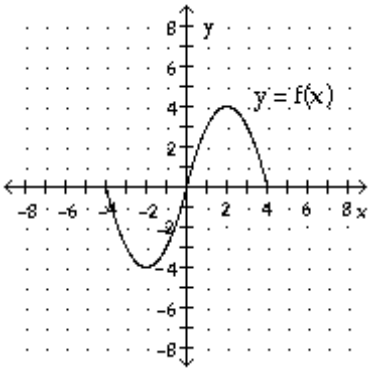
Exam

Name_____

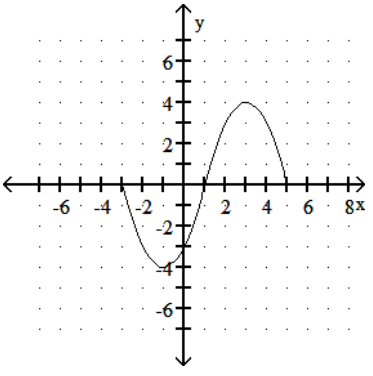
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

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

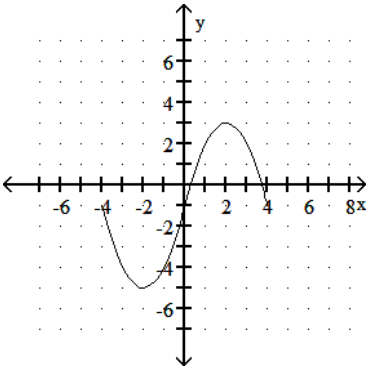
1) g(x) = f(x - 1) 1) _____



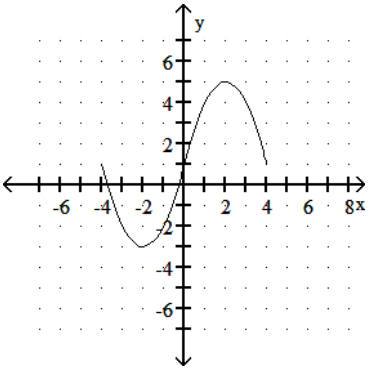
A)



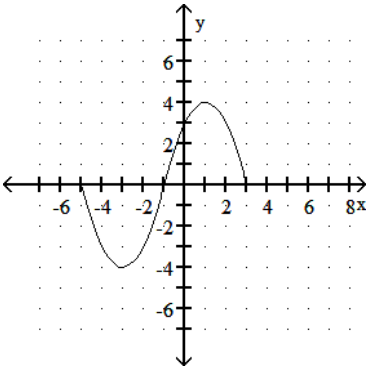
B)



C)



D)

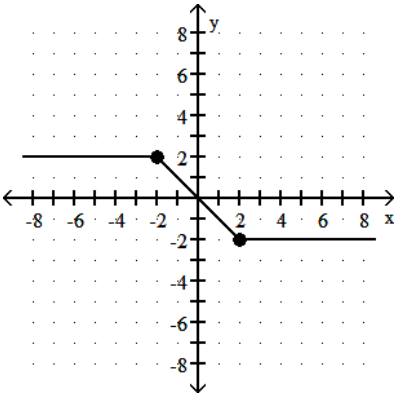


Answer: A

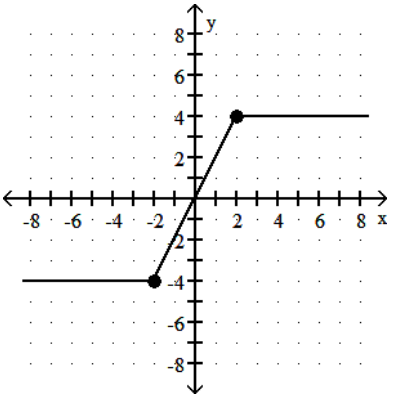
Explanation: A)
B)
C)
D)

2) g(x) = 2f(x)

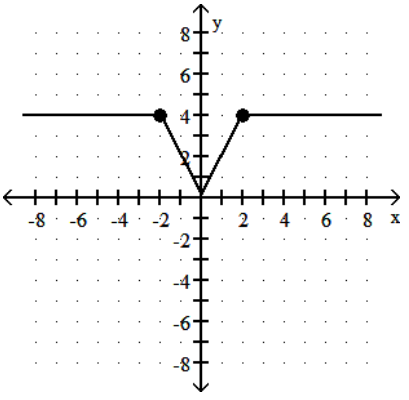
2) _____



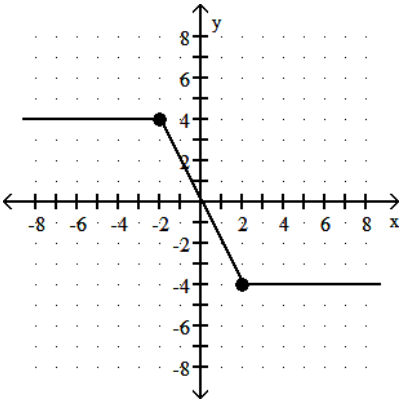
A)



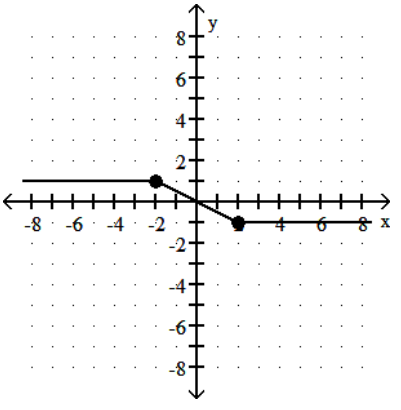
B)



C)



D)



Answer: C

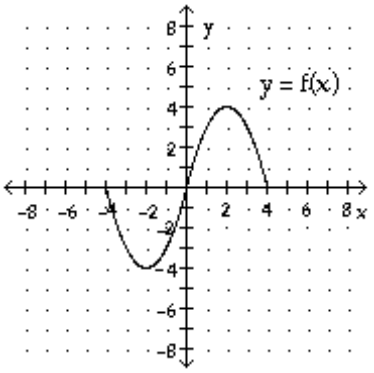
Explanation: A)

B)

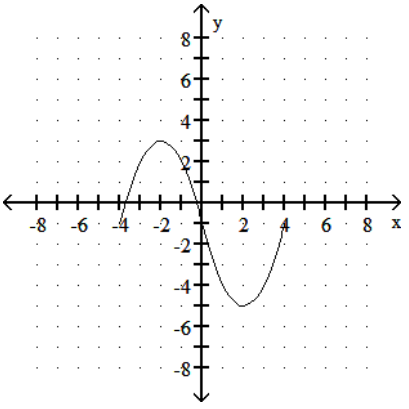
C)

D)

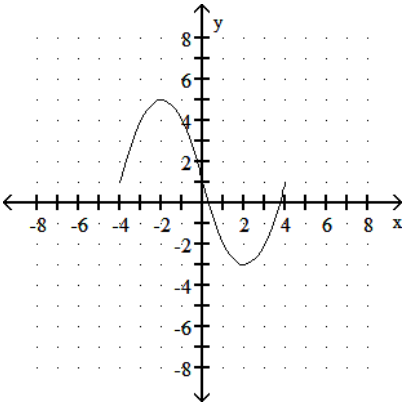
3) g(x) = - f(- x) - 1 3) _____



A)



B)



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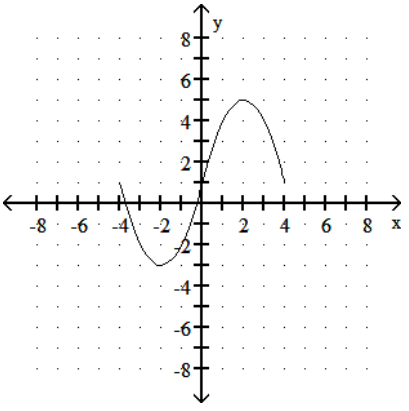
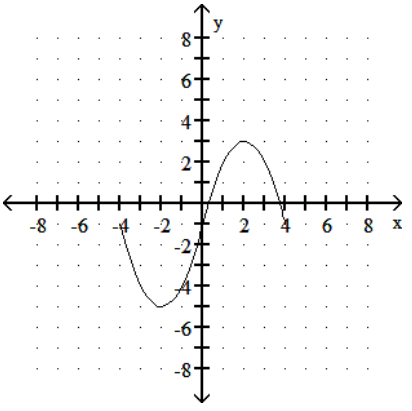


D)



Answer: D

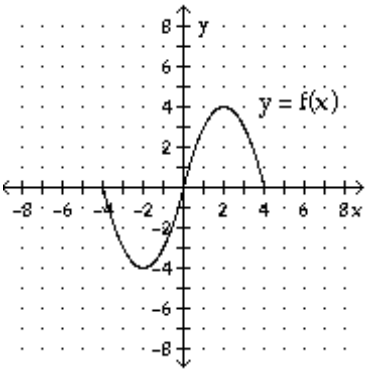
Explanation: A)

B)

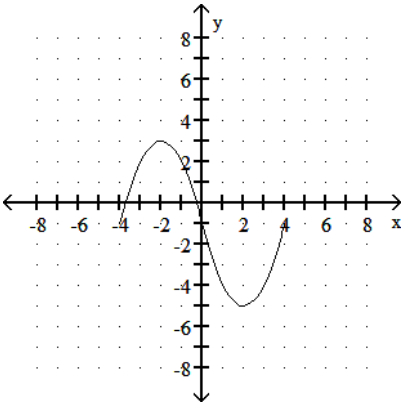
C)

D)

4) g(x) = f(- x) + 1 4) _____



A)



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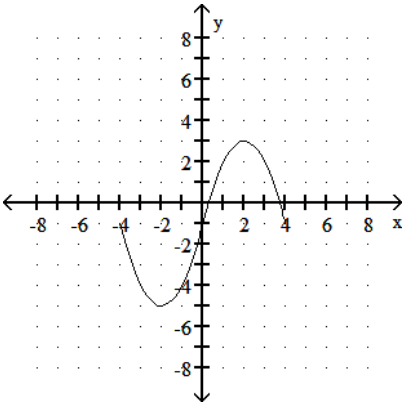
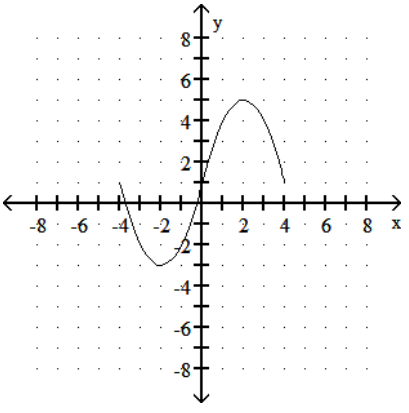
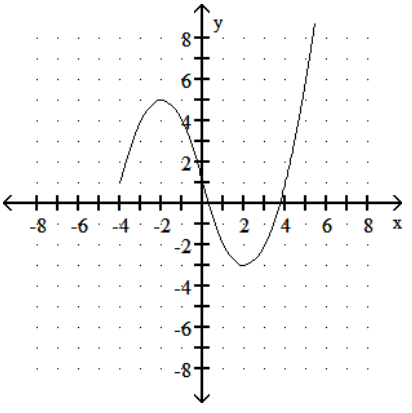


C)



D)



Answer: D

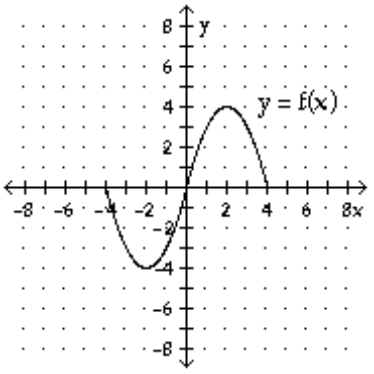
Explanation: A)

B)

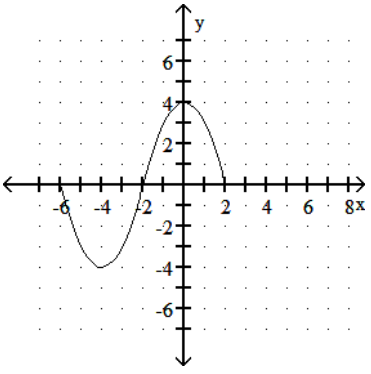
C)

D)

5) g(x) = f(x) - 2 5) _____



A)



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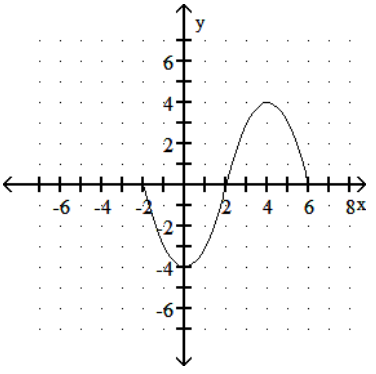
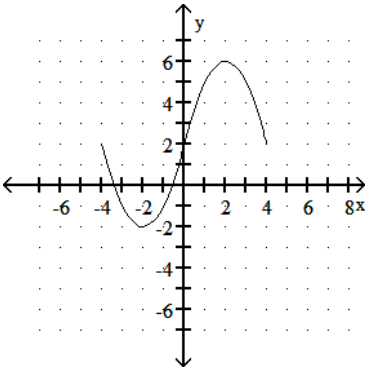
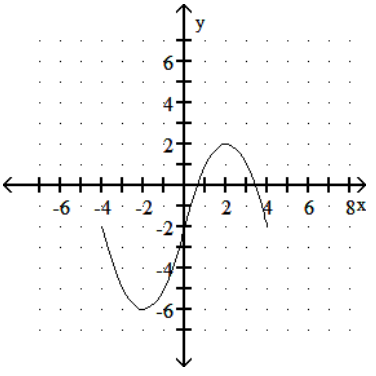


C)



D)



Answer: D

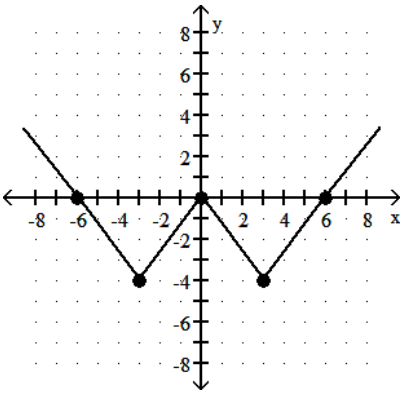
Explanation: A)

B)

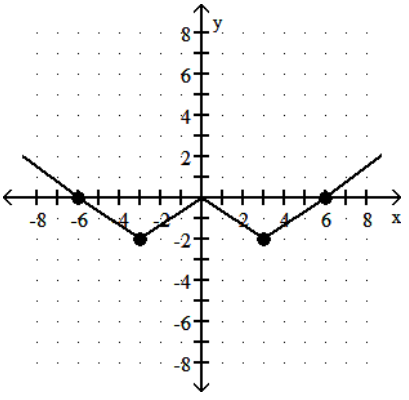
C)

D)

6) $g(x) = -\frac{1}{2}f(x)$ 6) _____



A)



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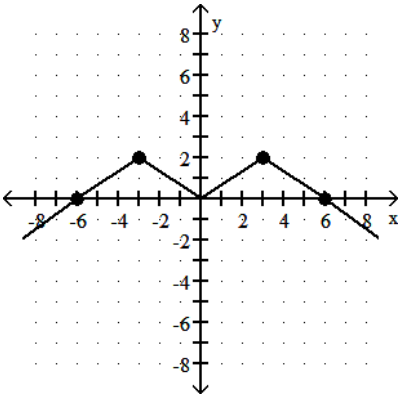

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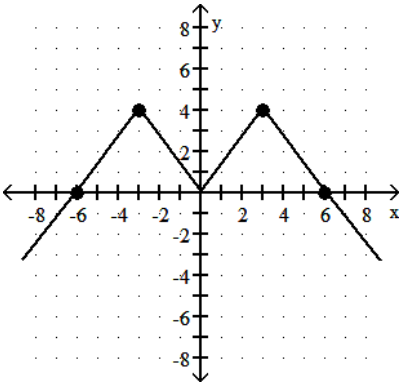
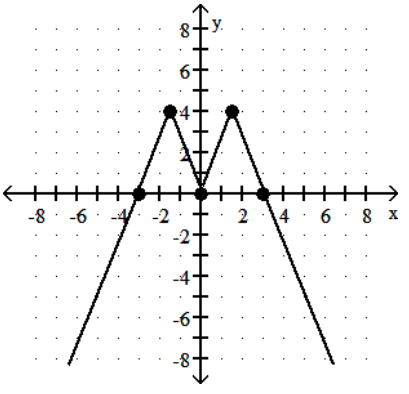


D)



Answer: B

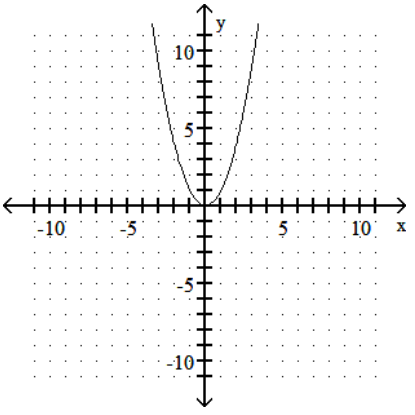
Explanation: A)

B)

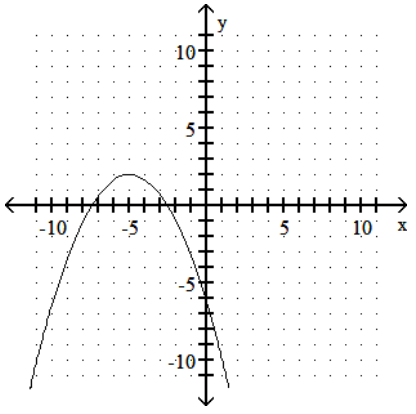
C)

D)

7) $g(x) = -3f(x + 5)^2 + 2$ 7) _____



A)



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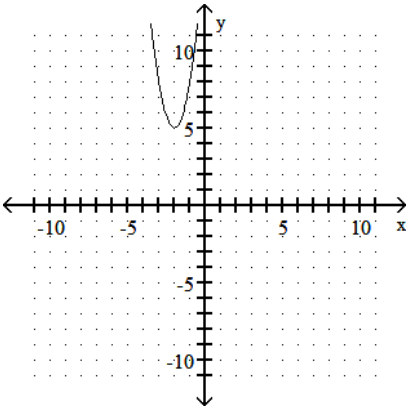
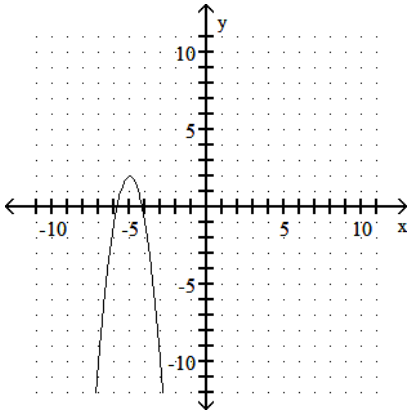
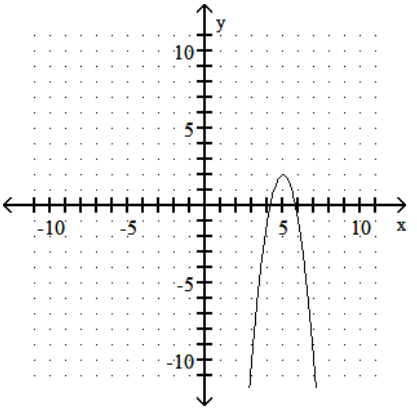


C)



D)



Answer: C

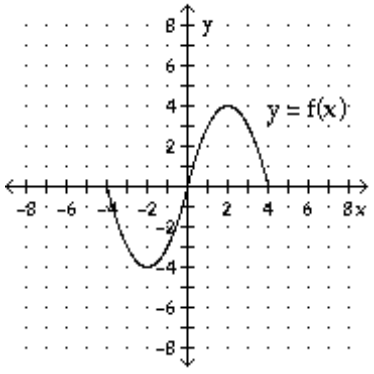
Explanation: A)

B)

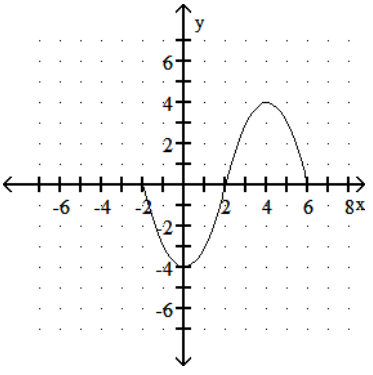
C)

D)

8) g(x) = f(x + 2) 8) _____



A)



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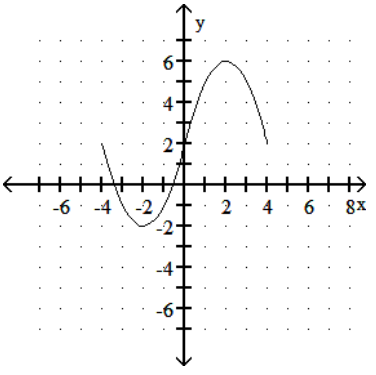
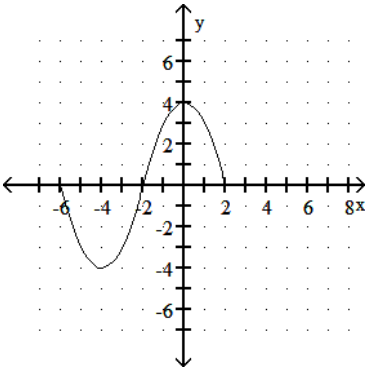
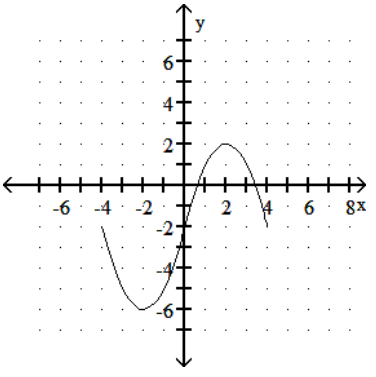


C)



D)



Answer: C

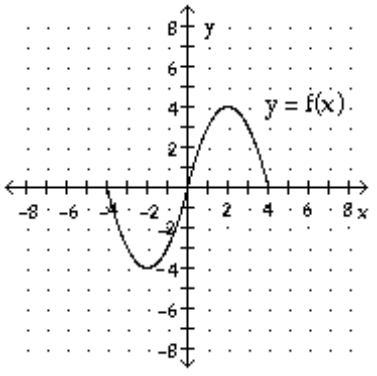
Explanation: A)

B)

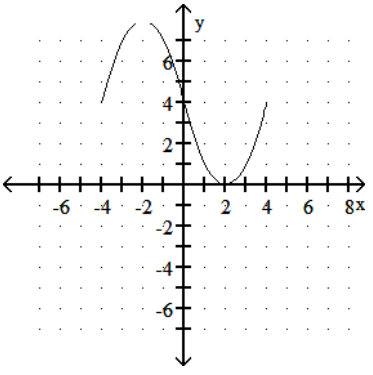
C)

D)

9) g(x) = - f(x) - 4 9) _____



A)



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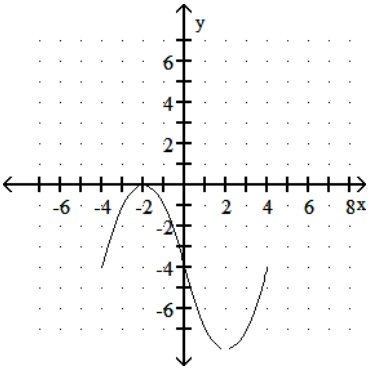
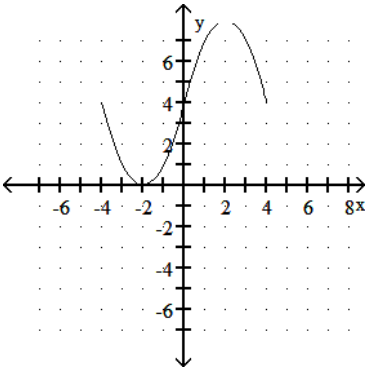
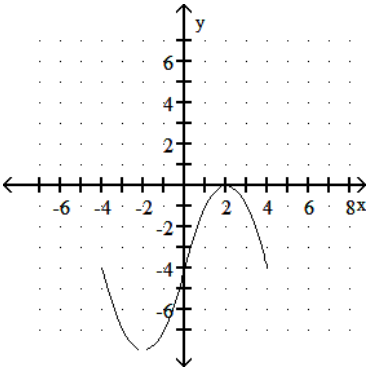


C)



D)



Answer: B

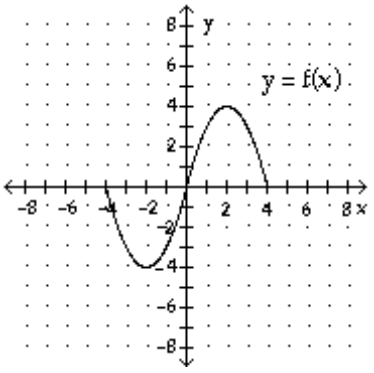
Explanation: A)

B)

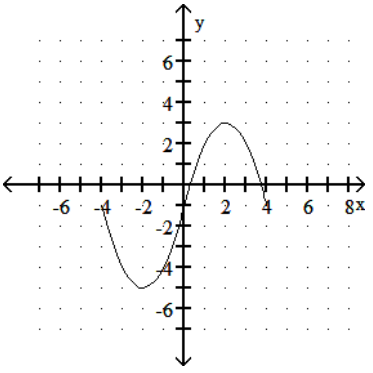
C)

D)

10) g(x) = - f(- x) + 1 10) _____



A)



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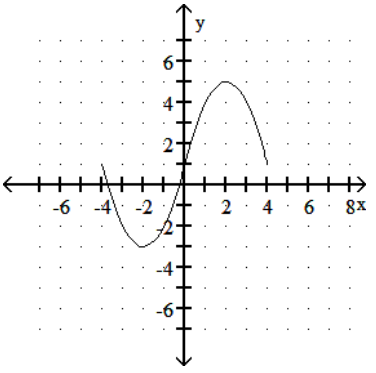
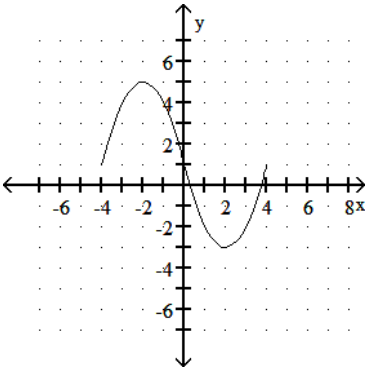
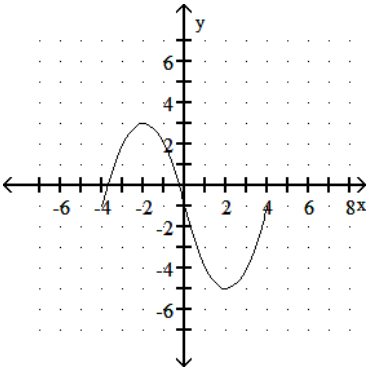


C)



D)



Answer: B

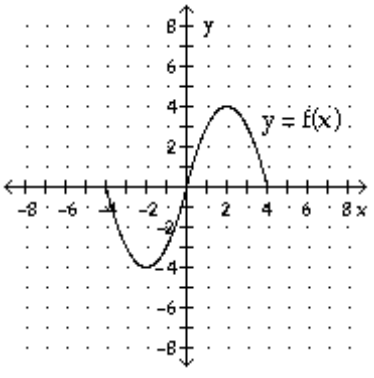
Explanation: A)

B)

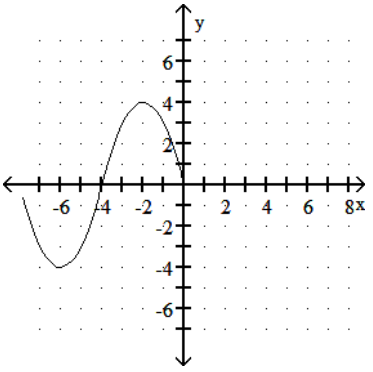
C)

D)

11) g(x) = f(x) + 4 11) _____



A)



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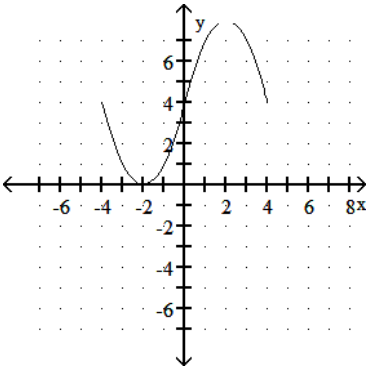
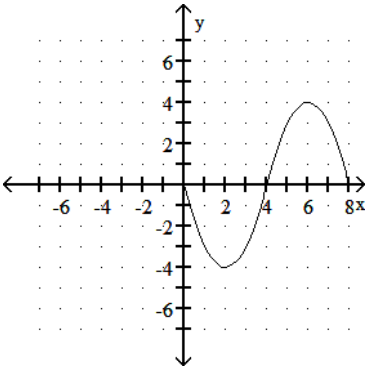
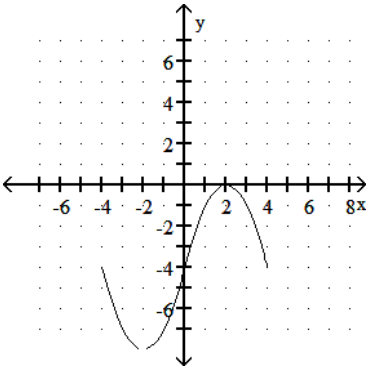


C)



D)



Answer: B
Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

12) p varies directly as q, and p = 1 when q = $\frac{1}{14}$. 12) _____

A) p = 13q B) p = 14q C) p = $\frac{1}{14}$q D) p = 15q

Answer: B
Explanation: A)
B)
C)
D)

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

13) Symmetric with respect to the y-axis 13) _____
(1.5, 1.75)

A) (-1.5, -1.75) B) (1.5, -1.5) C) (1.75, 1.5) D) (-1.5, 1.75)

Answer: D
Explanation: A)
B)
C)
D)

For the piecewise function, find the specified function value.

14) $f(x) = \begin{cases} 7x + 7, & \text{for } x \le 0, \\ 2 - 6x, & \text{for } 0 < x < 6, \\ x, & \text{for } x \ge 6 \end{cases}$ 14) _____

f(7)

A) 6 B) 7 C) 56 D) -40

Answer: B

Explanation: A)
B)
C)
D)

Answer the question.

15) How can the graph of $f(x) = \frac{1}{-x} - 11$ be obtained from the graph of $y = \frac{1}{x}$? 15) _____

A) Reflect it across the y-axis. Shift it 11 units up.
B) Reflect it across the x-axis. Shift it 11 units down.
C) Reflect it across the y-axis. Shift it 11 units down.
D) Reflect it across the x-axis. Shift it 11 units up.

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

16) The weight that a horizontal beam can support varies inversely as the length of the beam. Suppose that a 10-m beam can support 520 kg. How many kilograms can a 2-m beam support? 16) _____

A) 0.0004 kg B) 2600 kg C) 0.0385 kg D) 26 kg

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) = 2f(x); (2, 4) 17) _____

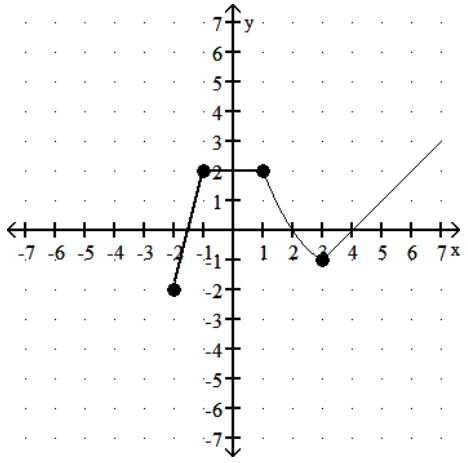
A) (2, 8) B) (4, 4) C) (5, 1) D) (1, 4)

Answer: A

Explanation: A)
B)
C)
D)

Determine the domain and range of the function.

18) 18) _____



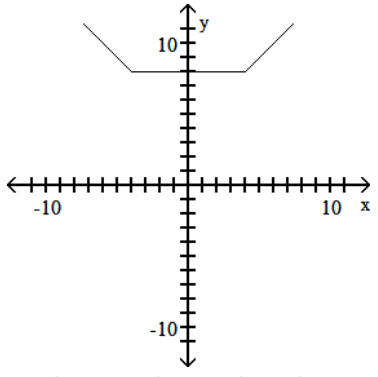
A) domain: (-2, ∞); range: (-2, ∞)
B) domain: [-2, 2]; range: [-2, ∞)
C) domain: [-2, ∞); range: [-2, 2]
D) domain: [-2, ∞); range: [-2, ∞)

Answer: D

Explanation: A)
B)
C)
D)

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

19) 19) _____



A) Increasing on (-∞, 4); Decreasing on (-4, ∞); Constant on (4, ∞)
B) Increasing on (4, ∞); Decreasing on (-4, ∞); Constant on (-4, 4)
C) Increasing on (4, ∞); Decreasing on (-∞, -4); Constant on (-4, 4)
D) Increasing on (-∞, 4); Decreasing on (-∞, -4); Constant on (4, ∞)

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).

20) $g(x) = f\left(-\frac{1}{2}x\right)$; (3, -2) 20) _____

A) (6, 2) B) (-6, -2) C) $\left(\frac{1}{6}, -3\right)$ D) $\left(-\frac{3}{2}, -3\right)$

Answer: B
Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated composition.

21) $f(x) = \frac{7}{x}$, $g(x) = 8x^5$ 21) _____

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

A) $\frac{134{,}456}{x^5}$ B) $\frac{8x^5}{7}$ C) $\frac{8x^5}{16{,}807}$ D) $\frac{7}{8x^5}$

Answer: A
Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

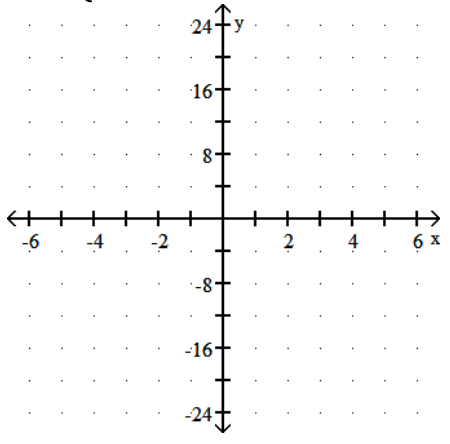
22) y varies jointly as x and w and inversely as z, and $y = \frac{33}{2}$ when x = 2, w = 5, and z = 20. 22) _____

A) $y = \frac{33xw}{z}$ B) $y = \frac{22z}{xw}$ C) $y = 28xwz$ D) $y = \frac{30xw}{z^2}$

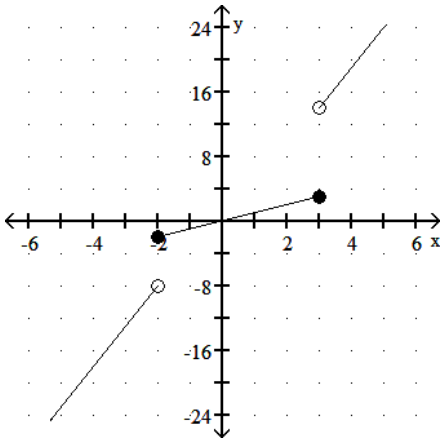
Answer: A
Explanation: A)
B)
C)
D)

Graph the function.

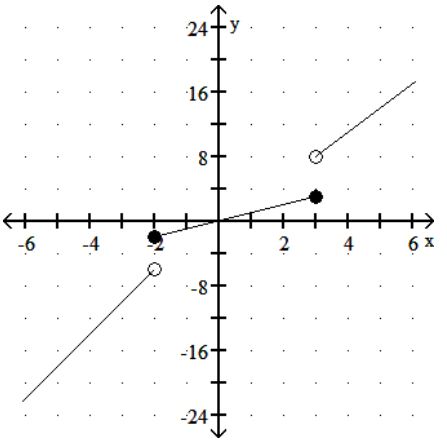
23) $f(x) = \begin{cases} 4x + 2 & \text{for } x < -2 \\ x & \text{for } -2 \le x \le 3 \\ 3x - 1 & \text{for } x > 3 \end{cases}$ 23) _____



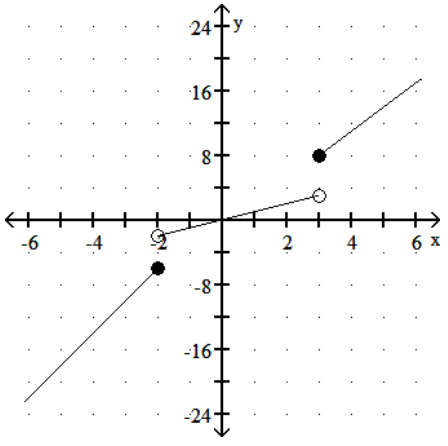
A)



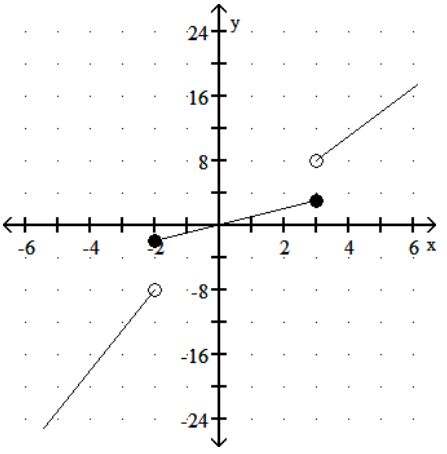
B)



C)



D)



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.

24) $y = (x - 9)(x + 9)$ 24) _____

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

Answer: A

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

25) y varies jointly as x and z, and y = 76.56 when x = 5.8 and z = 6 25) _____

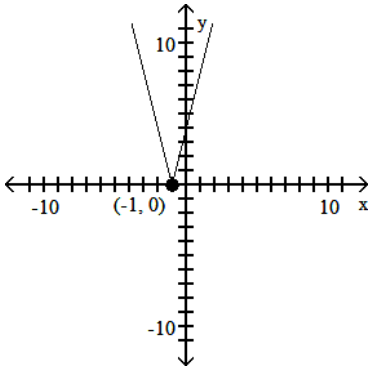
A) $y = \frac{2.2}{xz}$ B) y = 0.22xz C) y = 5.2xz D) y = 2.2xz

Answer: D

Explanation: A)
B)
C)
D)

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

26) 26) _____



A) Increasing on (- ∞, 1); Decreasing on (1, ∞)
B) Increasing on (1, ∞); Decreasing on (- ∞, 1)
C) Increasing on (-1, ∞); Decreasing on (- ∞, -1)
D) Increasing on (- ∞, -1); Decreasing on (-1, ∞)

Answer: C

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

27) y varies jointly as x and z and inversely as the product of w and p, and $y = \frac{9}{5}$ when x = 1, z = 9, 27) _____

w = 5 and p = 8.

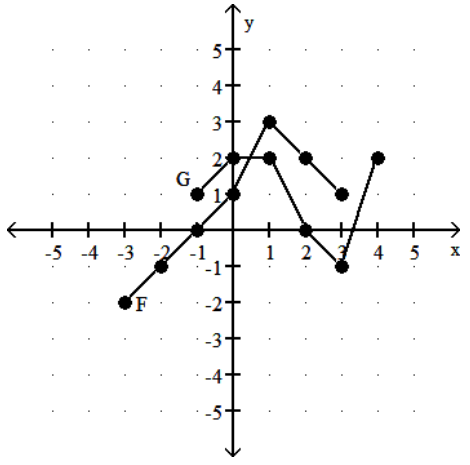
A) $y = \frac{8xz}{wp}$ B) $y = \frac{11wp}{xz}$ C) $y = \frac{72xz}{wp}$ D) y = 73pwxz

Answer: A

Explanation: A)
B)
C)
D)

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

28) Find the domain of F + G. 28) _____



A) [-3,4] B) [-1,4] C) [-1,3] D) [-3,3]

Answer: C

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

29) f(x) = 7x + 21, g(x) = x + 8 29) _____

Find the domain of f ∘g.

A) (-∞, 11) ∪ (11, ∞) B) (-∞, -11] ∪ [-11, ∞)

C) (-∞, -11) ∪ (-11, ∞) D) (∞ , ∞)

Answer: D

Explanation: A)
B)
C)
D)

Answer the question.

30) How can the graph of $f(x) = \frac{1}{2}(x + 6)^2 - 10$ be obtained from the graph of $y = x^2$? 30) _____

A) Shift it horizontally 6 units to the left. Shrink it vertically by a factor of $\frac{1}{2}$. Shift it 10 units down.

B) Shift it horizontally 6 units to the right. Shrink it vertically by a factor of $\frac{1}{2}$. Shift it 10 units down.

C) Shift it horizontally 6 units to the right. Stretch it vertically by a factor of 2. Shift it 10 units up.

D) Shift it horizontally 6 units to the left. Shrink it vertically by a factor of 2. Shift it 10 units down.

Answer: A

Explanation: A)
B)
C)
D)

Find f(x) and g(x) such that h(x) = (f ∘g)(x).

31) $h(x) = \frac{8}{\sqrt{7x + 3}}$ 31) _____

A) $f(x) = \frac{8}{x}$, g(x) = 7x + 3

B) f(x) = 8, $g(x) = \sqrt{7x + 3}$

C) $f(x) = \sqrt{7x + 3}$, g(x) = 8

D) $f(x) = \frac{8}{\sqrt{x}}$, g(x) = 7x + 3

Answer: D

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

32) f(x) = 2x - 5, $g(x) = \sqrt{x + 2}$ 32) _____

Find the domain of f + g.

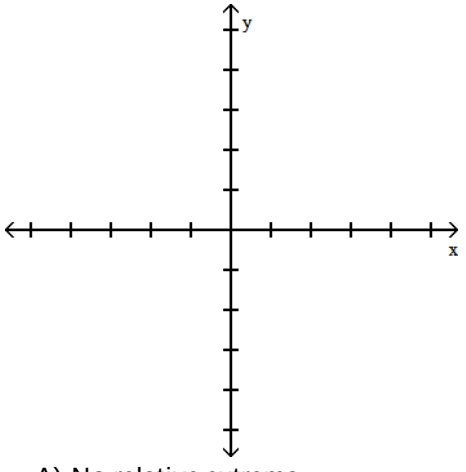
A) [-2, ∞) B) (-2, 2) C) [0, ∞) D) [2, ∞)

Answer: A

Explanation: A)
B)
C)
D)

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

33) f(x) = 4 - |x| 33) _____



A) No relative extrema

B) Relative minimum of 4 at x = 0

C) Relative maximum of 4.5 at x = 0

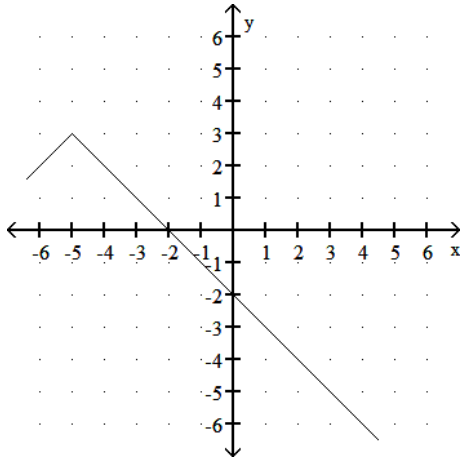
D) Relative maximum of 4 at x = 0

Answer: D

Explanation: A)
B)
C)
D)

Determine the domain and range of the function.

34) 34) _____



A) domain: $(-\infty, -5) \cup (-5, \infty)$; range: $(-\infty, 3) \cup (3, \infty)$
B) domain: $(-\infty, \infty)$; range: $(-\infty, 3]$
C) domain: $(-\infty, -5]$; range: $(-\infty, 3]$
D) domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$

Answer: B
Explanation: A)
B)
C)
D)

Solve the problem.

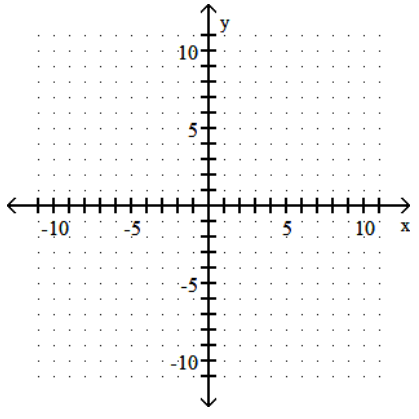
35) The number of miles per gallon of gasoline that a vehicle averages varies inversely as the average speed the car travels. A vehicle gets 15 miles per gallon at 57 mph. How many miles per gallon will it get at 35 mph? 35) _____

A) 0.11 mpg B) 0.04 mpg C) 9.2 mpg D) 24.4 mpg

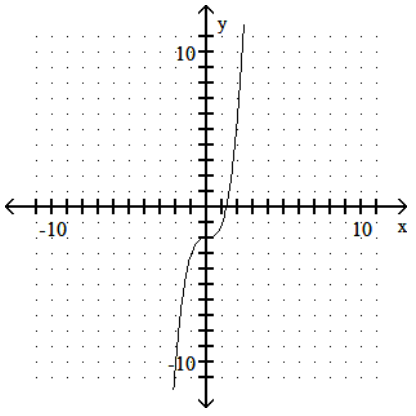
Answer: D
Explanation: A)
B)
C)
D)

Graph the function.

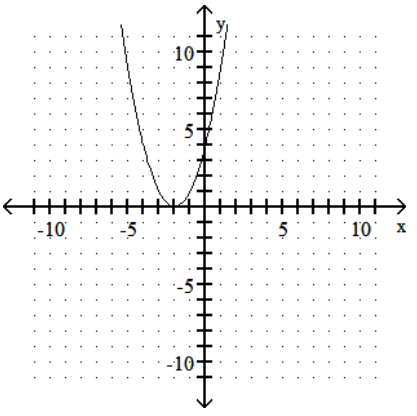
36) $g(x) = (x + 2)^3$ 36) _____



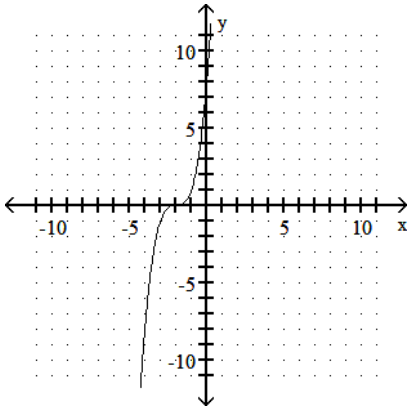
A)



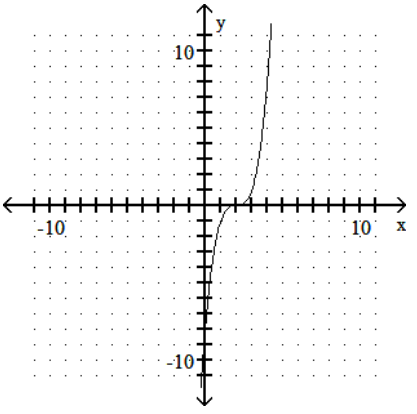
B)



C)



D)



Answer: C

Explanation: A)

B)

C)

D)

Solve the problem.

37) The pitch P of a musical tone varies inversely as its wavelength W. One tone has a pitch of 473 vibrations per second and a wavelength of 6.5 ft. Find the wavelength of another tone that has a pitch of 373 vibrations per second. 37) _____

A) 0.12 ft B) 27,142.9 ft C) 0.000037 ft D) 8.2 ft

Answer: D

Explanation: A)

B)

C)

D)

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

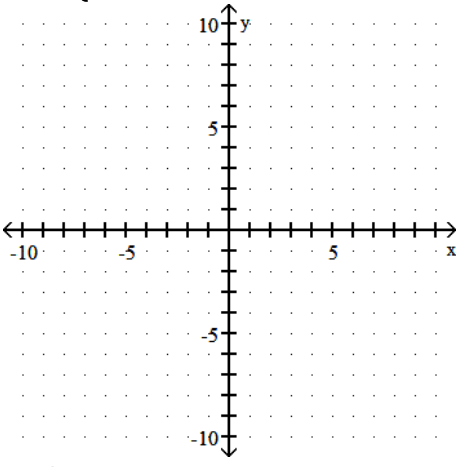
38) f(x) = 5x - 8 38) _____

A) $5 + \frac{-16}{h}$ B) $5 + \frac{10(x - 8)}{h}$ C) 5 D) 0

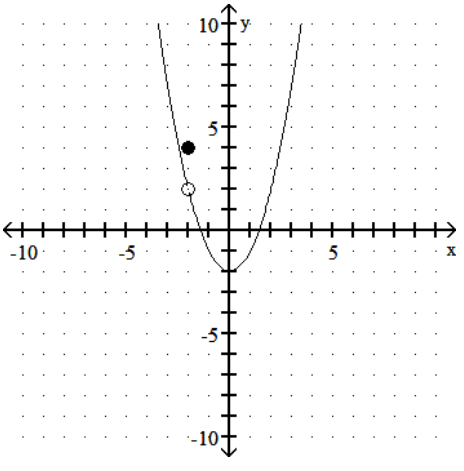
Answer: C
Explanation: A)
B)
C)
D)

Graph the function.

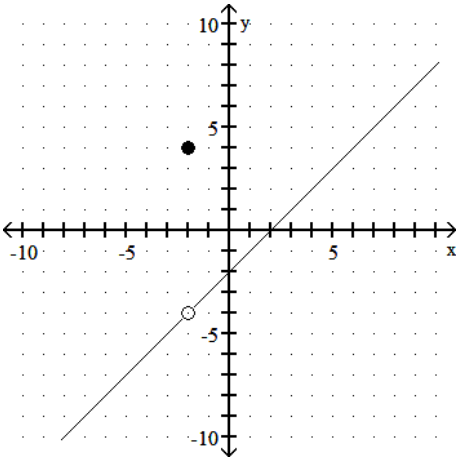
39) $f(x) = \begin{cases} \frac{x^2 - 4}{x + 2}, & \text{for } x \neq -2, \\ 4, & \text{for } x = -2 \end{cases}$ 39) _____



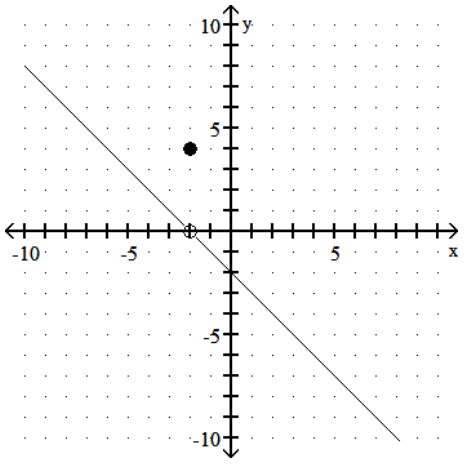
A)



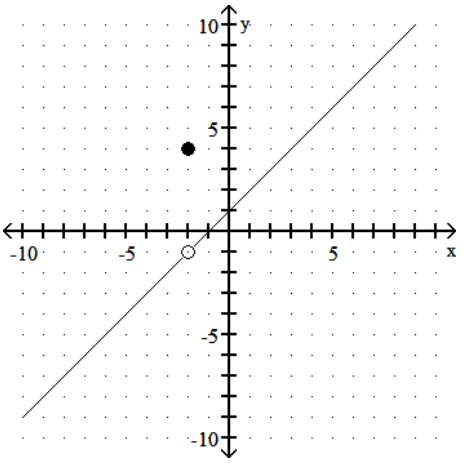
B)



C)



D)



Answer: B
Explanation: A)
B)
C)
D)

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

40) $f(x) = \frac{1}{x + 22}$ 40) _____

A) $\frac{1}{(x + h + 22)(x + 22)}$

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

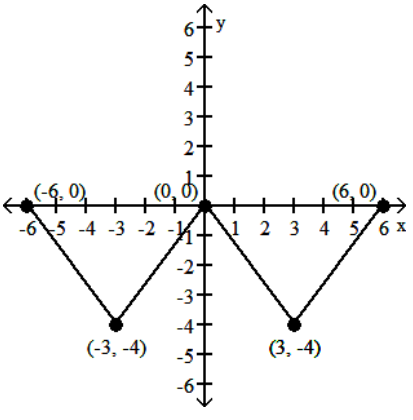
C) $-\frac{22}{(x + h + 22)(x + 22)}$

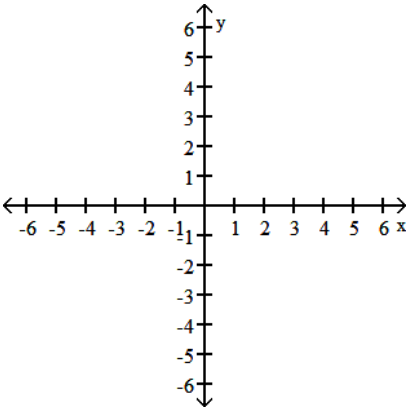
D) $-\frac{1}{(x + h + 22)(x + 22)}$

Answer: D
Explanation: A)
B)
C)
D)

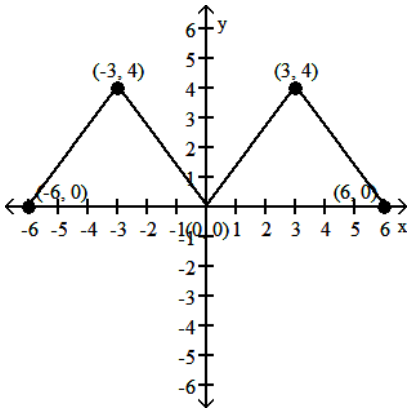
A graph of y = f(x) follows. No formula for f is given. Graph the given equation.

41) $y = -\frac{1}{2}f(x)$ 41) _____

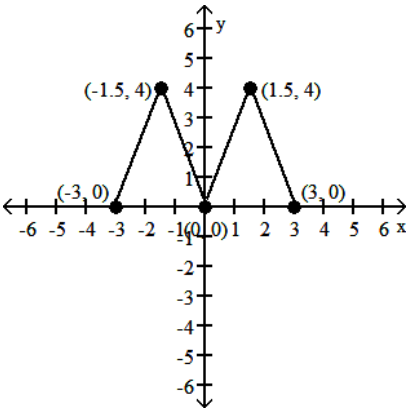




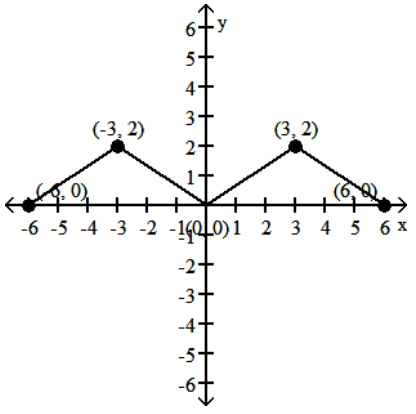
A)



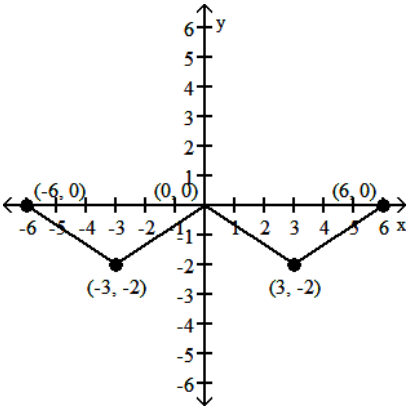
B)



C)



D)



Answer: C

Explanation: A)

B)

C)

D)

Answer the question.

42) How can the graph of $f(x) = -(x - 8)^2 + 5$ be obtained from the graph of $y = x^2$? 42) _____

A) Shift it horizontally 8 units to the right. Reflect it across the y-axis. Shift it 5 units up.

B) Shift it horizontally 8 units to the left. Reflect it across the x-axis. Shift it 5 units up.

C) Shift it horizontally 8 units to the right. Reflect it across the x-axis. Shift it 5 units up.

D) Shift it horizontally 8 units to the right. Reflect it across the y-axis. Shift it 5 units down.

Answer: C

Explanation: A)

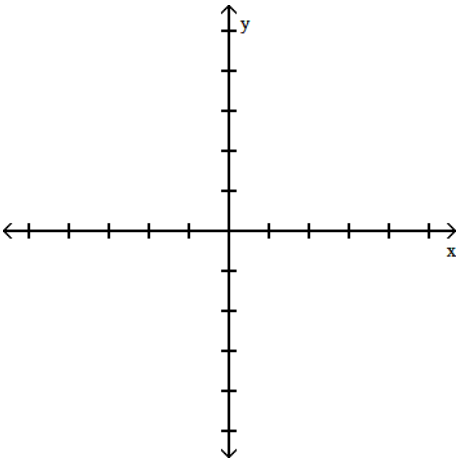
B)

C)

D)

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

43) $f(x) = x^2 + 8x + 13$ 43) _____



A) Relative minimum of -3 at x = -4
B) Relative maximum of -3 at x = -4
C) Relative maximum of -3.2 at x = -4.1
D) Relative minimum of -3.2 at x = -4.1

Answer: A
Explanation: A)
B)
C)
D)

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

44) $h(x) = x - 1,\ g(x) = \sqrt{x + 9}$ 44) _____

Find (hg)(-4).

A) $-5 - \sqrt{5}$ B) does not exist C) $-5\sqrt{5}$ D) $-3\sqrt{5}$

Answer: C
Explanation: A)
B)
C)
D)

Solve the problem.

45) 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 11 inches? 45) _____

A) 69.08 in^2 B) 34.54 in^2 C) 379.94 in^2 D) 382.34 in^2

Answer: C
Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

46) $f(x) = x^2 - 36,\ g(x) = 2x + 3$ 46) _____

Find the domain of g/f.

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

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

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

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

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

47) The current I in an electrical conductor varies inversely as the resistance R of the conductor. The current is 2 amperes when the resistance is 747 ohms. What is the current when the resistance is 402 ohms? 47) _____

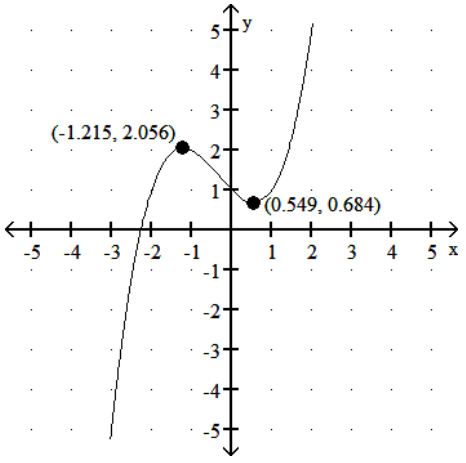
A) 0.27 amp B) 1.1 amp C) 0.93 amp D) 3.7 amp

Answer: D

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.

48) $f(x) = \frac{1}{2}x^3 + \frac{1}{2}x^2 - x + 1$ 48) _____



A) relative maximum: 2.056 at x = -1.215; relative minima: 0.684 at x = 0.549 and 1 at x = 0; increasing (-1.215, 0.549); decreasing (-∞ , -1.215), (0.549, ∞)

B) relative maximum: 2.056 at x = -1.215; relative minimum: 0.684 at x = 0.549; increasing (-∞ , -1.215), (0.549, ∞); decreasing (-1.215, 0.549)

C) relative maximum: 0.684 at x = 0.549; relative minimum: 2.056 at x = -1.215; increasing (-1.215, 0.549); decreasing (-∞ , -1.215), (0.549, ∞)

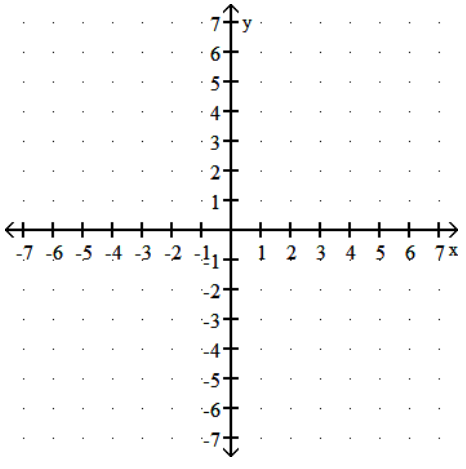
D) no relative maxima or minima; increasing (-∞ , -1.215), (0.549, ∞); decreasing (-1.215, 0.549)

Answer: B

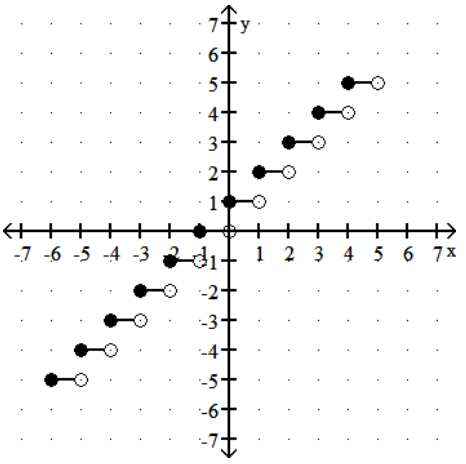
Explanation: A)
B)
C)
D)

Graph the equation.

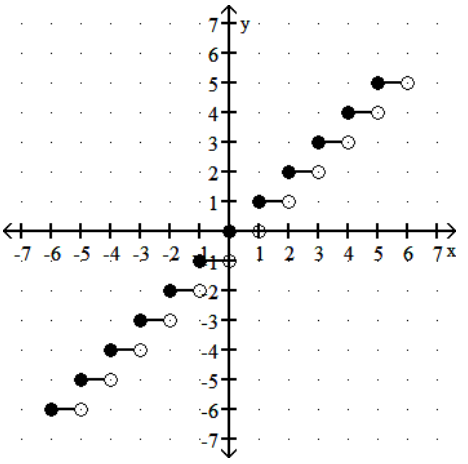
49) $y = [\![x]\!]$ 49) _____



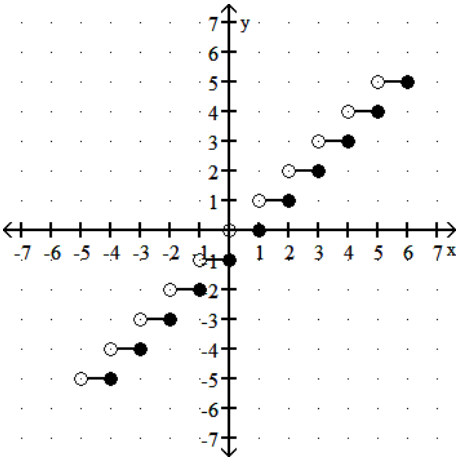
A)



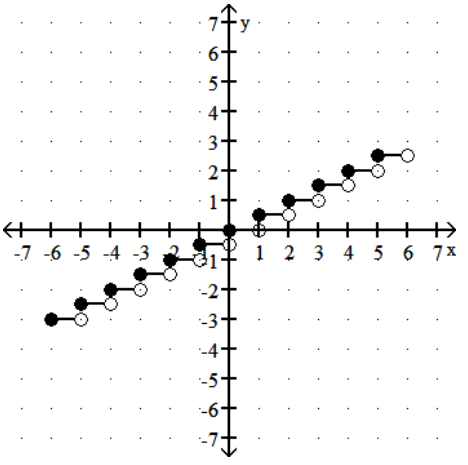
B)



C)



D)



Answer: B

Explanation: A)

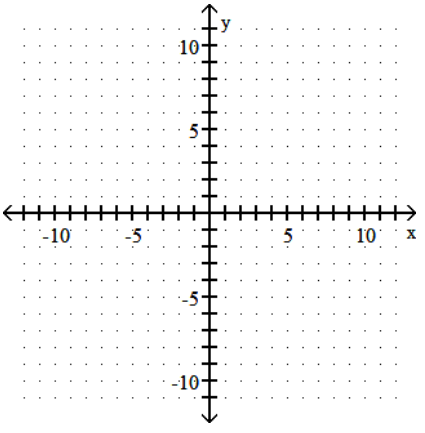
B)

C)

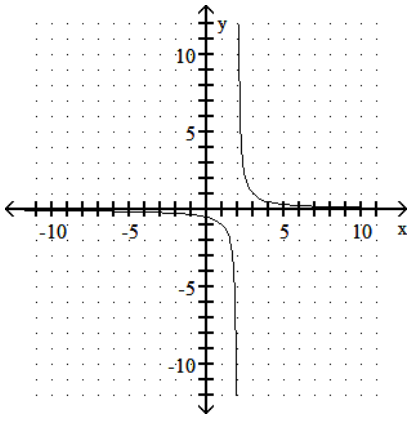
D)

Graph the function.

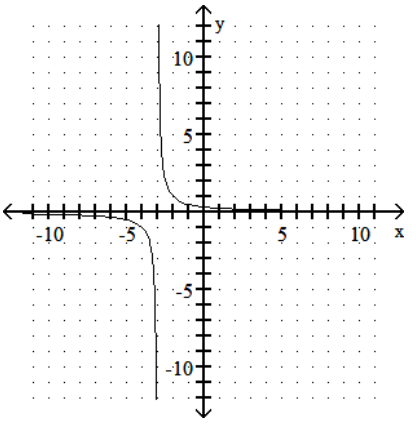
50) $f(x) = \frac{1}{x - 2}$ 50) _____



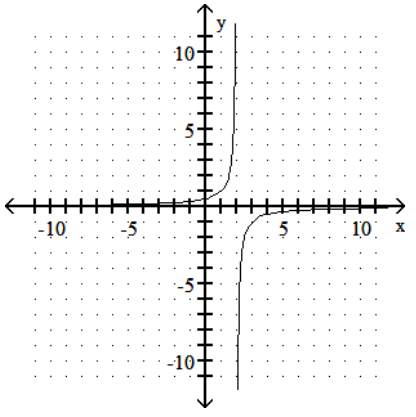
A)



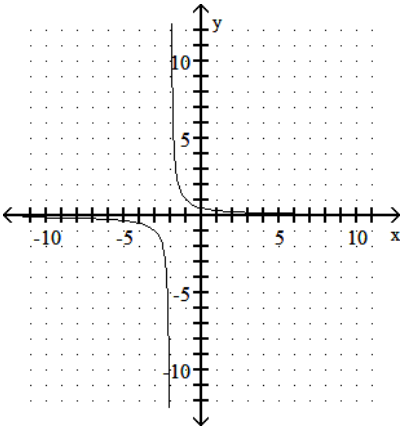
B)



C)



D)



Answer: A

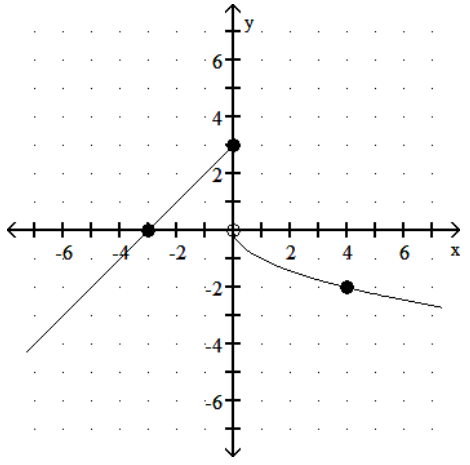
Explanation: A)

B)

C)

D)

Write an equation for the piecewise function.

51) 

51) _____

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

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

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

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

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

52) 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 5 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 $(A \circ r)(t)$.

52) _____

A) $(A \circ r)(t) = 5\pi t^2$

B) $(A \circ r)(t) = 25\pi^2 t$

C) $(A \circ r)(t) = 25\pi t^2$

D) $(A \circ r)(t) = 10\pi t^2$

Answer: C

Explanation: A)
B)
C)
D)

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

53) $f(x) = x^2 - 1$, $g(x) = 8x + 1$

53) _____

Find $(f/g)\left(-\frac{1}{8}\right)$.

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

B) does not exist

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

D) 0

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).

54) $g(x) = \frac{1}{8}f(x)$; $(-8, 32)$ 54) _____

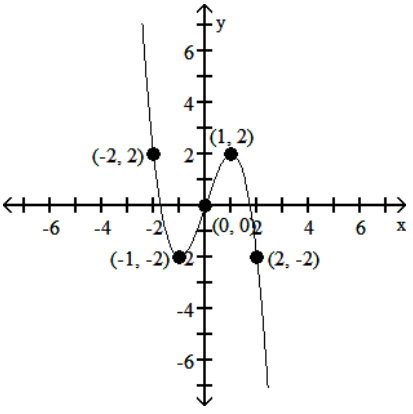
A) $(-1, -4)$ B) $(-8, -4)$ C) $(1, 4)$ D) $(-8, 4)$

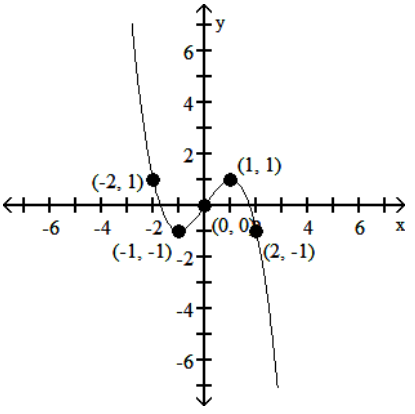
Answer: D

Explanation: A)
B)
C)
D)

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

55) $f(x) = -x^3 + 3x$ g(x) = 55) _____





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

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

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

56) $f(x) = x^2 - 1$, $g(x) = 2x + 3$ 56) _____

Find the domain of f/g.

A) $\left[-\frac{3}{2}, \infty\right)$ B) $(-1, 1)$

C) $\left(-\infty, -\frac{3}{2}\right) \cup \left(-\frac{3}{2}, \infty\right)$ D) (∞, ∞)

Answer: C

Explanation: A)
B)
C)
D)

Solve.

57) 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. 57) _____

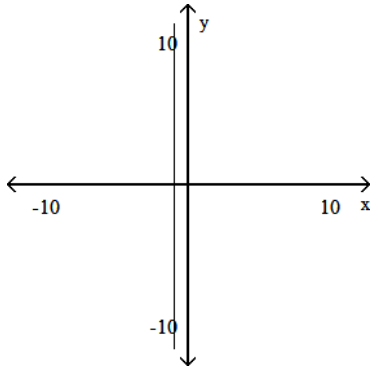
A) 4.1 inches B) 3.8 inches C) 4.0 inches D) 3.7 inches

Answer: C

Explanation: A)
B)
C)
D)

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

58) 58) _____



A) x-axis, y-axis B) y-axis C) no symmetry D) x-axis

Answer: D

Explanation: A)
B)
C)
D)

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

59) $f(x) = x + 1$, $g(x) = 5x^2 + 20x + 5$ 59) _____

Find $(fg)(-3)$.

A) 92 B) -200 C) 20 D) 40

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

60) 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 50 mph with a surface area of 32 ft^2 experiences a drag of 224 N (Newtons), how fast must a car with 47 ft^2 of surface area travel in order to experience a drag force of 348.74 N? 60) _____

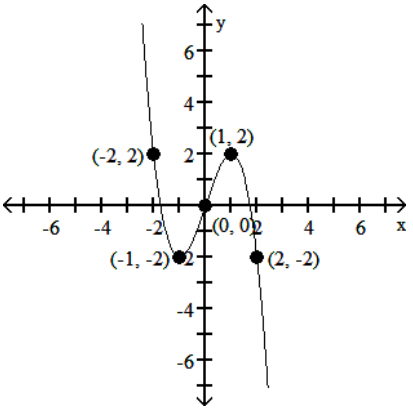
A) 50 mph B) 53 mph C) 55 mph D) 58 mph

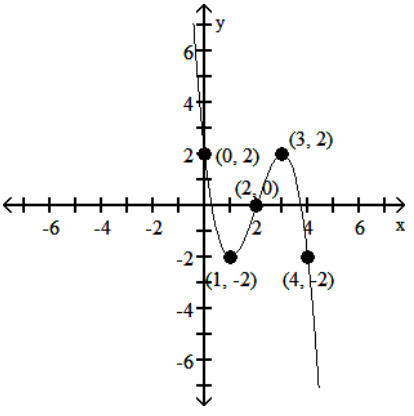
Answer: B

Explanation: A)
B)
C)
D)

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

61) $f(x) = -x^3 + 3x$ g(x) = 61) _____





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

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

Answer: D

Explanation: A)
B)
C)
D)

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

62) $f(x) = \frac{14}{x^2}$ 62) _____

A) Even B) Odd C) Neither

Answer: A

Explanation: A)
B)
C)

Answer the question.

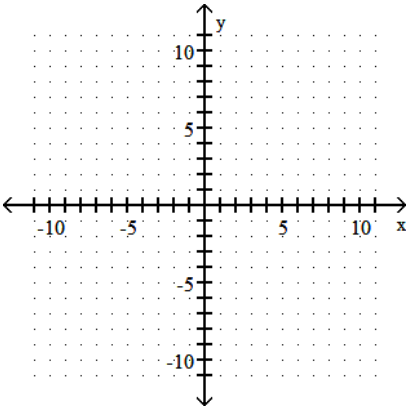
63) How can the graph of $f(x) = -\frac{1}{x} + 4$ be obtained from the graph of $y = \frac{1}{x}$? 63) _____

A) Reflect it across the y-axis. Shift it 4 units up.
B) Reflect it across the x-axis. Shift it 4 units up.
C) Reflect it across the x-axis. Shift it 4 units down.
D) Reflect it across the y-axis. Shift it 4 units down.

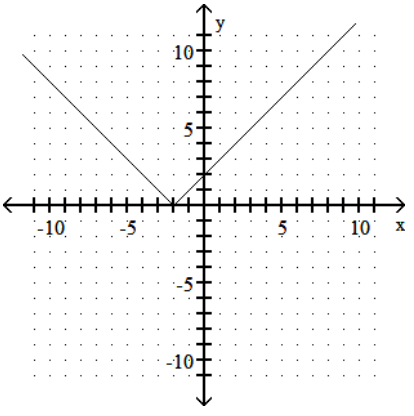
Answer: B
Explanation: A)
B)
C)
D)

Graph the function.

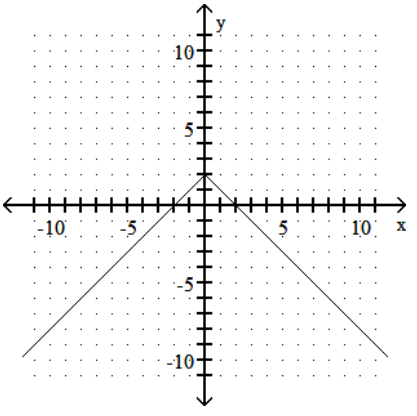
64) $f(x) = |x - 2|$ 64) _____



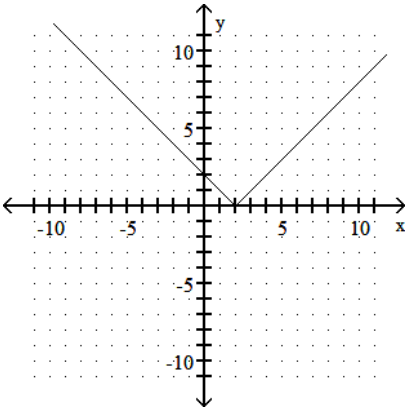
A)



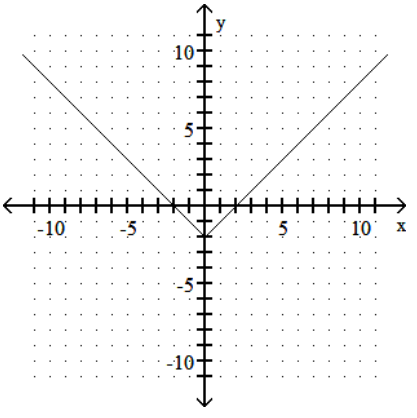
B)



C)



D)



Answer: C
Explanation: A)
B)
C)
D)

For the piecewise function, find the specified function value.

65) $f(x) = \begin{cases} 3x, & \text{for } x \le -1, \\ x - 6, & \text{for } x > -1 \end{cases}$ 65) _____

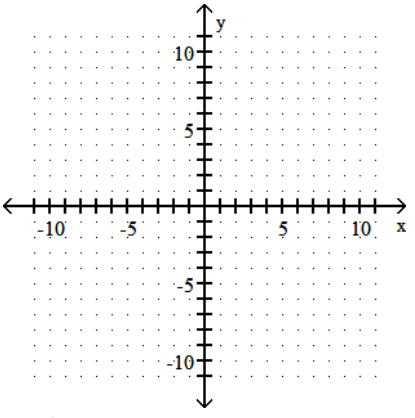
$f(-5)$

A) -1 B) 15 C) -11 D) -15

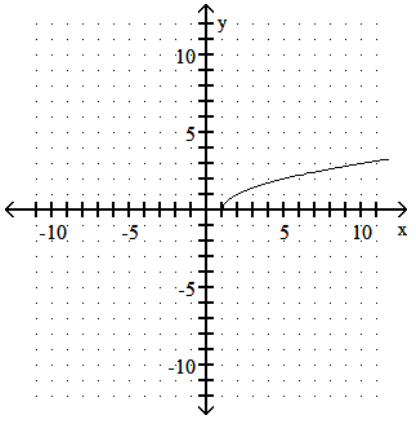
Answer: D
Explanation: A)
B)
C)
D)

Graph the function.

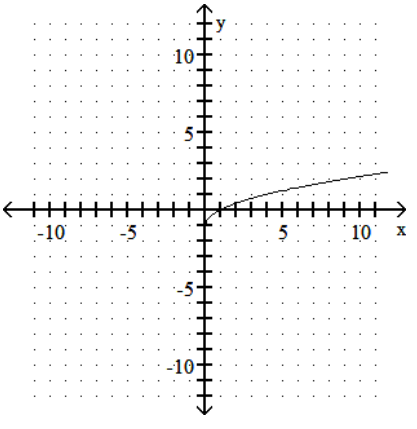
66) $f(x) = \sqrt{x + 1}$ 66) _____



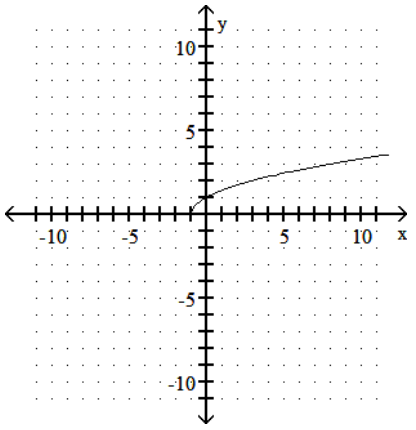
A)



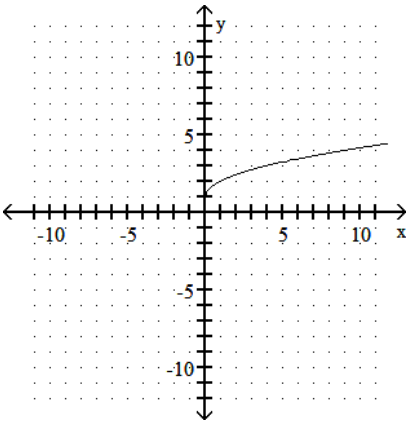
B)



C)



D)



Answer: C
Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

67) y varies directly as x, and $y = 0.9$ when $x = 0.2$. 67) _____

A) $y = \frac{2}{9}x$ B) $y = 1.1x$ C) $y = 0.7x$ D) $y = \frac{9}{2}x$

Answer: D
Explanation: A)
B)
C)
D)

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

68) $f(x) = 9 - 8x^3$ 68) _____

A) $-8(3x^2 - 3x - h)$ B) $-27x^2$

C) $-8(x^2 - xh - h^2)$ D) $-8(3x^2 + 3xh + h^2)$

Answer: D
Explanation: A)
B)
C)
D)

69) $f(x) = 4|x| + 6x$ 69) _____

A) $-5h$

B) $-7h$

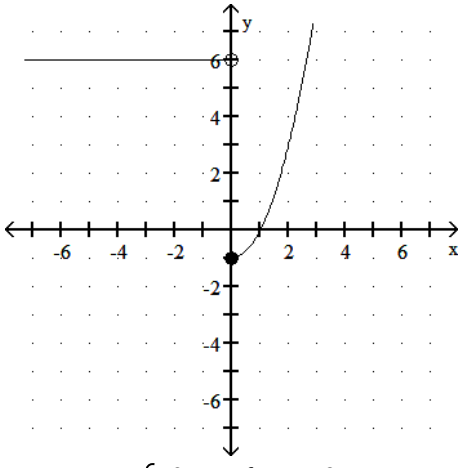
C) $\dfrac{-4|x + h| - 7h + 4|x|}{h}$

D) $\dfrac{4|x + h| - 6h - 4|x|}{h}$

Answer: D
Explanation: A)
B)
C)
D)

Write an equation for the piecewise function.

70) 70) _____



A) $f(x) = \begin{cases} -6, & \text{for } x \le 0, \\ x^2 - 1, & \text{for } x > 0 \end{cases}$

B) $f(x) = \begin{cases} -6, & \text{for } x < 0, \\ x^2, & \text{for } x \ge 0 \end{cases}$

C) $f(x) = \begin{cases} -6, & \text{for } x < 0, \\ |x| - 1, & \text{for } x \ge 0 \end{cases}$

D) $f(x) = \begin{cases} 6, & \text{for } x < 0, \\ x^2 - 1, & \text{for } x \ge 0 \end{cases}$

Answer: D
Explanation: A)
B)
C)
D)

For the piecewise function, find the specified function value.

71) $f(x) = \begin{cases} x - 3, & \text{for } x < 4, \\ 6 - x, & \text{for } x \ge 4 \end{cases}$ 71) _____

$f(0)$

A) -3 B) 6 C) 2 D) 1

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).

72) g(x) = f(x - 1) + 3; (4, 11) 72) _____

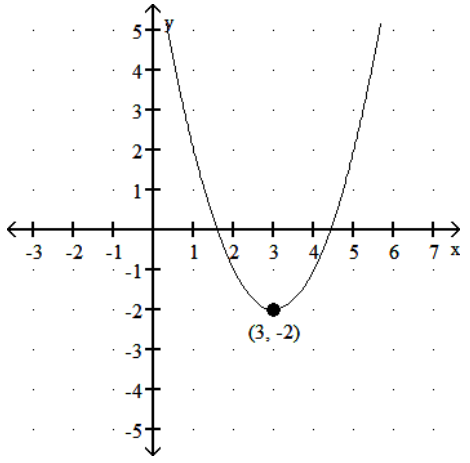
A) (5, 14) B) (12, 8) C) (5, 8) D) (12, 14)

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.

73) f(x) = x^2 - 6x + 7 73) _____



A) relative minimum: 3 at y = -2; increasing (-∞, 3); decreasing (3, ∞)
B) relative maximum: -2 at x = 3; increasing (3, ∞); decreasing (-∞, 3)
C) relative minimum: -2 at x = 3; increasing (3, ∞); decreasing (-∞, 3)
D) relative maximum: 3 at y = -2; increasing (-∞, 3); decreasing (3, ∞)

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

74) 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 2 foot-candles, find the intensity on a screen 15 ft from the light. 74) _____

A) $\frac{2}{5}$ foot-candle B) $\frac{2}{9}$ foot-candle

C) $1\frac{2}{9}$ foot-candles D) 2 foot-candles

Answer: B

Explanation: A)
B)
C)
D)

75) 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 24 feet tall having a measurement of 5 feet around the trunk? 75) _____

A) 48 ft^3 B) 40 ft^3 C) 57 ft^3 D) 52 ft^3

Answer: A

Explanation: A)
B)
C)
D)

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

76) Symmetric with respect to the y-axis 76) _____
(1.5, -1.75)

A) (-1.75, 1.5) B) (1.5, -1.5) C) (-1.5, 1.75) D) (-1.5, -1.75)

Answer: D

Explanation: A)
B)
C)
D)

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

77) f(x) = 4x - 3, g(x) = 7x - 4 77) _____
Find (f/g)(x).

A) $\frac{7x - 4}{4x - 3}$ B) $\frac{4x - 3}{7x - 4}$ C) $\frac{4x + 3}{7x + 4}$ D) $\frac{7x + 4}{4x + 3}$

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).

78) g(x) = f(x - 1); (3, 10) 78) _____

A) (4, 10) B) (2, 10) C) (3, 11) D) (3, 9)

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

79) 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 40 miles per hour in 30 minutes, how fast must it travel to cover the same distance in 20 minutes? 79) _____

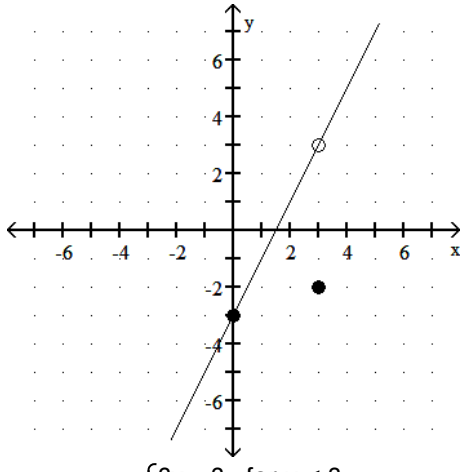
A) 15 mph B) 60 mph C) $\frac{80}{3}$ mph D) $\frac{3}{80}$ mph

Answer: B

Explanation: A)
B)
C)
D)

Write an equation for the piecewise function.

80) 80) _____



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

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

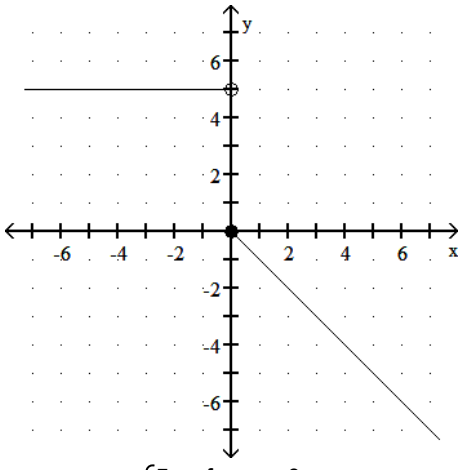
C) $f(x) = \begin{cases} x - 3, & \text{for } x \neq 3, \\ -2, & \text{for } x = 3 \end{cases}$

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

Answer: B

Explanation: A)
B)
C)
D)

81) 81) _____



A) $f(x) = \begin{cases} 5, & \text{for } x < 0, \\ -x, & \text{for } x \geq 0 \end{cases}$

B) $f(x) = \begin{cases} 5, & \text{for } x < 0, \\ -5x, & \text{for } x \geq 0 \end{cases}$

C) $f(x) = \begin{cases} 5, & \text{for } x < 0, \\ x, & \text{for } x \geq 0 \end{cases}$

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

Answer: A

Explanation: A)
B)
C)
D)

Answer the question.

82) How can the graph of $f(x) = \frac{1}{x + 9} - 7$ be obtained from the graph of $y = \frac{1}{x}$? 82) _____

A) Shift it horizontally 9 units to the left. Shift it 7 units up.
B) Shift it horizontally 9 units to the left. Shift it 7 units down.
C) Shift it horizontally 9 units to the right. Stretch it vertically by a factor of 7.
D) Shrink it horizontally by a factor of $\frac{1}{2}$. Shift it 7 units down.

Answer: B

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

83) y varies inversely as the square of x, and y = 0.16 when x = 0.9 83) _____

A) $y = \frac{0.1296}{x^2}$ B) $y = .57x^2$ C) $y = \frac{0.144}{x^2}$ D) $y = \frac{0.144}{x}$

Answer: A

Explanation: A)
B)
C)
D)

Answer the question.

84) How can the graph of $f(x) = 0.8(x + 11)^2 - 12$ be obtained from the graph of $y = x^2$? 84) _____

A) Shift it horizontally 12 units to the left. Stretch it vertically by a factor of 16. Shift it 11 units down.

B) Shift it horizontally 11 units to the right. Shrink it vertically by a factor of 0.8. Shift it 12 units up.

C) Shift it horizontally 11 units to the left. Shrink it vertically by a factor of 0.8. Shift it 12 units down.

D) Shift it horizontally 11 units to the left. Shrink it horizontally by a factor of 0.8. Shift it 12 units down.

Answer: C

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

85) r varies directly as s, and r = 0.0833 when s = 1. 85) _____

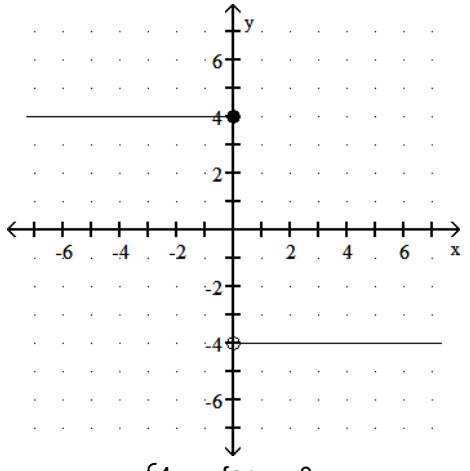
A) r = 13s B) r = 0.0833s C) r = 11 s D) r = 12s

Answer: B

Explanation: A)
B)
C)
D)

Write an equation for the piecewise function.

86) 86) _____



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

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

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

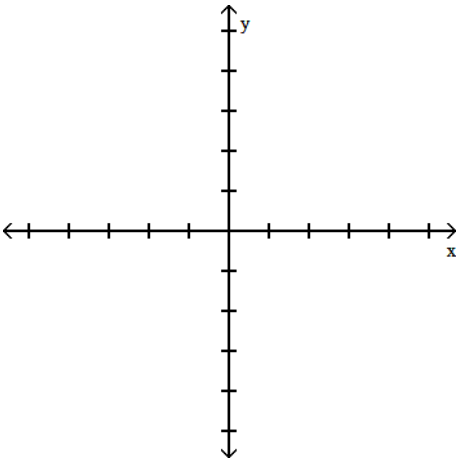
D) $f(x) = \begin{cases} 4, & \text{for } x < 0, \\ -4, & \text{for } x \ge 0 \end{cases}$

Answer: C

Explanation: A)
B)
C)
D)

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

87) $f(x) = -x^2 + 6x - 7$ 87) _____



A) Relative maximum of 2 at x = 3
B) No relative extrema
C) Relative maximum of 3 at x = 2
D) Relative minimum of 2 at x = 3

Answer: A
Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

88) $f(x) = x^2 - 16,\ g(x) = 2x + 3$ 88) _____
Find the domain of $g \circ f$.

A) $(-\infty, \infty)$
B) $[4, \infty)$
C) $\left(-\infty, -\frac{3}{2}\right] \cup \left(-\frac{3}{2}, \infty\right)$
D) $(-4, 4)$

Answer: A
Explanation: A)
B)
C)
D)

89) $f(x) = \sqrt{x},\ g(x) = 2x + 10$ 89) _____
Find the domain of $f \circ g$.

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

Answer: B
Explanation: A)
B)
C)
D)

Solve.

90) The distance D that a spring is stretched by a hanging object varies directly as the weight W of the object. If a 14-kg object stretches a spring 23 cm, how far will a 3-kg weight stretch the spring? 90) _____

A) 1.8261 cm B) 1.64285714 cm C) 40 cm D) 4.93 cm

Answer: D

Explanation: A)
B)
C)
D)

91) Sue wants to put a rectangular garden on her property using 90 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. 91) _____

A) $A(x) = 46x - 2x^2$ B) $A(x) = 44x - \frac{1}{4}x^2$

C) $A(x) = 45x^2 - x$ D) $A(x) = 45x - \frac{1}{2}x^2$

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.

92) $x^2 + 2y^4 = 4$ 92) _____

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

Answer: A

Explanation: A)
B)
C)
D)

Answer the question.

93) How can the graph of $f(x) = -\sqrt[3]{x + 7}$ be obtained from the graph of $y = \sqrt[3]{x}$? 93) _____

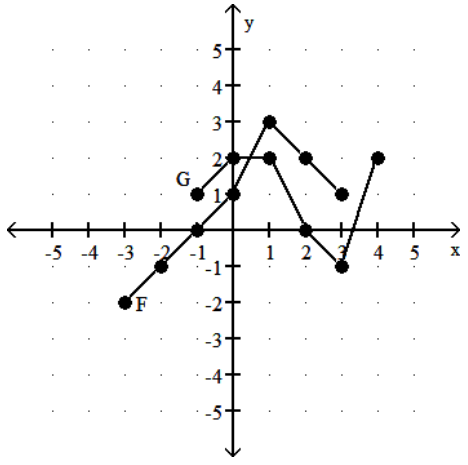
A) Shift it vertically 7 units upward. Reflect it across the x-axis.
B) Shift it horizontally 7 units to the left. Reflect it across the x-axis.
C) Shift it horizontally 7 units to the right. Reflect it across the x-axis.
D) Shift it horizontally 7 units to the left. Reflect it across the y-axis.

Answer: B

Explanation: A)
B)
C)
D)

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

94) Find the domain of F/G. 94) _____



A) $[-3,-1) \cup (-1,4)$ B) $[-1,3]$ C) $[-3,4]$ D) $[-1,2) \cup (2,3]$

Answer: D

Explanation: A)
B)
C)
D)

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

95) $f(x) = x^2 - 8$, $g(x) = 5x^2 - 40$ 95) _____

A) $f(x) + 5$ B) $5f(x)$ C) $f(5x)$ D) $f(x + 5)$

Answer: B

Explanation: A)
B)
C)
D)

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

96) $f(x) = 4x^2 + 7x$ 96) _____

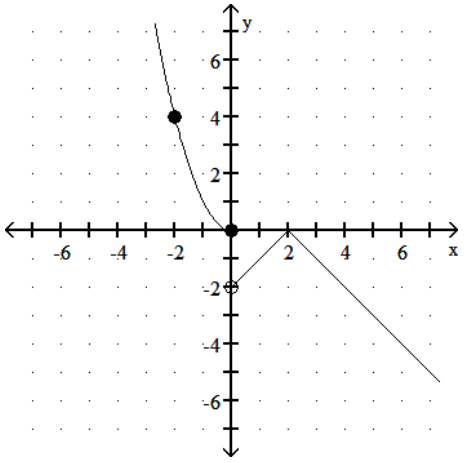
A) $12x - 6h + 14$ B) $8x^2 + 4h + 7x$ C) $8x + 7$ D) $8x + 4h + 7$

Answer: D

Explanation: A)
B)
C)
D)

Write an equation for the piecewise function.

97) 97) _____



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

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

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

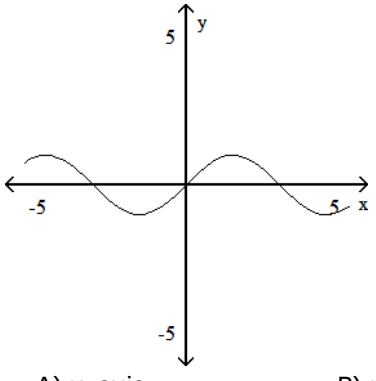
D) $f(x) = \begin{cases} x^2, & \text{for } x \le 0, \\ -|x - 2|, & \text{for } x > 0 \end{cases}$

Answer: D

Explanation: A)
B)
C)
D)

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

98) 98) _____



A) x-axis B) no symmetry C) y-axis D) origin

Answer: D

Explanation: A)
B)
C)
D)

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

99) $f(x) = 5x^2 + 6,\ g(x) = x + 3$ 99) _____

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

A) 93 B) 79 C) 87 D) -82

Answer: C

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

100) y varies jointly as x and the square of z, and y = 54 when x = 2 and z = 3 100) _____

A) $y = \frac{18}{x\sqrt{z}}$ B) $y = 4xz^2$ C) $y = 9xz$ D) $y = 3xz^2$

Answer: D

Explanation: A)
B)
C)
D)

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

101) $f(x) = x^2 - 1,\ g(x) = 2x + 1$ 101) _____

Find $(f/g)(\sqrt{6})$.

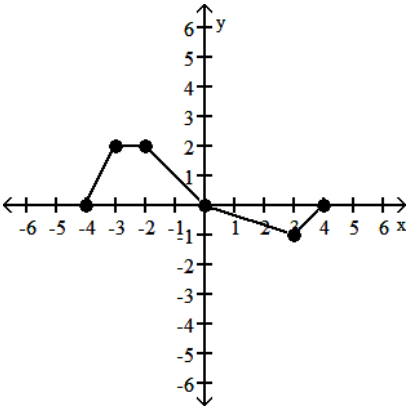
A) $\frac{10 - \sqrt{6}}{25}$ B) $\frac{\sqrt{6} - 1}{2}$ C) $\frac{9\sqrt{6} + 5}{11}$ D) $\frac{10\sqrt{6} - 5}{23}$

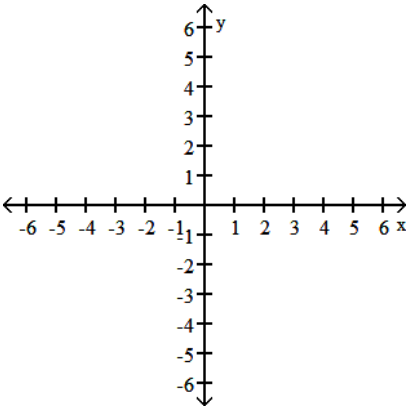
Answer: D

Explanation: A)
B)
C)
D)

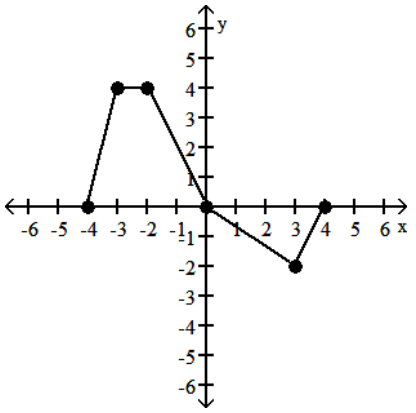
A graph of y = f(x) follows. No formula for f is given. Graph the given equation.

102) y = f(2x) 102) _____

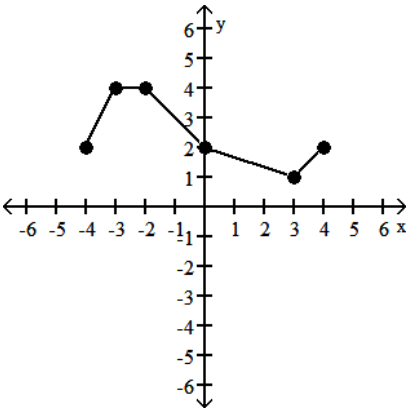




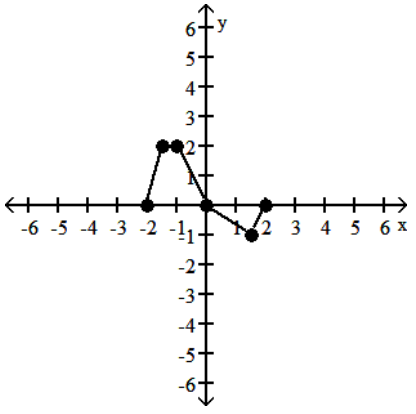
A)



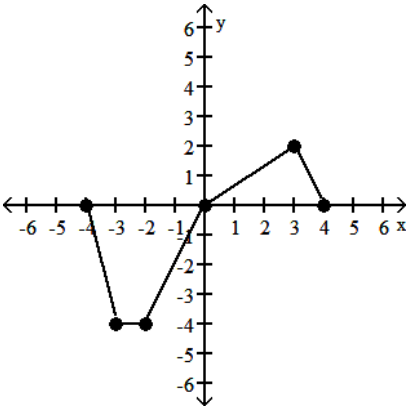
B)



C)



D)



Answer: C

Explanation: A)

B)

C)

D)

For the pair of functions, find the indicated composition.

103) $f(x) = x^3 - 4x^2 - 2x + 8$, $g(x) = x - 1$ 103) _____

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

A) $x^3 - 4x^2 - 2x + 9$

B) $x^3 - 1x^2 - 7x + 3$

C) $x^3 - 4x^2 - 2x + 7$

D) $x^3 - 7x^2 + 9x + 5$

Answer: D

Explanation: A)

B)

C)

D)

Find f(x) and g(x) such that h(x) = (f ◦g)(x).

104) $h(x) = (x - 7)^5 + 6(x - 7)^4 - 6(x - 7)^2 + 3$ 104) _____

A) $f(x) = x^5 + 6x^4 - 6x^2$, $g(x) = x - 10$

B) $f(x) = x^5 - 6x^4 + 6x^2 + 3$, $g(x) = x + 7$

C) $f(x) = x^5 + x^4 - x^2 + 3$, $g(x) = x - 7$

D) $f(x) = x^5 + 6x^4 - 6x^2 + 3$, $g(x) = x - 7$

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

105) 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 4.1 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 ◦d)(t). 105) _____

A) (S ◦d)(t) = 6.93t B) (S ◦d)(t) = 2.26t C) (S ◦d)(t) = 3.08t D) (S ◦d)(t) = 3.9t

Answer: C

Explanation: A)
B)
C)
D)

Find the requested function value.

106) $f(x) = \frac{x - 6}{9}$, $g(x) = 4x + 1$ 106) _____

Find (g ◦f)(42).

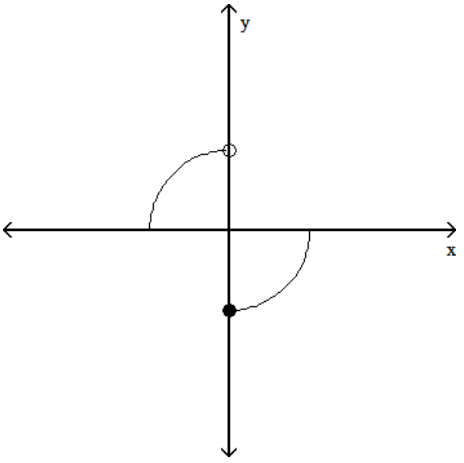
A) 17 B) 676 C) 20 D) $\frac{163}{9}$

Answer: A

Explanation: A)
B)
C)
D)

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

107) 107) _____



A) Odd B) Neither C) Even

Answer: B

Explanation: A)
B)
C)

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

108) g(x) = f(x) + 3; (6, 16) 108) _____

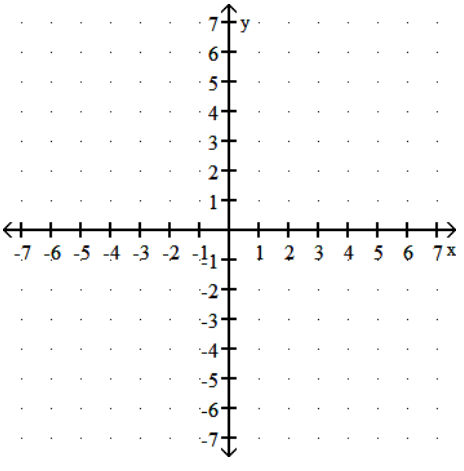
A) (6, 23) B) (6, 20) C) (6, 17) D) (6, 19)

Answer: D

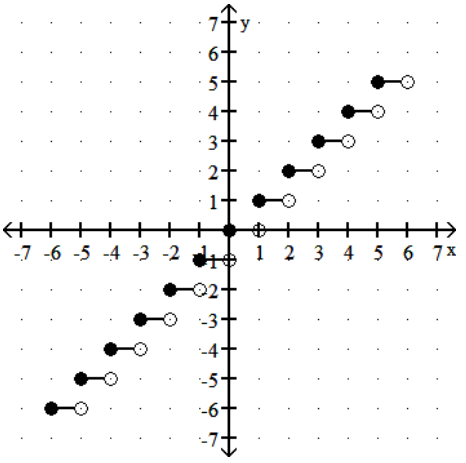
Explanation: A)
B)
C)
D)

Graph the equation.

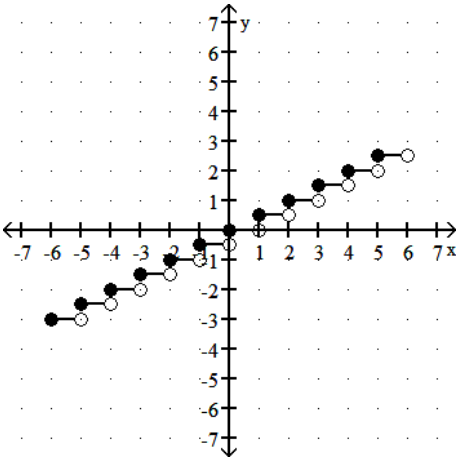
109) y = 2⟦x⟧ 109) _____



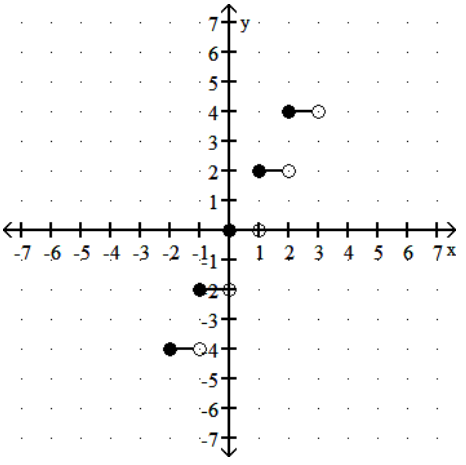
A)



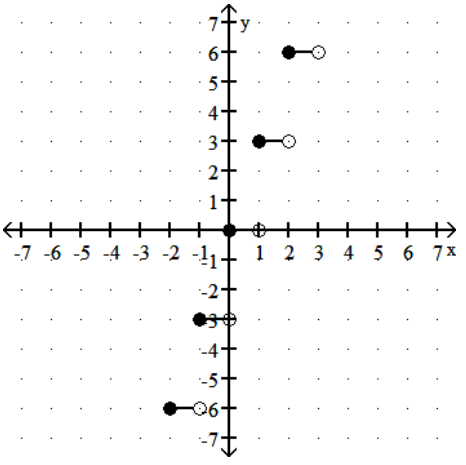
B)



C)



D)



Answer: C

Explanation: A)

B)

C)

D)

Solve the problem.

110) The distance it takes to stop a car varies directly as 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 49 miles per hour? 110) _____

A) 144.06 ft B) 168.41 ft C) 180.37 ft D) 168.07 ft

Answer: D

Explanation: A)

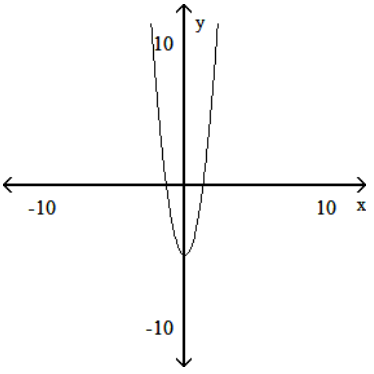
B)

C)

D)

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

111) 111) _____



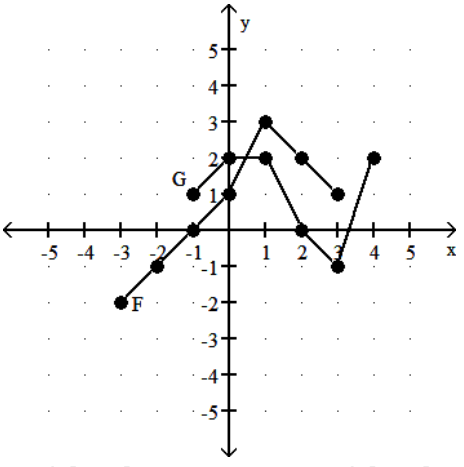
A) x-axis B) y-axis C) Origin D) x-axis, origin

Answer: B

Explanation: A)
B)
C)
D)

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

112) Find the domain of FG. 112) _____



A) [-3,3] B) [-1,3] C) [-1,4] D) [-3,4]

Answer: B

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated composition.

113) f(x) = 5x + 7, g(x) = 4x - 1 113) _____

Find (f ∘g)(x).

A) 20x + 27 B) 20x + 2 C) 20x + 12 D) 20x + 6

Answer: B

Explanation: A)
B)
C)
D)

Find f(x) and g(x) such that h(x) = (f ∘g)(x).

114) h(x) = $|7x + 3|$ 114) _____

A) f(x) = x, g(x) = 7x + 3
B) f(x) = -$|x|$, g(x) = 7x + 3
C) f(x) = $|x|$, g(x) = 7x + 3
D) f(x) = $|-x|$, g(x) = 7x - 3

Answer: C

Explanation: A)
B)
C)
D)

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

115) f(x) = $\sqrt{x^2 + 1}$ 115) _____

A) Even B) Odd C) Neither

Answer: A

Explanation: A)
B)
C)

Solve.

116) At Allied Electronics, production has begun on the X-15 Computer Chip. The total revenue function is given by R(x) = 59x - 0.3x^2 and the total cost function is given by C(x) = 5x + 15, 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). 116) _____

A) P(x) = 0.3x^2 + 54x - 30
B) P(x) = -0.3x^2 + 54x - 15
C) P(x) = 0.3x^2 + 49x - 45
D) P(x) = -0.3x^2 + 49x + 15

Answer: B

Explanation: A)
B)
C)
D)

Find f(x) and g(x) such that h(x) = (f ∘g)(x).

117) h(x) = $\frac{10}{x^2} + 1$ 117) _____

A) f(x) = x, g(x) = $\frac{10}{x} + 1$
B) f(x) = $\frac{10}{x^2}$, g(x) = 1
C) f(x) = x + 1, g(x) = $\frac{10}{x^2}$
D) f(x) = $\frac{1}{x}$, g(x) = $\frac{10}{x} + 1$

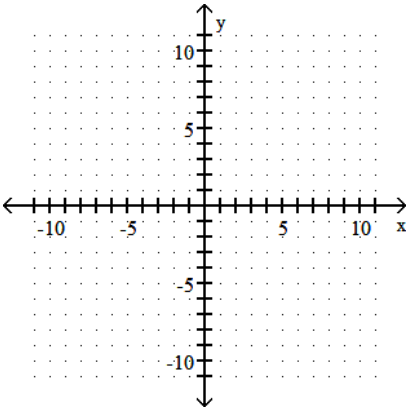
Answer: C

Explanation: A)
B)
C)
D)

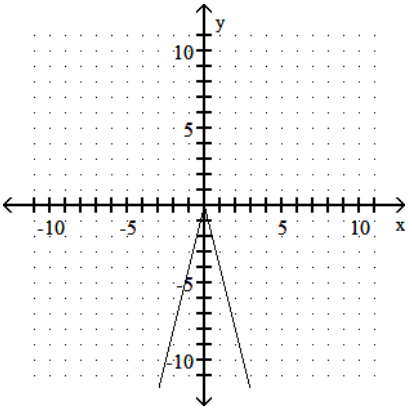
Graph the function.

118) g(x) = -4|x|

118) _____



A)



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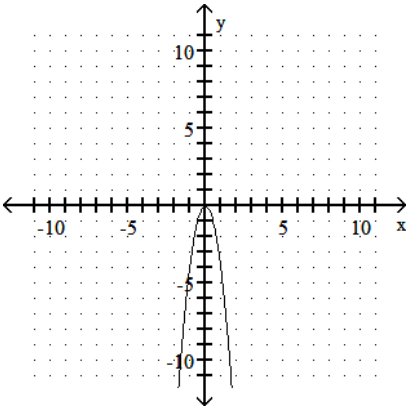
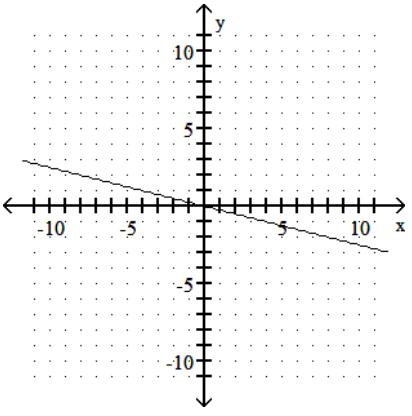
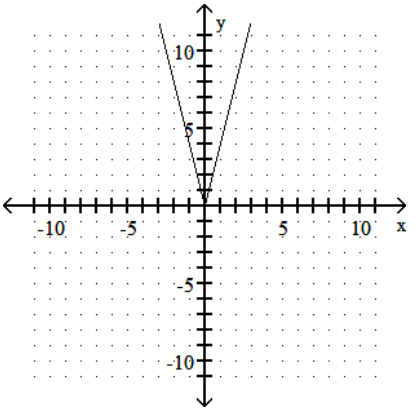


C)



D)



Answer: A

Explanation: A)

B)

C)

D)

For the pair of functions, find the indicated domain.

119) $f(x) = \frac{2x}{x - 4}$, $g(x) = \frac{4}{x + 10}$ 119) _____

Find the domain of f + g.

A) $(-\infty, -4) \cup (-4, -2) \cup (-2, \infty)$ B) $(-\infty, -10) \cup (-10, 4) \cup (4, \infty)$

C) $(-\infty, \infty)$ D) $(-\infty, -4) \cup (-4, 10) \cup (10, \infty)$

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.

120) $x^4 + y^4 = 6$ 120) _____

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

C) Origin only D) y-axis only

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).

121) g(x) = f(-2x); (3, -2) 121) _____

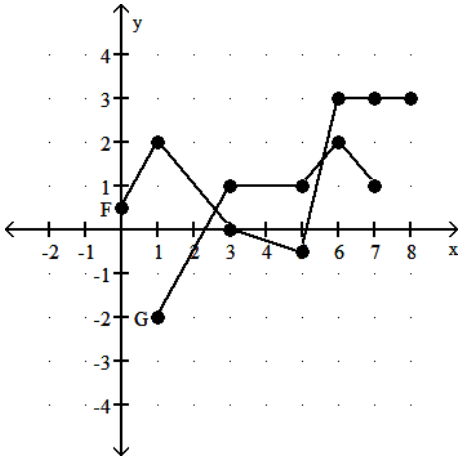
A) $\left(\frac{1}{6}, -3\right)$ B) $\left(-\frac{3}{2}, -2\right)$ C) (6, 2) D) (-6, -2)

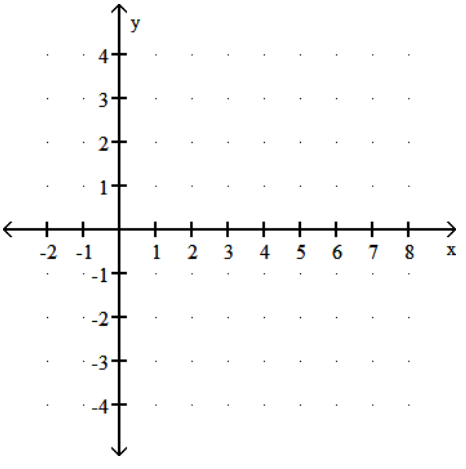
Answer: B

Explanation: A)
B)
C)
D)

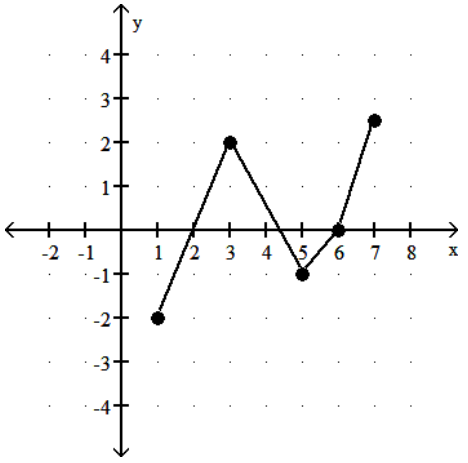
Consider the functions F and G as shown in the graph. Provide an appropriate response.

122) Graph F - G. 122) _____





A)



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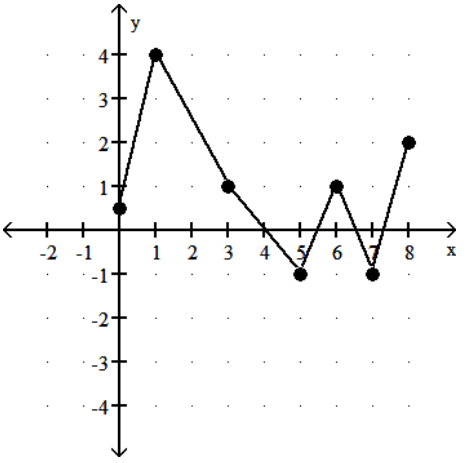
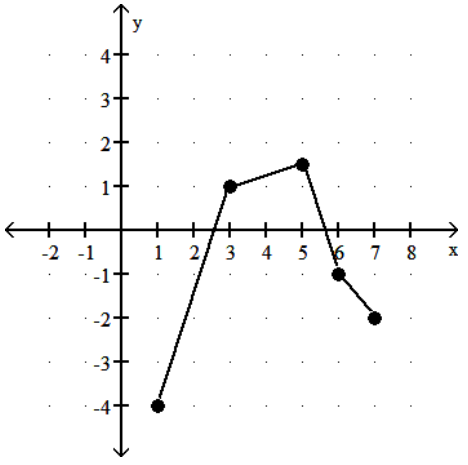
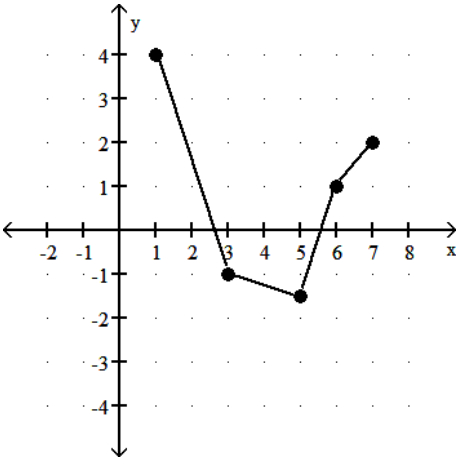


C)



D)



Answer: D

Explanation: A)
B)
C)
D)

Answer the question.

123) How can the graph of f(x) = 0.3|-x| - 1 be obtained from the graph of y = |x|? 123) _____

A) Reflect it across the x-axis. Stretch it horizontally by a factor of 1. Shift it horizontally 3 units to the left.

B) Reflect it across the y-axis. Shrink it vertically by a factor of 0.3. Shift it vertically 1 units upward.

C) Reflect it across the y-axis. Shrink it vertically by a factor of 0.3. Shift it vertically 1 units downward.

D) Reflect it across the x-axis. Stretch it vertically by a factor of 3. Shift it horizontally 1 units to the right.

Answer: C

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

124) s varies directly as the square of t, and $s = 175$ when $t = 5$. 124) _____

A) $s = \frac{1}{7}t^2$ B) $s = \frac{1}{35}t^2$ C) $s = 7t^2$ D) $s = 35t^2$

Answer: C

Explanation: A)
B)
C)
D)

Solve.

125) 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. 125) _____

A) $V(x) = 4x^3 - 96x^2$ B) $V(x) = 2x^3 - 72x^2 + 24x$

C) $V(x) = 2x^3 - 72x^2$ D) $V(x) = 4x^3 - 96x^2 + 576x$

Answer: D

Explanation: A)
B)
C)
D)

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

126) Symmetric with respect to the x-axis 126) _____

(7, 2)

A) (-7, -2) B) (7, -2) C) (2, 7) D) (-7, 2)

Answer: B

Explanation: A)
B)
C)
D)

Answer the question.

127) How can the graph of $f(x) = \frac{9}{x} + 6$ be obtained from the graph of $y = \frac{1}{x}$? 127) _____

A) Stretch it vertically by a factor of 9. Shift it 6 units up.

B) Shift it horizontally 9 units to the right. Shift it 6 units up.

C) Shrink it vertically a factor of $\frac{1}{9}$. Shift it 6 units up.

D) Shift it horizontally 9 units to the left. Shift it 6 units down.

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated composition.

128) $f(x) = 4x^2 + 5x + 6,\ g(x) = 5x - 8$ 128) _____

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

A) $20x^2 + 25x + 38$ B) $4x^2 + 5x - 2$ C) $20x^2 + 25x + 22$ D) $4x^2 + 25x + 22$

Answer: C

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

129) y varies jointly as x and p and inversely as the square of s, and $y = \frac{7}{2}$ when x = 1, p = 7, and s = 8. 129) _____

A) $y = \frac{256x^2p}{s^2}$ B) $y = 13xps^2$ C) $y = \frac{36xp^2}{s}$ D) $y = \frac{32xp}{s^2}$

Answer: D

Explanation: A)
B)
C)
D)

Solve.

130) A farmer's silo is the shape of a cylinder with a hemisphere as the roof. If the height of the silo is 96 feet and the radius of the hemisphere is r feet, express the volume of the silo as a function of r. 130) _____

A) $V(r) = \pi(96 - r) + \frac{4}{3}\pi r^2$ B) $V(r) = 96\pi r^2 + \frac{8}{3}\pi r^3$

C) $V(r) = \pi(96 - r)r^2 + \frac{2}{3}\pi r^3$ D) $V(r) = \pi(96 - r)r^3 + \frac{4}{3}\pi r^2$

Answer: C

Explanation: A)
B)
C)
D)

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

131) $h(x) = \frac{1}{x^2 - 3}$ 131) _____

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

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

Answer: D

Explanation: A)
B)
C)
D)

Solve.

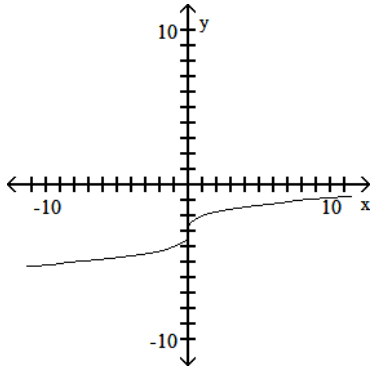
132) AAA Technology finds that the total revenue function associated with producing a new type of computer chip is $R(x) = 70 - 0.3x^2$, and the total cost function is $C(x) = 8x + 25$, where x represents the number of units of chips produced. Find the total profit function, P(x) . 132) _____

A) $P(x) = -0.03x^2 + 8x + 95$
B) $P(x) = 0.03x^2 + 8x + 47$
C) $P(x) = -0.03x^2 + 8x - 45$
D) $P(x) = -0.03x^2 - 8x + 45$

Answer: D
Explanation: A)
B)
C)
D)

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

133) 133) _____



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

Answer: A
Explanation: A)
B)
C)
D)

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

134) The shape of $y = |x|$ is vertically stretched by a factor of 4.8. This graph is then reflected across the x-axis. Finally, the graph is shifted 0.25 units downward. 134) _____

A) $f(x) = 4.8|x| - 0.25$
B) $f(x) = -4.8|x| - 0.25$
C) $f(x) = 4.8|-x| - 0.25$
D) $f(x) = 4.8|x - 0.25|$

Answer: B
Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

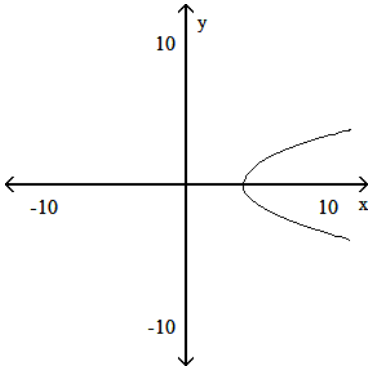
135) y varies inversely as x and y = 42 when $x = \frac{1}{7}$ 135) _____

A) $y = \frac{6}{x}$ B) $y = \frac{-1}{x}$ C) $y = \frac{7}{x}$ D) $y = \frac{13}{x}$

Answer: A
Explanation: A)
B)
C)
D)

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

136) 136) _____



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

Answer: C
Explanation: A)
B)
C)
D)

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

137) $f(x) = \frac{1}{9x}$ 137) _____

A) $\frac{-1}{9x(x+h)}$ B) $\frac{1}{9x}$ C) $\frac{-1}{x(x+h)}$ D) 0

Answer: A
Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

138) y varies directly as z, and $y = 12$ when $z = 96$. 138) _____

A) $y = 8z$ B) $y = \frac{1}{8}z$ C) $y = -\frac{1}{2}z$ D) $y = -2z$

Answer: B

Explanation: A)
B)
C)
D)

Solve.

139) A rocket is shot straight up in the air from the ground at a rate of 49 feet per second. The rocket is tracked by a rangefinder that is 402 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. 139) _____

A) $d(t) = \sqrt{402^2 + (49t)^2}$ B) $d(t) = \sqrt{49^2 + (402t)^2}$

C) $d(t) = 402 + 49t^2$ D) $d(t) = 402^2 + (49t)^2$

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

140) 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 2? 140) _____

A) The weight is divided by 2. B) The weight is multiplied by 2.

C) The weight is divided by 4. D) The weight is multiplied by 4.

Answer: C

Explanation: A)
B)
C)
D)

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

141) $f(x) = x + 3$, $g(x) = \sqrt{x - 7}$ 141) _____

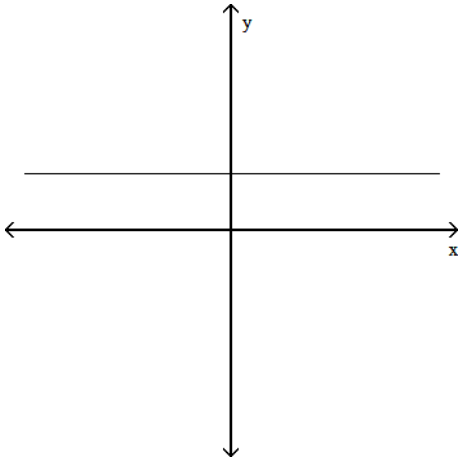
Find $(f - g)(-3)$.

A) $\sqrt{7}$ B) does not exist C) 0 D) $\sqrt{10}$

Answer: B

Explanation: A)
B)
C)
D)

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

142) 

142) _____

A) Neither B) Odd C) Even

Answer: C

Explanation: A)
B)
C)

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

143) $f(x) = x^2 + 8$, $g(x) = 2x - 1$

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

143) _____

A) 13 B) 22 C) 16 D) 34

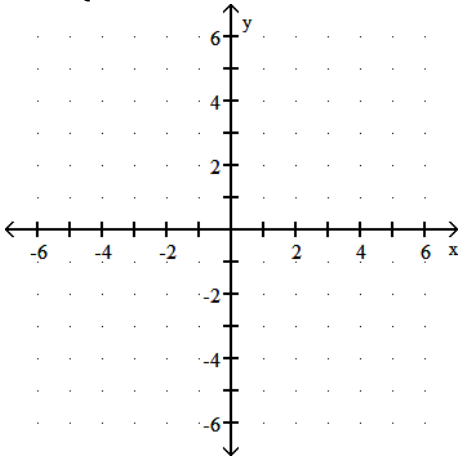
Answer: B

Explanation: A)
B)
C)
D)

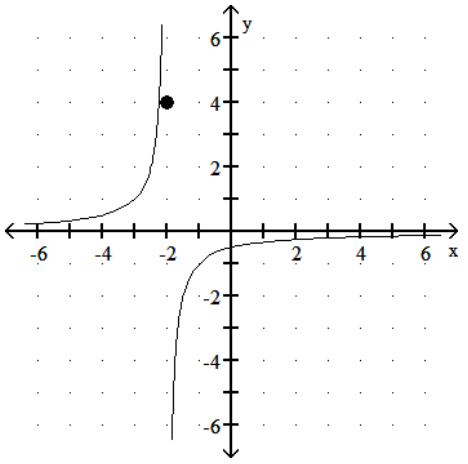
Graph the function.

144) $f(x) = \begin{cases} \dfrac{1}{x+2}, & \text{for } x \neq -2, \\ 4, & \text{for } x = -2 \end{cases}$

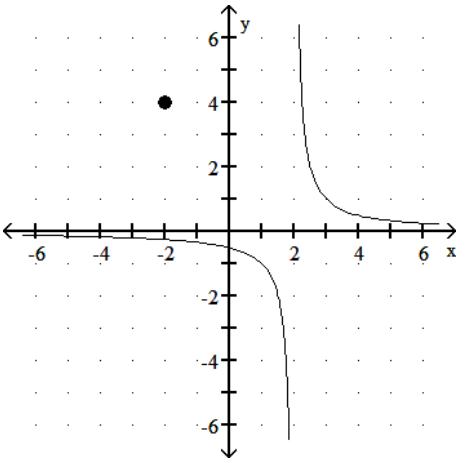
144) _____



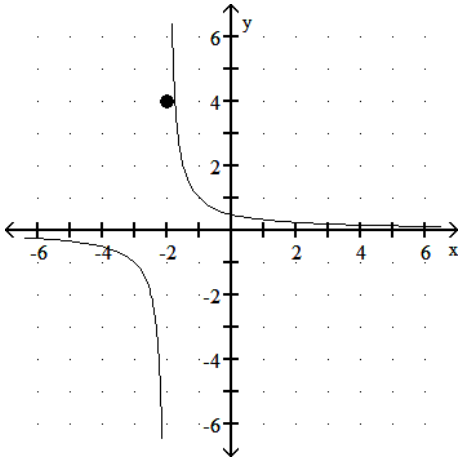
A)



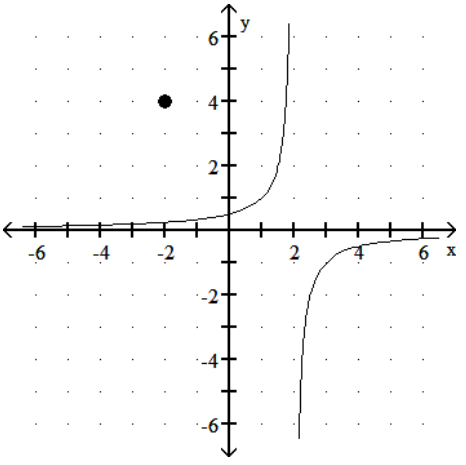
B)



C)



D)



Answer: C

Explanation: A)

B)

C)

D)

Solve the problem.

145) 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 450 miles above the earth's surface? Round your answer to the nearest tenth of a pound. 145) _____

A) 146.08 lb B) 144.18 lb C) 144.68 lb D) 145.08 lb

Answer: C

Explanation: A)

B)

C)

D)

Find an equation of variation for the given situation.

146) y varies jointly as x and the square of z, and y = 245.6676 when x = 0.9 and z = 4.6 146) _____

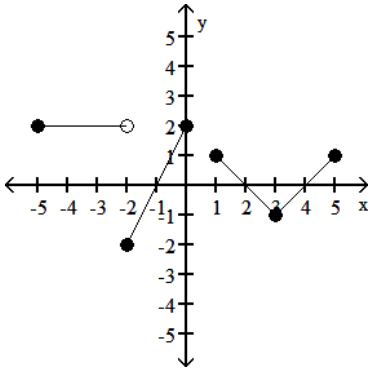
A) $y = 11.61x^2z^2$ B) $y = 12.9xz^2$ C) $y = 15.1xz^2$ D) $y = 13.4x\sqrt{z}$

Answer: B

Explanation: A)
B)
C)
D)

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

147) 147) _____



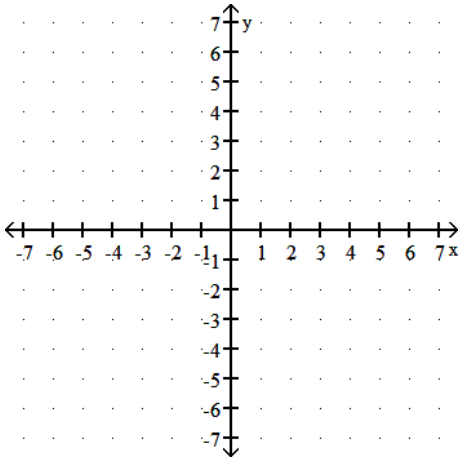
A) Increasing on (-1, 0) and (3, 5); Decreasing on (0, 3); Constant on (-5, -3)
B) Increasing on (1, 3); Decreasing on (-2, 0) and (3, 5); Constant on (2, 5)
C) Increasing on (-2, 0) and (3, 4); Decreasing on (-5, -2) and (1, 3)
D) Increasing on (-2, 0) and (3, 5); Decreasing on (1, 3); Constant on (-5,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

Answer: D

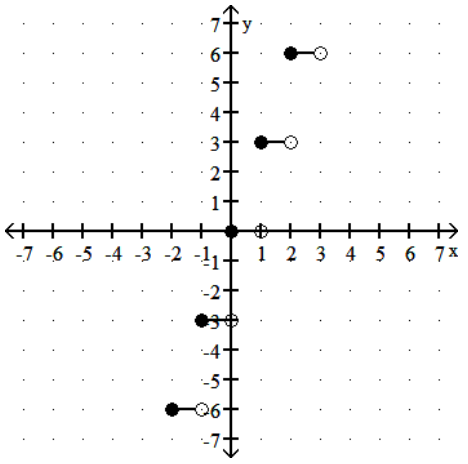
Explanation: A)
B)
C)
D)

Graph the equation.

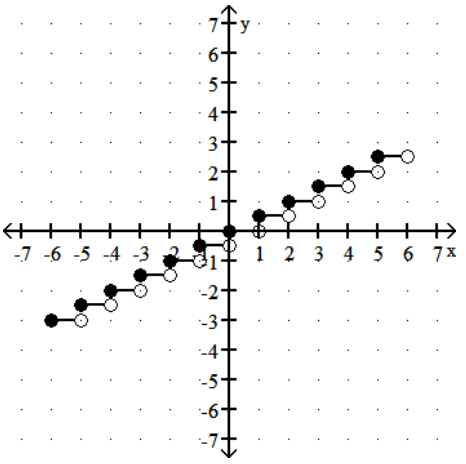
148) $y = 3[\![x]\!]$ 148) _____



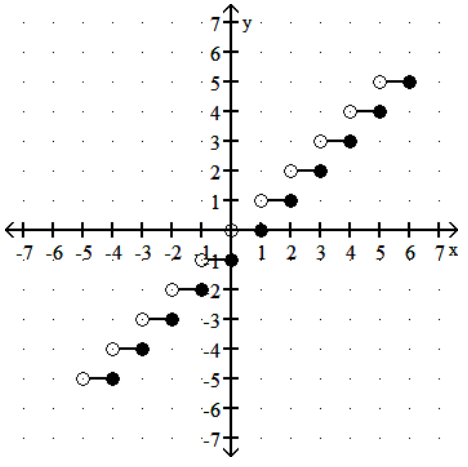
A)



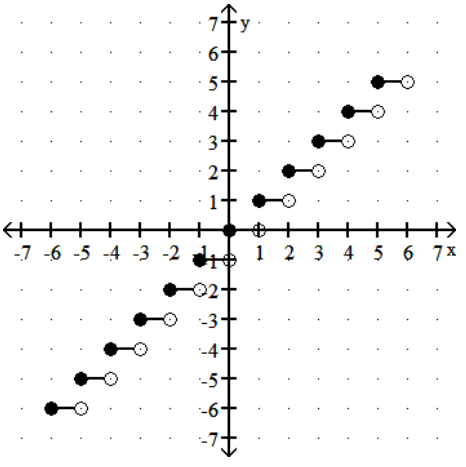
B)



C)



D)



Answer: A

Explanation: A)

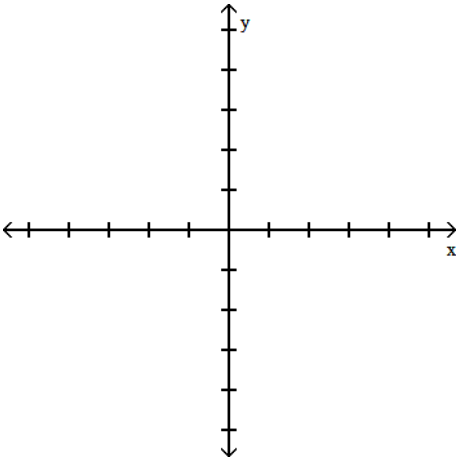
B)

C)

D)

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

149) $f(x) = |x + 3| - 1$ 149) _____



A) Relative minimum of 1.2 at x = -3
B) Relative minimum of 0.7 at x = -3
C) Relative maximum of 1 at x = -3
D) Relative minimum of -1 at x = -3

Answer: D

Explanation: A)
B)
C)
D)

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

150) $f(x) = 5x^2 - 1$ 150) _____

A) Even
B) Odd
C) Neither

Answer: A

Explanation: A)
B)
C)

Answer the question.

151) How can the graph of $f(x) = 0.5|x - 4| + 4.3$ be obtained from the graph of $y = |x|$? 151) _____

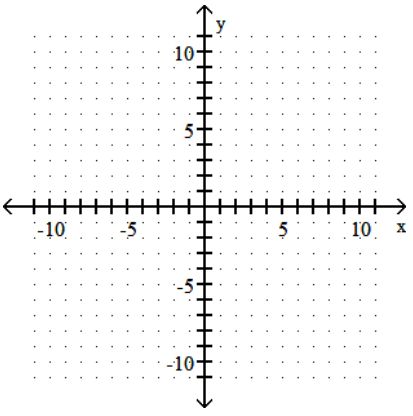
A) Shift it horizontally 5 units to the left. Shrink it vertically by a factor of 0.4. Shift it vertically 4.3 units upward.
B) Shift it horizontally 4.3 units to the right. Stretch it vertically by a factor of 5. Shift it vertically 4 units downward.
C) Shift it horizontally 4 units to the right. Shrink it vertically by a factor of 0.5. Shift it vertically 4.3 units upward.
D) Shift it horizontally 4 units to the left. Stretch it vertically by a factor of 5. Shift it vertically 4.3 units upward.

Answer: C

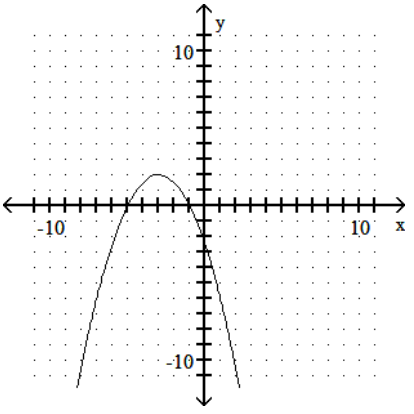
Explanation: A)
B)
C)
D)

Graph the function.

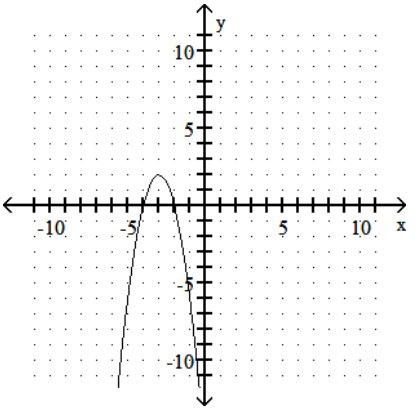
152) $f(x) = -\frac{1}{2}(x + 3)^2 + 2$ 152) _____



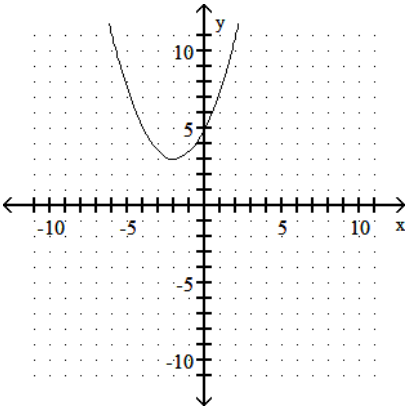
A)



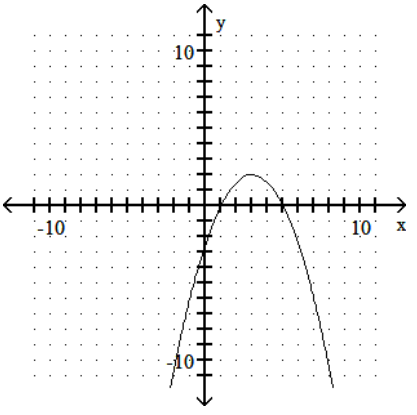
B)



C)



D)



Answer: A

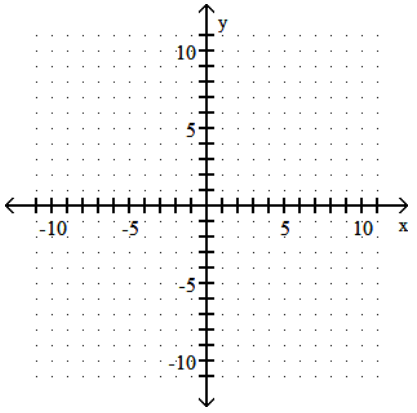
Explanation: A)

B)

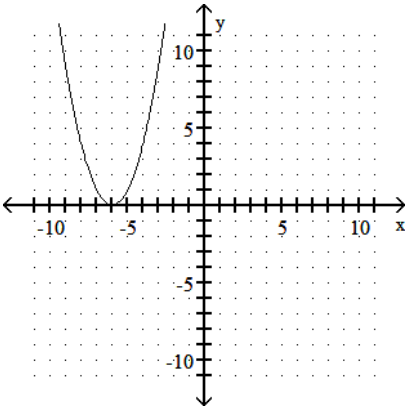
C)

D)

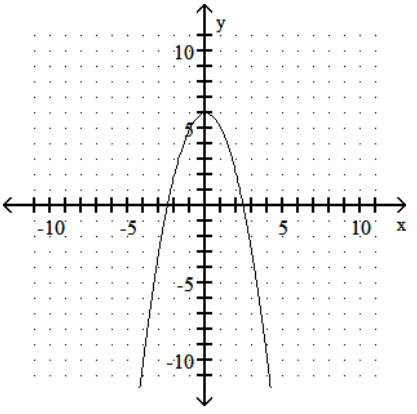
153) $f(x) = x^2 - 6$ 153) _____



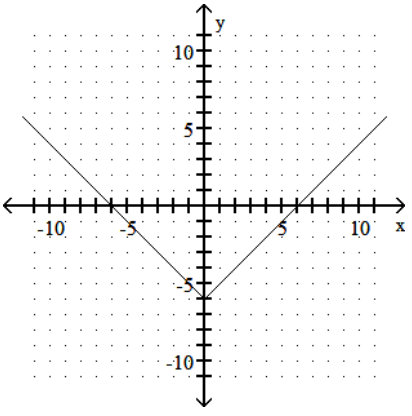
A)



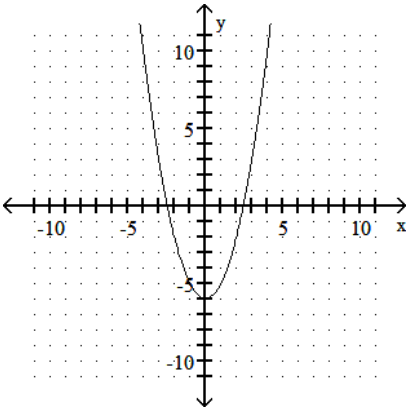
B)



C)



D)



Answer: D
Explanation: A)
B)
C)
D)

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

154) $f(x) = -3x^4 + 5x - 3$ 154) _____

A) Even B) Odd C) Neither

Answer: C
Explanation: A)
B)
C)

Answer the question.

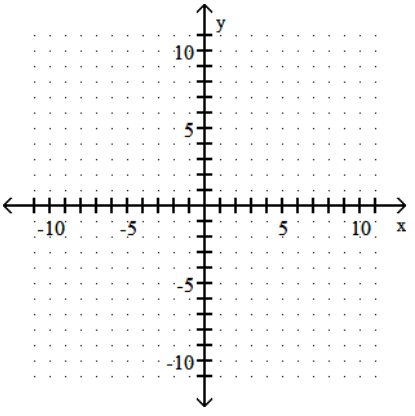
155) How can the graph of $h(x) = 0.4\sqrt[3]{-x}$ be obtained from the graph of $y = \sqrt[3]{x}$? 155) _____

A) Reflect it across the x-axis. Shrink it vertically by a factor of 0.4.
B) Reflect it across the y-axis. Stretch it vertically by a factor of 4.
C) Reflect it across the x-axis. Stretch it vertically by a factor of 4.
D) Reflect it across the y-axis. Shrink it vertically by a factor of 0.4.

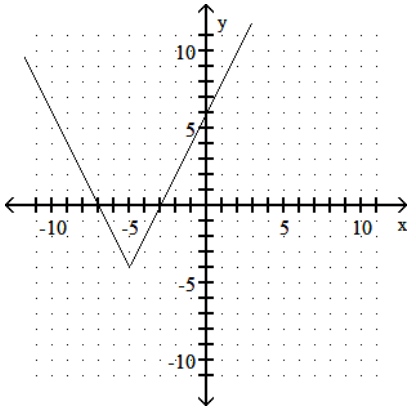
Answer: D
Explanation: A)
B)
C)
D)

Graph the function.

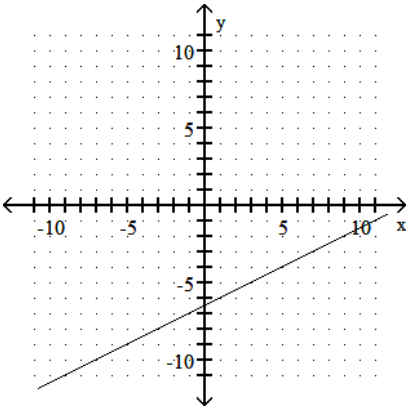
156) $h(x) = \frac{1}{2}|x + 5| - 4$ 156) _____



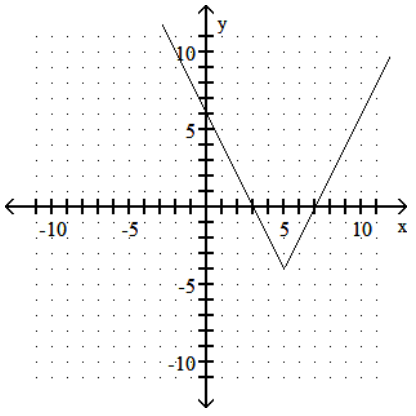
A)



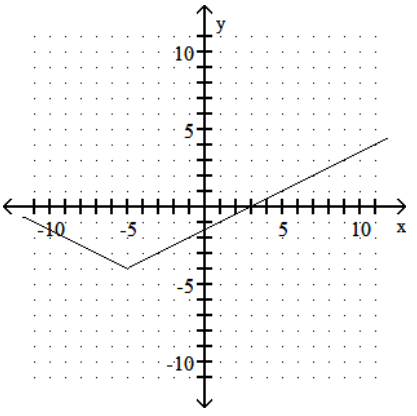
B)



C)



D)



Answer: D
Explanation: A)
B)
C)
D)

Solve.

157) The number G of gears a machine can make varies directly as the time T it operates. If it can make 8730 gears in 16 hours, how many gears can it make in 2 hours? 157) _____

A) 545.63 gears B) 0.0037 gears C) 8748 gears D) 1091.25 gears

Answer: D
Explanation: A)
B)
C)
D)

Solve the problem.

158) The time it takes to complete a certain job varies inversely as the number of people working on that job. If it takes 20 hours for 9 carpenters to frame a house, then how long will it take 30 carpenters to do the same job? 158) _____

A) 6.0 hr B) 30 hr C) 40 hr D) 13.5 hr

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

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

159) xy = -5 159) _____

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

Answer: D
Explanation: A)
B)
C)
D)

Solve.

160) 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. 160) _____

A) 29.1 feet B) 28.7 feet C) 28.3 feet D) 27.9 feet

Answer: C

Explanation: A)
B)
C)
D)

161) According to Ohm's law, the electric current I, in amperes, in a circuit varies directly as the voltage V. When 8 volts are applied, the current is 5 amperes. What is the current when 22 volts are applied? 161) _____

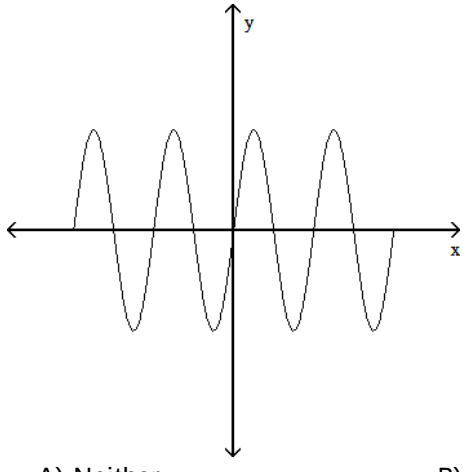
A) 13.75 amp B) 35 amp C) 35.2 amp D) 1.6 amp

Answer: A

Explanation: A)
B)
C)
D)

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

162) 162) _____

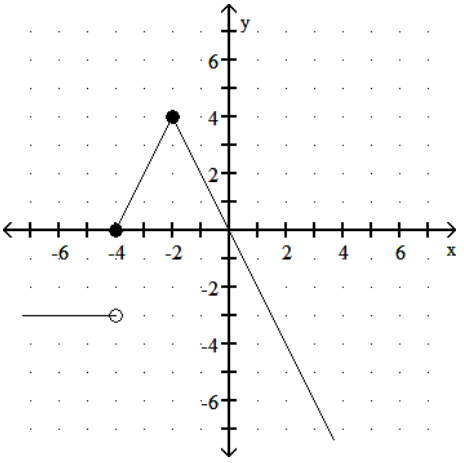


A) Neither B) Odd C) Even

Answer: B

Explanation: A)
B)
C)

Write an equation for the piecewise function.

163) 

163) _____

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

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

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

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

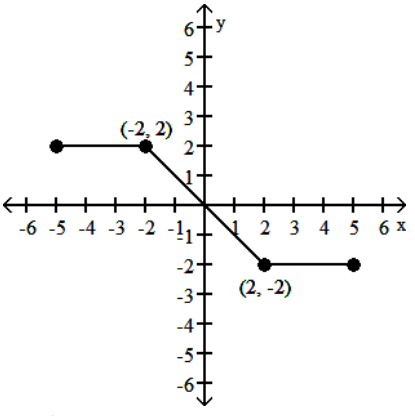
Answer: A

Explanation: A)
B)
C)
D)

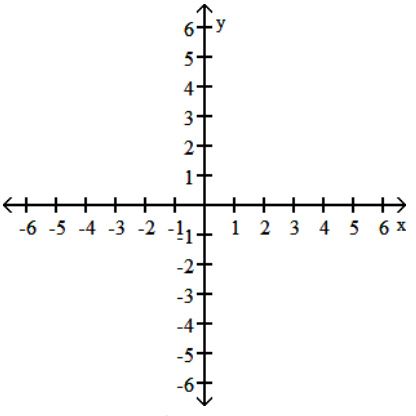
A graph of y = f(x) follows. No formula for f is given. Graph the given equation.

164) y = 2f(x)

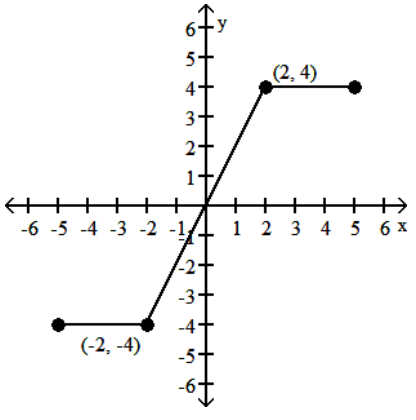
164) _____

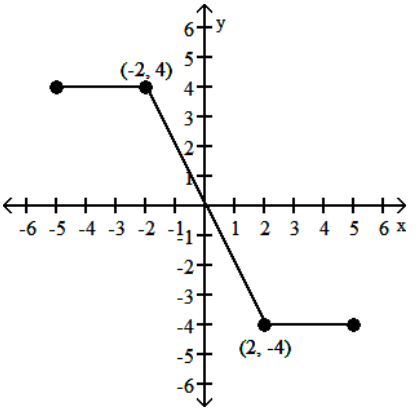


A)

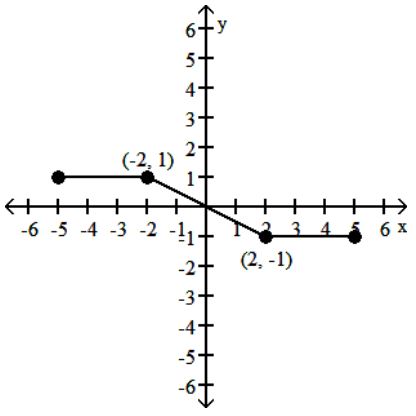


B)

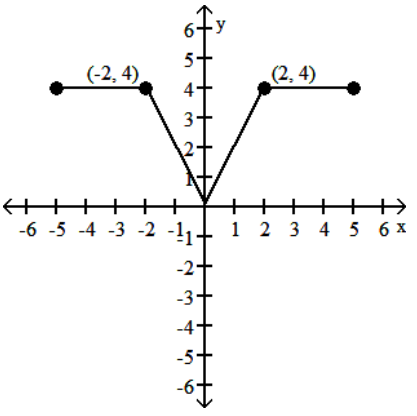




C)



D)



Answer: B

Explanation: A)

B)

C)

D)

Solve the problem.

165) 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 11 seconds? 165) _____

A) 1694 ft B) 176 ft C) 1936 ft D) 2178 ft

Answer: C

Explanation: A)

B)

C)

D)

For the pair of functions, find the indicated composition.

166) $f(x) = -3x + 4$, $g(x) = 2x + 5$ 166) _____

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

A) $-6x + 13$ B) $-6x - 3$ C) $-6x + 19$ D) $6x + 13$

Answer: A

Explanation: A)

B)

C)

D)

Solve the problem.

167) 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 1.05 ohm when the diameter is 1 mm and the length is 210 cm, what is the resistance when the diameter is 3 mm and the length is 2370 cm? 167) _____

A) 3.95 ohm B) 276.5 ohm C) 1.317 ohm D) 263.333 ohm

Answer: C

Explanation: A)

B)

C)

D)

Solve.

168) Bob wants to fence in a rectangular garden in his yard. He has 68 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. 168) _____

A) $A(x) = 34x - x^2$ B) $A(x) = 36x^2 - x$ C) $A(x) = 33x - x^2$ D) $A(x) = 35x - x^2$

Answer: A

Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated domain.

169) $f(x) = 2x - 5$, $g(x) = \sqrt{x + 9}$ 169) _____

Find the domain of $f \circ g$.

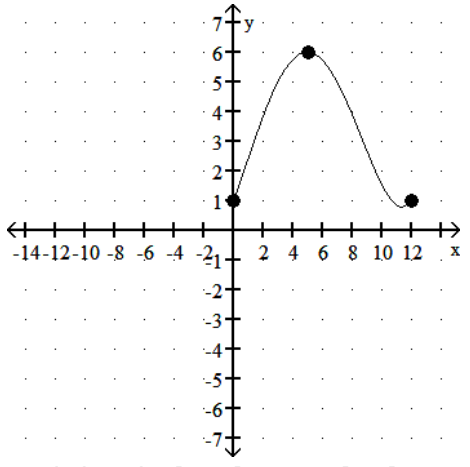
A) $(-9, 9)$ B) $[-9, \infty)$ C) $[9, \infty)$ D) $[0, \infty)$

Answer: B

Explanation: A)
B)
C)
D)

Determine the domain and range of the function.

170) 170) _____



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

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

Answer: A

Explanation: A)
B)
C)
D)

Solve.

171) 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. 171) _____

A) 2.5 inches B) 3.1 inches C) 2.8 inches D) 2.3 inches

Answer: A

Explanation: A)
B)
C)
D)

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

172) $f(x) = \frac{x - 20}{x + 3}$ 172) _____

A) $\frac{24}{(x + 3)(x - 3)}$ B) $\frac{23(x + h + 3)}{(x + 3)}$

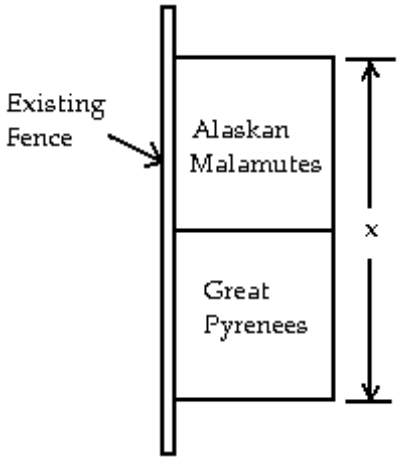
C) $-\frac{23}{x(x + 3)}$ D) $\frac{23}{(x + h + 3)(x + 3)}$

Answer: D

Explanation: A)
B)
C)
D)

Solve.

173) Elissa sells two breeds of dogs, Alaskan Malamutes and Great Pyrenees. She has 118 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. 173) _____



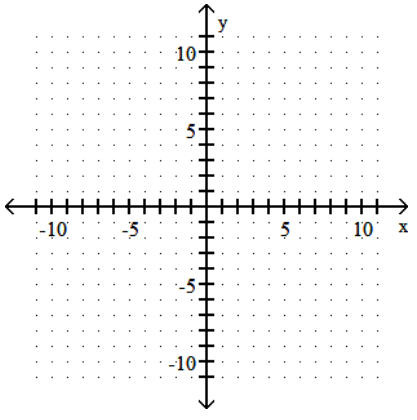
A) 58 feet B) 61 feet C) $59\frac{1}{2}$ feet D) 59 feet

Answer: D

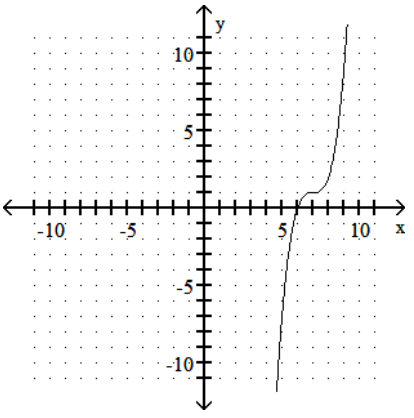
Explanation: A)
B)
C)
D)

Graph the function.

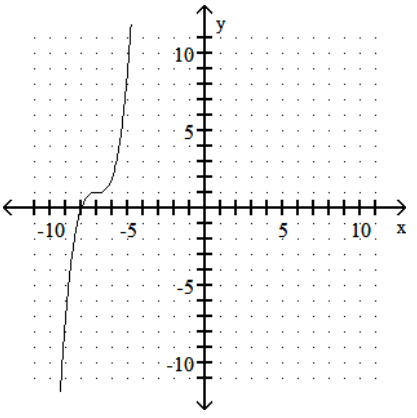
174) $f(x) = (x - 7)^3 - 1$ 174) _____



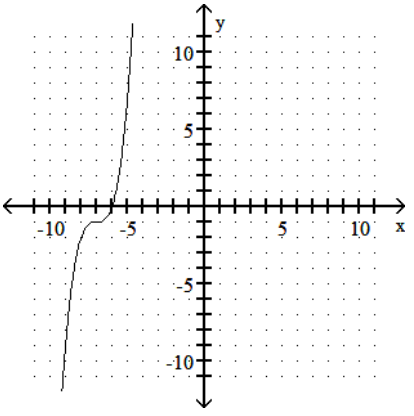
A)



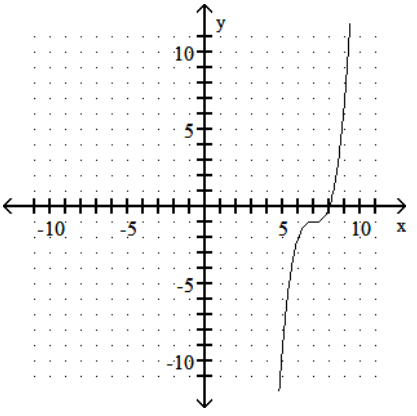
B)



C)



D)



Answer: D

Explanation: A)

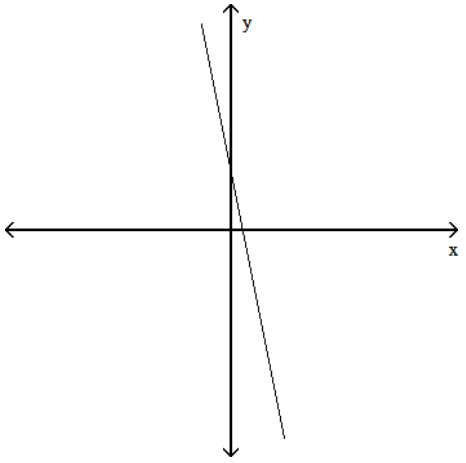
B)

C)

D)

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

175) 175) _____



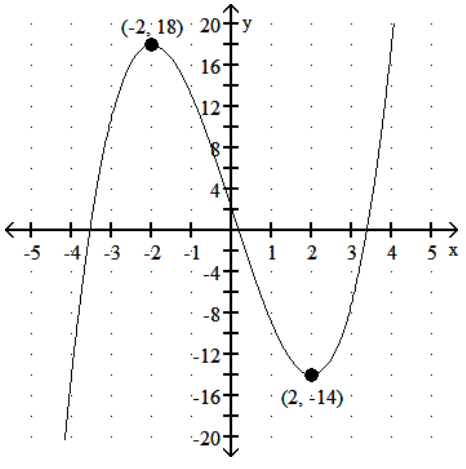
A) Neither B) Odd C) Even

Answer: A

Explanation: A)
B)
C)

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.

176) $f(x) = x^3 - 12x + 2$ 176) _____



A) relative maximum: -14 at x = 2; relative minimum: 18 at x = -2; increasing (-2, 2); decreasing $(-\infty, -2), (2, \infty)$

B) relative maximum: 18 at x = -2; relative minimum: -14 at x = 2; increasing $(-\infty, -2), (2, \infty)$; decreasing (-2, 2)

C) no relative maxima or minima; increasing $(-\infty, -2), (2, \infty)$; decreasing (-2, 2)

D) 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)

Answer: B

Explanation: A)
B)
C)
D)

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

177) $f(x) = x + \frac{5}{x}$ 177) _____

A) Even B) Odd C) Neither

Answer: B

Explanation: A)
B)
C)

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

178) $x^2 + xy^2 = 5$ 178) _____

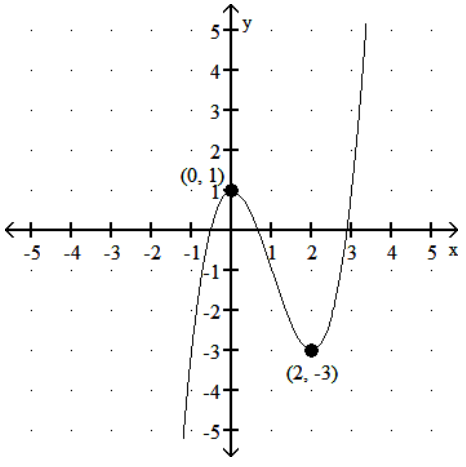
A) x-axis, y-axis, origin B) Origin only
C) y-axis only D) x-axis only

Answer: D

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.

179) $f(x) = x^3 - 3x^2 + 1$ 179) _____



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

Answer: C

Explanation: A)
B)
C)
D)

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

180) $f(x) = 5x - 4,\ g(x) = 3x - 5$ 180) _____

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

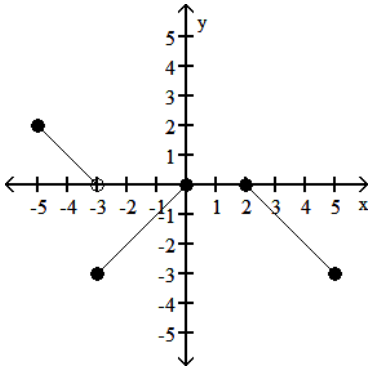
A) $2x + 1$ B) $8x - 9$ C) $2x - 9$ D) $-2x - 1$

Answer: A

Explanation: A)
B)
C)
D)

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

181) 181) _____



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

Answer: B

Explanation: A)
B)
C)
D)

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

182) $f(x) = \frac{5}{x - 2},\ g(x) = \frac{1}{9 + x}$ 182) _____

Find $(ff)(x)$.

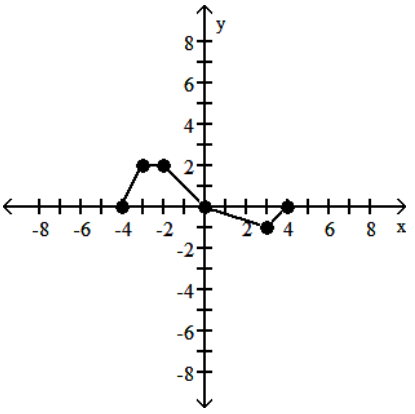
A) $\frac{25}{(x - 2)^2}$ B) $\frac{25}{(x - 2)(9 + x)}$ C) $\frac{25}{x - 2^2}$ D) $\frac{5}{(x - 2)^2}$

Answer: A

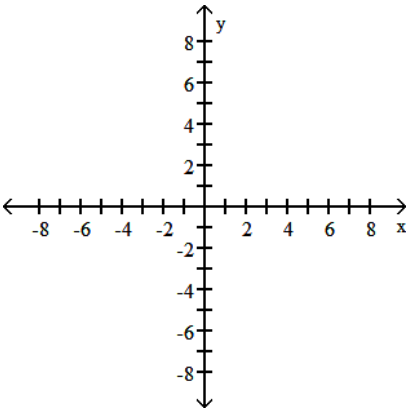
Explanation: A)
B)
C)
D)

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

183) $y = f\left(-\frac{1}{2}x\right)$ 183) _____



A)



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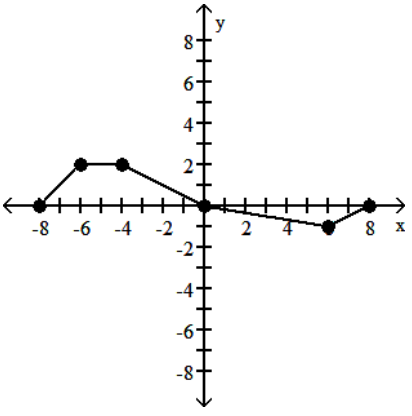
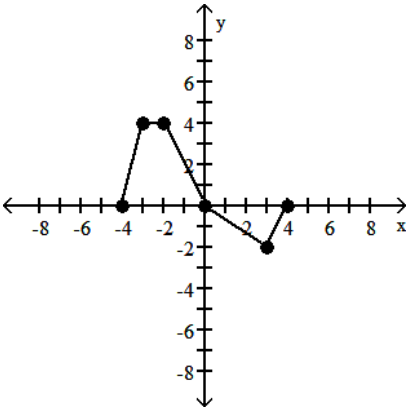
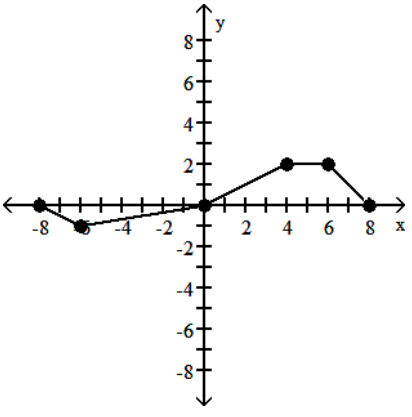
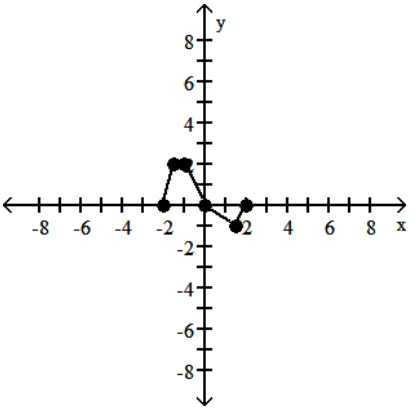


C)



D)





Answer: C

Explanation: A)

B)

C)

D)

Find f(x) and g(x) such that h(x) = (f ∘g)(x).

184) h(x) = $(7x - 2)^2$ 184) _____

A) f(x) = 7x - 2, g(x) = x^2

B) f(x) = x^2, g(x) = 7x - 2

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

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

Answer: B

Explanation: A)

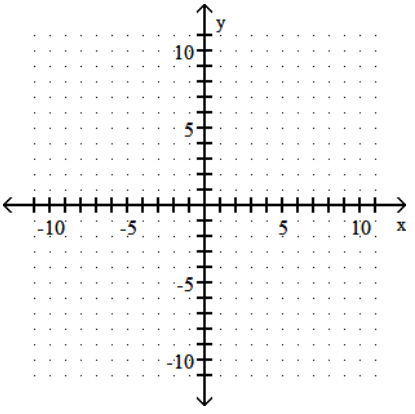
B)

C)

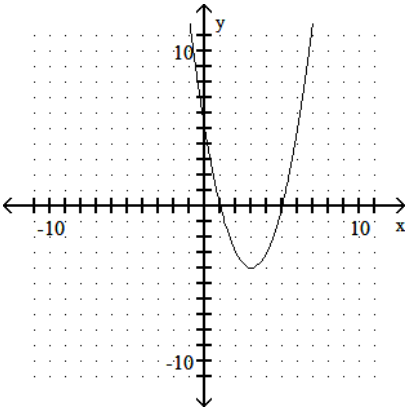
D)

Graph the function.

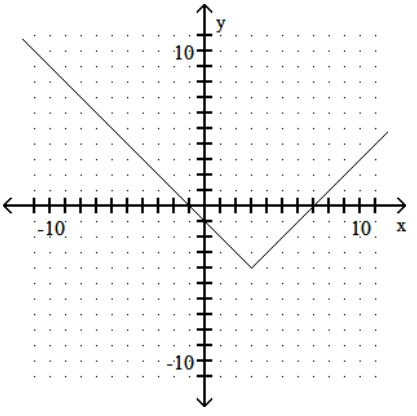
185) h(x) = $(x - 3)^2$ - 4 185) _____



A)



B)



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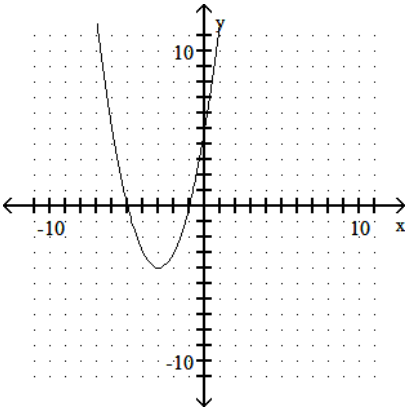
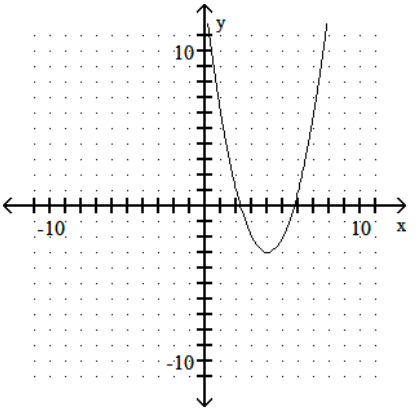


D)



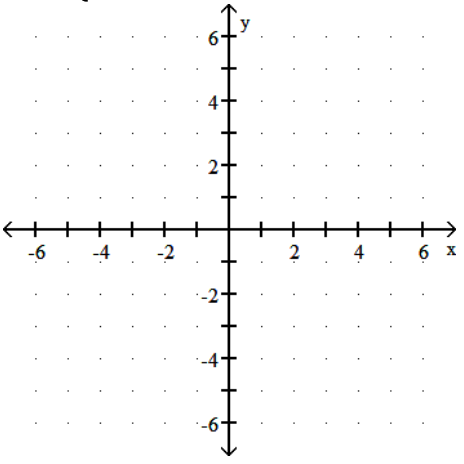
Answer: A

Explanation: A)

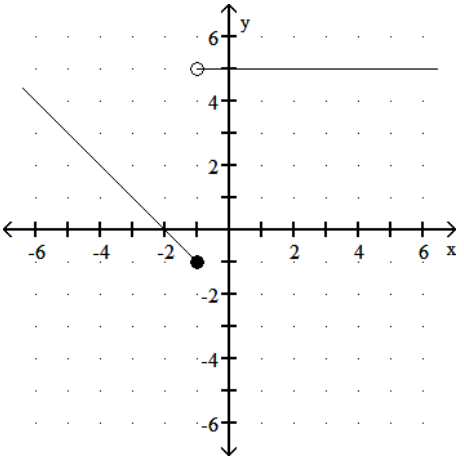
B)

B)
C)
D)

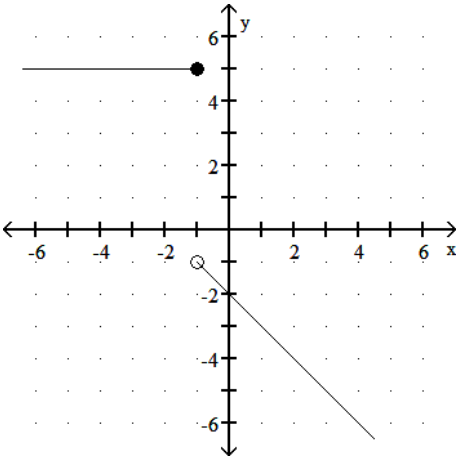
186) $f(x) = \begin{cases} x - 1, & \text{for } x > 0, \\ 5, & \text{for } x \le 0 \end{cases}$ 186) _____



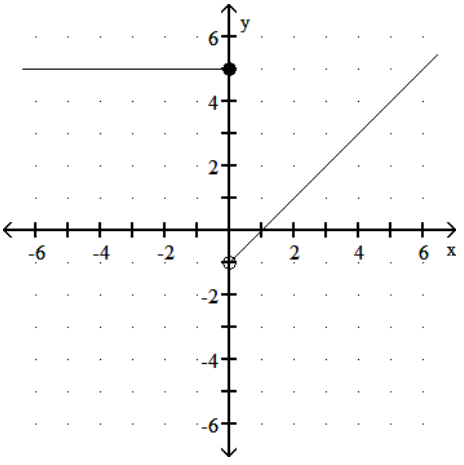
A)



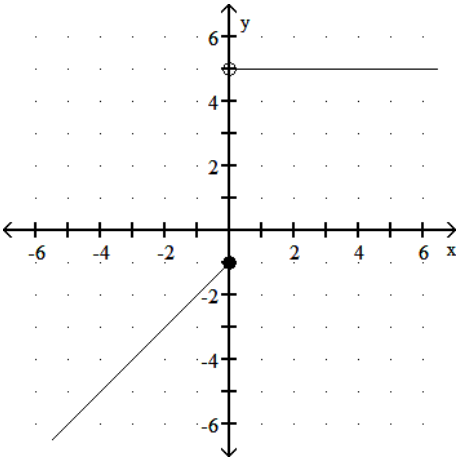
B)



C)



D)

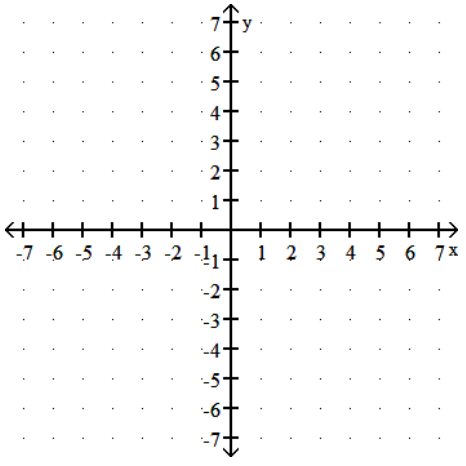


Answer: C

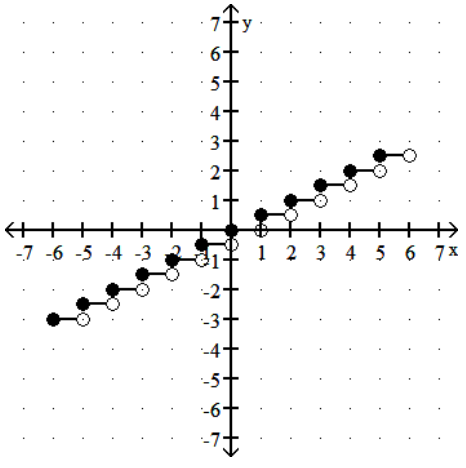
Explanation: A)
B)
C)
D)

Graph the equation.

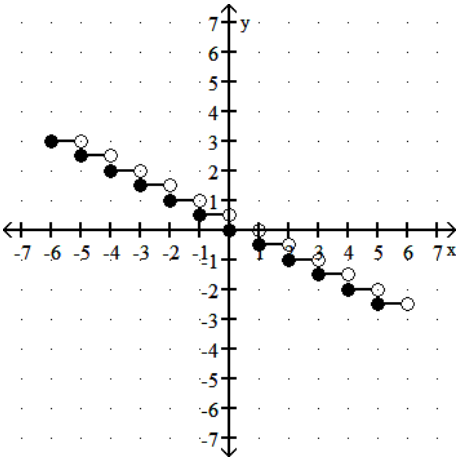
187) $y = \frac{1}{2}[[x]]$ 187) _____



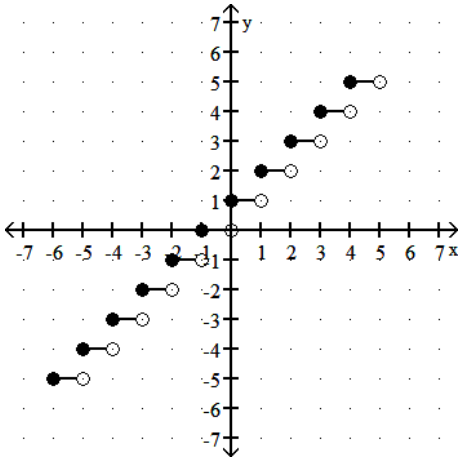
A)



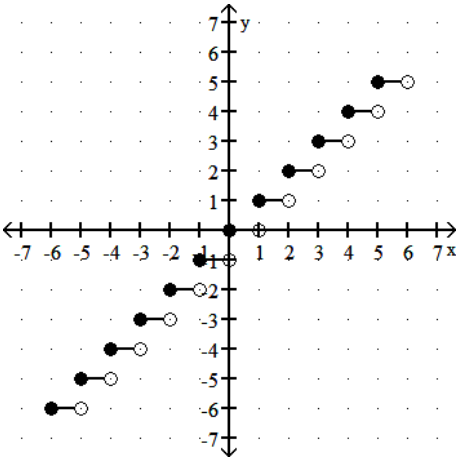
B)



C)



D)



Answer: A

Explanation: A)
B)
C)
D)

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

188) $f(x) = \frac{x}{7 - x}$ 188) _____

A) $\frac{hx}{(7 - x - h)(7 + x)}$

B) $\frac{7}{(7 - x - h)(7 - x)}$

C) $-\frac{7}{(7 - x + h)(7 - x)}$

D) $\frac{x}{(7 - x + h)(7 - x)}$

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

189) 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 650 feet at 50 mph? Round your answer to the nearest pound of force? 189) _____

A) 21,339 lb B) 20,637 lb C) 20,769 lb D) 20,801 lb

Answer: C

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

190) y varies directly as x and inversely as z, and y = 12 when x = 2 and z = 8. 190) _____

A) $y = 51xz$ B) $y = \frac{52x}{z}$ C) $y = \frac{48x}{z}$ D) $y = \frac{47z}{x}$

Answer: C

Explanation: A)
B)
C)
D)

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

191) $f(x) = 13\sqrt[3]{x}$ 191) _____

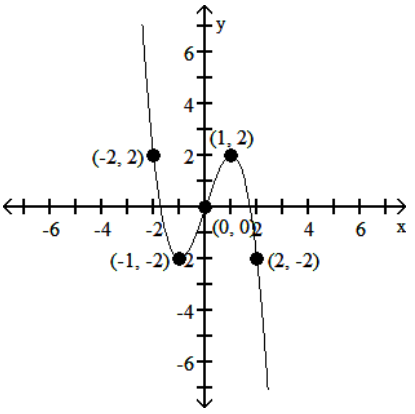
A) Even B) Odd C) Neither

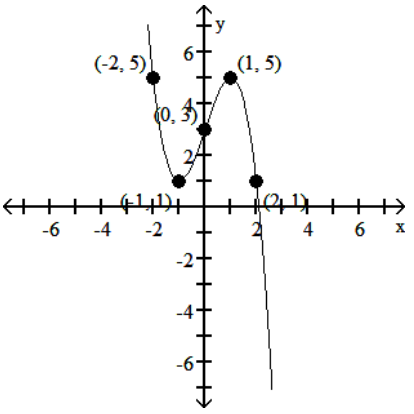
Answer: B

Explanation: A)
B)
C)

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

192) $f(x) = -x^3 + 3x$ g(x) = 192) _____





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

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

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

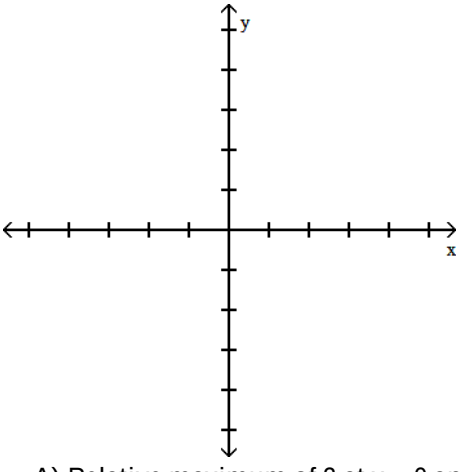
D) $g(x) = -(x - 3)^3 + 3(x - 3)$

Answer: B

Explanation: A)
B)
C)
D)

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

193) $f(x) = -x^2 + 2$ 193) _____



A) Relative maximum of 2 at x = 0 and relative minimum at x = 3

B) No relative extrema

C) Relative minimum of 2 at x = 0

D) Relative maximum of 2 at x = 0

Answer: D

Explanation: A)
B)
C)
D)

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

194) $f(x) = -8x^5 + 2x^3$ 194) _____

A) Even B) Odd C) Neither

Answer: B

Explanation: A)
B)
C)

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

195) $f(x) = x - 6,\ g(x) = x + 3$ 195) _____

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

A) 11 B) 17 C) -1 D) 5

Answer: D

Explanation: A)
B)
C)
D)

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

196) $h(x) = \sqrt{6 - \sqrt{x - 6}}$ 196) _____

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

C) $f(x) = \sqrt{x - 6}$, $g(x) = \sqrt{6 - x}$ D) $f(x) = \sqrt{6 - x}$, $g(x) = \sqrt{x - 6}$

Answer: D

Explanation: A)
B)
C)
D)

Solve.

197) A rectangular sign is being designed so that the length of its base, in feet, is 12 feet less than 4 times the height, h. Express the area of the sign as a function of h. 197) _____

A) $A(h) = -12h + 4h^2$ B) $A(h) = -12h^2 + 2h$

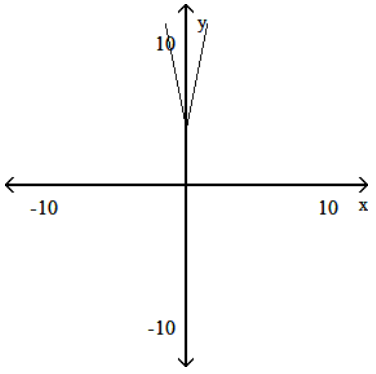
C) $A(h) = 12h - 2h^2$ D) $A(h) = -12h + h^2$

Answer: A

Explanation: A)
B)
C)
D)

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

198) 198) _____



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

Answer: A

Explanation: A)
B)
C)
D)

Solve.

199) 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. 199) _____

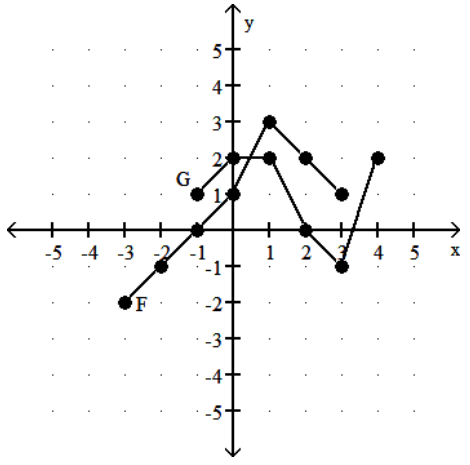
A) 8.63 feet B) 8.55 feet C) 7.92 feet D) 8.44 feet

Answer: B

Explanation: A)
B)
C)
D)

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

200) Find the domain of G/F. 200) _____



A) (-1,3] B) [-1,2) ∪ (2,3) C) [-3,4] D) [-3,3]

Answer: A

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

201) y varies directly as x and inversely as z, and y = 4.4 when x = 2 and z = 0.6. 201) _____

A) $y = \frac{8.89x}{z}$ B) $y = 1.64xz$ C) $y = \frac{x}{z}$ D) $y = \frac{1.32x}{z}$

Answer: D

Explanation: A)
B)
C)
D)

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

202) $f(x) = x^2 - 6$, $g(x) = 25x^2 - 6$ 202) _____

A) f(x) + 5 B) f(5x) C) 5f(x) D) f(x + 5)

Answer: B

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

203) y varies jointly as x and z and inversely as w , and $y = \frac{96}{7}$ when x = 8, z = 3, and w = 7. 203) _____

A) $y = 4xzw$ B) $y = \frac{96}{7}xzw$ C) $y = \frac{4xz}{w}$ D) $y = \frac{96}{7}\frac{xz}{w}$

Answer: C
Explanation: A)
B)
C)
D)

For the pair of functions, find the indicated composition.

204) $f(x) = \sqrt{x + 8}$, $g(x) = 8x - 12$ 204) _____

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

A) $8\sqrt{x - 4}$ B) $2\sqrt{2x + 1}$ C) $8\sqrt{x + 8} - 12$ D) $2\sqrt{2x - 1}$

Answer: D
Explanation: A)
B)
C)
D)

For the piecewise function, find the specified function value.

205) $f(x) = \begin{cases} 6x + 1, & \text{for } x < 9, \\ 9x, & \text{for } 9 \le x \le 12, \\ 9 - 5x, & \text{for } x > 12 \end{cases}$ 205) _____

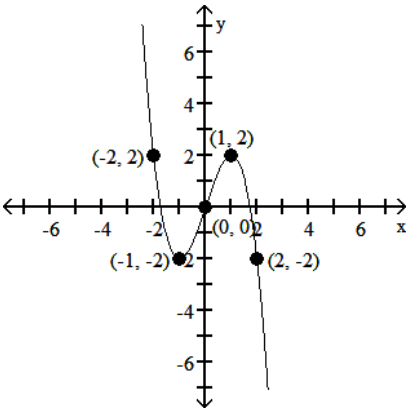
f(-9)

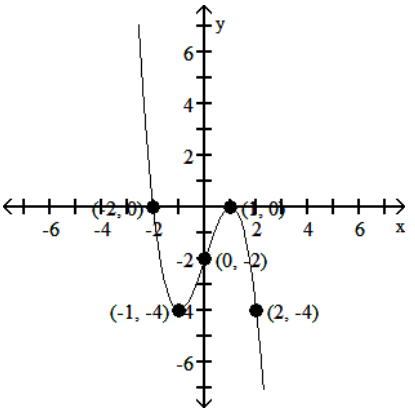
A) 54 B) -81 C) 55 D) -53

Answer: D
Explanation: A)
B)
C)
D)

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

206) $f(x) = -x^3 + 3x$ g(x) = 206) _____





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

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

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

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

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

207) 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 $(V \circ r)(t)$. 207) _____

A) $(V \circ r)(t) = \frac{700\pi t^3}{3}$

B) $(V \circ r)(t) = \frac{5000\pi t^2}{3}$

C) $(V \circ r)(t) = \frac{40000\pi\sqrt{t}}{3}$

D) $(V \circ r)(t) = \frac{4000\pi t^3}{3}$

Answer: D

Explanation: A)
B)
C)
D)

Find an equation of variation for the given situation.

208) y varies inversely as x and y = 0.5 when x = 0.9 208) _____

A) $y = \frac{1.4}{x}$

B) $y = 0.56x$

C) $y = \frac{0.45}{x}$

D) $y = \frac{0.56}{x}$

Answer: C

Explanation: A)
B)
C)
D)

209) y varies jointly as x and the square of z and inversely as w , and $y = \frac{189}{2}$ when x = 7, z = 3, and w = 4. 209) _____

A) $y = \frac{6xz^2}{w}$ B) $y = \frac{18xz^2}{w}$ C) $y = \frac{6xz}{w}$ D) $y = \frac{18xz}{w}$

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

210) 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 19 foot length with diameter 3 inches cost? 210) _____

A) $279.17 B) $273.60 C) $278.90 D) $271.20

Answer: B

Explanation: A)
B)
C)
D)

Answer the question.

211) How can the graph of $f(x) = -4\sqrt{x} + 7$ be obtained from the graph of $y = \sqrt{x}$? 211) _____

A) Stretch it vertically by a factor of 4. Reflect it across the x-axis. Shift it vertically 7 units upward.

B) Stretch it vertically by a factor of 4. Reflect it across the y-axis. Shift it 7 units horizontally to the left.

C) Shrink it vertically by a factor of $\frac{1}{4}$. Reflect it across the x-axis. Shift it vertically 7 units downward.

D) Stretch it vertically by a factor of 4. Reflect it across the x-axis. Shift it 7 units horizontally to the right.

Answer: A

Explanation: A)
B)
C)
D)

Answer Key
Testname: C2

1) A
2) C
3) D
4) D
5) D
6) B
7) C
8) C
9) B
10) B
11) B
12) B
13) D
14) B
15) C
16) B
17) A
18) D
19) C
20) B
21) A
22) A
23) B
24) A
25) D
26) C
27) A
28) C
29) D
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32) A
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81) A
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84) C
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86) C
87) A
88) A
89) B
90) D
91) D
92) A
93) B
94) D
95) B
96) D
97) D
98) D
99) C
100) D

Answer Key
Testname: C2

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103) D
104) D
105) C
106) A
107) B
108) D
109) C
110) D
111) B
112) B
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149) D
150) A

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152) A
153) D
154) C
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156) D
157) D
158) A
159) D
160) C
161) A
162) B
163) A
164) B
165) C
166) A
167) C
168) A
169) B
170) A
171) A
172) D
173) D
174) D
175) A
176) B
177) B
178) D
179) C
180) A
181) B
182) A
183) C
184) B
185) A
186) C
187) A
188) B
189) C
190) C
191) B
192) B
193) D
194) B
195) D
196) D
197) A
198) A
199) B
200) A

Answer Key
Testname: C2

201) D
202) B
203) C
204) D
205) D
206) A
207) D
208) C
209) A
210) B
211) A