Exam

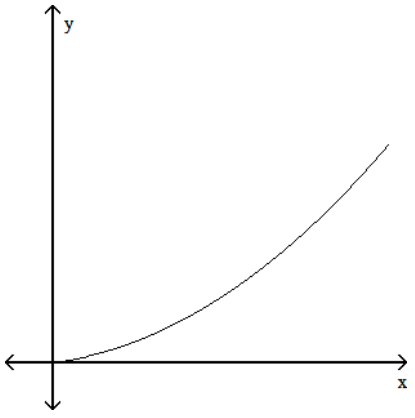
Name_____

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

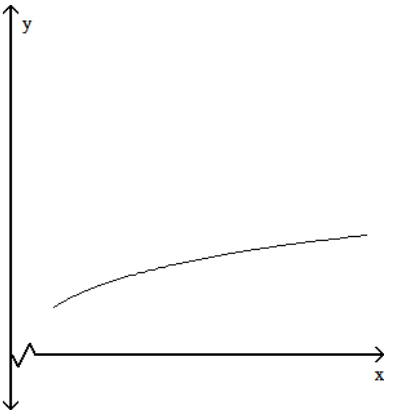
Match the function with the graph that best describes the situation.

1) The amount of rainfall as a function of time, if the rain fell more and more softly. 1) _____

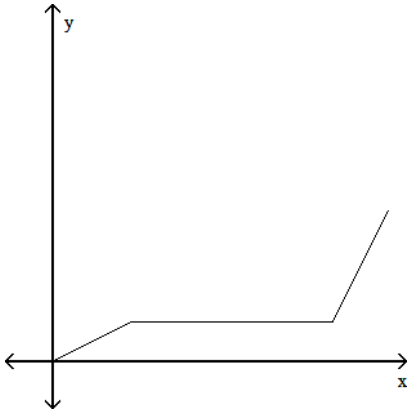
A)



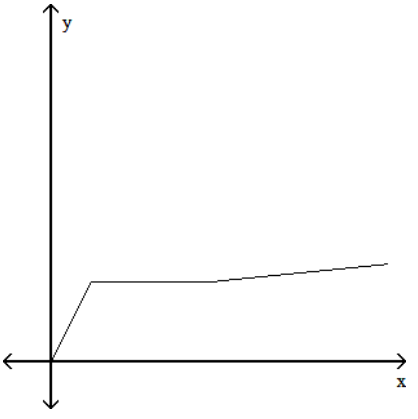

B)




C)




D)




Answer: B

Explanation: A)

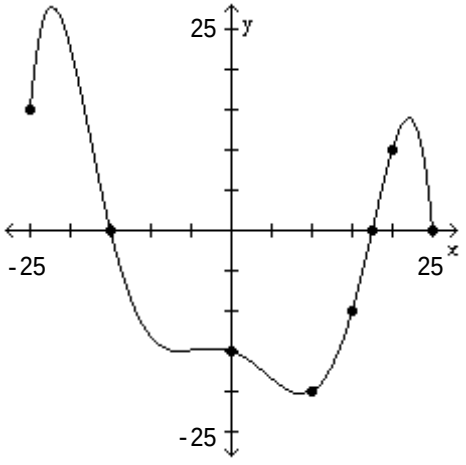
B)

C)

D)

The graph of a function f is given. Use the graph to answer the question.

2) For which of the following values of x does f(x) = 10? 2) _____



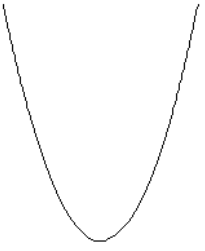

A) 10 B) 35 C) 20 D) 25

Answer: C

Explanation: A)
B)
C)
D)

Match the graph to the function listed whose graph most resembles the one given.

3) 3) _____



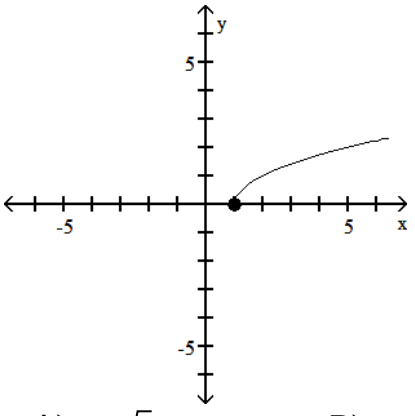
A) square function B) reciprocal function
C) cube function D) absolute value function

Answer: A

Explanation: A)
B)
C)
D)

Match the correct function to the graph.

4) 4) _____




A) $y = \sqrt{x}$ B) $y = \sqrt{x + 1}$ C) $y = x - 1$ D) $y = \sqrt{x - 1}$

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

5) Let P = (x, y) be a point on the graph of $y = \sqrt{x}$. Express the distance d from P to the point (1, 0) as a function of x. 5) _____

A) $d(x) = \sqrt{x^2 - x + 1}$ B) $d(x) = x^2 - x + 1$

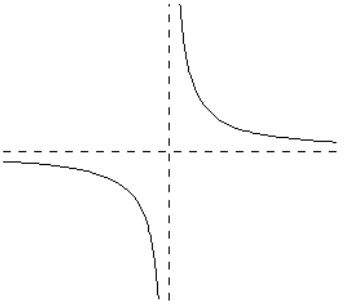
C) $d(x) = x^2 + 2x + 2$ D) $d(x) = \sqrt{x^2 + 2x + 2}$

Answer: A

Explanation: A)
B)
C)
D)

Match the graph to the function listed whose graph most resembles the one given.

6) 6) _____

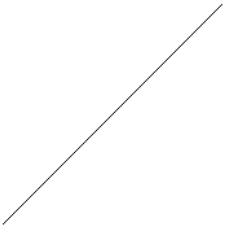


A) absolute value function
B) square function
C) square root function
D) reciprocal function

Answer: D

Explanation: A)
B)
C)
D)

7) 7) _____



A) constant function
B) absolute value function
C) reciprocal function
D) linear function

Answer: D

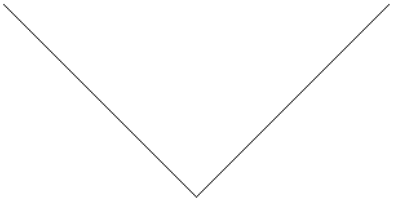
Explanation: A)
B)
C)
D)

8) 8) _____

A) cube root function
B) square function
C) cube function
D) square root function

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

9) 9) _____



A) square function
B) linear function
C) reciprocal function
D) absolute value function

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

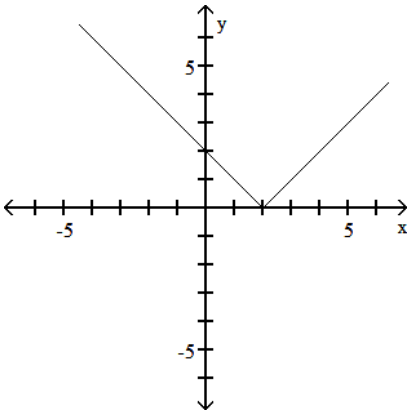
10) 10) _____

A) cube root function
B) square function
C) square root function
D) cube function

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

Match the correct function to the graph.

11) 11) _____




A) y = |2 - x| B) y = |1 - x| C) y = |x + 2| D) y = x - 2

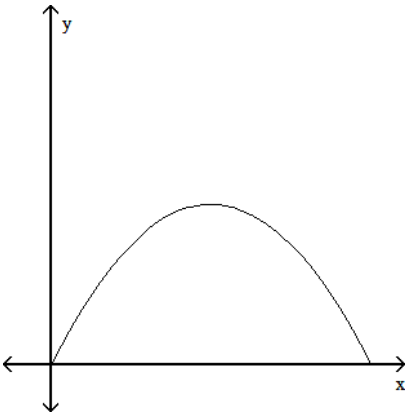
Answer: A

Explanation: A)
B)
C)
D)

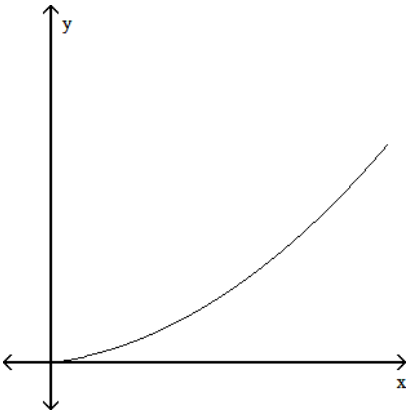
Match the function with the graph that best describes the situation.

12) The height of an animal as a function of time. 12) _____

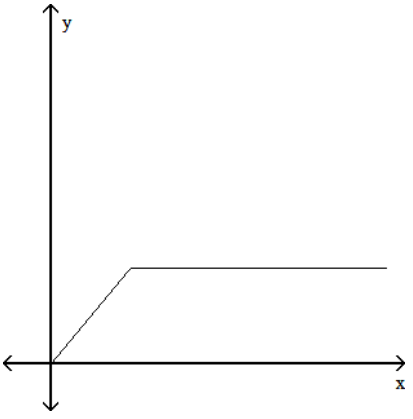
A)



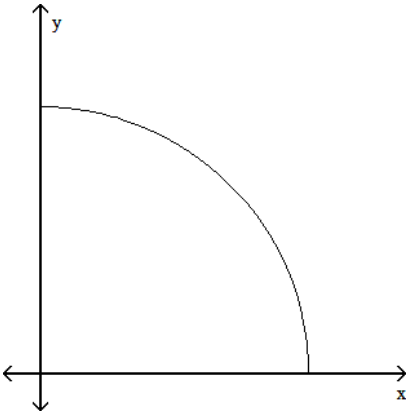

B)




C)




D)




Answer: C

Explanation: A)
B)
C)
D)

Match the graph to the function listed whose graph most resembles the one given.

13) 13) _____



A) linear function
B) absolute value function
C) constant function
D) reciprocal function

Answer: C

Explanation: A)
B)
C)
D)

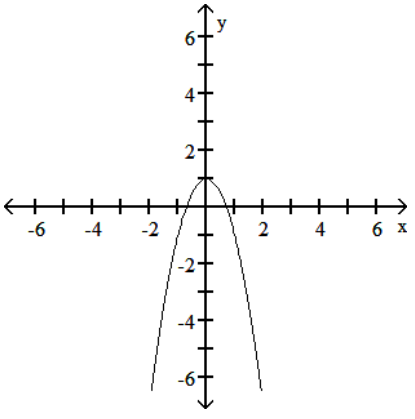
14) 14) _____

A) cube root function B) cube function
C) square function D) square root function

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

Match the correct function to the graph.

15) 15) _____




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

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

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

Solve the problem.

16) Two boats leave a dock at the same time. One boat is headed directly east at a constant speed of 35 knots (nautical miles per hour), and the other is headed directly south at a constant speed of 22 knots. Express the distance d between the boats as a function of the time t. 16) _____

Answer: $d(t) = \sqrt{1709}t$
Explanation:

17) A right triangle has one vertex on the graph of $y = x^2$ at (x, y), another at the origin, and the third on the (positive) y-axis at (0, y). Express the area A of the triangle as a function of x. 17) _____

Answer: $A(x) = \frac{1}{2}x^3$

Explanation:

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. Determine where the function is increasing and where it is decreasing. If necessary, round answers to two decimal places.

18) $f(x) = x^5 - x^2$; (-2, 2) 18) _____

Answer: local maximum at (0, 0)
local minimum at (0.74, -0.33)
increasing on (-2, 0) and (0.74, 2)
decreasing on (0, 0.74)

Explanation:

Solve the problem.

19) A cellular phone plan had the following schedule of charges: 19) _____

| | |
|---|---|
| Basic service, including 100 minutes of calls | $20.00 per month |
| 2nd 100 minutes of calls | $0.075 per minute |
| Additional minutes of calls | $0.10 per minute |

What is the charge for 200 minutes of calls in one month?
What is the charge for 250 minutes of calls in one month?
Construct a function that relates the monthly charge C for x minutes of calls.

Answer: $27.50
$32.50;

$$C(x) = \begin{cases} 20 & \text{if } 0 \le x \le 100 \\ 12.5 + 0.075x & \text{if } 100 < x \le 200 \\ 7.5 + 0.1x & \text{if } x > 200 \end{cases}$$

Explanation:

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. Determine where the function is increasing and where it is decreasing. If necessary, round answers to two decimal places.

20) $f(x) = x^3 - 4x^2 + 6$; (-1, 4) 20) _____

Answer: local maximum at (0, 6)
local minimum at (2.67, -3.48)
increasing on (-1, 0) and (2.67, 4)
decreasing on (0, 2.67)

Explanation:

Solve the problem.

21) The price p and x, the quantity of a certain product sold, obey the demand equation 21) _____

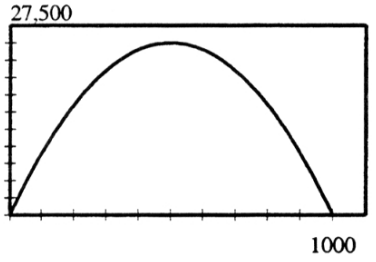
$$p = -\frac{1}{10}x + 100, \{x \mid 0 \le x \le 1000\}$$

a) Express the revenue R as a function of x.
b) What is the revenue if 450 units are sold?
c) Graph the revenue function using a graphing utility.
d) What quantity x maximizes revenue? What is the maximum revenue?
e) What price should the company charge to maximize revenue?

Answer: a. $R(x) = -\frac{1}{10}x^2 + 100x$

b. R(450) = $24,750.00

c.




d. 500; $25,000.00

e. $50.00

Explanation:

22) A wire 20 feet long is to be cut into two pieces. One piece will be shaped as a square and the other piece will be shaped as an equilateral triangle. Express the total area A enclosed by the pieces of wire as a function of the length x of a side of the equilateral triangle. What is the domain of A? 22) _____

Answer: $A(x) = \frac{4\sqrt{3} + 9}{16}x^2 - \frac{15}{2}x + 25; \{x \mid 0 \le x \le \frac{20}{3}\}$

Explanation:

23) The wind chill factor represents the equivalent air temperature at a standard wind speed tl would produce the same heat loss as the given temperature and wind speed. One formula computing the equivalent temperature is 23) _____

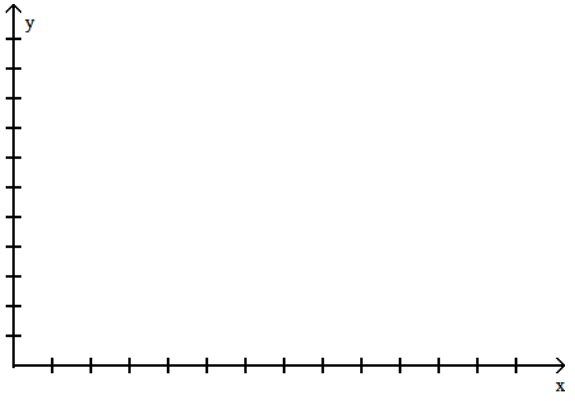
$$W(t) = \begin{cases} t & \text{if } 0 \le v < 1.79 \\ 33 - \dfrac{(10.45 + 10\sqrt{v} - v)(33 - t)}{22.04} & \text{if } 1.79 \le v < 20 \\ 33 - 1.5958(33 - t) & \text{if } v \ge 20 \end{cases}$$

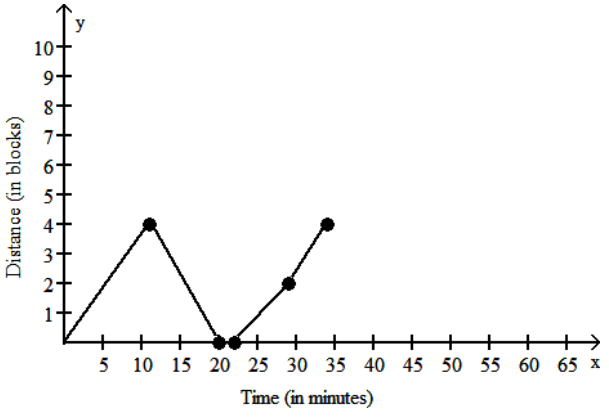
where v represents the wind speed (in meters per second) and t represents the air tempera (°C). Compute the wind chill for an air temperature of 15°C and a wind speed of 12 meters per second. (Round the answer to one decimal place.)

Answer: 6.0°C

Explanation:

24) Michael decides to walk to the mall to do some errands. He leaves home, walks 4 blocks in 11 minutes at a constant speed, and realizes that he forgot his wallet at home. So Michael runs back in 9 minutes. At home, it takes him 2 minutes to find his wallet and close the door. Michael walks 2 blocks in 7 minutes and then decides to jog to the mall. It takes him 5 minutes to get to the mall which is 2 blocks away. Draw a graph of Michael's distance from home (in blocks) as a function of time. 24) _____




Answer:

Explanation:

25) The volume V of a square-based pyramid with base sides s and height h is $V = \frac{1}{3}s^2h$. If the height is half of the length of a base side, express the volume V as a function of s. 25) _____

Answer: $V(s) = \frac{1}{6}s^3$

Explanation:

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. Determine where the function is increasing and where it is decreasing. If necessary, round answers to two decimal places.

26) $f(x) = -0.3x^3 + 0.2x^2 + 4x - 5;\ (-4, 5)$ 26) _____

Answer: local maximum at (2.34, 1.61)
local minimum at (-1.9, -9.82)
increasing on (-1.9, 2.34)
decreasing on (-4, -1.9) and (2.34, 5)

Explanation:

Solve the problem.

27) One Internet service provider has the following rate schedule for high-speed Internet service: 27) _____

| | |
|---|---|
| Monthly service charge | $18.00 |
| 1st 50 hours of use | free |
| Next 50 hours of use | $0.25/hour |
| Over 100 hours of use | $1.00/hour |

What is the charge for 50 hours of high-speed Internet use in one month?
What is the charge for 75 hours of high-speed Internet use in one month?
What is the charge for 135 hours of high-speed Internet use in one month?

Answer: $18.00
$24.25
$65.50

Explanation:

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. Determine where the function is increasing and where it is decreasing. If necessary, round answers to two decimal places.

28) $f(x) = 0.15x^4 + 0.3x^3 - 0.8x^2 + 5;\ (-4, 2)$ 28) _____

Answer: local maximum at (0, 5)
local minima at (-2.55, 1.17) and (1.05, 4.65)
increasing on (-2.55, 0) and (1.05, 2)
decreasing on (-4, -2.55) and (0, 1.05)

Explanation:

Solve the problem.

29) An electric company has the following rate schedule for electricity usage in single-family residences: 29) _____

| | |
|---|---|
| Monthly service charge | $4.93 |
| Per kilowatt service charge | |
| 1st 300 kilowatts | $0.11589/kW |
| Over 300 kilowatts | $0.13321/kW |

What is the charge for using 300 kilowatts in one month?
What is the charge for using 375 kilowatts in one month?
Construct a function that gives the monthly charge C for x kilowatts of electricity.

Answer: $39.70
$49.69

$$C(x) = \begin{cases} 4.93 + 0.11589x & \text{if } 0 \le x \le 300 \\ -0.266 + 0.13321x & \text{if } x > 300 \end{cases}$$

Explanation:

30) A gas company has the following rate schedule for natural gas usage in single-family residences: 30) _____

| | |
|---|---|
| Monthly service charge | $8.80 |
| Per therm service charge | |
| 1st 25 therms | $0.6686/therm |
| Over 25 therms | $0.85870/therm |

What is the charge for using 25 therms in one month?
What is the charge for using 45 therms in one month?
Construct a function that gives the monthly charge C for x therms of gas.

Answer: $25.52
$42.69

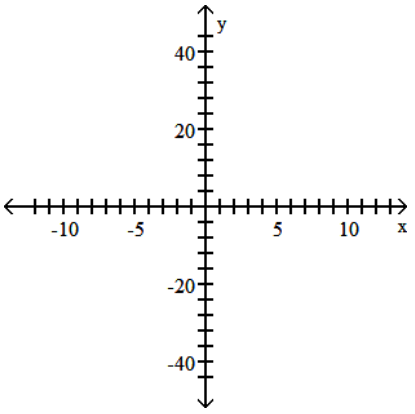
$$C(x) = \begin{cases} 8.8 + 0.6686x & \text{if } 0 \le x \le 25 \\ 4.0475 + 0.8587x & \text{if } x > 25 \end{cases}$$

Explanation:

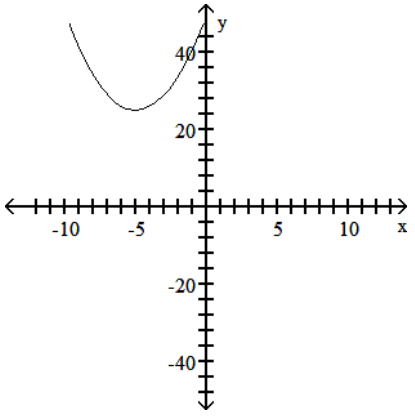
**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

Complete the square and then use the shifting technique to graph the function.

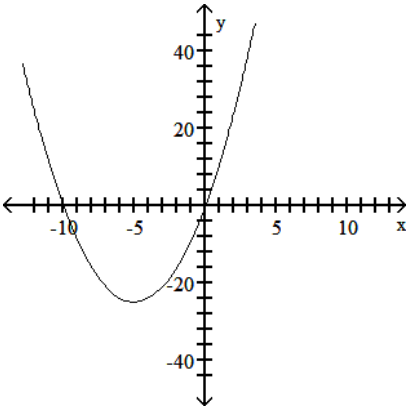
31) $f(x) = x^2 - 10x$ 31) _____



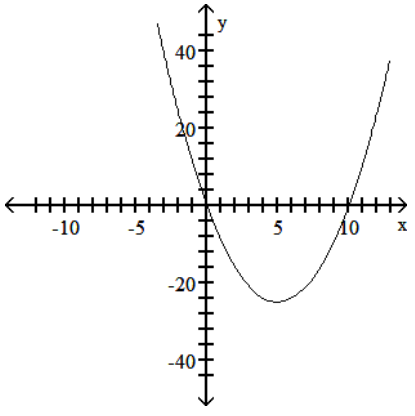

A)



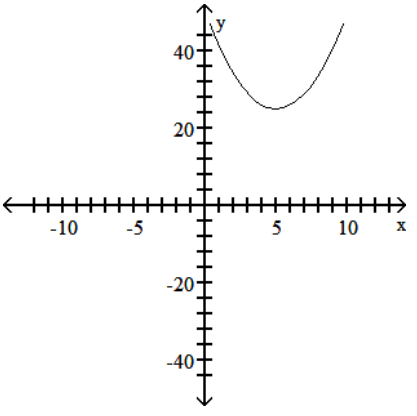

B)




C)




D)




Answer: C

Explanation: A)

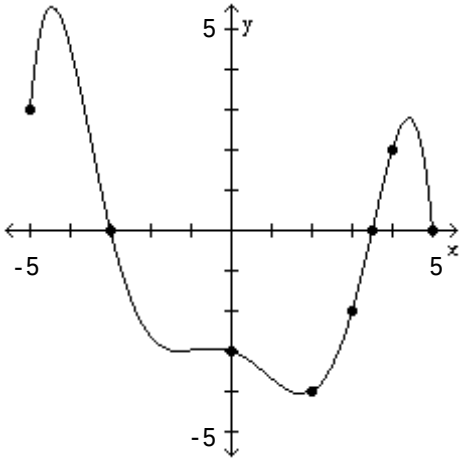
B)

C)

D)

The graph of a function f is given. Use the graph to answer the question.

32) What is the y-intercept? 32) _____



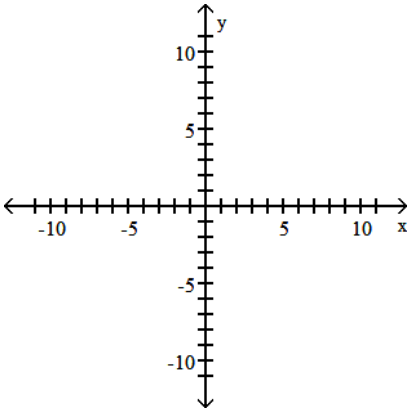

A) -4 B) 3.5 C) -3 D) 5

Answer: C

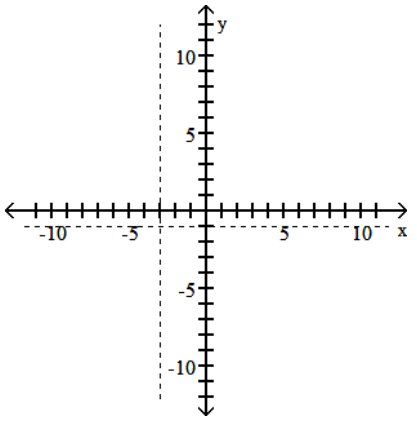
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

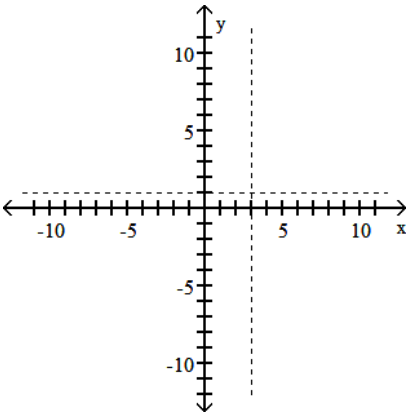
33) $f(x) = \frac{1}{x + 3} + 1$ 33) _____



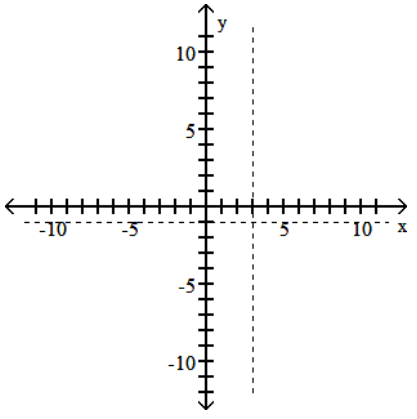
A)



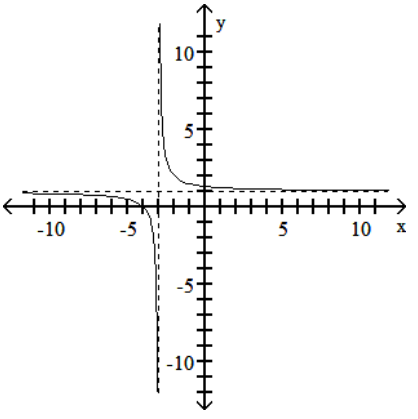

B)




C)




D)




Answer: D

Explanation: A)

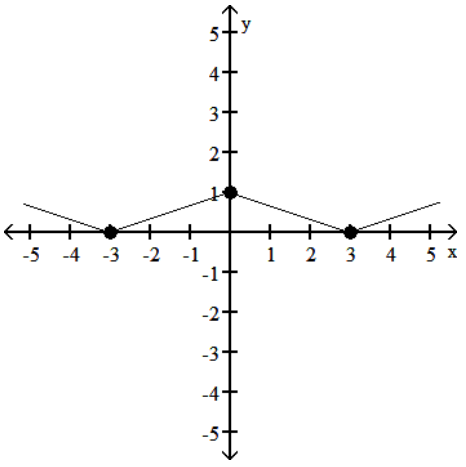
B)

C)

D)

The graph of a function f is given. Use the graph to answer the question.

34) Find the numbers, if any, at which f has a local maximum. What are the local maxima? 34) _____




A) f has a local maximum at x = -3 and 3; the local maximum is 0

B) f has a local maximum at x = 3; the local maximum is 1

C) f has a local maximum at x = 0; the local maximum is 1

D) f has no local maximum

Answer: C

Explanation: A)

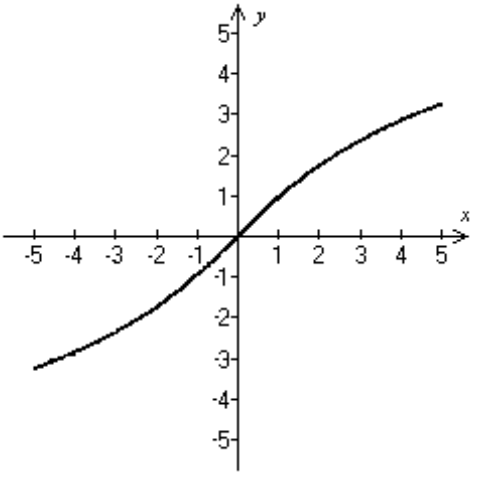
B)

C)

D)

Use the graph to find the intervals on which it is increasing, decreasing, or constant.

35) 35) _____




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

B) Increasing on $(-\infty, 0)$; decreasing on $(0, \infty)$

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

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

Answer: D

Explanation: A)
B)
C)
D)

Find the average rate of change for the function between the given values.

36) $f(x) = 1x^3 + 2x^2 + 4$; from -7 to 6 36) _____

A) $\frac{146}{3}$ B) $\frac{533}{6}$ C) 41 D) $\frac{292}{13}$

Answer: C

Explanation: A)
B)
C)
D)

Determine whether the equation defines y as a function of x.

37) $y = \frac{5x - 4}{x + 1}$ 37) _____

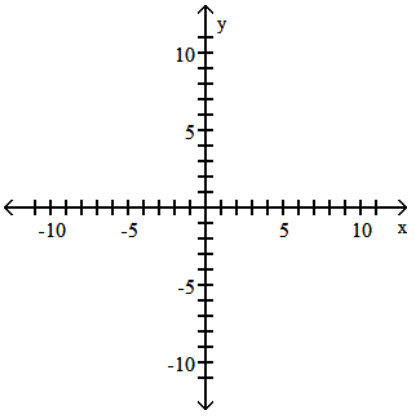
A) function B) not a function

Answer: A

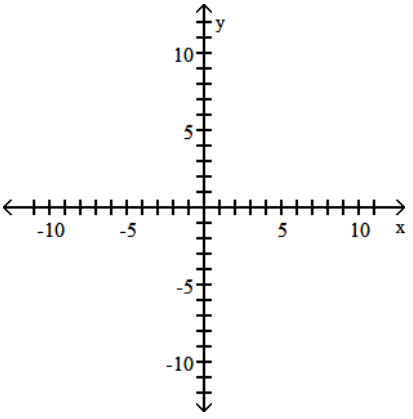
Explanation: A)
B)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

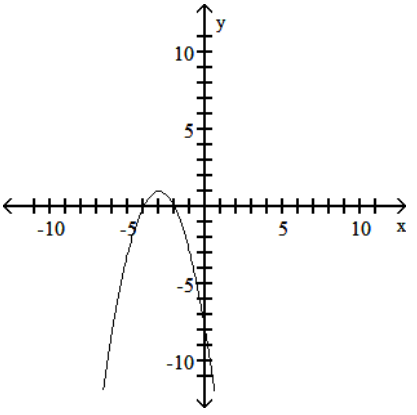
38) $f(x) = -(x + 3)^2 - 1$ 38) _____



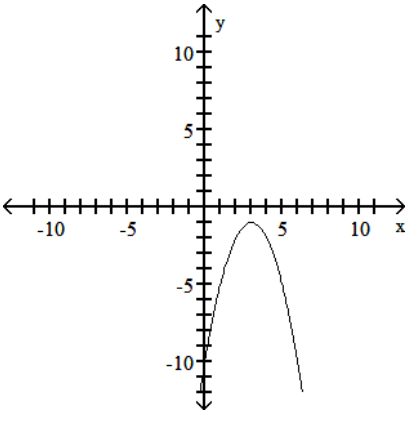

A)



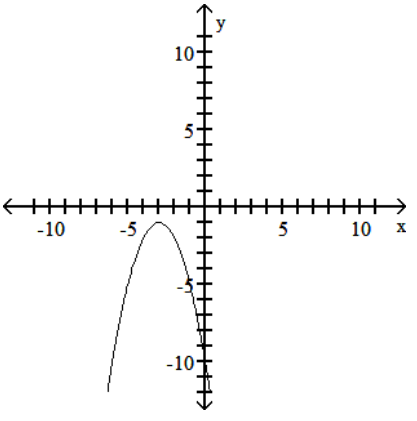

B)




C)




D)




Answer: D

Explanation: A)

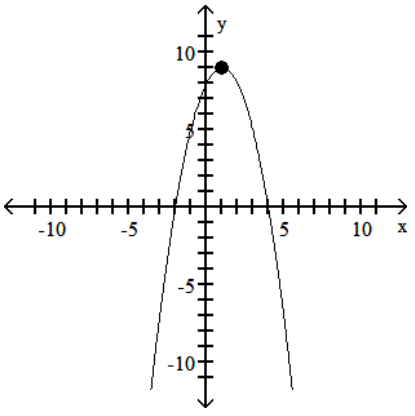
B)

C)

D)

Determine whether the graph is that of a function. If it is, use the graph to find its domain and range, the intercepts, if any, and any symmetry with respect to the x-axis, the y-axis, or the origin.

39) 39) _____




A) function
domain: {x|x ≤ 9}
range: all real numbers
intercepts: (-2, 0), (0, 8), (4, 0)
symmetry: y-axis

B) function
domain: all real numbers
range: {y|y ≤ 9}
intercepts: (-2, 0), (0, 8), (4, 0)
symmetry: none

C) function
domain: all real numbers
range: {y|y ≤ 9}
intercepts: (0, -2), (8, 0), (0, 4)
symmetry: none

D) not a function

Answer: B

Explanation: A)
B)
C)
D)

Find the value for the function.

40) Find f(-x) when $f(x) = -3x^2 - 2x - 2$. 40) _____

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

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

41) Elissa wants to set up a rectangular dog run in her backyard. She has 22 feet of fencing to work with and wants to use it all. If the dog run is to be x feet long, express the area of the dog run as a function of x. 41) _____

A) $A(x) = 12x - x^2$ B) $A(x) = 13x^2 - x$

C) $A(x) = 11x - x^2$ D) $A(x) = 10x - x^2$

Answer: C

Explanation: A)

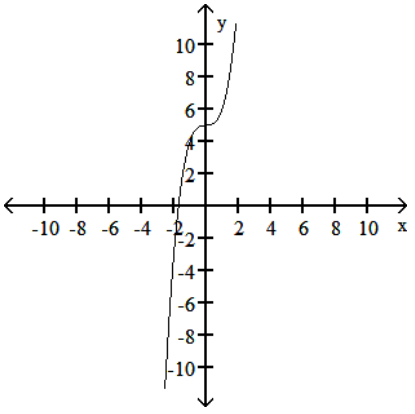
B)

C)

D)

The graph of a function is given. Decide whether it is even, odd, or neither.

42) 42) _____




A) even B) odd C) neither

Answer: C

Explanation: A)

B)

C)

Solve the problem.

43) If a rock falls from a height of 70 meters on Earth, the height H (in meters) after x seconds is approximately 43) _____

$H(x) = 70 - 4.9x^2$.

What is the height of the rock when x = 1.5 seconds? Round to the nearest hundredth, if necessary.

A) 62.65 m B) 59.2 m C) 81.03 m D) 58.98 m

Answer: D

Explanation: A)

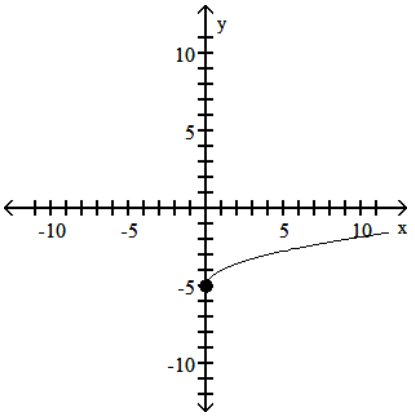
B)

C)

D)

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

44) $(0, \infty)$ 44) _____




A) decreasing B) constant C) increasing

Answer: C

Explanation: A)
B)
C)

Solve the problem.

45) Jacey, a commissioned salesperson, earns $450 base pay plus $37 per item sold. Express Jacey's gross salary G as a function of the number x of items sold. 45) _____

A) G(x) = 450x +37 B) G(x) = 37x + 450

C) G(x) = 37(x + 450) D) G(x) = 450(x + 37)

Answer: B

Explanation: A)
B)
C)
D)

Solve.

46) A rock falls from a tower that is 400 ft high. As it is falling, its height is given by the formula $h(t) = 400 - 16t^2$. How many seconds will it take for the rock to hit the ground (h=0)? Round to the nearest tenth. 46) _____

A) 25 sec B) 10,000 sec C) 20 sec D) 5 sec

Answer: D

Explanation: A)
B)
C)
D)

Write the equation of a sine function that has the given characteristics.

47) The graph of $y = \sqrt{x}$, shifted 8 units upward 47) _____

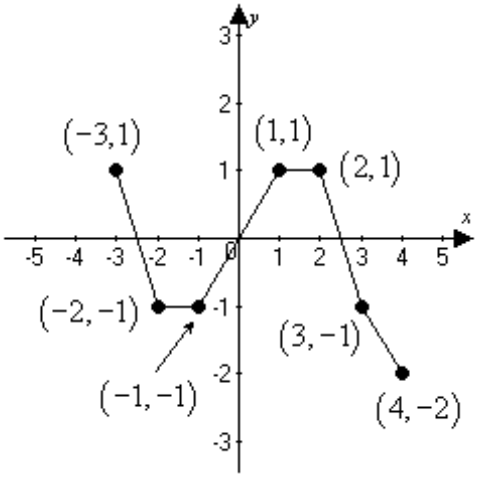
A) $y = \sqrt{x - 8}$ B) $y = \sqrt{x + 8}$ C) $y = \sqrt{x} - 8$ D) $y = \sqrt{x} + 8$

Answer: D

Explanation: A)
B)
C)
D)

Use the graph to find the intervals on which it is increasing, decreasing, or constant.

48) 48) _____




A) Decreasing on (-3, -2) and (2, 4); increasing on (-1, 1); constant on (-2, -1) and (1, 2)

B) Increasing on (-3, -2) and (2, 4); decreasing on (-1, 1); constant on (-2, -1) and (1, 2)

C) Decreasing on (-3, -2) and (2, 4); increasing on (-1, 1)

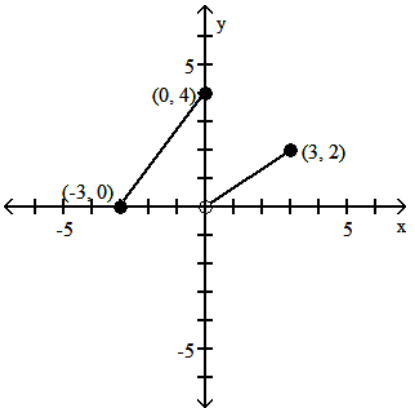
D) Decreasing on (-3, -1) and (1, 4); increasing on (-2, 1)

Answer: A

Explanation: A)
B)
C)
D)

The graph of a piecewise-defined function is given. Write a definition for the function.

49) 49) _____




A)

$$f(x) = \begin{cases} \frac{4}{3}x - 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } 0 \le x \le 3 \end{cases}$$

B)

$$f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x + 2 & \text{if } 0 < x \le 3 \end{cases}$$

C)

$$f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } 0 < x \le 3 \end{cases}$$

D)

$$f(x) = \begin{cases} \frac{3}{4}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{3}{2}x & \text{if } 0 < x \le 3 \end{cases}$$

Answer: C

Explanation: A)

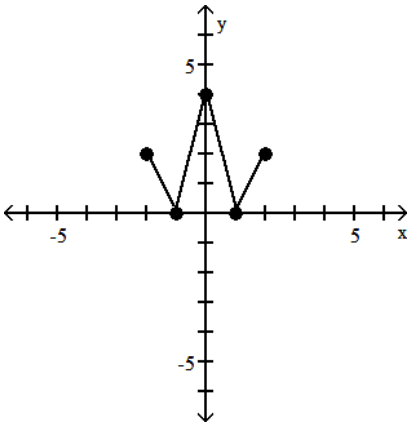
B)

C)

D)

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

50) (1, 2) 50) _____




A) constant B) decreasing C) increasing

Answer: C

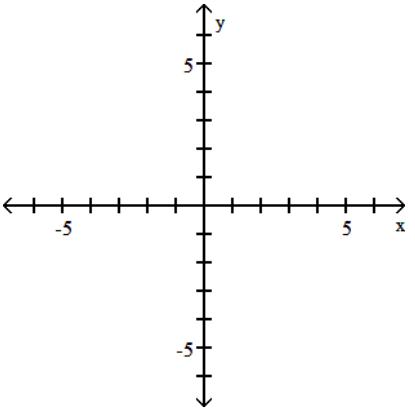
Explanation: A)

B)

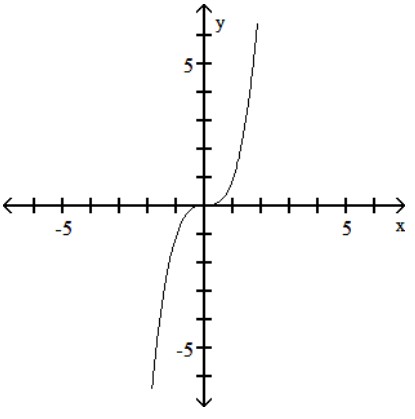
C)

Graph the function.

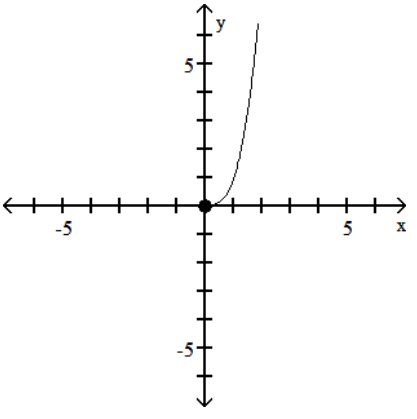
51) $f(x) = \sqrt[3]{x}$ 51) _____



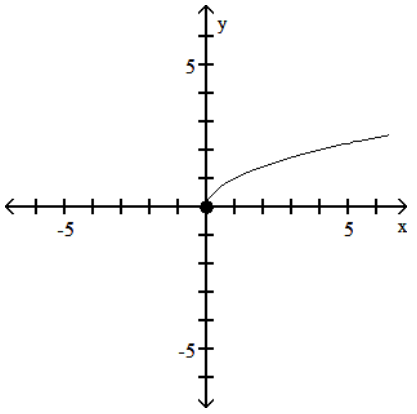

A)



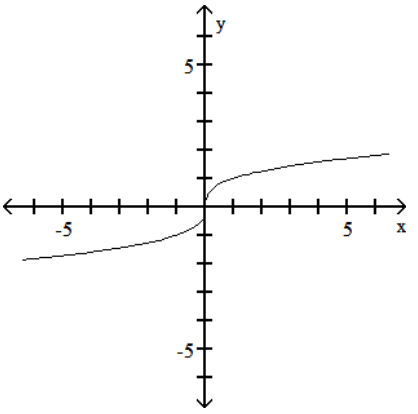

B)



C)




D)




Answer: D

Explanation: A)

B)

C)

D)

Answer the question about the given function.

52) Given the function $f(x) = 3x^2 - 6x + 6$, what is the domain of f? 52) _____

A) all real numbers B) $\{x|x \geq 1\}$

C) $\{x|x \geq -1\}$ D) $\{x|x \leq 1\}$

Answer: A

Explanation: A)

B)

C)

D)

Determine whether the equation defines y as a function of x.

53) $y^2 + x = 5$ 53) _____

A) function B) not a function

Answer: B

Explanation: A)

B)

Find the value for the function.

54) Find $f(x - 1)$ when $f(x) = 4x^2 - 4x - 7$. 54) _____

A) $4x^2 - 12x + 1$ B) $4x^2 - 32x - 7$ C) $4x^2 - 12x - 7$ D) $-12x^2 + 4x + 1$

Answer: A

Explanation: A)

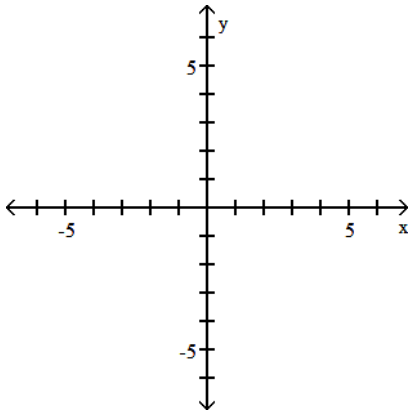
B)

C)

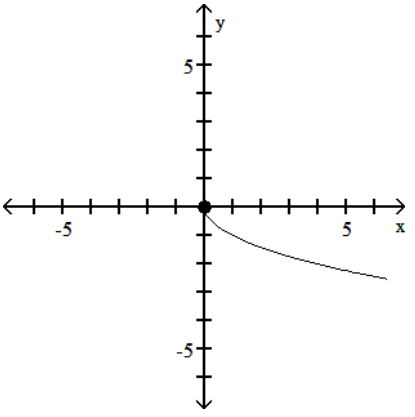
D)

Graph the function.

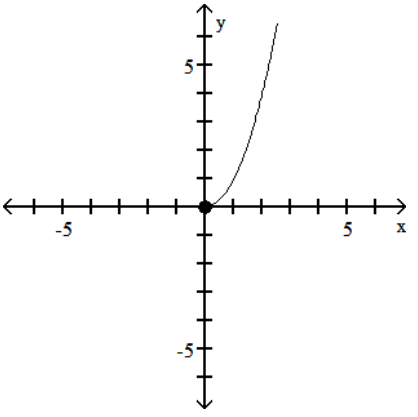
55) $f(x) = \sqrt{x}$ 55) _____



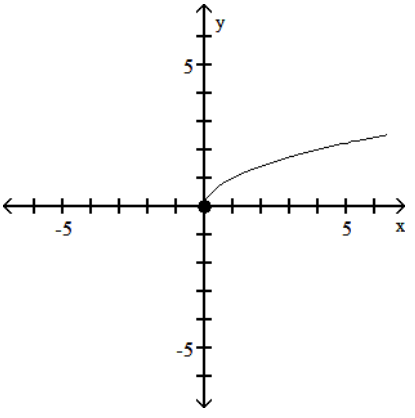

A)



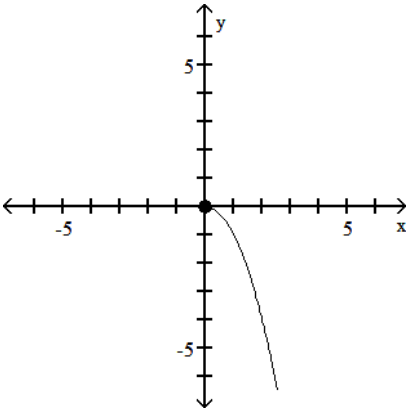

B)




C)




D)




Answer: C

Explanation: A)

B)

C)

D)

Determine whether the equation defines y as a function of x.

56) $x^2 + 4y^2 = 1$ 56) _____

A) function B) not a function

Answer: B

Explanation: A)

B)

Solve the problem.

57) Suppose that the x-intercepts of the graph of y = f(x) are 6 and 9. What are the x-intercepts of y = f(x - 5)? 57) _____

A) 6 and 4 B) 1 and 4 C) 30 and 45 D) 11 and 14

Answer: D

Explanation: A)

B)

C)

D)

Find the average rate of change for the function between the given values.

58) f(x) = 3x - 6; from 1 to 2 58) _____

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

Answer: A

Explanation: A)

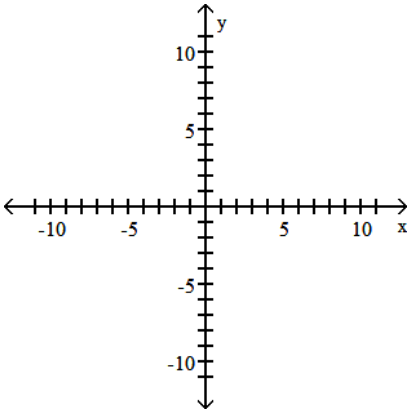
B)

C)

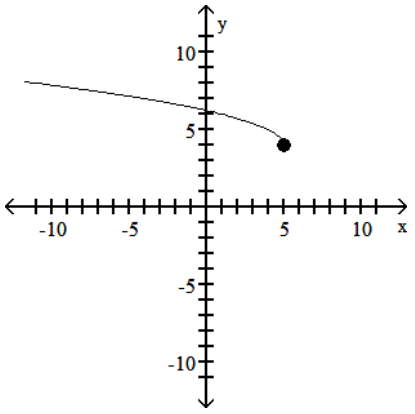
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

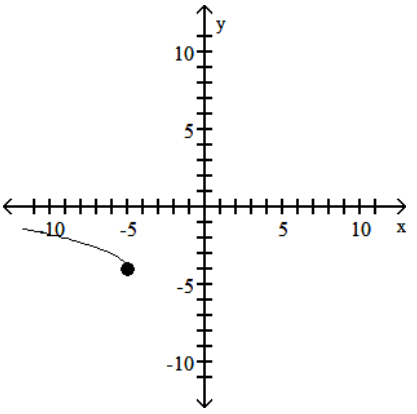
59) $f(x) = \sqrt{x + 5} + 4$ 59) _____



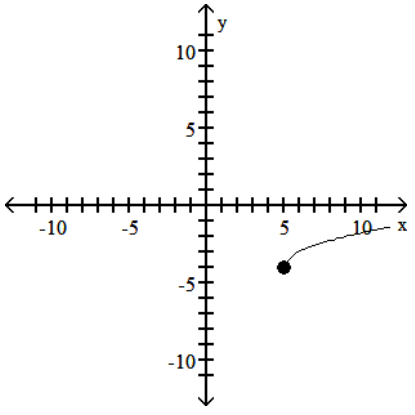
A)



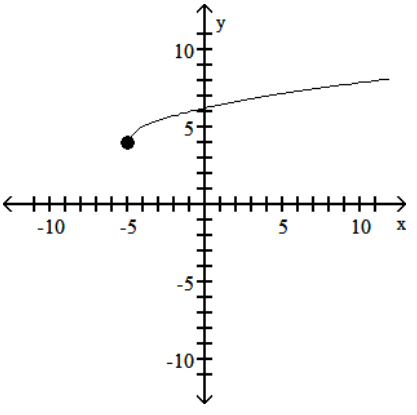

B)




C)




D)




Answer: D

Explanation: A)

B)

C)

D)

Solve the problem.

60) Find (f + g)(1) when f(x) = x + 4 and g(x) = x - 3. 60) _____

A) -5 B) 1 C) 3 D) 9

Answer: C

Explanation: A)

B)

C)

D)

Find the domain of the function.

61) $g(x) = \frac{3x}{x^2 - 1}$ 61) _____

A) $\{x \mid x > 1\}$

B) $\{x \mid x \neq 0\}$

C) $\{x \mid x \neq -1, 1\}$

D) all real numbers

Answer: C

Explanation: A)

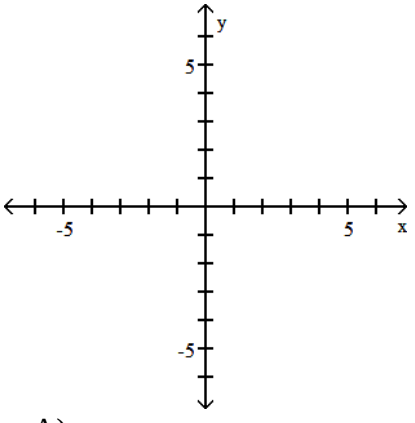
B)

C)

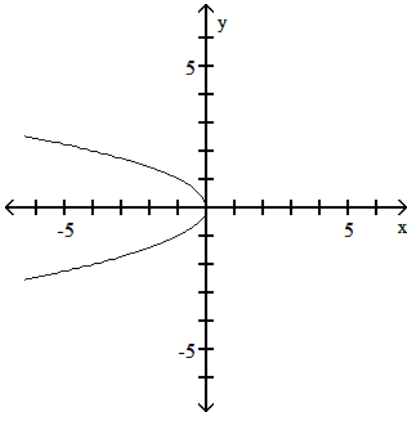
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

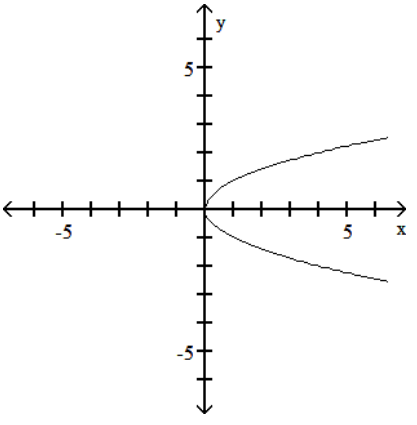
62) $f(x) = -x^2$ 62) _____



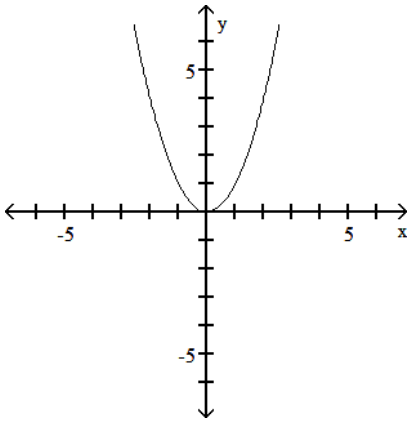

A)



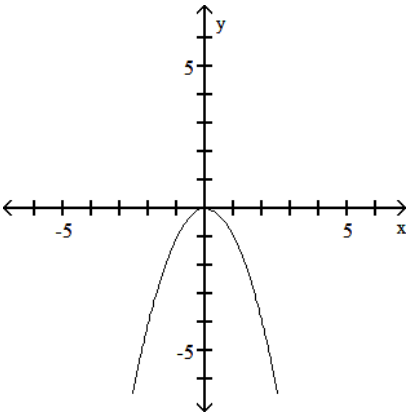

B)



C)




D)




Answer: D

Explanation: A)

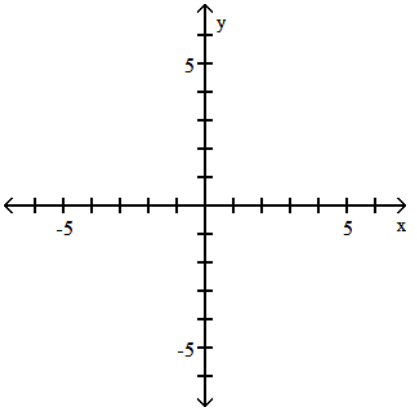
B)

C)

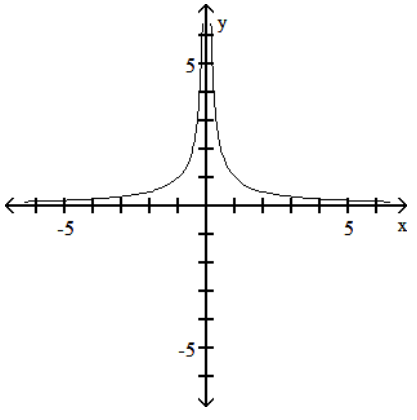
D)

Graph the function.

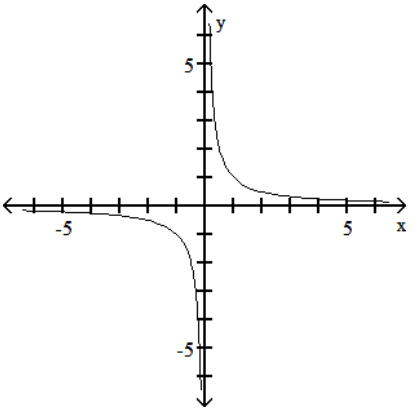
63) $f(x) = \frac{1}{x}$ 63) _____



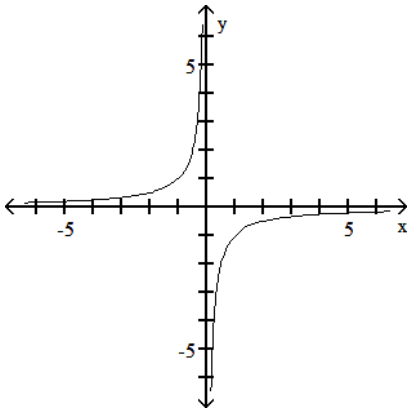

A)



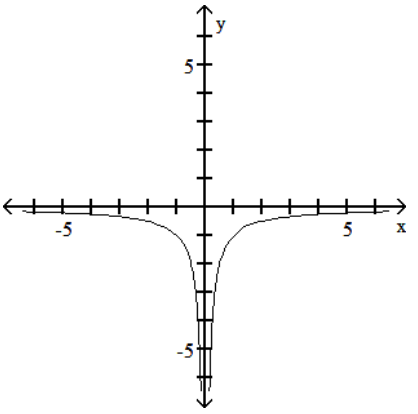

B)



C)




D)




Answer: B

Explanation: A)

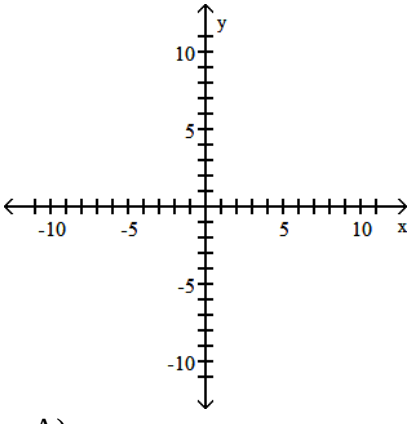
B)

C)

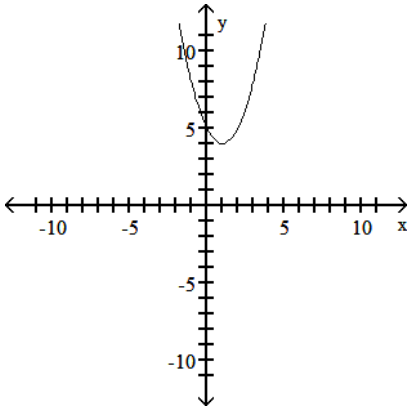
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

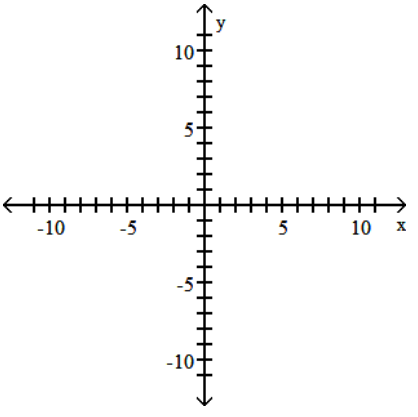
64) $f(x) = (x - 1)^2 + 4$ 64) _____



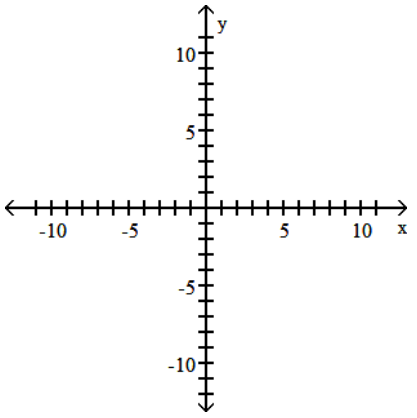

A)



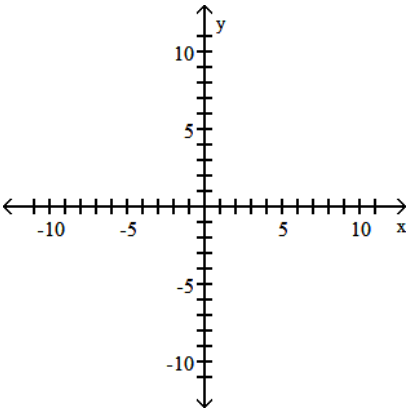

B)



C)




D)




Answer: A

Explanation: A)

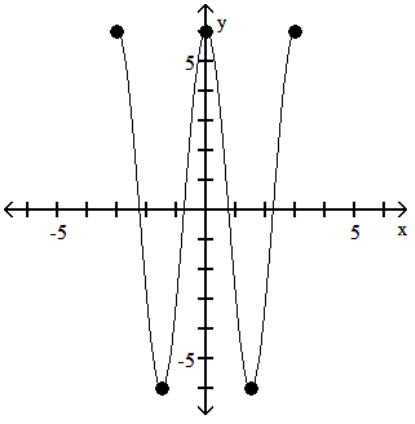
B)

C)

D)

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

65) $(-3, -\frac{3}{2})$ 65) _____




A) constant B) increasing C) decreasing

Answer: C

Explanation: A)

B)

C)

Find an equation of the secant line containing (1, f(1)) and (2, f(2)).

66) $f(x) = \sqrt{x + 80}$ 66) _____

A) $y = (\sqrt{82} - 9)x + \sqrt{82} - 18$

B) $y = (-\sqrt{82} + 9)x + \sqrt{82} - 18$

C) $y = (-\sqrt{82} - 9)x - \sqrt{82} + 18$

D) $y = (\sqrt{82} - 9)x - \sqrt{82} + 18$

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

67) Suppose that the function y = f(x) is decreasing on the interval (7, 3). What can be said about the graph of y = -f(x)? 67) _____

A) decreasing on (7, 3)

B) increasing on (7, 3)

C) increasing on (-7, -3)

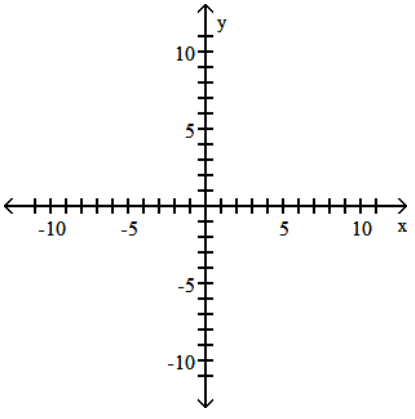
D) decreasing on (-7, -3)

Answer: B

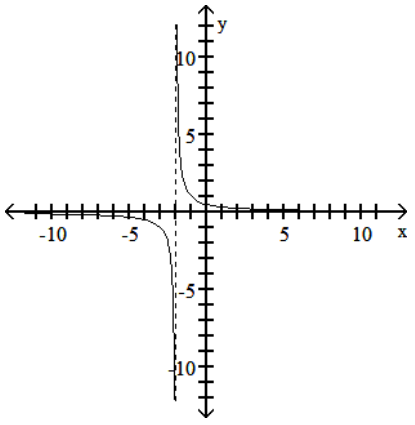
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

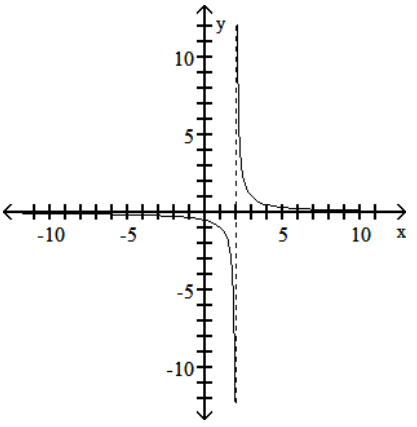
68) $f(x) = \frac{1}{x} - 2$ 68) _____



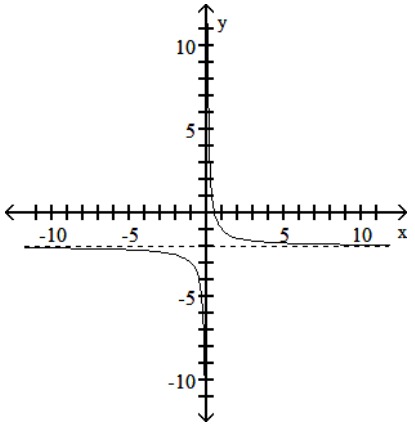
A)



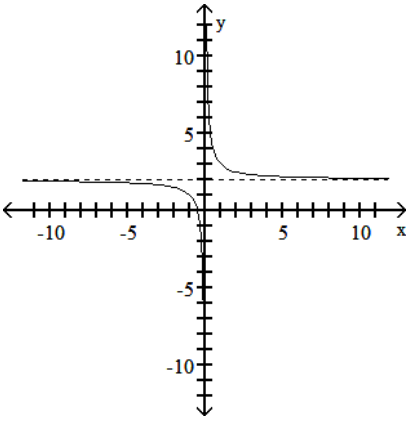

B)




C)




D)




Answer: C

Explanation: A)

B)

C)

D)

Write the equation of a sine function that has the given characteristics.

69) The graph of y = |x|, shifted 9 units upward 69) _____

A) y = |x| - 9 B) y = |x - 9| C) y = |x| + 9 D) y = |x + 9|

Answer: C

Explanation: A)

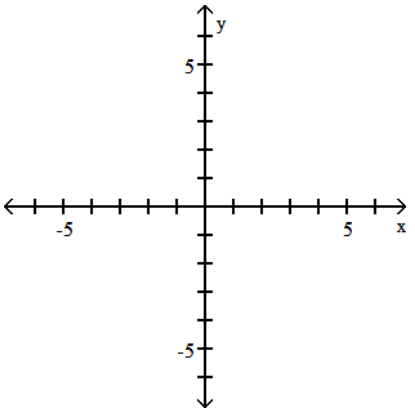
B)

C)

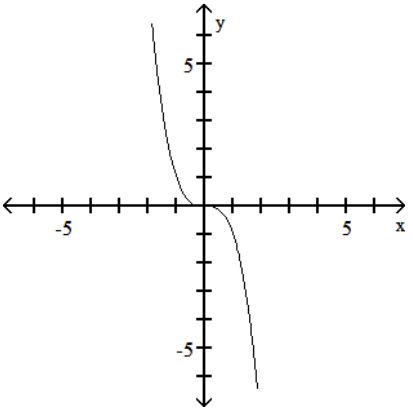
D)

Graph the function.

70) $f(x) = x^2$ 70) _____




A)

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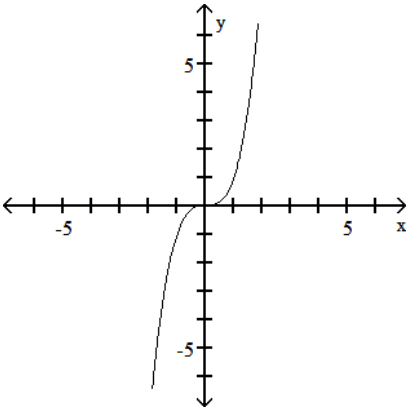
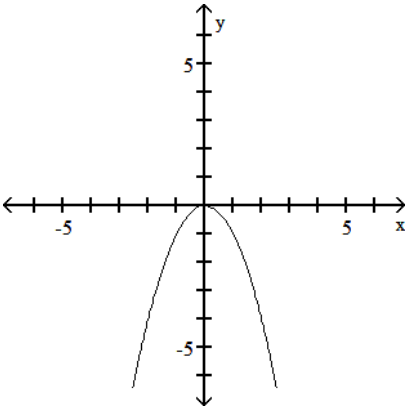
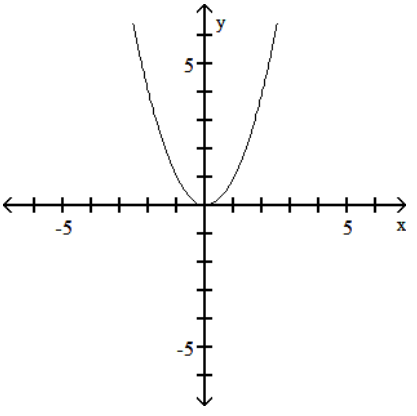



C)




D)




Answer: D

Explanation: A)

B)

C)

D)

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. If necessary, round answers to two decimal places.

71) $f(x) = x^3 - 3x^2 + 1;\ (-5, 5)$ 71) _____

A) local minimum at (2, -3)

B) local maximum at (0, 1)
local minimum at (2, -3)

C) local minimum at (0, 1)
local maximum at (2, -3)

D) none

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

72) If $f(x) = \frac{x - B}{x - A}$, $f(-3) = 0$, and $f(7)$ is undefined, what are the values of A and B? 72) _____

A) A = 3, B = -7 B) A = -3, B = 7 C) A = -7, B = 3 D) A = 7, B = -3

Answer: D

Explanation: A)
B)
C)
D)

Find the value for the function.

73) Find $f(-x)$ when $f(x) = \frac{x}{x^2 + 5}$. 73) _____

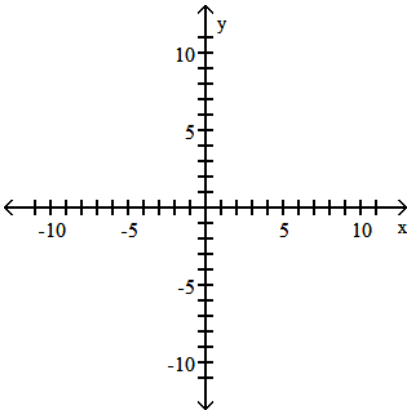
A) $\frac{-x}{x^2 + 5}$ B) $\frac{-x}{x^2 - 5}$ C) $\frac{-x}{-x^2 + 5}$ D) $\frac{x}{-x^2 + 5}$

Answer: A

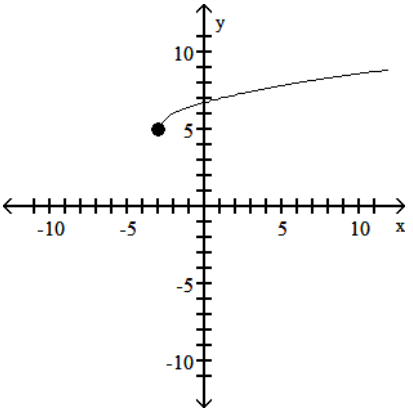
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

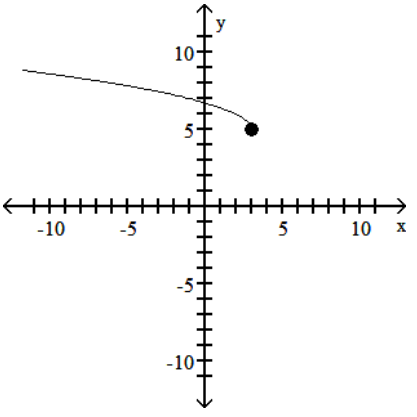
74) $f(x) = \sqrt{x + 3} + 5$ 74) _____



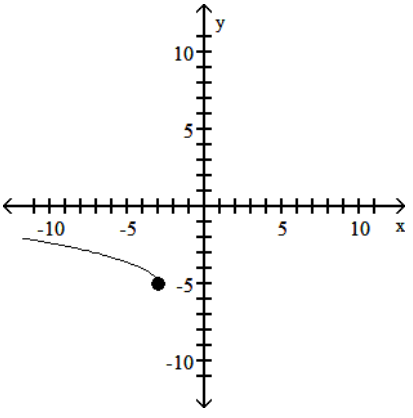

A)



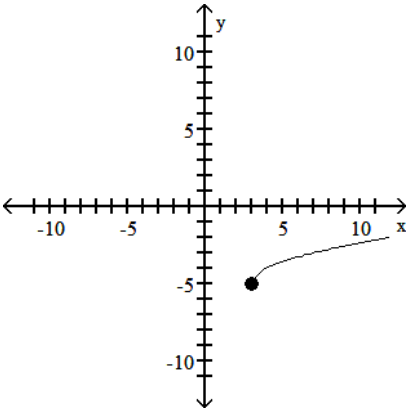

B)




C)




D)




Answer: A

Explanation: A)

B)

C)

D)

Determine algebraically whether the function is even, odd, or neither.

75) $f(x) = \frac{1}{x^2}$ 75) _____

A) even B) odd C) neither

Answer: A

Explanation: A)
B)
C)

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

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

76) $f(x) = \frac{2}{x + 1}$ 76) _____

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

Answer: B

Explanation: A)
B)
C)
D)

Write the equation that results in the desired transformation.

77) The graph of $y = x^3$, vertically compressed by a factor of 0.9 77) _____

A) $y = (x + 0.9)^3$ B) $y = (x - 0.9)^3$ C) $y = 0.9x^3$ D) $y = 0.9\sqrt[3]{x}$

Answer: C

Explanation: A)
B)
C)
D)

Suppose the point (2, 4) is on the graph of y = f(x). Find a point on the graph of the given function.

78) The reflection of the graph of y = f(x) across the y-axis 78) _____

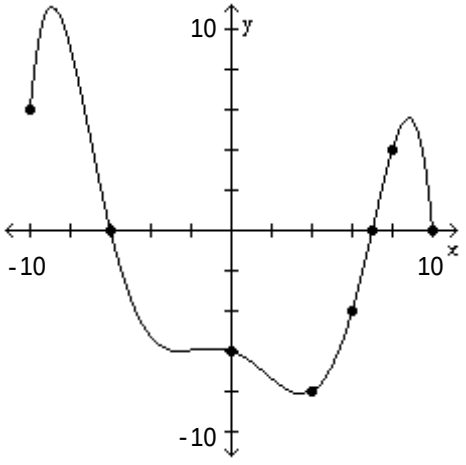
A) (-2, -4) B) (2, -4) C) (2, 4) D) (-2, 4)

Answer: D

Explanation: A)
B)
C)
D)

The graph of a function f is given. Use the graph to answer the question.

79) How often does the line y = -10 intersect the graph? 79) _____



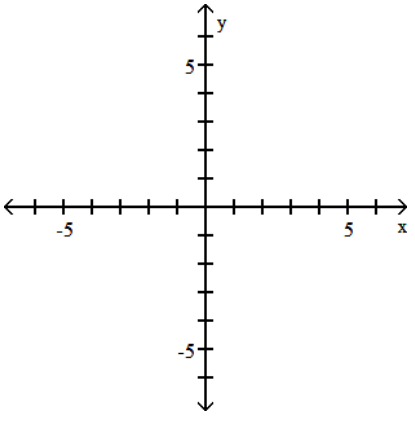

A) once
B) twice
C) three times
D) does not intersect

Answer: D

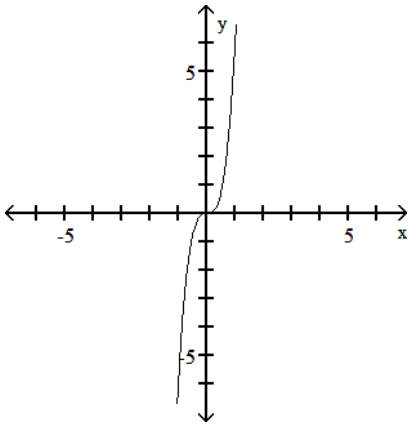
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

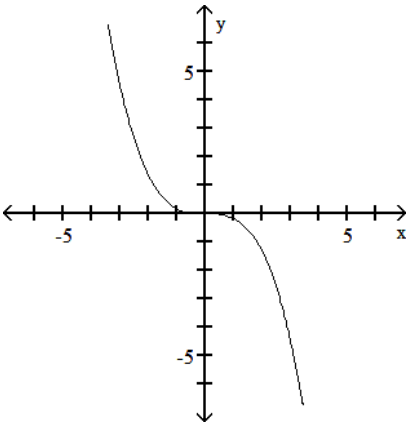
80) $f(x) = \frac{1}{6}x^3$ 80) _____



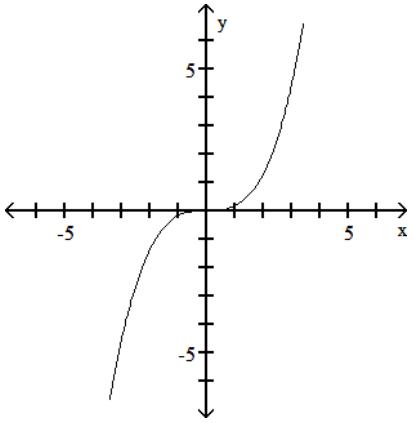
A)



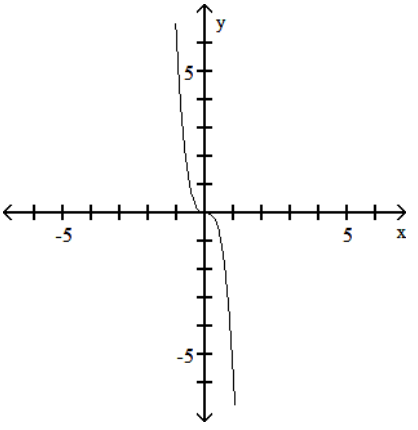

B)




C)




D)




Answer: C

Explanation: A)

B)

C)

D)

Answer the question about the given function.

81) Given the function $f(x) = \frac{x^2 - 9}{x + 3}$, is the point $(1, \frac{5}{2})$ on the graph of f? 81) _____

A) Yes B) No

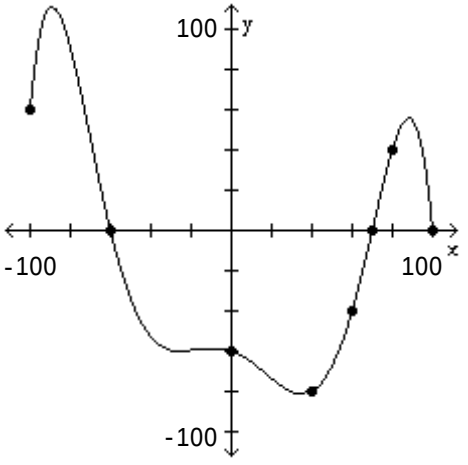
Answer: B

Explanation: A)

B)

The graph of a function f is given. Use the graph to answer the question.

82) What are the x-intercepts? 82) _____




A) -60, 70
B) -60, 70, 100
C) -60
D) -100, -60, 70, 100

Answer: B

Explanation: A)
B)
C)
D)

Find and simplify the difference quotient of f, $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$, for the function.

83) f(x) = 3 83) _____

A) 3
B) 0
C) $1 + \frac{6}{h}$
D) 1

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

84) A farmer has 800 yards of fencing to enclose a rectangular garden. Express the area A of the rectangle as a function of the width x of the rectangle. What is the domain of A? 84) _____

A) $A(x) = -x^2 + 400x;\ \{x|0 < x < 400\}$
B) $A(x) = -x^2 + 400x;\ \{x|0 < x < 800\}$
C) $A(x) = x^2 + 400x;\ \{x|0 < x < 400\}$
D) $A(x) = -x^2 + 800x;\ \{x|0 < x < 800\}$

Answer: A

Explanation: A)
B)
C)
D)

Find the value for the function.

85) Find f(4) when $f(x) = \sqrt{x^2 + 3x}$. 85) _____

A) 5 B) $2\sqrt{7}$ C) $\sqrt{19}$ D) $2\sqrt{3}$

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

86) Express the gross salary G of a person who earns $24 per hour as a function of the number x of hours worked. 86) _____

A) $G(x) = 24x$ B) $G(x) = \frac{24}{x}$ C) $G(x) = 24x^2$ D) $G(x) = 24 + x$

Answer: A

Explanation: A)
B)
C)
D)

87) If an object weighs m pounds at sea level, then its weight W (in pounds) at a height of h miles above sea level is given approximately by $W(h) = m\left(\frac{4000}{4000 + h}\right)^2$. How much will a man who weighs 165 pounds at sea level weigh on the top of a mountain which is 14,494 feet above sea level? Round to the nearest hundredth of a pound, if necessary. 87) _____

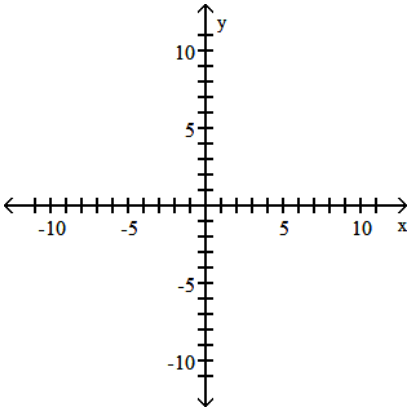
A) 165 pounds B) 7.72 pounds C) 164.77 pounds D) 165.23 pounds

Answer: C

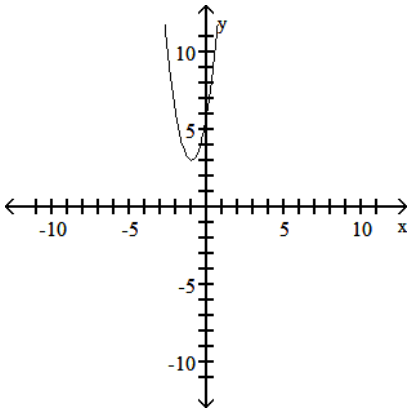
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

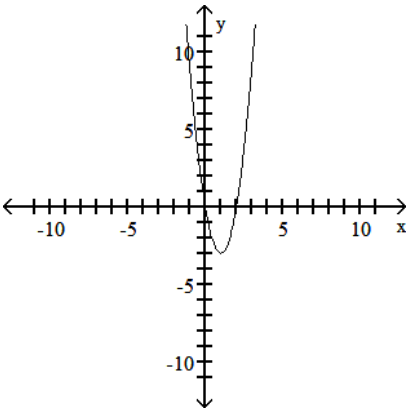
88) $f(x) = 3(x + 1)^2 + 3$ 88) _____



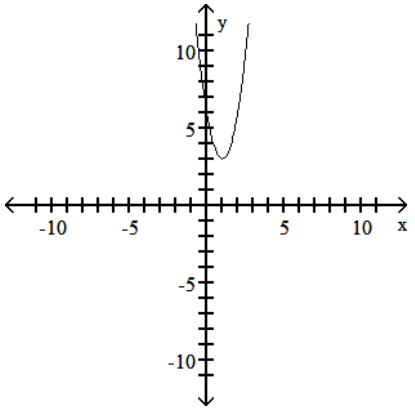
A)



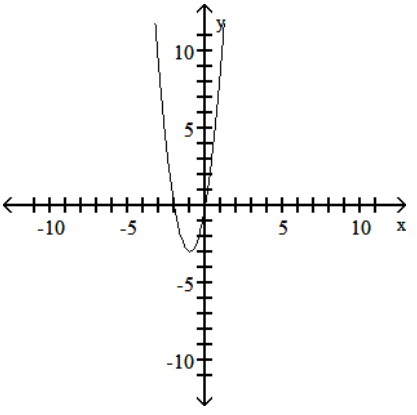

B)




C)




D)




Answer: A

Explanation: A)

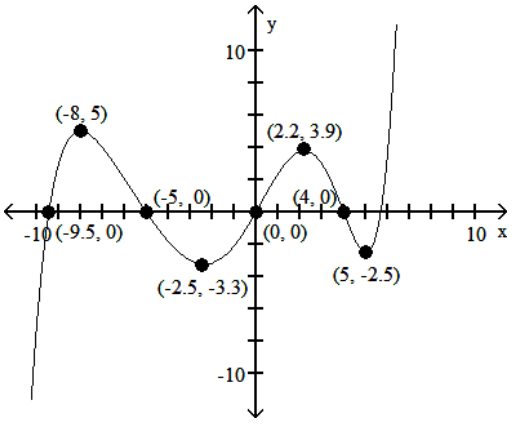
B)

C)

D)

The graph of a function f is given. Use the graph to answer the question.

89) 89) _____




Find the numbers, if any, at which f has a local maximum. What are the local maxima?

A) f has a local maximum at x = 5 and 3.9; the local maximum at 5 is -8; the local maximum at 3.9 is 2.2

B) f has a local minimum at x = -8 and 2.2; the local minimum at -8 is 5; the local minimum at 2.2 is 3.9

C) f has a local minimum at x = 5 and 3.9; the local minimum at 5 is -8; the local minimum at 3.9 is 2.2

D) f has a local maximum at x = -8 and 2.2; the local maximum at -8 is 5; the local maximum at 2.2 is 3.9

Answer: D

Explanation: A)
B)
C)
D)

Determine whether the relation represents a function. If it is a function, state the domain and range.

90) {(-2, 2), (-1, -1), (0, -2), (1, -1), (3, 7)} 90) _____

A) function
domain: {-2, -1, 0, 1, 3}
range: {2, -1, -2, 7}

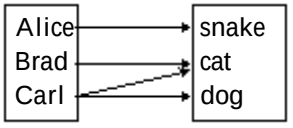
B) function
domain: {2, -1, -2, 7}
range: {-2, -1, 0, 1, 3}

C) not a function

Answer: A

Explanation: A)
B)
C)

91) 91) _____




A) function
domain: {Alice, Brad, Carl}
range: {snake, cat, dog}

B) function
domain: {snake, cat, dog}
range: {Alice, Brad, Carl}

C) not a function

Answer: C

Explanation: A)
B)
C)

For the given functions f and g, find the requested function and state its domain.

92) $f(x) = 16 - x^2$; $g(x) = 4 - x$ 92) _____

Find f + g.

A) $(f + g)(x) = -x^2 + x + 12$; all real numbers

B) $(f + g)(x) = -x^2 - x + 20$; all real numbers

C) $(f + g)(x) = x^3 - 4x^2 - 16x + 64$; all real numbers

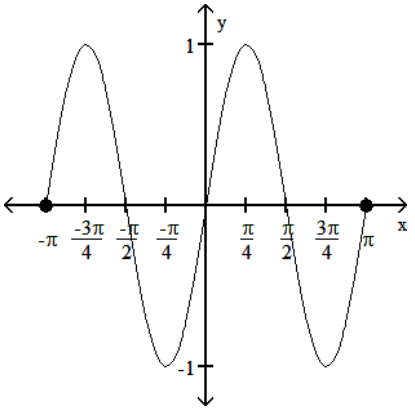
D) $(f + g)(x) = 4 + x$; $\{x | x \neq -4\}$

Answer: B

Explanation: A)
B)
C)
D)

Determine whether the graph is that of a function. If it is, use the graph to find its domain and range, the intercepts, if any, and any symmetry with respect to the x-axis, the y-axis, or the origin.

93) 93) _____



A) function
domain: $\{x \mid -\pi \le x \le \pi\}$
range: $\{y \mid -1 \le y \le 1\}$
intercepts: $(-\pi, 0), (-\frac{\pi}{2}, 0), (0, 0), (\frac{\pi}{2}, 0), (\pi, 0)$
symmetry: origin

B) function
domain: all real numbers
range: $\{y \mid -1 \le y \le 1\}$
intercepts: $(-\pi, 0), (-\frac{\pi}{2}, 0), (0, 0), (\frac{\pi}{2}, 0), (\pi, 0)$
symmetry: origin

C) function
domain: $\{x \mid -1 \le x \le 1\}$
range: $\{y \mid -\pi \le y \le \pi\}$
intercepts: $(-\pi, 0), (-\frac{\pi}{2}, 0), (0, 0), (\frac{\pi}{2}, 0), (\pi, 0)$
symmetry: none

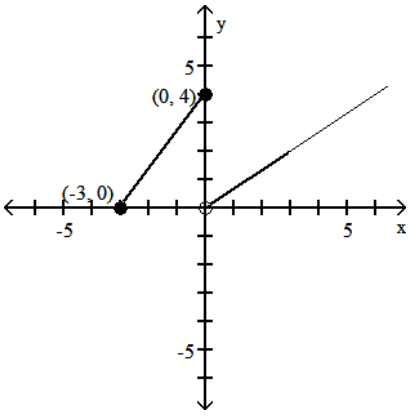
D) not a function

Answer: A

Explanation: A)
B)
C)
D)

The graph of a piecewise-defined function is given. Write a definition for the function.

94) 94) _____




A) $f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } x > 0 \end{cases}$

B) $f(x) = \begin{cases} \frac{3}{4}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{3}{2}x & \text{if } x \ge 0 \end{cases}$

C) $f(x) = \begin{cases} \frac{3}{4}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{3}{2}x & \text{if } x > 0 \end{cases}$

D) $f(x) = \begin{cases} \frac{4}{3}x + 4 & \text{if } -3 \le x \le 0 \\ \frac{2}{3}x & \text{if } 0 < x \le 3 \end{cases}$

Answer: A

Explanation: A)
B)
C)
D)

Suppose the point (2, 4) is on the graph of y = f(x). Find a point on the graph of the given function.

95) The reflection of the graph of y = f(x) across the x-axis 95) _____

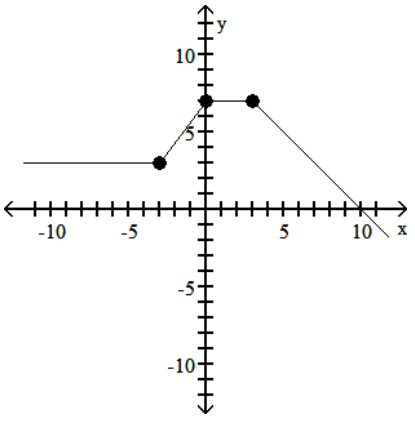
A) (-2, -4) B) (-2, 4) C) (2, 4) D) (2, -4)

Answer: D

Explanation: A)
B)
C)
D)

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

96) (-3, 0) 96) _____




A) decreasing B) constant C) increasing

Answer: C

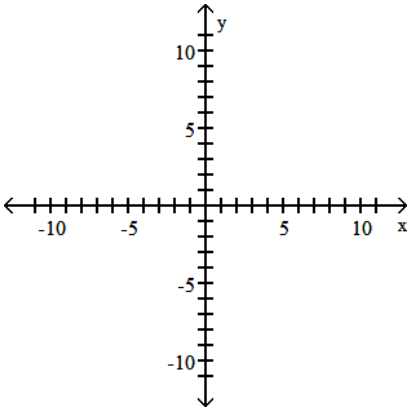
Explanation: A)

B)

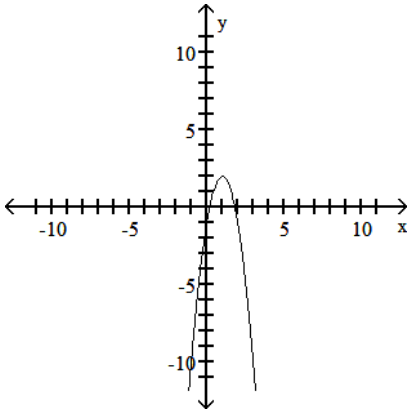
C)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

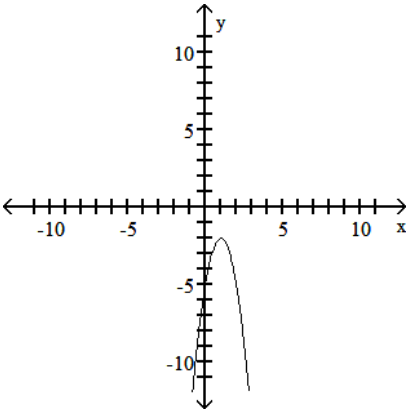
97) $f(x) = -3(x + 1)^2 + 2$ 97) _____



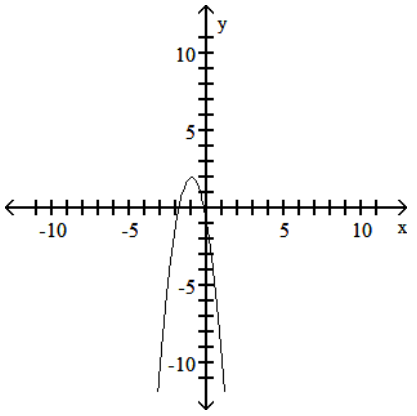

A)



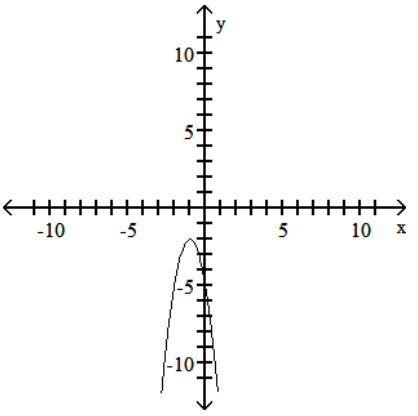

B)



C)




D)




Answer: C

Explanation: A)

B)

C)

D)

Solve the problem.

98) Find $(f - g)(4)$ when $f(x) = 5x^2 + 1$ and $g(x) = x - 4$. 98) _____

A) 73 B) 89 C) -85 D) 81

Answer: D

Explanation: A)

B)

C)

D)

Solve.

99) Bob owns a watch repair shop. He has found that the cost of operating his shop is given by $c(x) = 3x^2 - 168x + 66$, where c is cost and x is the number of watches repaired. How many watches must he repair to have the lowest cost? 99) _____

A) 33 watches B) 28 watches C) 66 watches D) 30 watches

Answer: B

Explanation: A)

B)

C)

D)

Answer the question about the given function.

100) Given the function $f(x) = \frac{x^2 - 8}{x + 1}$, if $x = -2$, what is $f(x)$? What point is on the graph of f? 100) ____

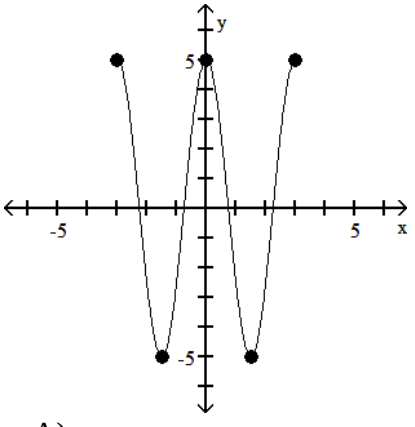
A) 4; (-2, 4) B) - 12; (- 12, -2) C) - 12; (-2, - 12) D) 4; (4, -2)

Answer: A

Explanation: A)
B)
C)
D)

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

101) $(-\frac{3}{2}, 0)$ 101) ____




A) constant B) decreasing C) increasing

Answer: C

Explanation: A)
B)
C)

Solve the problem.

102) A rectangular box with volume 506 cubic feet is built with a square base and top. The cost is $1.50 per square foot for the top and the bottom and $2.00 per square foot for the sides. Let x represent the length of a side of the base. Express the cost the box as a function of x. 102) ____

A) $C(x) = 2x^2 + \frac{4048}{x}$ B) $C(x) = 4x + \frac{4048}{x^2}$

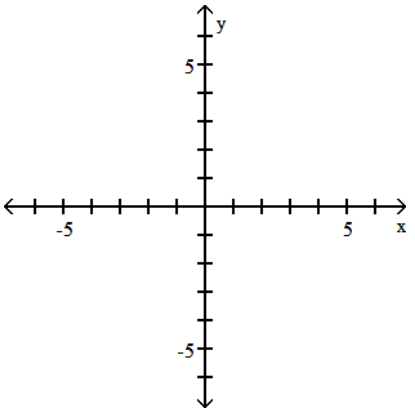
C) $C(x) = 3x^2 + \frac{4048}{x}$ D) $C(x) = 3x^2 + \frac{2024}{x}$

Answer: C

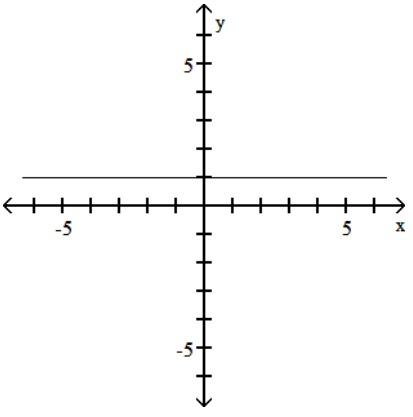
Explanation: A)
B)
C)
D)

Graph the function.

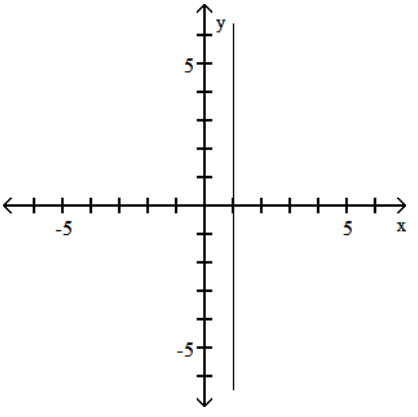
103) f(x) = x 103) ____



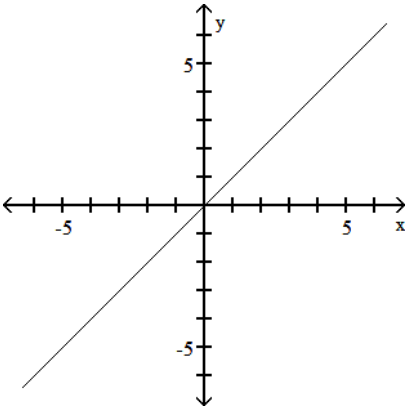

A)



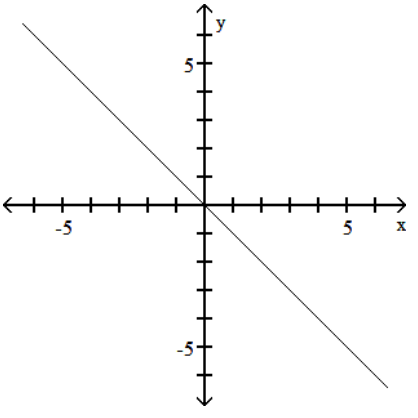

B)




C)




D)




Answer: C

Explanation: A)

B)

C)

D)

Solve the problem.

104) Suppose that the x-intercepts of the graph of y = f(x) are 7 and 4. What are the x-intercepts of y = f(x + 3)? 104) ____

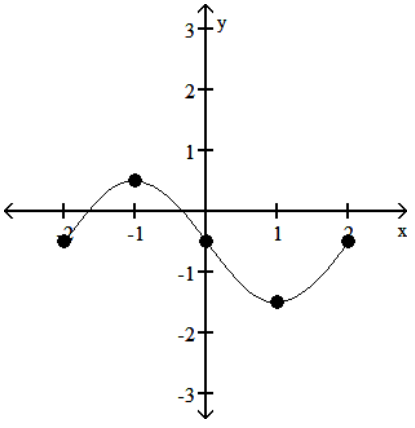
A) 10 and 7 B) 21 and 12 C) 4 and 1 D) 7 and 7

Answer: C

Explanation: A)
B)
C)
D)

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

105) (-1, 1) 105) ____



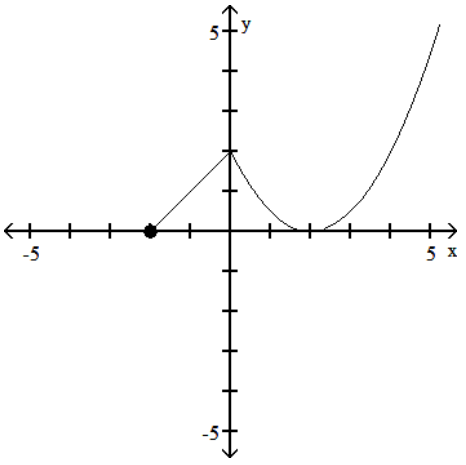

A) increasing B) constant C) decreasing

Answer: C

Explanation: A)
B)
C)

Determine whether the graph is that of a function. If it is, use the graph to find its domain and range, the intercepts, if any, and any symmetry with respect to the x-axis, the y-axis, or the origin.

106) 106) ____




A) function
domain: {x|x ≥ 0}
range: {y|y ≥ -2}
intercepts: (-2, 0), (0, 2), (2, 0)
symmetry: y-axis

B) function
domain: {x|x ≥ -2}
range: {y|y ≥ 0}
intercepts: (-2, 0), (0, 2), (2, 0)
symmetry: none

C) function
domain: all real numbers
range: all real numbers
intercepts: (-2, 0), (0, 2), (2, 0)
symmetry: none

D) not a function

Answer: B

Explanation: A)
B)
C)
D)

Determine whether the equation defines y as a function of x.

107) $y = 4x^2 - 6x + 9$ 107) ____

A) function

B) not a function

Answer: A

Explanation: A)
B)

Solve the problem.

108) A wire of length 7x is bent into the shape of a square. Express the area A of the square as a function of x. 108) ____

A) $A(x) = \frac{1}{16}x^2$ B) $A(x) = \frac{49}{8}x^2$ C) $A(x) = \frac{7}{4}x^2$ D) $A(x) = \frac{49}{16}x^2$

Answer: D

Explanation: A)
B)
C)
D)

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. If necessary, round answers to two decimal places.

109) $f(x) = x^2 + 2x - 3$; $(-5, 5)$ 109) ____

A) local maximum at $(-1, 4)$ B) local minimum at $(1, 4)$

C) local minimum at $(-1, -4)$ D) local maximum at $(1, -4)$

Answer: C

Explanation: A)
B)
C)
D)

Find the value for the function.

110) Find $f(x + h)$ when $f(x) = \frac{-5x + 9}{8x + 3}$. 110) ____

A) $\frac{-5x - 5h + 9}{8x + 8h + 3}$ B) $\frac{-5x + 9h}{8x + 3h}$ C) $\frac{-5x - 5h + 9}{8x + 3}$ D) $\frac{-5x + 4h}{8x + 11h}$

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

111) A retail store buys 250 VCRs from a distributor at a cost of $175 each plus an overhead charge of $ 35 per order. The retail markup is 35% on the total price paid. Find the profit on the sale of one VCR. 111) ____

A) $61.25 B) $61.30 C) $61.20 D) $6130.00

Answer: B

Explanation: A)
B)
C)
D)

112) From a 48-inch by 48-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. 112) ____

A) $V(x) = 2x^3 - 144x^2 + 48x$

B) $V(x) = 4x^3 - 192x^2 + 2304x$

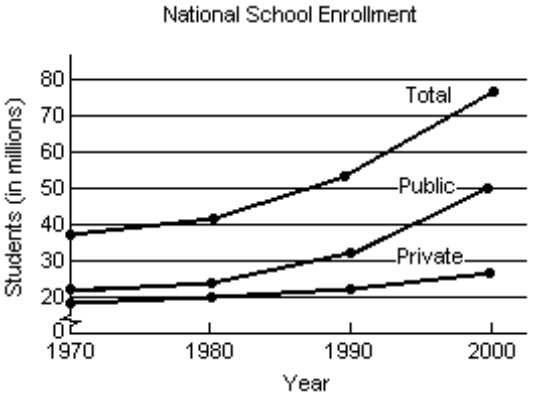
C) $V(x) = 4x^3 - 192x^2$

D) $V(x) = 2x^3 - 144x^2$

Answer: B

Explanation: A)
B)
C)
D)

113) The following graph shows the private, public and total national school enrollment for students for select years from 1970 through 2000. 113) ____




i) How is the graph for total school enrollment, T, determined from the graph of the private enrollment, r, and the public enrollment, u?

ii) During which 10-year period did the total number of students enrolled increase the least?

iii) During which 10-year period did the total number of students enrolled increase the most?

A) i) T is the difference of r and u.
ii) 1970 - 1980
iii) 1990-2000

B) i) T is the sum of r and u.
ii) 1970 - 1980
iii) 1980-1990

C) i) T is the sum of r and u.
ii) 1970 - 1980
iii) 1990-2000

D) i) T is the sum of r and u.
ii) 1990-2000
iii) 1970-1980

Answer: C

Explanation: A)
B)
C)
D)

Determine algebraically whether the function is even, odd, or neither.

114) $f(x) = 9x^3 - 3$ 114) ____

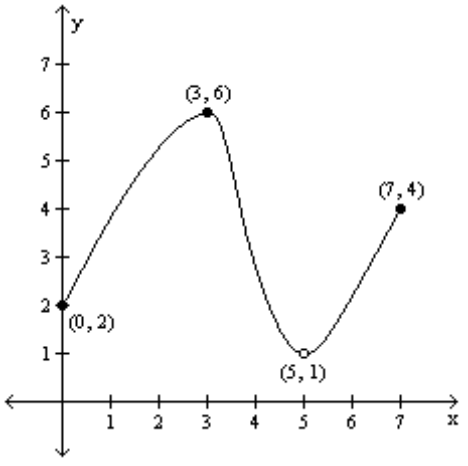
A) even B) odd C) neither

Answer: C

Explanation: A)
B)
C)

For the graph of the function y = f(x), find the absolute maximum and the absolute minimum, if it exists.

115) 115) ____




A) Absolute maximum: f(3) = 6; Absolute minimum: f(0) = 2

B) Absolute maximum: f(3) = 6; Absolute minimum: none

C) Absolute maximum: f(7) = 4; Absolute minimum: f(0) = 2

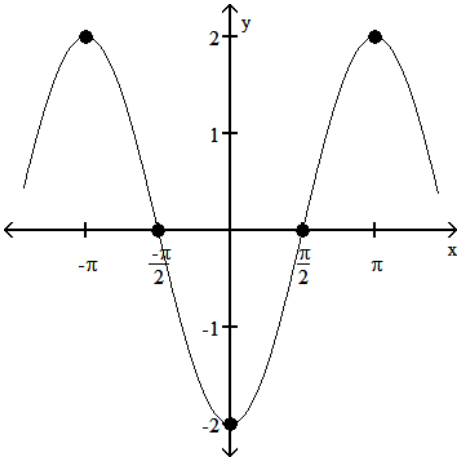
D) Absolute maximum: f(3) = 6; Absolute minimum: f(5) = 1

Answer: B

Explanation: A)
B)
C)
D)

The graph of a function f is given. Use the graph to answer the question.

116) Find the numbers, if any, at which f has a local minimum. What are the local minima? 116) ____




A) f has a local minimum at x = 0; the local minimum is -2

B) f has a local minimum at x = -π; the local minimum is -2

C) f has a local minimum at x = -π and π; the local minimum is 2

D) f has no local minimum

Answer: A

Explanation: A)

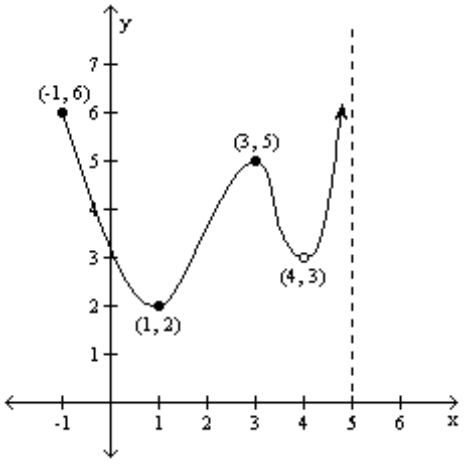
B)

C)

D)

For the graph of the function y = f(x), find the absolute maximum and the absolute minimum, if it exists.

117) 117) ____




A) Absolute maximum: f(-1) = 6; Absolute minimum: f(1) = 2

B) Absolute maximum: none; Absolute minimum: f(1) = 2

C) Absolute maximum: f(3) = 5; Absolute minimum: f(1) = 2

D) Absolute maximum: none; Absolute minimum: none

Answer: B

Explanation: A)

B)

C)

D)

Determine whether the equation defines y as a function of x.

118) $y = \pm\sqrt{1 - 3x}$ 118) ____

A) function B) not a function

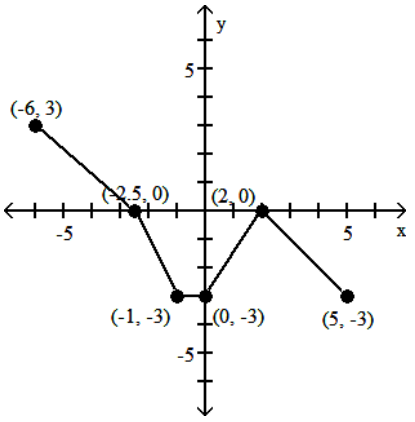
Answer: B

Explanation: A)

B)

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

119) (-6, -2.5) 119) ____




A) constant B) decreasing C) increasing

Answer: B

Explanation: A)
B)
C)

Solve the problem.

120) A firm is considering a new product. The accounting department estimates that the total cost, C(x), producing x units will be 120) ____

C(x) = 85x + 3140.

The sales department estimates that the revenue, R(x), from selling x units will be

R(x) = 95x,

but that no more than 702 units can be sold at that price. Find and interpret (R - C)(702).

A) $3880 profit, income exceeds cost
It is worth it to develop product.

B) -$3880 loss, cost exceeds income
It is not worth it to develop product.

C) $1016 profit, income exceeds cost
It is worth it to develop product.

D) $129,500 profit, income exceeds cost
It is worth it to develop product.

Answer: A

Explanation: A)
B)
C)
D)

Find the value for the function.

121) Find f(-9) when f(x) = |x| - 6. 121) ____

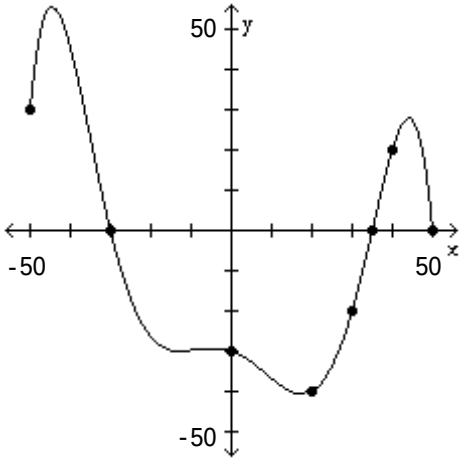
A) 15 B) -15 C) 3 D) -3

Answer: C

Explanation: A)
B)
C)
D)

The graph of a function f is given. Use the graph to answer the question.

122) For what numbers x is f(x) < 0? 122) ____




A) $(-\infty, -30)$ B) $(-30, \infty)$

C) $(-30, 35)$ D) $[-50, -30), (35, 50)$

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

123) A rectangle that is x feet wide is inscribed in a circle of radius 19 feet. Express the area of the rectangle as a function of x. 123) ____

A) $A(x) = x(1444 - x^2)$ B) $A(x) = x\sqrt{1083 - x}$

C) $A(x) = x\sqrt{1444 - x^2}$ D) $A(x) = x^2\sqrt{722 - x^2}$

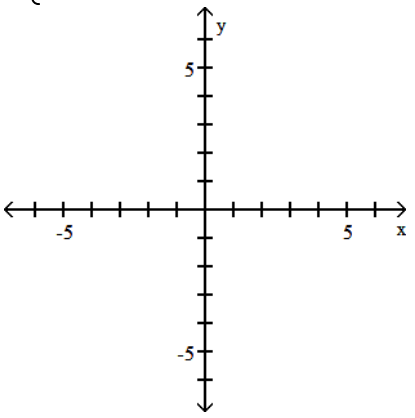
Answer: C

Explanation: A)
B)
C)
D)

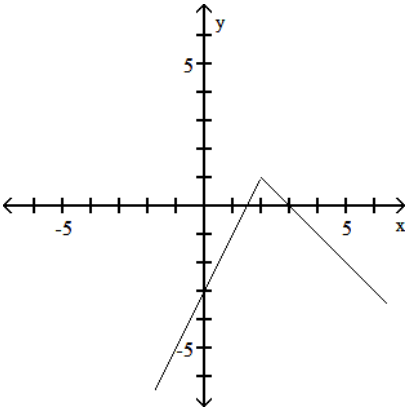
Graph the function.

124) 124) ____

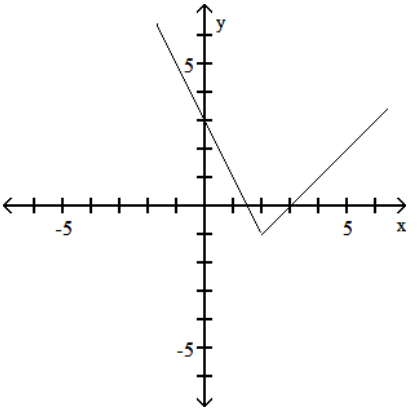
$$f(x) = \begin{cases} -x + 3 & \text{if } x < 2 \\ 2x - 3 & \text{if } x \geq 2 \end{cases}$$



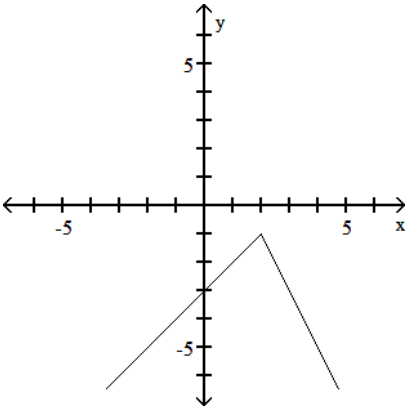

A)



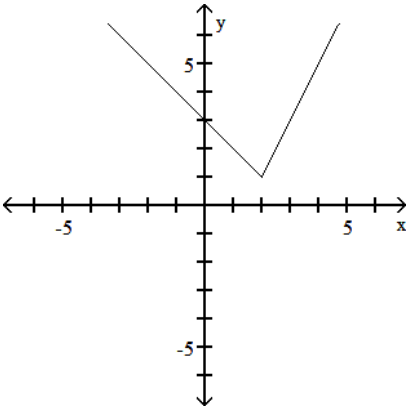

B)




C)




D)




Answer: D

Explanation: A)
B)
C)
D)

Find the function.

125) Find the function that is finally graphed after the following transformations are applied to the graph of $y = |x|$. The graph is shifted up 3 units, reflected about the x-axis, and finally shifted right 4 units. 125) ____

A) $y = -|,x + 4| - 3$ B) $y = -|,x - 4| + 3$ C) $y = -|,x - 4| - 3$ D) $y = |-x + 4| + 3$

Answer: B

Explanation: A)
B)
C)
D)

Determine algebraically whether the function is even, odd, or neither.

126) $f(x) = \sqrt{x}$ 126) ____

A) even B) odd C) neither

Answer: C

Explanation: A)
B)
C)

127) $f(x) = \dfrac{-x^3}{9x^2 - 5}$ 127) ____

A) even B) odd C) neither

Answer: B

Explanation: A)
B)
C)

For the given functions f and g, find the requested function and state its domain.

128) $f(x) = \sqrt{x + 11}$; $g(x) = \dfrac{3}{x}$ 128) ____

Find $f \cdot g$.

A) $(f \cdot g)(x) = \dfrac{\sqrt{3x + 33}}{x}$; $\{x \mid x \geq -11, x \neq 0\}$ B) $(f \cdot g)(x) = \sqrt{\dfrac{3x + 33}{x}}$; $\{x \mid x \geq -11, x \neq 0\}$

C) $(f \cdot g)(x) = \sqrt{\dfrac{14}{x}}$; $\{x \mid x \neq 0\}$ D) $(f \cdot g)(x) = \dfrac{3\sqrt{x + 11}}{x}$; $\{x \mid x \geq -11, x \neq 0\}$

Answer: D

Explanation: A)
B)
C)
D)

Find the value for the function.

129) Find $f(x + h)$ when $f(x) = 2x^2 + 3x - 4$. 129) ____

A) $2x^2 + 4xh + 2h^2 + 3x + 3h - 4$ B) $2x^2 + 2h^2 + 3x + 3h - 4$

C) $2x^2 + 2xh + 2h^2 + 3x + 3h - 4$ D) $2x^2 + 2h^2 + 7x + 7h - 4$

Answer: A

Explanation: A)
B)
C)
D)

Find the function.

130) Find the function that is finally graphed after the following transformations are applied to the graph of $y = \sqrt{x}$. The graph is shifted up 2 units, reflected about the x-axis, and finally shifted left 6 units. 130) ____

A) $y = \sqrt{-x - 6} + 2$ B) $y = -\sqrt{x - 6} - 2$ C) $y = -\sqrt{x + 6} - 2$ D) $y = -\sqrt{x + 6} + 2$

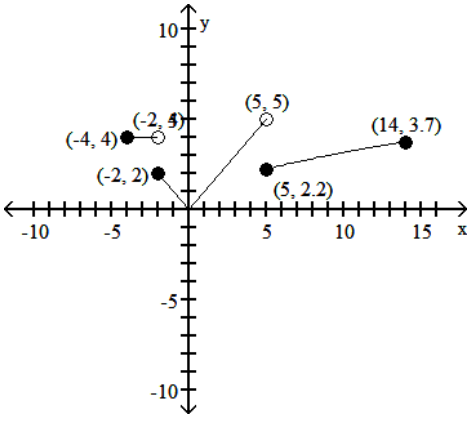
Answer: D

Explanation: A)
B)
C)
D)

Based on the graph, find the range of y = f(x).

131) 131) ____

$$f(x) = \begin{cases} 4 & \text{if } -4 \le x < -2 \\ |x| & \text{if } -2 \le x < 5 \\ \sqrt{x} & \text{if } 5 \le x \le 14 \end{cases}$$




A) $[0, \sqrt{14}]$ B) $[0, 5)$ C) $[0, 5]$ D) $[0, \infty)$

Answer: B

Explanation: A)
B)
C)
D)

Answer the question about the given function.

132) Given the function $f(x) = 2x^2 + 4x + 7$, is the point $(-1, 5)$ on the graph of f? 132) ____

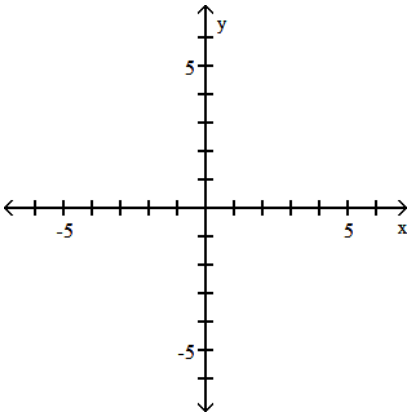
A) Yes B) No

Answer: A

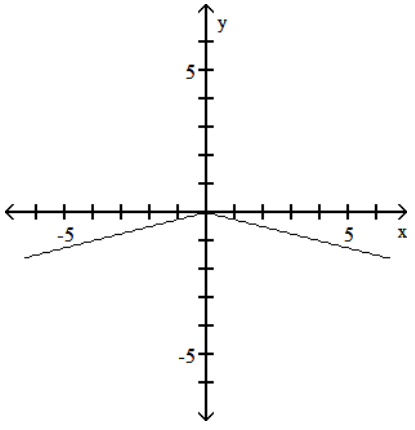
Explanation: A)
B)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

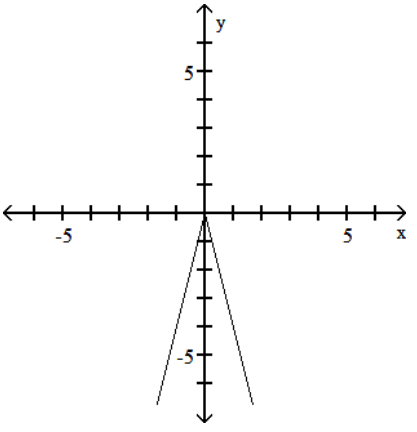
133) $f(x) = \frac{1}{4}|x|$ 133) ____



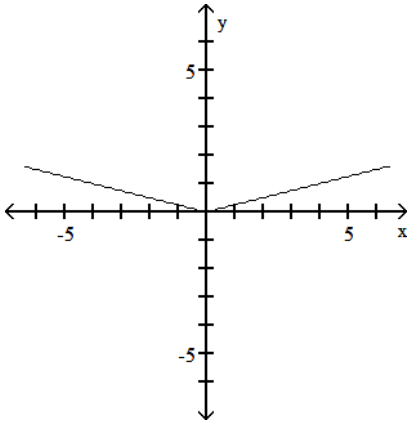

A)



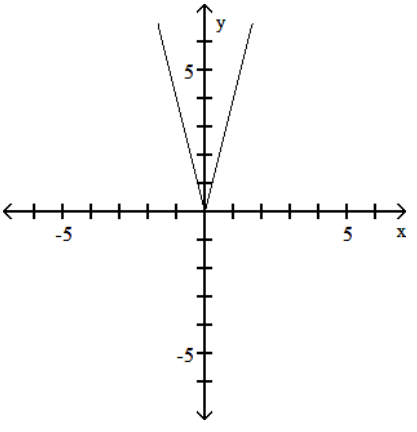

B)




C)



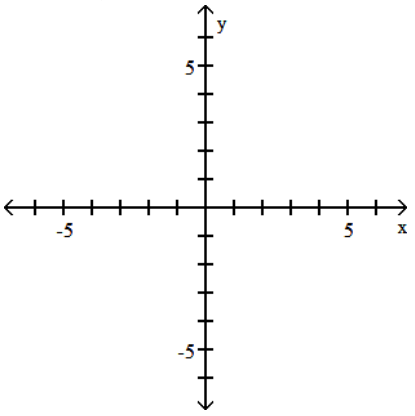

D)



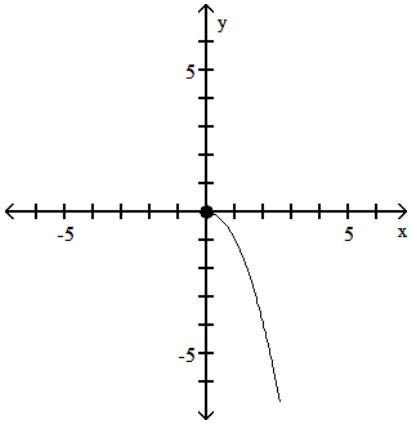

Answer: C

Explanation: A)
B)
C)
D)

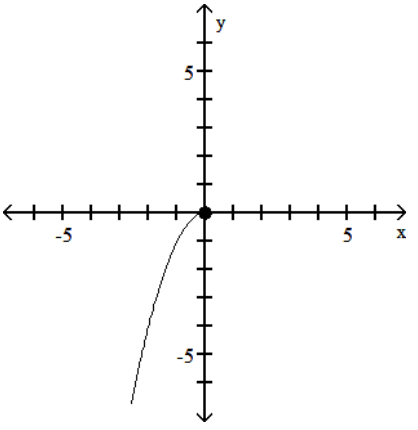
134) $f(x) = -\sqrt{x}$ 134) ____



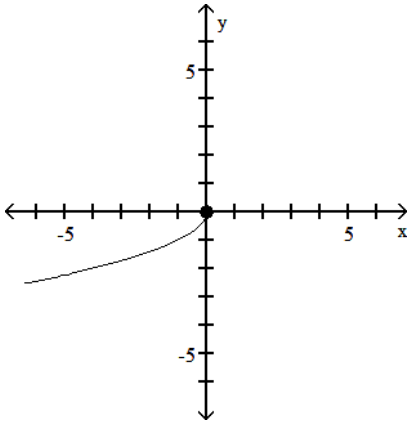

A)



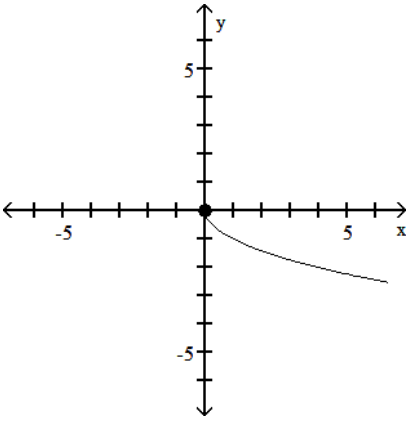

B)




C)




D)




Answer: D

Explanation: A)

B)

C)

D)

Answer the question about the given function.

135) Given the function $f(x) = \frac{x^2 - 8}{x + 1}$, is the point $(-2, 4)$ on the graph of f? 135) ____

A) Yes B) No

Answer: A

Explanation: A)
B)

Find the function.

136) Find the function that is finally graphed after the following transformations are applied to the graph of $y = |x|$. The graph is shifted right 3 units, stretched by a factor of 3, shifted vertically down 2 units, and finally reflected across the x-axis. 136) ____

A) $y = -(3|x - 3| - 2)$ B) $y = -3|x - 3| - 2$

C) $y = 3|-x - 3| - 2$ D) $y = -(3|x + 3| - 2)$

Answer: A

Explanation: A)
B)
C)
D)

Find and simplify the difference quotient of f, $\frac{f(x + h) - f(x)}{h}$, $h \neq 0$, for the function.

137) $f(x) = 8x + 9$ 137) ____

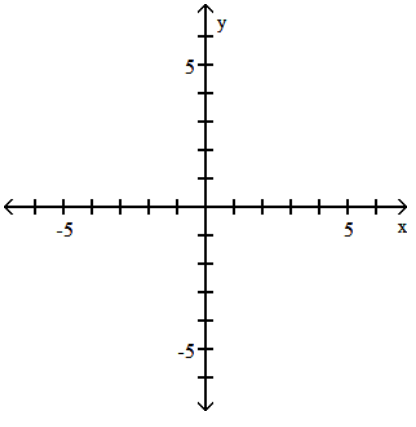
A) 0 B) $8 + \frac{18}{h}$ C) $8 + \frac{16(x + 9)}{h}$ D) 8

Answer: D

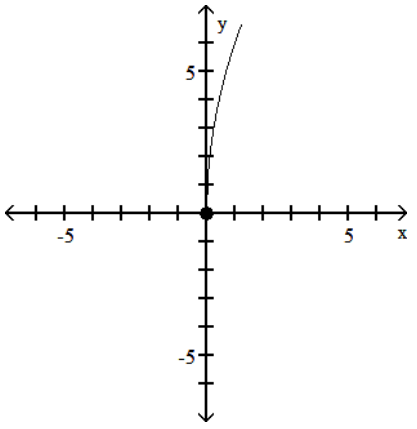
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

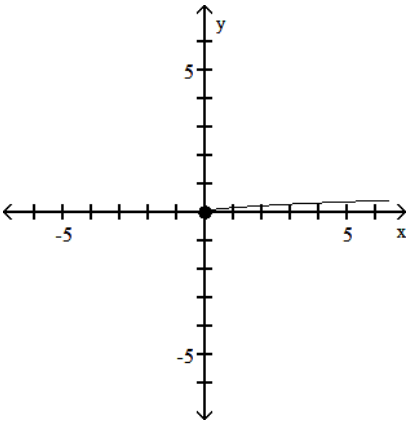
138) $f(x) = \frac{1}{6}\sqrt{x}$ 138) ____



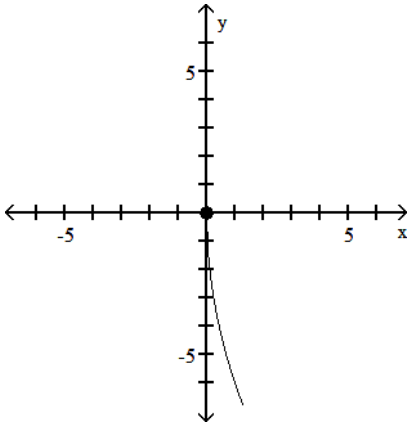
A)



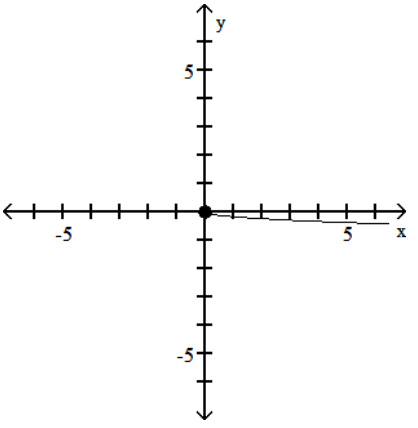

B)




C)




D)




Answer: B

Explanation: A)

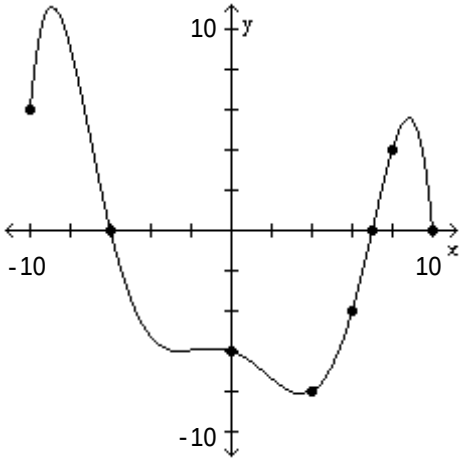
B)

C)

D)

The graph of a function f is given. Use the graph to answer the question.

139) For what numbers x is f(x) = 0? 139) ____




A) (-10, -6), (7, 10)
B) -6
C) (-6, 7)
D) -6, 7, 10

Answer: D

Explanation: A)
B)
C)
D)

Write the equation of a sine function that has the given characteristics.

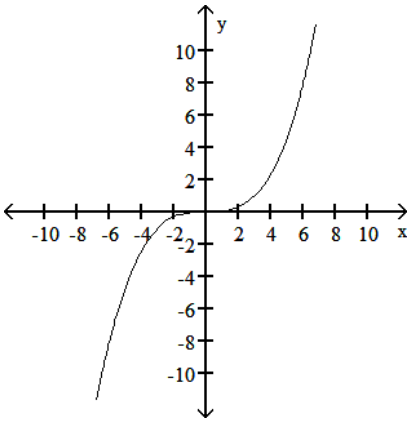
140) The graph of $y = x^2$, shifted 7 units upward 140) ____

A) $y = x^2 - 7$
B) $y = 7x^2$
C) $y = \frac{x^2}{7}$
D) $y = x^2 + 7$

Answer: D

Explanation: A)
B)
C)
D)

The graph of a function is given. Decide whether it is even, odd, or neither.

141) 


141) ____

A) even B) odd C) neither

Answer: B

Explanation: A)
B)
C)

Solve.

142) A projectile is thrown upward so that its distance above the ground after t seconds is $h(t) = -16t^2 + 330t$. After how many seconds does it reach its maximum height? Round to the nearest second.

142) ____

A) 10 sec B) 22.5 sec C) 7 sec D) 30 sec

Answer: A

Explanation: A)
B)
C)
D)

Determine algebraically whether the function is even, odd, or neither.

143) $\sqrt[3]{9x^2 + 7}$

143) ____

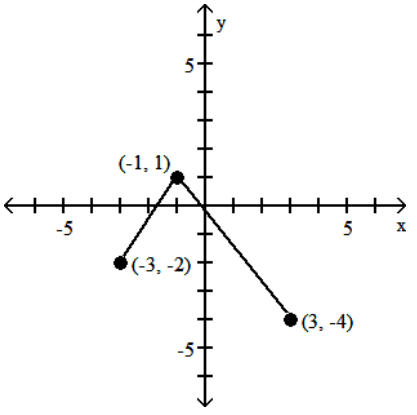
A) even B) odd C) neither

Answer: A

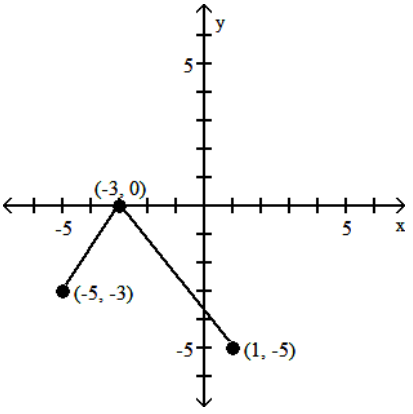
Explanation: A)
B)
C)

Using transformations, sketch the graph of the requested function.

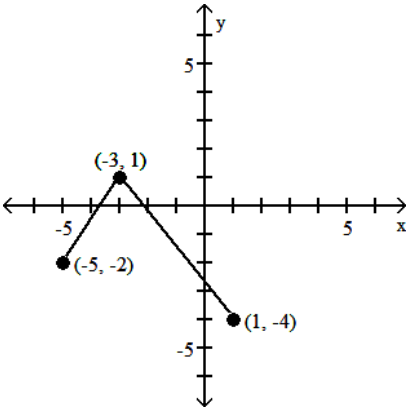
144) The graph of a function f is illustrated. Use the graph of f as the first step toward graphing the function F(x), where F(x) = f(x + 2) - 1. 144) ____



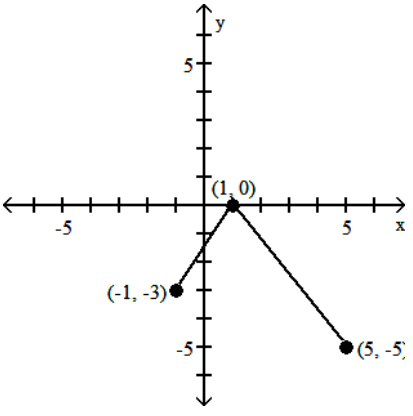

A)



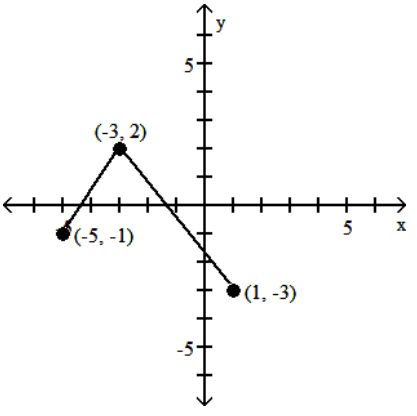

B)




C)




D)




Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

145) The concentration C (arbitrary units) of a certain drug in a patient's bloodstream can be modeled using $C(t) = \frac{t}{(0.482t + 2.074)^2}$, where t is the number of hours since a 500 milligram oral dose was administered. Using the TABLE feature of a graphing utility, find the time at which the concentration of the drug is greatest. Round to the nearest tenth of an hour. 145) ____

A) 4.3 hours B) 5.1 hours C) 5.8 hours D) 6.6 hours

Answer: A

Explanation: A)
B)
C)
D)

Answer the question about the given function.

146) Given the function $f(x) = \frac{x^2 + 7}{x - 9}$, what is the domain of f? 146) ____

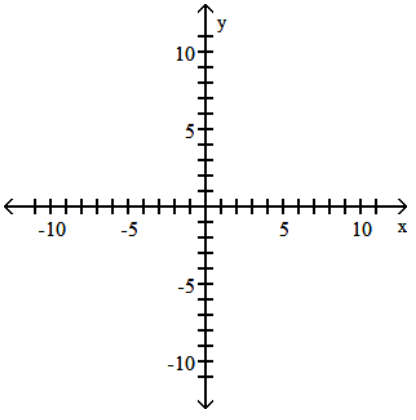
A) $\{x | x \neq 7\}$ B) $\{x | x \neq -9\}$ C) $\{x | x \neq 9\}$ D) $\{x | x \neq \frac{7}{9}\}$

Answer: C

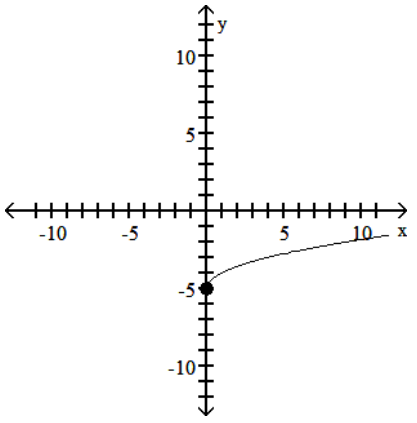
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

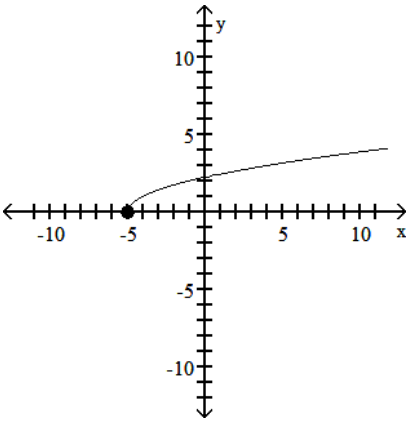
147) $f(x) = \sqrt{x} + 5$ 147) ____



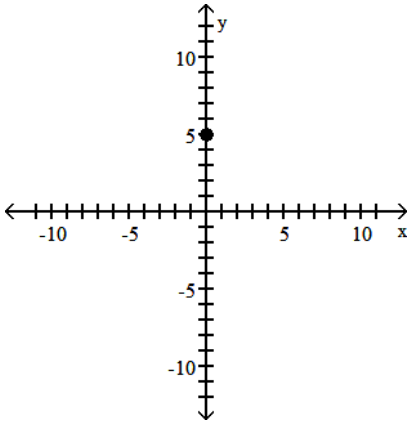
A)



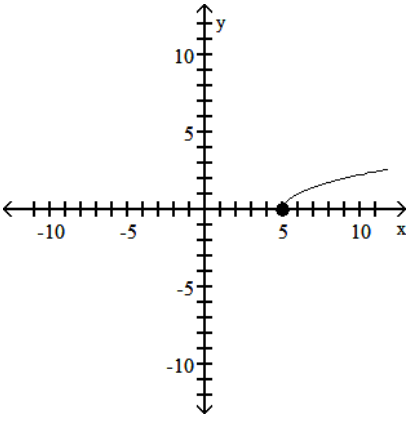

B)




C)




D)




Answer: C

Explanation: A)

B)

C)

D)

Find the domain of the function.

148) $f(x) = \frac{x^2}{x^2 + 14}$ 148) ____

A) all real numbers

B) $\{x \mid x \neq 0\}$

C) $\{x \mid x > -14\}$

D) $\{x \mid x \neq -14\}$

Answer: A

Explanation: A)

B)

C)

D)

Locate any intercepts of the function.

149) $f(x) = \begin{cases} -3x + 8 & \text{if } x < 1 \\ 8x - 3 & \text{if } x \geq 1 \end{cases}$ 149) ____

A) $(0, 8), (\frac{8}{3}, 0), (\frac{3}{8}, 0)$

B) $(0, -3), (\frac{8}{3}, 0), (\frac{3}{8}, 0)$

C) $(0, 8)$

D) $(0, -3)$

Answer: C

Explanation: A)
B)
C)
D)

Suppose the point (2, 4) is on the graph of y = f(x). Find a point on the graph of the given function.

150) $y = f(x + 3)$ 150) ____

A) $(2, 7)$ B) $(5, 4)$ C) $(2, 1)$ D) $(-1, 4)$

Answer: D

Explanation: A)
B)
C)
D)

Determine whether the equation defines y as a function of x.

151) $4x + x^2 - 39 = y$ 151) ____

A) function

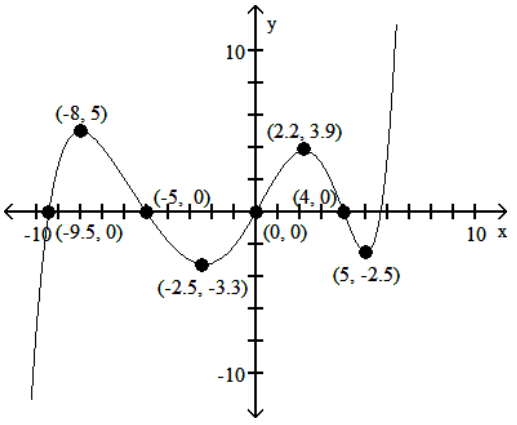
B) not a function

Answer: A

Explanation: A)
B)

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

152) (2.2, 5) 152) ____




A) decreasing B) constant C) increasing

Answer: A

Explanation: A)
B)
C)

For the given functions f and g, find the requested function and state its domain.

153) $f(x) = \sqrt{x}$; $g(x) = 3x - 1$ 153) ____

Find $\frac{f}{g}$.

A) $\left(\frac{f}{g}\right)(x) = \frac{\sqrt{x}}{3x - 1}$; $\left\{x \mid x \neq \frac{1}{3}\right\}$

B) $\left(\frac{f}{g}\right)(x) = \frac{\sqrt{x}}{3x - 1}$; $\{x \mid x \neq 0\}$

C) $\left(\frac{f}{g}\right)(x) = \frac{3x - 1}{\sqrt{x}}$; $\{x \mid x \geq 0\}$

D) $\left(\frac{f}{g}\right)(x) = \frac{\sqrt{x}}{3x - 1}$; $\left\{x \mid x \geq 0, x \neq \frac{1}{3}\right\}$

Answer: D

Explanation: A)
B)
C)
D)

Answer the question about the given function.

154) Given the function $f(x) = -4x^2 - 8x + 6$, list the y-intercept, if there is one, of the graph of f. 154) ____

A) 6 B) -2 C) 10 D) -6

Answer: B

Explanation: A)
B)
C)
D)

155) Given the function $f(x) = x^2 + 9x - 36$, list the x-intercepts, if any, of the graph of f. 155) ____

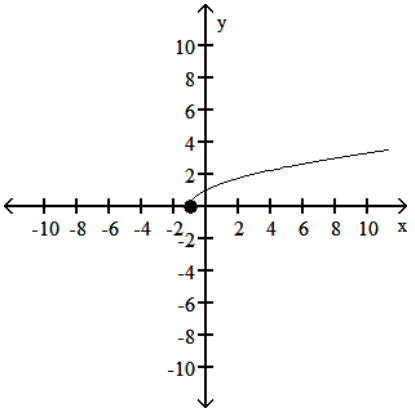
A) (12, 0), (3, 0) B) (-12, 0), (1, 0) C) (12, 0), (-3, 0) D) (-12, 0), (3, 0)

Answer: D

Explanation: A)
B)
C)
D)

The graph of a function is given. Decide whether it is even, odd, or neither.

156) 156) ____




A) even B) odd C) neither

Answer: C

Explanation: A)
B)
C)

Find the domain of the function.

157) 157) ____

$$f(x) = \begin{cases} -3x & \text{if } x \neq 0 \\ -3 & \text{if } x = 0 \end{cases}$$

A) $\{x \mid x \neq 0\}$ B) $\{0\}$

C) $\{x \mid x \leq 0\}$ D) all real numbers

Answer: D

Explanation: A)
B)
C)
D)

Determine whether the relation represents a function. If it is a function, state the domain and range.

158) {(29, -3), (4, -2), (4, 0), (8, 2), (20, 4)} 158) ____

A) function
domain: {29, 8, 4, 20}
range: {-3, -2, 0, 2, 4}

B) function
domain: {-3, -2, 0, 2, 4}
range: {29, 8, 4, 20}

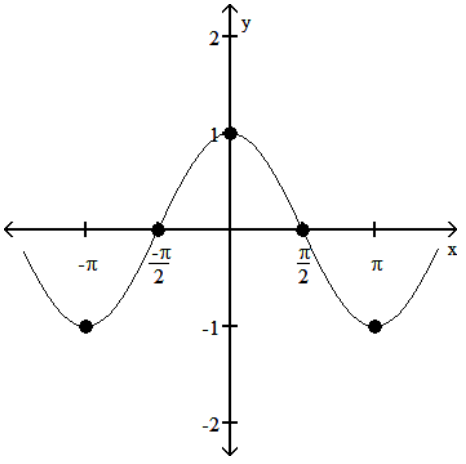
C) not a function

Answer: C

Explanation: A)
B)
C)

The graph of a function f is given. Use the graph to answer the question.

159) Find the numbers, if any, at which f has a local maximum. What are the local maxima? 159) ____




A) f has a local maximum at x = -π and π; the local maximum is -1

B) f has no local maximum

C) f has a local maximum at -π; the local maximum is 1

D) f has a local maximum at x = 0; the local maximum is 1

Answer: D

Explanation: A)
B)
C)
D)

For the given functions f and g, find the requested function and state its domain.

160) $f(x) = x + 5;\ g(x) = 4x^2$ 160) ____

Find f - g.

A) $(f - g)(x) = -4x^2 + x + 5;$ all real numbers

B) $(f - g)(x) = 4x^2 + x + 5;$ all real numbers

C) $(f - g)(x) = -4x^2 + x + 5;\ \{x|x \neq -5\}$

D) $(f - g)(x) = 4x^2 - x - 5;$ all real numbers

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

161) Suppose that the x-intercepts of the graph of y = f(x) are 2 and 3. What are the x-intercepts of y = f(-x)? 161) ____

A) -2 and 3 B) 2 and -3 C) 2 and 3 D) -2 and -3

Answer: D

Explanation: A)
B)
C)
D)

162) A farmer's silo is the shape of a cylinder with a hemisphere as the roof. If the height of the silo is 119 feet and the radius of the hemisphere is r feet, express the volume of the silo as a function of r. 162) ____

A) $V(r) = \pi(119 - r)r^2 + \frac{2}{3}\pi r^3$ B) $V(r) = 119\pi r^2 + \frac{8}{3}\pi r^3$

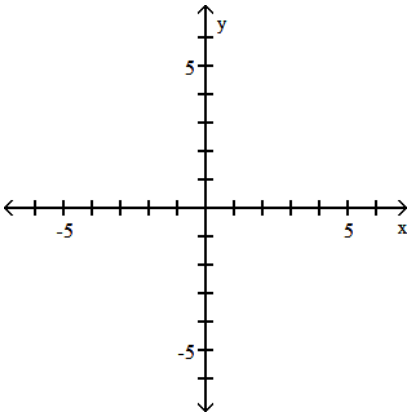
C) $V(r) = \pi(119 - r) + \frac{4}{3}\pi r^2$ D) $V(r) = \pi(119 - r)r^3 + \frac{4}{3}\pi r^2$

Answer: A

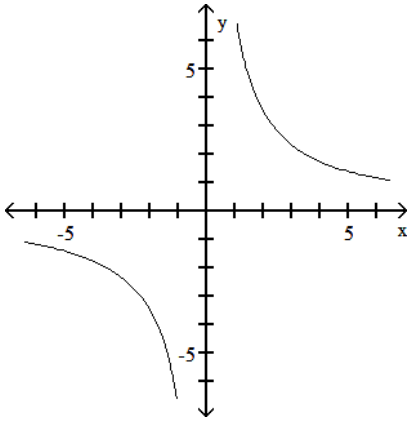
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

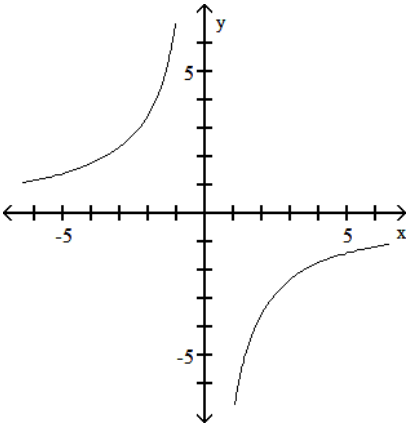
163) $f(x) = \frac{7}{x}$ 163) ____



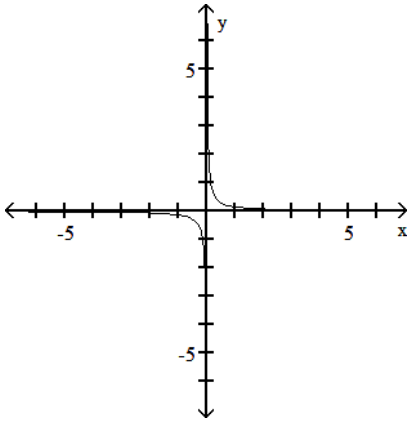

A)



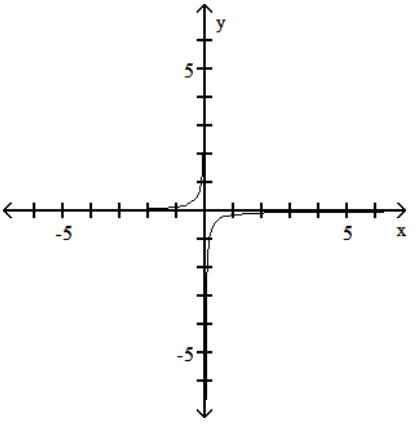

B)




C)




D)




Answer: A

Explanation: A)

B)

C)

D)

Find the average rate of change for the function between the given values.

164) $f(x) = \frac{3}{x - 2}$; from 4 to 7 164) ____

A) 2 B) $\frac{1}{3}$ C) 7 D) $-\frac{3}{10}$

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

165) A deep sea diving bell is being lowered at a constant rate. After 9 minutes, the bell is at a depth of 600 ft. After 55 minutes the bell is at a depth of 1600 ft. What is the average rate of lowering per minute? Round to the nearest hundredth is needed. 165) ____

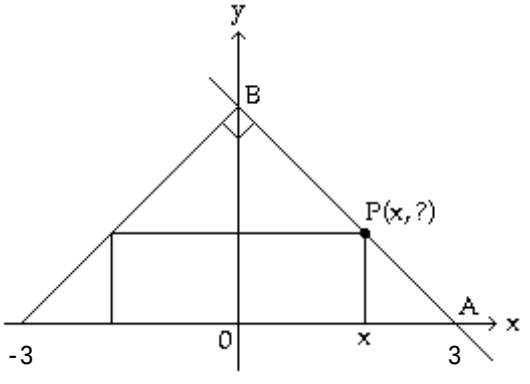
A) 21.7 ft per minute B) 18.2 ft per minute

C) 0.05 ft per minute D) 29.1 ft per minute

Answer: A

Explanation: A)
B)
C)
D)

166) The figure shown here shows a rectangle inscribed in an isosceles right triangle whose hypotenuse is 6 units long. Express the area A of the rectangle in terms of x. 166) ____




A) $A(x) = x(3 - x)$ B) $A(x) = 2x(3 - x)$

C) $A(x) = 2x^2$ D) $A(x) = 2x(x - 3)$

Answer: B

Explanation: A)
B)
C)
D)

Write the equation of a sine function that has the given characteristics.

167) The graph of $y = \sqrt{x}$, shifted 5 units to the right 167) ____

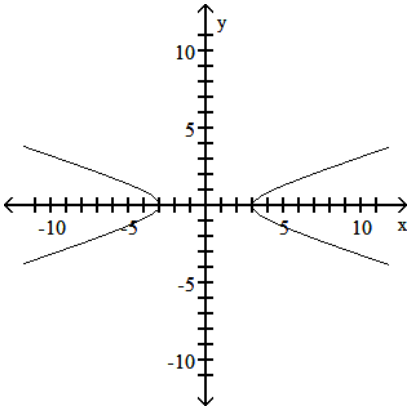
A) $y = \sqrt{x} + 5$ B) $y = \sqrt{x - 5}$ C) $y = \sqrt{x + 5}$ D) $y = \sqrt{x} - 5$

Answer: B

Explanation: A)
B)
C)
D)

Determine whether the graph is that of a function. If it is, use the graph to find its domain and range, the intercepts, if any, and any symmetry with respect to the x-axis, the y-axis, or the origin.

168) 168) ____




A) function
domain: all real numbers
range: $\{y \mid y \le -3 \text{ or } y \ge 3\}$
intercepts: (-3, 0), (3, 0)
symmetry: y-axis

B) function
domain: $\{x \mid x \le -3 \text{ or } x \ge 3\}$
range: all real numbers
intercepts: (-3, 0), (3, 0)
symmetry: x-axis, y-axis, origin

C) function
domain: $\{x \mid -3 \le x \le 3\}$
range: all real numbers
intercepts: (-3, 0), (3, 0)
symmetry: x-axis, y-axis

D) not a function

Answer: D

Explanation: A)
B)
C)
D)

Find and simplify the difference quotient of f, $\frac{f(x+h)-f(x)}{h}$, $h \neq 0$, for the function.

169) $f(x) = 9x^2$ 169) ____

A) 9

B) $\frac{9(2x^2+2xh+h^2)}{h}$

C) $\frac{18}{h} + x + 9h$

D) 9(2x+h)

Answer: D

Explanation: A)
B)
C)
D)

Determine whether the equation defines y as a function of x.

170) $y^2 = 5 - x^2$ 170) ____

A) function

B) not a function

Answer: B

Explanation: A)
B)

Solve the problem.

171) The function F described by $F(C) = \frac{9}{5}C + 32$ gives the Fahrenheit temperature corresponding to the Celsius temperature C. Find the Fahrenheit temperature equivalent to -15°C. 171) ____

A) -49°F B) 5°F C) -22°F D) -76°F

Answer: B

Explanation: A)
B)
C)
D)

Determine whether the equation defines y as a function of x.

172) $y = |x|$ 172) ____

A) function

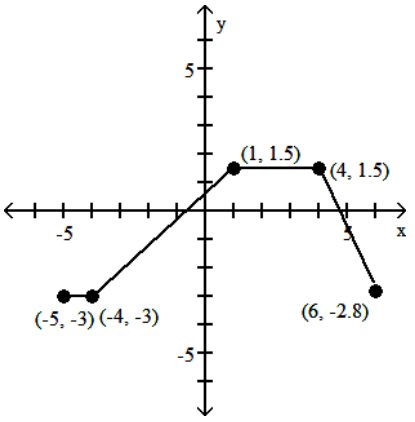
B) not a function

Answer: A

Explanation: A)
B)

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

173) (4, 3) 173) ____

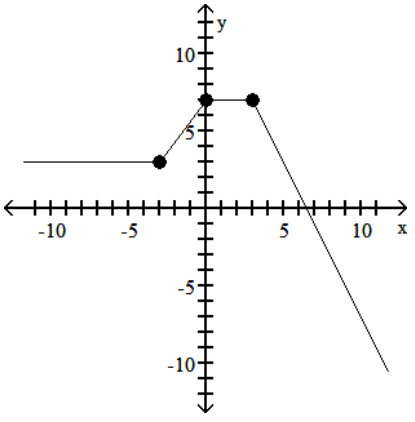



A) decreasing B) increasing C) constant

Answer: A

Explanation: A)
B)
C)

174) (3, ∞) 174) ____




A) constant B) increasing C) decreasing

Answer: C

Explanation: A)
B)
C)

Determine algebraically whether the function is even, odd, or neither.

175) $f(x) = \frac{-2x}{|x|}$ 175) ____

A) even B) odd C) neither

Answer: B

Explanation: A)
B)
C)

Solve the problem.

176) It has been determined that the number of fish f(t) that can be caught in t minutes in a certain pond using a certain bait is $f(t) = 0.27t + 1$, for $t > 10$. Find the approximate number of fish that can be caught if you fish for 30 minutes. 176) ____

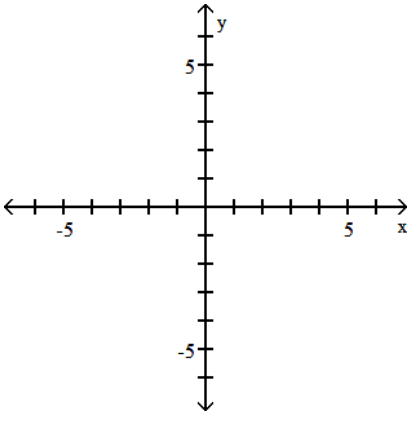
A) About 9 fish B) About 32 fish C) About 19 fish D) About 34 fish

Answer: A

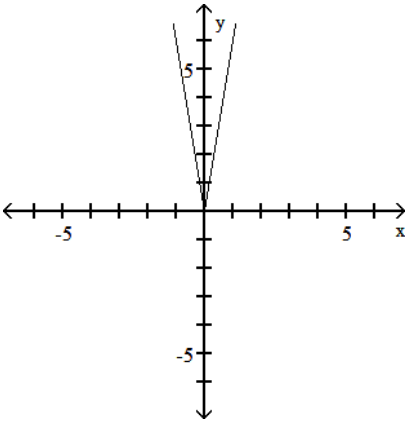
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

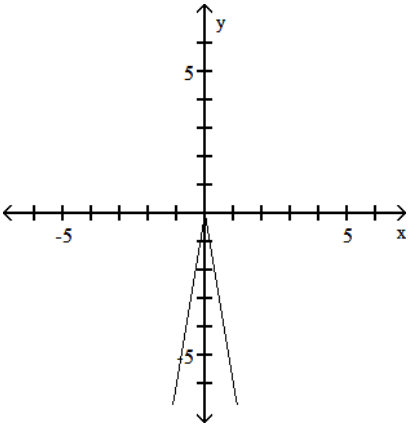
177) $f(x) = 6|x|$ 177) ____



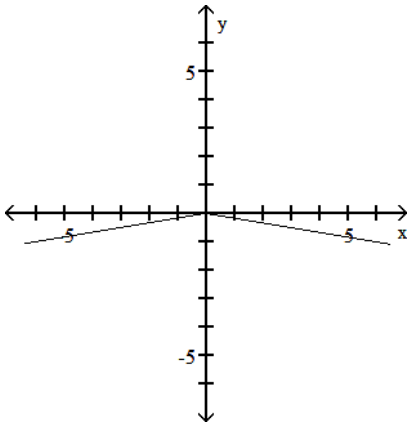

A)



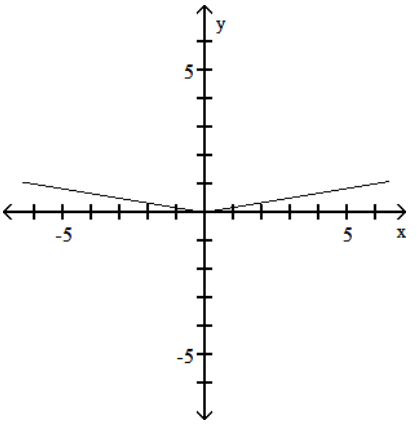

B)



C)




D)




Answer: A

Explanation: A)

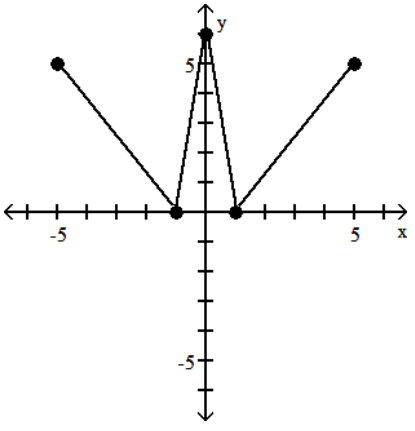
B)

C)

D)

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

178) (0, 1) 178) ____




A) decreasing B) constant C) increasing

Answer: A

Explanation: A)

B)

C)

Find the domain of the function.

179) $f(x) = x^2 + 6$ 179) ____

A) $\{x \mid x \geq -6\}$

B) all real numbers

C) $\{x \mid x \neq -6\}$

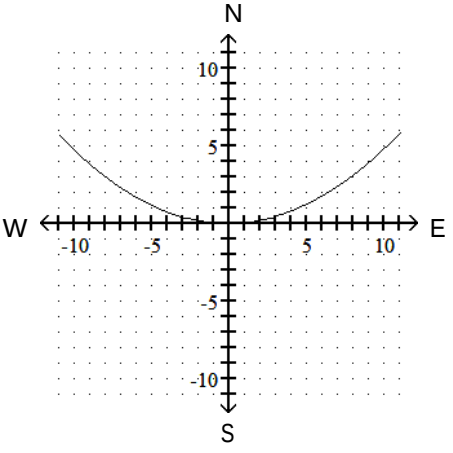
D) $\{x \mid x > -6\}$

Answer: B

Explanation: A)
B)
C)
D)

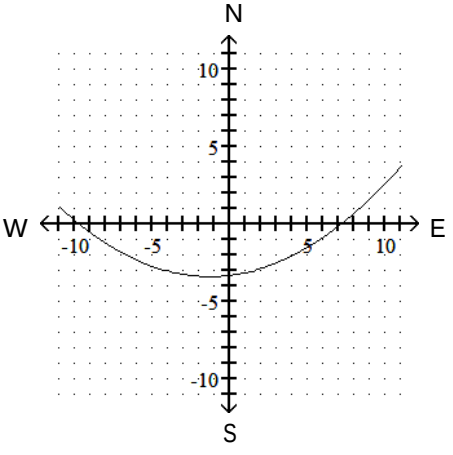
Solve the problem.

180) Suppose a cold front is passing through the United States at noon with a shape described by the function $y = \frac{1}{21}x^2$, where each unit represents 100 miles. St. Louis, Missouri is located at (0, 0), and the positive y-axis points north. 180) ____

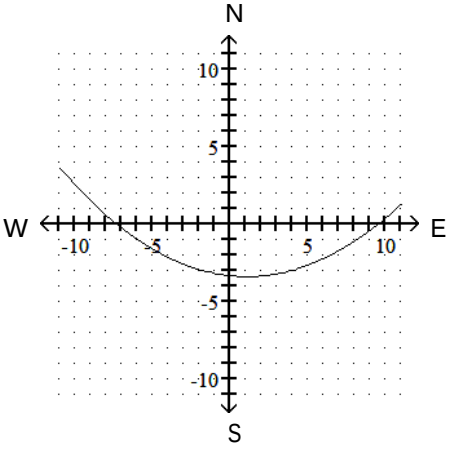



Suppose the front moves south 340 miles and west 120 miles and maintains its shape. Give the equ for the new front and plot the new position of the front.

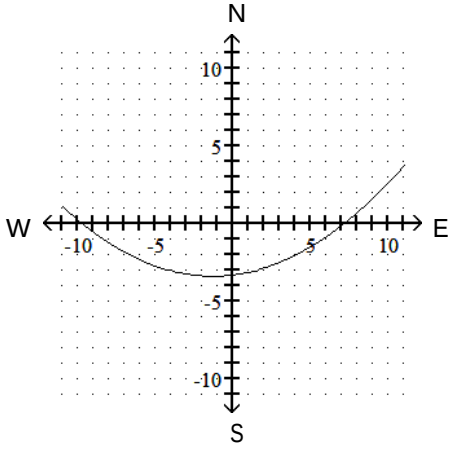
A) $y = \frac{1}{21}(x + 1.2)^2 - 3.4$



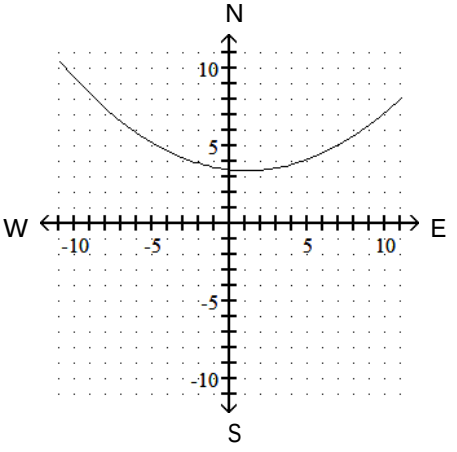

B) $y = \frac{1}{21}(x - 1.2)^2 - 3.4$



C) $y = -\frac{1}{21}(x + 1.2)^2 - 3.4$




D) $y = \frac{1}{21}(x - 1.2)^2 + 3.4$




Answer: A

Explanation: A)

B)

C)

D)

181) Find $\left(\frac{f}{g}\right)(-2)$ when $f(x) = 5x - 4$ and $g(x) = 3x^2 + 14x + 5$. 181) ____

A) $-\frac{3}{11}$ B) 0 C) $\frac{14}{11}$ D) $\frac{1}{2}$

Answer: C

Explanation: A)

B)

C)

D)

Determine algebraically whether the function is even, odd, or neither.

182) $f(x) = -2x^2 + 9$ 182) ____

A) even B) odd C) neither

Answer: A

Explanation: A)

B)

C)

Solve the problem.

183) Suppose that the x-intercepts of the graph of y = f(x) are 8 and 5. What are the x-intercepts of y = 4f(x)? 183) ____

A) 40 and 20 B) 8 and 5 C) 12 and 9 D) 4 and 1

Answer: B

Explanation: A)
B)
C)
D)

184) Suppose that the function y = f(x) is increasing on the interval (4, 5). Over what interval is the graph of y = f(x + 2) increasing? 184) ____

A) (2, 3) B) (4, 5) C) (6, 7) D) (8, 10)

Answer: A

Explanation: A)
B)
C)
D)

185) If $f(x) = 9x^3 + 2x^2 - x + C$ and f(2) = 1, what is the value of C? 185) ____

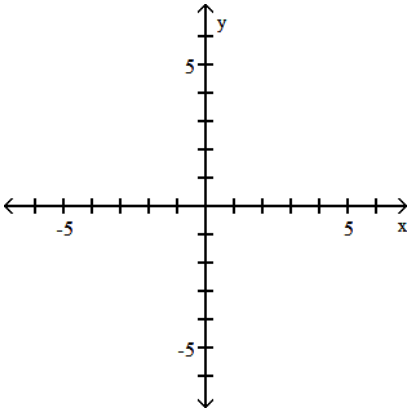
A) C = -77 B) C = -29 C) C = 83 D) C = 67

Answer: A

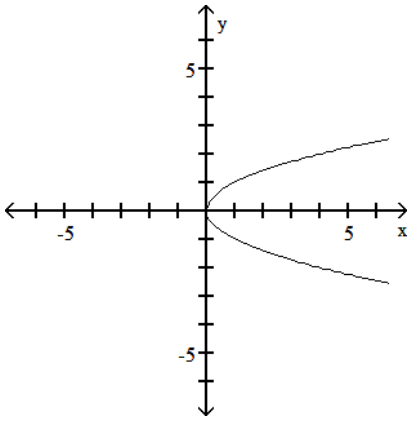
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

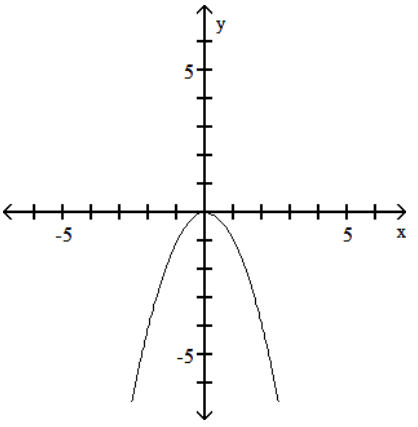
186) $f(x) = (-x)^2$ 186) ____



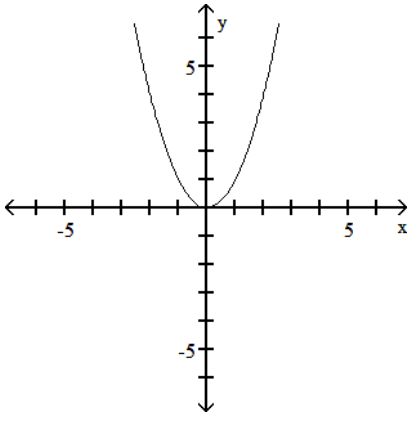
A)



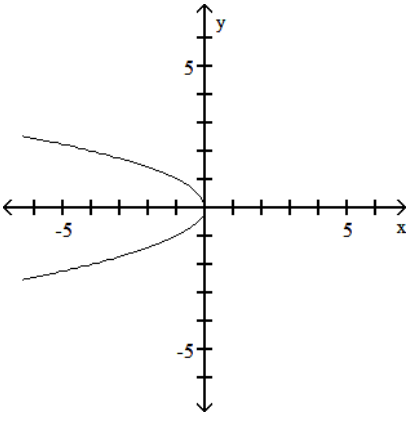

B)




C)




D)




Answer: C

Explanation: A)

B)

C)

D)

For the given functions f and g, find the requested function and state its domain.

187) $f(x) = \sqrt{8 - x}$; $g(x) = \sqrt{x - 1}$ 187) ____

Find $f \cdot g$.

A) $(f \cdot g)(x) = \sqrt{(8 - x)(x - 1)}$; $\{x \mid x \geq 0\}$

B) $(f \cdot g)(x) = \sqrt{(8 - x)(x - 1)}$; $\{x \mid 1 \leq x \leq 8\}$

C) $(f \cdot g)(x) = \sqrt{(8 - x)(x - 1)}$; $\{x \mid x \neq 1, x \neq 8\}$

D) $(f \cdot g)(x) = \sqrt{-x^2 - 8}$; $\{x \mid x \neq 8\}$

Answer: B

Explanation: A)

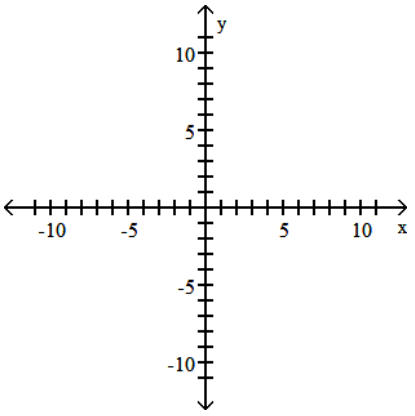
B)

C)

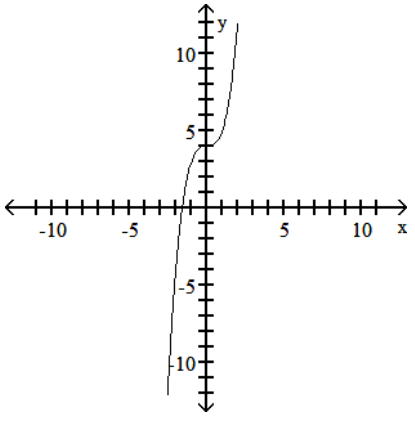
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

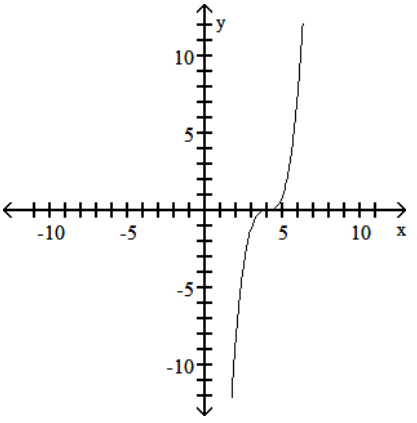
188) $f(x) = (x - 4)^3$ 188) ____



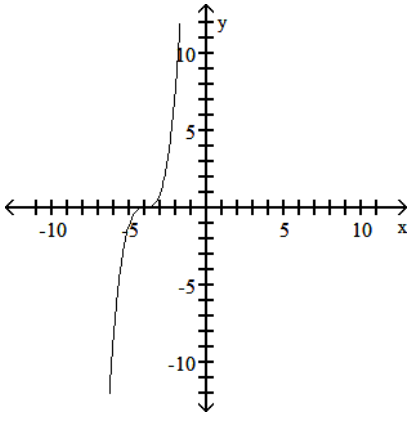

A)



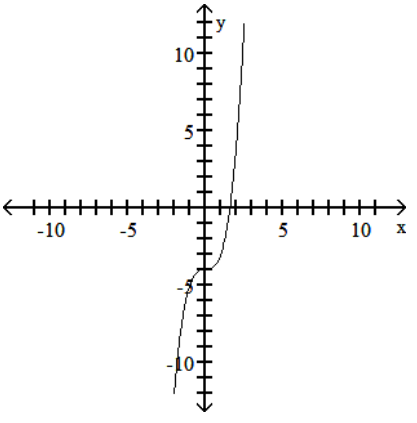

B)




C)




D)




Answer: B

Explanation: A)

B)

C)

D)

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. Determine where the function is increasing and where it is decreasing. If necessary, round answers to two decimal places.

189) $f(x) = x^3 - 3x^2 + 1, (-1, 3)$ 189) ____

A) local maximum at (2, -3)
local minimum at (0, 1)
increasing on (-1, 0) and (2, 3)
decreasing on (0, 2)

B) local maximum at (0, 1)
local minimum at (2, -3)
increasing on (-1, 0) and (2, 3)
decreasing on (0, 2)

C) local maximum at (0, 1)
local minimum at (2, -3)
increasing on (0, 2)
decreasing on (-1, 0) and (2, 3)

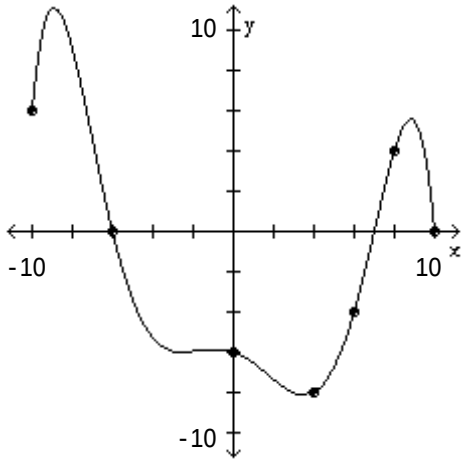
D) local maximum at (2, -3)
local minimum at (0, 1)
increasing on (-1, 0)
decreasing on (0, 2)

Answer: B

Explanation: A)
B)
C)
D)

The graph of a function f is given. Use the graph to answer the question.

190) Is f(6) positive or negative? 190) ____




A) positive

B) negative

Answer: B

Explanation: A)
B)

Find the domain of the function.

191) $f(x) = \sqrt{16 - x}$ 191) ____

A) $\{x | x \neq 16\}$ B) $\{x | x \leq 4\}$ C) $\{x | x \neq 4\}$ D) $\{x | x \leq 16\}$

Answer: D

Explanation: A)
B)
C)
D)

Solve.

192) John owns a hotdog stand. His profit is represented by the equation $P(x) = -x^2 + 10x + 35$, with P being profits and x the number of hotdogs sold. What is the most he can earn? 192) ____

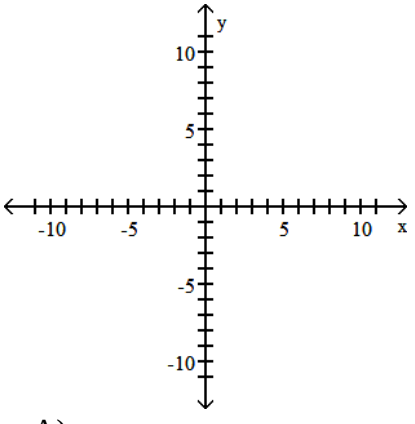
A) \$60 B) \$25 C) \$110 D) \$35

Answer: A

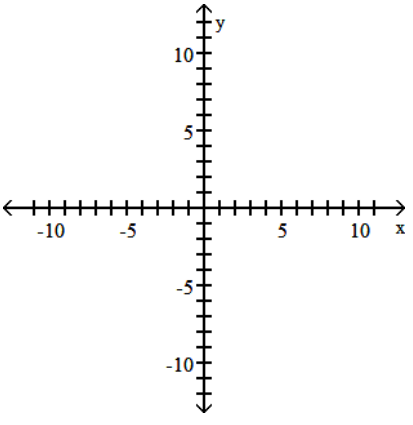
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

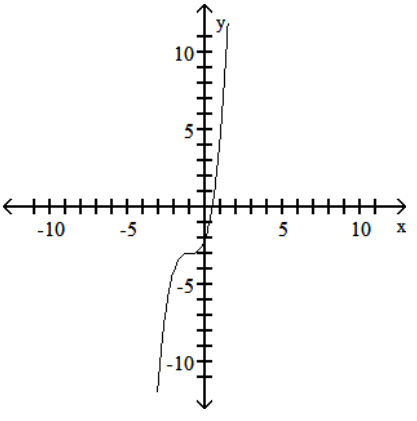
193) $f(x) = (x + 1)^3 - 3$ 193) ____



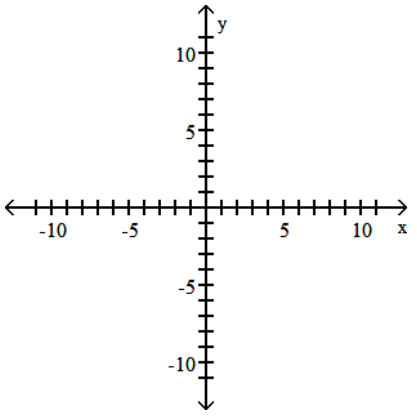

A)



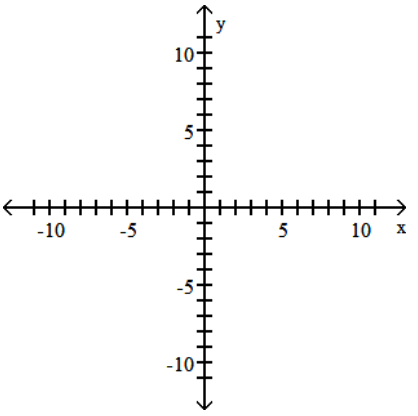

B)



C)




D)




Answer: B

Explanation: A)

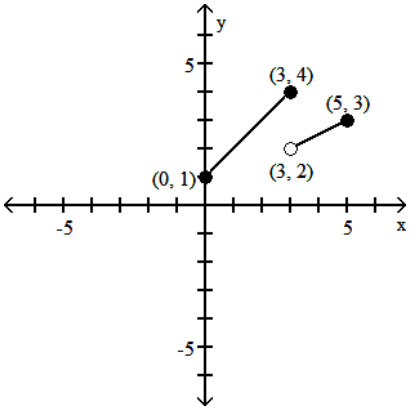
B)

C)

D)

The graph of a piecewise-defined function is given. Write a definition for the function.

194) 194) ____




A)

$$f(x) = \begin{cases} x + 1 & \text{if } 0 \le x \le 3 \\ \frac{1}{2}x + 2 & \text{if } 3 < x \le 5 \end{cases}$$

B)

$$f(x) = \begin{cases} x + 1 & \text{if } 0 \le x \le 3 \\ \frac{1}{2}x - \frac{1}{2} & \text{if } 3 < x \le 5 \end{cases}$$

C)

$$f(x) = \begin{cases} x + 1 & \text{if } 0 \le x \le 3 \\ \frac{1}{2}x & \text{if } 3 < x \le 5 \end{cases}$$

D)

$$f(x) = \begin{cases} x + 1 & \text{if } 0 \le x \le 3 \\ \frac{1}{2}x + \frac{1}{2} & \text{if } 3 < x \le 5 \end{cases}$$

Answer: D

Explanation: A)

B)

C)

D)

Find the average rate of change for the function between the given values.

195) $f(x) = \sqrt{2x - 1}$; from 1 to 5 195) ____

A) -28 B) $\frac{1}{2}$ C) $-\frac{1}{6}$ D) -2

Answer: B

Explanation: A)
B)
C)
D)

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. If necessary, round answers to two decimal places.

196) $f(x) = x^3 - 12x + 2$; (-5, 5) 196) ____

A) local maximum at (-2, 18)
local minimum at (2, -14)

B) local minimum at (0, 0)

C) local maximum at (-2, 18)
local minimum at (0, 0)
local minimum at (2, -14)

D) none

Answer: A

Explanation: A)
B)
C)
D)

Find the average rate of change for the function between the given values.

197) $f(x) = \sqrt{2x}$; from 2 to 8 197) ____

A) $-\frac{3}{10}$ B) 2 C) $\frac{1}{3}$ D) 7

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

198) If a rock falls from a height of 60 meters on Earth, the height H (in meters) after x seconds is approximately

$H(x) = 60 - 4.9x^2$.

When does the rock strike the ground? Round to the nearest hundredth, if necessary. 198) ____

A) 1.58 sec B) 12.24 sec C) 3.5 sec D) 2.5 sec

Answer: C

Explanation: A)
B)
C)
D)

Find the average rate of change for the function between the given values.

199) $f(x) = -3x^2 - x$; from 5 to 6 199) ____

A) $\frac{1}{2}$ B) -34 C) $-\frac{1}{6}$ D) -2

Answer: B

Explanation: A)
B)
C)
D)

For the given functions f and g, find the requested function and state its domain.

200) $f(x) = 2 - 9x$; $g(x) = -5x + 9$ 200) ____

Find f + g.

A) $(f + g)(x) = -5x + 2$; $\{x | x \neq \frac{2}{5}\}$ B) $(f + g)(x) = -3x$; all real numbers

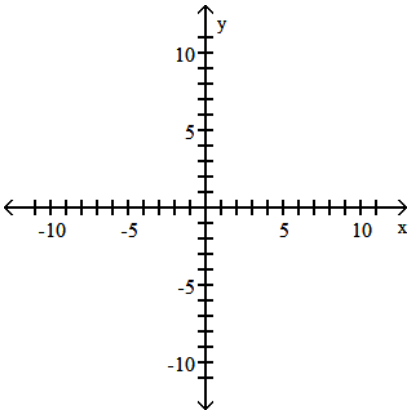
C) $(f + g)(x) = -4x + 11$; $\{x | x \neq -\frac{11}{4}\}$ D) $(f + g)(x) = -14x + 11$; all real numbers

Answer: D

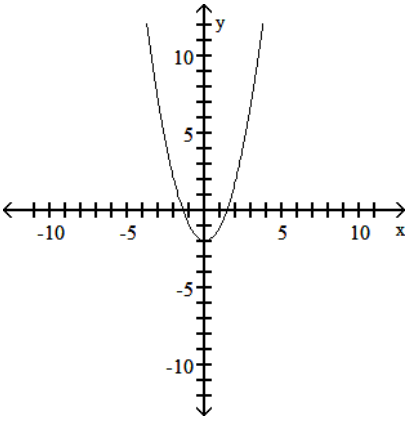
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

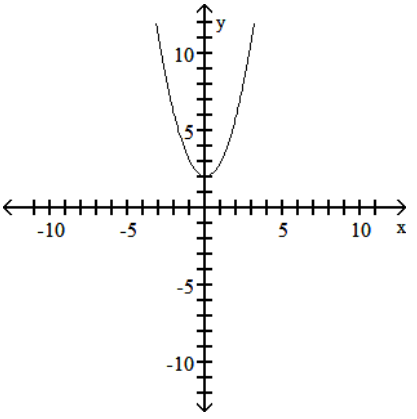
201) $f(x) = (x - 2)^2$ 201) ____



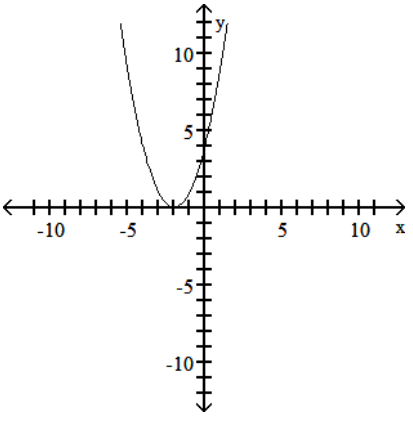

A)



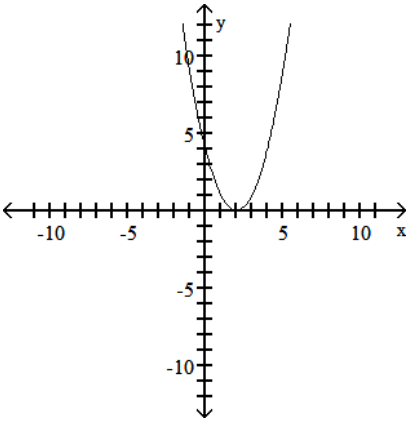

B)




C)




D)




Answer: D

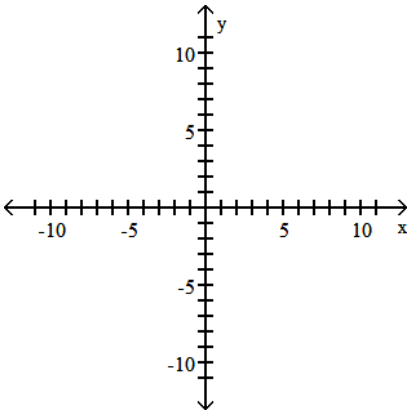
Explanation: A)

B)

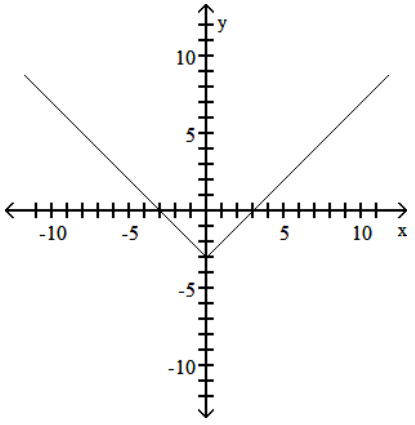
C)

D)

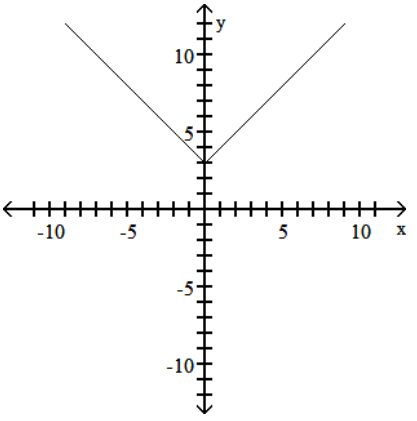
202) $f(x) = |x - 3|$ 202) ____



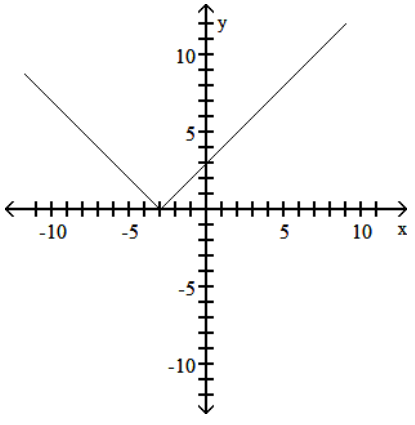

A)



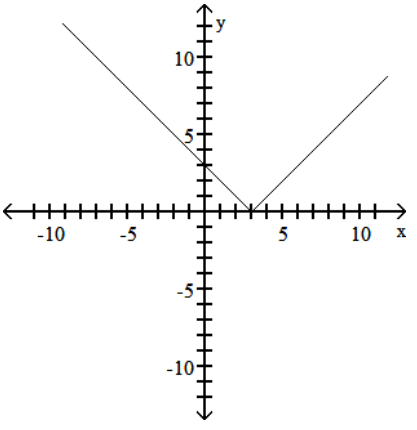

B)




C)




D)




Answer: D

Explanation: A)

B)

C)

D)

Determine whether the relation represents a function. If it is a function, state the domain and range.

203) {(-2, 8), (2, 3), (3, 0), (7, -2)} 203) ____

A) function
domain: {8, 3, 0, -2}
range: {-2, 2, 3, 7}

B) function
domain: {-2, 2, 3, 7}
range: {8, 3, 0, -2}

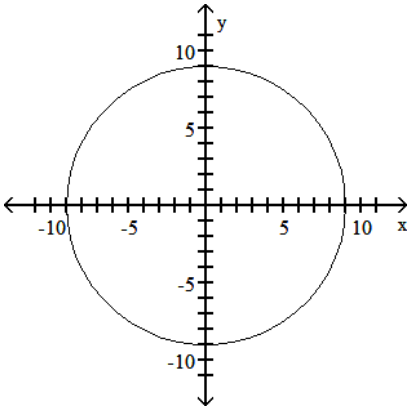
C) not a function

Answer: B

Explanation: A)
B)
C)

Determine whether the graph is that of a function. If it is, use the graph to find its domain and range, the intercepts, if any, and any symmetry with respect to the x-axis, the y-axis, or the origin.

204) 204) ____




A) function
domain: {x | -9 ≤ x ≤ 9}
range: {y | -9 ≤ y ≤ 9}
intercepts: (-9, 0), (0, -9), (0, 9), (9, 0)
symmetry: x-axis, y-axis, origin

B) function
domain: {x | -9 ≤ x ≤ 9}
range: {y | -9 ≤ y ≤ 9}
intercepts: (-9, 0), (0, -9), (0, 0), (0, 9), (9, 0)
symmetry: origin

C) function
domain: {x | -9 ≤ x ≤ 9}
range: {y | -9 ≤ y ≤ 9}
intercepts: (-9, 0), (0, -9), (0, 9), (9, 0)
symmetry: x-axis, y-axis

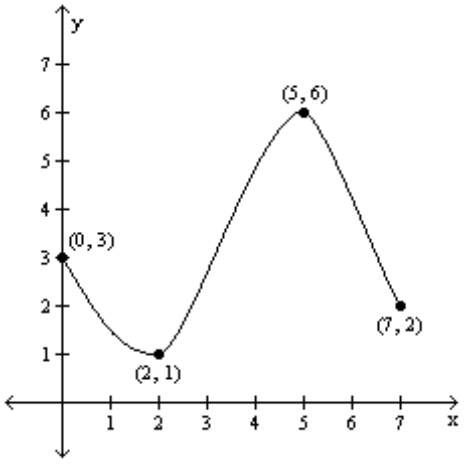
D) not a function

Answer: D

Explanation: A)
B)
C)
D)

For the graph of the function y = f(x), find the absolute maximum and the absolute minimum, if it exists.

205) 205) ____




A) Absolute maximum: f(6) = 5; Absolute minimum: f(1) = 2

B) Absolute maximum: f(7) = 2; Absolute minimum: f(0) = 3

C) Absolute maximum: f(2) = 7; Absolute minimum: f(3) = 0

D) Absolute maximum: f(5) = 6; Absolute minimum: f(2) = 1

Answer: D

Explanation: A)

B)

C)

D)

Find the domain of the function.

206) $\frac{x}{\sqrt{x - 2}}$ 206) ____

A) $\{x \mid x \neq 2\}$

B) all real numbers

C) $\{x \mid x \geq 2\}$

D) $\{x \mid x > 2\}$

Answer: D

Explanation: A)

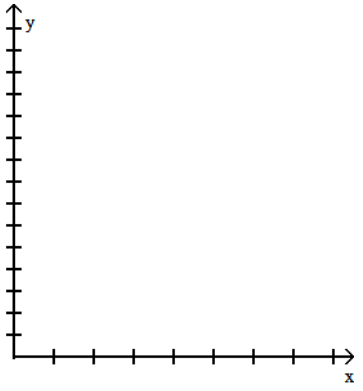
B)

C)

D)

Solve the problem.

207) The height s of a ball (in feet) thrown with an initial velocity of 90 feet per second from an initial height of 6 feet is given as a function of time t (in seconds) by $s(t) = -16t^2 + 90t + 6$. What is the maximum height? Round to the nearest hundredth, if necessary. 207) ____




A) 132.56 ft B) 126.94 ft C) 146.63 ft D) -98.06 ft

Answer: A

Explanation: A)
B)
C)
D)

Write the equation that results in the desired transformation.

208) The graph of $y = x^2$, vertically stretched by a factor of 6 208) ____

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

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

209) Find (fg)(-2) when $f(x) = x + 3$ and $g(x) = 3x^2 + 17x + 3$. 209) ____

A) -75 B) -27 C) -19 D) 95

Answer: C

Explanation: A)
B)
C)
D)

210) From April through December 2000, the stock price of QRS Company had a roller coaster ride. The chart below indicates the price of the stock at the beginning of each month during that period. Find the monthly average rate of change in price between June and September. 210) ____

| Month | Price |
|---|---|
| April (x = 1) | 115 |
| May | 109 |
| June | 89 |
| July | 101 |
| August | 96 |
| September | 113 |
| October | 92 |
| November | 84 |
| December | 64 |

A) -$8.00 per month
B) $12.00 per month
C) -$12.00 per month
D) $8.00 per month

Answer: D

Explanation: A)
B)
C)
D)

Suppose the point (2, 4) is on the graph of y = f(x). Find a point on the graph of the given function.

211) y = 4f(x) 211) ____

A) (5, 3) B) (3, 8) C) (8, 4) D) (2, 16)

Answer: D

Explanation: A)
B)
C)
D)

Find the value for the function.

212) Find f(x + 1) when $f(x) = \frac{x^2 - 8}{x - 3}$. 212) ____

A) $\frac{x^2 - 7}{x - 2}$ B) $\frac{x^2 + 2x - 7}{x + 4}$ C) $\frac{x^2 + 2x + 9}{x - 2}$ D) $\frac{x^2 + 2x - 7}{x - 2}$

Answer: D

Explanation: A)
B)
C)
D)

For the given functions f and g, find the requested function and state its domain.

213) $f(x) = 3x^3 + 2$; $g(x) = 4x^2 + 1$ 213) ____

Find $f \cdot g$.

A) $(f \cdot g)(x) = 12x^6 + 3x^3 + 8x^2 + 2$; all real numbers

B) $(f \cdot g)(x) = 12x^5 + 3x^3 + 8x^2 + 2$; all real numbers

C) $(f \cdot g)(x) = 12x^5 + 3x^3 + 8x^2 + 2$; $\{x | x \neq 0\}$

D) $(f \cdot g)(x) = 3x^3 + 4x^2 + 2$; all real numbers

Answer: B

Explanation: A)

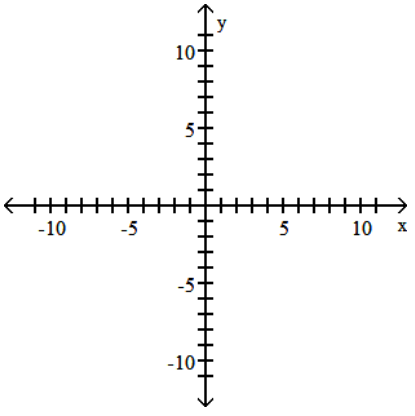
B)

C)

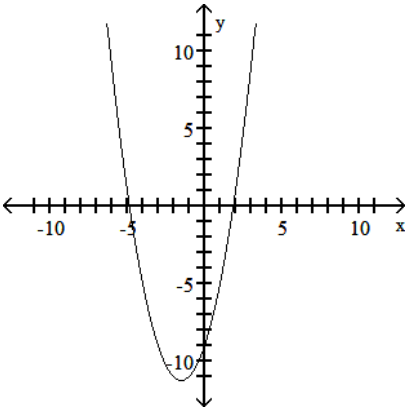
D)

Complete the square and then use the shifting technique to graph the function.

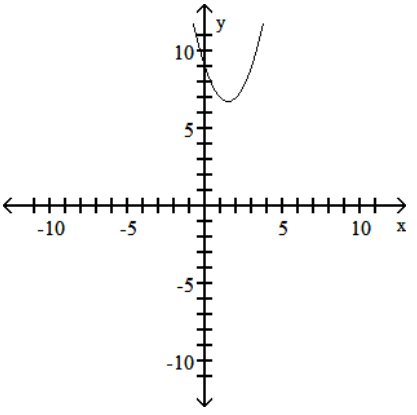
214) $f(x) = x^2 - 3x - 9$ 214) ____



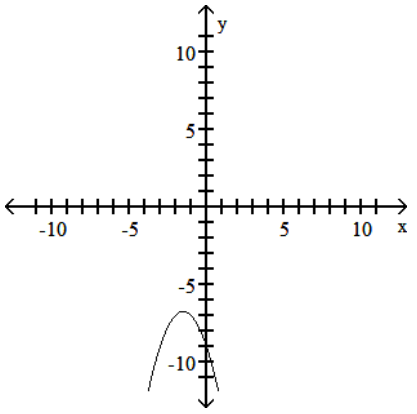

A)



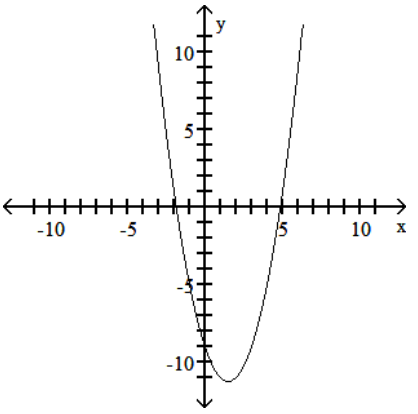

B)



C)




D)




Answer: D

Explanation: A)

B)

C)

D)

Write the equation of a sine function that has the given characteristics.

215) The graph of $y = \sqrt{x}$, shifted 3 units downward 215) ____

A) $y = \sqrt{x} + 3$ B) $y = \sqrt{x + 3}$ C) $y = \sqrt{x} - 3$ D) $y = \sqrt{x - 3}$

Answer: C

Explanation: A)

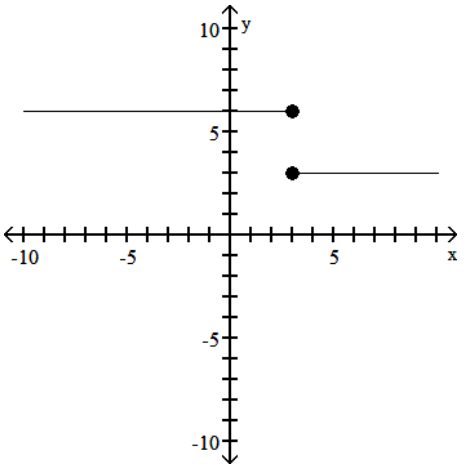
B)

C)

D)

Determine whether the graph is that of a function. If it is, use the graph to find its domain and range, the intercepts, if any, and any symmetry with respect to the x-axis, the y-axis, or the origin.

216) 216) ____




A) function
domain: all real numbers
range: {y|y = 3 or y = 6}
intercept: (0, 6)
symmetry: none

B) function
domain: all real numbers
range: all real numbers
intercept: (0, 6)
symmetry: none

C) function
domain: {x|x = 3 or x = 6}
range: all real numbers
intercept: (6, 0)
symmetry: x-axis

D) not a function

Answer: D

Explanation: A)
B)
C)
D)

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. If necessary, round answers to two decimal places.

217) $f(x) = x^4 - 5x^3 + 3x^2 + 9x - 3;\ (-5, 5)$ 217) ____

A) local minimum at (-0.61, -5.64)
local maximum at (1.41, 6.12)
local minimum at (3, -3)

B) local minimum at (-0.57, -6.12)
local maximum at (1.32, 5.64)
local minimum at (3, -3)

C) local minimum at (-1, -6)
local maximum at (1, 6)
local minimum at (3, -3)

D) local minimum at (-3, -3)
local maximum at (-1.32, 5.64)
local minimum at (0.57, -6.12)

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

218) Sue wants to put a rectangular garden on her property using 76 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. 218) ____

A) $A(x) = 38x - \frac{1}{2}x^2$

B) $A(x) = 38x^2 - x$

C) $A(x) = 37x - \frac{1}{4}x^2$

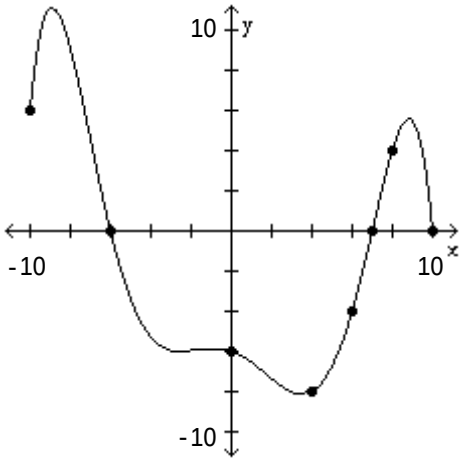
D) $A(x) = 39x - 2x^2$

Answer: A

Explanation: A)
B)
C)
D)

The graph of a function f is given. Use the graph to answer the question.

219) How often does the line y = 2 intersect the graph? 219) ____




A) once

B) twice

C) three times

D) does not intersect

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

220) A farmer's silo is the shape of a cylinder with a hemisphere as the roof. If the radius of the hemisphere is 10 feet and the height of the silo is h feet, express the volume of the silo as a function of h. 220) ____

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

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

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

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

Answer: A

Explanation: A)
B)
C)
D)

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. If necessary, round answers to two decimal places.

221) $f(x) = 2 + 8x - x^2;\ (-5, 5)$ 221) ____

A) local maximum at (4, 18)

B) local minimum at (-4, 18)

C) local minimum at (4, 50)

D) local maximum at (-4, 50)

Answer: A

Explanation: A)
B)
C)
D)

Answer the question about the given function.

222) Given the function $f(x) = \frac{x^2 + 8}{x + 3}$, list the y-intercept, if there is one, of the graph of f. 222) ____

A) $(\frac{8}{3}, 0)$

B) $(0, \frac{8}{3})$

C) (0, -3)

D) (0, -8)

Answer: B

Explanation: A)
B)
C)
D)

For the given functions f and g, find the requested function and state its domain.

223) $f(x) = 2x + 5;\ g(x) = 3x - 1$ 223) ____

Find $\frac{f}{g}$.

A) $\left(\frac{f}{g}\right)(x) = \frac{2x + 5}{3x - 1};\ \left\{x \mid x \neq \frac{1}{3}\right\}$

B) $\left(\frac{f}{g}\right)(x) = \frac{3x - 1}{2x + 5};\ \left\{x \mid x \neq -\frac{5}{2}\right\}$

C) $\left(\frac{f}{g}\right)(x) = \frac{3x - 1}{2x + 5};\ \left\{x \mid x \neq \frac{1}{3}\right\}$

D) $\left(\frac{f}{g}\right)(x) = \frac{2x + 5}{3x - 1};\ \left\{x \mid x \neq -\frac{5}{2}\right\}$

Answer: A

Explanation: A)
B)
C)
D)

Find the value for the function.

224) Find $-f(x)$ when $f(x) = 2x^2 - 3x + 3$. 224) ____

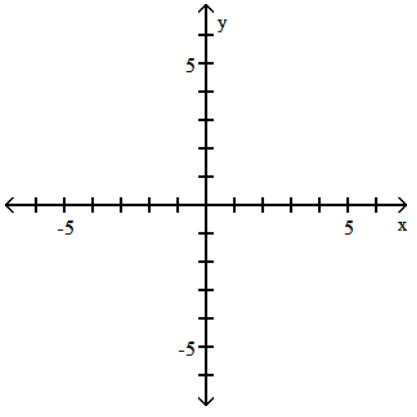
A) $2x^2 + 3x - 3$ B) $2x^2 + 3x + 3$ C) $-2x^2 + 3x - 3$ D) $-2x^2 + 3x + 3$

Answer: C

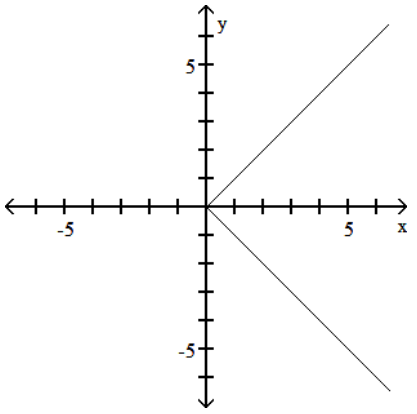
Explanation: A)
B)
C)
D)

Graph the function.

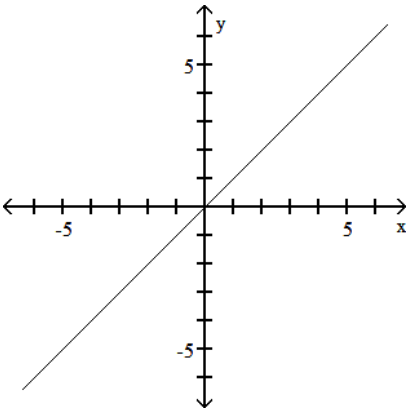
225) $f(x) = |x|$ 225) ____



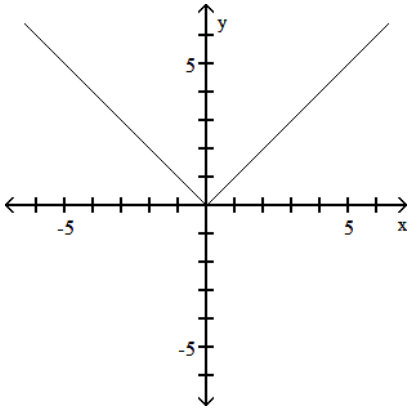
A)



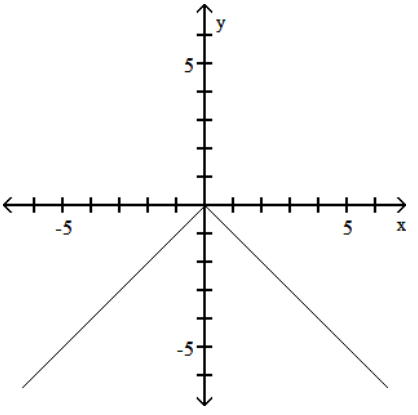

B)




C)




D)




Answer: C

Explanation: A)

B)

C)

D)

Solve the problem.

226) The price p and the quantity x sold of a certain product obey the demand equation: 226) ____

$$p = -\frac{1}{5}x + 300, \{x \mid 0 \le x \le 500\}$$

What is the revenue to the nearest dollar when 400 units are sold?

A) $170,000 B) $152,000 C) $88,000 D) $10,000

Answer: C

Explanation: A)

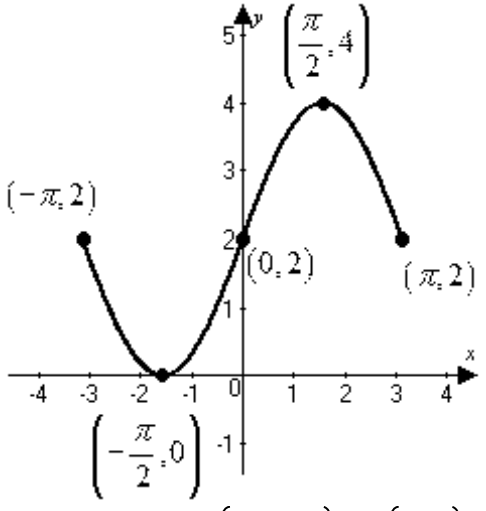
B)

C)

D)

Use the graph to find the intervals on which it is increasing, decreasing, or constant.

227) 227) ____




A) Increasing on $\left(-\pi, -\frac{\pi}{2}\right)$ and $\left(\frac{\pi}{2}, \pi\right]$; decreasing on $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

B) Decreasing on $(-\pi, 0)$; increasing on $(0, \pi)$

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

D) Decreasing on $\left(-\pi, -\frac{\pi}{2}\right)$ and $\left(\frac{\pi}{2}, \pi\right]$; increasing on $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

228) If f(x) = int(2x), find f(-1.6). 228) ____

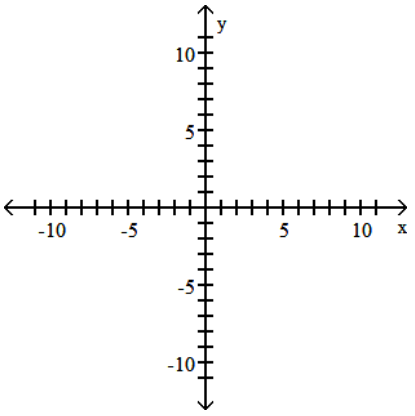
A) -4 B) -2 C) -3 D) -1

Answer: A

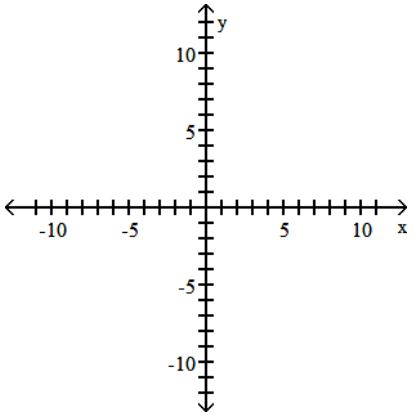
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

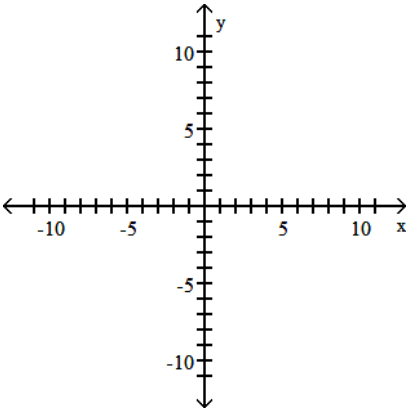
229) $f(x) = |x + 5| + 2$ 229) ____



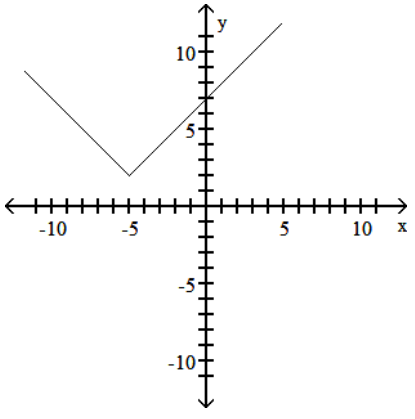

A)



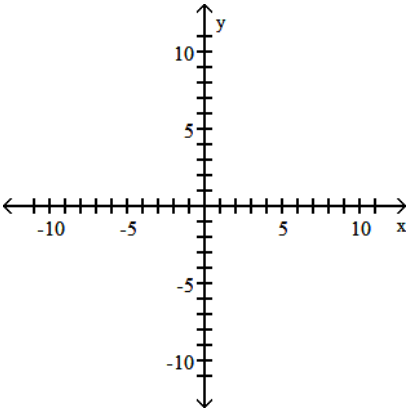

B)




C)




D)




Answer: C

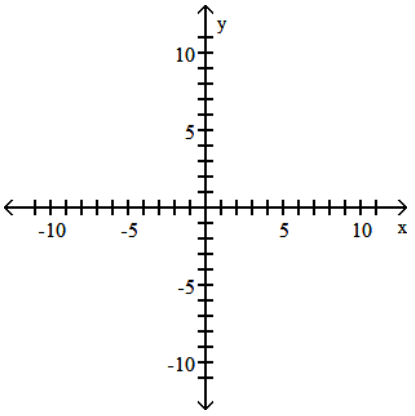
Explanation: A)

B)

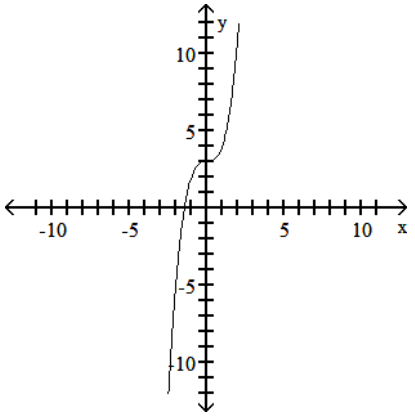
C)

D)

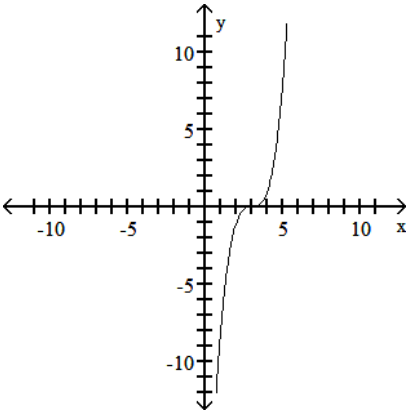
230) $f(x) = x^3 + 3$ 230) ____



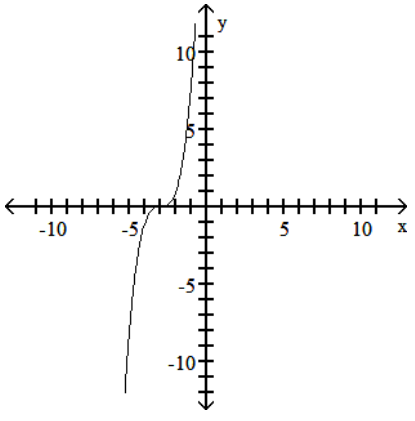

A)



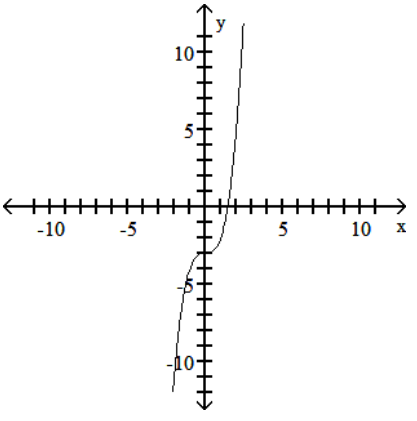

B)




C)




D)




Answer: A

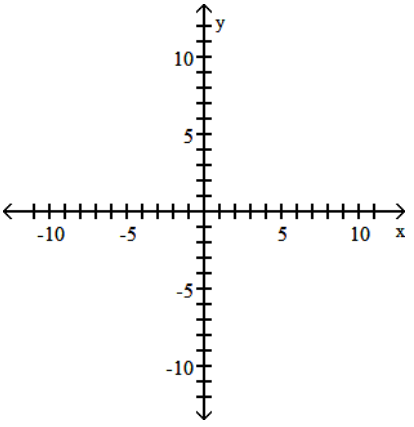
Explanation: A)
B)
C)
D)

Graph the function.

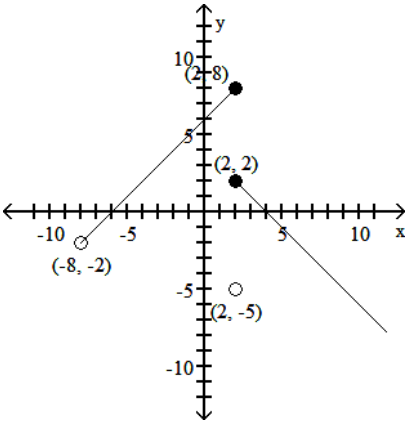
231)

231) ____

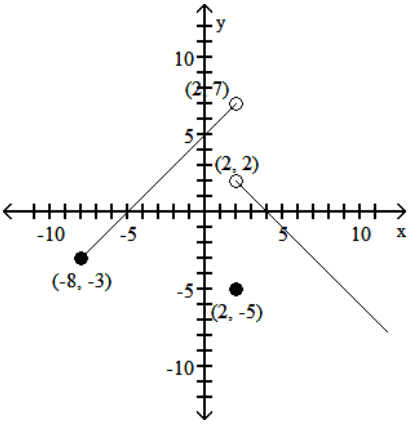
$$f(x) = \begin{cases} x + 5 & \text{if } -8 \le x < 2 \\ -5 & \text{if } x = 2 \\ -x + 4 & \text{if } x > 2 \end{cases}$$



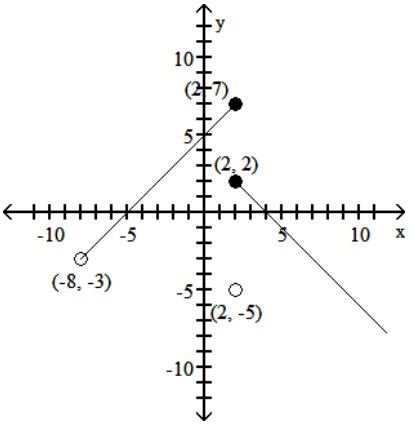

A)



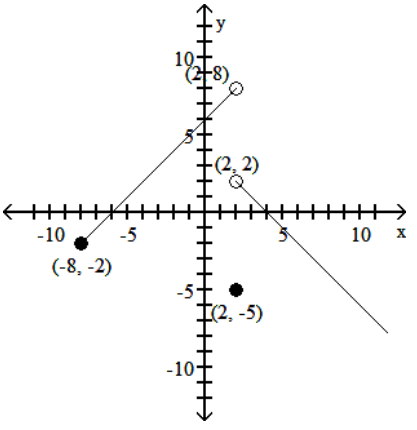

B)




C)




D)




Answer: B

Explanation: A)

B)

C)

D)

For the given functions f and g, find the requested function and state its domain.

232) $f(x) = 6x - 9;\ g(x) = 4x - 2$ 232) ____

Find f - g.

A) $(f - g)(x) = -2x + 7;$ all real numbers

B) $(f - g)(x) = 10x - 11;\ \{x|x \neq 1\}$

C) $(f - g)(x) = 2x - 7;$ all real numbers

D) $(f - g)(x) = 2x - 11;\ \{x|x \neq \frac{11}{2}\}$

Answer: C

Explanation: A)
B)
C)
D)

Find the average rate of change for the function between the given values.

233) $f(x) = 4x^2;$ from 0 to $\frac{7}{4}$ 233) ____

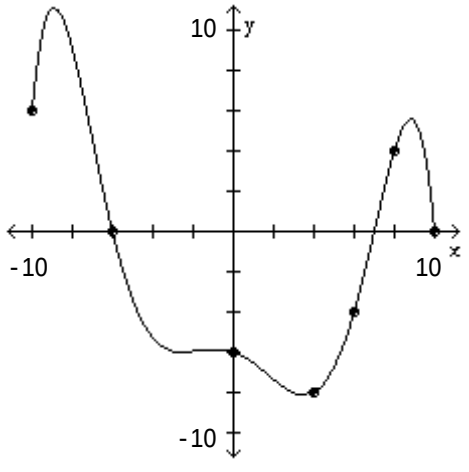
A) 7 B) 2 C) $-\frac{3}{10}$ D) $\frac{1}{3}$

Answer: A

Explanation: A)
B)
C)
D)

The graph of a function f is given. Use the graph to answer the question.

234) Use the graph of f given below to find f(-10). 234) ____




A) 0 B) 16 C) -10 D) 6

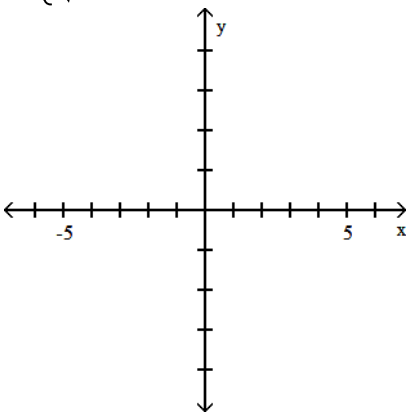
Answer: D

Explanation: A)
B)
C)
D)

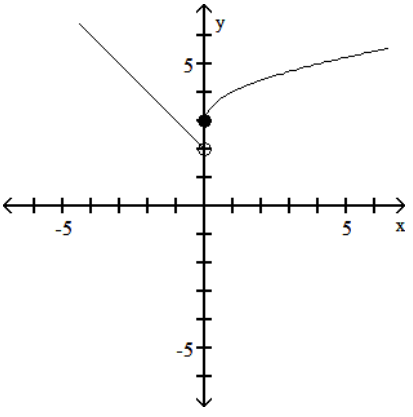
Graph the function.

235) 235) ____

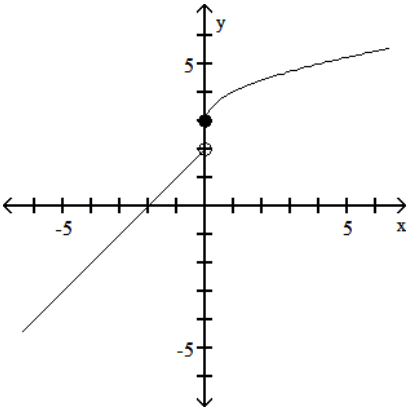
$$f(x) = \begin{cases} -x + 2 & x < 0 \\ \sqrt{x} + 3 & x \geq 0 \end{cases}$$



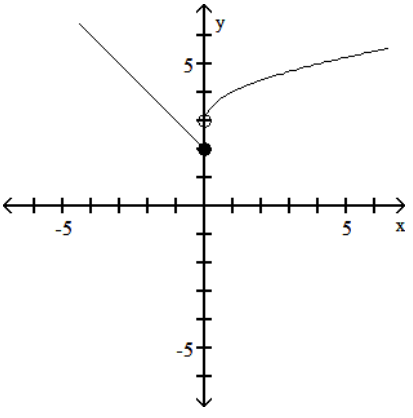

A)



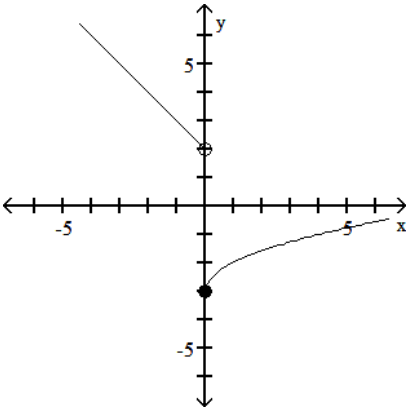

B)




C)




D)




Answer: A

Explanation: A)

B)

C)

D)

Find the domain of the function.

236) $h(x) = \dfrac{x - 3}{x^3 - 64x}$ 236) ____

A) all real numbers
B) $\{x \mid x \neq 3\}$
C) $\{x \mid x \neq -8, 0, 8\}$
D) $\{x \mid x \neq 0\}$

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

237) The following numerical representation for f computes the average number of hours of television watched per day based on year of birth x. 237) ____

| x | 1975 | 1980 | 1983 | 1988 | 1990 | 1992 | 1995 |
|---|---|---|---|---|---|---|---|
| f(x) | 2 | 2.5 | 3 | 3.5 | 4 | 3.5 | 4 |

Give a numerical representation for a function g that computes the average number of hours of tele watched per day for the year x, where x = 0 corresponds to the birth year 1975. Write an equation that shows the relationship between f(x) and g(x).

A)

| x | 0 | 5 | 8 | 13 | 15 | 17 | 20 |
|---|---|---|---|---|---|---|---|
| g(x) | 2 | 2.5 | 3 | 3.5 | 4 | 3.5 | 4 |

f(x) = g(x - 1975)

B)

| x | 0 | 5 | 8 | 13 | 15 | 17 | 20 |
|---|---|---|---|---|---|---|---|
| g(x) | 2 | 2.5 | 3 | 3.5 | 4 | 3.5 | 4 |

f(x) = g(x + 1975)

C)

| x | 75 | 80 | 83 | 88 | 90 | 92 | 95 |
|---|---|---|---|---|---|---|---|
| g(x) | 2 | 2.5 | 3 | 3.5 | 4 | 3.5 | 4 |

f(x) = g(x - 1900)

D)

| x | 0 | 5 | 8 | 13 | 15 | 17 | 20 |
|---|---|---|---|---|---|---|---|
| g(x) | 2 | 2.5 | 3 | 3.5 | 4 | 3.5 | 4 |

f(x) = g(x) - 1975

Answer: A

Explanation: A)
B)
C)
D)

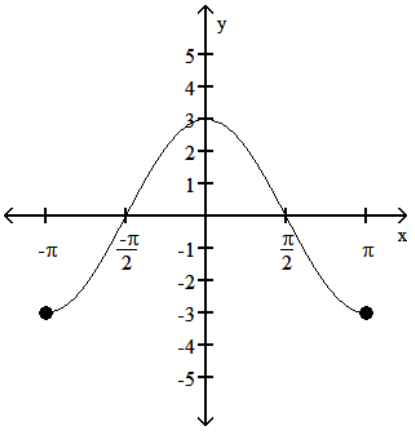
238) A rectangular sign is being designed so that the length of its base, in feet, is 6 feet less than 4 times the height, h. Express the area of the sign as a function of h. 238) ____

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

Answer: C

Explanation: A)
B)
C)
D)

The graph of a function is given. Decide whether it is even, odd, or neither.

239) 


239) ____

A) even B) odd C) neither

Answer: A

Explanation: A)
B)
C)

Determine whether the equation defines y as a function of x.

240) $y = x^2$ 240) ____

A) function B) not a function

Answer: A

Explanation: A)
B)

Find and simplify the difference quotient of f, $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$, for the function.

241) $f(x) = x^2 + 3x + 5$ 241) ____

A) $2x + h + 5$ B) 1

C) $2x + h + 3$ D) $\frac{2x^2 + 2x + 2xh + h^2 + h + 10}{h}$

Answer: C

Explanation: A)
B)
C)
D)

Solve.

242) A rock falls from a tower that is 63.7 m high. As it is falling, its height is given by the formula $h(t) = 63.7 - 4.9t^2$. How many seconds will it take for the rock to hit the ground (h=0)? Round to the nearest tenth. 242) ____

A) 8 sec B) 3.6 sec C) 13 sec D) 800 sec

Answer: B

Explanation: A)
B)
C)
D)

Find the value for the function.

243) Find f(-1) when $f(x) = x^2 - 3x + 7$. 243) ____

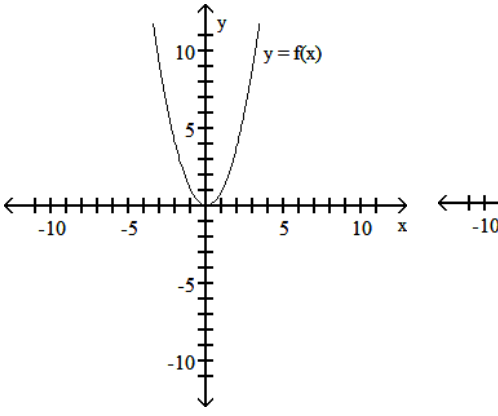
A) 5 B) -9 C) -3 D) 11

Answer: D

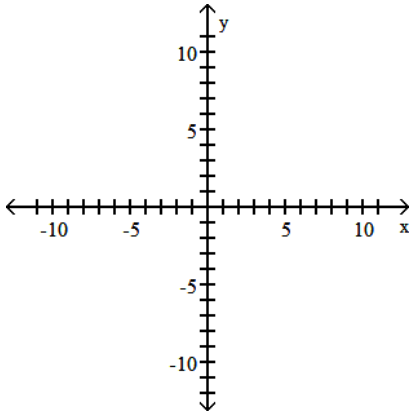
Explanation: A)
B)
C)
D)

Use the accompanying graph of y = f(x) to sketch the graph of the indicated equation.

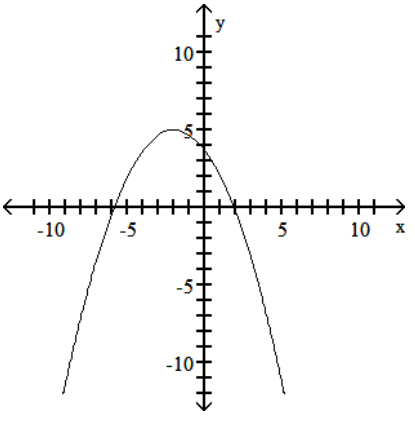
244) $y = -\frac{1}{3}f(x + 2) + 5$ 244) ____

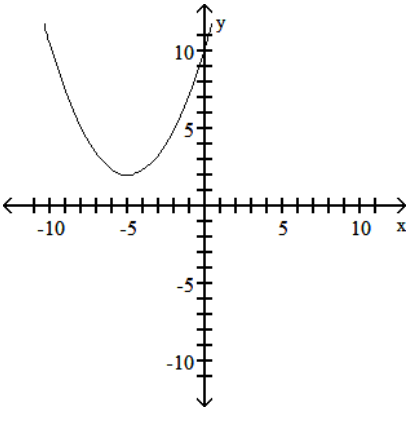



A)

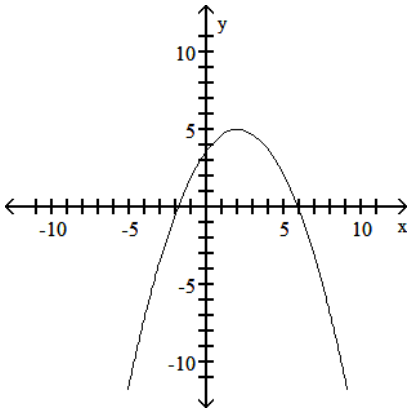



B)

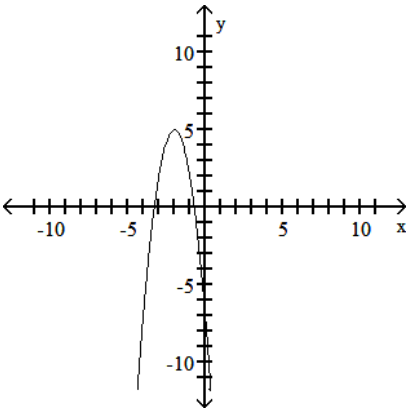


C)




D)




Answer: A

Explanation: A)

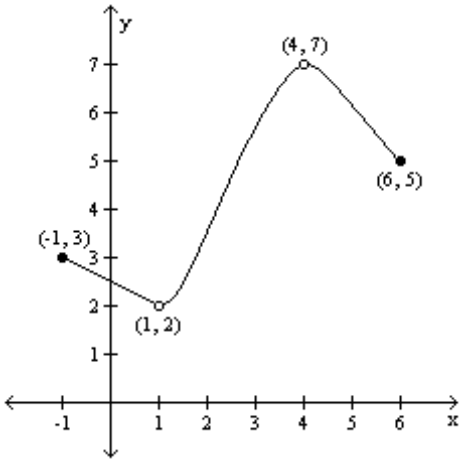
B)

C)

D)

For the graph of the function y = f(x), find the absolute maximum and the absolute minimum, if it exists.

245) 245) ____




A) Absolute maximum: f(4) = 7; Absolute minimum: none

B) Absolute maximum: f(4) = 7; Absolute minimum: f(1) = 2

C) Absolute maximum: none; Absolute minimum: none

D) Absolute maximum: none; Absolute minimum: f(1) = 2

Answer: C

Explanation: A)

B)

C)

D)

Write the equation of a sine function that has the given characteristics.

246) The graph of $y = |x|$, shifted 9 units to the left 246) ____

A) $y = |x| + 9$ B) $y = |x + 9|$ C) $y = |x| - 9$ D) $y = |x - 9|$

Answer: B

Explanation: A)

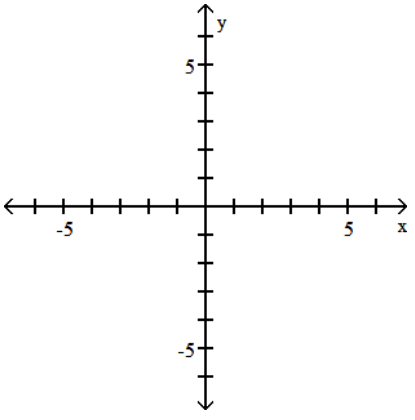
B)

C)

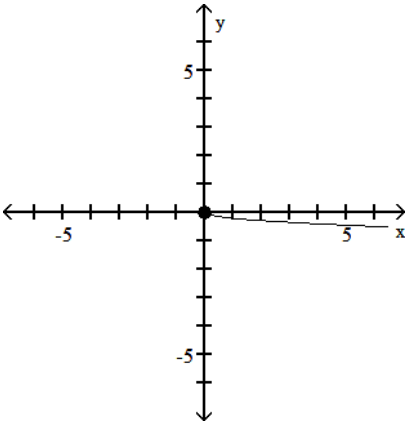
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

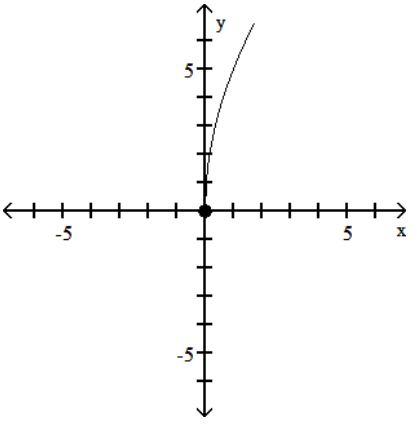
247) $f(x) = 5\sqrt{x}$ 247) ____



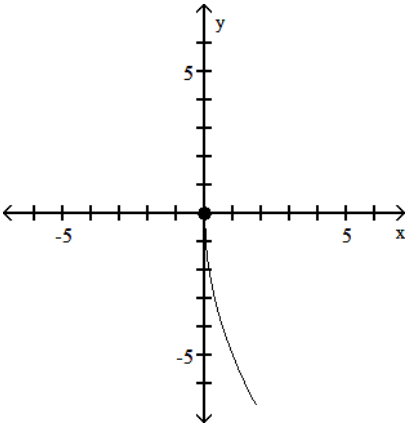

A)



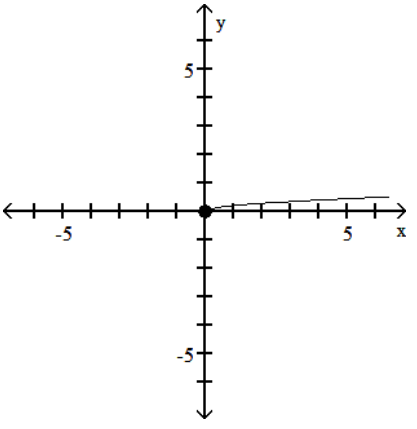

B)




C)




D)



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

Find the average rate of change for the function between the given values.

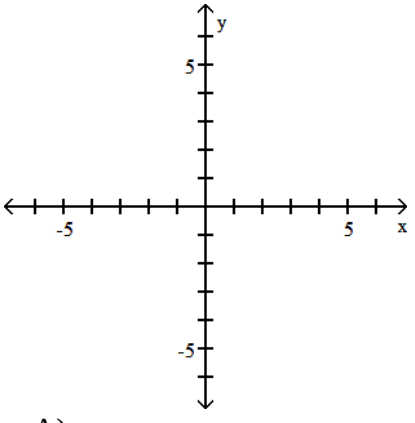
248) $f(x) = x^3 + x^2 - 8x - 7$; from 0 to 2 248) ____

A) $\frac{1}{2}$ B) $-\frac{1}{6}$ C) -28 D) -2

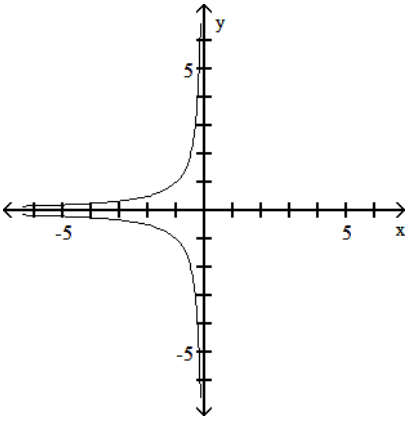
Answer: D
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

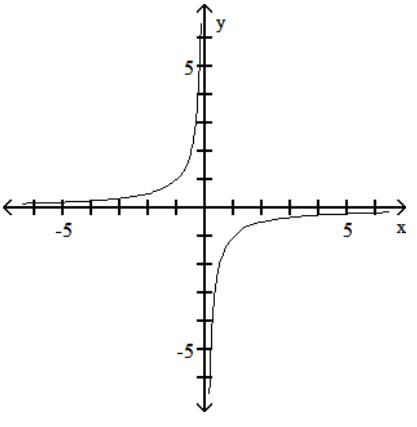
249) $f(x) = -\frac{1}{x}$ 249) ____



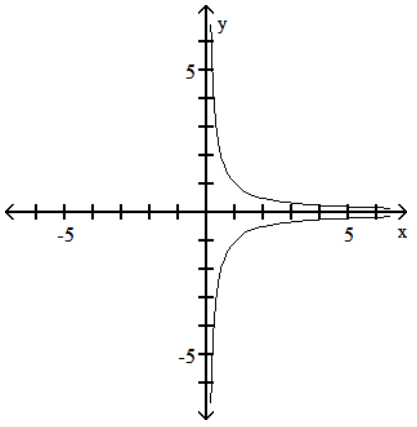

A)



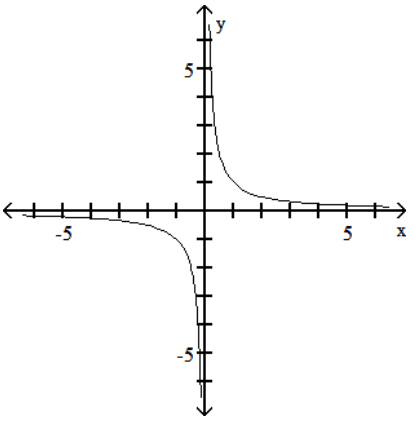

B)



C)




D)




Answer: B

Explanation: A)

B)

C)

D)

Solve the problem.

250) Suppose that P(x) represents the percentage of income spent on automobile insurance in year x and I(x) represents income in year x. Determine a function A that represents total automobile insurance expenditures in year x. 250) ____

A) $A(x) = \left(\frac{I}{P}\right)(x)$

B) $A(x) = (P + I)(x)$

C) $A(x) = (I - P)(x)$

D) $A(x) = (P \cdot I)(x)$

Answer: D

Explanation: A)

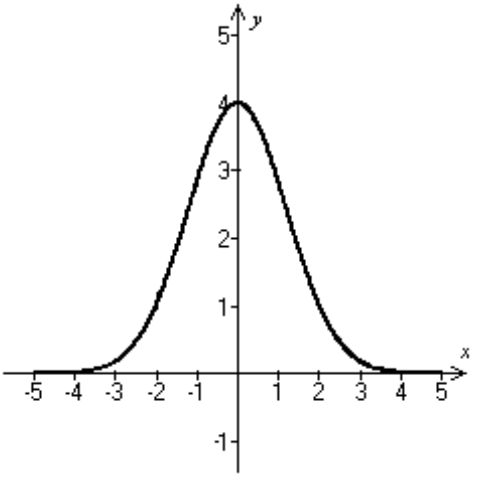
B)

C)

D)

Use the graph to find the intervals on which it is increasing, decreasing, or constant.

251) 251) ____




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

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

C) Increasing on $(-\infty, 0)$; decreasing on $(0, \infty)$

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

Answer: C

Explanation: A)
B)
C)
D)

Answer the question about the given function.

252) Given the function $f(x) = 3x^2 + 6x - 8$, if $x = -1$, what is $f(x)$? What point is on the graph of f? 252) ____

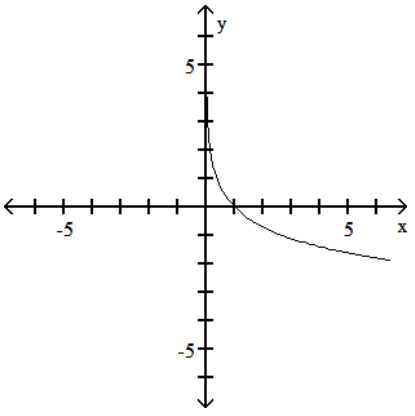
A) -11; (-1, -11) B) -11; (-11, -1) C) 1; (-1, 1) D) 1; (1, -1)

Answer: A

Explanation: A)
B)
C)
D)

Determine whether the graph is that of a function. If it is, use the graph to find its domain and range, the intercepts, if any, and any symmetry with respect to the x-axis, the y-axis, or the origin.

253) 253) ____




A) function
domain: all real numbers
range: {y|y > 0}
intercept: (1, 0)
symmetry: none

B) function
domain: {x|x > 0}
range: all real numbers
intercept: (0, 1)
symmetry: origin

C) function
domain: {x|x > 0}
range: all real numbers
intercept: (1, 0)
symmetry: none

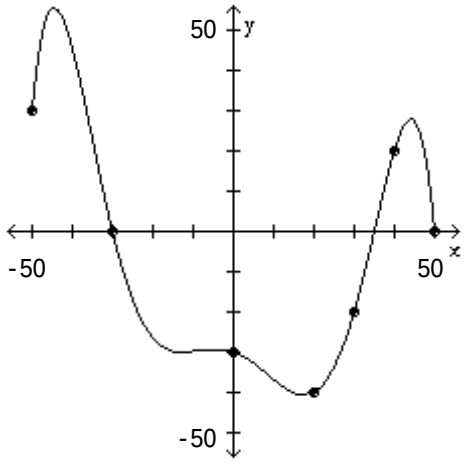
D) not a function

Answer: C

Explanation: A)
B)
C)
D)

The graph of a function f is given. Use the graph to answer the question.

254) Is f(40) positive or negative? 254) ____




A) positive B) negative

Answer: A

Explanation: A)
B)

Find an equation of the secant line containing (1, f(1)) and (2, f(2)).

255) $f(x) = x^3 + x$ 255) ____

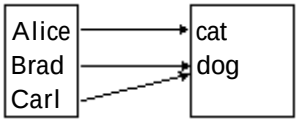
A) $y = 8x - 6$ B) $y = -8x - 6$ C) $y = 8x + 6$ D) $y = -8x + 6$

Answer: A

Explanation: A)
B)
C)
D)

Determine whether the relation represents a function. If it is a function, state the domain and range.

256) 256) ____




A) function
domain: {Alice, Brad, Carl}
range: {cat, dog}

B) function
domain: {cat, dog}
range: {Alice, Brad, Carl}

C) not a function

Answer: A

Explanation: A)
B)
C)

Solve the problem.

257) Suppose that the function y = f(x) is increasing on the interval (2, 8). Over what interval is the graph of y = f(x - 9) increasing? 257) ____

A) (18 , 72) B) (-7, -1) C) (11, 17) D) (2, 8)

Answer: C

Explanation: A)
B)
C)
D)

258) Bob wants to fence in a rectangular garden in his yard. He has 66 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. 258) ____

A) $A(x) = 33x - x^2$ B) $A(x) = 35x^2 - x$

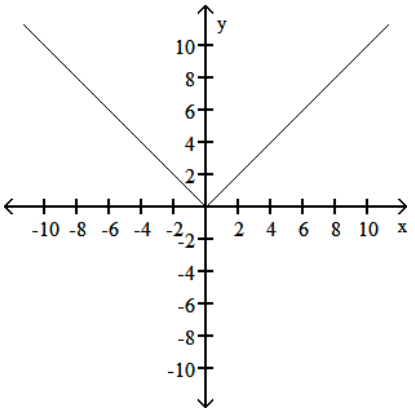
C) $A(x) = 34x - x^2$ D) $A(x) = 32x - x^2$

Answer: A

Explanation: A)
B)
C)
D)

The graph of a function is given. Decide whether it is even, odd, or neither.

259) 259) ____




A) even B) odd C) neither

Answer: A

Explanation: A)
B)
C)

Find the average rate of change for the function between the given values.

260) $f(x) = \frac{3}{x + 2}$; from 1 to 4 260) ____

A) $\frac{1}{2}$ B) -28 C) -2 D) $-\frac{1}{6}$

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

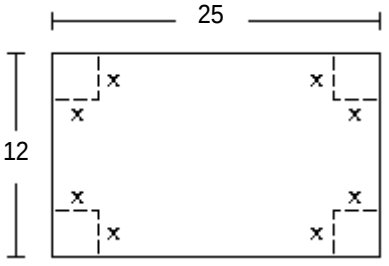
261) Given $f(x) = \frac{1}{x}$ and $(\frac{f}{g})(x) = \frac{x + 6}{x^2 - 4x}$, find the function g. 261) ____

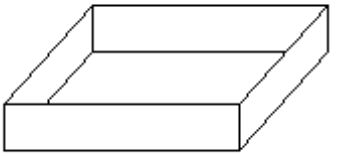
A) $g(x) = \frac{x + 4}{x - 6}$ B) $g(x) = \frac{x - 6}{x + 4}$ C) $g(x) = \frac{x + 6}{x - 4}$ D) $g(x) = \frac{x - 4}{x + 6}$

Answer: D

Explanation: A)
B)
C)
D)

262) A box with an open top is to be constructed from a rectangular piece of cardboard with dimensions 12 inches by 25 inches by cutting out equal squares of side x at each corner and then folding up the sides as in the figure. Express the volume V of the box as a function of x. 262) ____



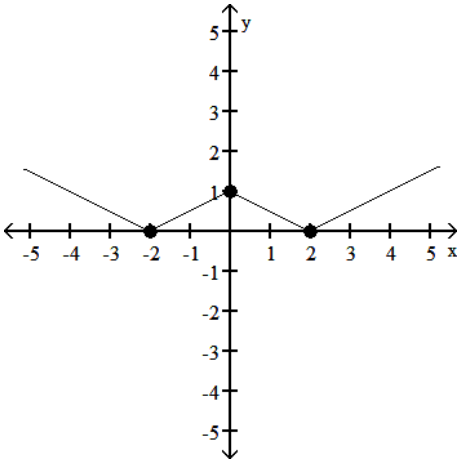
A) V(x) = (12 - 2x)(25 - 2x)
B) V(x) = x(12 - x)(25 - x)
C) V(x) = (12 - x)(25 - x)
D) V(x) = x(12 - 2x)(25 - 2x)

Answer: D

Explanation: A)
B)
C)
D)

The graph of a function f is given. Use the graph to answer the question.

263) Find the numbers, if any, at which f has a local minimum. What are the local minima? 263) ____



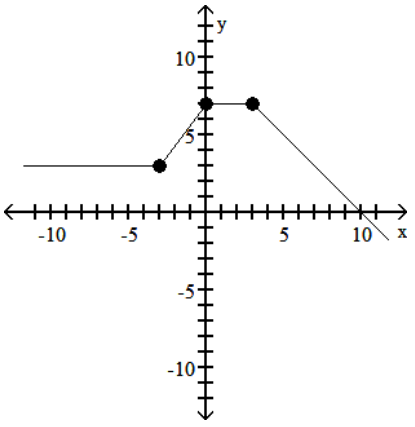

A) f has a local minimum at x = -2; the local minimum is 0
B) f has a local minimum at x = 0; the local minimum is 1
C) f has a local minimum at x = -2 and 2; the local minimum is 0
D) f has no local minimum

Answer: C

Explanation: A)
B)
C)
D)

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

264) (0, 3) 264) ____



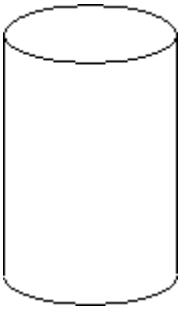

A) increasing B) constant C) decreasing

Answer: B

Explanation: A)
B)
C)

Solve the problem.

265) A steel can in the shape of a right circular cylinder must be designed to hold 500 cubic centimeters of juice (see figure). It can be shown that the total surface area of the can (including the ends) is given by $S(r) = 2\pi r^2 + \frac{1000}{r}$, where r is the radius of the can in centimeters. Using the TABLE feature of a graphing utility, find the radius that minimizes the surface area (and thus the cost) of the can. Round to the nearest tenth of a centimeter. 265) ____



A) 4.3 cm B) 5.5 cm C) 0 cm D) 3.5 cm

Answer: A

Explanation: A)
B)
C)
D)

Answer the question about the given function.

266) Given the function $f(x) = \frac{x^2 + 2}{x - 8}$, list the x-intercepts, if any, of the graph of f. 266) ____

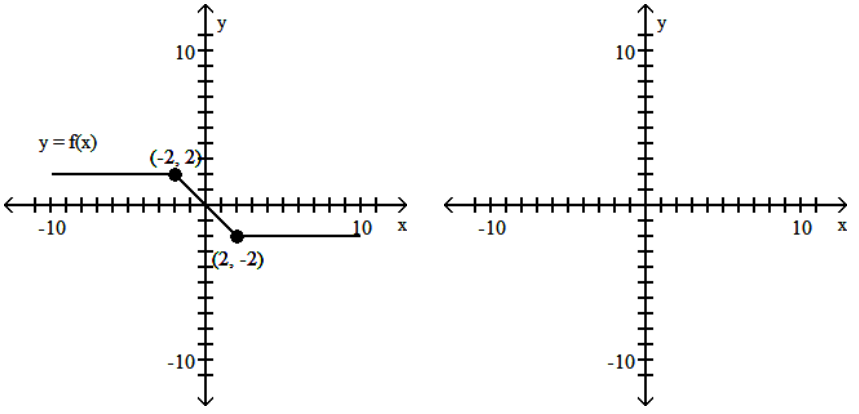
A) $(-\sqrt{2}, 0)$ B) (2, 0), (-2, 0) C) (8, 0) D) none

Answer: D

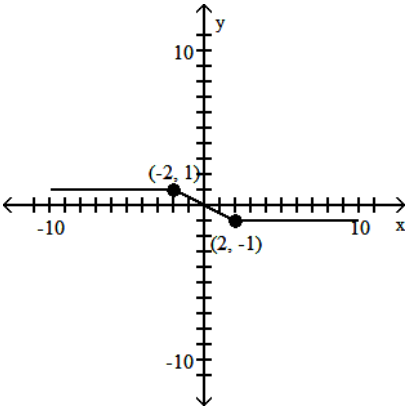
Explanation: A)
B)
C)
D)

Use the accompanying graph of y = f(x) to sketch the graph of the indicated equation.

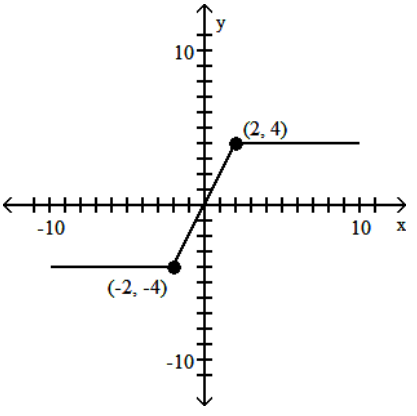
267) y = 2f(x) 267) ____



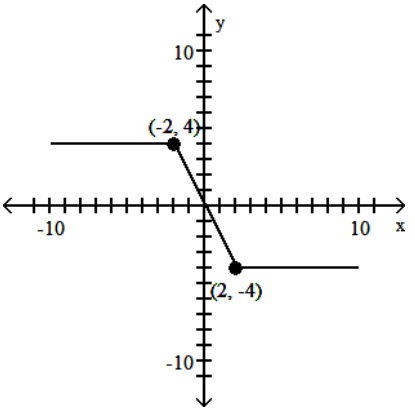

A)



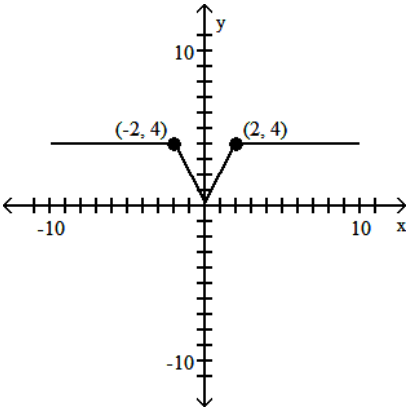

B)




C)




D)



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

Find the domain of the function.

268) $f(x) = \begin{cases} 1 & \text{if } -6 \le x < -3 \\ |x| & \text{if } -3 \le x < 6 \\ \sqrt{x} & \text{if } 6 \le x \le 18 \end{cases}$ 268) ____

A) $\{x \mid 6 \le x \le 18\}$ B) $\{x \mid x \ge -6\}$
C) $\{x \mid -6 \le x < 6 \text{ or } 6 < x \le 18\}$ D) $\{x \mid -6 \le x \le 18\}$

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

Solve the problem.

269) The function $f(t) = -0.14t^2 + 0.5t + 31.8$ models the U.S. population in millions, ages 65 and older, where t represents years after 1990. The function $g(t) = 0.54t^2 + 12.3t + 106.8$ models the total yearly cost of Medicare in billions of dollars, where t represents years after 1990. What does the function $\frac{g}{f}$ represent? Find $\left(\frac{g}{f}\right)(5)$. 269) ____

A) Cost per person in thousands of dollars. \$5.90 thousand
B) Cost per person in thousands of dollars. \$0.17 thousand
C) Cost per person in thousands of dollars. \$12.50 thousand
D) Cost per person in thousands of dollars. \$0.21 thousand

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

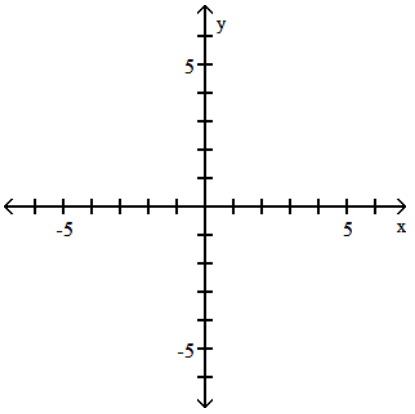
270) If $f(x) = \frac{x - 5A}{10x + 2}$ and $f(10) = -5$, what is the value of A? 270) ____

A) A = -104 B) A = 104 C) A = -100 D) A = 100

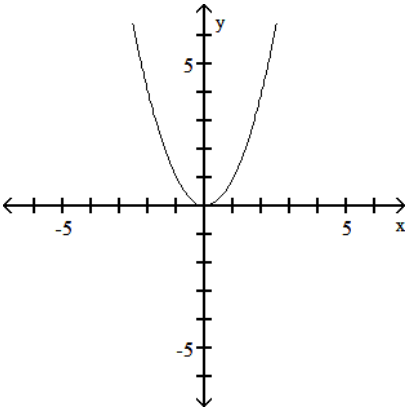
Answer: B
Explanation: A)
B)
C)
D)

Graph the function.

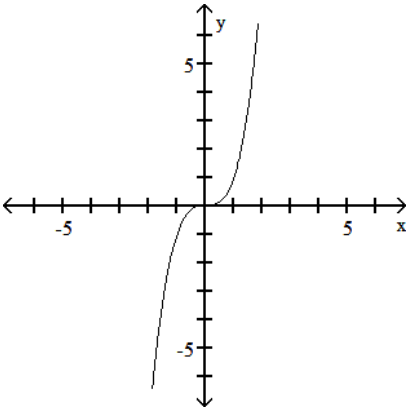
271) $f(x) = x^3$ 271) ____



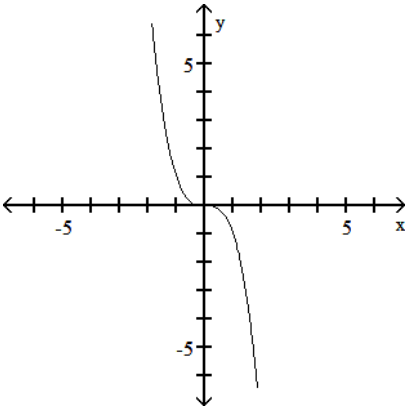

A)



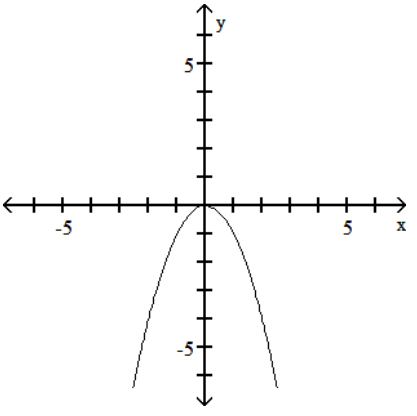

B)




C)




D)




Answer: B

Explanation: A)

B)

C)

D)

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

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

272) $f(x) = \sqrt{x + 48}$ 272) ____

A) $\frac{\sqrt{x + 48} + 7}{x - 1}$ B) $\frac{\sqrt{x + 48} + 7}{x + 1}$ C) $\frac{\sqrt{x + 48} - 7}{x + 1}$ D) $\frac{\sqrt{x + 48} - 7}{x - 1}$

Answer: D

Explanation: A)

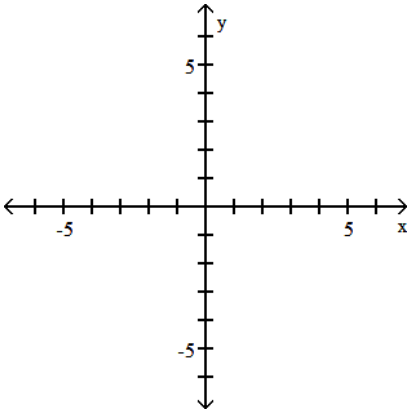
B)

C)

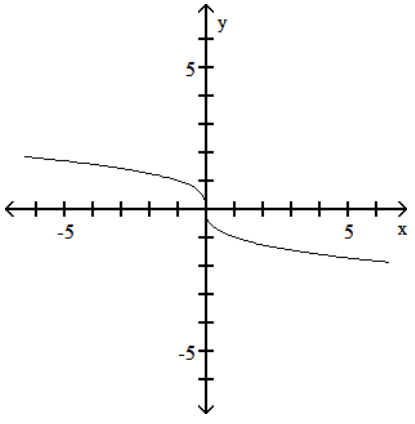
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

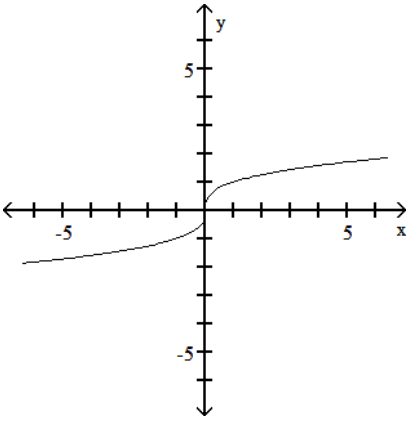
273) $f(x) = -x^3$ 273) ____



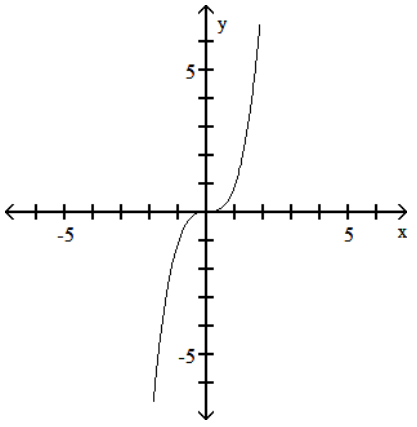

A)



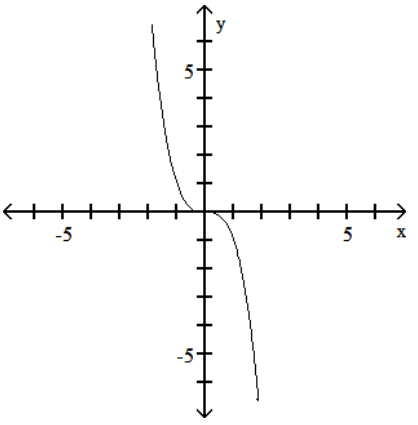

B)



C)




D)




Answer: D

Explanation: A)

B)

C)

D)

Find the value for the function.

274) Find -f(x) when f(x) = |x| - 1. 274) ____

A) |-x| + 1 B) -|x| - 1 C) -|x| + 1 D) |-x| - 1

Answer: C

Explanation: A)

B)

C)

D)

Suppose the point (2, 4) is on the graph of y = f(x). Find a point on the graph of the given function.

275) f(x) + 4 275) ____

A) (2, -4) B) (-2, 4) C) (6, 4) D) (2, 8)

Answer: D

Explanation: A)

B)

C)

D)

Answer the question about the given function.

276) Given the function $f(x) = -5x^2 + 10x - 8$, is the point (2, -18) on the graph of f? 276) ____

A) Yes B) No

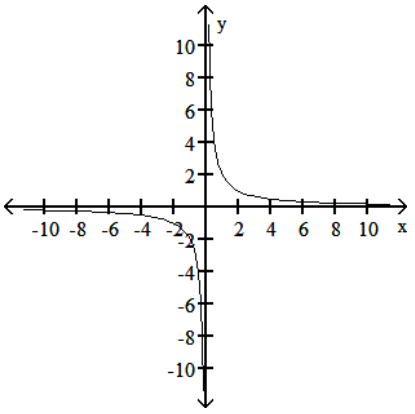
Answer: B

Explanation: A)

B)

The graph of a function is given. Decide whether it is even, odd, or neither.

277) 277) ____



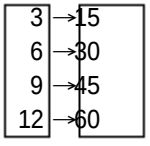

A) even B) odd C) neither

Answer: B

Explanation: A)
B)
C)

Determine whether the relation represents a function. If it is a function, state the domain and range.

278) 278) ____




A) function
domain:{15, 30, 45, 60}
range: {3, 6, 9, 12}

B) function
domain: {3, 6, 9, 12}
range: {15, 30, 45, 60}

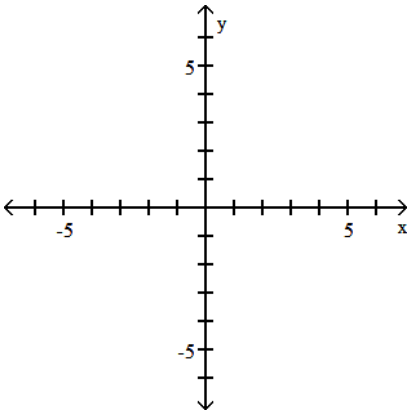
C) not a function

Answer: B

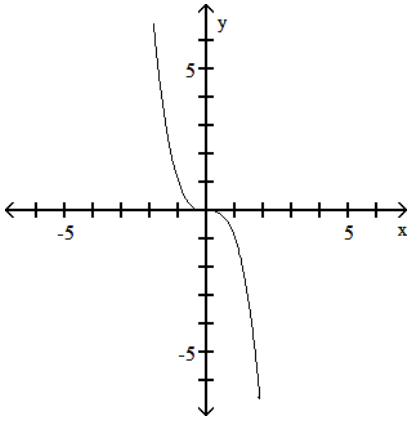
Explanation: A)
B)
C)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

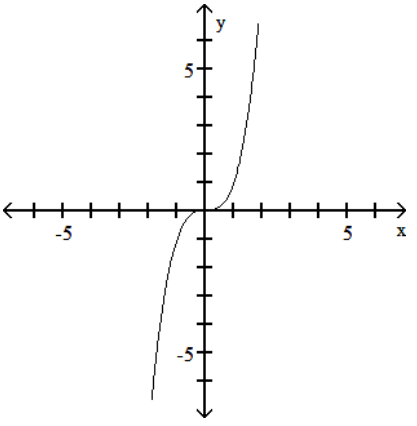
279) $f(x) = (-x)^3$ 279) ____



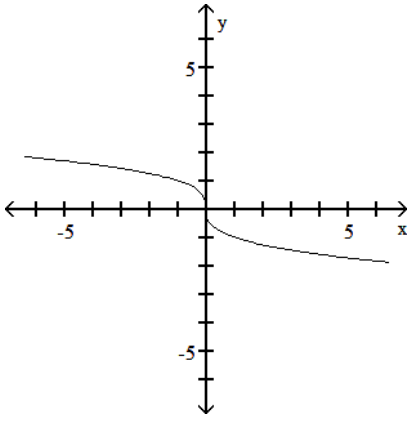

A)



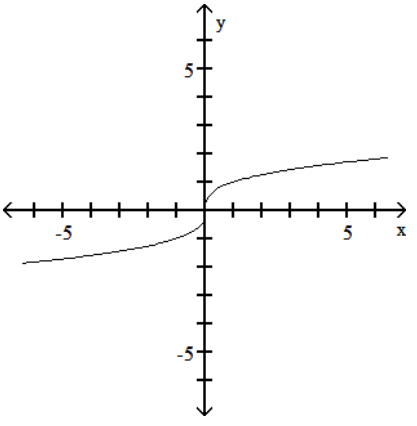

B)




C)




D)




Answer: A

Explanation: A)

B)

C)

D)

Determine algebraically whether the function is even, odd, or neither.

280) $f(x) = 5x^3$ 280) ____

A) even B) odd C) neither

Answer: B

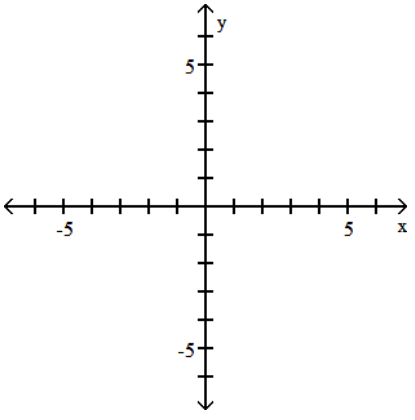
Explanation: A)

B)

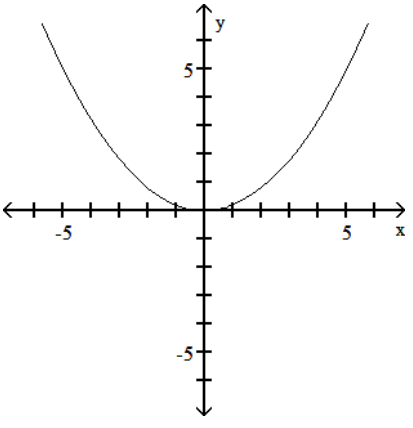
C)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

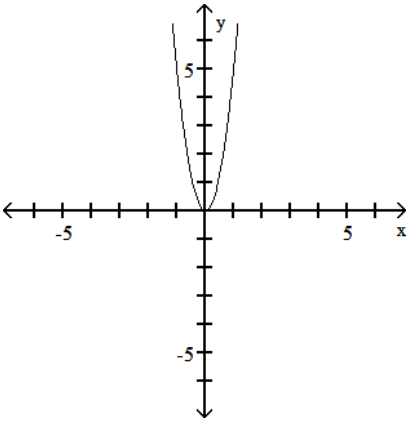
281) $f(x) = \frac{1}{5}x^2$ 281) ____



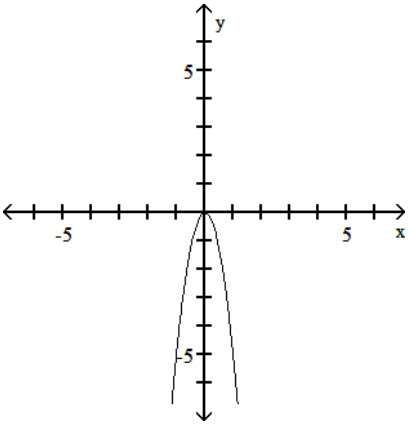

A)




B)




C)

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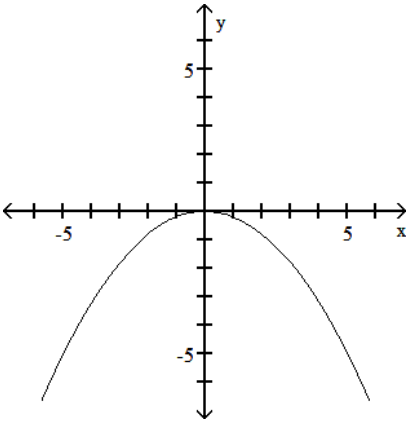


Answer: A

Explanation: A)

B)

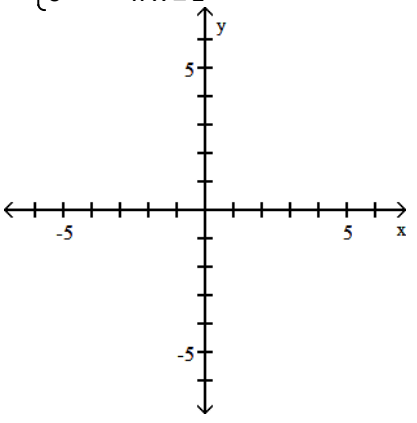
C)

D)

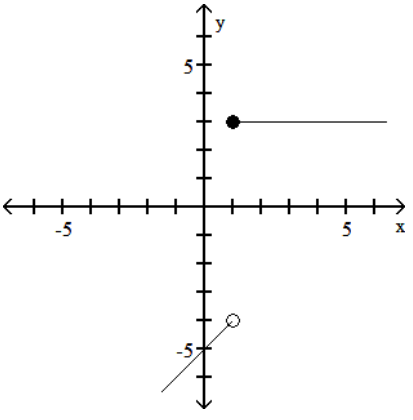
Graph the function.

282) 282) ____

$f(x) = \begin{cases} x - 5 & \text{if } x < 1 \\ 3 & \text{if } x \geq 1 \end{cases}$




A)

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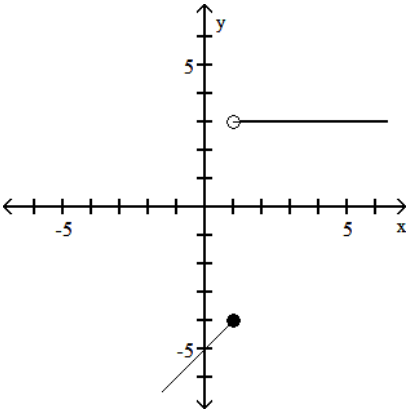
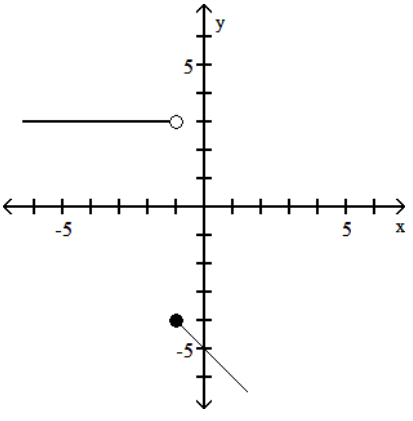
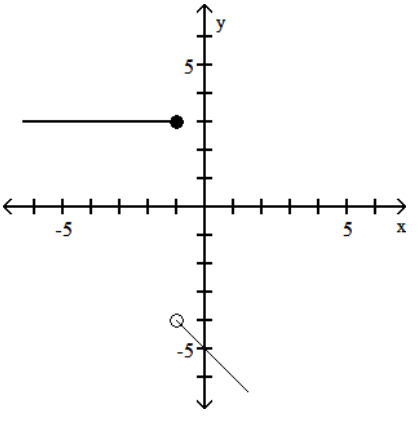



C)




D)




Answer: A

Explanation: A)

B)

B)
C)
D)

Solve the problem.

283) The function $P(d) = 1 + \frac{d}{33}$ gives the pressure, in atmospheres (atm), at a depth d feet in the sea. 283) ____

Find the pressure at 50 feet.

A) $\frac{17}{11}$ atm B) $\frac{83}{33}$ atm C) $\frac{50}{33}$ atm D) $\frac{17}{33}$ atm

Answer: B

Explanation: A)
B)
C)
D)

Find and simplify the difference quotient of f, $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$, for the function.

284) $f(x) = \frac{1}{5x}$ 284) ____

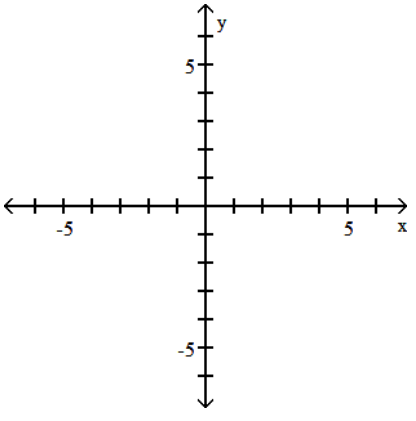
A) $\frac{1}{5x}$ B) $\frac{-1}{x(x+h)}$ C) $\frac{-1}{5x(x+h)}$ D) 0

Answer: C

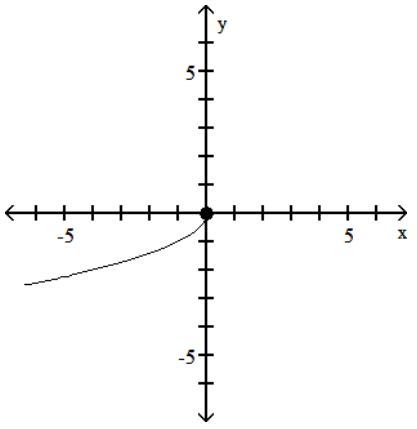
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

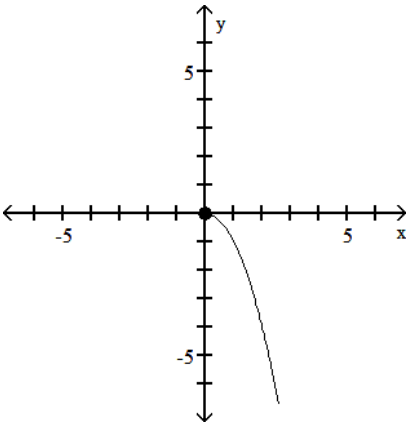
285) $f(x) = \sqrt{-x}$ 285) ____



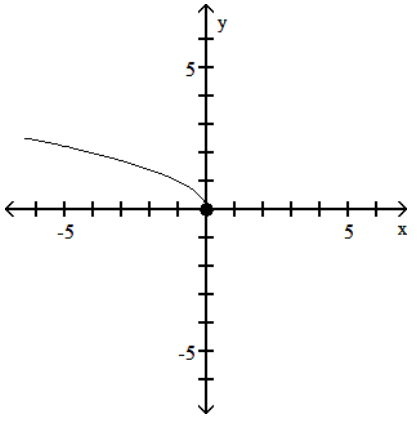
A)



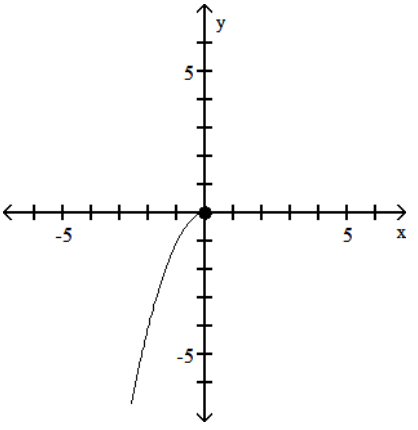

B)




C)




D)




Answer: C

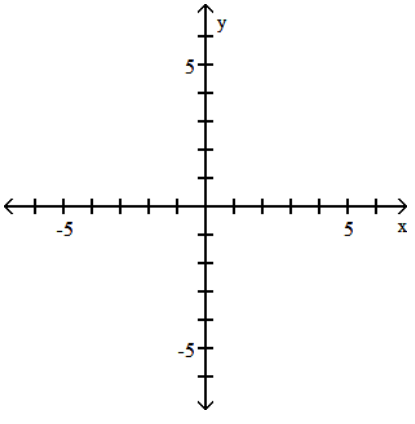
Explanation: A)

B)

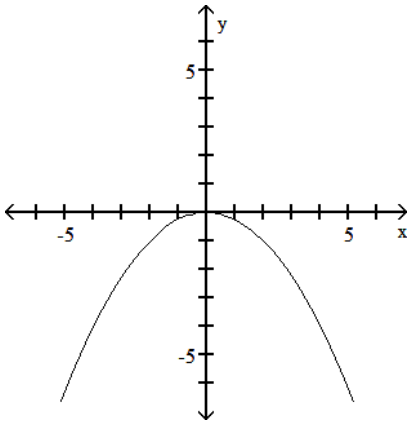
C)

D)

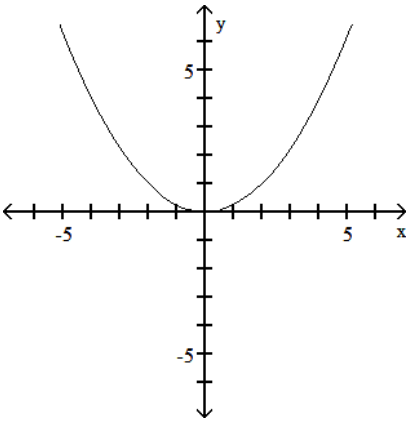
286) $f(x) = 4x^2$ 286) ____



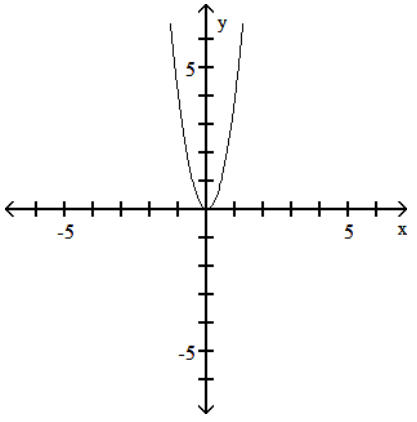
A)



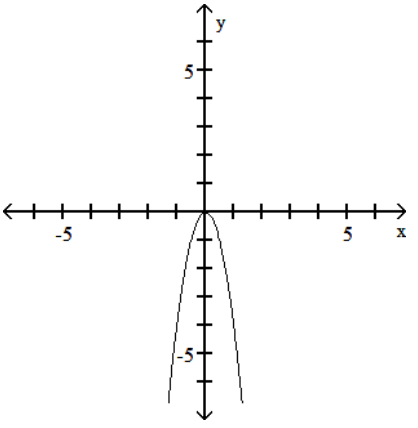

B)




C)




D)




Answer: C

Explanation: A)

B)

C)

D)

Find the value for the function.

287) Find f(-x) when $f(x) = 2x^2 - 2x - 4$. 287) ____

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

Answer: D

Explanation: A)

B)

C)

D)

Solve the problem.

288) Along with incomes, people's charitable contributions have steadily increased over the past few years. The table below shows the average deduction for charitable contributions reported on individual income tax returns for the period 1993 to 1998. Find the average rate of change between 1995 and 1997. 288) ____

| Year | Charitable Contributions |
|---|---|
| 1993 | $1780 |
| 1994 | $2380 |
| 1995 | $2480 |
| 1996 | $2850 |
| 1997 | $3040 |
| 1998 | $3190 |

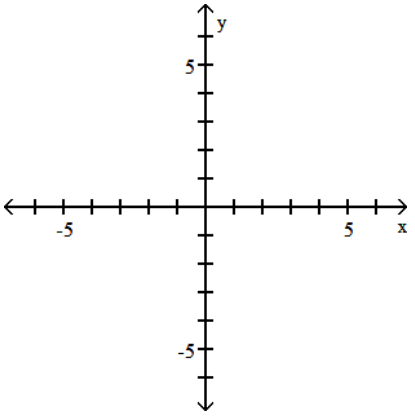
A) $560 per year B) $330 per year C) $280 per year D) $355 per year

Answer: C

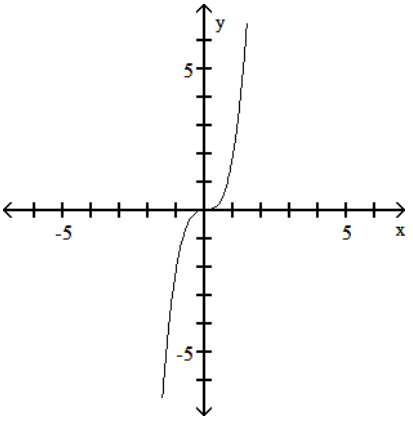
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

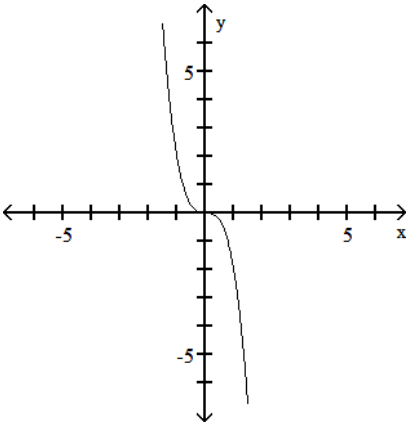
289) $f(x) = 2x^3$ 289) ____



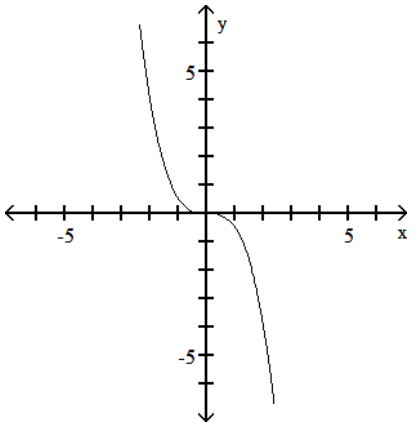

A)



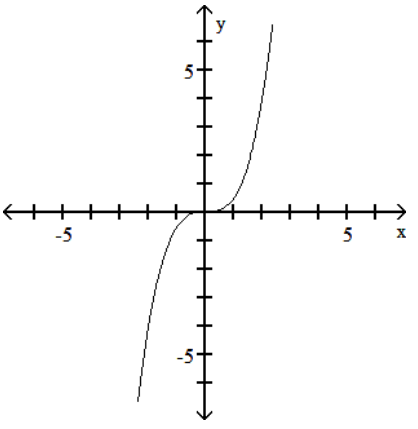

B)



C)




D)




Answer: A

Explanation: A)

B)

C)

D)

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

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

290) $f(x) = -2x$ 290) ____

A) $\frac{-2}{x - 1}$ B) $-3$ C) $-2$ D) $0$

Answer: C

Explanation: A)

B)

C)

D)

Find the average rate of change for the function between the given values.

291) $f(x) = x^2 + 6x$; from 5 to 9 291) ____

A) 15 B) 20 C) $\frac{135}{4}$ D) $\frac{80}{9}$

Answer: B

Explanation: A)

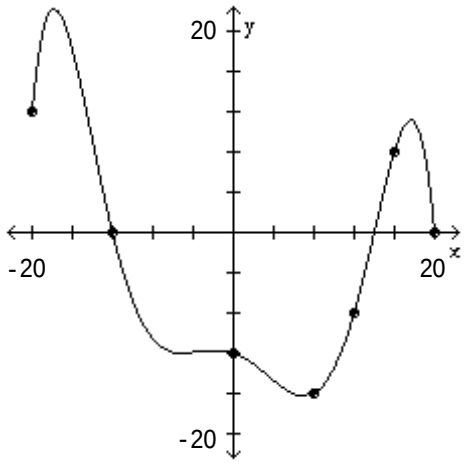
B)

C)

D)

The graph of a function f is given. Use the graph to answer the question.

292) What is the domain of f? 292) ____




A) all real numbers
B) $\{x \mid x \geq 0\}$
C) $\{x \mid -20 \leq x \leq 20\}$
D) $\{x \mid -16 \leq x \leq 22\}$

Answer: C

Explanation: A)
B)
C)
D)

Find the value for the function.

293) Find $f(-1)$ when $f(x) = \frac{x^2 - 8}{x + 2}$. 293) ____

A) 1
B) 9
C) - 7
D) 3

Answer: C

Explanation: A)
B)
C)
D)

For the given functions f and g, find the requested function and state its domain.

294) $f(x) = 3x - 8$; $g(x) = 7x + 4$ 294) ____

Find $f \cdot g$.

A) $(f \cdot g)(x) = 21x^2 - 44x - 32$; all real numbers

B) $(f \cdot g)(x) = 21x^2 - 52x - 32$; $\{x | x \neq -32\}$

C) $(f \cdot g)(x) = 21x^2 - 32$; $\{x | x \neq -32\}$

D) $(f \cdot g)(x) = 10x^2 - 44x - 4$; all real numbers

Answer: A

Explanation: A)

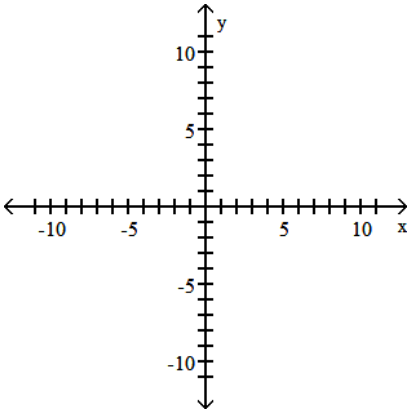
B)

C)

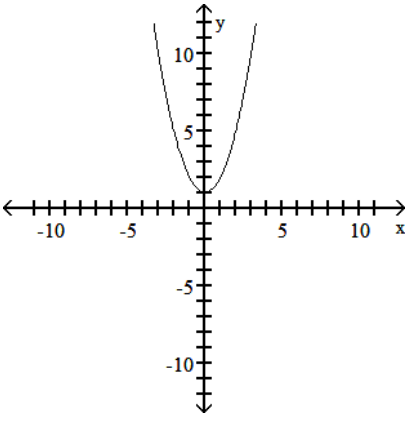
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

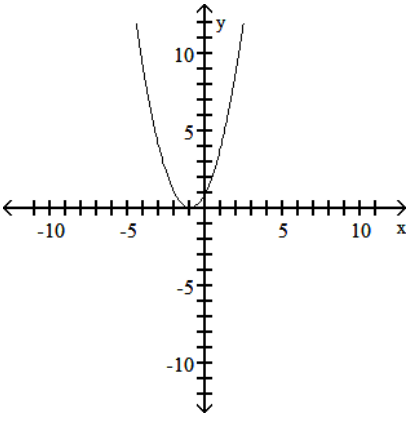
295) $f(x) = x^2 - 1$ 295) ____



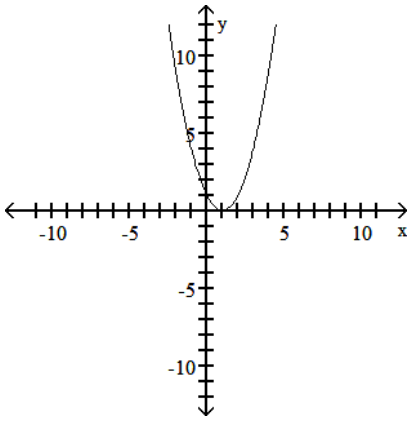

A)



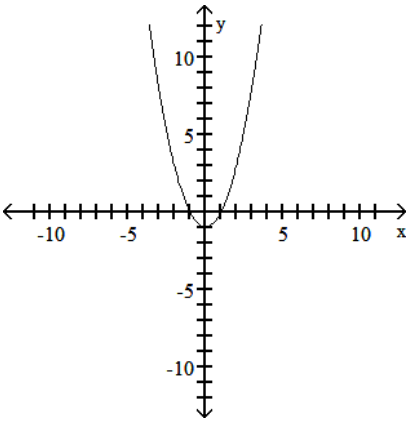

B)



C)




D)




Answer: D

Explanation: A)

B)

C)

D)

Find the domain of the function.

296) $f(x) = 9x + 1$ 296) ____

A) $\{x \mid x > 0\}$

B) $\{x \mid x \neq 0\}$

C) $\{x \mid x \geq -1\}$

D) all real numbers

Answer: D

Explanation: A)

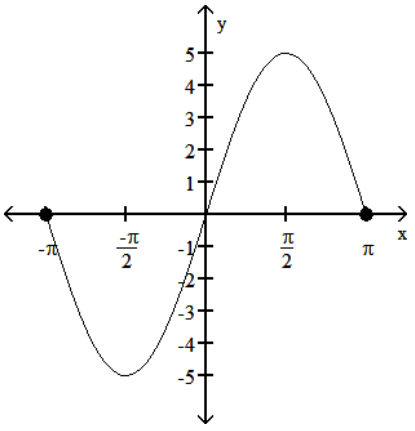
B)

C)

D)

The graph of a function is given. Decide whether it is even, odd, or neither.

297) 297) ____




A) even B) odd C) neither

Answer: B

Explanation: A)
B)
C)

Determine algebraically whether the function is even, odd, or neither.

298) $f(x) = \sqrt[3]{x}$ 298) ____

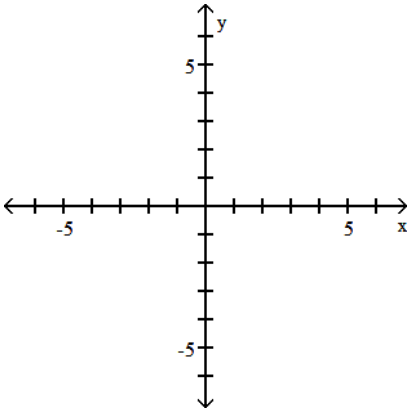
A) even B) odd C) neither

Answer: B

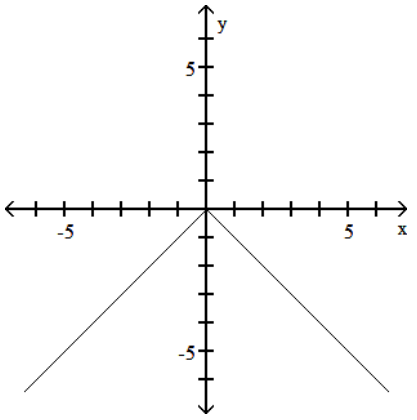
Explanation: A)
B)
C)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

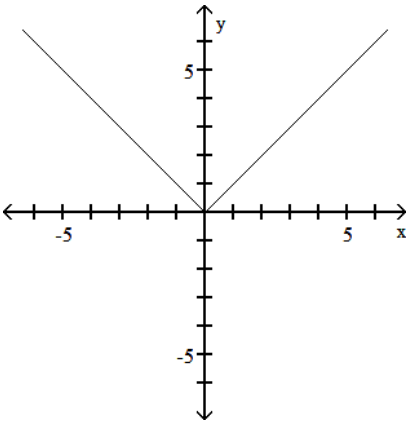
299) $f(x) = -|x|$ 299) ____



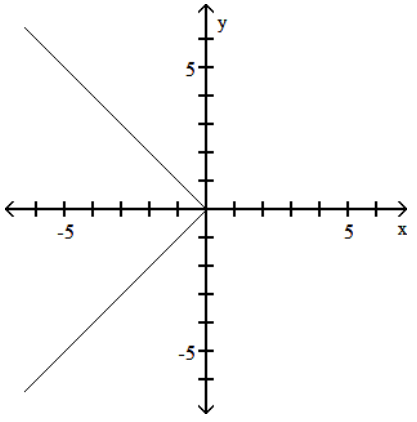
A)



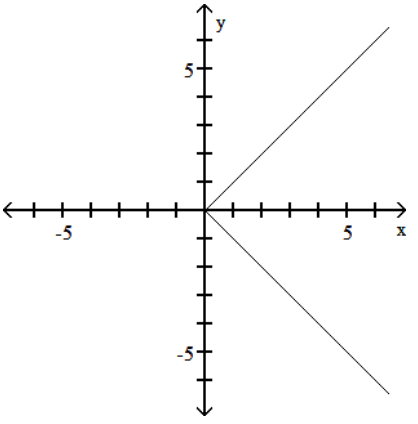

B)




C)




D)




Answer: A

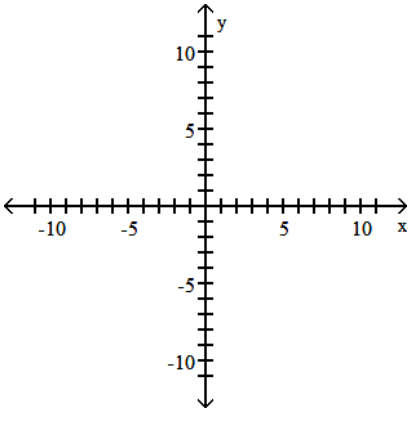
Explanation: A)

B)

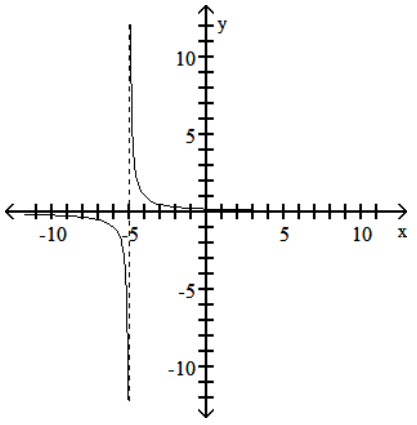
C)

D)

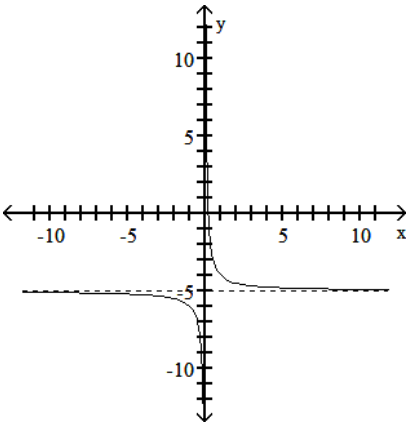
300) $f(x) = \frac{1}{x - 5}$ 300) ____



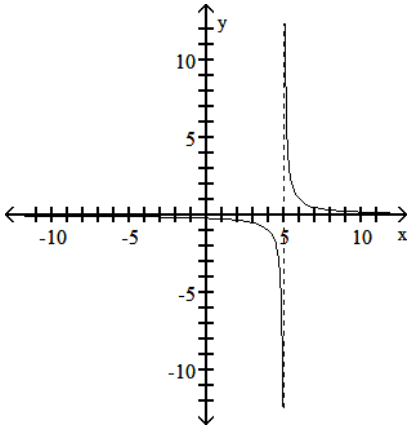
A)



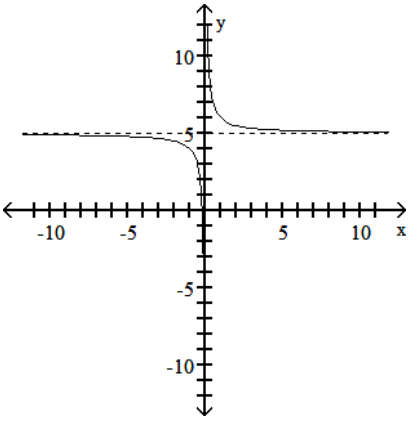

B)




C)




D)




Answer: C

Explanation: A)

B)

C)

D)

Determine whether the relation represents a function. If it is a function, state the domain and range.

301) $\{(3.11, 5.31), (3.111, -5.3), (\frac{5}{3}, 0), (1.67, -3)\}$ 301) ____

A) function

domain: $\{3.11, 3.111, \frac{5}{3}, 1.67\}$

range: $\{5.31, -5.3, 0, -3\}$

B) function

domain: $\{5.31, -5.3, 0, -3\}$

range: $\{3.11, 3.111, \frac{5}{3}, 1.67\}$

C) not a function

Answer: A

Explanation: A)

B)

C)

Determine whether the equation defines y as a function of x.

302) $y = \frac{1}{x}$ 302) ____

A) function B) not a function

Answer: A

Explanation: A)

B)

For the given functions f and g, find the requested function and state its domain.

303) $f(x) = \frac{7x - 3}{2x - 5}$; $g(x) = \frac{5x}{2x - 5}$ 303) ____

Find f - g.

A) $(f - g)(x) = \frac{2x - 3}{2x - 5}$; $\{x | x \neq 0\}$

B) $(f - g)(x) = \frac{2x - 3}{2x - 5}$; $\left\{x | x \neq \frac{5}{2}, x \neq \frac{3}{2}\right\}$

C) $(f - g)(x) = \frac{12x + 3}{2x - 5}$; $\left\{x | x \neq \frac{5}{2}\right\}$

D) $(f - g)(x) = \frac{2x - 3}{2x - 5}$; $\left\{x | x \neq \frac{5}{2}\right\}$

Answer: D

Explanation: A)

B)

C)

D)

Find the value for the function.

304) Find f(2x) when $f(x) = \sqrt{7x^2 - 5x}$. 304) ____

A) $\sqrt{14x^2 - 20x}$ B) $2\sqrt{7x^2 - 5x}$ C) $\sqrt{28x^2 - 10x}$ D) $\sqrt{14x^2 - 10x}$

Answer: C

Explanation: A)

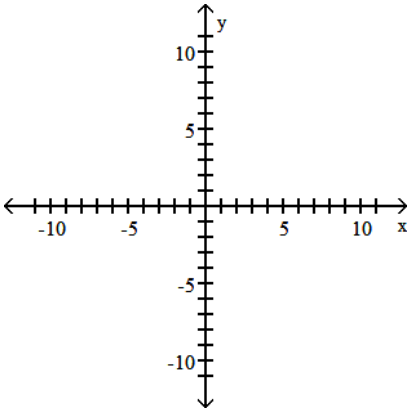
B)

C)

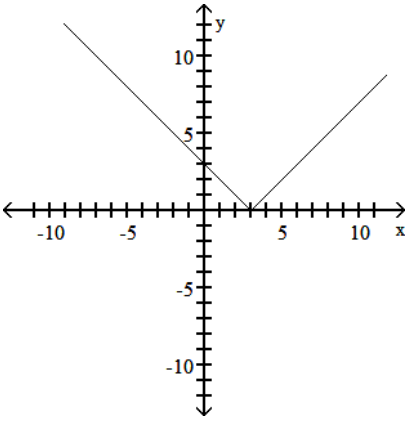
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

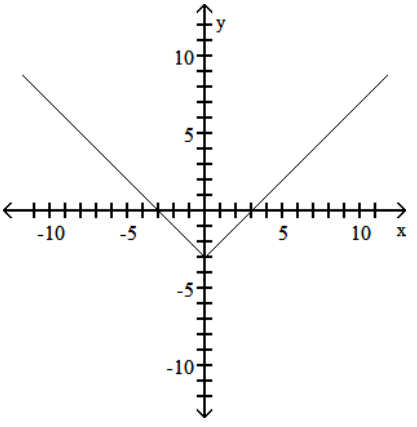
305) f(x) = |x| - 3 305) ____



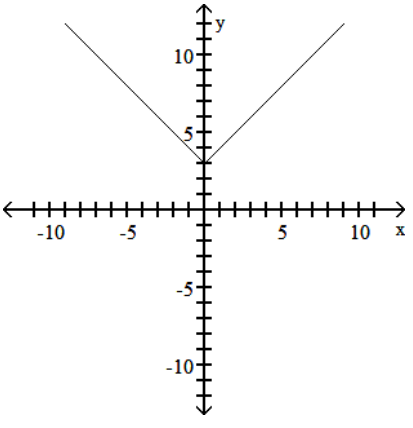

A)



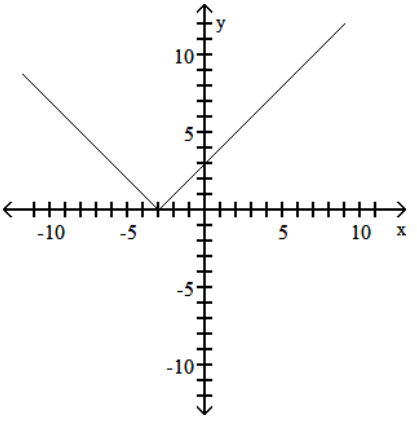

B)




C)




D)



Answer: B

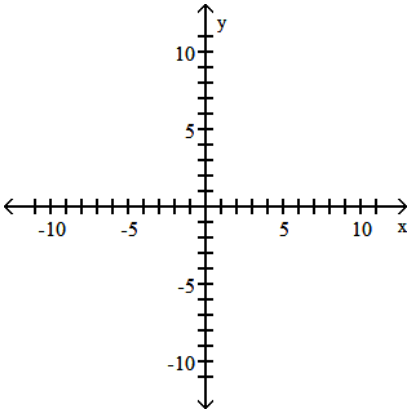
Explanation: A)

B)

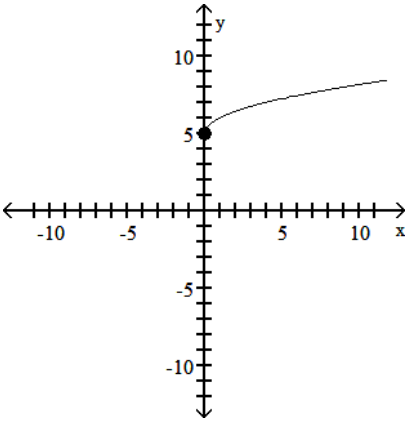
C)

D)

306) $f(x) = \sqrt{x + 5}$ 306) ____




A)

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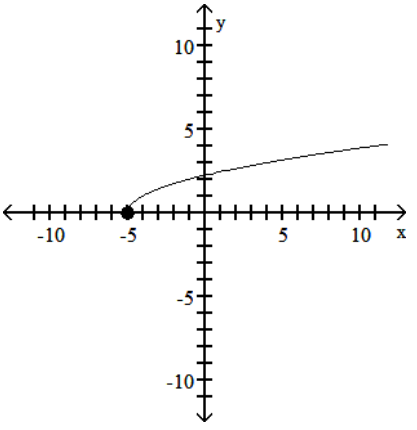
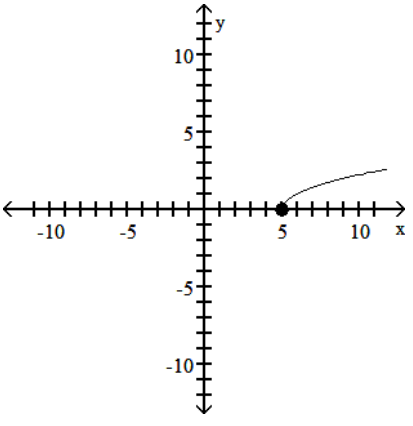
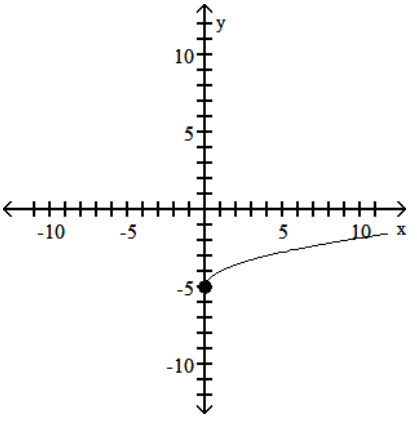



C)




D)




Answer: B

Explanation: A)

B)

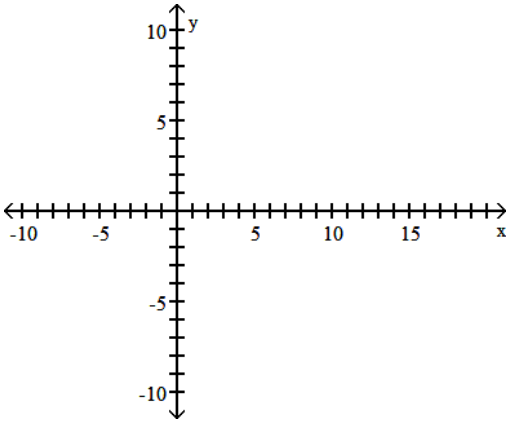
C)

D)

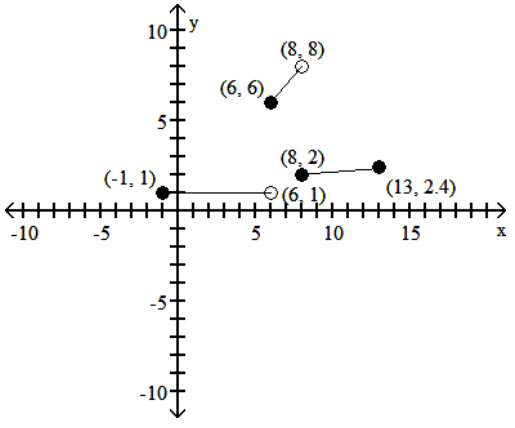
Graph the function.

307) 307) ____

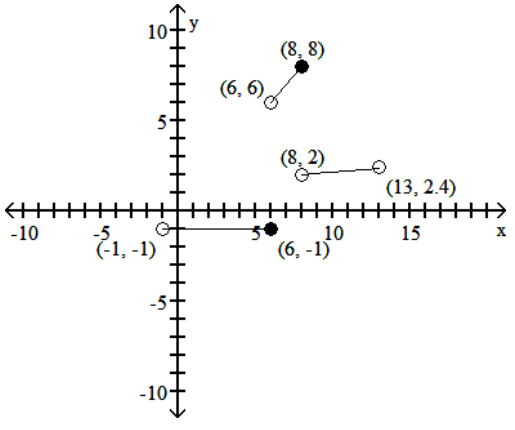
$$f(x) = \begin{cases} 1 & \text{if } -1 \le x < 6 \\ |x| & \text{if } 6 \le x < 8 \\ \sqrt[3]{x} & \text{if } 8 \le x \le 13 \end{cases}$$



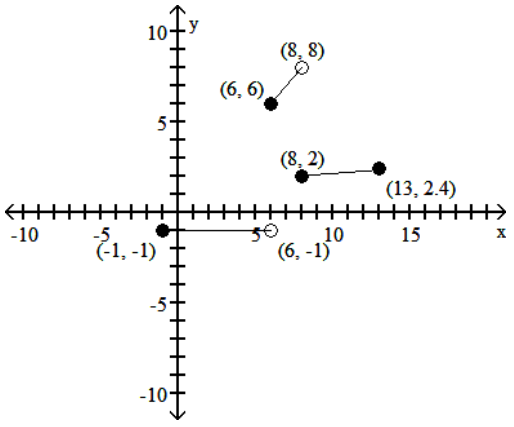

A)



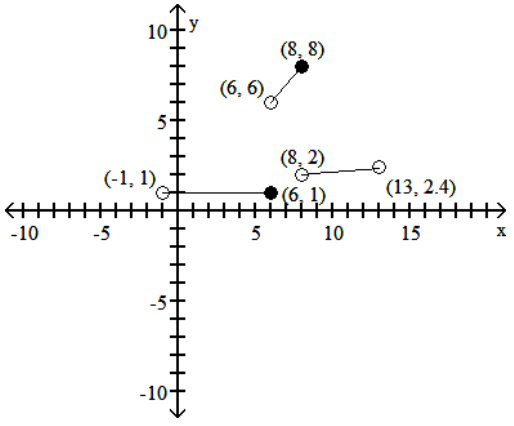

B)



C)




D)




Answer: A

Explanation: A)

B)

C)

D)

Solve the problem.

308) A rocket is shot straight up in the air from the ground at a rate of 42 feet per second. The rocket is tracked by a range finder that is 442 feet from the launch pad. Let d represent the distance from the rocket to the range finder and t represent the time, in seconds, since "blastoff". Express d as a function of t. 308) ____

A) $d(t) = \sqrt{442^2 + (42t)^2}$

B) $d(t) = 442^2 + (42t)^2$

C) $d(t) = 442 + 42t^2$

D) $d(t) = \sqrt{42^2 + (442t)^2}$

Answer: A

Explanation: A)

B)

C)

D)

Determine algebraically whether the function is even, odd, or neither.

309) $f(x) = \frac{x}{x^2 + 2}$ 309) ____

A) even B) odd C) neither

Answer: B

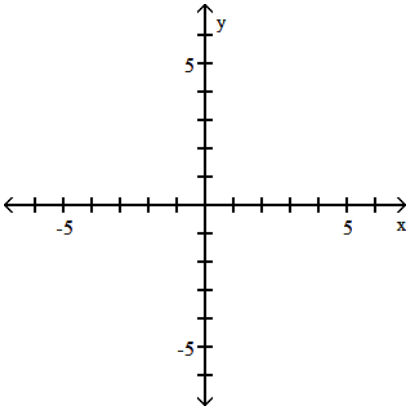
Explanation: A)

B)

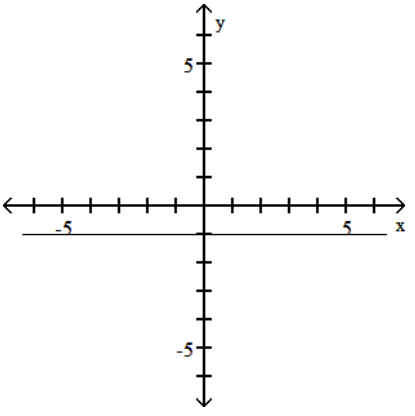
C)

Graph the function.

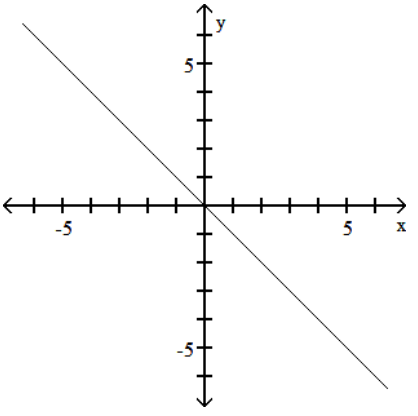
310) $f(x) = -1$ 310) ____



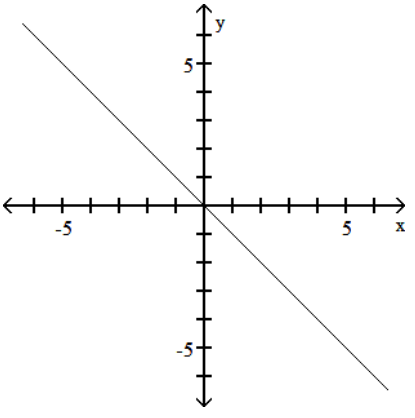

A)



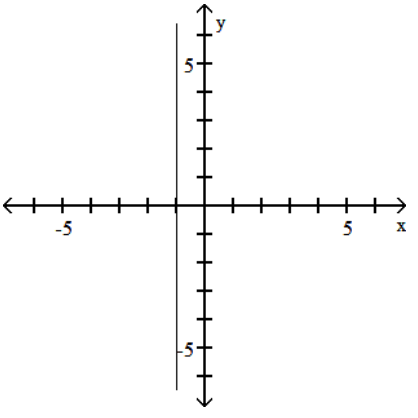

B)




C)




D)




Answer: A

Explanation: A)

Explanation: A)
B)
C)
D)

Determine whether the equation defines y as a function of x.

311) $x = y^2$ 311) ____

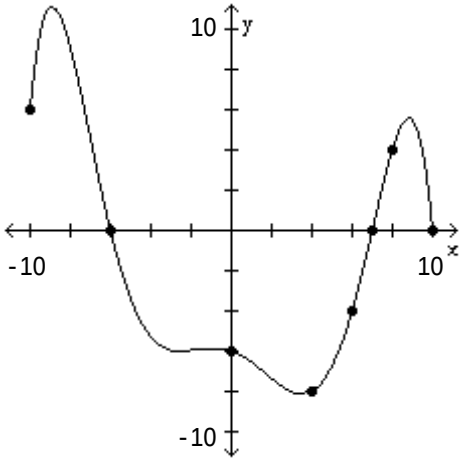
A) function B) not a function

Answer: B

Explanation: A)
B)

The graph of a function f is given. Use the graph to answer the question.

312) For what numbers x is f(x) > 0? 312) ____




A) [-10, -6), (7, 10) B) (-6, ∞)

C) (-6, 7) D) (-∞ -6)

Answer: A

Explanation: A)
B)
C)
D)

Solve.

313) John owns a hotdog stand. He has found that his profit is represented by the equation $P(x) = -x^2 + 54x + 74$, with P being profits and x the number of hotdogs sold. How many hotdogs must he sell to earn the most profit? 313) ____

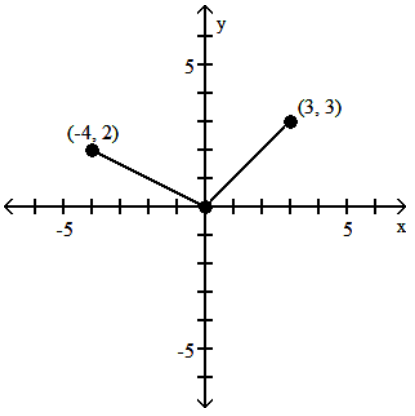
A) 23 hotdogs B) 27 hotdogs C) 47 hotdogs D) 28 hotdogs

Answer: B

Explanation: A)
B)
C)
D)

The graph of a piecewise-defined function is given. Write a definition for the function.

314) 314) ____




A) $f(x) = \begin{cases} \frac{1}{2}x & \text{if } -4 < x < 0 \\ x & \text{if } 0 < x < 3 \end{cases}$

B) $f(x) = \begin{cases} -\frac{1}{2}x & \text{if } -4 \le x \le 0 \\ x & \text{if } 0 < x \le 3 \end{cases}$

C) $f(x) = \begin{cases} -\frac{1}{2}x & \text{if } -4 < x < 0 \\ x & \text{if } 0 < x < 3 \end{cases}$

D) $f(x) = \begin{cases} -2x & \text{if } -4 \le x \le 0 \\ x & \text{if } 0 < x \le 3 \end{cases}$

Answer: B

Explanation: A)
B)
C)
D)

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

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

315) $f(x) = x^2 - 2x$ 315) ____

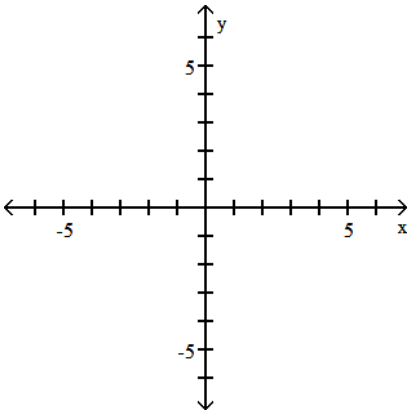
A) $x + 1$ B) $1$ C) $\frac{x^2 - 2x - 1}{x - 1}$ D) $x - 1$

Answer: D

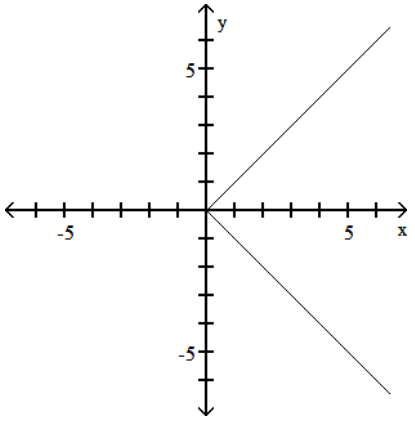
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

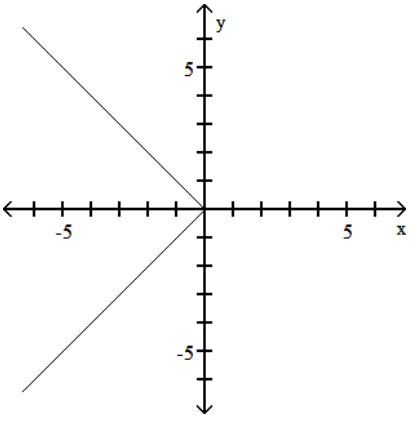
316) $f(x) = |-x|$ 316) ____



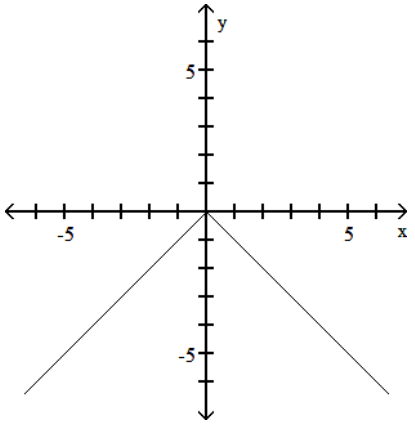

A)



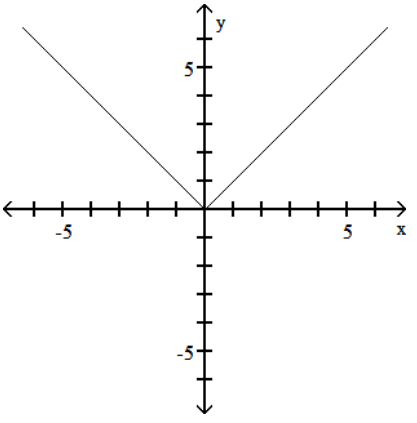

B)




C)




D)




Answer: D

Explanation: A)

B)

C)

D)

Determine algebraically whether the function is even, odd, or neither.

317) $f(x) = 3x^4 - x^2$ 317) ____

A) even B) odd C) neither

Answer: A

Explanation: A)
B)
C)

Write the equation of a sine function that has the given characteristics.

318) The graph of $y = \sqrt{x}$, shifted 4 units to the left 318) ____

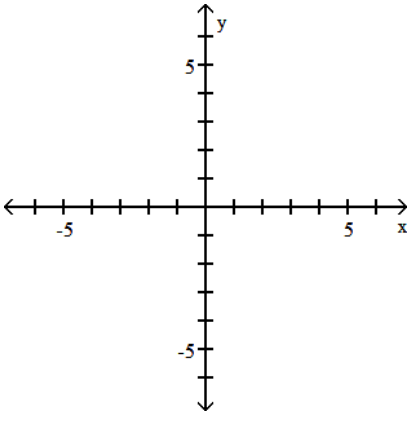
A) $y = \sqrt{x} + 4$ B) $y = \sqrt{x - 4}$ C) $y = \sqrt{x + 4}$ D) $y = \sqrt{x} - 4$

Answer: C

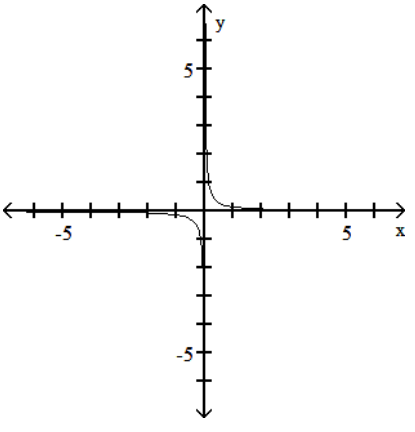
Explanation: A)
B)
C)
D)

Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

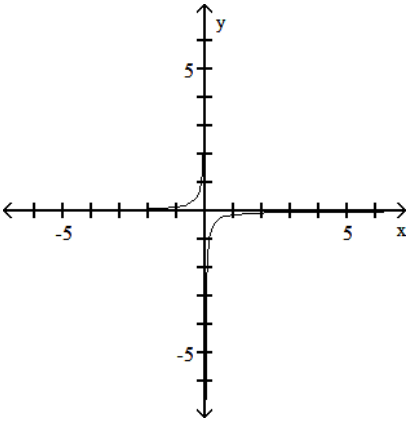
319) $f(x) = \frac{1}{7x}$ 319) ____



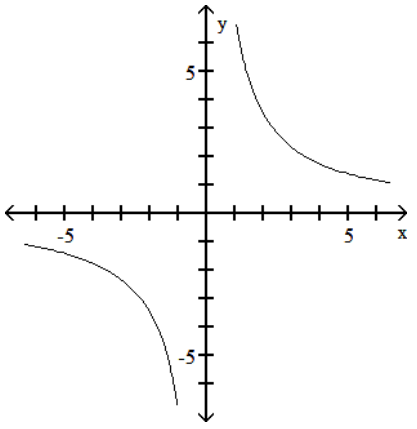

A)



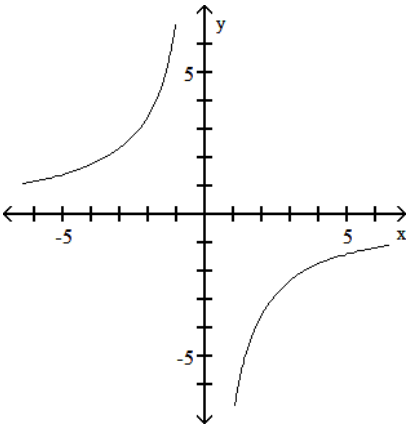

B)



C)




D)




Answer: A

Explanation: A)

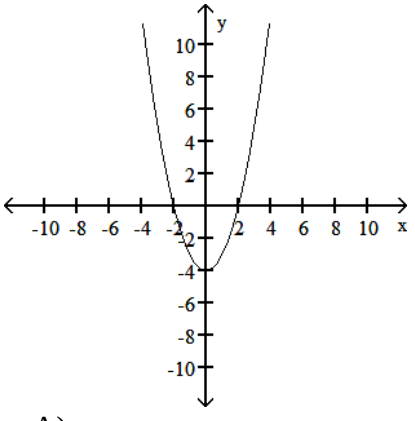
B)

C)

D)

The graph of a function is given. Decide whether it is even, odd, or neither.

320) 320) ____




A) even B) odd C) neither

Answer: A

Explanation: A)

B)

C)

Find an equation of the secant line containing (1, f(1)) and (2, f(2)).

321) $f(x) = \frac{6}{x + 5}$ 321) ____

A) $y = \frac{6}{7}x + \frac{1}{7}$ B) $y = \frac{1}{7}x + \frac{4}{3}$ C) $y = -\frac{1}{7}x + \frac{8}{7}$ D) $y = \frac{1}{7}x + \frac{6}{7}$

Answer: C

Explanation: A)

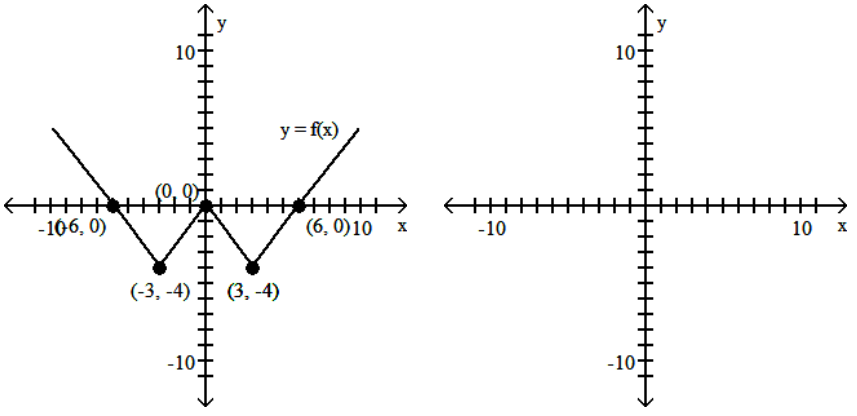
B)

C)

D)

Use the accompanying graph of y = f(x) to sketch the graph of the indicated equation.

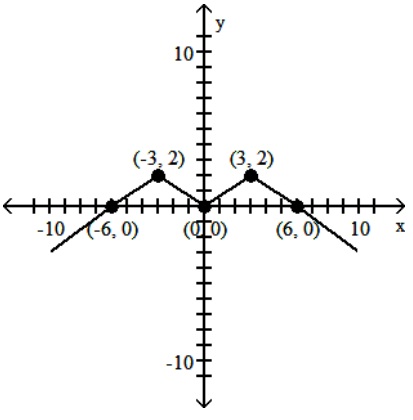
322) $y = -\frac{1}{2}f(x)$ 322) ____

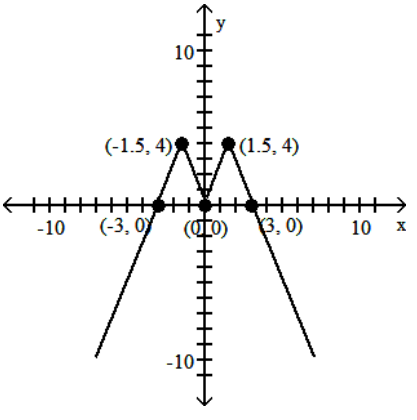



A)

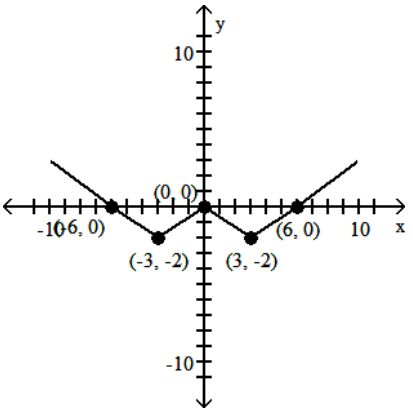



B)

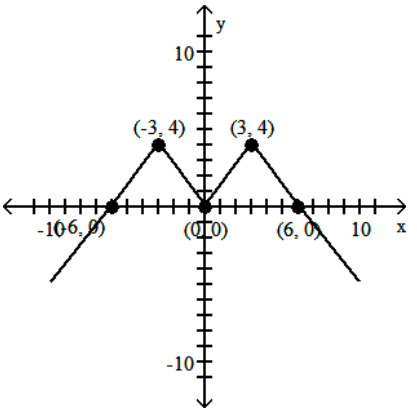


C)




D)



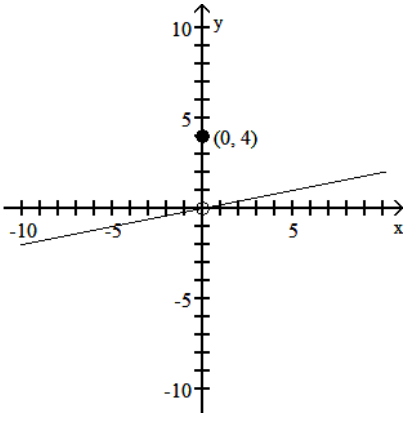

Answer: A

Explanation: A)
B)
C)
D)

Based on the graph, find the range of y = f(x).

323) 323) ____

$$f(x) = \begin{cases} \frac{1}{5}x & \text{if } x \neq 0 \\ 4 & \text{if } x = 0 \end{cases}$$




A) (-10, 10)

B) (- ∞, 0) or {0} or (0, ∞)

C) (- ∞, ∞)

D) (- ∞, 0) or (0, ∞)

Answer: D

Explanation: A)
B)
C)
D)

Determine whether the equation defines y as a function of x.

324) $x - 7y = 9$ 324) ____

A) function B) not a function

Answer: A

Explanation: A)

B)

Locate any intercepts of the function.

325) 325) ____

$$f(x) = \begin{cases} 1 & \text{if } -9 \le x < -2 \\ |x| & \text{if } -2 \le x < 9 \\ \sqrt{x} & \text{if } 9 \le x \le 29 \end{cases}$$

A) (0, 0), (1, 0) B) (0, 0) C) (0, 0), (0, 1) D) none

Answer: B

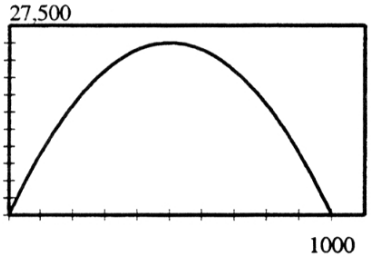
Explanation: A)

B)

C)

D)

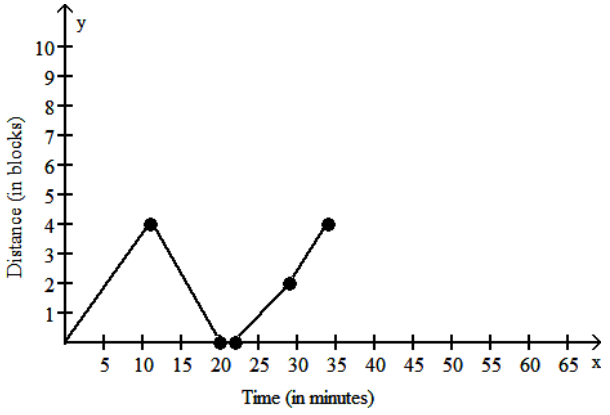
1) B
2) C
3) A
4) D
5) A
6) D
7) D
8) D
9) D
10) D
11) A
12) C
13) C
14) A
15) A
16) $d(t) = \sqrt{1709t}$
17) $A(x) = \frac{1}{2}x^3$
18) local maximum at (0, 0)
local minimum at (0.74, -0.33)
increasing on (-2, 0) and (0.74, 2)
decreasing on (0, 0.74)
19) $27.50
$32.50;
$$C(x) = \begin{cases} 20 & \text{if } 0 \le x \le 100 \\ 12.5 + 0.075x & \text{if } 100 < x \le 200 \\ 7.5 + 0.1x & \text{if } x > 200 \end{cases}$$
20) local maximum at (0, 6)
local minimum at (2.67, -3.48)
increasing on (-1, 0) and (2.67, 4)
decreasing on (0, 2.67)
21) a. $R(x) = -\frac{1}{10}x^2 + 100x$
b. R(450) = $24,750.00
c.




d. 500; $25,000.00
e. $50.00

22) $A(x) = \frac{4\sqrt{3}+9}{16}x^2 - \frac{15}{2}x + 25;\ \{x \mid 0 \le x \le \frac{20}{3}\}$

23) 6.0°C




24)

25) $V(s) = \frac{1}{6}s^3$

26) local maximum at (2.34, 1.61)
local minimum at (-1.9, -9.82)
increasing on (-1.9, 2.34)
decreasing on (-4, -1.9) and (2.34, 5)

27) $18.00
$24.25
$65.50

28) local maximum at (0, 5)
local minima at (-2.55, 1.17) and (1.05, 4.65)
increasing on (-2.55, 0) and (1.05, 2)
decreasing on (-4, -2.55) and (0, 1.05)

29) $39.70
$49.69

$$C(x) = \begin{cases} 4.93 + 0.11589x & \text{if } 0 \le x \le 300 \\ -0.266 + 0.13321x & \text{if } x > 300 \end{cases}$$

30) $25.52
$42.69

$$C(x) = \begin{cases} 8.8 + 0.6686x & \text{if } 0 \le x \le 25 \\ 4.0475 + 0.8587x & \text{if } x > 25 \end{cases}$$

31) C
32) C
33) D
34) C
35) D
36) C
37) A
38) D
39) B
40) C

41) C
42) C
43) D
44) C
45) B
46) D
47) D
48) A
49) C
50) C
51) D
52) A
53) B
54) A
55) C
56) B
57) D
58) A
59) D
60) C
61) C
62) D
63) B
64) A
65) C
66) D
67) B
68) C
69) C
70) D
71) B
72) D
73) A
74) A
75) A
76) B
77) C
78) D
79) D
80) C
81) B
82) B

83) B
84) A
85) B
86) A
87) C
88) A
89) D
90) A
91) C
92) B
93) A
94) A
95) D
96) C
97) C
98) D
99) B
100) A
101) C
102) C
103) C
104) C
105) C
106) B
107) A
108) D
109) C
110) A
111) B
112) B
113) C
114) C
115) B
116) A
117) B
118) B
119) B
120) A
121) C
122) C
123) C
124) D

125) B
126) C
127) B
128) D
129) A
130) D
131) B
132) A
133) C
134) D
135) A
136) A
137) D
138) B
139) D
140) D
141) B
142) A
143) A
144) A
145) A
146) C
147) C
148) A
149) C
150) D
151) A
152) A
153) D
154) B
155) D
156) C
157) D
158) C
159) D
160) A
161) D
162) A
163) A
164) D
165) A
166) B

167) B
168) D
169) D
170) B
171) B
172) A
173) A
174) C
175) B
176) A
177) A
178) A
179) B
180) A
181) C
182) A
183) B
184) A
185) A
186) C
187) B
188) B
189) B
190) B
191) D
192) A
193) B
194) D
195) B
196) A
197) C
198) C
199) B
200) D
201) D
202) D
203) B
204) D
205) D
206) D
207) A
208) B

209) C
210) D
211) D
212) D
213) B
214) D
215) C
216) D
217) B
218) A
219) C
220) A
221) A
222) B
223) A
224) C
225) C
226) C
227) D
228) A
229) C
230) A
231) B
232) C
233) A
234) D
235) A
236) C
237) A
238) C
239) A
240) A
241) C
242) B
243) D
244) A
245) C
246) B
247) B
248) D
249) B
250) D

251) C
252) A
253) C
254) A
255) A
256) A
257) C
258) A
259) A
260) D
261) D
262) D
263) C
264) B
265) A
266) D
267) C
268) D
269) A
270) B
271) B
272) D
273) D
274) C
275) D
276) B
277) B
278) B
279) A
280) B
281) A
282) A
283) B
284) C
285) C
286) C
287) D
288) C
289) A
290) C
291) B
292) C

293) C
294) A
295) D
296) D
297) B
298) B
299) A
300) C
301) A
302) A
303) D
304) C
305) B
306) B
307) A
308) A
309) B
310) A
311) B
312) A
313) B
314) B
315) D
316) D
317) A
318) C
319) A
320) A
321) C
322) A
323) D
324) A
325) B