

Explanation: A)
B)
C)
D)

Find the requested function value.

156) $f(x) = 8x - 2$, $g(x) = -3x^2 - 5x - 4$

156) _____

Find $(g \circ f)(-9)$.

A) -16,062

B) -1618

C) 542

D) 588

Answer: A

Explanation: A)
B)
C)
D)

Find $f(x)$ and $g(x)$ such that $h(x) = (f \circ g)(x)$.

157) $h(x) = \sqrt{\frac{x+2}{x-1}}$

157) _____

A) $f(x) = \frac{x+2}{x-1}$, $g(x) = \sqrt{x}$

B) $f(x) = \sqrt{\frac{1}{x-1}}$, $g(x) = x+2$

C) $f(x) = \sqrt{x+2}$, $g(x) = \frac{1}{x-1}$

D) $f(x) = \sqrt{x}$, $g(x) = \frac{x+2}{x-1}$

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

158) The current I in an electrical conductor varies inversely as the resistance R of the conductor. The current is 7 amperes when the resistance is 765 ohms. What is the current when the resistance is 777 ohms?

158) _____

A) 0.15 amp

B) 0.14 amp

C) 6.9 amp

D) 7.1 amp

Answer: C

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

159) y varies inversely as the square of x, and y = 0.19 when x = 0.8

159) _____

A) $y = \frac{0.1216}{x^2}$

B) $y = .57x^2$

C) $y = \frac{0.152}{x}$

D) $y = \frac{0.152}{x^2}$

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

160) $f(x) = \frac{1}{x-2}$, $g(x) = \frac{1}{5+x}$

160) _____

Find $(f/g)(x)$.

A) $\frac{5+x}{1(x-2)}$

B) $\frac{1}{(x-2)(5+x)}$

C) $\frac{x-2}{1(5+x)}$

D) $\frac{1(5+x)}{x-2}$

Answer: D

Explanation: A)
B)
C)
D)

Determine algebraically whether the function is even, odd, or neither even nor odd.

161) $f(x) = -8$

161) _____

A) Even

B) Odd

C) Neither

Answer: A

Explanation: A)
B)
C)

Determine algebraically whether the graph is symmetric with respect to the x-axis, the y-axis, and the origin.

162) $y = (x-7)(x+7)$

162) _____

A) Origin only

B) x-axis, y-axis, origin

C) x-axis only

D) y-axis only

Answer: D

Explanation: A)
B)
C)
D)

Answer the question.

163) How can the graph of $f(x) = 0.4|-x| - 9$ be obtained from the graph of $y = |x|$?

163) _____

- A) Reflect it across the x-axis. Stretch it vertically by a factor of 4. Shift it horizontally 9 units to the right.
- B) Reflect it across the y-axis. Shrink it vertically by a factor of 0.4. Shift it vertically 9 units upward.
- C) Reflect it across the x-axis. Stretch it horizontally by a factor of 9. Shift it horizontally 4 units to the left.
- D) Reflect it across the y-axis. Shrink it vertically by a factor of 0.4. Shift it vertically 9 units downward.

Answer: D

Explanation: A)
B)
C)
D)

Solve.

164) Bob wants to fence in a rectangular garden in his yard. He has 74 feet of fencing to work with and wants to use it all. If the garden is to be x feet wide, express the area of the garden as a function of x .

164) _____

- A) $A(x) = 39x^2 - x$ B) $A(x) = 38x - x^2$ C) $A(x) = 36x - x^2$ D) $A(x) = 37x - x^2$

Answer: D

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

165) $f(x) = x^2 - 9$, $g(x) = 2x + 3$

165) _____

Find the domain of $f - g$.

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

Answer: A

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

166) y varies inversely as x , and $y = 20$ when $x = 6$

166) _____

- A) $y = 120x$ B) $y = \frac{1}{120x}$ C) $y = \frac{x}{120}$ D) $y = \frac{120}{x}$

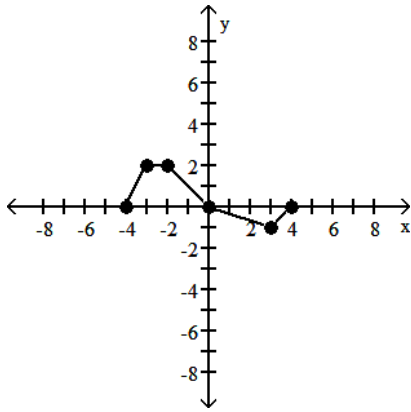
Answer: D

Explanation: A)
B)
C)
D)

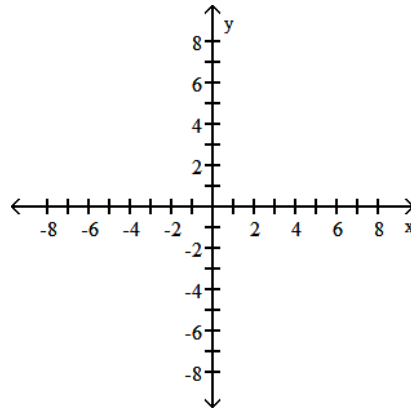
A graph of $y = f(x)$ follows. No formula for f is given. Graph the given equation.

167) $y = f\left(-\frac{1}{2}x\right)$

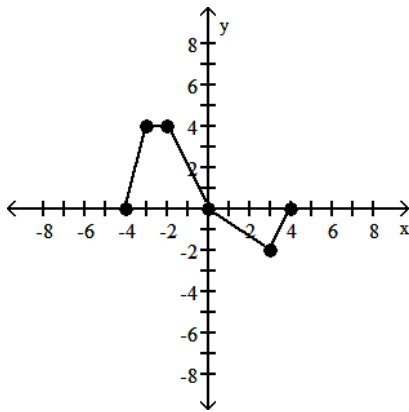
167) _____



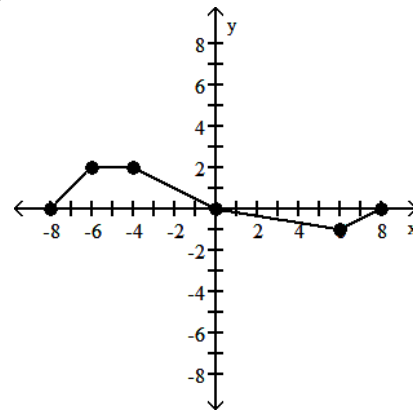
A)



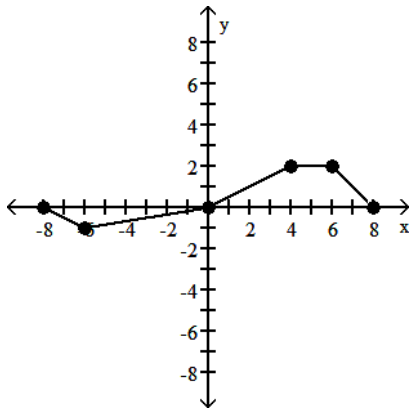
B)



C)

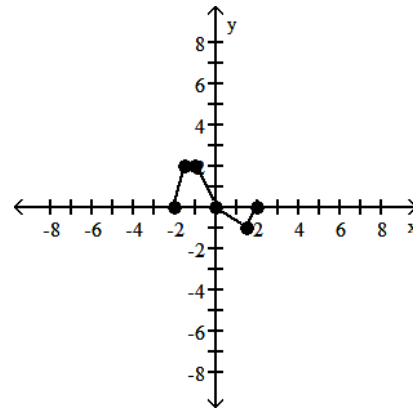


D)



Answer: C

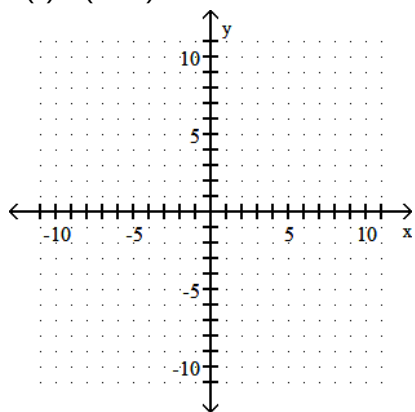
Explanation: A)
B)
C)
D)



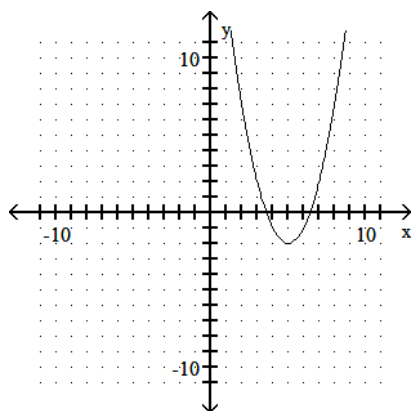
Graph the function.

168) $h(x) = (x - 5)^2 - 2$

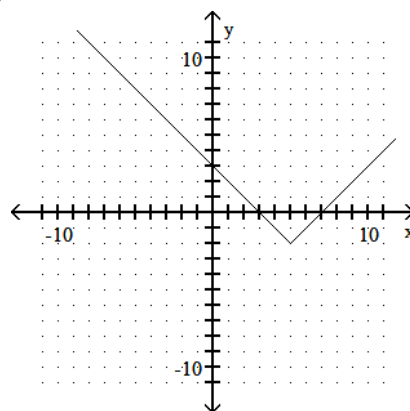
168) _____



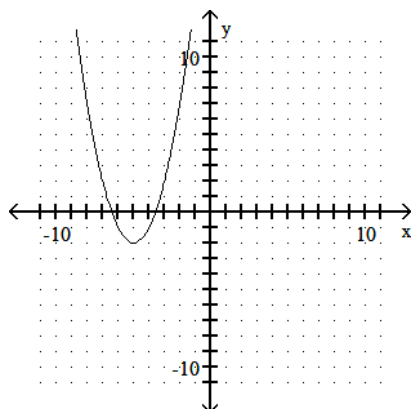
A)



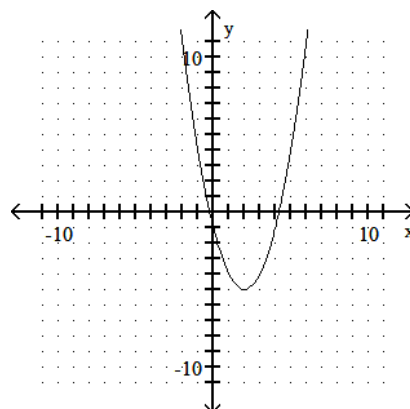
B)



C)



D)



Answer: A

Explanation: A)
B)
C)
D)

Determine algebraically whether the graph is symmetric with respect to the x-axis, the y-axis, and the origin.

169) $y = 5x^2 - 5$

169) _____

- A) x-axis, y-axis, origin
C) x-axis only

- B) y-axis only
D) Origin only

Answer: B

Explanation: A)
B)
C)
D)

For the piecewise function, find the specified function value.

170) $f(x) = \begin{cases} 6x + 1, & \text{for } x < 1, \\ 3x, & \text{for } 3 \leq x \leq 7, \\ 3 - 5x, & \text{for } x > 7 \end{cases}$

170) _____

f(3)

A) 9

B) 36

C) 7

D) -12

Answer: A

Explanation: A)
B)
C)
D)

For the function f, construct and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$.

171) $f(x) = 6x^2 + 3x$

171) _____

A) $12x^2 + 6h + 3x$

B) $18x - 8h + 6$

C) $12x + 6h + 3$

D) $12x + 3$

Answer: C

Explanation: A)
B)
C)
D)

Solve.

172) Acme Communication finds that the total revenue function associated with producing a new type of cellular phone is $R(x) = 206x - x^2$, and the total cost function is $C(x) = 6000 + 8x$, where x represents the number of units of cellular phones produced. Find the total profit function, P(x).

172) _____

A) $P(x) = -x^2 + 198x - 6000$

B) $P(x) = -2x^2 + 220x - 7000$

C) $P(x) = -x^2 + 214x + 6000$

D) $P(x) = x^4 - 198x^2 + 6000$

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated composition.

173) $f(x) = x^3 - 6x^2 + 2x + 6$, $g(x) = x - 1$

173) _____

Find $(f \circ g)(x)$.

A) $x^3 - 6x^2 + 2x + 5$

B) $x^3 - 3x^2 - 7x + 3$

C) $x^3 - 9x^2 + 17x - 3$

D) $x^3 - 6x^2 + 2x + 7$

Answer: C

Explanation: A)

B)

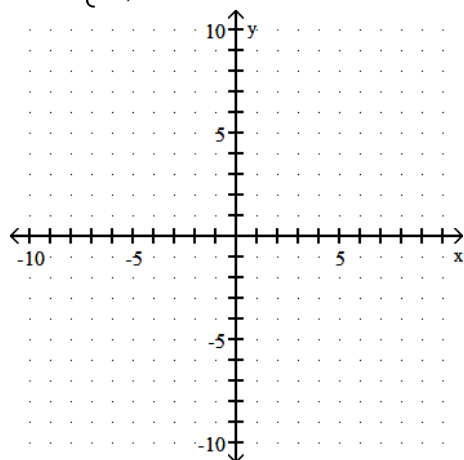
C)

D)

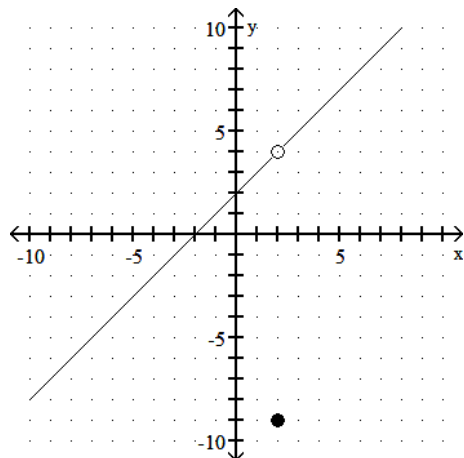
Graph the function.

174) $f(x) = \begin{cases} \frac{x^2 - 4}{x - 2}, & \text{for } x \neq 2, \\ -9, & \text{for } x = 2 \end{cases}$

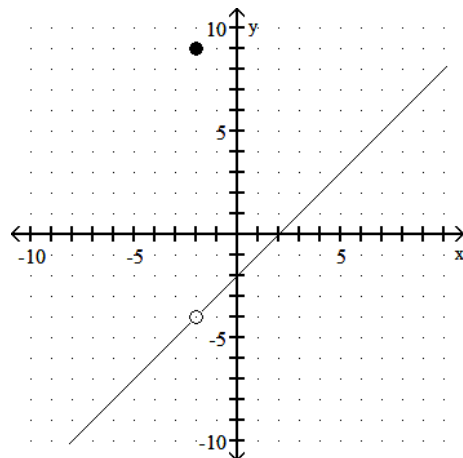
174) _____



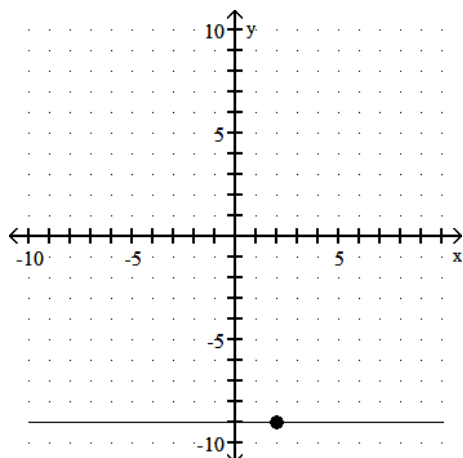
A)



B)



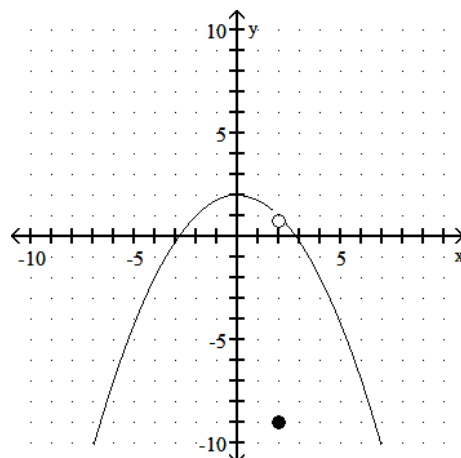
C)



Answer: A

Explanation: A)
B)
C)
D)

D)



Find an equation of variation for the given situation.

175) y varies inversely as x , and $y = 8$ when $x = 18$

- A) $y = 144x$ B) $y = \frac{144}{x}$ C) $y = \frac{1}{144x}$ D) $y = \frac{x}{144}$

175) _____

Answer: B

Explanation: A)
B)
C)
D)

176) y varies jointly as x and z , and $y = 64.96$ when $x = 5.6$ and $z = 4$

- A) $y = 2.9xz$ B) $y = 0.29xz$ C) $y = 5.9xz$ D) $y = \frac{2.9}{xz}$

176) _____

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

177) A stone is thrown into a pond. A circular ripple is spreading over the pond in such a way that the radius is increasing at the rate of 2.6 feet per second. Find a function, $r(t)$, for the radius in terms of t . Find a function, $A(r)$, for the area of the ripple in terms of r . Find $(A \circ r)(t)$.

177) _____

- A) $(A \circ r)(t) = 6.76\pi t^2$ B) $(A \circ r)(t) = 6.76\pi^2 t$
C) $(A \circ r)(t) = 5.2\pi t^2$ D) $(A \circ r)(t) = 2.6\pi t^2$

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated composition.

178) $f(x) = \frac{6}{x-4}$, $g(x) = \frac{3}{4x}$

178) _____

Find $(f \circ g)(x)$.

A) $\frac{3x-12}{24x}$

B) $\frac{6x}{3-16x}$

C) $\frac{24x}{3+16x}$

D) $\frac{24x}{3-16x}$

Answer: D

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

179) $f(x) = \frac{2x}{x-6}$, $g(x) = \frac{5}{x+9}$

179) _____

Find the domain of $f + g$.

A) $(-\infty, \infty)$

B) $(-\infty, -5) \cup (-5, -2) \cup (-2, \infty)$

C) $(-\infty, -6) \cup (-6, 9) \cup (9, \infty)$

D) $(-\infty, -9) \cup (-9, 6) \cup (6, \infty)$

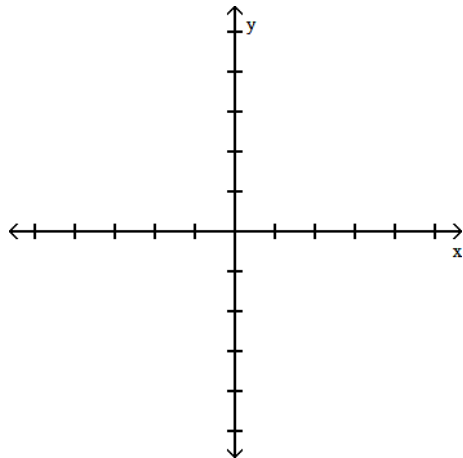
Answer: D

Explanation: A)
B)
C)
D)

Graph the function. Use the graph to find any relative maxima or minima.

180) $f(x) = -x^2 + 3$

180) _____



A) Relative minimum of 3 at $x = 0$

B) No relative extrema

C) Relative maximum of 3 at $x = 0$ and relative minimum at $x = 3$

D) Relative maximum of 3 at $x = 0$

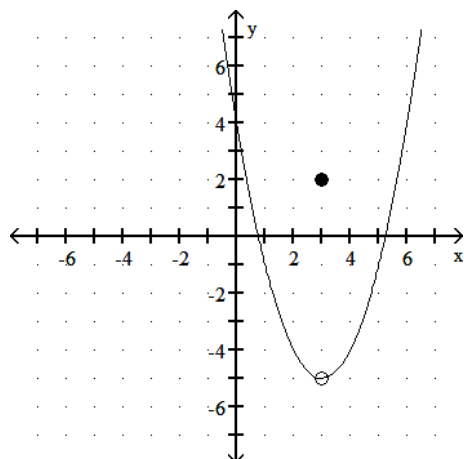
Answer: D

Explanation: A)
B)
C)
D)

Write an equation for the piecewise function.

181)

181) _____



A) $f(x) = \begin{cases} (x + 3)^2 - 5, & \text{for } x \neq 3, \\ 2, & \text{for } x = 3 \end{cases}$

B) $f(x) = \begin{cases} (x - 3)^2 - 5, & \text{for } x \neq 3, \\ 2, & \text{for } x = 3 \end{cases}$

C) $f(x) = \begin{cases} |x - 3| - 5, & \text{for } x \neq 3, \\ 2, & \text{for } x = 3 \end{cases}$

D) $f(x) = (x - 3)^2 - 5$

Answer: B

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

182) $f(x) = x^2 - 64$, $g(x) = 2x + 3$

182) _____

Find the domain of $f \circ g$.

A) $(-\infty, \infty)$

B) $(-8, 8)$

C) $[0, \infty)$

D) $[8, \infty)$

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

183) $f(x) = 4x - 7$, $g(x) = 9x - 5$

183) _____

Find $(f/g)(x)$.

A) $\frac{9x - 5}{4x - 7}$

B) $\frac{4x + 7}{9x + 5}$

C) $\frac{9x + 5}{4x + 7}$

D) $\frac{4x - 7}{9x - 5}$

Answer: D

Explanation: A)
B)
C)
D)

Answer the question.

184) How can the graph of $f(x) = -7x^3 + 8$ be obtained from the graph of $y = x^3$?

184) _____

- A) Stretch it horizontally by a factor of -7. Reflect it across the x-axis. Shift it vertically 8 units downward.
- B) Stretch it horizontally by a factor of 8. Reflect it across the x-axis. Shift it vertically 7 units upward.
- C) Stretch it vertically by a factor of 7. Reflect it across the x-axis. Shift it vertically 8 units upward.
- D) Stretch it vertically by a factor of 7. Reflect it across the y-axis. Shift it vertically 8 units upward.

Answer: C

Explanation: A)
B)
C)
D)

Find $f(x)$ and $g(x)$ such that $h(x) = (f \circ g)(x)$.

185) $h(x) = \sqrt{-16x^2 + 67}$

185) _____

A) $f(x) = \sqrt{x}$, $g(x) = -16x^2 + 67$

B) $f(x) = \sqrt{-16x + 67}$, $g(x) = x^2$

C) $f(x) = -16x^2 + 67$, $g(x) = \sqrt{x}$

D) $f(x) = \sqrt{-16x^2}$, $g(x) = \sqrt{67}$

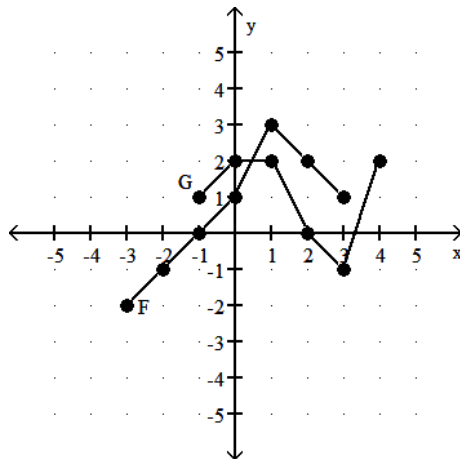
Answer: A

Explanation: A)
B)
C)
D)

Consider the functions F and G as shown in the graph. Provide an appropriate response.

186) Find the domain of F/G .

186) _____



A) $[-3, -1) \cup (-1, 4)$

B) $[-1, 2) \cup (2, 3]$

C) $[-1, 3]$

D) $[-3, 4]$

Answer: B

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

187) y varies directly as z, and y = 23 when z = 161.

187) _____

A) $y = \frac{1}{7}z$

B) $y = 7z$

C) $y = -\frac{1}{2}z$

D) $y = -2z$

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated composition.

188) $f(x) = \frac{9}{2}x$, $g(x) = -\frac{2}{9}x$

188) _____

Find $(f \circ g)(x)$.

A) 1

B) 0

C) -x

D) x

Answer: C

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

189) $f(x) = 4x - 5$, $g(x) = 3x^2 + 14x + 2$

189) _____

Find $(f/g)(-4)$.

A) $-\frac{1}{2}$

B) $\frac{7}{2}$

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

D) $\frac{3}{11}$

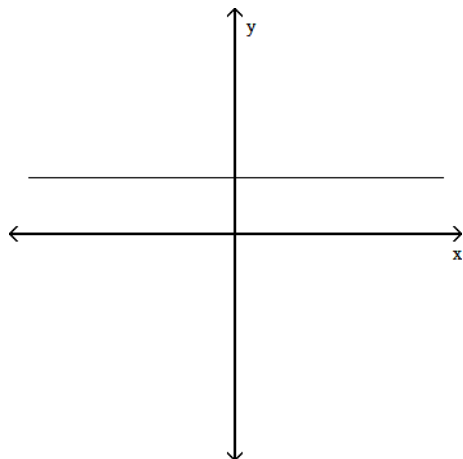
Answer: B

Explanation: A)
B)
C)
D)

Determine whether the given function is even, odd, or neither even nor odd.

190)

190) _____



A) Even

B) Neither

C) Odd

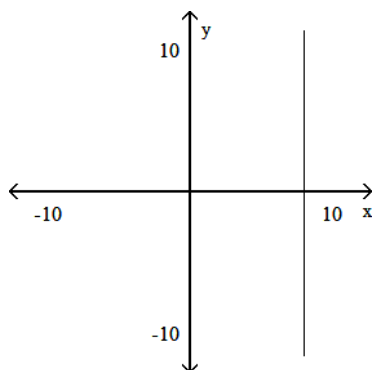
Answer: A

Explanation: A)
B)
C)

Determine if the graph is symmetric with respect to x-axis, y-axis, and/or the origin.

191)

191) _____



A) no symmetry

B) x-axis, y-axis

C) x-axis

D) y-axis

Answer: C

Explanation: A)
B)
C)
D)

For the piecewise function, find the specified function value.

$$192) f(x) = \begin{cases} x - 5, & \text{for } x < 5, \\ 7 - x, & \text{for } x \geq 5 \end{cases}$$

192) _____

f(0)

A) -5

B) 2

C) 0

D) 7

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

193) For $f(x) = \sqrt{x - 6}$ and $g(x) = \frac{1}{x - 8}$

193) _____

Find the domain of fg .

A) $(6, 8) \cup (8, \infty)$

B) $[6, 8) \cup (8, \infty)$

C) $[0, 8) \cup (8, \infty)$

D) $[6, \infty)$

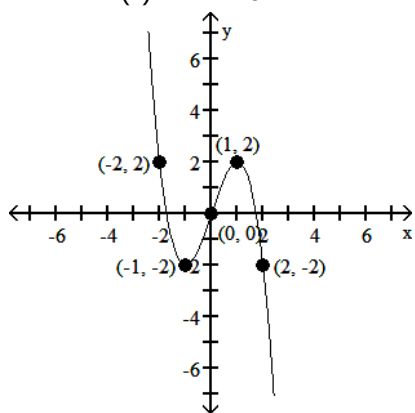
Answer: B

Explanation: A)
B)
C)
D)

Given the graph of the function $f(x) = -x^3 + 3x$; find a formula for $g(x)$.

194)

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



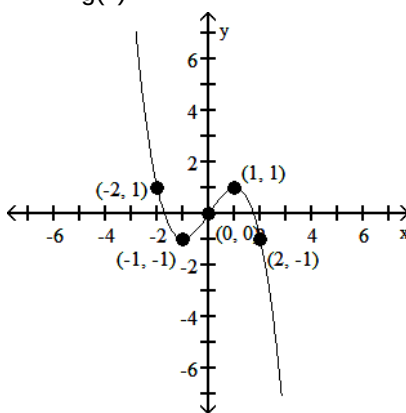
A) $g(x) = -x^3 + 3x - \frac{1}{2}$

C) $g(x) = \frac{1}{2}(-x^3 + 3x)$

Answer: C

Explanation: A)
B)
C)
D)

$g(x) =$



B) $g(x) = -x^3 + 3x + \frac{1}{2}$

D) $g(x) = 2(-x^3 + 3x)$

194) _____

For the pair of functions, find the indicated sum, difference, product, or quotient.

195) $f(x) = -2x^2 + 7$, $g(x) = x - 4$

195) _____

Find $(f - g)(-3)$.

A) -12

B) -10

C) -4

D) 14

Answer: C

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

196) y varies inversely as the square of x , and $y = 7$ when $x = 4$

196) _____

A) $y = 28x$

B) $y = \frac{112}{x^2}$

C) $y = 28x^2$

D) $y = \frac{110}{x^2}$

Answer: B

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated composition.

197) $f(x) = -3x + 6$, $g(x) = 5x + 7$

197) _____

Find $(g \circ f)(x)$.

A) $15x + 37$

B) $-15x - 23$

C) $-15x + 27$

D) $-15x + 37$

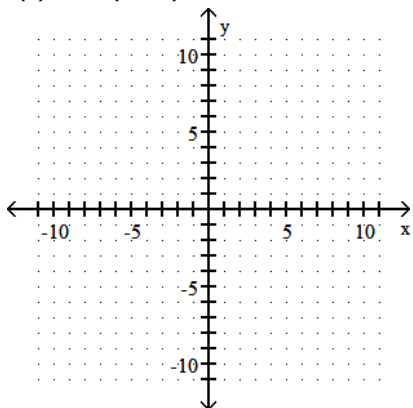
Answer: D

Explanation: A)
B)
C)
D)

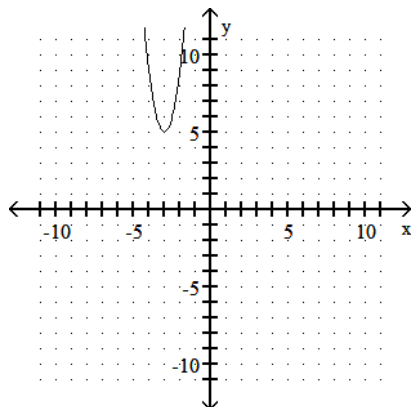
Graph the function.

198) $f(x) = -4(x + 5)^2 + 3$

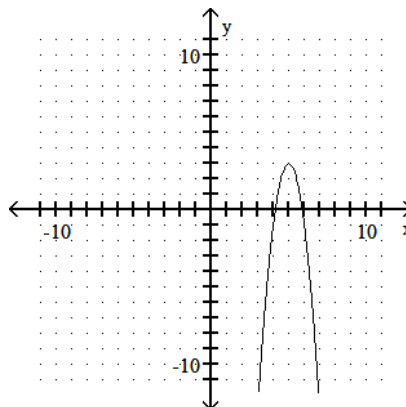
198) _____



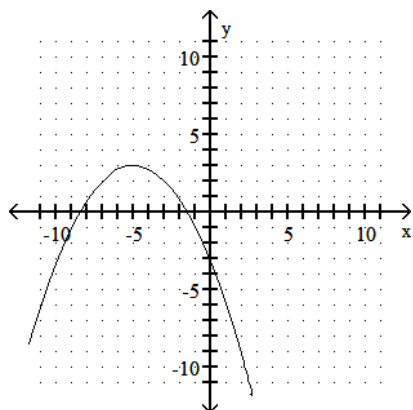
A)



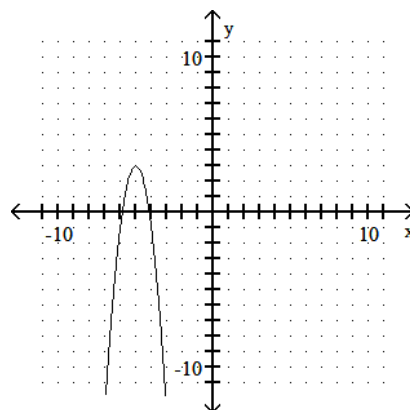
B)



C)



D)



Answer: D

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

199) y varies directly as x , and $y = 0.7$ when $x = 0.4$.

A) $y = 0.3x$

B) $y = 1.1x$

C) $y = \frac{4}{7}x$

D) $y = \frac{7}{4}x$

199) _____

Answer: D

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

200) $f(x) = 8x - 2$, $g(x) = 5x - 9$

Find $(f - g)(x)$.

A) $3x + 7$

B) $13x - 11$

C) $3x - 11$

D) $-3x - 7$

200) _____

Answer: A

Explanation: A)
B)
C)
D)

201) $h(x) = x - 2$, $g(x) = \sqrt{x + 6}$

Find $(hg)(-1)$.

A) $-3\sqrt{5}$

B) does not exist

C) $1\sqrt{5}$

D) $-3 - \sqrt{5}$

201) _____

Answer: A

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

202) y varies jointly as x and w and inversely as z , and $y = \frac{39}{5}$ when $x = 2$, $w = 5$, and $z = 50$.

202) _____

A) $y = \frac{26z}{xw}$

B) $y = \frac{39xw}{z}$

C) $y = \frac{36xw}{z^2}$

D) $y = 34xwz$

Answer: B

Explanation: A)
B)
C)
D)

Solve.

203) At Allied Electronics, production has begun on the X-15 Computer Chip. The total revenue

203) _____

function is given by $R(x) = 47x - 0.3x^2$ and the total profit function is given by

$P(x) = -0.3x^2 + 37x - 10$, where x represents the number of boxes of computer chips produced. The total cost function, $C(x)$, is such that $C(x) = R(x) - P(x)$. Find $C(x)$.

A) $C(x) = 10x + 10$

B) $C(x) = 12x + 6$

C) $C(x) = -0.3x^2 + 20x + 10$

D) $C(x) = 11x + 15$

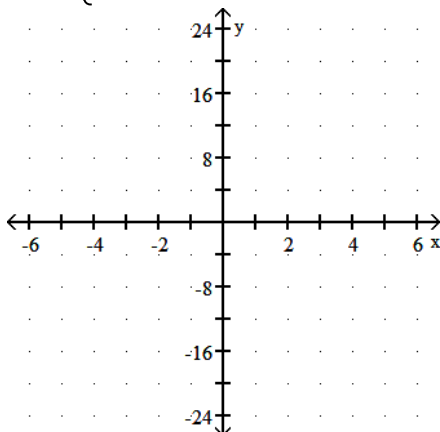
Answer: A

Explanation: A)
B)
C)
D)

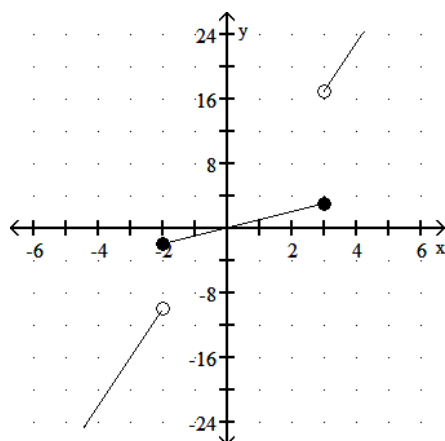
Graph the function.

204) $f(x) = \begin{cases} 5x + 2 & \text{for } x < -2 \\ x & \text{for } -2 \leq x \leq 3 \\ 4x - 1 & \text{for } x > 3 \end{cases}$

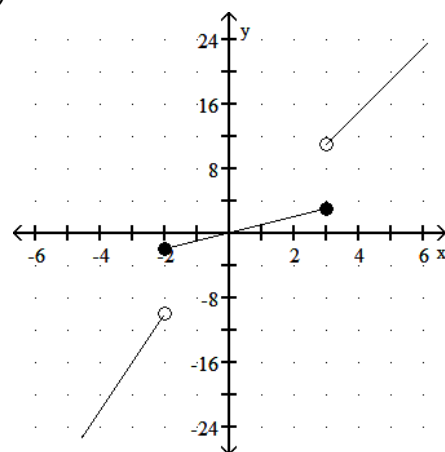
204) _____



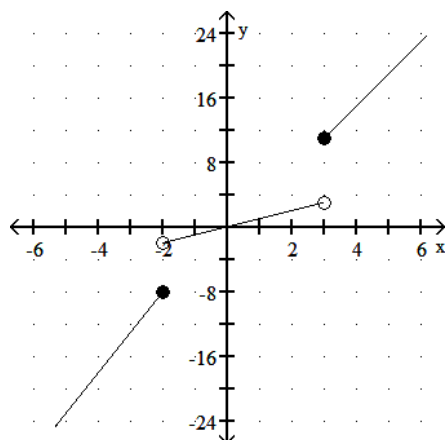
A)



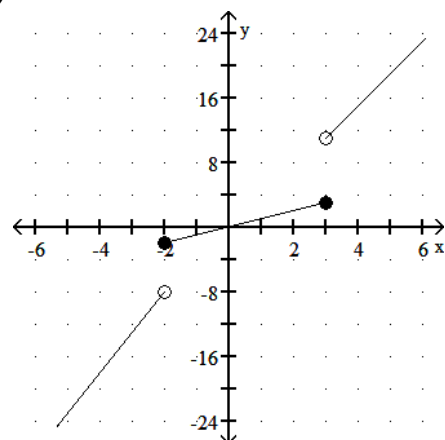
B)



C)



D)



Answer: D

Explanation: A)
B)
C)
D)

Find $f(x)$ and $g(x)$ such that $h(x) = (f \circ g)(x)$.

205) $h(x) = (7x + 15)^2$

A) $f(x) = 7x + 15$, $g(x) = x^2$

C) $f(x) = (7x)^2$, $g(x) = 15$

B) $f(x) = x^2$, $g(x) = 7x + 15$

D) $f(x) = 7x^2$, $g(x) = x + 15$

Answer: B

Explanation: A)
B)
C)
D)

205) _____

206) $h(x) = \frac{1}{x^2 - 7}$

206) _____

A) $f(x) = \frac{1}{7}, g(x) = x^2 - 7$

B) $f(x) = \frac{1}{x^2}, g(x) = x - 7$

C) $f(x) = \frac{1}{x}, g(x) = x^2 - 7$

D) $f(x) = \frac{1}{x^2}, g(x) = -\frac{1}{7}$

Answer: C

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

207) $f(x) = \frac{7}{x - 2}, g(x) = \frac{1}{3 + x}$

207) _____

Find $(fg)(x)$.

A) $\frac{49}{(x - 2)(3 + x)}$

B) $\frac{49}{x - 2^2}$

C) $\frac{7}{(x - 2)^2}$

D) $\frac{49}{(x - 2)^2}$

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

208) The number of miles per gallon of gasoline that a vehicle averages varies inversely as the average speed the car travels. A vehicle gets 17 miles per gallon at 60 mph. How many miles per gallon will it get at 44 mph?

208) _____

A) 0.08 mpg

B) 12.5 mpg

C) 0.04 mpg

D) 23.2 mpg

Answer: D

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

209) y varies inversely as x and y = 0.75 when x = 8

209) _____

A) $y = \frac{6}{x}$

B) $y = \frac{7}{x}$

C) $y = 6x$

D) $y = \frac{9}{x}$

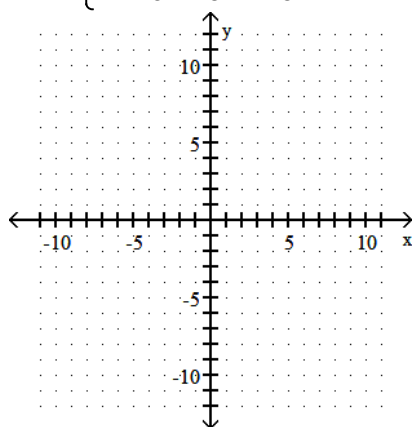
Answer: A

Explanation: A)
B)
C)
D)

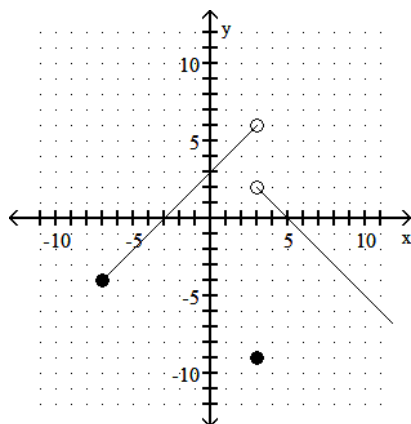
Graph the function.

$$210) f(x) = \begin{cases} x + 2 & \text{for } -7 \leq x < 3 \\ -9 & \text{for } x = 3 \\ -x + 5 & \text{for } x > 3 \end{cases}$$

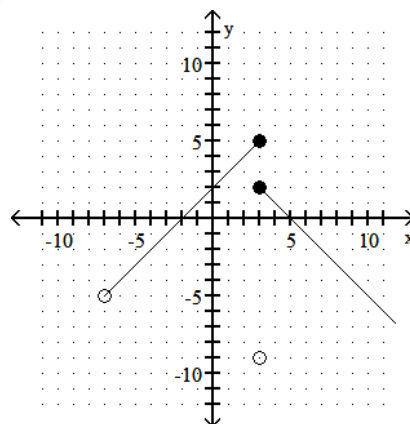
210) _____



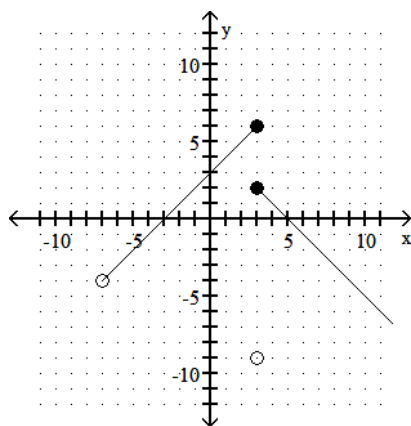
A)



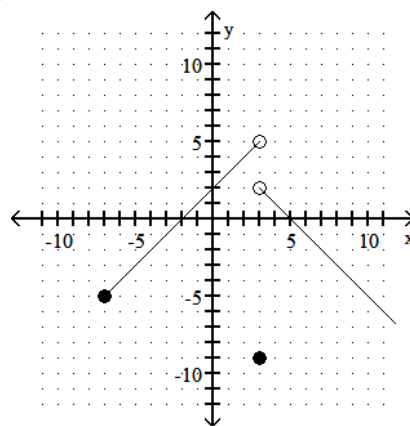
B)



C)



D)



Answer: D

Explanation: A)
B)
C)
D)

Find $f(x)$ and $g(x)$ such that $h(x) = (f \circ g)(x)$.

211) $h(x) = |6x + 2|$

A) $f(x) = x, g(x) = 6x + 2$

C) $f(x) = |x|, g(x) = 6x + 2$

B) $f(x) = -|x|, g(x) = 6x + 2$

D) $f(x) = |-x|, g(x) = 6x - 2$

211) _____

Answer: C

Explanation: A)
B)
C)
D)

Solve.

212) A rocket is shot straight up in the air from the ground at a rate of 67 feet per second. The rocket is tracked by a rangefinder that is 430 feet from the launch pad. Let d represent the distance from the rocket to the rangefinder and t represent the time, in seconds, since "blastoff". Express d as a function of t .

A) $d(t) = \sqrt{430^2 + (67t)^2}$

B) $d(t) = \sqrt{67^2 + (430t)^2}$

C) $d(t) = 430^2 + (67t)^2$

D) $d(t) = 430 + 67t^2$

212) _____

Answer: A

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

213) y varies jointly as x and the square of z and inversely as w , and $y = 108$ when $x = 8, z = 3$, and $w = 4$.

A) $y = \frac{18xz}{w}$

B) $y = \frac{6xz^2}{w}$

C) $y = \frac{6xz}{w}$

D) $y = \frac{18xz^2}{w}$

213) _____

Answer: B

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

214) $f(x) = x + 3, g(x) = \sqrt{x - 2}$

Find $(f - g)(-3)$.

A) does not exist

B) $\sqrt{5}$

C) 0

D) $\sqrt{2}$

214) _____

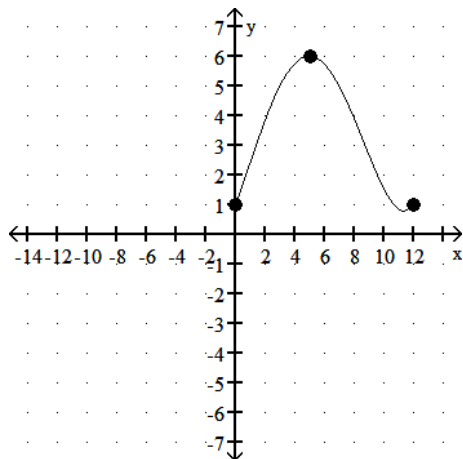
Answer: A

Explanation: A)
B)
C)
D)

Determine the domain and range of the function.

215)

215) _____



A) domain: (1, 6); range: (0, 12)

B) domain: [0, 12]; range: [1, 6]

C) domain: [1, 6]; range: [0, 12]

D) domain: (0, 12); range: (1, 6)

Answer: B

Explanation: A)
B)
C)
D)

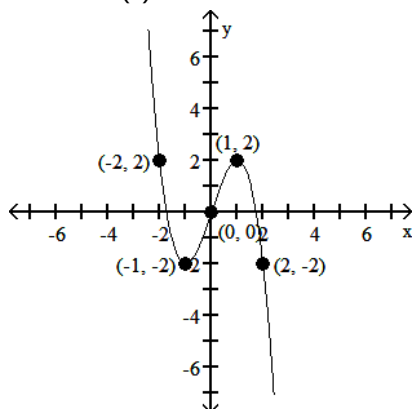
Given the graph of the function $f(x) = -x^3 + 3x$; find a formula for $g(x)$.

216)

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

$g(x) =$

216) _____



A) $g(x) = -x^3 + 3x - 3$

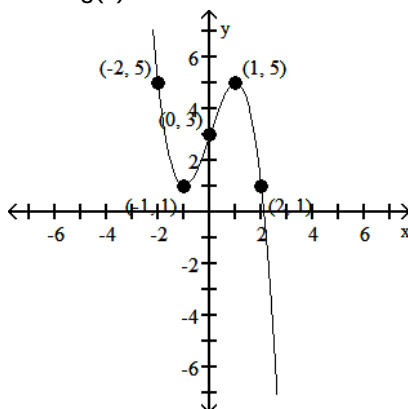
B) $g(x) = -(x - 3)^3 + 3(x - 3)$

C) $g(x) = -x^3 + 3x + 3$

D) $g(x) = -(x + 3)^3 + 3(x + 3)$

Answer: C

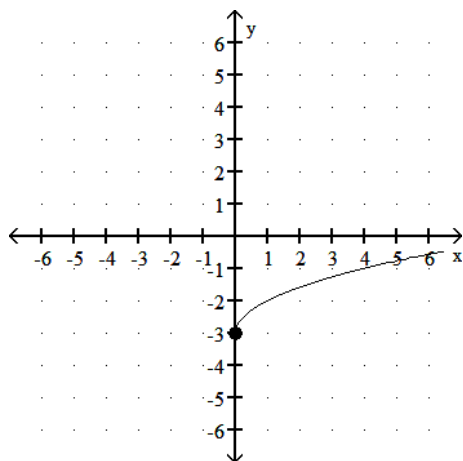
Explanation: A)
B)
C)
D)



Determine the domain and range of the function.

217)

217) _____



A) domain: $[0, \infty)$; range: $[0, \infty)$

B) domain: $(-\infty, \infty)$; range: $[-3, \infty)$

C) domain: $[0, \infty)$; range: $[-3, \infty)$

D) domain: $[0, \infty)$; range: $(-\infty, \infty)$

Answer: C

Explanation: A)

B)

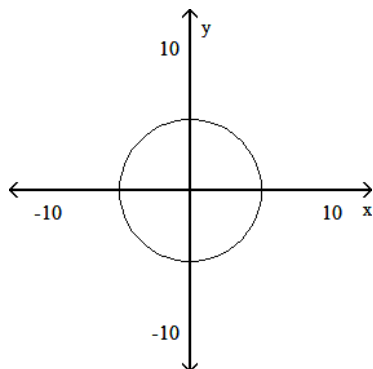
C)

D)

Determine if the graph is symmetric with respect to x-axis, y-axis, and/or the origin.

218)

218) _____



A) x-axis, origin

B) Origin

C) x-axis

D) x-axis, y-axis, origin

Answer: D

Explanation: A)

B)

C)

D)

Solve.

- 219) From a 16-inch by 16-inch piece of metal, squares are cut out of the four corners so that the sides can then be folded up to make a box. Let x represent the length of the sides of the squares, in inches, that are cut out. Express the volume of the box as a function of x . 219) _____

A) $V(x) = 4x^3 - 64x^2$

B) $V(x) = 4x^3 - 64x^2 + 256x$

C) $V(x) = 2x^3 - 48x^2$

D) $V(x) = 2x^3 - 48x^2 + 16x$

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

- 220) The distance it takes to stop a car varies directly as the square of the speed of the car. If it takes 112 feet for a car traveling at 40 miles per hour to stop, what distance is required for a speed of 45 miles per hour? 220) _____

A) 154.05 ft

B) 142.09 ft

C) 121.5 ft

D) 141.75 ft

Answer: D

Explanation: A)
B)
C)
D)

For the function f , construct and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$.

- 221) $f(x) = 7 - 7x^3$ 221) _____

A) $-7(x^2 - xh - h^2)$

B) $-7(3x^2 - 3x - h)$

C) $-21x^2$

D) $-7(3x^2 + 3xh + h^2)$

Answer: D

Explanation: A)
B)
C)
D)

Given the function f , match the function g with a transformation of f .

- 222) $f(x) = x^2 - 6$, $g(x) = 2x^2 - 12$ 222) _____

A) $f(2x)$

B) $2f(x)$

C) $f(x) + 2$

D) $f(x + 2)$

Answer: B

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated composition.

223) $f(x) = \sqrt{x+7}$, $g(x) = 8x - 11$

223) _____

Find $(f \circ g)(x)$.

A) $8\sqrt{x-4}$

B) $2\sqrt{2x+1}$

C) $8\sqrt{x+7} - 11$

D) $2\sqrt{2x-1}$

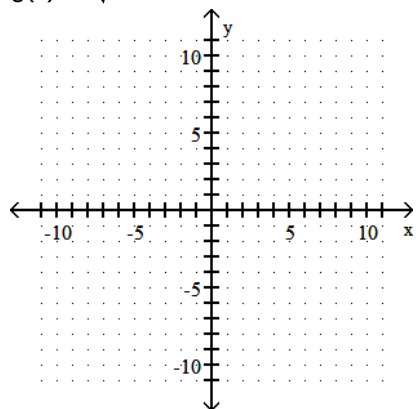
Answer: D

Explanation: A)
B)
C)
D)

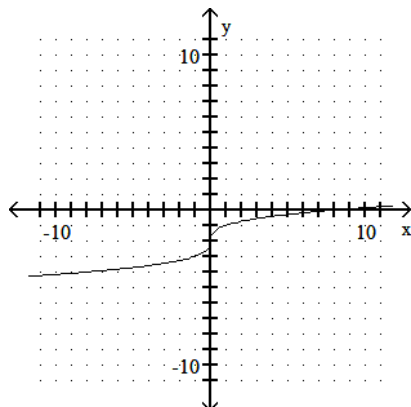
Graph the function.

224) $g(x) = \sqrt[3]{x} + 2$

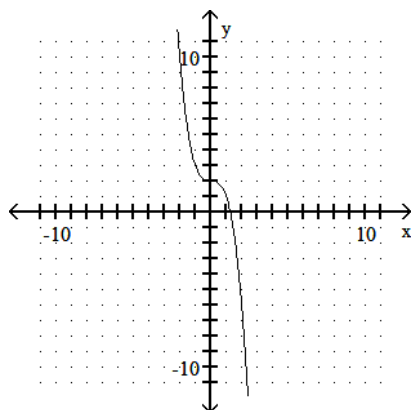
224) _____



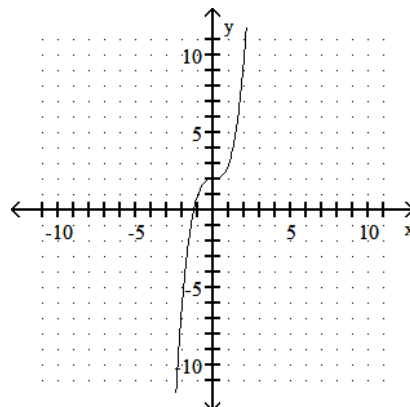
A)



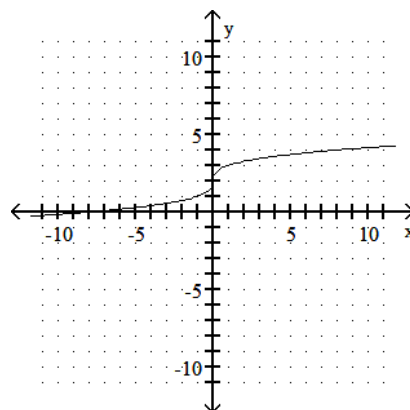
C)



B)



D)



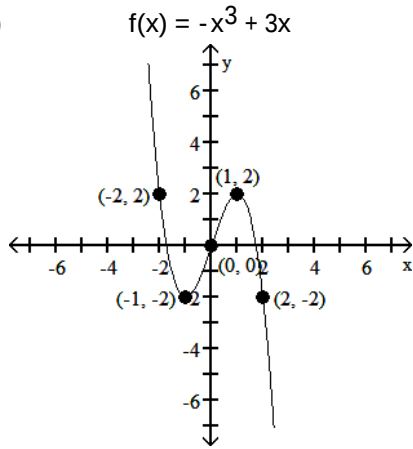
Answer: D

Explanation: A)
B)

- B)
C)
D)

Given the graph of the function $f(x) = -x^3 + 3x$; find a formula for $g(x)$.

225)

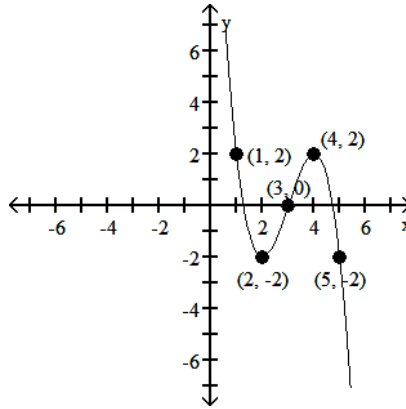


- A) $g(x) = -x^3 + 3x - 3$
C) $g(x) = -(x + 3)^3 + 3(x + 3)$

Answer: B

Explanation: A)
B)
C)
D)

$g(x) =$



- B) $g(x) = -(x - 3)^3 + 3(x - 3)$
D) $g(x) = -x^3 + 3x + 3$

225) _____

Determine algebraically whether the function is even, odd, or neither even nor odd.

226) $f(x) = 3x^2 - 4$

A) Even

B) Odd

C) Neither

Answer: A

Explanation: A)
B)
C)

226) _____

For the pair of functions, find the indicated composition.

227) $f(x) = \frac{x - 3}{10}$, $g(x) = 10x + 3$

Find $(g \circ f)(x)$.

A) $x + 6$

B) x

C) $10x + 27$

D) $x - \frac{3}{10}$

Answer: B

Explanation: A)
B)
C)
D)

227) _____

Find $f(x)$ and $g(x)$ such that $h(x) = (f \circ g)(x)$.

228) $h(x) = \sqrt{5 - \sqrt{x - 5}}$

A) $f(x) = \sqrt{x - 5}$, $g(x) = \sqrt{5 - x}$

C) $f(x) = \sqrt{x - 5}$, $g(x) = \sqrt{x - 5}$

B) $f(x) = \sqrt{5 + x}$, $g(x) = \sqrt{x - 5}$

D) $f(x) = \sqrt{5 - x}$, $g(x) = \sqrt{x - 5}$

Answer: D

Explanation: A)

B)

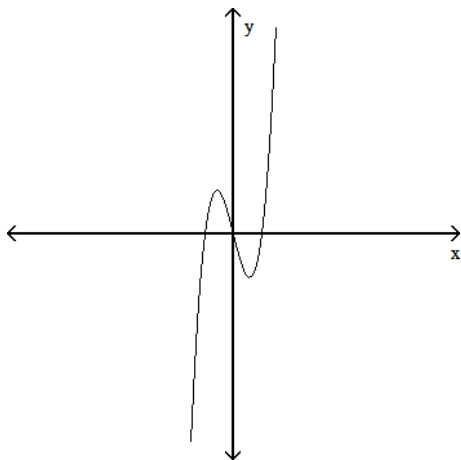
C)

D)

228) _____

Determine whether the given function is even, odd, or neither even nor odd.

229)



A) Even

B) Odd

C) Neither

Answer: B

Explanation: A)

B)

C)

229) _____

Solve.

230) A farmer's silo is the shape of a cylinder with a hemisphere as the roof. If the height of the silo is 118 feet and the radius of the hemisphere is r feet, express the volume of the silo as a function of r .

230) _____

A) $V(r) = 118\pi r^2 + \frac{8}{3}\pi r^3$

B) $V(r) = \pi(118 - r) + \frac{4}{3}\pi r^2$

C) $V(r) = \pi(118 - r)r^2 + \frac{2}{3}\pi r^3$

D) $V(r) = \pi(118 - r)r^3 + \frac{4}{3}\pi r^2$

Answer: C

Explanation: A)

B)

C)

D)

231) A farmer's silo is the shape of a cylinder with a hemisphere as the roof. If the radius of the hemisphere is 10 feet and the height of the silo is h feet, express the volume of the silo as a function of h .

231) _____

A) $V(h) = 100 \pi h + \frac{4000}{3} \pi h^2$

B) $V(h) = 100 \pi (h^2 - 10) + \frac{5000}{3} \pi$

C) $V(h) = 100 \pi (h - 10) + \frac{2000}{3} \pi$

D) $V(h) = 4100 \pi (h - 10) + \frac{500}{7} \pi$

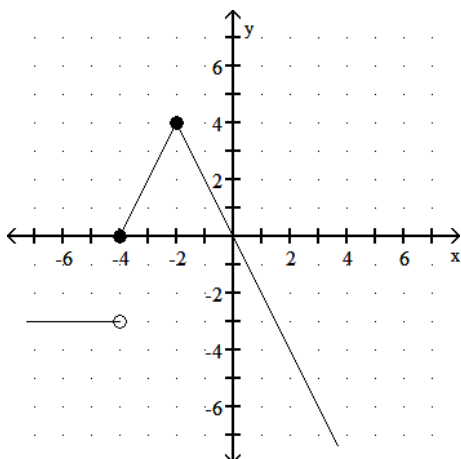
Answer: C

Explanation: A)
B)
C)
D)

Write an equation for the piecewise function.

232)

232) _____



A) $f(x) = \begin{cases} -3x, & \text{for } x < -4, \\ -2|x + 2| + 4, & \text{for } x \geq -4 \end{cases}$

B) $f(x) = \begin{cases} -3, & \text{for } x < -4, \\ -2|x + 2| + 4, & \text{for } x \geq -4 \end{cases}$

C) $f(x) = \begin{cases} -3x, & \text{for } x \leq -4, \\ -2|x + 2| + 4, & \text{for } x > -4 \end{cases}$

D) $f(x) = \begin{cases} -3, & \text{for } x \leq -4, \\ -2|x + 2| + 4, & \text{for } x > -4 \end{cases}$

Answer: B

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

233) $f(x) = x^2 - 64$, $g(x) = 2x + 3$

233) _____

Find the domain of f/g .

A) $\left[-\frac{3}{2}, \infty\right)$

B) $\left(-\infty, -\frac{3}{2}\right) \cup \left(-\frac{3}{2}, \infty\right)$

C) $(-\infty, \infty)$

D) $(-8, 8)$

Answer: B

Explanation: A)
B)
C)
D)

Find $f(x)$ and $g(x)$ such that $h(x) = (f \circ g)(x)$.

$$234) h(x) = \frac{6}{\sqrt{2x+6}}$$

234) _____

A) $f(x) = \sqrt{2x+6}, g(x) = 6$

B) $f(x) = 6, g(x) = \sqrt{2x+6}$

C) $f(x) = \frac{6}{\sqrt{x}}, g(x) = 2x+6$

D) $f(x) = \frac{6}{x}, g(x) = 2x+6$

Answer: C

Explanation: A)
B)
C)
D)

Find the point that is symmetric to the given point with respect to the requested axis.

235) Symmetric with respect to the origin

235) _____

$$\left(3, \frac{27}{2}\right)$$

A) $\left(3, -\frac{27}{2}\right)$

B) $\left(-3, -\frac{27}{2}\right)$

C) $\left(-\frac{27}{2}, 3\right)$

D) $\left(3, \frac{27}{2}\right)$

Answer: B

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

$$236) f(x) = \sqrt{x}, g(x) = 6x+30$$

236) _____

Find the domain of $f \circ g$.

A) $(-\infty, -5] \cup [0, \infty)$

B) $(-\infty, \infty)$

C) $[-5, \infty)$

D) $[0, \infty)$

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

237) The volume V of a gas at constant temperature varies inversely as the pressure P on it. The volume of a gas is 220 cm^3 under a pressure of 24 kg/cm^2 . What will be its volume under a pressure of 30 kg/cm^2 ?

237) _____

A) 158 cm^3

B) 176 cm^3

C) 289 cm^3

D) 275 cm^3

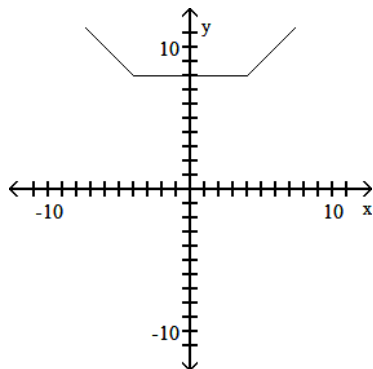
Answer: B

Explanation: A)
B)
C)
D)

Determine the intervals on which the function is increasing, decreasing, and constant.

238)

238) _____



- A) Increasing on $(4, \infty)$; Decreasing on $(-\infty, -4)$; Constant on $(-4, 4)$
- B) Increasing on $(4, \infty)$; Decreasing on $(-4, \infty)$; Constant on $(-4, 4)$
- C) Increasing on $(-\infty, 4)$; Decreasing on $(-\infty, -4)$; Constant on $(4, \infty)$
- D) Increasing on $(-\infty, 4)$; Decreasing on $(-4, \infty)$; Constant on $(4, \infty)$

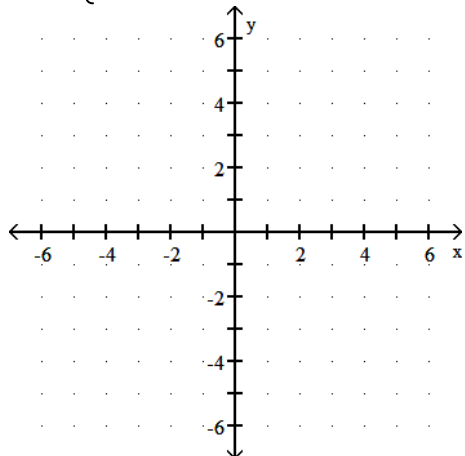
Answer: A

Explanation: A)
B)
C)
D)

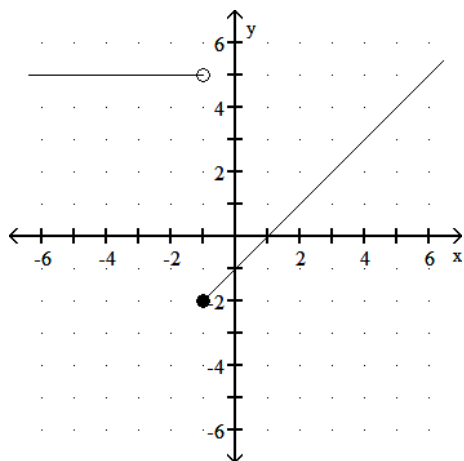
Graph the function.

239) $f(x) = \begin{cases} 5, & \text{for } x \geq 1, \\ -1 - x, & \text{for } x < 1 \end{cases}$

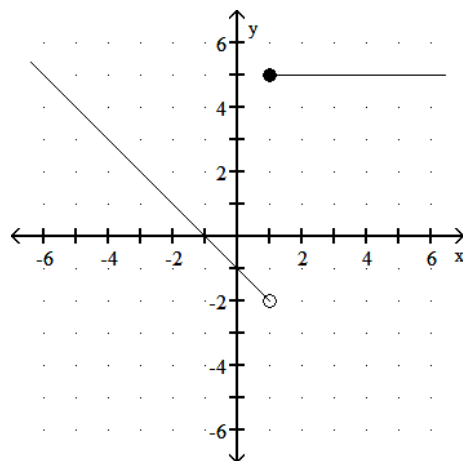
239) _____



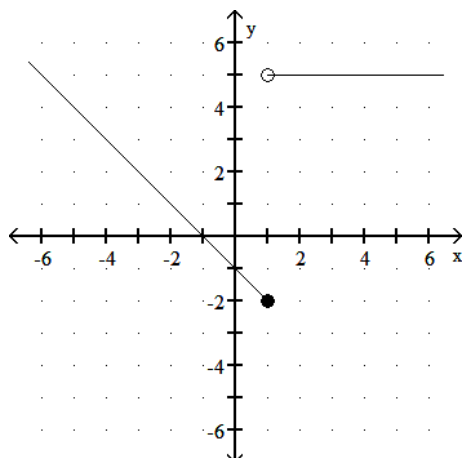
A)



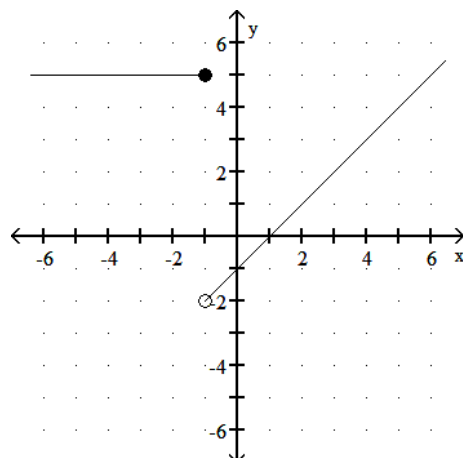
B)



C)



D)



Answer: B

Explanation: A)
B)
C)
D)

Answer the question.

240) How can the graph of $f(x) = 0.2|x - 8| + 3.7$ be obtained from the graph of $y = |x|$?

240) _____

- A) Shift it horizontally 3.7 units to the right. Stretch it vertically by a factor of 2. Shift it vertically 8 units downward.
- B) Shift it horizontally 2 units to the left. Shrink it vertically by a factor of 0.8. Shift it vertically 3.7 units upward.
- C) Shift it horizontally 8 units to the left. Stretch it vertically by a factor of 2. Shift it vertically 3.7 units upward.
- D) Shift it horizontally 8 units to the right. Shrink it vertically by a factor of 0.2. Shift it vertically 3.7 units upward.

Answer: D

Explanation: A)
B)
C)
D)

Determine algebraically whether the function is even, odd, or neither even nor odd.

$$241) f(x) = \frac{14}{x^2}$$

241) _____

A) Even

B) Odd

C) Neither

Answer: A

Explanation: A)
B)
C)

For the piecewise function, find the specified function value.

$$242) f(x) = \begin{cases} 5x + 6, & \text{for } x \leq 0, \\ 4 - 4x, & \text{for } 0 < x < 4, \\ x, & \text{for } x \geq 4 \end{cases}$$

242) _____

f(5)

A) 4

B) -16

C) 5

D) 31

Answer: C

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

$$243) f(x) = x^2 - 64, \quad g(x) = 2x + 3$$

243) _____

Find the domain of g/f .

$$A) \left(-\infty, -\frac{3}{2} \right) \cup \left(\frac{3}{2}, \infty \right)$$

$$B) (-\infty, \infty)$$

$$C) (-\infty, -8) \cup (-8, 8) \cup (8, \infty)$$

$$D) \left[-\frac{3}{2}, \infty \right)$$

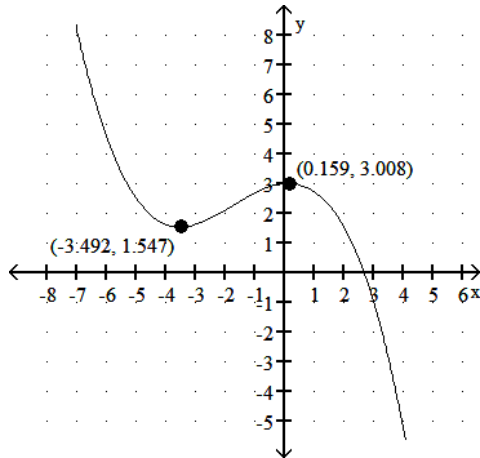
Answer: C

Explanation: A)
B)
C)
D)

Using the graph, determine any relative maxima or minima of the function and the intervals on which the function is increasing or decreasing. Round to three decimal places when necessary.

244) $f(x) = -0.06x^3 - 0.3x^2 + 0.1x + 3$

244) _____



- A) relative maximum: 1.547 at $x = -3.492$; relative minimum: 3.008 at $x = 0.159$; increasing $(-\infty, -3.492)$; decreasing $(-3.492, 0.159)$; decreasing $(0.159, \infty)$
 B) relative maxima: 3 at $x = 0$ and 3.008 at $x = 0.159$; relative minimum: 1.547 at $x = -3.492$; increasing $(-\infty, -3.492)$; decreasing $(-3.492, 0.159)$; increasing $(0.159, \infty)$
 C) no relative maxima or minima; increasing $(-\infty, -3.492)$; decreasing $(-3.492, 0.159)$; increasing $(0.159, \infty)$
 D) relative maximum: 3.008 at $x = 0.159$; relative minimum: 1.547 at $x = -3.492$; increasing $(-\infty, -3.492)$; decreasing $(-3.492, 0.159)$; increasing $(0.159, \infty)$

Answer: D

Explanation: A)
 B)
 C)
 D)

Solve.

245) According to Ohm's law, the electric current I , in amperes, in a circuit varies directly as the voltage V . When 20 volts are applied, the current is 2 amperes. What is the current when 19 volts are applied?

245) _____

- A) 41 amp B) 190 amp C) 10 amp D) 1.9 amp

Answer: D

Explanation: A)
 B)
 C)
 D)

Determine algebraically whether the function is even, odd, or neither even nor odd.

246) $f(x) = \sqrt{x^2 + 4}$

246) _____

- A) Even B) Odd C) Neither

Answer: A

Explanation: A)
 B)
 C)

Find $f(x)$ and $g(x)$ such that $h(x) = (f \circ g)(x)$.

247) $h(x) = (x - 4)^5 + 4(x - 4)^4 - 4(x - 4)^2 + 4$

A) $f(x) = x^5 + x^4 - x^2 + 4$, $g(x) = x - 4$

C) $f(x) = x^5 - 4x^4 + 4x^2 + 4$, $g(x) = x + 4$

B) $f(x) = x^5 + 4x^4 - 4x^2$, $g(x) = x - 8$

D) $f(x) = x^5 + 4x^4 - 4x^2 + 4$, $g(x) = x - 4$

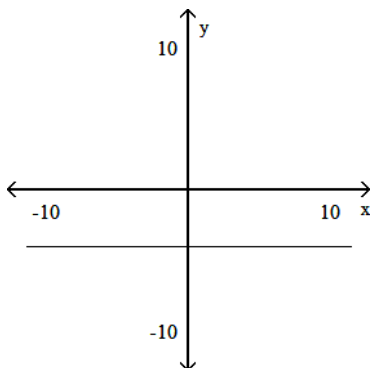
247) _____

Answer: D

Explanation: A)
B)
C)
D)

Determine if the graph is symmetric with respect to x-axis, y-axis, and/or the origin.

248)



A) y-axis, origin

B) y-axis

C) x-axis

D) x-axis, y-axis

Answer: B

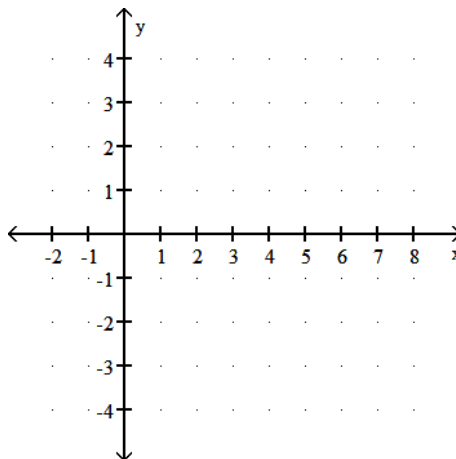
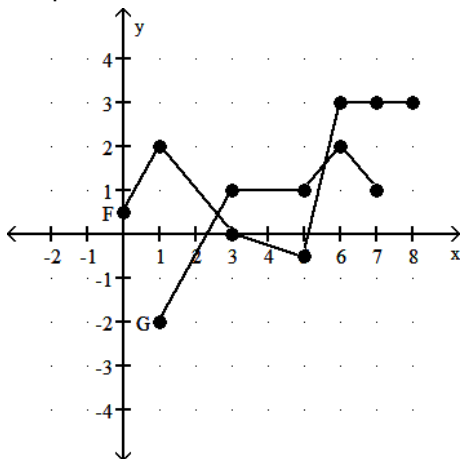
Explanation: A)
B)
C)
D)

248) _____

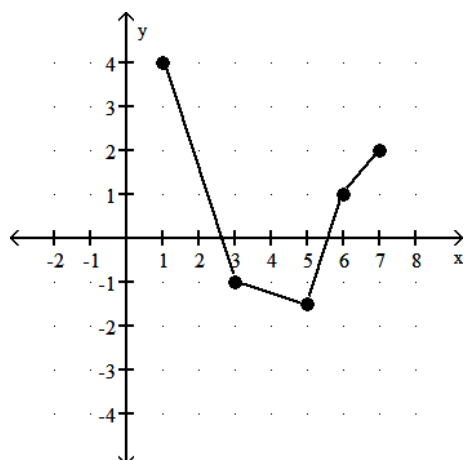
Consider the functions F and G as shown in the graph. Provide an appropriate response.

249) Graph $F - G$.

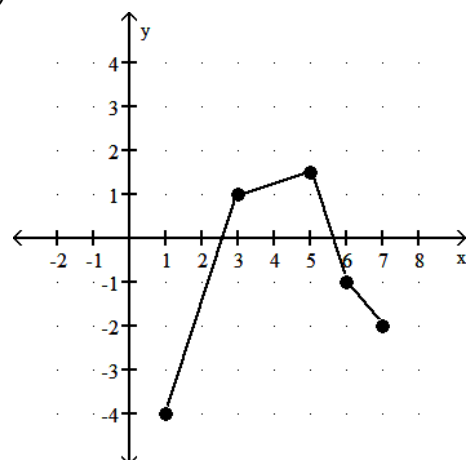
249) _____



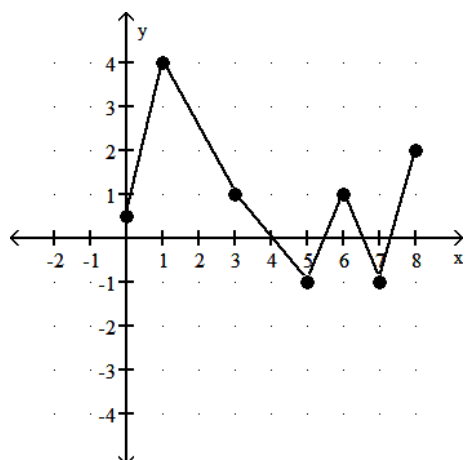
A)



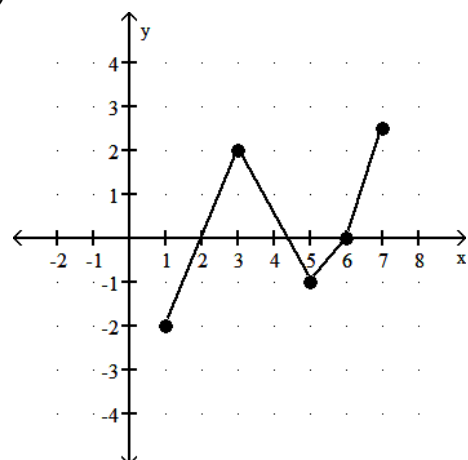
B)



C)



D)



Answer: A

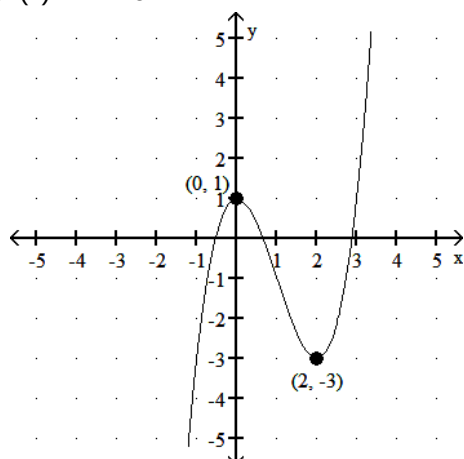
Explanation:

- A)
- B)
- C)
- D)

Using the graph, determine any relative maxima or minima of the function and the intervals on which the function is increasing or decreasing. Round to three decimal places when necessary.

250) $f(x) = x^3 - 3x^2 + 1$

250) _____



- A) relative maximum: 1 at $x = 0$; no relative minima; increasing $(-\infty, 0)$, $(2, \infty)$; decreasing $(0, 2)$
- B) relative maximum: 1 at $x = 0$; relative minimum: -3 at $x = 2$; increasing $(-\infty, 0)$, $(2, \infty)$; decreasing $(0, 2)$
- C) no relative maxima; relative minimum: -3 at $x = 2$; increasing $(-\infty, 0)$, $(2, \infty)$; decreasing $(0, 2)$
- D) relative maximum: -3 at $x = 2$; relative minimum: 1 at $x = 0$; increasing $(0, 2)$; decreasing $(-\infty, 0)$, $(2, \infty)$

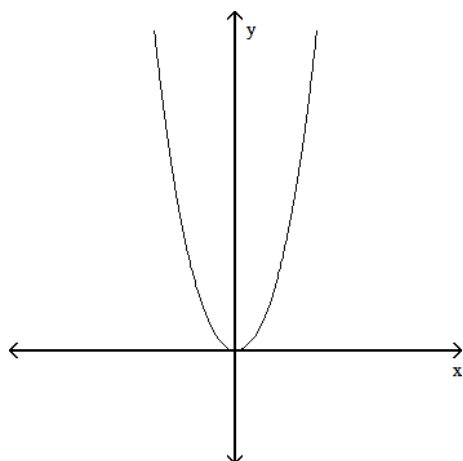
Answer: B

Explanation: A)
B)
C)
D)

Determine whether the given function is even, odd, or neither even nor odd.

251)

251) _____



A) Neither

B) Odd

C) Even

Answer: C

Explanation: A)
B)
C)

For the function f , construct and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$.

252) $f(x) = 3x + 5$

A) 3

B) 0

C) $3 + \frac{10}{h}$

D) $3 + \frac{6(x+5)}{h}$

252) _____

Answer: A

Explanation: A)
B)
C)
D)

Solve.

253) A rectangular sign is being designed so that the length of its base, in feet, is 6 feet less than 4 times the height, h . Express the area of the sign as a function of h .

253) _____

A) $A(h) = -6h + h^2$

B) $A(h) = 6h - 2h^2$

C) $A(h) = -6h^2 + 2h$

D) $A(h) = -6h + 4h^2$

Answer: D

Explanation: A)
B)
C)
D)

254) From a 24-inch by 24-inch piece of metal, squares are cut out of the four corners so that the sides can then be folded up to make a box. Let x represent the length of the sides of the squares, in inches, that are cut out. Express the volume of the box as a function of x . Graph the function and from the graph determine the value of x , to the nearest tenth of an inch, that will yield the maximum volume.

254) _____

A) 4.0 inches

B) 4.1 inches

C) 3.7 inches

D) 3.8 inches

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

255) The weight of a person on or above the surface of the earth varies inversely as the square of the distance the person is from the center of the earth. If a person weighs 180 pounds on the surface of the earth and the radius of the earth is 3900 miles, what will the person weigh if he or she is 25 miles above the earth's surface? Round your answer to the nearest tenth of a pound.

255) _____

A) 177.71 lb

B) 179.11 lb

C) 177.21 lb

D) 178.11 lb

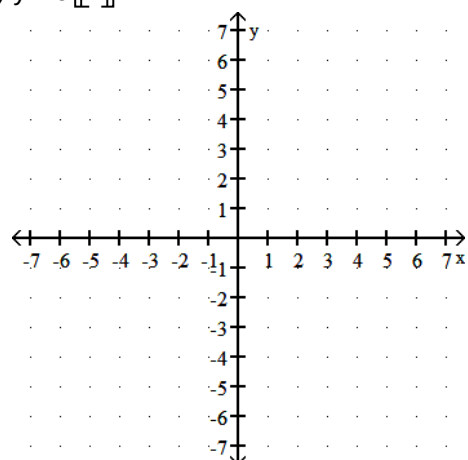
Answer: A

Explanation: A)
B)
C)
D)

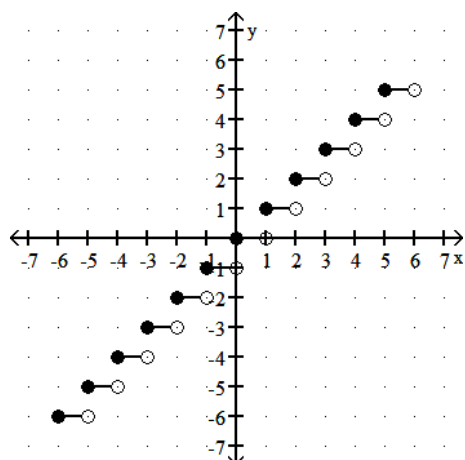
Graph the equation.

256) $y = 3 \llbracket x \rrbracket$

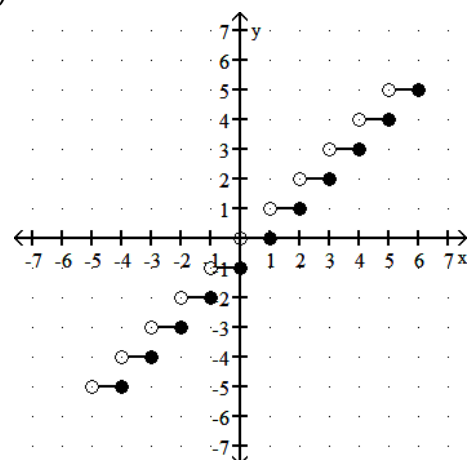
256) _____



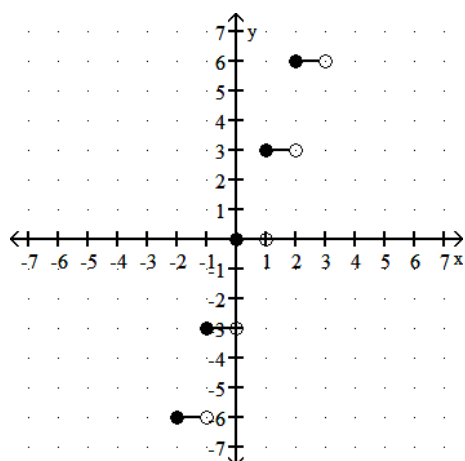
A)



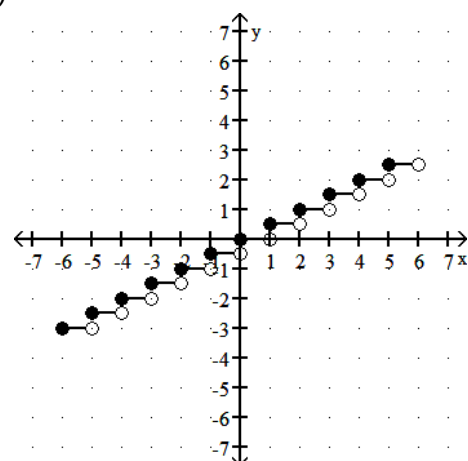
B)



C)



D)



Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

- 257) The distance an object falls when dropped from a tower varies directly as the square of the time it falls. If the object falls 144 feet in 3 seconds, how far will it fall in 6 seconds? 257) _____
- A) 504 ft B) 576 ft C) 96 ft D) 648 ft

Answer: B

Explanation: A)
 B)
 C)
 D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

- 258) $f(x) = x^2 - 1$, $g(x) = 2x + 1$ 258) _____

Find $(f/g)(\sqrt{3})$.

- A) $\frac{4 - \sqrt{3}}{13}$ B) $\frac{4\sqrt{3} - 2}{11}$ C) $\frac{3\sqrt{3} + 2}{5}$ D) $\frac{\sqrt{3} - 1}{2}$

Answer: B

Explanation: A)
 B)
 C)
 D)

Solve the problem.

- 259) Wind resistance or atmospheric drag tends to slow down moving objects. Atmospheric drag varies jointly as an object's surface area A and velocity v . If a car traveling at a speed of 60 mph with a surface area of 36 ft^2 experiences a drag of 237.6 N (Newtons), how fast must a car with 39 ft^2 of surface area travel in order to experience a drag force of 227.37 N? 259) _____
- A) 55 mph B) 58 mph C) 53 mph D) 50 mph

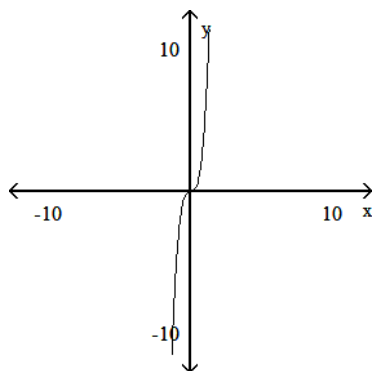
Answer: C

Explanation: A)
 B)
 C)
 D)

Determine if the graph is symmetric with respect to x-axis, y-axis, and/or the origin.

260)

260) _____



A) x-axis, origin

B) x-axis

C) y-axis

D) Origin

Answer: D

Explanation: A)
B)
C)
D)

Solve.

261) At Allied Electronics, production has begun on the X-15 Computer Chip. The total revenue function is given by $R(x) = 47x - 0.3x^2$ and the total cost function is given by $C(x) = 6x + 13$, where x represents the number of boxes of computer chips produced. The total profit function, $P(x)$, is such that $P(x) = R(x) - C(x)$. Find $P(x)$.

261) _____

A) $P(x) = -0.3x^2 + 35x + 13$

B) $P(x) = 0.3x^2 + 41x - 26$

C) $P(x) = 0.3x^2 + 35x - 39$

D) $P(x) = -0.3x^2 + 41x - 13$

Answer: D

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

262) s varies directly as the square of t , and $s = 294$ when $t = 7$.

262) _____

A) $s = \frac{1}{42}t^2$

B) $s = 42t^2$

C) $s = 6t^2$

D) $s = \frac{1}{6}t^2$

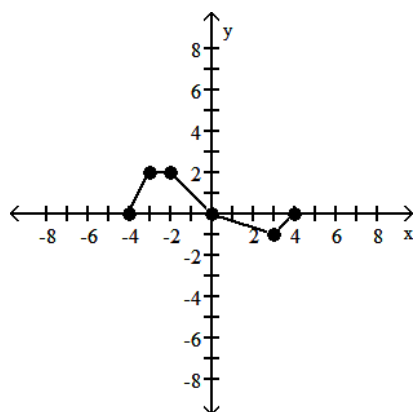
Answer: C

Explanation: A)
B)
C)
D)

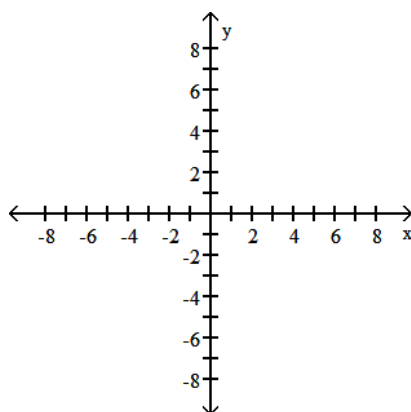
A graph of $y = f(x)$ follows. No formula for f is given. Graph the given equation.

263) $y = -2f(x + 1) - 3$

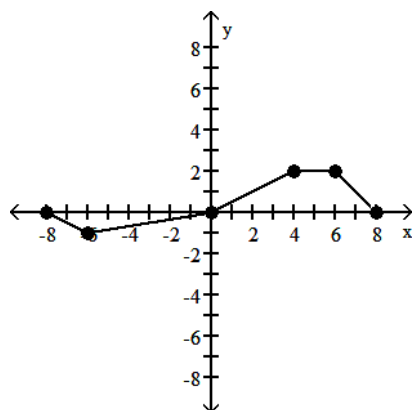
263) _____



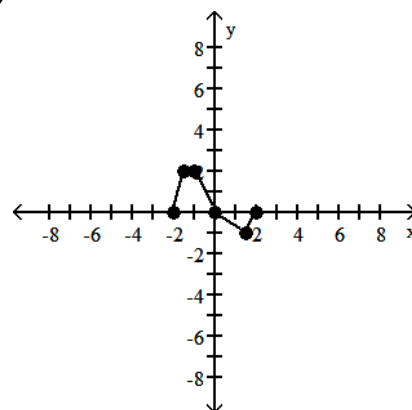
A)



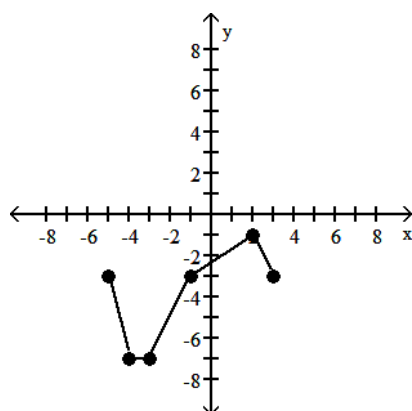
B)



C)



D)



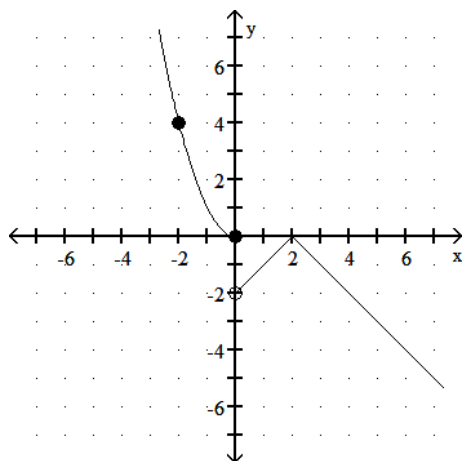
Answer: C

Explanation: A)
B)
C)
D)

Write an equation for the piecewise function.

264)

264) _____



A) $f(x) = \begin{cases} x^2, & \text{for } x \leq 0, \\ -|x - 2|, & \text{for } x > 0 \end{cases}$

C) $f(x) = \begin{cases} -|x - 2|, & \text{for } x < 0, \\ x^2, & \text{for } x \geq 0 \end{cases}$

B) $f(x) = \begin{cases} -x^2, & \text{for } x \leq 0, \\ |x - 2|, & \text{for } x > 0 \end{cases}$

D) $f(x) = \begin{cases} x^2, & \text{for } x \leq 0, \\ -|x + 2|, & \text{for } x > 0 \end{cases}$

Answer: A

Explanation:

A)

B)

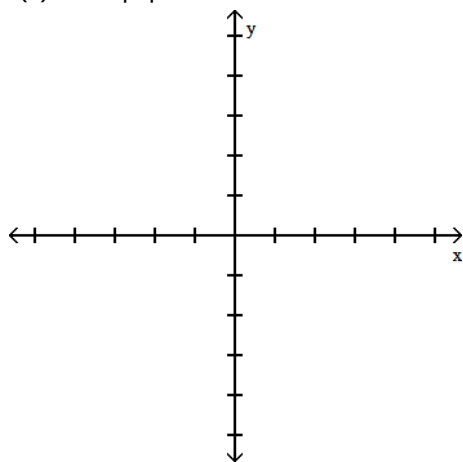
C)

D)

Graph the function. Use the graph to find any relative maxima or minima.

265) $f(x) = 2 - |x|$

265) _____



A) Relative minimum of 2 at $x = 0$

C) Relative maximum of 2.5 at $x = 0$

B) Relative maximum of 2 at $x = 0$

D) No relative extrema

Answer: B

Explanation:

A)

B)

C)

D)

Solve the problem.

266) The intensity I of light varies inversely as the square of the distance D from the source. If the intensity of illumination on a screen 5 ft from a light is 3 foot-candles, find the intensity on a screen 20 ft from the light.

266) _____

A) $\frac{3}{5}$ foot-candle

B) $\frac{3}{16}$ foot-candle

C) $1\frac{3}{16}$ foot-candles

D) 2 foot-candles

Answer: B

Explanation: A)
B)
C)
D)

The given point is on the graph of $y = f(x)$. Find a point on the graph of $y = g(x)$.

267) $g(x) = f(x + 1)$; (2, 9)

267) _____

A) (1, 9)

B) (3, 9)

C) (2, 8)

D) (2, 10)

Answer: A

Explanation: A)
B)
C)
D)

Determine algebraically whether the graph is symmetric with respect to the x -axis, the y -axis, and the origin.

268) $x^2 + y^2 = 8$

268) _____

A) x -axis, y -axis, origin

B) y -axis only

C) Origin only

D) x -axis only

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

269) The area of a circle varies directly as the square of the radius of the circle. If a circle with a radius of 5 inches has an area of 78.5 square inches, what is the area of a circle with a radius of 18 inches?

269) _____

A) 1017.36 in^2

B) 113.04 in^2

C) 56.52 in^2

D) 1019.76 in^2

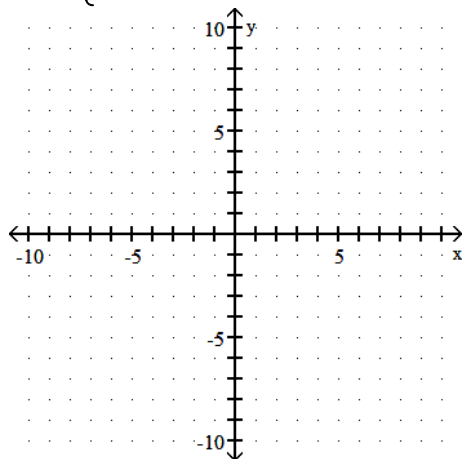
Answer: A

Explanation: A)
B)
C)
D)

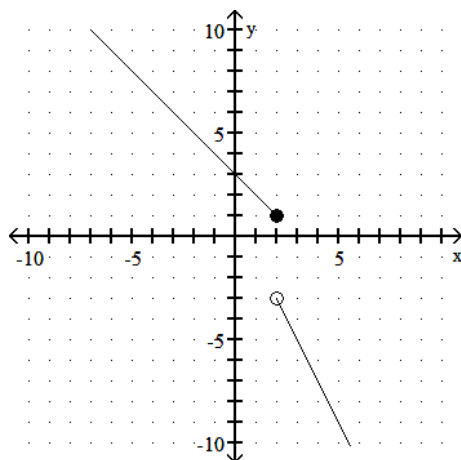
Graph the function.

270) $f(x) = \begin{cases} 3 - x, & \text{for } x \leq 2, \\ 1 + 2x, & \text{for } x > 2 \end{cases}$

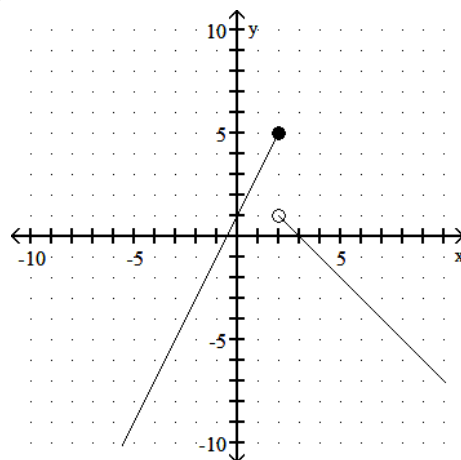
270) _____



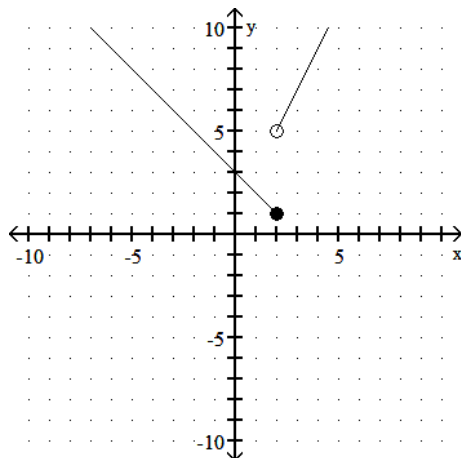
A)



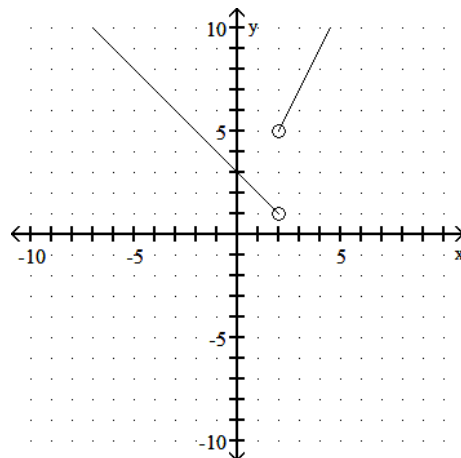
B)



C)



D)



Answer: C

Explanation: A)
B)
C)
D)

Determine algebraically whether the function is even, odd, or neither even nor odd.

271) $f(x) = -0.92x^2 + |x| - 1$

271) _____

A) Even

B) Odd

C) Neither

Answer: A

Explanation: A)
B)
C)

Solve the problem.

272) At a fixed temperature, the resistance R of a wire varies directly as the length l and inversely as the square of its diameter d . If the resistance is 1.2 ohm when the diameter is 1 mm and the length is 240 cm, what is the resistance when the diameter is 3 mm and the length is 610 cm?

272) _____

A) 0.339 ohm

B) 67.778 ohm

C) 1.017 ohm

D) 81.333 ohm

Answer: A

Explanation: A)
B)
C)
D)

The given point is on the graph of $y = f(x)$. Find a point on the graph of $y = g(x)$.

273) $g(x) = f(x) - 1$; (6, 14)

273) _____

A) (6, 13)

B) (6, 17)

C) (6, 14)

D) (6, 11)

Answer: A

Explanation: A)
B)
C)
D)

Answer the question.

274) How can the graph of $f(x) = \frac{1}{2}(x + 2)^2 - 5$ be obtained from the graph of $y = x^2$?

274) _____

A) Shift it horizontally 2 units to the right. Stretch it vertically by a factor of 2. Shift it 5 units up.

B) Shift it horizontally 2 units to the left. Shrink it vertically by a factor of 2. Shift it 5 units down.

C) Shift it horizontally 2 units to the right. Shrink it vertically by a factor of $\frac{1}{2}$. Shift it 5 units down.

D) Shift it horizontally 2 units to the left. Shrink it vertically by a factor of $\frac{1}{2}$. Shift it 5 units down.

Answer: D

Explanation: A)
B)
C)
D)

Solve.

275) From a 15-inch by 15-inch piece of metal, squares are cut out of the four corners so that the sides can then be folded up to make a box. Let x represent the length of the sides of the squares, in inches, that are cut out. Express the volume of the box as a function of x . Graph the function and from the graph determine the value of x , to the nearest tenth of an inch, that will yield the maximum volume.

275) _____

A) 2.5 inches

B) 2.8 inches

C) 2.3 inches

D) 3.1 inches

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

276) $f(x) = x^2 + 9$, $g(x) = 5x + 4$

276) _____

Find $(f + g)(2)$.

A) 25

B) 37

C) 23

D) 27

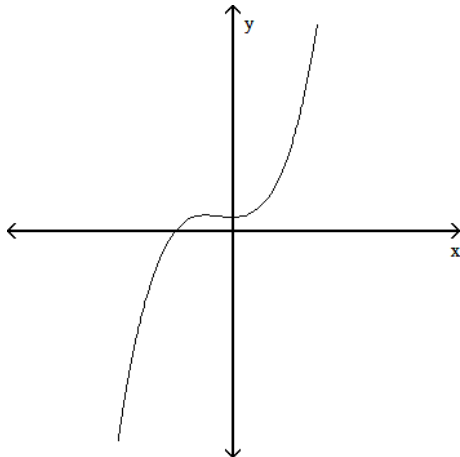
Answer: D

Explanation: A)
B)
C)
D)

Determine whether the given function is even, odd, or neither even nor odd.

277)

277) _____



A) Neither

B) Odd

C) Even

Answer: A

Explanation: A)
B)
C)

For the pair of functions, find the indicated domain.

278) $f(x) = \frac{10}{x+3}$, $g(x) = x + 8$

278) _____

Find the domain of $g \circ f$.

A) $(-\infty, \infty)$

B) $(-\infty, -11) \cup (-11, \infty)$

C) $(-\infty, -3) \cup (-3, \infty)$

D) $(-\infty, -3] \cup [-3, \infty)$

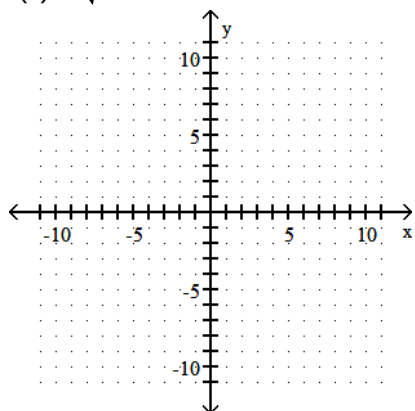
Answer: C

Explanation: A)
B)
C)
D)

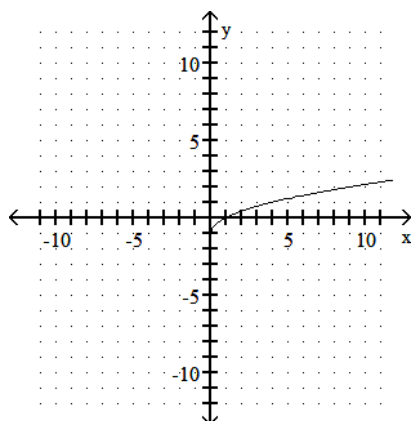
Graph the function.

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

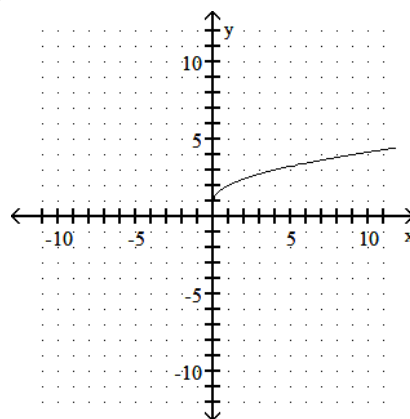
279) _____



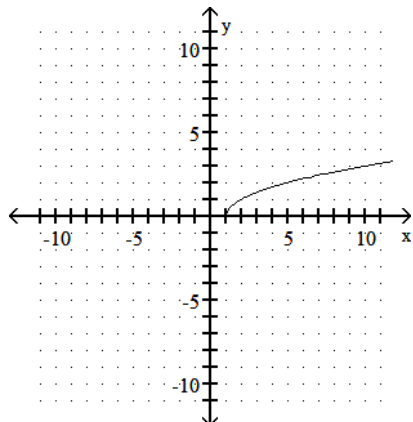
A)



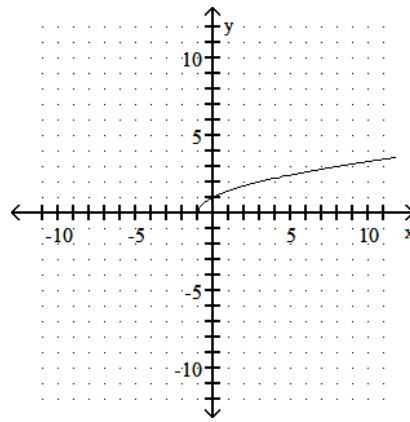
B)



C)



D)



Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

280) The intensity of a radio signal from the radio station varies inversely as the square of the distance from the station. Suppose the the intensity is 8000 units at a distance of 2 miles. What will the intensity be at a distance of 11 miles? Round your answer to the nearest unit.

A) 264 units B) 228 units C) 247 units D) 290 units

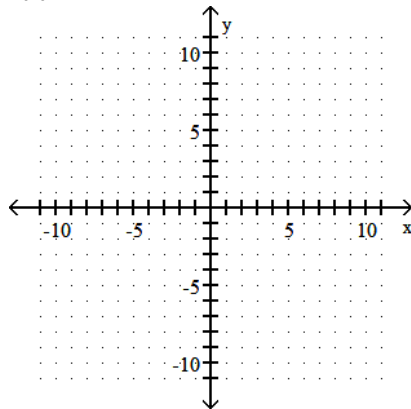
Answer: A

Explanation: A)
B)
C)
D)

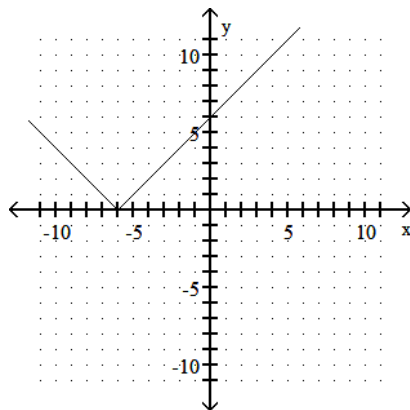
Graph the function.

281) $f(x) = |x - 6|$

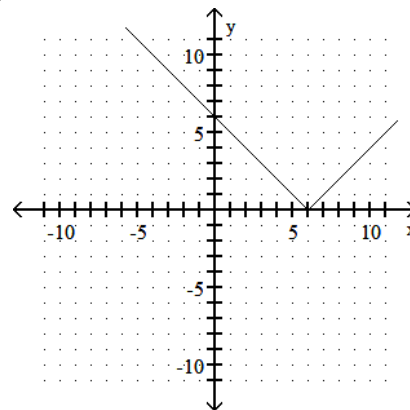
281) _____



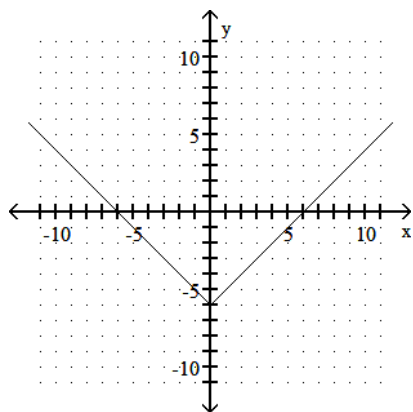
A)



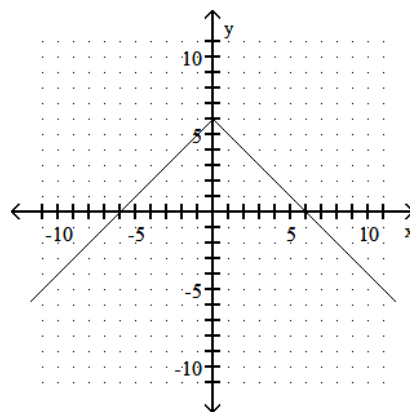
B)



C)



D)



Answer: B

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

282) y varies directly as x and inversely as z , and $y = 4.4$ when $x = 2$ and $z = 0.2$.

A) $y = \frac{x}{z}$

B) $y = -0.12xz$

C) $y = \frac{0.44x}{z}$

D) $y = \frac{8.01x}{z}$

282) _____

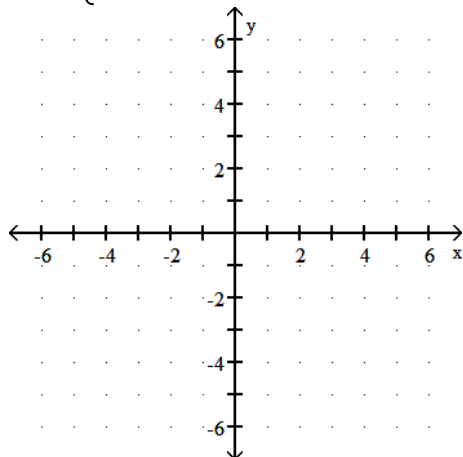
Answer: C

Explanation: A)
B)
C)
D)

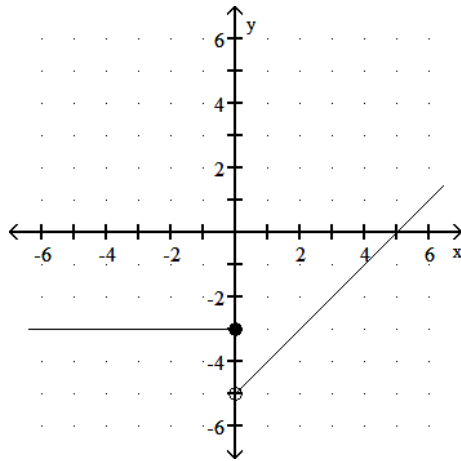
Graph the function.

283) $f(x) = \begin{cases} x - 5, & \text{for } x > 0, \\ -3, & \text{for } x \leq 0 \end{cases}$

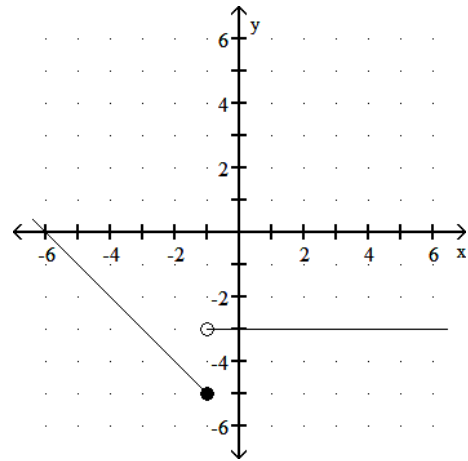
283) _____



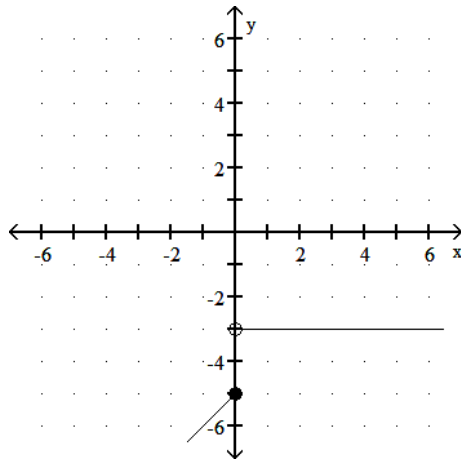
A)



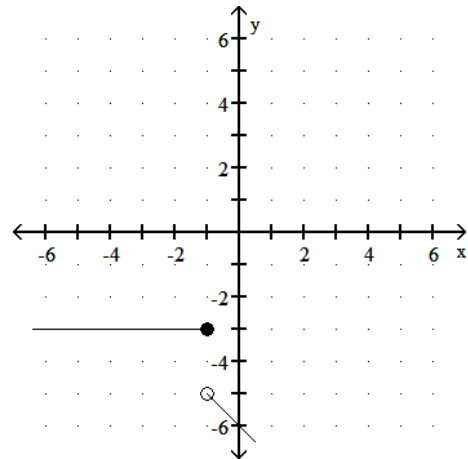
B)



C)



D)



Answer: A

Explanation: A)
B)
C)
D)

Answer the question.

284) How can the graph of $f(x) = -\sqrt{x+4}$ be obtained from the graph of $y = \sqrt{x}$?

- A) Shift it horizontally 4 units to the right. Reflect it across the x-axis.
- B) Shift it horizontally 4 units to the left. Reflect it across the y-axis.
- C) Shift it horizontally -4 units to the left. Reflect it across the x-axis.
- D) Shift it horizontally 4 units to the left. Reflect it across the x-axis.

Answer: D

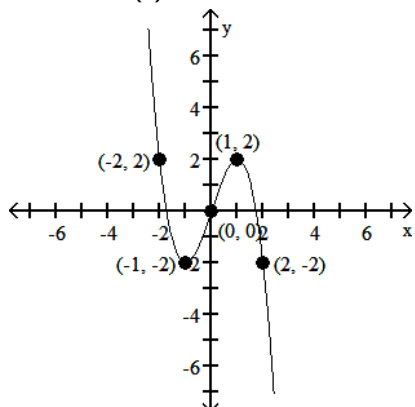
Explanation: A)
B)
C)
D)

284) _____

Given the graph of the function $f(x) = -x^3 + 3x$; find a formula for $g(x)$.

285)

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



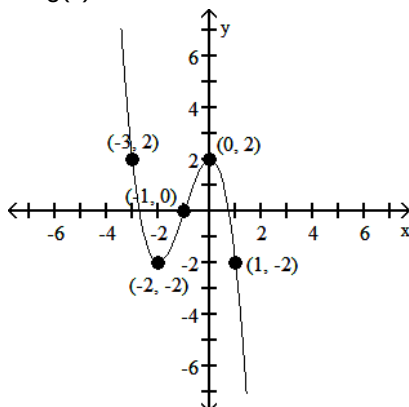
A) $g(x) = -x^3 + 3x - 1$

C) $g(x) = -x^3 + 3x + 1$

Answer: B

Explanation: A)
B)
C)
D)

$$g(x) =$$



B) $g(x) = -(x + 1)^3 + 3(x + 1)$

D) $g(x) = -(x - 1)^3 + 3(x - 1)$

285) _____

Solve the problem.

286) The pitch P of a musical tone varies inversely as its wavelength W . One tone has a pitch of 231 vibrations per second and a wavelength of 17.1 ft. Find the wavelength of another tone that has a pitch of 269 vibrations per second.

A) 0.07 ft

B) 0.000275 ft

C) 3633.9 ft

D) 14.7 ft

Answer: D

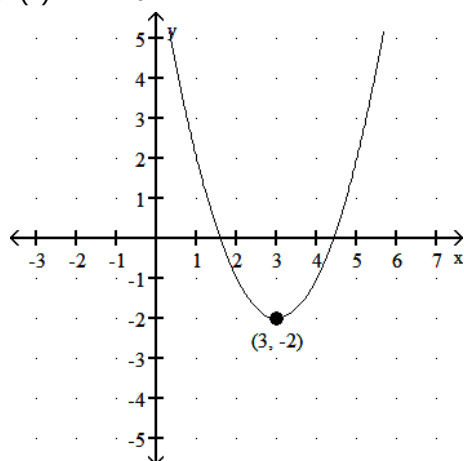
Explanation: A)
B)
C)
D)

286) _____

Using the graph, determine any relative maxima or minima of the function and the intervals on which the function is increasing or decreasing. Round to three decimal places when necessary.

287) $f(x) = x^2 - 6x + 7$

287) _____



- A) relative maximum: -2 at $x = 3$; increasing $(3, \infty)$; decreasing $(-\infty, 3)$
- B) relative minimum: 3 at $y = -2$; increasing $(-\infty, 3)$; decreasing $(3, \infty)$
- C) relative maximum: 3 at $y = -2$; increasing $(-\infty, 3)$; decreasing $(3, \infty)$
- D) relative minimum: -2 at $x = 3$; increasing $(3, \infty)$; decreasing $(-\infty, 3)$

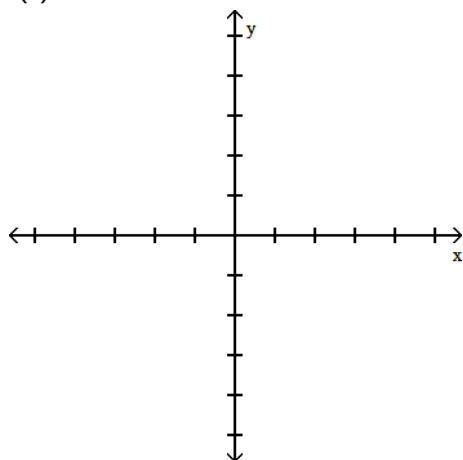
Answer: D

Explanation: A)
B)
C)
D)

Graph the function. Use the graph to find any relative maxima or minima.

288) $f(x) = -x^2 + 8x - 15$

288) _____



- A) Relative maximum of 4 at $x = 1$
- B) Relative minimum of 1 at $x = 4$
- C) No relative extrema
- D) Relative maximum of 1 at $x = 4$

Answer: D

Explanation: A)
B)
C)
D)

Determine algebraically whether the function is even, odd, or neither even nor odd.

289) $f(x) = x + \frac{13}{x}$

289) _____

A) Even

B) Odd

C) Neither

Answer: B

Explanation: A)
B)
C)

Given the function f , match the function g with a transformation of f .

290) $f(x) = x^2 + 2$, $g(x) = (x - 4)^2 + 2$

290) _____

A) $f(x) - 4$

B) $f(x + 4)$

C) $f(x) + 4$

D) $f(x - 4)$

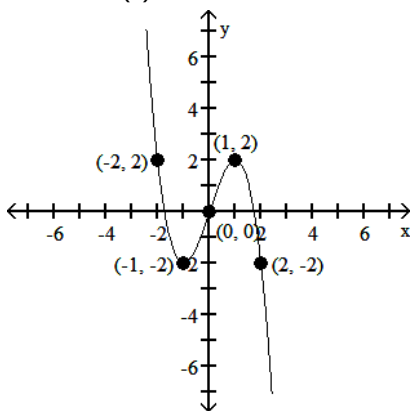
Answer: D

Explanation: A)
B)
C)
D)

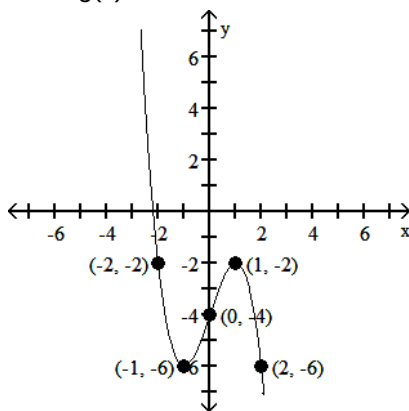
Given the graph of the function $f(x) = -x^3 + 3x$; find a formula for $g(x)$.

291) $f(x) = -x^3 + 3x$

291) _____



$g(x) =$



A) $g(x) = -x^3 + 3x + 4$

B) $g(x) = -(x - 4)^3 + 3(x - 4)$

C) $g(x) = -(x + 4)^3 + 3(x + 4)$

D) $g(x) = -x^3 + 3x - 4$

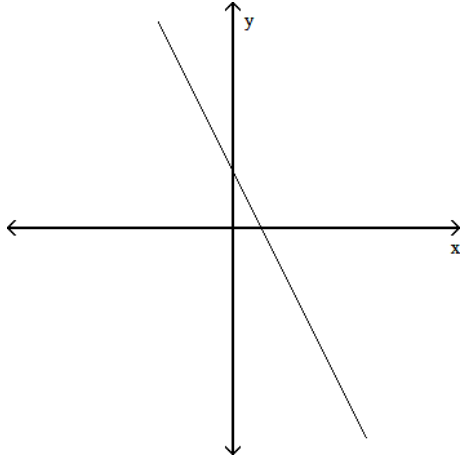
Answer: D

Explanation: A)
B)
C)
D)

Determine whether the given function is even, odd, or neither even nor odd.

292)

292) _____



A) Neither

B) Odd

C) Even

Answer: A

Explanation: A)
B)
C)

Given the function f , match the function g with a transformation of f .

293) $f(x) = x^2 + 8$, $g(x) = x^2 + 4$

293) _____

A) $f(x) - 4$

B) $f(x) + 4$

C) $f(x + 4)$

D) $f(x - 4)$

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

294) The cost of stainless steel tubing varies jointly as the length and the diameter of the tubing. If a 5 foot length with diameter 2 inches costs \$48.00, how much will a 9 foot length with diameter 3 inches cost?

294) _____

A) \$134.90

B) \$129.60

C) \$135.17

D) \$127.20

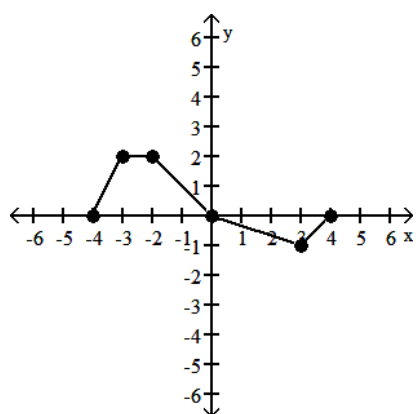
Answer: B

Explanation: A)
B)
C)
D)

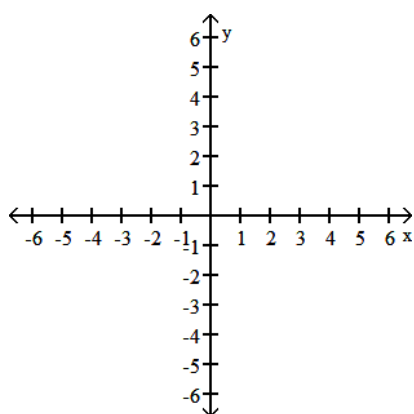
A graph of $y = f(x)$ follows. No formula for f is given. Graph the given equation.

295) $y = \frac{1}{2}f(x - 1) + 3$

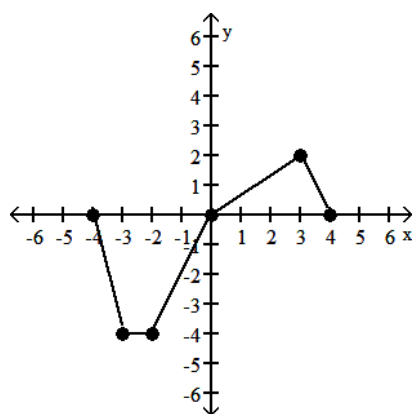
295) _____



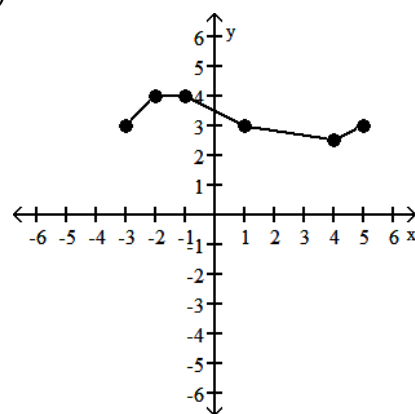
A)



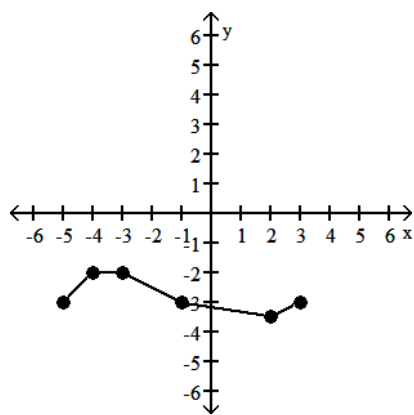
B)



C)

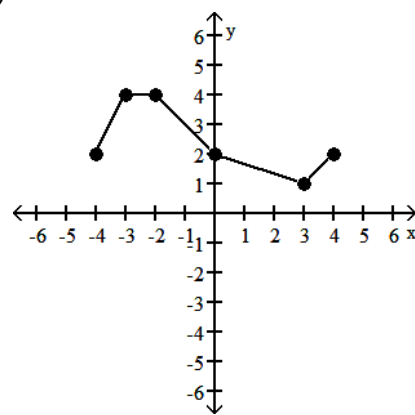


D)



Answer: B

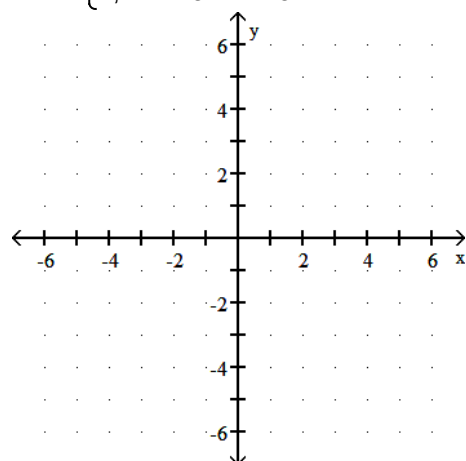
Explanation: A)
B)
C)
D)



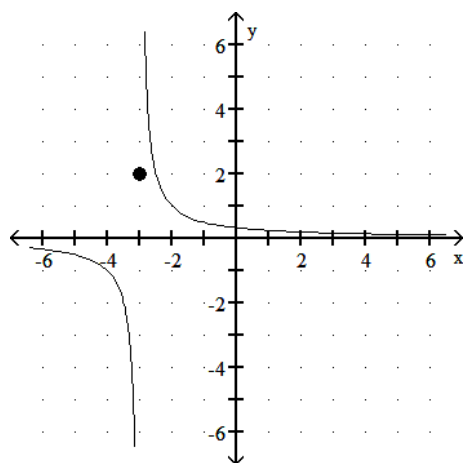
Graph the function.

296) $f(x) = \begin{cases} \frac{1}{x+3}, & \text{for } x \neq -3, \\ 2, & \text{for } x = -3 \end{cases}$

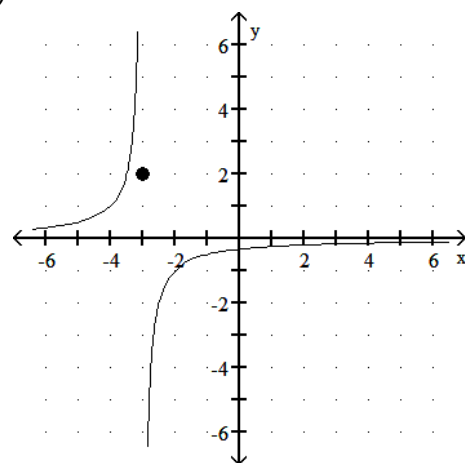
296) _____



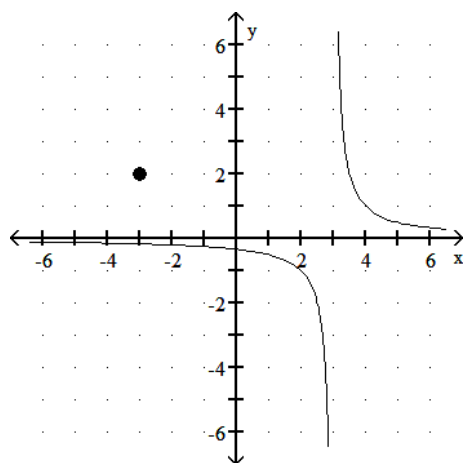
A)



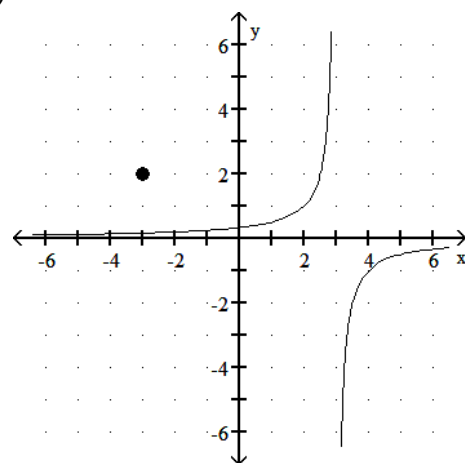
B)



C)



D)



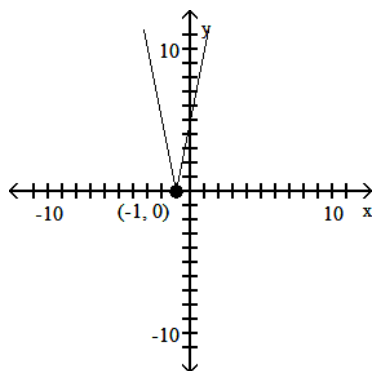
Answer: A

Explanation: A)
B)
C)
D)

Determine the intervals on which the function is increasing, decreasing, and constant.

297)

297) _____



- A) Increasing on $(-1, \infty)$; Decreasing on $(-\infty, -1)$
- B) Increasing on $(-\infty, 1)$; Decreasing on $(1, \infty)$
- C) Increasing on $(-\infty, -1)$; Decreasing on $(-1, \infty)$
- D) Increasing on $(1, \infty)$; Decreasing on $(-\infty, 1)$

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated sum, difference, product, or quotient.

298) $h(x) = x - 5$, $g(x) = \sqrt{x - 3}$

298) _____

Find $(h + g)(28)$.

- A) 48
- B) 22
- C) 28
- D) 33

Answer: C

Explanation: A)
B)
C)
D)

The given point is on the graph of $y = f(x)$. Find a point on the graph of $y = g(x)$.

299) $g(x) = f(x) + 1$; $(6, 14)$

299) _____

- A) $(6, 19)$
- B) $(6, 16)$
- C) $(6, 15)$
- D) $(6, 13)$

Answer: C

Explanation: A)
B)
C)
D)

For the function f , construct and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$.

300) $f(x) = \frac{x}{7-x}$

300) _____

A) $\frac{x}{(7-x+h)(7-x)}$

B) $\frac{hx}{(7-x-h)(7+x)}$

C) $-\frac{7}{(7-x+h)(7-x)}$

D) $\frac{7}{(7-x-h)(7-x)}$

Answer: D

Explanation: A)
B)
C)
D)

Answer the question.

301) How can the graph of $f(x) = -3\sqrt{x} + 7$ be obtained from the graph of $y = \sqrt{x}$?

301) _____

A) Shrink it vertically by a factor of $\frac{1}{3}$. Reflect it across the x -axis. Shift it vertically 7 units downward.

B) Stretch it vertically by a factor of 3. Reflect it across the y -axis. Shift it 7 units horizontally to the left.

C) Stretch it vertically by a factor of 3. Reflect it across the x -axis. Shift it vertically 7 units upward.

D) Stretch it vertically by a factor of 3. Reflect it across the x -axis. Shift it 7 units horizontally to the right.

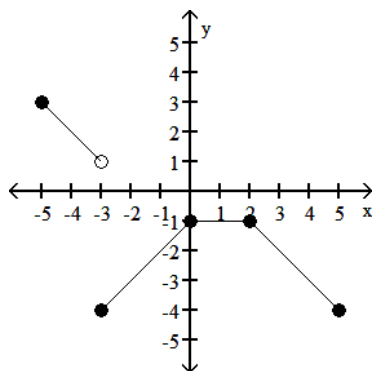
Answer: C

Explanation: A)
B)
C)
D)

Determine the intervals on which the function is increasing, decreasing, and constant.

302)

302) _____



- A) Increasing on $(-5, -3)$ and $(2, 5)$; Decreasing on $(-3, 0)$; Constant on $(0, 2)$
- B) Increasing on $(-3, -1)$; Decreasing on $(-5, -2)$ and $(2, 4)$; Constant on $(-1, 2)$
- C) Increasing on $(-3, 1)$; Decreasing on $(-5, -3)$ and $(0, 5)$; Constant on $(1, 2)$
- D) Increasing on $(-3, 0)$; Decreasing on $(-5, -3)$ and $(2, 5)$; Constant on $(0, 2)$

Answer: D

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

303) $f(x) = 3x^2 + 2$, $g(x) = 2x^3 + 7$

303) _____

Find the domain of $f + g$.

- A) $(-\infty, -3) \cup (-3, -2) \cup (-2, \infty)$
- B) $(0, \infty)$
- C) $(-\infty, \infty)$
- D) $(-\infty, 0) \cup (0, \infty)$

Answer: C

Explanation: A)
B)
C)
D)

Determine algebraically whether the function is even, odd, or neither even nor odd.

304) $f(x) = -2x^5 + 4x^3$

304) _____

- A) Even
- B) Odd
- C) Neither

Answer: B

Explanation: A)
B)
C)

Find $f(x)$ and $g(x)$ such that $h(x) = (f \circ g)(x)$.

305) $h(x) = \frac{9}{x^2} + 10$

305) _____

A) $f(x) = \frac{9}{x^2}$, $g(x) = 10$

B) $f(x) = x$, $g(x) = \frac{9}{x} + 10$

C) $f(x) = \frac{1}{x}$, $g(x) = \frac{9}{x} + 10$

D) $f(x) = x + 10$, $g(x) = \frac{9}{x^2}$

Answer: D

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

306) y varies directly as x and inversely as z , and $y = 7$ when $x = 14$ and $z = 12$.

306) _____

A) $y = 6xz$

B) $y = 7xz$

C) $y = \frac{6x}{z}$

D) $y = \frac{7x}{z}$

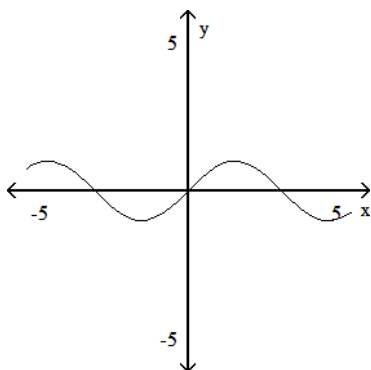
Answer: C

Explanation: A)
B)
C)
D)

Determine if the graph is symmetric with respect to x -axis, y -axis, and/or the origin.

307)

307) _____



A) x -axis

B) y -axis

C) origin

D) no symmetry

Answer: C

Explanation: A)
B)
C)
D)

Solve.

308) The distance D that a spring is stretched by a hanging object varies directly as the weight W of the object. If a 18-kg object stretches a spring 67 cm, how far will a 25-kg weight stretch the spring?

308) _____

- A) 6.7164 cm B) 3.72222222 cm C) 93.06 cm D) 110 cm

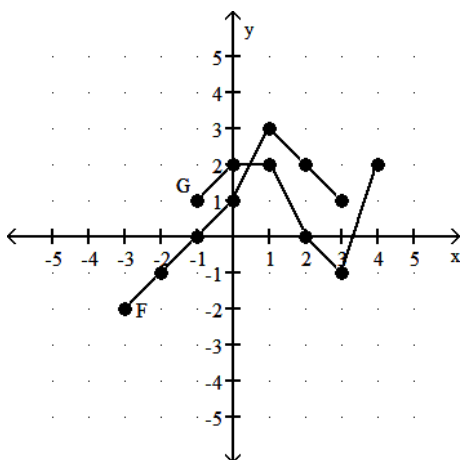
Answer: C

Explanation: A)
B)
C)
D)

Consider the functions F and G as shown in the graph. Provide an appropriate response.

309) Find the domain of $F - G$.

309) _____



- A) $[-3, 3]$ B) $[-1, 4]$ C) $[-3, 4]$ D) $[-1, 3]$

Answer: D

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

310) $f(x) = \frac{10}{x+3}$, $g(x) = x + 1$

310) _____

Find the domain of $f \circ g$.

- A) $(-\infty, -4] \cup [-4, \infty)$ B) $(-\infty, \infty)$
C) $(-\infty, -4) \cup (-4, \infty)$ D) $(-\infty, -3) \cup (-3, \infty)$

Answer: C

Explanation: A)
B)
C)
D)

Find the point that is symmetric to the given point with respect to the requested axis.

311) Symmetric with respect to the origin

311) _____

$(-1, 4)$

A) $(1, -4)$

B) $(-1, -4)$

C) $(4, -1)$

D) $(1, 4)$

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

312) $f(x) = \sqrt{6 - x}$; $g(x) = \sqrt{x - 3}$

312) _____

Find the domain of fg .

A) $(-\infty, 18) \cup (18, \infty)$

B) $(-\infty, 3) \cup (6, \infty)$

C) $(3, 6)$

D) $[3, 6]$

Answer: D

Explanation: A)
B)
C)
D)

Determine algebraically whether the function is even, odd, or neither even nor odd.

313) $f(x) = 7x^4 + 2x + 8$

313) _____

A) Even

B) Odd

C) Neither

Answer: C

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

314) y varies jointly as x and z and inversely as w , and $y = 105$ when $x = 5$, $z = 9$, and $w = 3$.

314) _____

A) $y = 7xzw$

B) $y = 105 \frac{xz}{w}$

C) $y = 105xzw$

D) $y = \frac{7xz}{w}$

Answer: D

Explanation: A)
B)
C)
D)

315) y varies jointly as x and the square of z , and $y = 750$ when $x = 6$ and $z = 5$

315) _____

A) $y = 5xz^2$

B) $y = \frac{150}{x\sqrt{z}}$

C) $y = 6xz^2$

D) $y = 25xz$

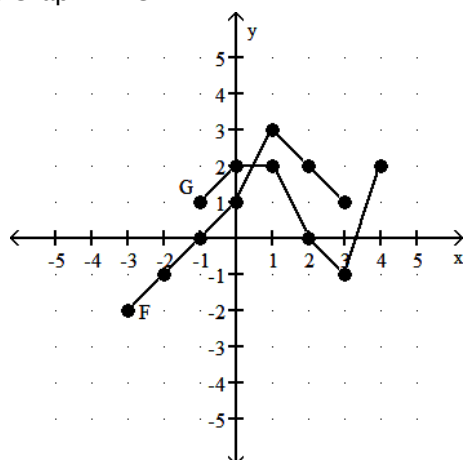
Answer: A

Explanation: A)
B)
C)
D)

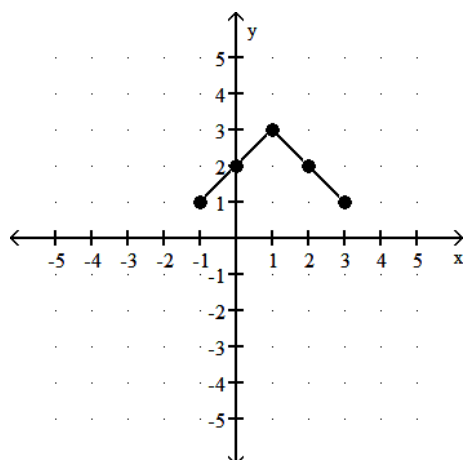
Consider the functions F and G as shown in the graph. Provide an appropriate response.

316) Graph $F + G$.

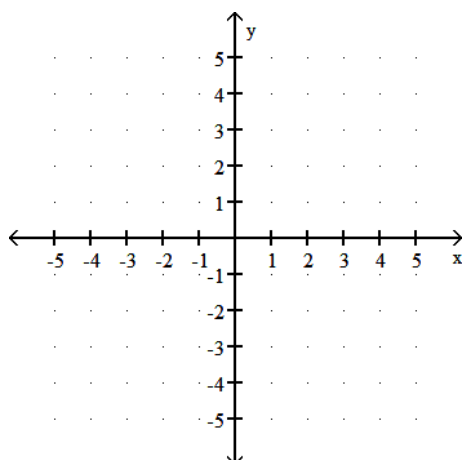
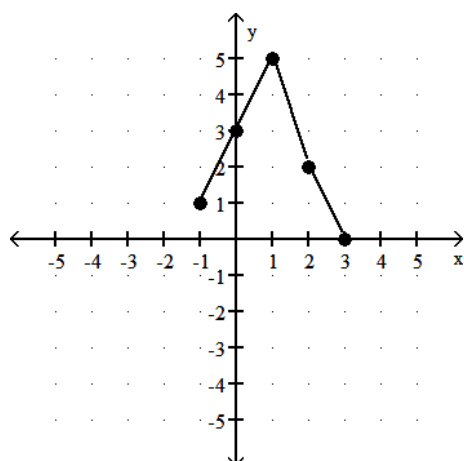
316) _____



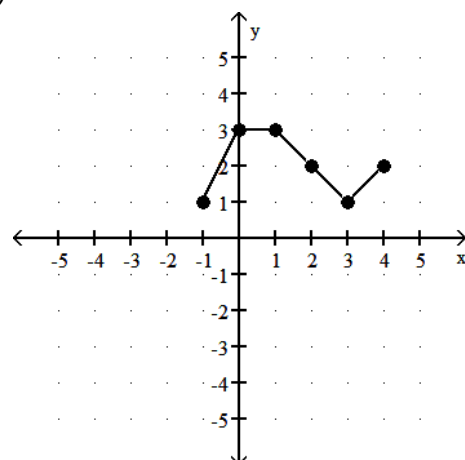
A)



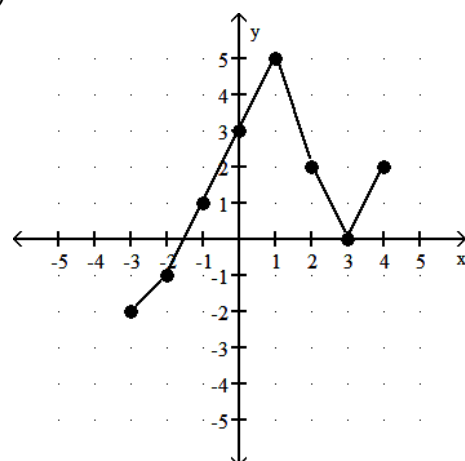
C)



B)



D)



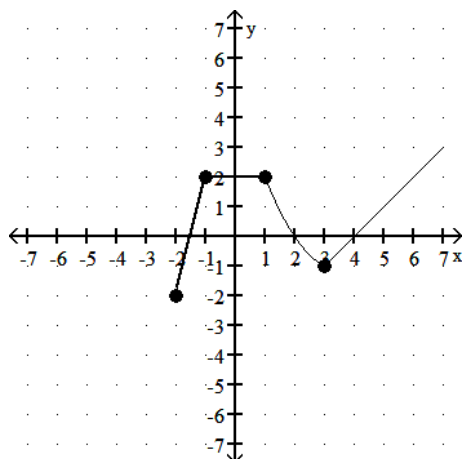
Answer: C

Explanation: A)
B)
C)
D)

Determine the domain and range of the function.

317)

317) _____



A) domain: $[-2, 2]$; range: $[-2, \infty)$

C) domain: $[-2, \infty)$; range: $[-2, \infty)$

B) domain: $[-2, \infty)$; range: $[-2, 2]$

D) domain: $(-2, \infty)$; range: $(-2, \infty)$

Answer: C

Explanation: A)
B)
C)
D)

Determine algebraically whether the graph is symmetric with respect to the x-axis, the y-axis, and the origin.

318) $xy = 4$

318) _____

A) y-axis only

B) x-axis only

C) Origin only

D) x-axis, y-axis, origin

Answer: C

Explanation: A)
B)
C)
D)

Answer the question.

319) How can the graph of $f(x) = \frac{1}{x+8} - 6$ be obtained from the graph of $y = \frac{1}{x}$?

319) _____

A) Shrink it horizontally by a factor of $\frac{1}{2}$. Shift it 6 units down.

B) Shift it horizontally 8 units to the left. Shift it 6 units down.

C) Shift it horizontally 8 units to the right. Stretch it vertically by a factor of 6.

D) Shift it horizontally 8 units to the left. Shift it 6 units up.

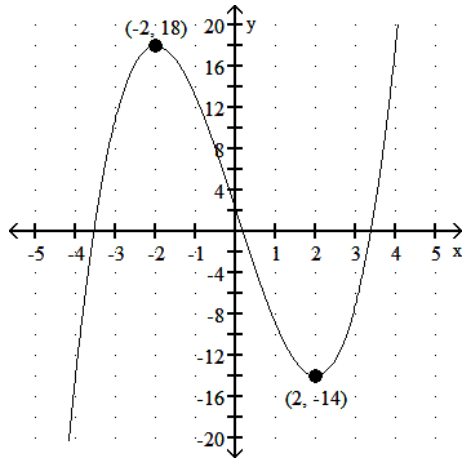
Answer: B

Explanation: A)
B)
C)
D)

Using the graph, determine any relative maxima or minima of the function and the intervals on which the function is increasing or decreasing. Round to three decimal places when necessary.

320) $f(x) = x^3 - 12x + 2$

320) _____



- A) relative maxima: 18 at $x = -2$ and 0 at $x = 0$; relative minimum: -14 at $x = 2$; increasing $(-\infty, -2)$, $(2, \infty)$; decreasing $(-2, 2)$
 B) relative maximum: -14 at $x = 2$; relative minimum: 18 at $x = -2$; increasing $(-2, 2)$; decreasing $(-\infty, -2)$, $(2, \infty)$
 C) relative maximum: 18 at $x = -2$; relative minimum: -14 at $x = 2$; increasing $(-\infty, -2)$, $(2, \infty)$; decreasing $(-2, 2)$
 D) no relative maxima or minima; increasing $(-\infty, -2)$, $(2, \infty)$; decreasing $(-2, 2)$

Answer: C

Explanation: A)
 B)
 C)
 D)

Solve the problem.

- 321) The volume of wood in a tree varies jointly as the height of the tree and the square of the distance around the tree trunk. If the volume of wood is 15.84 cubic feet when the height is 22 feet and the distance around the trunk is 3 feet, what is the volume of wood obtained from a tree that is 23 feet tall having a measurement of 6 feet around the trunk?

321) _____

- A) 75.24 ft^3 B) 58.24 ft^3 C) 70.24 ft^3 D) 66.24 ft^3

Answer: D

Explanation: A)
 B)
 C)
 D)

- 322) The resistance of a wire varies directly as the length of the wire and inversely as the square of the diameter of the wire. A 20 foot length of wire with a diameter of 0.1 inch has a resistance of 3 ohms. What would the resistance be for a 37 foot length, with diameter 0.01 inch, of the same kind of wire ? 322) _____

A) 555 ohms B) 552.5 ohms C) 567 ohms D) 548 ohms

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

- 323) $f(x) = 5x + 35$, $g(x) = x + 5$ 323) _____

Find the domain of $f \circ g$.

A) $(-\infty, 12) \cup (12, \infty)$ B) $(-\infty, -12] \cup [-12, \infty)$
C) $(-\infty, -12) \cup (-12, \infty)$ D) (∞, ∞)

Answer: D

Explanation: A)
B)
C)
D)

Write an equation for a function that has a graph with the given characteristics.

- 324) The shape of $y = \sqrt[3]{x}$ is shifted 7.6 units to the left. This graph is then vertically stretched by a factor of 4.1. Finally, the graph is reflected across the x-axis. 324) _____

A) $f(x) = 4.1\sqrt[3]{x + 7.6}$ B) $f(x) = -7.6\sqrt[3]{x + 4.1}$
C) $f(x) = -4.1\sqrt[3]{x + 7.6}$ D) $f(x) = -4.1\sqrt[3]{x - 7.6}$

Answer: C

Explanation: A)
B)
C)
D)

Solve.

- 325) The weight W of an object on the Moon varies directly as the weight E on earth. A person who weighs 191 lb on earth weighs 38.2 lb on the Moon. How much would a 140-lb person weigh on the Moon? 325) _____

A) 0.2 lb B) 700 lb C) 28 lb D) 369.2 lb

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

- 326) A balloon (in the shape of a sphere) is being inflated. The radius is increasing at a rate of 10 cm per second. Find a function, $r(t)$, for the radius in terms of t . Find a function, $V(r)$, for the volume of the balloon in terms of r . Find $(V \circ r)(t)$. 326) _____

A) $(V \circ r)(t) = \frac{5000\pi t^2}{3}$

B) $(V \circ r)(t) = \frac{700\pi t^3}{3}$

C) $(V \circ r)(t) = \frac{40000\pi t\sqrt{t}}{3}$

D) $(V \circ r)(t) = \frac{4000\pi t^3}{3}$

Answer: D

Explanation: A)
B)
C)
D)

Answer Key

Testname: C2

- 1) C
- 2) B
- 3) C
- 4) A
- 5) C
- 6) D
- 7) C
- 8) A
- 9) C
- 10) D
- 11) D
- 12) D
- 13) B
- 14) C
- 15) C
- 16) B
- 17) B
- 18) B
- 19) B
- 20) D
- 21) B
- 22) C
- 23) B
- 24) A
- 25) D
- 26) C
- 27) B
- 28) A
- 29) A
- 30) B
- 31) A
- 32) D
- 33) C
- 34) A
- 35) C
- 36) D
- 37) A
- 38) D
- 39) A
- 40) D
- 41) B
- 42) D
- 43) C
- 44) D
- 45) C
- 46) B
- 47) D
- 48) C
- 49) C
- 50) A

Answer Key
Testname: C2

- 51) C
- 52) C
- 53) D
- 54) D
- 55) B
- 56) B
- 57) A
- 58) B
- 59) B
- 60) C
- 61) B
- 62) D
- 63) A
- 64) C
- 65) C
- 66) D
- 67) C
- 68) B
- 69) D
- 70) B
- 71) C
- 72) D
- 73) C
- 74) D
- 75) C
- 76) D
- 77) D
- 78) D
- 79) A
- 80) A
- 81) C
- 82) B
- 83) A
- 84) D
- 85) B
- 86) A
- 87) B
- 88) B
- 89) A
- 90) B
- 91) A
- 92) C
- 93) B
- 94) C
- 95) A
- 96) A
- 97) B
- 98) D
- 99) D
- 100) A

Answer Key

Testname: C2

- 101) B
- 102) D
- 103) B
- 104) A
- 105) C
- 106) C
- 107) D
- 108) C
- 109) D
- 110) D
- 111) C
- 112) D
- 113) D
- 114) C
- 115) B
- 116) C
- 117) A
- 118) B
- 119) D
- 120) B
- 121) B
- 122) B
- 123) C
- 124) B
- 125) C
- 126) A
- 127) B
- 128) B
- 129) B
- 130) D
- 131) C
- 132) C
- 133) D
- 134) B
- 135) A
- 136) C
- 137) D
- 138) C
- 139) D
- 140) D
- 141) A
- 142) B
- 143) A
- 144) C
- 145) A
- 146) B
- 147) A
- 148) C
- 149) B
- 150) D

Answer Key

Testname: C2

- 151) B
- 152) C
- 153) C
- 154) B
- 155) D
- 156) A
- 157) D
- 158) C
- 159) A
- 160) D
- 161) A
- 162) D
- 163) D
- 164) D
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- 166) D
- 167) C
- 168) A
- 169) B
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- 171) C
- 172) A
- 173) C
- 174) A
- 175) B
- 176) A
- 177) A
- 178) D
- 179) D
- 180) D
- 181) B
- 182) A
- 183) D
- 184) C
- 185) A
- 186) B
- 187) A
- 188) C
- 189) B
- 190) A
- 191) C
- 192) A
- 193) B
- 194) C
- 195) C
- 196) B
- 197) D
- 198) D
- 199) D
- 200) A

Answer Key

Testname: C2

- 201) A
- 202) B
- 203) A
- 204) D
- 205) B
- 206) C
- 207) D
- 208) D
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- 210) D
- 211) C
- 212) A
- 213) B
- 214) A
- 215) B
- 216) C
- 217) C
- 218) D
- 219) B
- 220) D
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- 225) B
- 226) A
- 227) B
- 228) D
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- 230) C
- 231) C
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- 239) B
- 240) D
- 241) A
- 242) C
- 243) C
- 244) D
- 245) D
- 246) A
- 247) D
- 248) B
- 249) A
- 250) B

Answer Key

Testname: C2

- 251) C
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- 253) D
- 254) A
- 255) A
- 256) C
- 257) B
- 258) B
- 259) C
- 260) D
- 261) D
- 262) C
- 263) C
- 264) A
- 265) B
- 266) B
- 267) A
- 268) A
- 269) A
- 270) C
- 271) A
- 272) A
- 273) A
- 274) D
- 275) A
- 276) D
- 277) A
- 278) C
- 279) C
- 280) A
- 281) B
- 282) C
- 283) A
- 284) D
- 285) B
- 286) D
- 287) D
- 288) D
- 289) B
- 290) D
- 291) D
- 292) A
- 293) A
- 294) B
- 295) B
- 296) A
- 297) A
- 298) C
- 299) C
- 300) D

Answer Key
Testname: C2

- 301) C
- 302) D
- 303) C
- 304) B
- 305) D
- 306) C
- 307) C
- 308) C
- 309) D
- 310) C
- 311) A
- 312) D
- 313) C
- 314) D
- 315) A
- 316) C
- 317) C
- 318) C
- 319) B
- 320) C
- 321) D
- 322) A
- 323) D
- 324) C
- 325) C
- 326) D