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

Provide the missing information.

1) In a rectangular coordinate system, the point where the *x*- and *y*-axes meet is called the _____.

Answer: origin

2) The *x*- and *y*-axes divide the coordinate plane into four regions called _____.

Answer: quadrants

3) The distance between two distinct points (x_1, y_1) and (x_2, y_2) is given by the formula _____.

Answer: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

4) The midpoint of the line segment with endpoints (x_1, y_1) and (x_2, y_2) is given by the formula _____.

Answer: $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

5) A _____ to an equation in the variables *x* and *y* is an ordered pair (*x*, *y*) that makes the equation a true statement.

Answer: solution

6) An *x*-intercept of a graph has a *y*-coordinate _____.

Answer: 0

7) A *y*-intercept of a graph has an *x*-coordinate of _____.

Answer: 0

8) Given an equation in the variables *x* and *y*, find the *y*-intercept by substituting _____ for *x* and solving for _____.

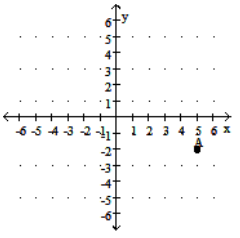
Answer: 0; *y*

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

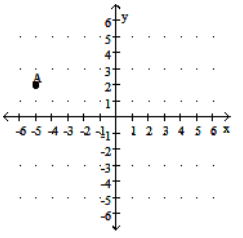
Plot the point on a rectangular coordinate system.

9) $A(2, -5)$

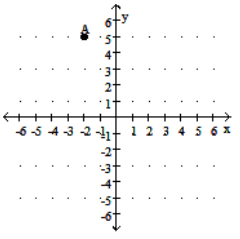
A)



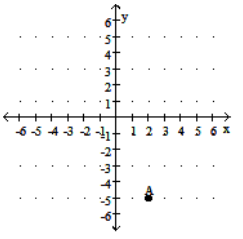
B)



C)



D)



Answer: D

Find the exact distance between the points.

10) (-9, 4) and (-5, -6)

A) 116 B) $10\sqrt{2}$ C) $2\sqrt{29}$ D) 200

Answer: C

Find the midpoint of the line segment whose endpoints are the given points.

11) (5.3, 4.7) and (7.2, -9.7)

A) (5, -1.25) B) (6.25, 7.2) C) (6.25, -2.5) D) (-0.95, 7.2)

Answer: C

Find the exact distance between the points.

12) $(\sqrt{5}, -\sqrt{3})$ and $(4\sqrt{5}, -7\sqrt{3})$

A) $2\sqrt{42}$ B) $2\sqrt{58}$ C) $6\sqrt{7}$ D) $3\sqrt{17}$

Answer: D

Find the midpoint of the line segment whose endpoints are the given points.

13) (3, 1) and (9, 4)

A) (12, 5) B) $\left(-3, \frac{3}{2}\right)$ C) $\left(6, \frac{5}{2}\right)$ D) (-6, 3)

Answer: C

14) (-24.6, 38.1) and (-25.7, -17.7)

A) (0.55, 27.9) B) (6.75, -21.7) C) (-25.15, 10.2) D) (-25.15, 27.9)

Answer: C

15) $(\sqrt{7}, -\sqrt{3})$ and $(6\sqrt{7}, -5\sqrt{3})$

A) $\left(\frac{5\sqrt{7}}{2}, -2\sqrt{3}\right)$ B) $(7\sqrt{7}, -6\sqrt{3})$ C) $\left(\frac{7\sqrt{7}}{2}, -3\sqrt{3}\right)$ D) $(5\sqrt{7}, -4\sqrt{3})$

Answer: C

Determine if the given points form the vertices of a right triangle.

16) (-3, 5), (-1, 3), and (-4, 0)

A) No B) Yes

Answer: A

Determine which of the given points are solutions to the given equation.

17) $2x^2 + y = 4$

I. (3, -14) II. (-3, 14) III. (-3, -14)

A) I B) II C) I and III D) III E) I and II

Answer: C

18) $|x - 3| - y = 2$

I. (1, 0) II. $\left(\frac{1}{4}, \frac{3}{4}\right)$ III. (-5, 10)

A) III B) I and II C) II D) I E) I and III

Answer: B

Identify the set of values *x* for which *y* will be a real number.

19) $y = \frac{10}{x + 7}$

A) $\left\{x \mid x \neq \frac{10}{7}\right\}$ B) $\{x \mid x \neq -7\}$ C) $\{x \mid x \neq 7\}$ D) $\{x \mid x \neq 10\}$

Answer: B

20) $y = \sqrt{x - 8}$

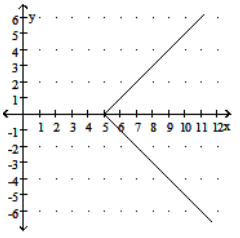
A) $\{x \mid x > 8\}$ B) $\{x \mid x \geq 8\}$ C) $\{x \mid x < 8\}$ D) $\{x \mid x \leq 8\}$

Answer: B

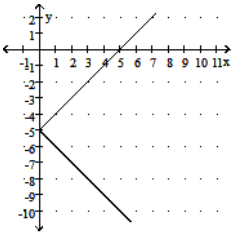
Graph the equation by plotting points.

21) $x = |y| - 5$

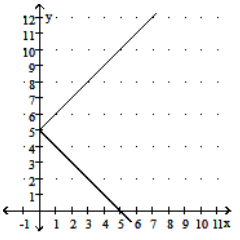
A)



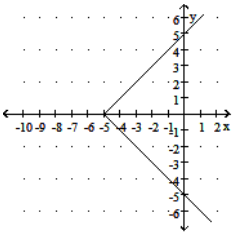
B)



C)



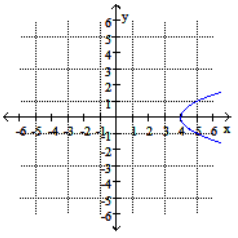
D)



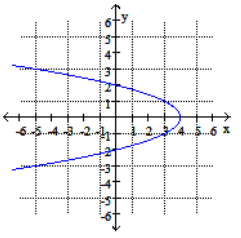
Answer: D

22) $y^2 - x + 4 = 0$

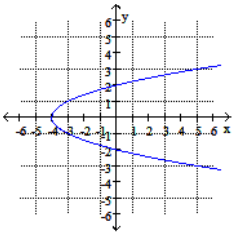
A)



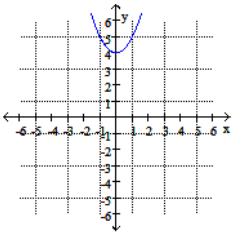
B)



C)



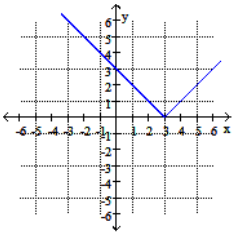
D)



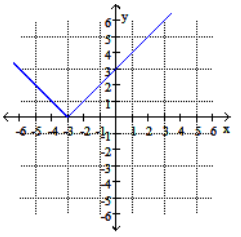
Answer: A

23) $y = |x - 3|$

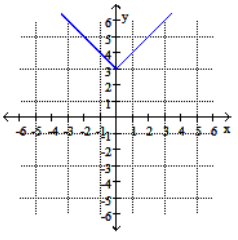
A)



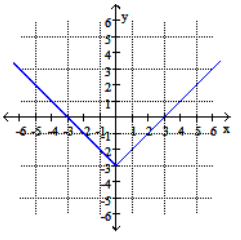
B)



C)



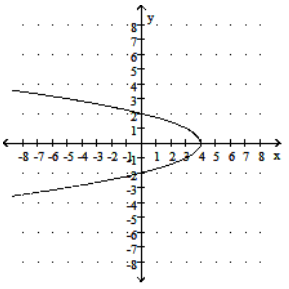
D)



Answer: A

Estimate the *x*- and *y*-intercepts from the graph.

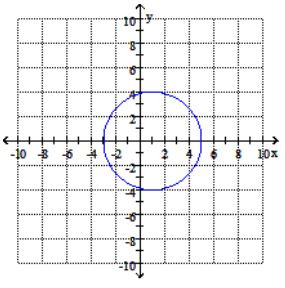
24)



A) *x*-intercepts: (-2, 0) and (2, 0); *y*-intercept: (0, 4)
B) *x*-intercept: (0, 4); *y*-intercepts: (-2, 0) and (2, 0)
C) *x*-intercept: (4, 0); *y*-intercepts: (0, -2) and (0, 2)
D) *x*-intercepts: (0, -2) and (0, 2); *y*-intercept: (4, 0)

Answer: C

25)



A) *x*-int: (-3, 0), (5, 0)
y-int: (0, -3.9), (0, 3.9)

B) *x*-int: (0, -3), (0, 5)
y-int: (-3.9, 0), (3.9, 0)

C) *x*-int: (-3.9, 0), (3.9, 0)
y-int: (0, -3), (0, 5)

D) x-int: (0, -3.9), (0, 3.9)
y-int: (-3, 0), (5, 0)

Answer: A

Determine the *x*- and *y*-intercepts of the graph whose points are defined in the table.

26)

x	-5	0	5	10	15	20
y	9	7	2	0	-2	-9

A) *x*-intercept: (0, 7); *y*-intercept: (10, 0)
B) *x*-intercept: (10, 0); *y*-intercept: (0, 7)
C) *x*-intercept: (0, 10); *y*-intercept: (7, 0)
D) *x*-intercept: (7, 0); *y*-intercept: (0, 10)

Answer: B

Find the *x*- and *y*-intercepts.

27) $y = |x + 1| - 5$

A) *x*-intercept: (-6, 0); *y*-intercept: (0, -5)
B) *x*-intercept: (4, 0); *y*-intercept: (0, -4)
C) *x*-intercepts: (4, 0) and (-6, 0); *y*-intercept: (0, -5)
D) *x*-intercepts: (4, 0) and (-6, 0); *y*-intercept: (0, -4)

Answer: D

28) $\frac{(x - 5)^2}{1} + \frac{(y - 4)^2}{4} = 1$

A) *x*-intercepts: (-1, 0) and (1, 0); *y*-intercepts: (0, -2) and (0, 2)
B) *x*-intercept: (6, 0); *y*-intercept: (0, 6)
C) *x*-intercept: none; *y*-intercept: none
D) *x*-intercept: (1, 0); *y*-intercept: (0, 2)

Answer: C

29) $x^2 + y = 64$

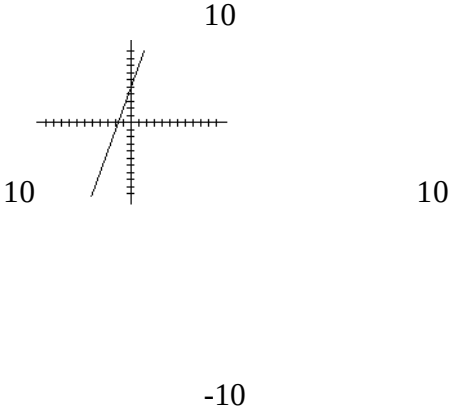
A) *x*-intercept: (0, 64); *y*-intercepts: (-8, 0) and (8, 0)
B) *x*-intercept: (8, 0); *y*-intercept: (0, 64)
C) *x*-intercept: none; *y*-intercept: (0, 64)
D) *x*-intercepts: (-8, 0) and (8, 0); *y*-intercept: (0, 64)

Answer: D

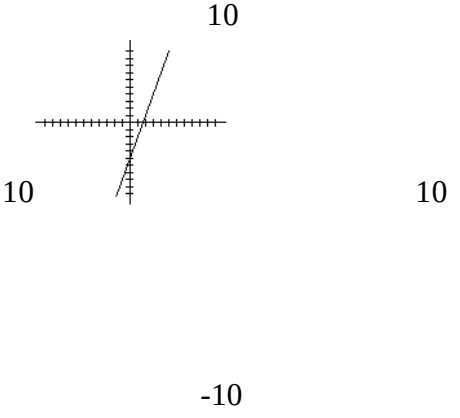
Graph the equation with a graphing utility on the given viewing window.

30) $y = 3x - 5$ on [-10, 10, 1] by [-10, 10, 1]

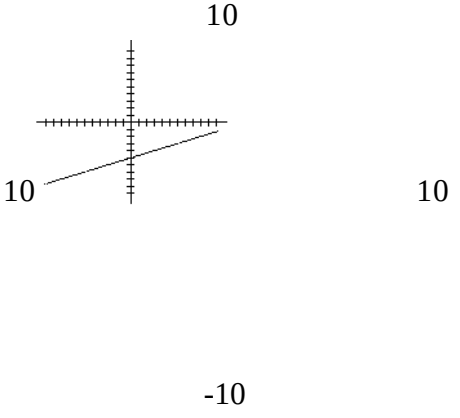
A)



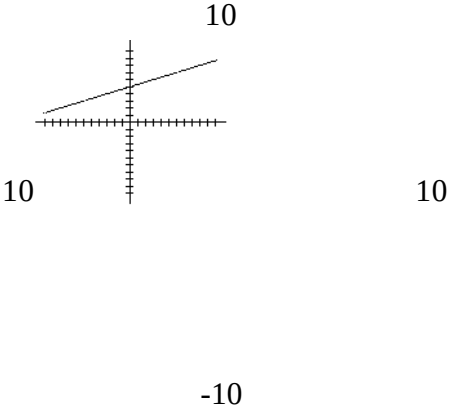
B)



C)



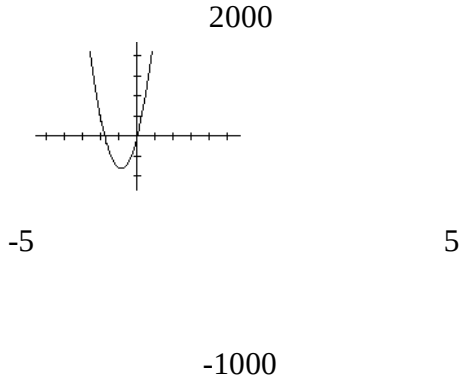
D)



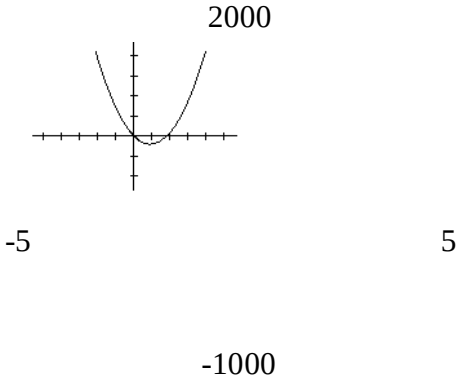
Answer: B

31) $y = 1000x^2 - 1800x$ on [-5, 5, 1] by [-1000, 2000, 500]

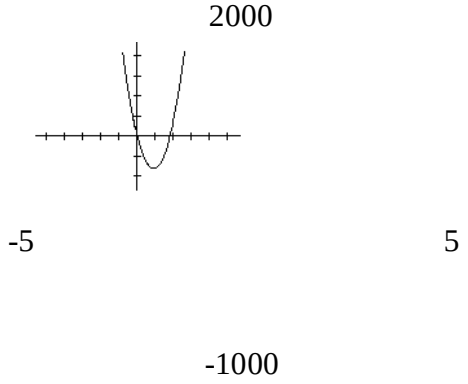
A)



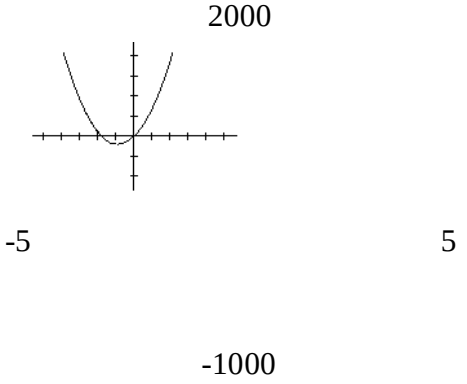
B)



C)



D)



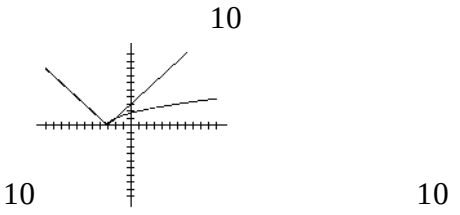
Answer: C

Graph the equations on the standard viewing window.

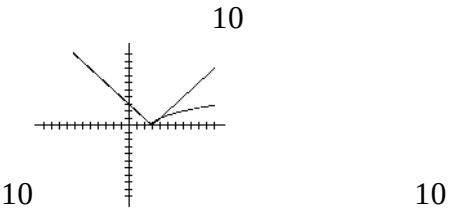
32) $y = \sqrt{x - 3}$

$y = |x + 3|$

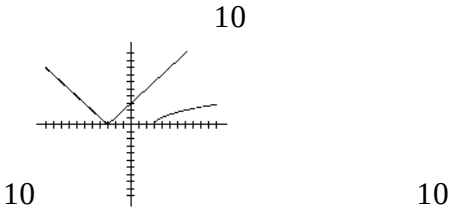
A)



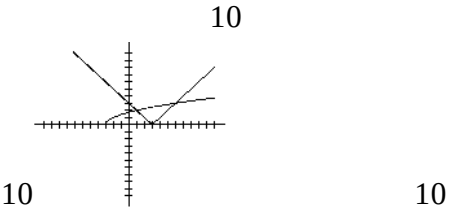
B)



C)



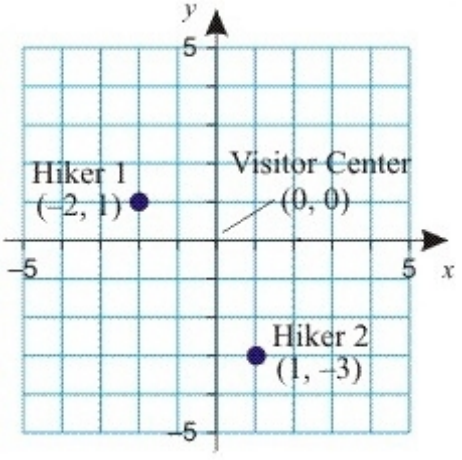
D)



Answer: C

Solve the problem.

33) A map of a hiking area is drawn so that the Visitor Center is at the origin of a rectangular grid. Two hikers are located at positions (-2, 1) and (1, -3) with respect to the Visitor Center where all units are miles. A campground is located exactly halfway between the hikers. What are the coordinates of the campground?



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

Answer: C

34) The position of an object in a video game is represented by an ordered pair. The coordinates of the ordered pair give the number of pixels horizontally and vertically from the origin.

a. Suppose that player A is located at (54, 337) and player B is located at (414, 63). How far apart are the players? Round to the nearest pixel.

b. If the two players move directly toward each other at the same speed, where will they meet?

A) **a.** 634 pixels; **b.** (234, 200) B) **a.** 452 pixels; **b.** (234, 200)

C) **a.** 452 pixels; **b.** (59, 376) D) **a.** 634 pixels; **b.** (59, 376)

Answer: B

Find the center of a circle if a diameter of the circle has the given endpoints.

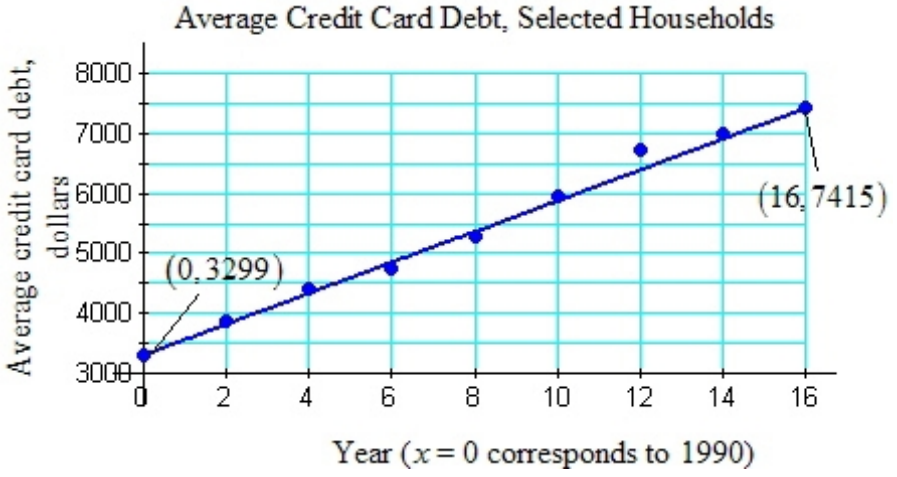
35) (-1, -6) and (-7, -2).

A) (-4, -4) B) (3, -4) C) (3, -2) D) (-4, -2)

Answer: A

Solve the problem.

36) The figure represents the average credit card debt for selected households in Silerville.



Let y represent the credit card debt in dollars. Let x represent the year, where $x = 0$ corresponds to the year 1990, $x = 4$ represents 1994, and so on.

a. Use the ordered pairs given in the graph, (0, 3299) and (16, 7415) to find a linear equation to estim average credit card debt versus the year. Round the slope to the nearest tenth.
b. Use the model from (a) to estimate the average debt in 2003. Round to the nearest dollar.

A) a. $y = 257.3x + 3299$
b. \$6644 in 2003

B) a. $y = 334.49x + 3299$
b. \$7647 in 2003

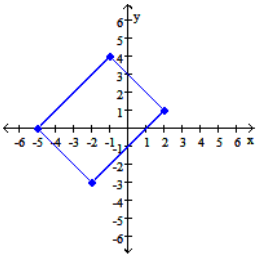
C) a. $y = 257.3x + 3299$
b. \$11 in 2003

D) a. $y = 334.49x + 3299$
b. \$7159 in 2003

Answer: A

Assume that the units shown in the grid are in feet.
a. Determine the exact length and width of the rectangle shown.
b. Determine the perimeter and area.

37)



A) **a.** Length: $4\sqrt{2}$ ft; Width: $3\sqrt{2}$ ft
b. Perimeter: $7\sqrt{2}$ ft; Area: 24 ft^2

B) **a.** Length: $4\sqrt{2}$ ft; Width: $3\sqrt{2}$ ft
b. Perimeter: $14\sqrt{2}$ ft; Area: 24 ft^2

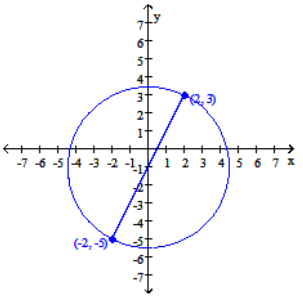
C) **a.** Length: 4 ft; Width: 3 ft
b. Perimeter: 14 ft; Area: 12 ft^2

D) **a.** Length: 4 ft; Width: 3 ft
b. Perimeter: 7 ft; Area: 12 ft^2

Answer: B

The endpoints of a diameter of a circle are shown. Find the center and radius of the circle.

38)



A) center: (-1, 0); radius: $2\sqrt{5}$

B) center: (-1, 0); radius: 4

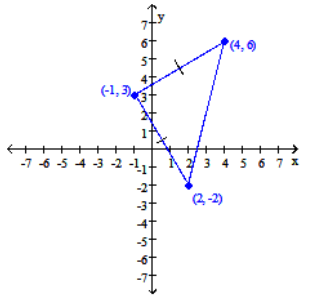
C) center: (0, -1); radius: $2\sqrt{5}$

D) center: (0, -1); radius: 20

Answer: C

An isosceles triangle is shown. Find the area of the triangle. Assume that the units shown in the grid are in meters.

39)



A) Area: 34 m^2 B) Area: $\sqrt{17}$ m^2 C) Area: 17 m^2 D) Area: $2\sqrt{17}$ m^2

Answer: C

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

Provide the missing information.

40) A _____ is the set of all points in a plane equidistant from a fixed point called the _____.

Answer: circle; center

41) The distance from the center of a circle to any point on the circle is called the _____ and is often denoted by *r*.

Answer: radius

42) The standard form of an equation of a circle with center (*h*, *k*) and radius *r* is given by _____.

Answer: $(x - h)^2 + (y - k)^2 = r^2$

43) An equation of a circle written in the form $x^2 + y^2 + Ax + By + C = 0$ is called the _____ form of an equation of a circle.

Answer: general

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

Solve the problem.

44) Is the point (-3, -1) on the circle defined by $(x + 3)^2 + (y + 1)^2 = 9$

A) No B) Yes

Answer: A

Determine the center and radius of the circle.

45) $(x - 4)^2 + (y - 8)^2 = 9$

A) Center: (4, 8); Radius: 9 B) Center: (4, 8); Radius: 3

C) Center: (-4, -8); Radius: 9 D) Center: (-4, -8); Radius: 3

Answer: B

46) $(x + 2)^2 + (y - 3)^2 = 45$

A) Center: (2, -3); Radius: 45 B) Center: (2, -3); Radius: $3\sqrt{5}$

C) Center: (-2, 3); Radius: 45 D) Center: (-2, 3); Radius: $3\sqrt{5}$

Answer: D

Identify the center and radius of the circle.

47) Identify the center and radius of the circle.

$$\left(x - \frac{4}{7}\right)^2 + y^2 = 12$$

A) Center = $\left(\frac{4}{7}, 0\right)$; $r = 2\sqrt{3}$ B) Center = $\left(-\frac{4}{7}, 0\right)$; $r = 2\sqrt{3}$

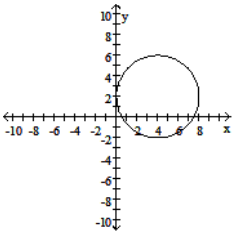
C) Center = $\left(0, \frac{4}{7}\right)$; $r = 12$ D) Center = $\left(\frac{4}{7}, 0\right)$; $r = 12$

Answer: A

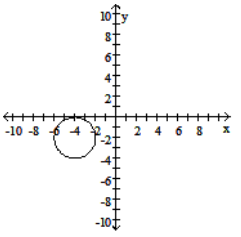
Use the given information about a circle to write an equation of the circle in standard form. Graph the circle.

48) Center: (4, 2); Radius: 4

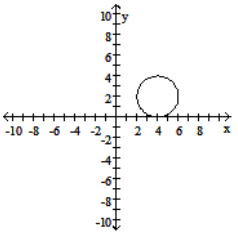
A) $(x + 4)^2 + (y + 2)^2 = 16$



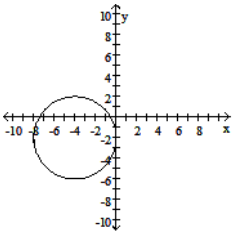
B) $(x - 4)^2 + (y - 2)^2 = 4$



C) $(x + 4)^2 + (y + 2)^2 = 4$



D) $(x - 4)^2 + (y - 2)^2 = 16$



Answer: A

Use the given information about a circle to find its equation.

49) Center (-1, -5) and radius $\sqrt{3}$

A) $(x + 1)^2 + (y + 5)^2 = 3$

B) $(x + 1)^2 + (y + 5)^2 = \sqrt{3}$

C) $(x - 1)^2 + (y - 5)^2 = 3$

D) $(x - 1)^2 + (y - 5)^2 = \sqrt{3}$

Answer: A

50) Center (6, -7) and radius of 5

A) $(x - 6)^2 + (y + 7)^2 = 5$

B) $(x + 6)^2 + (y - 7)^2 = 25$

C) $(x + 6)^2 + (y - 7)^2 = 5$

D) $(x - 6)^2 + (y + 7)^2 = 25$

Answer: D

51) Center (-5, -4) and diameter 10

A) $(x - 5)^2 + (y - 4)^2 = 100$

B) $(x + 5)^2 + (y + 4)^2 = 25$

C) $(x - 5)^2 + (y - 4)^2 = 25$

D) $(x + 5)^2 + (y + 4)^2 = 100$

Answer: B

Use the given information about a circle to write an equation of the circle in standard form.

52) The endpoints of a diameter are (3, 11) and (-9, -5).

A) $(x + 3)^2 + (y + 11)^2 = 20$

B) $(x + 3)^2 + (y - 3)^2 = 100$

C) $(x - 3)^2 + (y - 11)^2 = 100$

D) $(x - 3)^2 + (y + 3)^2 = 20$

Answer: B

53) The center is (-5, -4) and another point on the circle is (1, 4)

A) $(x - 5)^2 + (y - 4)^2 = 100$

B) $(x + 5)^2 + (y + 4)^2 = 100$

C) $(x - 5)^2 + (y - 4)^2 = 10$

D) $(x + 5)^2 + (y + 4)^2 = 10$

Answer: B

Find an equation of the circle with the given characteristics.

54) Center (8, -7) and radius 3

A) $(x - 8)^2 + (y + 7)^2 = 9$

B) $(x + 8)^2 + (y - 7)^2 = 3$

C) $(x + 8)^2 + (y - 7)^2 = 9$

D) $(x - 8)^2 + (y + 7)^2 = 3$

Answer: A

55) Center (-10, -2) and radius 6

A) $(x + 10)^2 + (y + 2)^2 = 6$

B) $(x - 10)^2 + (y - 2)^2 = 36$

C) $(x + 10)^2 + (y + 2)^2 = 36$

D) $(x - 10)^2 + (y - 2)^2 = 6$

Answer: C

56) (-6, 0) and radius 3

A) $(x + 6)^2 + y^2 = 9$

B) $(x - 6)^2 = 3$

C) $(x + 6)^2 = 9$

D) $(x - 6)^2 + y^2 = 3$

Answer: A

57) (0, 12) and radius $\sqrt{6}$

A) $x^2 + (y - 12)^2 = 6$

B) $(y - 12)^2 = \sqrt{6}$

C) $(y + 12)^2 = 6$

D) $x^2 + (y + 12)^2 = \sqrt{6}$

Answer: A

Use the given information about a circle to write an equation of the circle in standard form.

58) The center is (4, -1) and the circle is tangent to the *x*-axis.

A) $(x + 4)^2 + (y - 1)^2 = 16$

B) $(x - 4)^2 + (y + 1)^2 = 16$

C) $(x + 4)^2 + (y - 1)^2 = 1$

D) $(x - 4)^2 + (y + 1)^2 = 1$

Answer: D

Solve the problem.

59) Write an equation that represents the set of points that are 5 units from (-5, -7).

A) $|x - 5| + |y - 7| = 5$

B) $(x + 5)^2 + (y + 7)^2 = 25$

C) $|x + 5| + |y + 7| = 5$

D) $(x + 5)^2 + (y + 7)^2 = 5$

Answer: B

60) Write an equation of the circle that is tangent to both axes with radius $\sqrt{3}$ and center in Quadrant IV.

A) $(x + \sqrt{3})^2 + (y - \sqrt{3})^2 = \sqrt{3}$

B) $(x - \sqrt{3})^2 + (y + \sqrt{3})^2 = \sqrt{3}$

C) $(x + \sqrt{3})^2 + (y - \sqrt{3})^2 = 3$

D) $(x - \sqrt{3})^2 + (y + \sqrt{3})^2 = 3$

Answer: D

Determine the solution set for the equation.

61) $(x + 4)^2 + (y - 2)^2 = 0$

A) $\{(4, -2)\}$ B) $\{\ \}$ C) $\{(-4,2)\}$ D) $\{(16, 4)\}$

Answer: C

Write the equation in standard form to find the center and radius of the circle.

62) $x^2 + y^2 + 6x + 14y + 37 = 0$

A) $(x + 3)^2 + (y + 7)^2 = 21$; center (-3, -7), radius 21

B) $(x - 3)^2 + (y - 7)^2 = 21$; center (3, 7), radius $\sqrt{21}$

C) $(x + 3)^2 + (y + 7)^2 = 21$; center (-3, -7), radius $\sqrt{21}$

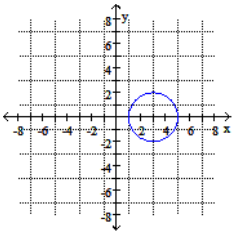
D) $(x + 3)^2 + (y + 7)^2 = 21$; center (3, 7), radius 21

Answer: C

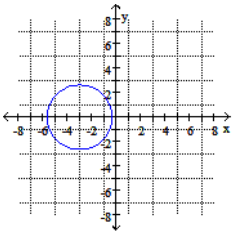
Write the equation in standard form to find the center and radius of the circle. Then sketch the graph.

63) $x^2 + y^2 - 6x + 5 = 0$

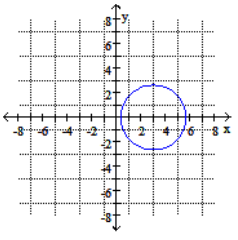
A) $(x - 3)^2 + y^2 = 4$



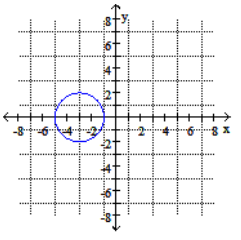
B) $(x - 3)^2 + y^2 = 7$



C) $(x - 3)^2 + y^2 = 7$



D) $(x - 3)^2 + y^2 = 4$



Answer: A

Write the given equation in the form $(x - h)^2 + (y - k)^2 = r^2$. Identify the center and radius.

64) $x^2 + y^2 + 16x + 8y - 20 = 0$

A) $(x + 16)^2 + (y + 8)^2 = 20$
Center: $(-16, -8)$; $r = 20$

B) $(x + 8)^2 + (y + 4)^2 = 100$
Center: $(-8, -4)$; $r = 10$

C) $(x + 16)^2 + (y + 8)^2 = 20$
Center: $(16, 8)$; $r = 20$

D) $(x + 8)^2 + (y + 4)^2 = 100$
Center: $(8, 4)$; $r = 10$

Answer: B

65) $x^2 + y^2 + 8x - 10y + 25 = 0$

A) $(x + 8)^2 + (y - 10)^2 = 25$
Center: (-8, 10); $r = 25$

B) $(x + 8)^2 + (y - 10)^2 = 25$
Center: (8, -10); $r = 25$

C) $(x + 4)^2 + (y - 5)^2 = 16$
Center: (4, -5); $r = 4$

D) $(x + 4)^2 + (y - 5)^2 = 16$
Center: (-4, 5); $r = 4$

Answer: D

66) $x^2 + y^2 - 6x + 6y - 82 = 0$

A) $(x + 3)^2 + (y + 3)^2 = 100$
Center: (3, -3); $r = 10$

B) $(x + 3)^2 + (y - 3)^2 = 100$
Center: (3, -3); $r = 10$

C) $(x - 3)^2 + (y + 3)^2 = 100$
Center: (-3, 3); $r = 10$

D) $(x - 3)^2 + (y + 3)^2 = 100$
Center: (3, -3); $r = 10$

Answer: D

67) $x^2 + y^2 + 22x + 21 = 0$

A) $(x + 22)^2 + y^2 = 21$
Center: (-22, 0); $r = 21$

B) $(x + 11)^2 + y^2 = 100$
Center: (-11, 0); $r = 10$

C) $(x + 22)^2 + y^2 = 21$
Center: (0, 22); $r = 21$

D) $(x + 11)^2 + y^2 = 100$
Center: (0, 11); $r = 10$

Answer: B

Identify the center and radius of the circle.

68) $x^2 - 10x + y^2 = 11$

A) Center: (10, 0); $r = 36$

B) Center: (0, -5); $r = 6$

C) Center: (5, 0); $r = 6$

D) Center: (10, 0); $r = \sqrt{11}$

Answer: C

Write the given equation in the form $(x - h)^2 + (y - k)^2 = r^2$. Identify the center and radius.

69) $x^2 + y^2 - 8y + 11 = 0$

A) Center: (0, 4); $r = \sqrt{5}$

B) Center: (0, -4); $r = 5$

C) Center: (0, -8); $r = 11$

D) Center: (0, 8); $r = 11$

Answer: A

70) $25x^2 + 25y^2 - 20x + 60y - 360 = 0$

A) Center: $\left(-\frac{4}{5}, \frac{12}{5}\right)$; $r = 360$

B) Center: $\left(-\frac{2}{5}, \frac{6}{5}\right)$; $r = 4$

C) Center: $\left(\frac{2}{5}, -\frac{6}{5}\right)$; $r = 4$

D) Center: $\left(\frac{4}{5}, -\frac{12}{5}\right)$; $r = 360$

Answer: C

Write the equation in standard form: $(x - h)^2 + (y - k)^2 = r^2$. Then, if possible, identify the center and radius of the circle. If the equation represents a degenerate case, give the solution set.

71) $x^2 + y^2 + 4x + 8y + 11 = 0$

A) $(x + 2)^2 + (y + 4)^2 = -9$; Degenerate case: { }

B) $(x + 2)^2 + (y + 4)^2 = 9$; Center: (-2, -4); Radius: 3

C) $(x + 2)^2 + (y + 4)^2 = 9$; Center: (2, 4); Radius: 3

D) $(x + 2)^2 + (y + 4)^2 = 0$; Degenerate case (single point): {(-2, -4)}

Answer: B

72) $x^2 + y^2 - 4x + 2y + 5 = 0$

A) $(x - 2)^2 + (y + 1)^2 = 25$; Center: (2, -1); Radius: 5

B) $(x - 2)^2 + (y + 1)^2 = -5$; Degenerate case: { }

C) $(x - 2)^2 + (y + 1)^2 = 0$; Degenerate case (single point): {(2, -1)}

D) $(x - 2)^2 + (y + 1)^2 = 25$; Center: (-2, 1); Radius: 5

Answer: C

Solve the problem.

73) A cell tower is a site where antennas, transmitters, and receivers are placed to create a cellular network. Suppose that a cell tower is located at a point $A(-7, -6)$ on a map and its range is 2.5 mi. Write an equation that represents the boundary of the area that can receive a signal from the tower. Assume that all distances are in miles.

A) $|x + 7| + |(y + 6)| = 2.5$

B) $(x + 7)^2 + (y + 6)^2 = 6.25$

C) $|x - 7| + |(y - 6)| = 2.5$

D) $(x + 7)^2 + (y + 6)^2 = 2.5$

Answer: B

74) Find the shortest distance from the origin to a point on the circle defined by $x^2 + y^2 - 14x - 18y + 121 = 0$.

A) $\sqrt{130} + 3$ B) $2\sqrt{130}$ -+ 3 C) $2\sqrt{130} - 3$ D) $\sqrt{130} - 3$

Answer: D

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

Provide the missing information.

75) A set of ordered pairs (x, y) is called a _____ in x and y. The set of x values in the relation is called the _____ of the relation. The set of _____ values is called the range of the relation.

Answer: relation; domain; y

76) Explain what it means for a relation to define y as a function of x.

Answer: A relation defines y as a function of x if for each value of x in the domain, there is exactly one value of y in the range.

77) If the graph of a set of points (x, y) has two points aligned vertically then the relation (does/does not) define y as a function of x.

Answer: does not

78) Given a function defined by $y = f(x)$, the statement $f(2) = 4$ is equivalent to what ordered pair?

Answer: $(2, 4)$

79) Given a function defined by $y = f(x)$, to find the _____ -intercept, evaluate $f(0)$.

Answer: y

80) Given a function defined by $y = f(x)$, to find the x-intercept(s), substitute 0 for _____ and solve for x.

Answer: $f(x)$

81) Given, $f(x) = \dfrac{x + 1}{x + 5}$ the domain is restricted so that $x \neq$ _____.

Answer: -5

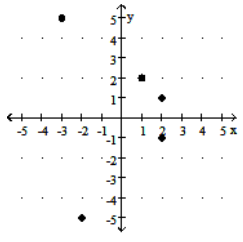
82) Given $g(x) = \sqrt{x - 5}$, the domain is restricted so that $x \geq$ _____.

Answer: 5

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

Write the domain and range of the relation.

83)

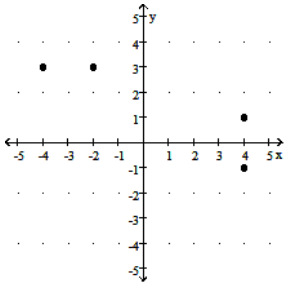


A) Domain: {-5, -1, 1, 2, 5}; Range: {-3, -2, 1, 2}
B) Domain: {-3, -2, 1, 2, 2}; Range: {-5, -1, 1, 2, 5}
C) Domain: {-5, -1, 1, 2, 5}; Range: {-3, -2, 1, 2, 2}
D) Domain: {-3, -2, 1, 2}; Range: {-5, -1, 1, 2, 5}

Answer: D

For the given relation, write the domain, write the range, and determine if the relation defines *y* as a function of *x*.

84)



A) Domain: {-4, -2, 4}; Range: {-1, 1, 3}; function

B) Domain: {-1, 1, 3}; Range: {-4, -2, 4}; function

C) Domain: {-1, 1, 3}; Range: {-4, -2, 4}; not a function

D) Domain: {-4, -2, 4}; Range: {-1, 1, 3}; not a function

Answer: D

Identify the domain and range of the relation, and determine whether the relation is a function.

85) {(-7, -12), (-3, -5), (1, 16), (8, 18)}

A) Domain: {-12, -5, 16, 18}; Range: {-7, -3, 1, 8}; Function

B) Domain: {-7, -3, 1, 8}; Range: {-12, -5, 16, 18}; Not a function

C) Domain: {-12, -5, 16, 18}; Range: {-7, -3, 1, 8}; Not a function

D) Domain: {-7, -3, 1, 8}; Range: {-12, -5, 16, 18}; Function

Answer: D

86) {(-9, 4), (-1, 2), (18, -2), (-1, -4)}

A) Domain: {-9, -1, 18}; Range: {-4, -2, 2, 4}; Not a function

B) Domain: {-4, -2, 2, 4}; Range: {-9, -1, 18}; Function

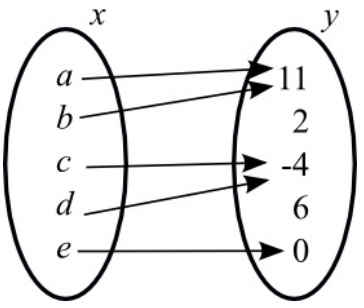
C) Domain: {-4, -2, 2, 4}; Range: {-9, -1, 18}; Not a function

D) Domain: {-9, -1, -1, 18}; Range: {-4, -2, 2, 4}; Function

Answer: A

Determine whether the relation defines *y* as a function of *x*.

87)

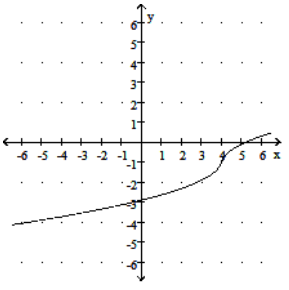


A) Not a function

B) Function

Answer: B

88)

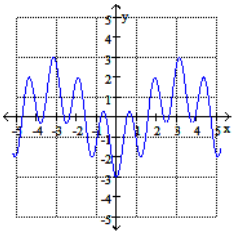


A) Function

B) Not a function

Answer: A

89)

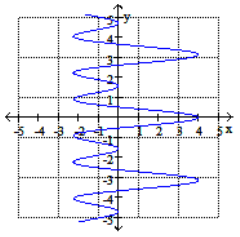


A) Not a function

B) Function

Answer: B

90)



A) Function B) Not a function

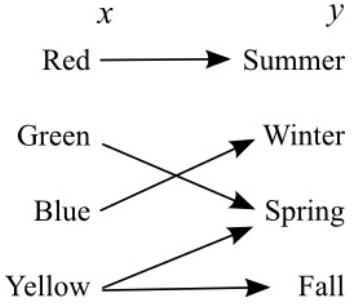
Answer: B

91) $x = |y + 1|$

A) Not a function B) Function

Answer: A

92)



A) Function B) Not a function

Answer: B

93) $(x + 6)^2 + (y - 7)^2 = 25$

A) Function B) Not a function

Answer: B

Solve the problem.

94) Find $f(5)$ for the given function.

$f(x) = 2$

A) 7 B) 5 C) 2 D) 10

Answer: C

Evaluate the function for the indicated value, then simplify.

95) $f(x) = -2x - 2$; find $f(a - 1)$, then simplify as much as possible.

A) $-2a$ B) $-2a - 3$ C) a D) $a - 5$

Answer: A

96) $f(x) = 2x^2 - 4x$; find $f(8)$

A) -16 B) 96 C) 124 D) 224

Answer: B

97) $f(x) = x^2 + 5x$; find $f(a + 1)$, then simplify as much as possible.

A) $a^2 + 3a + 6$ B) $a^2 + 7a + 7$ C) $a^2 + 3a + 2$ D) $a^2 + 7a + 6$

Answer: D

98) $f(t) = t^2 + 5t$; find $f(t - 5)$, then simplify as much as possible.

A) $t^2 - 5t$ B) $t^2 + 15t$ C) $t^2 - 15t$ D) $t^2 - 20t$

Answer: A

Evaluate as indicated.

99) Find $f(a + 2)$ for the given function.

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

A) $\sqrt{x + a - 3}$ B) $\sqrt{x + a - 10}$ C) $\sqrt{a - 10}$ D) $\sqrt{a - 3}$

Answer: D

100) If $K(x) = |x - 9| + x$, find $K(-7)$.

A) 9 B) -9 C) -23 D) 23

Answer: A

101) If $f(x) = 3x^2 + 8x - 3$, find and simplify $f(2 + x)$.

A) $3x^2 + 2x + 25$ B) $3x^2 + 20x + 25$ C) $25 + x$ D) $3x^2 + 8x - 5$

Answer: B

102) If $z(t) = 2t^2 + 7t - 4$, find $z(-1)$ and $z(4)$.

A) $z(-1) = -13$; $z(4) = 56$ B) $z(-1) = -9$; $z(4) = 56$

C) $z(-1) = 5$; $z(4) = 35$ D) $z(-1) = -7$; $z(4) = 88$

Answer: B

103) If $f(x) = 4x^2 + 4x - 5$, find and simplify $f(2 + x)$.

A) $4x^2 + 20x + 19$ B) $4x^2 + 4x - 7$ C) $19 + x$ D) $4x^2 + 2x + 19$

Answer: A

104) Let $f(x) = 7x - 2$. Find $f(m - 6)$ and simplify.

A) $7xm - 42x - 2m + 12$ B) $7x - 8$

C) $7m - 8$ D) $7m - 44$

Answer: D

Find and simplify $f(x + h)$.

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

A) $-3x^2\ 2xh + h^2 + 2x + 2h + 1$ B) $-3x^2 - 6xh - 3h^2 + 2x + 2h + 1$

C) $-3x^2 - 3h^2 + 2x + 2h + 1$ D) $-3x^2 - 3h^2 + 2x\ h + 1$

Answer: B

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

A) $-4x^2 - 8xh - 4h^2 + 3$ B) $-4x^2 + h^2 + 3$

C) $f(x) = -4x^2 + h + 3$ D) $-4x^2 + 2xh + h^2 + 3$

Answer: A

107) $f(x) = x^3 - 5x + 8$

A) $x^3 - 5x + h + 8$ B) $x^3 + h^3 - 5x - 5h + 8$

C) $x^3 - 5x - 5h + 8$ D) $x^3 + 3x^2h + 3xh^2 + h^3 - 5x - 5h + 8$

Answer: D

Solve the problem.

108) Consider the function $f = \{(-6, -3), (-2, 3), (2, -1), (4, 2)\}$ Determine $f(-2)$

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

Answer: A

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

109) Consider the function $z = \{(9, -5),(-7, 3),(-1, 9)\}$. Find the function value $z(-7)$.

Answer: 3

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

110) Sarita needs to drive 350 mi. After having driven x miles, the distance remaining $r(x)$ (in mi) is given by $r(x) = 350 - x$. Evaluate $r(250)$ and interpret the meaning.

A) $r(250) = 250$; Sarita still has 250 miles remaining.

B) $r(250) = 100$; Sarita still has 100 miles remaining.

C) $r(250) = 250$; Sarita has traveled 250 miles.

D) $r(250) = 100$; Sarita has traveled 100 miles.

Answer: B

111) If bottled water costs \$0.63 per bottle, then the cost, C (in dollars), for b bottles is defined by $C(b) = 0.63b$. How many bottles of water can be purchased for \$7.56?

A) 8 bottles B) 12 bottles C) 5 bottles D) 16 bottles

Answer: B

112) The number of accidents in 1 month involving drivers x years of age in a certain country can be approximated by the function

$$f(x) = 3x^2 - 150x + 2000.$$

Find the number of accidents in 1 month that involved 47-year olds.

A) 1577 B) 2000 C) 6627 D) 7191

Answer: A

113) Suppose the weight (in pounds) of a baby boy x months old, for his first 10 months, can be approxim by the function

$$f(x) = 1.3x + 7.7.$$

Find the predicted weight at the age of 1 months.

A) 8.7 lb B) 9 lb C) 10 lb D) 7.7 lb

Answer: B

114) For over 20 years, the population of Tressel, Ohio has been increasing linearly according tothe function

$$P(t) = 225t + 7000$$

where P is the number of residents, and t is years after 1980. Compute $P(0)$ and interpret its meaning in the context of this problem.

A) $P(0) = 7000$; This was the population of the town in 1981.

B) $P(0) = 7000$; This was the population of the town in 1980.

C) $P(0) = 7225$; This was the population of the town in 1980.

D) $P(0) = 7225$; This was the population of the town in 1981.

Answer: B

115) At one college, a study found that the average grade point average decreased linearlyaccording to the function

$g(h) = 3.00 - 0.10h$

where h is the number of hours per week spent watching reality shows on television. Compute $g(5)$ and interpret its meaning.

A) $g(5) = 3.50$. This tells us that the average GPA of students that watch 5 hours of reality programming per week is 3.50.

B) $g(5) = 3.50$. On average, watching 5 hours of reality programming per week will increase your GPA by 3.50.

C) $g(5) = 2.50$. This tells us that the average GPA of students that watch 5 hours of reality programming per week is 2.50.

D) $g(5) = 2.50$. On average, watching 5 hours of reality programming per week will decrease your GPA by 2.50.

Answer: C

Determine the *x*- and *y*-intercepts for the given function.

116) $f(x) = \sqrt{x} - 2$

A) x-intercept: (-2, 0); y-intercept: (0, 4)

B) x-intercept: (4, 0); y-intercept: (0, -2)

C) x-intercept: (-2, 0); y-intercepts: (0, -4) and (0, 4)

D) x-intercepts: (-4, 0) and (4, 0); y-intercept: (0, -2)

Answer: B

117) $g(x) = -7x - 15$

A) x-intercept: $\left(-\frac{15}{7}, 0\right)$; y-intercept: (0, -15)

B) x- and y-intercept: (0, 0)

C) x-intercept: $\left(0, -\frac{15}{7}\right)$; y-intercept: (-15, 0)

D) x-intercept: (0, -15); y-intercept: (22, 0)

Answer: A

118) $B(x) = 7x + 3$

A) x-intercept: $\left(-\frac{3}{7}, 0\right)$; y-intercept: (0, -3)

B) x-intercept: $\left(-\frac{3}{7}, 0\right)$; y-intercept: (0, 3)

C) x-intercept: $\left(-\frac{7}{3}, 0\right)$; y-intercept: (3, 0)

D) x- and y-intercept: (0, 0)

Answer: B

119) $q(x) = -x^2 + 18$

A) x-intercept: none;
y-intercept: (0, 18)

B) x-intercept: (0, 18);
y-intercepts: $(3\sqrt{2}, 0)$, $(-3\sqrt{2}, 0)$

C) x-intercepts: (18, 0), (-18, 0);
y-intercept: $(0, 3\sqrt{2})$

D) x-intercepts: $(3\sqrt{2}, 0)$, $(-3\sqrt{2}, 0)$;
y-intercept: (0, 18)

Answer: D

120) $r(x) = |x - 8|$

A) x-intercepts: (0, 8), (0, -8); y-intercept: (0, 8)

B) x-intercept: (8, 0); y-intercept: (0, 8)

C) x-intercept: (0, 8); y-intercept: (0, 0)

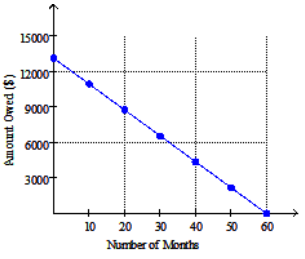
D) x-intercept: none; y-intercept: (0, 8)

Answer: B

Solve the problem.

121) A student decides to finance a used car over a 5-yr (60-month) period. After making a down payment of $5000, the remaining cost of the car including tax and interest is $13,140. The amount owed $y = A(t)$ (in $) is given by $A(t) = 13{,}140 - 219t$, where t is the number of months after purchase and $0 \le t \le 60$. Determine the t-intercept and y-intercept.

Amount Owed on Vehicles after *t* Months



A) t-intercept: (13,140, 0); y-intercept: (0, 60)

B) t-intercept: (60,0); y-intercept: (0,13,140)

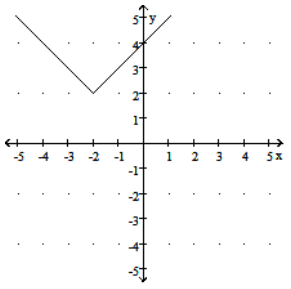
C) t-intercept: (0, 60); y-intercept: (13,140, 0)

D) t-intercept: (0,13,140); y-intercept: (60,0)

Answer: B

Determine the domain and range of the function.

122)



A) Domain: [2, ∞); Range: (-∞, ∞)

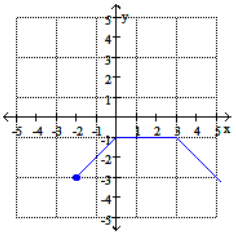
B) Domain: (-∞, 2]; Range: (-∞, ∞)

C) Domain: (-∞, ∞); Range: [2, ∞)

D) Domain: (-∞, ∞); Range: (-∞, 2]

Answer: C

123)



A) Domain: [-2, ∞]); Range [-3, -∞)

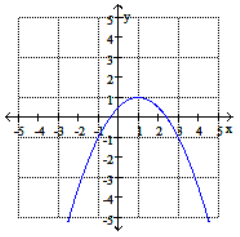
B) Domain: (-2, ∞); Range: (-∞, -1)

C) Domain: [-2, ∞); Range: (-∞, -1]

D) Domain: (-∞, -1]; Range: [-2, ∞)

Answer: C

124)



A) Domain: $(-\infty, 1]$; Range $(-\infty, \infty)$
B) Domain: $(-\infty, 1]$; Range $[3, \infty)$
C) Domain: $(-\infty, \infty)$; Range $(-\infty, \infty)$
D) Domain: $(-\infty, \infty)$; Range $(-\infty, 1]$

Answer: D

Write the domain in interval notation.

125) $f(x) = \dfrac{x + 7}{x + 3}$

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

Answer: C

126) $k\,(x) = \dfrac{x + 9}{x\ - 4}$

A) $(-\infty, -4) \cup (-4, \infty)$
B) $(-\infty, 4) \cup (4, \infty)$
C) $(-\infty, 9) \cup (9, \infty)$
D) $(-\infty, -9) \cup (-9, \infty)$

Answer: B

127) $f(x) = \dfrac{4}{\sqrt{3 - x}}$

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

Answer: D

128) $z(a) = \sqrt{a + 9}$

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

Answer: D

129) $y\,(t\,) = \sqrt{8 - t}$

A) $(-\infty, 8]$
B) $[0, 16]$
C) $(-\infty, 8)$
D) $(-\infty, \infty)$

Answer: A

130) $m(x) = \dfrac{5}{|x| + 1}$

A) $(-\infty, -1) \cup (-1, \infty)$
B) $(-\infty, -1) \cup (-1, 1) \cup (1, \infty)$
C) (∞, ∞)
D) $(-\infty, -5) \cup (-5, \infty)$

Answer: C

131) $r(x) = \dfrac{-14}{x^2 + 81}$

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

Answer: A

132) $f(x) = \dfrac{x - 4}{x - 5}$

A) $(-\infty, \infty)$
B) $(-\infty, 4) \cup (4, \infty)$
C) $(-\infty, 5) \cup (5, \infty)$
D) $((-\infty, -\sqrt{5}) \cup (-\sqrt{5}, \sqrt{5}) \cup (\sqrt{5}, \infty)$

Answer: C

133) $a(x) = \sqrt{8 - x}$

A) $(-8, \infty)$
B) $(-\infty, 8]$
C) $(-\infty, -8) \cup (-8, \infty)$
D) $[-8, \infty)$

Answer: B

134) $g(t) = \sqrt[3]{5 - t}$

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

Answer: C

135) $r(x) = x^2 + 2x - 35$

A) $(-\infty, -7) \cup (-7, 5) \cup (5, \infty)$
B) $(-\infty, -8) \cup (-8, \infty)$
C) $(-\infty, -5) \cup (-5, 7) \cup (7, \infty)$
D) $(-\infty, \infty)$

Answer: D

136) $w(a) = \dfrac{4}{6 - |a - 3|}$

A) $(-\infty, -3) \cup (-3, 9) \cup (9, \infty)$
B) $(-\infty, -3) \cup (-3, \infty)$
C) $(-\infty, 9) \cup (9, \infty)$
D) $(-\infty, \infty)$

Answer: A

137) $h(c) = \dfrac{2}{\sqrt{c + 11} - 1}$

A) $(-11, -10) \cup (-10, \infty)$
B) $(-11, \infty)$
C) $[-11, \infty)$
D) $[-11, -10) \cup (-10, \infty)$

Answer: D

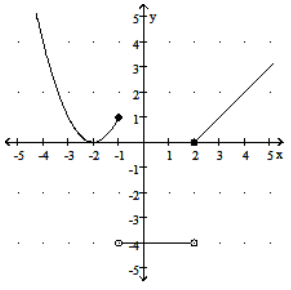
138) $p(x) = 7x + 1; x \geq 0$

A) $\left(-\infty, -\frac{1}{7}\right) \cup \left(-\frac{1}{7}, \infty\right)$
B) $[0, 4)$
C) $(-\infty, \infty)$
D) $[0, \infty)$

Answer: D

Use the graph of $y = f(x)$ to answer the questions.

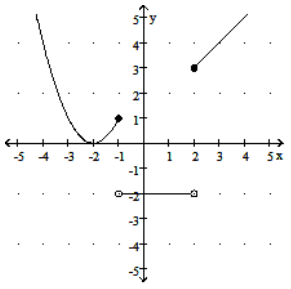
139) a. Determine $f(-1)$
b. Find all x for which $f(x) = -4$



A) $f(-1) = -4$; $f(x) = -4$ for $x = 4$
B) $f(-1) = 1$; $f(x) = -4$ for $x = 4$
C) $f(-1) = 1$; $f(x) = -4$ for all x on the interval $(-1, 2)$
D) $f(-1) = -4$; $f(x) = -4$ for all x on the interval $(-1,2)$

Answer: C

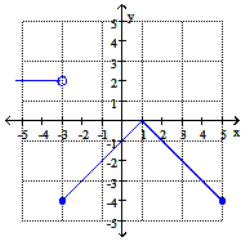
140) a. Determine $f(-1)$
b. Find the range of f.



A) $f(-1) = -2$; Range: $[-2, \infty)$
B) $f(-1) = 1$; Range: $[-2, \infty)$
C) $f(-1) = -2$; Range: $\{-2\} \cup [0, \infty)$
D) $f(-1) = 1$; Range: $\{-2\} \cup [0, \infty)$

Answer: D

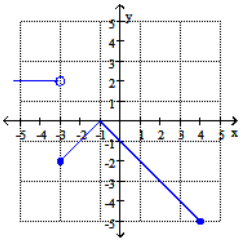
141) a. Determine the y-intercept
b. Find $f(-4)$



A) y-intercept: (0, -1); $f(-4) = -2$
B) y-intercept: (1, 0); $f(-4) = 2$
C) y-intercept: (0, -1); $f(-4) = 2$
D) y-intercept: (1, 0); $f(-4) = -2$

Answer: C

142) a. Determine the domain
b. Determine the x-intercept



A) Domain: [-5, 0]; x-intercept (0, -1)
B) Domain: (-∞, 4); x-intercept (-1, 0)
C) Domain: (-∞, ∞); x-intercept (0, -1)
D) Domain: [-5, 0] ∪ {2}; x-intercept (-1, 0)

Answer: B

Write a function defined by $y = f(x)$ subject to the following conditions.

143) The value of $f(x)$ is four more than eight times x.

A) $f(x) = 8x + 4$ B) $f(x) = 8x - 4$ C) $f(x) = 4x + 8$ D) $f(x) = 4x - 8$

Answer: A

144) The value of $f(x)$ is nine times the square root of x.

A) $f(x) = 9\sqrt{x}$ B) $f(x) = \sqrt{9x}$ C) $f(x) = (9x)^2$ D) $f(x) = 9x^2$

Answer: A

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

Provide the missing information.

145) A _____ diagram is a visual representation of a set of data points represented as ordered pairs.

Answer: scatter

146) A _____ equation in the variables x and y can be written in the form $Ax + By = C$, where A and B are not both zero.

Answer: linear

147) An equation of the form $x = k$ where k is a constant represents the graph of a _____ line.

Answer: vertical

148) An equation of the form $y = k$ where k is a constant represents the graph of a _____ line.

Answer: horizontal

149) True or false: The slope between any two distinct points on a nonvertical line is a constant.

Answer: True

150) Write the formula for the slope of a line between the two distinct points (x_1, y_1) and (x_2, y_2).

Answer: $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

151) The slope of a horizontal line is _____.

Answer: zero

152) The slope of a vertical line is _____.

Answer: undefined

153) An equation written in the form $y = mx + b$ is said to be written in _____-_____ form.

Answer: slope-intercept

154) A function f is a linear function if $f(x)$ = _____ where m represents the slope and $(0, b)$ represents the y-intercept.

Answer: $mx + b$

155) If f is defined on the interval $[x_1, x_2]$, then the average rate of change of f on the interval $[x_1, x_2]$ is given by the formula _____.

Answer: $m = \dfrac{f(x_2) - f(x_1)}{x_2 - x_1}$

156) The graph of a constant function defined by $f(x) = b$ is a (horizontal/vertical) line.

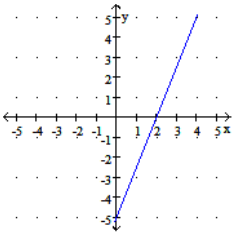
Answer: horizontal

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

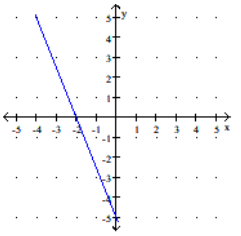
Graph the equation and identify the *x*- and *y*-intercepts.

157) $-5x - 2y = 10$

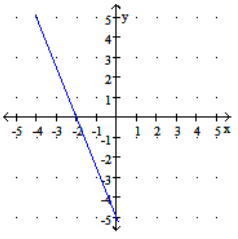
A) *x*-intercept: (-5, 0);
y-intercept: (0, 2)



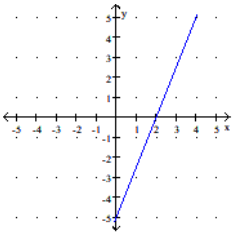
B) *x*-intercept: (-2, 0);
y-intercept: (0, -5)



C) *x*-intercept: (-5, 0);
y-intercept: (0, -2)



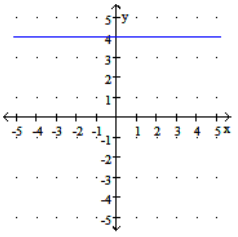
D) *x*-intercept: (2, 0);
y-intercept: (0, -5)



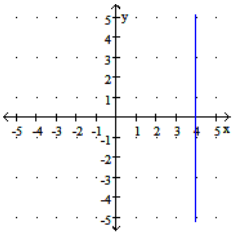
Answer: B

158) $5y + 1 = 21$

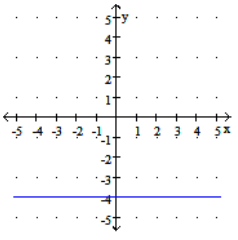
A) *x*-intercept: none; *y*-intercept: (0, 4)



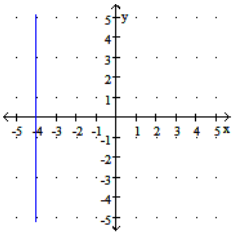
B) *x*-intercept: (4,0); *y*-intercept: none



C) *x*-intercept: none; *y*-intercept: (0, -4)



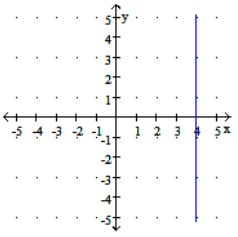
D) *x*-intercept: (-4,0); *y*-intercept: none



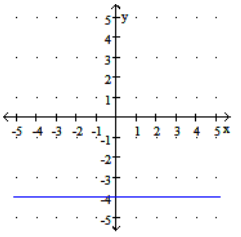
Answer: A

159) $5x + 4 = 24$

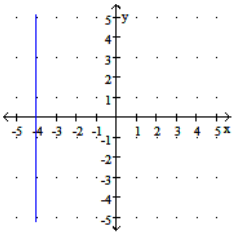
A) *x*-intercept: (4,0); *y*-intercept: none



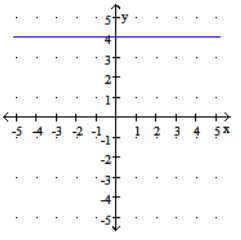
B) *x*-intercept: none; *y*-intercept: (0, -4)



C) *x*-intercept: (-4,0); *y*-intercept: none



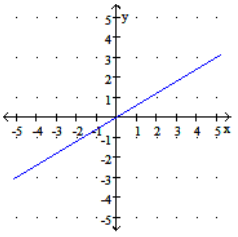
D) *x*-intercept: none; *y*-intercept: (0, 4)



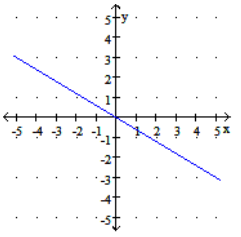
Answer: A

160) $3x = -5y$

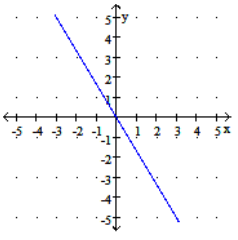
A) *x*-intercept: (0, 0); *y*-intercept: (0, 0)



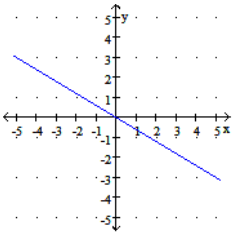
B) *x*-intercept: (0, 0); *y*-intercept: (0, 0)



C) *x*-intercept: (0, 0); *y*-intercept: (0, 0)



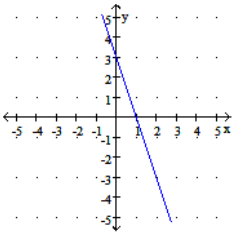
D) *x*-intercept: none; *y*-intercept: none



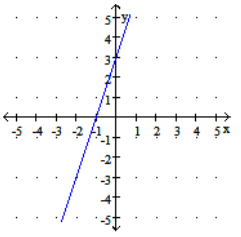
Answer: B

161) $0.03x + 0.01y = 0.03$

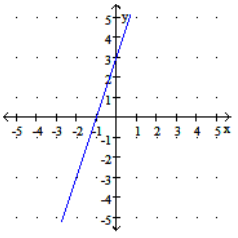
A) x-intercept: (1, 0); y-intercept: (0, 3)



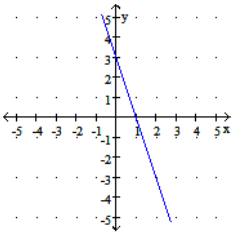
B) x-intercept: (-1, 0); y-intercept: (0, 3)



C) x-intercept: (0, 3); y-intercept: (-1, 0)



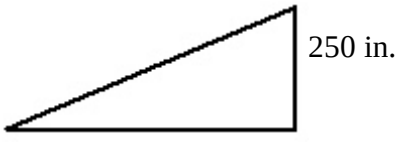
D) x-intercept: (0, 3); y-intercept: (1, 0)



Answer: A

Find the average slope of the ramp.

162)



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

B) $m = \frac{1}{4}$

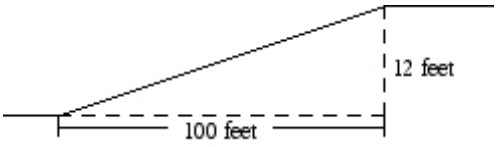
C) $m = 4$

D) $m = -4$

Answer: B

Find the slope of the ramp pictured below.

163)



A) $\frac{25}{3}$ B) 88 C) -88 D) $\frac{3}{25}$

Answer: D

Solve the problem.

164) If a plane loses 800 feet in altitude over a horizontal distance of 14,000 feet, what is the slope?

A) $-\frac{2}{35}$ B) $\frac{2}{37}$ C) $-\frac{35}{2}$ D) $\frac{2}{35}$

Answer: A

Determine the slope of the line passing through the given points.

165) (1, -1) and (-8, -3)

A) $m = \frac{9}{2}$ B) $m = \frac{2}{9}$ C) $m = -\frac{2}{9}$ D) $m = -\frac{9}{2}$

Answer: B

166) (-2, -2) and (-2, 3)

A) 5 B) 0 C) 1 D) Undefined

Answer: D

167) (-7, -10) and (5, -10)

A) 1 B) Undefined C) 12 D) 0

Answer: D

168) (8, -1) and (10, -7)

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

Answer: C

169) $\left(\frac{3}{5}, \frac{2}{3}\right)$ and $\left(-\frac{1}{9}, -\frac{8}{7}\right)$

A) $m = \frac{285}{112}$ B) $m = -\frac{75}{77}$ C) $m = -\frac{285}{77}$ D) $m = -\frac{21}{325}$

Answer: A

170) $\left(\frac{5}{3}, \frac{5}{2}\right)$ and $\left(-\frac{1}{4}, \frac{1}{2}\right)$

A) $m = \frac{24}{17}$ B) $m = \frac{23}{24}$ C) $m = -\frac{24}{17}$ D) $m = \frac{24}{23}$

Answer: D

171) (-3.4, 3.4) and (-4.4, 2.1).

A) $m = 0.77$ B) $m = -1.3$ C) $m = 1.3$ D) $m = -0.77$

Answer: C

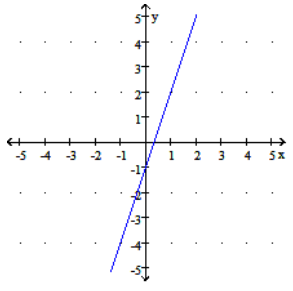
172) $(3\sqrt{11}, 6\sqrt{6})$ and $(\sqrt{11}, \sqrt{6})$

A) $m = \frac{5\sqrt{66}}{22}$ B) $m = -2$ C) $m = -\frac{5\sqrt{66}}{22}$ D) $m = 2$

Answer: A

Determine the slope of the line.

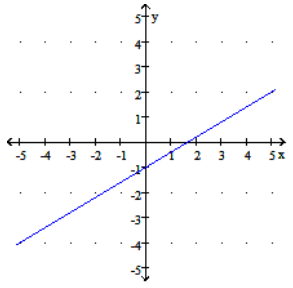
173)



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

Answer: A

174)



A) $m = -\frac{3}{5}$ B) $m = \frac{5}{3}$ C) $m = \frac{3}{5}$ D) $m = -\frac{5}{3}$

Answer: C

Solve the problem.

175) If the slope of a line is $\frac{7}{10}$, how much vertical change will be present for a horizontal change of 63 ft?

A) 441 ft B) 90 ft C) 6.3 ft D) 44.1 ft

Answer: D

Write the equation in slope-intercept form and determine the slope and *y*-intercept.

176) $-2x = -3y - 6$

A) $y = \frac{2}{3}x + 6$; slope: $\frac{2}{3}$; *y*-intercept: (0, 6)

B) $y = -\frac{2}{3}x + 6$; slope: $-\frac{2}{3}$; *y*-intercept: (0, 6)

C) $y = -\frac{2}{3}x - 2$; slope: $-\frac{2}{3}$; *y*-intercept: (0, -2)

D) $y = \frac{2}{3}x - 2$; slope: $\frac{2}{3}$; *y*-intercept: (0, -2)

Answer: D

Determine the slope and the *y*-intercept of the line.

177) $6 = -6y$

A) Slope: 1; *y*-intercept: (0, -1)

B) Slope: 0; *y*-intercept: (-1, 0)

C) Slope: 0; *y*-intercept: (0, -1)

D) Slope: undefined; *y*-intercept: (-1, 0)

Answer: C

178) $6x - 5y = 4$

A) Slope: Slope: $\frac{5}{6}$; y-intercept: $\left(0, -\frac{5}{4}\right)$

B) Slope: $-\frac{6}{5}$; y-intercept: $\left(0, -\frac{4}{5}\right)$

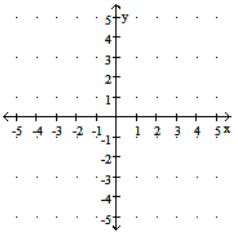
C) Slope: Slope: $\frac{6}{5}$; y-intercept: $\left(0, -\frac{4}{5}\right)$

D) Slope: Slope: $\frac{6}{5}$; y-intercept: $(0, 4)$

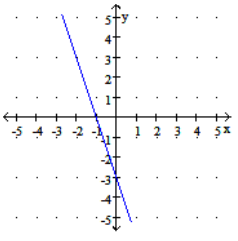
Answer: C

Write the equation in slope-intercept form. Then, graph the line using the slope and y-intercept.

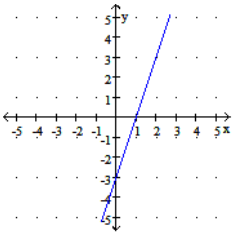
179) $3x = 3 - y$



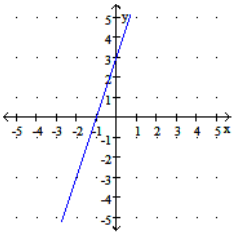
A) $y = -3x - 3$



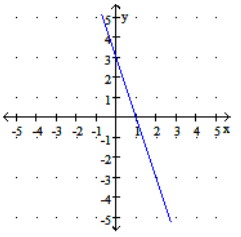
B) $y = 3x - 3$



C) $y = 3x + 3$

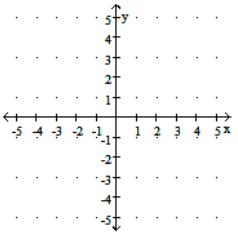


D) $y = -3x + 3$

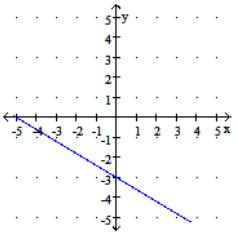


Answer: D

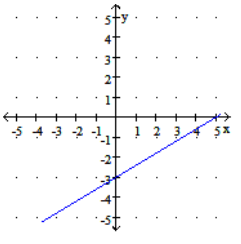
180) $-3x + 5y = -15$



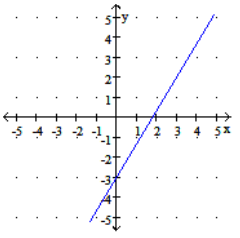
A) $y = -\frac{3}{5}x - 3$



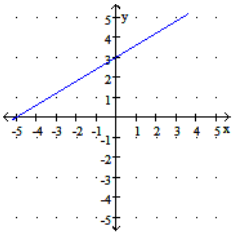
B) $y = \frac{3}{5}x - 3$



C) $y = \frac{5}{3}x - 3$

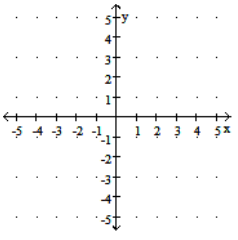


D) $y = \frac{3}{5}x + 3$

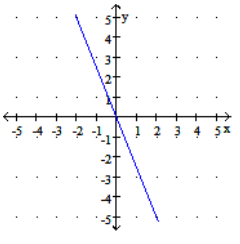


Answer: B

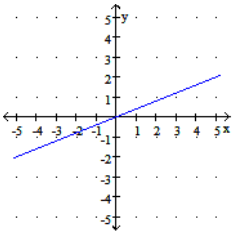
181) $-5x - 2y = 0$



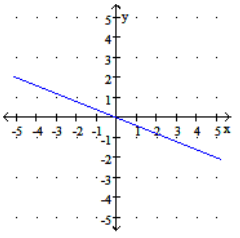
A) $y = -\frac{5}{2}x$



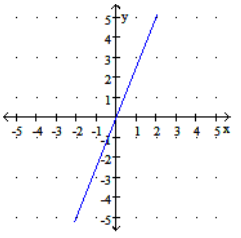
B) $y = \frac{2}{5}x$



C) $y = -\frac{2}{5}x$



D) $y = \frac{5}{2}x$



Answer: A

Determine if the function is linear, constant, or neither.

182) $f(x) = \frac{5}{3}$

A) linear B) constant C) neither

Answer: B

Use the slope-intercept form to write an equation of the line that passes through the given point and has the given slope. Use function notation where $y = f(x)$.

183) (-4, -5); $m = 4$

A) $f(x) = 4x - 5$ B) $f(x) = 4x + 11$ C) $f(x) = 4x - 4$ D) $f(x) = 4x - 25$

Answer: B

184) (-3, 1); $m = -\frac{2}{3}$

A) $f(x) = -\frac{2}{3}x - 3$ B) $f(x) = -\frac{2}{3}x + 5$ C) $f(x) = \frac{2}{3}x - 1$ D) $f(x) = -\frac{2}{3}x - 1$

Answer: D

Use the slope-intercept form to write an equation of the line that passes through the given points. Use function notation where $y = f(x)$.

185) (2, -3) and (-7, -11)

A) $f(x) = -\frac{9}{8}x - \frac{1}{9}$ B) $f(x) = -\frac{8}{9}x - \frac{1}{9}$ C) $f(x) = \frac{8}{9}x - \frac{43}{9}$ D) $f(x) = \frac{9}{8}x - \frac{43}{9}$

Answer: C

186) (10, 2) and (8, 10)

A) $f(x) = -4x + 38$ B) $f(x) = -4x + 42$ C) $f(x) = -4x - 42$ D) $f(x) = 4x + 38$

Answer: B

Use the slope-intercept form to write an equation of the line that passes through the given point and has the given slope. Use function notation where $y = f(x)$.

187) (9, -3); $m = 0$

A) $f(x) = -3$ B) $f(x) = 9x$ C) $f(x) = 9$ D) $f(x) = 0$

Answer: A

188) (-2.5, 4.3); $m = -5.2$

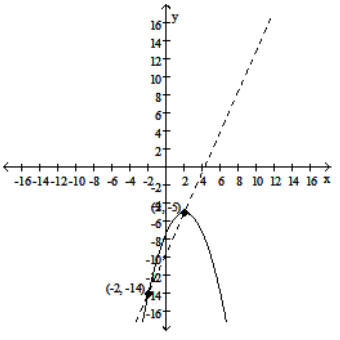
A) $f(x) = -5.2x + 8.7$ B) $f(x) = -5.2x - 8.7$

C) $f(x) = -8.7x - 5.2$ D) $f(x) = -5.2x + 4.3$

Answer: B

Find the slope of the secant line indicated with a dashed line.

189)



A) $m = \frac{4}{9}$ B) $m = -\frac{4}{9}$ C) $m = \frac{9}{4}$ D) $m = -\frac{9}{4}$

Answer: C

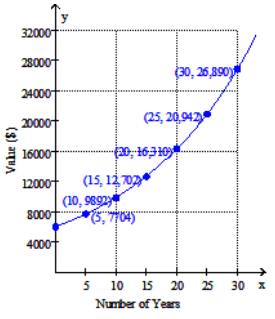
Solve the problem.

190) The population of a certain country since 1990 can be approximated by $f(t) = 0.008t^2 + 2.1t + 175$ where $f(t)$ is the population in millions and t represents the number of years since 1990. Find the average rate of change in the country's population between 1990 and 2010. Round to 1 decimal place.

A) 2.3 million/yr B) 2.9 million/yr C) 2.5 million/yr D) 2.0 million/yr

Answer: A

191) The function given by $y = f(x)$ shows the value of $6000 invested at 5% interest compounded continuously, x years after the money was originally invested. Find the average amount earned per year between the 25th year and 30th year.



A) $20,942.00/year B) $1189.60/year C) $5948.00/year D) $26,890.00/year

Answer: B

Determine the average rate of change of the function on the given interval.

192) $f(x) = \sqrt{x + 1}$ on [0, 3]

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

Answer: A

193) $f(x) = 3x^2 + 3$ on [3, 5]

A) $\frac{5}{2}$ B) $\frac{3}{2}$ C) -24 D) 24

Answer: D

194) $f(x) = x^3 + 3$ on $[2, 3]$

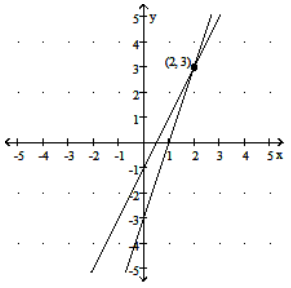
A) $\frac{19}{2}$ B) -19 C) 19 D) $-\frac{19}{2}$

Answer: C

Use the graph to solve the equation and inequality. Write the solution to the inequality in interval notation.

195) a. $3x - 3 = 2x - 1$

b. $3x - 3 > 2x - 1$

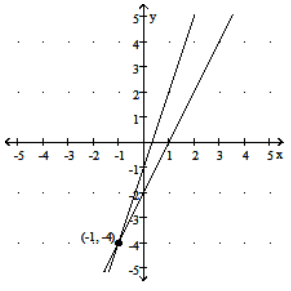


A) a. {3} b. $(-\infty, 3]$ B) a. {2}; b. $(2, \infty)$ C) a. {2}; b. $(-\infty, 2)$ D) a. {3}; b. $(3, \infty)$

Answer: B

196) a. $3x - 1 = 2x - 2$

b. $3x - 1 < 2x - 2$



A) a. {-1}; b. $(-\infty, -1)$ B) a. {-1}; b. $(-1, \infty)$ C) a. {-4} b. $(-\infty, -4]$ D) a. {-4}; b. $(-4, \infty)$

Answer: A

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

Provide the missing information.

197) Given a point (x_1, y_1) on a line with slope m, the point-slope formula is given by _____.

Answer: $y - y_1 = m(x - x_1)$

198) If two nonvertical lines have the same slope but different y-intercepts, then the lines are (parallel/perpendicular).

Answer: parallel

199) If m_1 and m_2 represent the slopes of two nonvertical perpendicular lines, then $m_1 m_2$ = _____.

Answer: -1

200) Suppose that $y = C(x)$ represents the cost to produce x items, and that $y = R(x)$ represents the revenue for selling x items. The profit $P(x)$ of producing and selling x items is defined by $P(x)$ = _____.

Answer: $R(x) - C(x)$

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

Use the point-slope formula to write an equation of the line that passes through the given points. Write the answer in slope-intercept form (if possible).

201) (3, -3) and (-4, -5)

A) $y = -\frac{7}{2}x - \frac{3}{7}$ B) $y = \frac{2}{7}x - \frac{27}{7}$ C) $y = \frac{7}{2}x - \frac{27}{7}$ D) $y = -\frac{2}{7}x - \frac{3}{7}$

Answer: B

202) Passes through (4, 1) and the slope is undefined.

A) $x = 4$ B) $y = x + 4$ C) $y = 1$ D) $y = x + 1$

Answer: A

Write an equation of the line satisfying the given conditions. Write the answer in standard form.

203) The line has a slope of $-\frac{6}{7}$ and contains the point (-5, -8).

A) $6x + 7y = -86$ B) $6x + 7y = 86$ C) $y = -\frac{6}{7}x - \frac{86}{7}$ D) $\frac{6}{7}x + y = \frac{83}{7}$

Answer: A

Write an equation of the line satisfying the given conditions. Write the answer in slope-intercept form.

204) The line passes through the point (15, -2) and has a slope of $\frac{2}{5}$.

A) $y = \frac{2}{5}x - 8$ B) $y = \frac{2}{5}x + 22$ C) $y = \frac{2}{5}x + 15$ D) $y = -\frac{2}{5}x - 8$

Answer: A

205) The line passes through the point (2, 13) and has a slope of 4.

A) $y = 4x + 5$ B) $y = -4x + 13$ C) $y = 4x + 2$ D) $y = 4x + 13$

Answer: A

206) The line passes through the point (-4, 1) and has a slope of $\frac{3}{2}$.

A) $y = \frac{3}{2}x - 5$ B) $y = \frac{3}{2}x + 7$ C) $y = -\frac{3}{2}x + 7$ D) $y = \frac{3}{2}x - 4$

Answer: B

207) The line passes through (12, 9) and (9, 9).

A) $y = -\frac{1}{6}x - \frac{21}{2}$ B) $x = 9$ C) $y = 9$ D) $y = -\frac{1}{6}x + \frac{21}{2}$

Answer: C

208) The line passes through (-12, -12) and (-12, -4).

A) $y = -12$ B) $x = -12$ C) $y = -12x$ D) $y = 12$

Answer: B

The slope of a line is given.
a. Determine the slope of a line parallel to the given line, if possible.
b. Determine the slope of a line perpendicular to the given line, if possible.

209) $m = \frac{8}{5}$

A) a. $m = 0$; b. $m = -\frac{8}{5}$ B) a. $m = \frac{8}{5}$; b. $m = \frac{5}{8}$

C) a. $m = 0$; b. $m = \frac{5}{8}$ D) a. $m = \frac{8}{5}$; b. $m = -\frac{5}{8}$

Answer: D

The slope of a line is given. Find the slope of a line parallel to the given line.

210) $m = \frac{11}{10}$

A) $-\frac{11}{10}$ B) $\frac{11}{10}$ C) $\frac{10}{11}$ D) $-\frac{10}{11}$

Answer: B

The slope of a line is given. Find the slope of a line perpendicular to the given line.

211) $m = \frac{14}{5}$

A) $\frac{5}{14}$ B) $\frac{14}{5}$ C) $-\frac{5}{14}$ D) $-\frac{14}{5}$

Answer: C

The slope of a line is given.
a. Determine the slope of a line parallel to the given line, if possible.
b. Determine the slope of a line perpendicular to the given line, if possible.

212) m is undefined

A) **a.** $m = 0$; **b.** m is undefined B) **a.** $m = 0$; **b.** $m = -1$
C) **a.** m is undefined; **b.** $m = 0$ D) **a.** $m = 0$; **b.** $m = 1$

Answer: C

Determine if the lines defined by the given equations are parallel, perpendicular, or neither.

213) $y = \frac{7}{5}x - 2$

$y = -\frac{7}{5}x - 4$

A) neither B) parallel C) perpendicular

Answer: A

214) $-4y = 2x + 5$
$-4x = 8y + 3$

A) parallel B) perpendicular C) neither

Answer: A

215) $-4x - 9y = -4$
$\frac{2}{3}x + \frac{3}{2}y = -9$

A) parallel B) perpendicular C) neither

Answer: A

216) $-4y = -3x - 3$
$-12x = 9y + 8$

A) perpendicular B) parallel C) neither

Answer: A

217) $-4x - 4y = -1$
$-\frac{1}{2}x + \frac{1}{2}y = 3$

A) perpendicular B) neither C) parallel

Answer: A

218) $-5x - 4y = 6$
$\frac{1}{2}x + \frac{2}{3}y = 8$

A) neither B) parallel C) perpendicular

Answer: A

Write an equation of the line satisfying the given conditions. Write the answer in standard form with no fractional coefficients.

219) Passes through (-1, -4) and is parallel to the line defined by $5x + 3y = -8$

A) $5x + 3y = -1$ B) $5x + 3y = -5$ C) $5x + 3y = -17$ D) $5x + 3y = -4$

Answer: C

220) Passes through (4, 4) and is perpendicular to the line defined by $-5x + 4y = -6$

A) $4x - 5y = -4$ B) $4x + 5y = 36$ C) $5x - 4y = 4$ D) $-5x - 4y = -36$

Answer: B

Write an equation of the line satisfying the given conditions.

221) Passes through (1, 4) and is parallel to the y-axis.

A) $x = 1$ B) $x = 4$ C) $y = 1$ D) $y = 4$

Answer: A

222) The line passes through (42, 17) and is parallel to $y = 6$.

A) $x = 42$ B) $y = 17$ C) $x = -\frac{1}{6}$ D) $y = -\frac{1}{6}$

Answer: B

223) The line passes through (25, 24) and is perpendicular to $y = 6$.

A) $y = 24$ B) $y = -\frac{1}{6}$ C) $x = 25$ D) $x = -\frac{1}{6}$

Answer: C

Solve the problem.

224) Joey borrows $2400 from his grandfather and pays the money back in monthly payments of $200.
a. Write a linear function that represents the remaining money owed $L(x)$ after x months.
b. Evaluate $L(10)$ and interpret the meaning in the context of this problem.

A) $L(x) = 200x + 2400$; $L(10) = 4400$, This represents the amount Joey still owes his grandfather after 10 months.
B) $L(x) = -200x + 2400$; $L(10) = 400$, This represents the amount Joey has paid his grandfather after 10 months.
C) $L(x) = -200x + 2400$; $L(10) = 400$, This represents the amount Joey still owes his grandfather after 10 months.
D) $L(x) = 200x + 2400$; $L(10) = 4400$, This represents the amount Joey has paid his grandfather after 10 months.

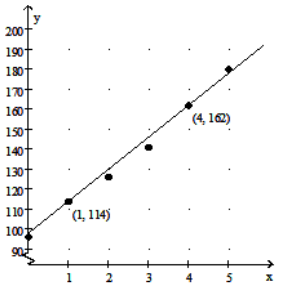
Answer: C

225) A bakery makes and sells pastries. The fixed monthly cost to the bakery is $770. The cost for labor, taxes, and ingredients for the pastries amounts to $0.90 per pastry. The pastries sell for $1.60 each.
a. Write a linear profit function representing the profit for producing and selling x pastries.
b. Determine the break-even point for the bakery.

A) a. $P(x) = 0.7x - 770$; b. 1100 pastries
B) a. $P(x) = 1.60x - 770$; b. 481 pastries
C) a. $P(x) = 1.60x + 770$; b. 481 pastries
D) a. $P(x) = 0.7x + 770$; b. 1100 pastries

Answer: A

226) The graph shows the number of organ transplants y in a certain country for the years 2005 to 2010 where x represents the number of years since 2005.



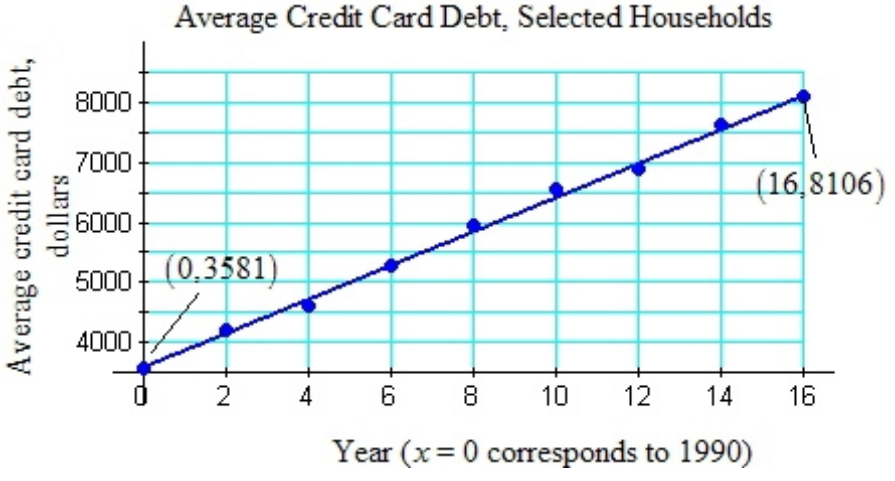
a. Use the points (1, 114) and (4, 162) to write a linear model for these data. Round the slope to one decimal place and the y-intercept to the nearest whole unit.
b. Use the model to approximate the number of organ transplants performed in 2012.

A) a. $y = 16.0x + 98$ b. approximately 290
B) a. $y = 16.0x + 114$ b. approximately 306
C) a. $y = 16.0x + 98$ b. approximately 210
D) a. $y = 16.0x + 114$ b. approximately 226

Answer: C

Plot the point on a rectangular coordinate system.

227) The figure represents the average credit card debt for selected households in Silerville.



Let y represent the credit card debt in dollars. Let x represent the year, where $x = 0$ corresponds to the year 1990, $x = 4$ represents 1994, and so on.

a. Use the ordered pairs given in the graph, (0, 3581) and (16, 8106) to find a linear equation to estim average credit card debt versus the year. Round the slope to the nearest tenth.
b. Use the model from (a) to estimate the average debt in 2003. Round to the nearest dollar.
c. Interpret the slope of the model in the context of this problem.

A) a. $y = 282.8x + 3581$
b. -$95.4 in 2003
c. The average household credit card debt is decreasing at approximately $3581 per year.

B) a. $y = 282.8x + 3581$
b. $7257 in 2003
c. The average household credit card debt is increasing at approximately $283 per year.

C) a. $y = 282.8x + 3581$
b. $7257 in 2003
c. The average household credit card debt is increasing at approximately $3581 per year.

D) a. $y = -282.8x + 3581$
b. $95.4 in 2003
c. The average household credit card debt is decreasing at approximately $283 per year.

Answer: B

Solve the problem.

228) At the Jumping Jack cookie factory, quality assurance inspectors remove broken or otherwise defective cookies from a moving conveyor belt prior to packaging. Based on past studies, the plant manager knows that the inspectors eliminate 98% of the defective cookies at a conveyor belt speed of 9 feet per minute. As the belt speed increases, the factory can produce more cookies per hour, but at the cost of lower quality of the packaged product. Inspectors collect only 60% of defective cookies at a belt speed of 18 feet per minute.

a. Find an equation of the line through the given points. Write the equation in slope-intercept form. R the slope and y-intercept each to 1 decimal place.
b. Use the equation from part (b) to predict the efficiency of the inspectors at a belt speed of 15 feet p minute. Round to the nearest percent.

A) a. $y = 136.0 + 4.2x$
b. 73% at a belt speed of 15 feet per minute.

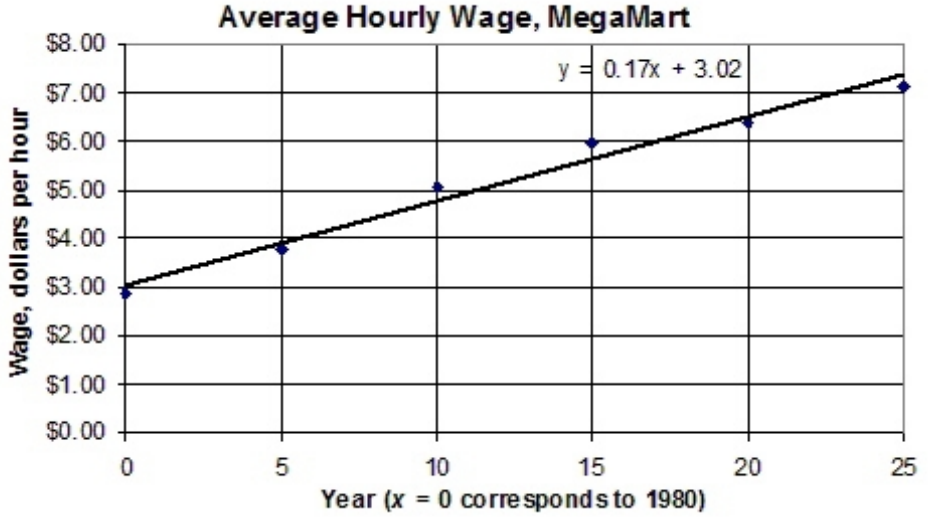
B) a. $y = 136.0 - 4.2x$
b. 66.5% at a belt speed of 15 feet per minute.

C) a. $y = 136.0 - 4.2x$
b. 73% at a belt speed of 15 feet per minute.

D) a. $y = 136.0 + 4.2x$
b. 66.5% at a belt speed of 15 feet per minute.

Answer: C

229) The following figure represents the average hourly wage for employees of MegaMart from 1980 to 2005.



Let y represent the hourly wage and let x represent the year, where $x = 0$ corresponds to the year 198($x = 1$ represents 1981, and so on. Then the average wage can be approximated by the equation $y = 0.17x + 3.02$, where $0 \le x \le 25$.

Use the linear equation to approximate the average wage for the year 1990 and compare it to the actu wage of $5.05 per hour.

A) $4.72 per hour; the calculated wage was $0.33 less than the actual wage.
B) $5.57 per hour; the calculated wage was $0.52 more than the actual wage.
C) $3.87 per hour; the calculated wage was $0.12 more than the actual wage.
D) $3.87 per hour; the calculated wage was $1.18 less than the actual wage.

Answer: A

230) In 2005, a special mixed-nut blend at a store cost $1.35 per lb, and in 2010 the blend cost $1.83 per lb. Let y represent the cost of a pound of the mixed-nut blend x years after 2005. Use a linear equation model to estimate the cost of a pound of the mixed-nut blend in 2007.

A) $1.59 B) $1.64 C) $1.54 D) $1.68

Answer: C

231) A certain medicine is administered to animals based on the weight. The recommended dose is 4 mg per lb of the animal's weight. Construct a linear function and use it to determine what size animal would require a 1300-mg dose of the medicine.

A) 5200 lb B) 325 lb C) 2600 lb D) 650 lb

Answer: B

232) A tumor originally weighed 34 g. Every day, chemotherapy treatment reduces the size of the tumor by 2.49 g. Express the size of the tumor as a linear function of the number of days spent in chemotherapy then determine how much the tumor weighs after 5 days of treatment.

A) $W(x) = -2.49x + 34$; 12.45 g
B) $W(x) = 34x - 2.49$; 12.45 g
C) $W(x) = 34x - 2.49$; 21.55 g
D) $W(x) = -2.49x + 34$; 21.55 g

Answer: D

233) The fixed and variable costs to produce an item are given along with the price at which an item is sol Determine the break-even point.

Fixed cost: $2093
Variable cost per items: $34.50
Price at which the item is sold: $80.00

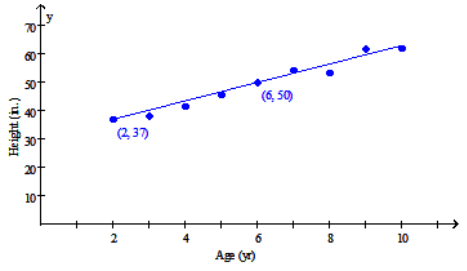
A) 46 items B) 18 items C) 26 items D) 61 items

Answer: A

234) A pediatrician records the age x (in yr) and average height y (in inches) for girls between the ages of 2 and 10.

a. Use the points (2, 37) and (6, 50) to write a linear model for these data.

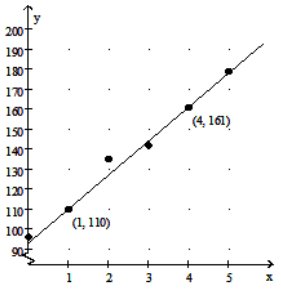
b. Use the model to forecast the average height of 11-yr-old girls.



A) **a.** $y = 3x + 29.5$; **b.** 62.5 in.
B) **a.** $y = 3.25x + 30.5$; **b.** 67.25 in.
C) **a.** $y = 3x + 29.5$; **b.** 63.25 in.
D) **a.** $y = 3.25x + 30.5$; **b.** 66.25 in.

Answer: D

235) The graph shows the number of organ transplants y in a certain country for the years 2005 to 2010 where x represents the number of years since 2005.



The linear model $y = 17.0x + 93$ was created using the points (1, 110) and (4, 161).

a. Interpret the meaning of the slope in the context of this problem.

b. Interpret the meaning of the y-intercept in the context of this problem.

A) a. $m = 17.0$ means that the number of organ transplants increased at an average rate of 17.0 per yr during this time period.
b. The y-intercept is (0, 93) and means that approximately 93 organ transplants were performed in the year 2005.

B) a. $m = 17.0$ means that 17.0 more organ transplants were performed in 2009 than in 2006.
b. The y-intercept is (0, 93) and means that health officials predicted that approximately 93 organ transplants would be performed in the year 2005.

C) a. $m = 17.0$ means that the number of organ transplants increased at an average rate of 17.0 per yr during this time period.
b. The y-intercept is (0, 96) and means that approximately 96 organ transplants were performed in the year 2005.

D) a. $m = 17.0$ means that 17.0 more organ transplants were performed in 2009 than in 2006.
b. The y-intercept is (0, 96) and means that health officials predicted that approximately 96 organ transplants would be performed in the year 2005.

Answer: A

Compute the least-squares regression line for the given data set.

236)

x	2	3	4	5	6	7
y	3.4	-1.7	-3	-4.3	-10.9	-13.9

A) $y = 3.46x + 3.4$

B) $y = 3.46x + 9.77$

C) $y = -3.30x + 9.77$

D) $y = 9.77x - 3.30$

Answer: C

Compute the least-squares regression line for predicting the ribeye price from the corn price.

237) One of the primary feeds for beef cattle is corn. The following table presents the average price in dollars for a bushel of corn and a pound of ribeye steak for 10 consecutive months.

Corn Price ($/bu)	Ribeye Price ($/lb)
6.67	14.42
5.75	11.90
6.06	12.35
5.92	12.62
6.36	13.01
6.13	13.27

A) $y = 2.46 - 2.22x$

B) $y = -2.22 + 2.46x$

C) $y = 2.22 + 0.41x$

D) $y = -2.22 + 0.41x$

Answer: B

Compute the least-squares regression line for predicting the temperature from the chirp rate.

238) The common cricket can be used as a crude thermometer. The colder the temperature, the slower the rate of chirping. The table below shows the average chirp rate of a cricket at various temperatures.

Chirp Rate (chirps/second)	Temperature (°F)
3.8	71.2
2.3	52
2.2	48.9
1.1	34.5
1.5	53.8
1.2	42.9

A) $y \approx 11.09 + 28.18x$

B) $y \approx 13.59 + 28.18x$

C) $y \approx 28.18 + 11.09x$

D) $y \approx 28.18 + 13.59x$

Answer: C

Solve the problem.

239) The data in the table shows the number of violent crimes in a certain city in the even years since 2000.

Years Since 2000 (x)	Number of Violent Crimes (y)
0	19
2	33
4	43
6	46
8	57
10	63
12	78

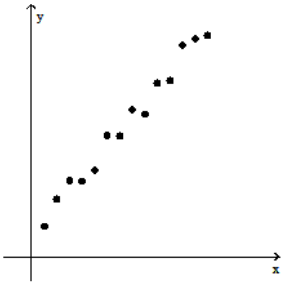
Use the data to find the least-squares regression line. Round the slope and y-intercept to 1 decimal pl
Use the model to approximate the number of violent crimes in the city in 2005.

A) $y = 4.4x + 22.3$; approximately 44.3
B) $y = 4.8x + 22.1$; approximately 46.1
C) $y = 4.1x + 20.9$; approximately 44.5
D) $y = 4.5x + 21.5$; approximately 44.0

Answer: D

Use the scatter plot to determine if a linear regression model appears to be appropriate.

240)



A) Yes
B) No

Answer: A

Solve the problem.

241) The table below shows the wind speed y (in mph) of a hurricane versus the barometric pressure x (in mb).

Barometric Pressure (mb) (x)	Wind Speed (mph) (y)
1005	35
1004	45
1000	50
996	65
984	80
970	100
949	110
929	145
904	160

a. Use the data in the table to find the least-squares regression line. Round the slope to 2 decimal places and the y-intercept to the nearest whole unit.
b. Use the model in part (a) to approximate the wind speed of a hurricane with a barometric pressure of 900 mb.

A) **a.** $y = -1.38x + 1395$; **b.** 155 mph
B) **a.** $y = -1.38x + 1395$; **b.** 153 mph
C) **a.** $y = -1.2x + 1251$; **b.** 171 mph
D) **a.** $y = -1.2x + 1251$; **b.** 155 mph

Answer: C

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

Provide the missing information.

242) A function defined by $f(x) = mx + b$ is a _____ function and its graph is a line in a rectangular coordinate system.

Answer: linear

243) Let c represent a positive real number. The graph of $y = f(x) + c$ is the graph of $y = f(x)$ shifted (up/down/left/right) c units.

Answer: up

244) Let c represent a positive real number. The graph of $y = f(x + c)$ is the graph of $y = f(x)$ shifted (up/down/left/right) c units.

Answer: left

245) Let c represent a positive real number. The graph of $y = f(x - c)$ is the graph of $y = f(x)$ shifted (up/down/left/right) c units.

Answer: right

246) Let c represent a positive real number. The graph of $y = f(x) - c$ is the graph of $y = f(x)$ shifted (up/down/left/right) c units.

Answer: down

247) The graph of $y = 3f(x)$ is the graph of $y = f(x)$ with a (choose one: vertical stretch, vertical shrink, horizontal stretch, horizontal shrink).

Answer: vertical stretch

248) The graph of $y = f(3x)$ is the graph of $y = f(x)$ with a (choose one: vertical stretch, vertical shrink, horizontal stretch, horizontal shrink).

Answer: horizontal shrink

249) The graph of $y = f(\frac{1}{3}x)$ is the graph of $y = f(x)$ with a (choose one: vertical stretch, vertical shrink, horizontal stretch, horizontal shrink).

Answer: horizontal stretch

250) The graph of $y = \frac{1}{3}f(x)$ is the graph of $y = f(x)$ with a (choose one: vertical stretch, vertical shrink, horizontal stretch, horizontal shrink).

Answer: vertical shrink

251) The graph of $y = -f(x)$ is the graph of $y = f(x)$ reflected across the _____ axis.

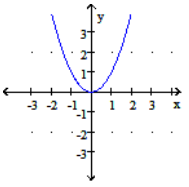
Answer: x

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

From memory match each equation with its graph.

252) $f(x) = \sqrt[3]{x}$ $g(x) = x^2$ $h(x) = |x|$

I



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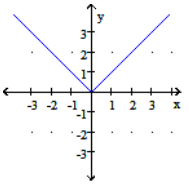
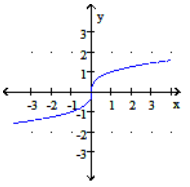


III

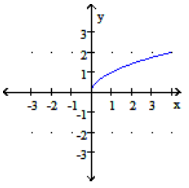


A) $f(x)$, I; $g(x)$, III; $h(x)$, II
B) $f(x)$, III; $g(x)$, I; $h(x)$, II
C) $f(x)$, III; $g(x)$, II; $h(x)$, I
D) $f(x)$, II; $g(x)$, III; $h(x)$, I

Answer: B

253) $f(x) = \sqrt{x}$ $g(x) = \dfrac{1}{x}$ $h(x) = x^2$

I



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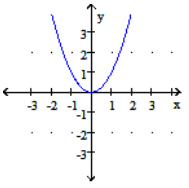
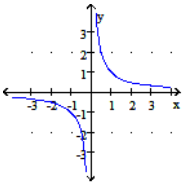


III



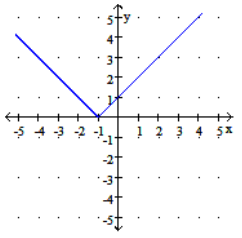
A) $f(x)$, III; $g(x)$, II; $h(x)$, I
B) $f(x)$, III; $g(x)$, I; $h(x)$, II
C) $f(x)$, II; $g(x)$, III; $h(x)$, I
D) $f(x)$, I; $g(x)$, III; $h(x)$, II

Answer: D

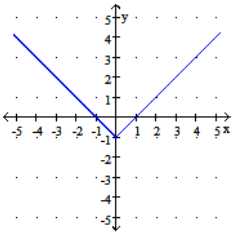
Use translations to graph the given function.

254) $f(x) = |x + 1|$

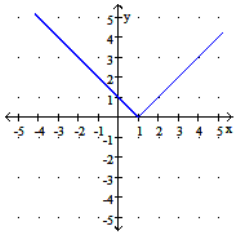
A)



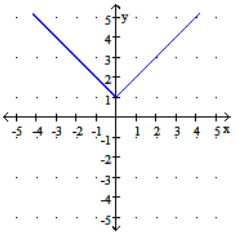
B)



C)



D)

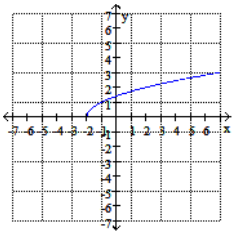


Answer: A

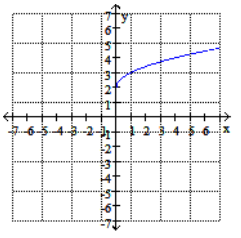
Sketch the graph using transformations of a parent function (without a table of values).

255) $r(x) = \sqrt{x} + 2$

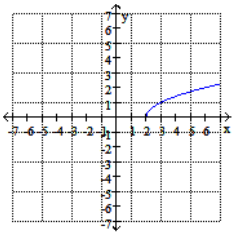
A)



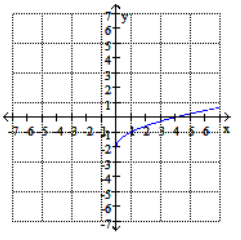
B)



C)



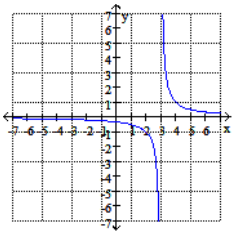
D)



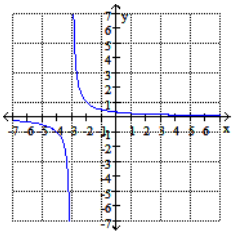
Answer: B

256) $m(x) = \dfrac{1}{x} + 3$

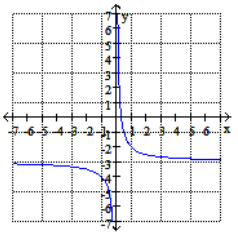
A)



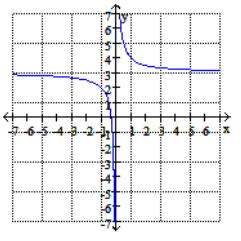
B)



C)



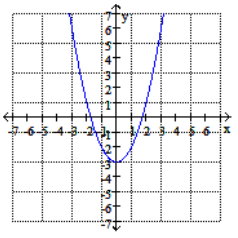
D)



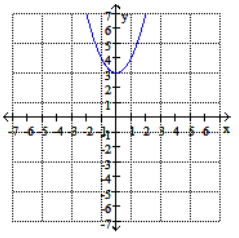
Answer: D

257) $a(x) = x^2 - 3$

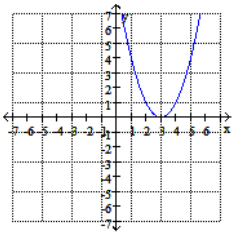
A)



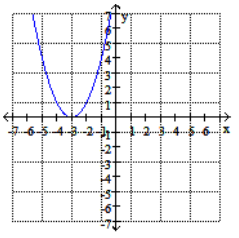
B)



C)



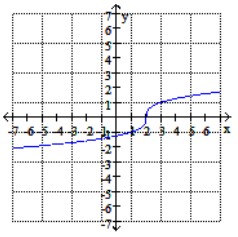
D)



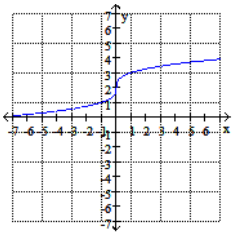
Answer: A

258) $h(x) = \sqrt[3]{x - 2}$

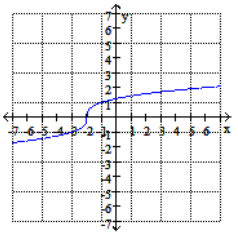
A)



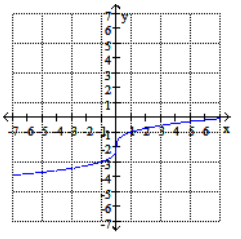
B)



C)



D)

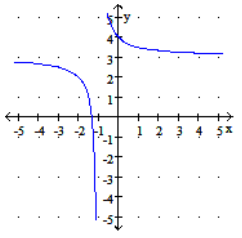


Answer: A

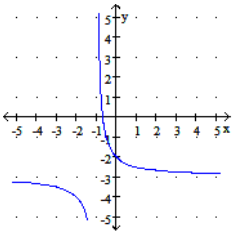
Use translations to graph the given function.

259) $g(x) = \dfrac{1}{x - 1} + 3$

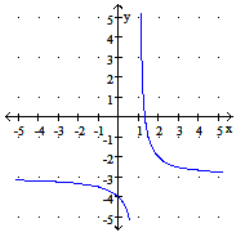
A)



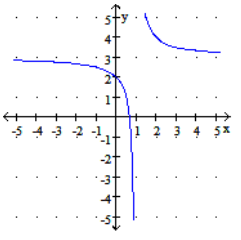
B)



C)



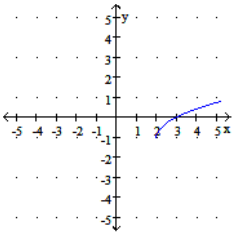
D)



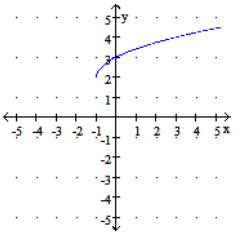
Answer: D

260) $a(x) = \sqrt{x - 2} - 1$

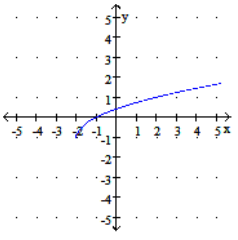
A)



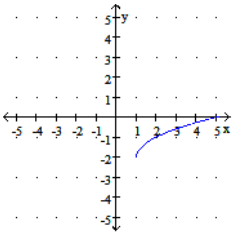
B)



C)



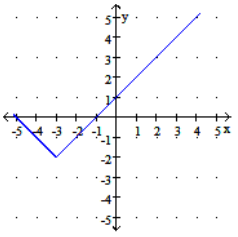
D)



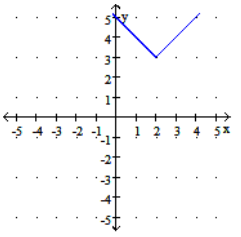
Answer: A

261) $b(x) = |x - 2| + 3$

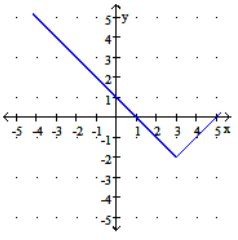
A)



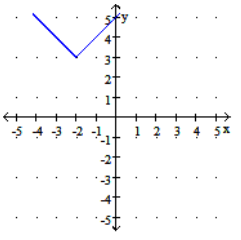
B)



C)



D)

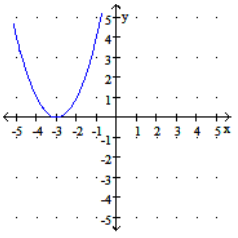


Answer: B

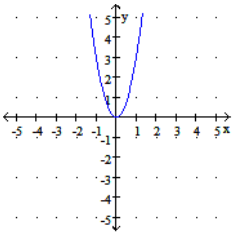
Use transformations to graph the given function.

262) $f(x) = 3x^2$

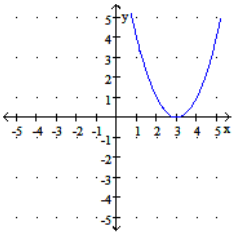
A)



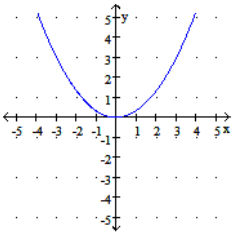
B)



C)



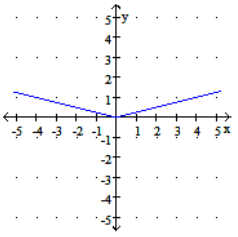
D)



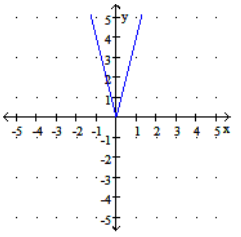
Answer: B

263) $f(x) = |4x|$

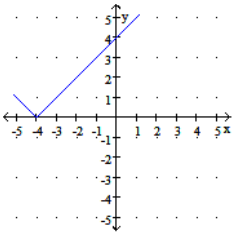
A)



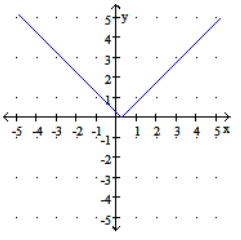
B)



C)



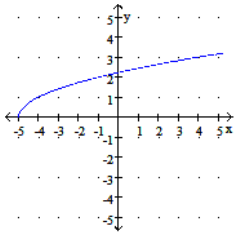
D)



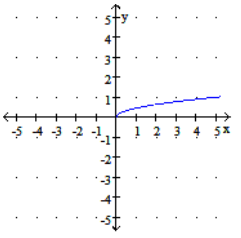
Answer: B

264) $q(x) = \sqrt{5x}$

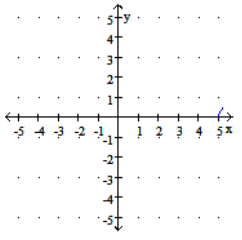
A)



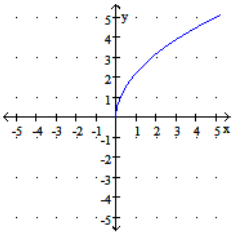
B)



C)



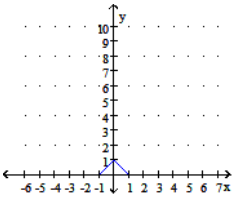
D)



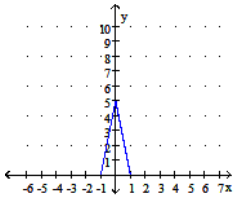
Answer: D

Solve the problem.

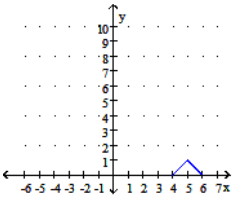
265) Use the graph of $y = f(x)$ below to graph $y = 5f(x)$



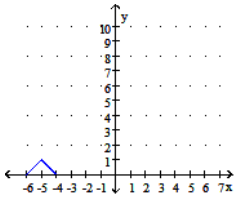
A)



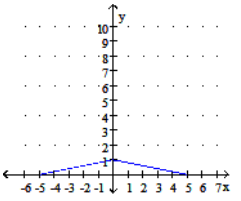
B)



C)

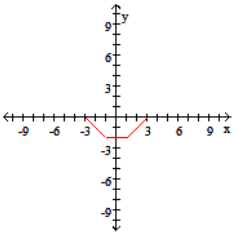


D)

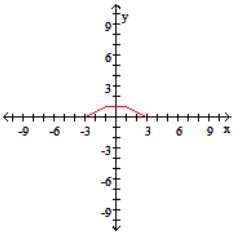


Answer: A

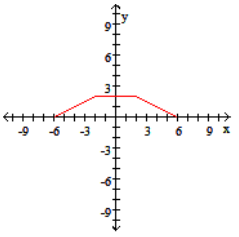
266) Use the graph of $y = b(x)$ below to graph $y = b(\frac{1}{2}x)$.



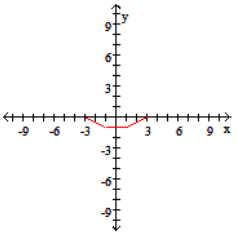
A)



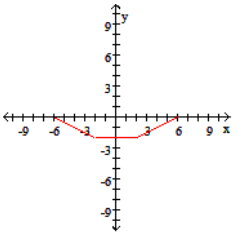
B)



C)



D)

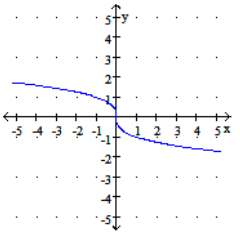


Answer: D

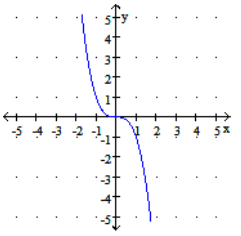
Graph the function by applying an appropriate reflection.

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

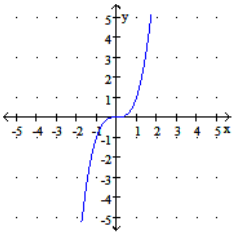
A)



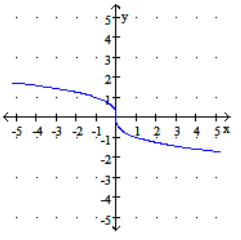
B)



C)



D)

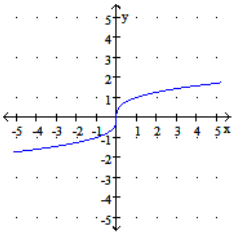


Answer: A

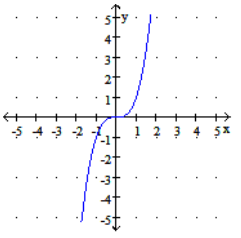
Graph the equation by plotting points.

268) $p(x) = -x^3$

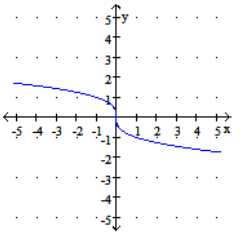
A)



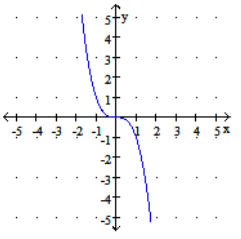
B)



C)



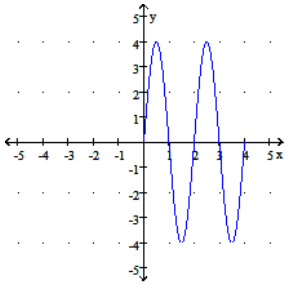
D)



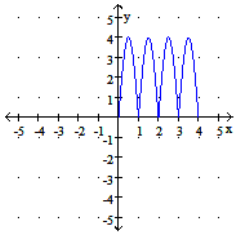
Answer: D

Use the graph of $y = f(x)$ below to graph $y = -f(x)$

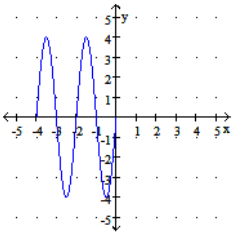
269)



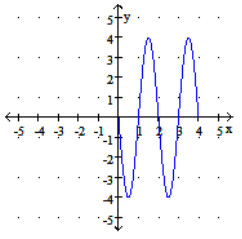
A)



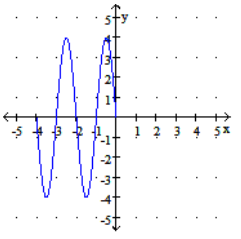
B)



C)



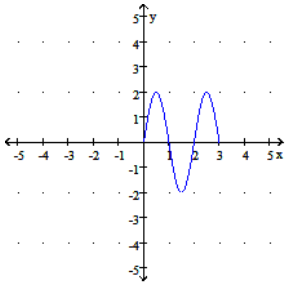
D)



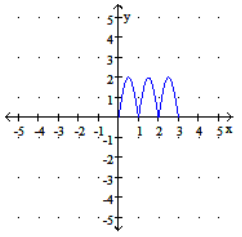
Answer: C

Use the graph of $y = f(x)$ below to graph $y = f(-x)$

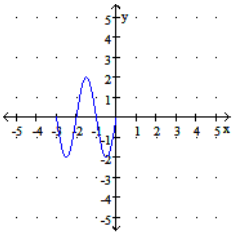
270)



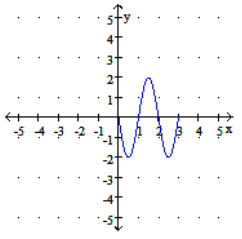
A)



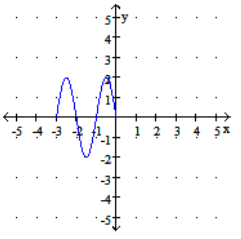
B)



C)

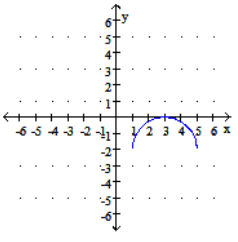


D)

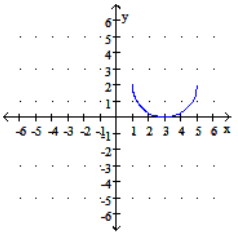


Answer: D

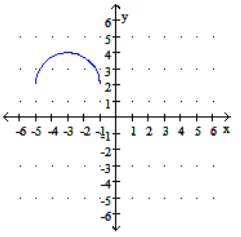
271)



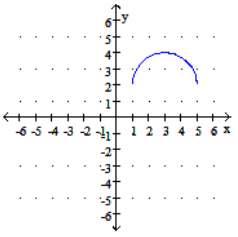
A)



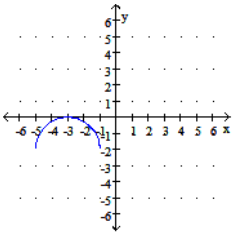
B)



C)



D)

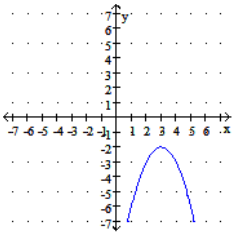


Answer: D

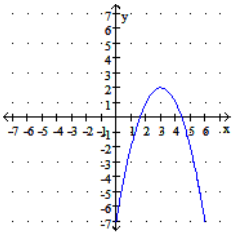
Use transformations to graph the given function.

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

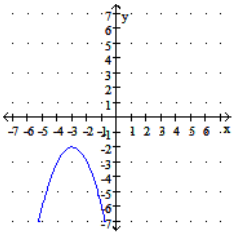
A)



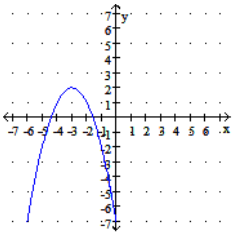
B)



C)



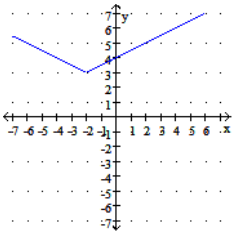
D)



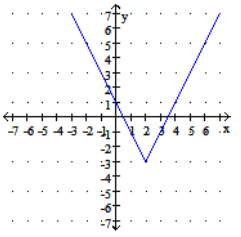
Answer: D

273) $f(x) = \frac{1}{2}|x + 2| + 3$

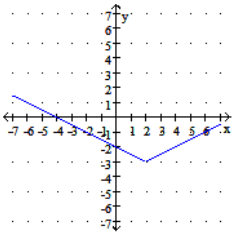
A)



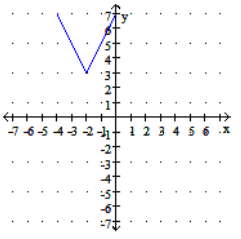
B)



C)



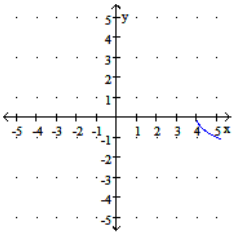
D)



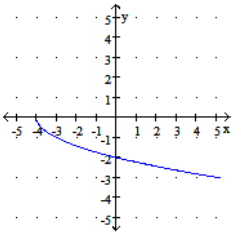
Answer: A

274) $f(x) = \sqrt{-x - 4}$

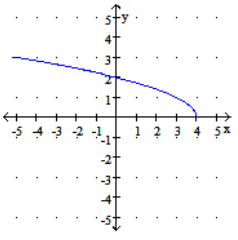
A)



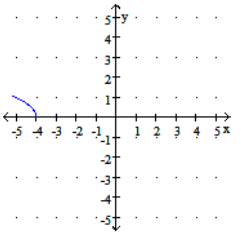
B)



C)



D)



Answer: D

A function *g* is given. Identify the parent function. Then use the steps for graphing multiple transformations of functions to list, in order, the transformations applied to the parent function to obtain the graph of g.

275) $g(x) = \dfrac{4}{x + 5} - 3$

A) Parent function: $f(x) = \dfrac{1}{x}$; Shift the graph of f to the left 5 units, shrink the graph vertically by a factor of $\dfrac{1}{4}$, and shift the graph downward by 3 units.

B) Parent function: $f(x) = \dfrac{1}{x}$; Shift the graph of f to the right 5 units, shrink the graph vertically by a factor of $\dfrac{1}{4}$, and shift the graph upward by 3 units.

C) Parent function: $f(x) = \dfrac{1}{x}$; Shift the graph of f to the left 5 units, stretch the graph vertically by a factor of 4, and shift the graph downward by 3 units.

D) Parent function: $f(x) = \dfrac{1}{x}$; Shift the graph of f to the right 5 units, stretch the graph vertically by a factor of 4, and shift the graph upward by 3 units.

Answer: C

276) $g(x) = \dfrac{1}{5}(x + 1.3)^2 - 2.5$

A) Parent function: $f(x) = x^2$; Shift the graph of f to the left 1.3 units, strech the graph vertically by a factor of 5, and shift the graph downward by 2.5 units.

B) Parent function: $f(x) = x^2$; Shift the graph of f to the right 1.3 units, shrink the graph vertically by a factor of $\dfrac{1}{5}$, and shift the graph upward by 2.5 units.

C) Parent function: $f(x) = x^2$; Shift the graph of f to the right 1.3 units, stretch the graph vertically by a factor of 5, and shift the graph upward by 2.5 units.

D) Parent function: $f(x) = x^2$; Shift the graph of f to the left 1.3 units, shrink the graph vertically by a factor of $\dfrac{1}{5}$, and shift the graph downward by 2.5 units.

Answer: D

277) $g(x) = \frac{1}{5}\sqrt{x + 2.7} + 2.6$

A) Parent function: $f(x) = \sqrt{x}$; Shift the graph of f to the left 2.7 units, shrink the graph vertically by a factor of $\frac{1}{5}$, and shift the graph upward by 2.6 units.

B) Parent function: $f(x) = \sqrt{x}$; Shift the graph of f to the right 2.7 units, strech the graph vertically by a factor of 5, and shift the graph downward by 2.6 units.

C) Parent function: $f(x) = \sqrt{x}$; Shift the graph of f to the left 2.7 units, strech the graph vertically by a factor of 5, and shift the graph upward by 2.6 units.

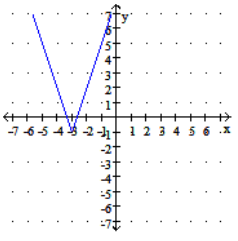
D) Parent function: $f(x) = \sqrt{x}$; Shift the graph of f to the right 2.7 units, shrink the graph vertically by a factor of $\frac{1}{5}$, and shift the graph downward by 2.6 units.

Answer: A

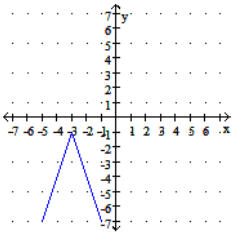
Use transformations to graph the given function.

278) $p(x) = -3|x + 3| - 1$

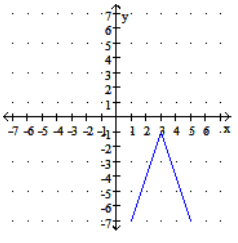
A)



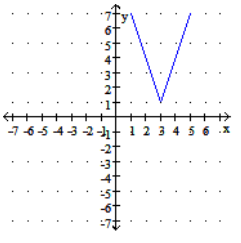
B)



C)



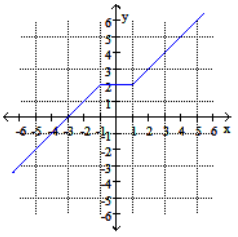
D)



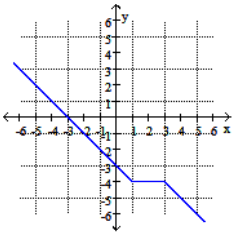
Answer: B

The graph of $y = f(x)$ is given. Graph the indicated function.

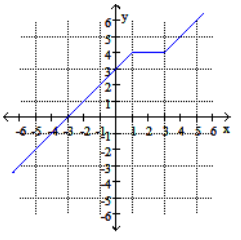
279) Graph $y = -f(x - 2) - 2$



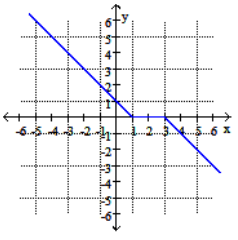
A)



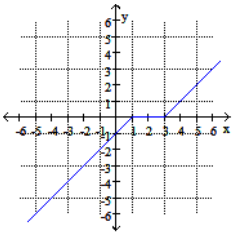
B)



C)

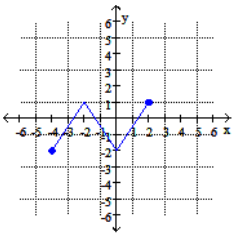


D)

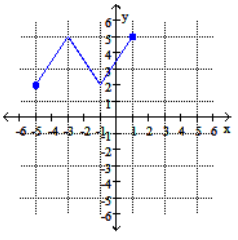


Answer: A

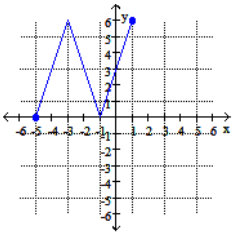
280) Graph $y = 2f(x + 1) + 4$



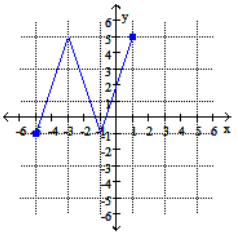
A)



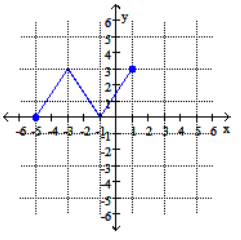
B)



C)

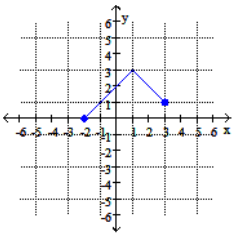


D)

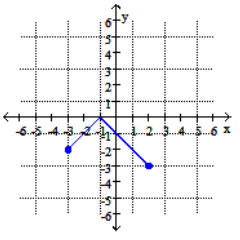


Answer: B

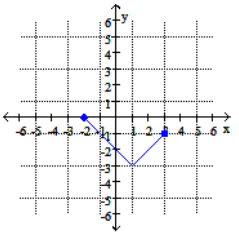
281) Graph $y = f(-x) - 4$



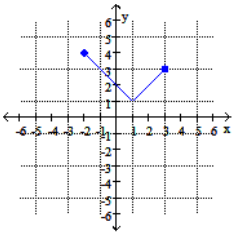
A)



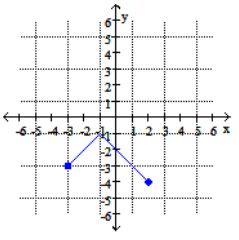
B)



C)



D)



Answer: D

Write a function based on the given parent function and the transformations in the given order.

282) Parent function: $y = x^3$

1. Shift 6.8 units to the right.
2. Reflect across the y-axis.
3. Shift downward 5.2 units.

A) $y = (-x - 6.8)^3 - 5.2$ B) $y = -(x + 6.8)^3 + 5.2$

C) $y = -(x - 6.8)^3 - 5.2$ D) $y = (-x + 6.8)^3 + 5.2$

Answer: A

283) Parent function $y = \sqrt[3]{x}$

1. Shift 9 units to the left.
2. Shift horizontally by a factor of 5.
3. Reflect across the x-axis.

A) $y = -\sqrt[3]{5x + 9}$ B) $y = -\sqrt[3]{\frac{1}{5}x + 9}$ C) $y = -\sqrt[3]{5x - 9}$ D) $y = \sqrt[3]{-\frac{1}{5}x - 9}$

Answer: B

284) Parent function $y = \frac{1}{x}$

1. Stretch vertically by a factor of 6.
2. Reflect across the x-axis.
3. Shift downward 9 units.

A) $y = \frac{6}{x} + 9$ B) $y = -\frac{6}{x} - 9$ C) $y = \frac{6}{x} - 9$ D) $y = -\frac{6}{x} + 9$

Answer: B

285) Parent function $y = |x|$

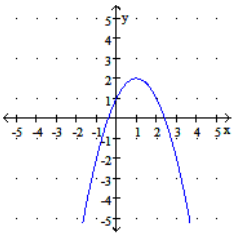
1. Shift 4.5 units to the right.
2. Shrink horizontally by a factor of $\frac{1}{5}$.
3. Reflect across the y-axis.

A) $y = |-\frac{1}{5}x - 4.5|$ B) $y = |-5x + 4.5|$ C) $y = |-\frac{1}{5}x + 4.5|$ D) $y = |-5x - 4.5|$

Answer: D

Use transformations on the basic functions to write a rule $y = f(x)$ that would produce the given graph.

286)



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

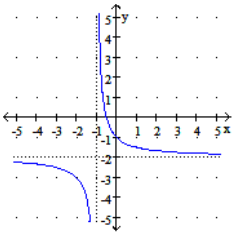
B) $f(x) = -(x + 1)^2 + 2$

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

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

Answer: C

287)



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

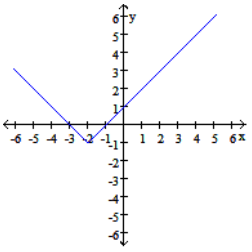
B) $f(x) = \frac{1}{x + 1} + 2$

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

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

Answer: A

288)



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

Answer: B

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

Provide the missing information.

289) A graph of an equation is symmetric with respect to the _____ -axis if replacing x by $-x$ results in an equivalent equation.

Answer: y

290) A graph of an equation is symmetric with respect to the _____ -axis if replacing y by $-y$ results in an equivalent equation.

Answer: x

291) A graph of an equation is symmetric with respect to the _____ if replacing x by $-x$ and y by $-y$ results in an equivalent equation.

Answer: origin

292) An even function is symmetric with respect to the _____.

Answer: y -axis

293) An odd function is symmetric with respect to the _____.

Answer: origin

294) The expression _____ represents the greatest integer, less than or equal to x.

Answer: x or int(x) or floor(x)

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

Determine whether the graph of the equation is symmetric with respect to the *x*-axis, *y*-axis, origin, or none of these.

295) $x = y^4 - y^6$

A) *x*-axis B) *y*-axis C) origin D) none of these

Answer: A

296) $x = y^2 + 6$

A) *y*-axis
B) *x*-axis, *y*-axis, and origin
C) *x*-axis
D) none of these

Answer: C

297) $|x| + |y| = 7.3$

A) *y*-axis
B) *x*-axis, *y*-axis, and origin
C) *x*-axis
D) none of these

Answer: B

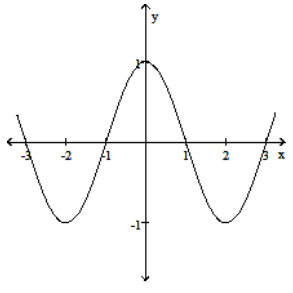
298) $y = -\frac{5}{9}x + 5$

A) *y*-axis
B) *x*-axis
C) *x*-axis, *y*-axis, and origin
D) none of these

Answer: D

Use the graph to determine if the function is even, odd, or neither.

299)



A) odd B) even C) neither

Answer: B

Find $f(-x)$ and determine whether f is odd, even, or neither.

300) $f(x) = 4x^5 - 5x^4$

A) $f(-x) = -4x^5 + 5x^4$; f is odd.

B) $f(-x) = -4x^5 - 5x^4$; f is even.

C) $f(-x) = 4x^5 + 5x^4$; f is neither odd nor even.

D) $f(-x) = -4x^5 - 5x^4$; f is neither odd nor even.

Answer: D

Determine if the function is odd, even, or neither.

301) $f(x) = 3x^4 + 3|x^3| - 3$

A) odd B) even C) neither

Answer: B

302) $f(x) = \dfrac{x^3}{7x^2}$

A) Neither B) Odd C) Even

Answer: B

303) $f(x) = \dfrac{x^3}{|x + 5|}$

A) Neither B) Even C) Odd

Answer: A

304) $f(x) = \dfrac{-\sqrt[3]{x}}{8x^2}$

A) Even B) Neither C) Odd

Answer: C

Evaluate the function for the given values of x.

305)

$$f(x) = \begin{cases} -5x + 4, & \text{for } x < -1 \\ x^2 + 3, & \text{for } -1 \le x < 2 \\ 1, & \text{for } x \ge 2 \end{cases}$$

(a) $f(-1)$; (b) $f(3)$

A) (a) 9; (b) 1 B) (a) 4; (b) 1 C) (a) 4; (b) 12 D) (a) 9; (b) 12

Answer: B

Evaluate the function for the indicated value.

306) Evaluate $f(-12)$.

$$f(x) = \begin{cases} 7 & x \le -2 \\ |x + 1| & -2 < x \le 4 \\ -5 & x > 4 \end{cases}$$

A) -12 B) 11 C) 7 D) -5

Answer: C

307) Evaluate $f(-1)$.

$$f(x) = \begin{cases} 9 & x \le -1 \\ |x + 1| & -1 < x \le 5 \\ -5 & x > 5 \end{cases}$$

A) 0 B) -1 C) -5 D) 9

Answer: D

308) Evaluate $f(-1)$.

$$f(x) = \begin{cases} 7 & x \le -2 \\ |x + 1| & -2 < x \le 2 \\ -5 & x > 2 \end{cases}$$

A) -1 B) 7 C) -5 D) 0

Answer: D

309) Evaluate $f(3)$.

$$f(x) = \begin{cases} 7 & x \le -1 \\ |x + 1| & -1 < x \le 3 \\ -5 & x > 3 \end{cases}$$

A) -5 B) 7 C) 4 D) 3

Answer: C

310) Evaluate $f(10)$.

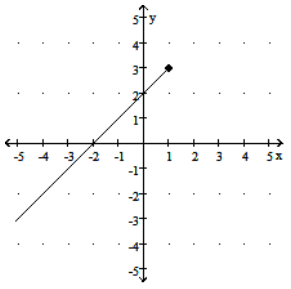
$$f(x) = \begin{cases} 9 & x \le -1 \\ |x + 1| & -1 < x \le 2 \\ -2 & x > 2 \end{cases}$$

A) 9 B) 10 C) -2 D) 11

Answer: C

Match the function with the graph.

311)



A) $f(x) = x + 2$ for $x \leq 3$

B) $f(x) = x + 2$ for $x \leq 1$

C) $f(x) = x + 2$ for $x \geq 1$

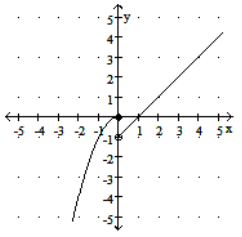
D) $f(x) = x + 2$ for $x \geq 3$

Answer: B

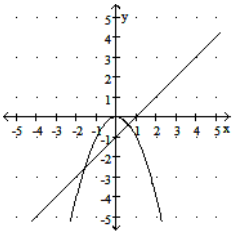
Graph the function.

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

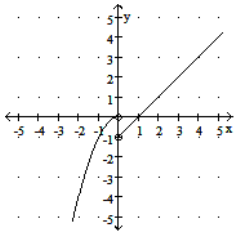
A)



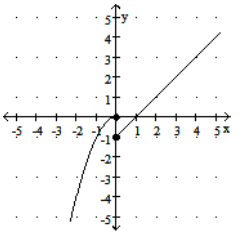
B)



C)



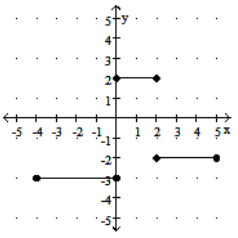
D)



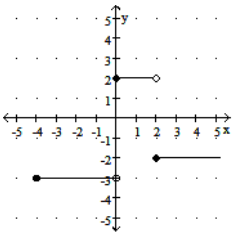
Answer: A

313) $r(x) = \begin{cases} -3 & \text{for } -4 \le x < 0 \\ 2 & \text{for } 0 \le x < 2 \\ -2 & \text{for } x \ge 2 \end{cases}$

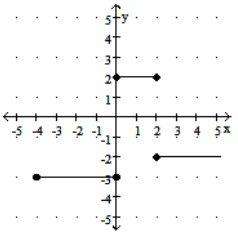
A)



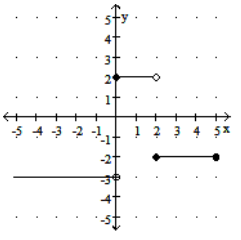
B)



C)



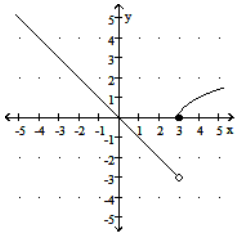
D)



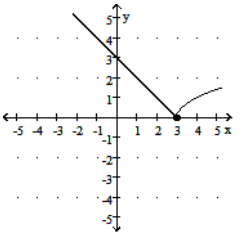
Answer: B

314) $s(x) = \begin{cases} -x + 3 & \text{for } x \leq 3 \\ \sqrt{x - 3} & \text{for } x > 3 \end{cases}$

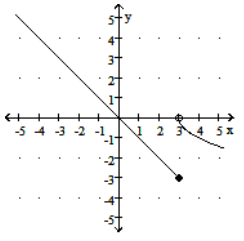
A)



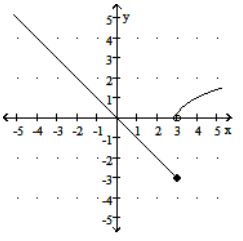
B)



C)



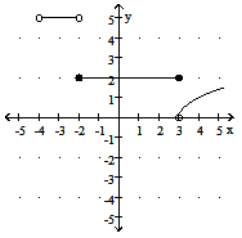
D)



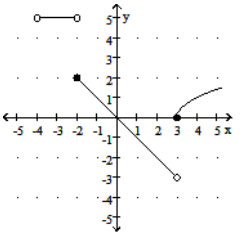
Answer: B

315) $m(x) = \begin{cases} 5 & \text{for } -4 < x < -2 \\ -x & \text{for } -2 \le x < 3 \\ \sqrt{x - 3} & \text{for } x \ge 3 \end{cases}$

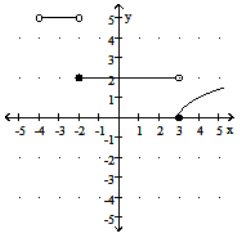
A)



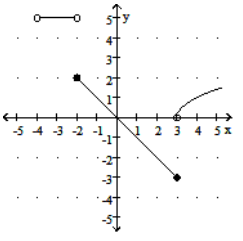
B)



C)



D)



Answer: B

Evaluate the step function defined by *f*(*x*) = int(*x*) for the given value of *x*.

316) $f(-1.9)$

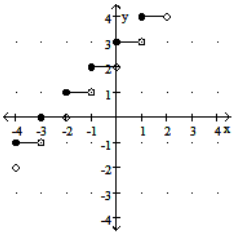
A) 1.9 B) -2 C) -1 D) -1.9

Answer: B

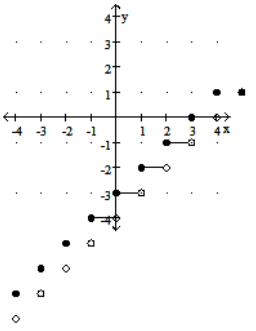
Graph the function.

317) $f(x) = \text{int}(x + 3)$

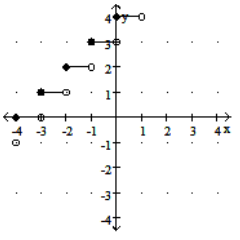
A)



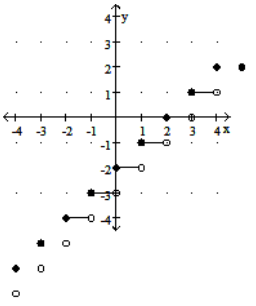
B)



C)



D)



Answer: A

Write a piecewise-defined function to model the monthly cost $C(x)$ (in \$) as a function of the number of minutes used x for the month.

318) A cell phone plan charges \$45.75 per month, plus \$9.55 in taxes, plus \$0.35 per minute for calls beyond the 500-min monthly limit.

A) $C(x) = \begin{cases} 55.3, & \text{for } x \le 500 \\ 0.35x, & \text{for } x > 500 \end{cases}$

B) $C(x) = \begin{cases} 55.3, & \text{for } x \le 500 \\ 55.3 + 0.35x, & \text{for } x > 500 \end{cases}$

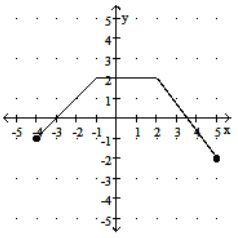
C) $C(x) = \begin{cases} 55.3, & \text{for } x \le 500 \\ 0.35(x - 500), & \text{for } x > 500 \end{cases}$

D) $C(x) = \begin{cases} 55.3, & \text{for } x \le 500 \\ 55.3 + 0.35(x - 500), & \text{for } x > 500 \end{cases}$

Answer: D

Solve the problem.

319) Use interval notation to write the intervals over which f is constant

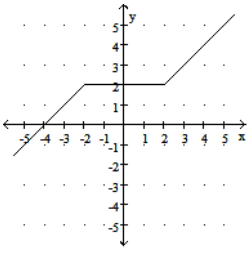


A) $(2, 2)$ B) $(2, 5)$ C) $(-1, 2)$ D) $(-4, -1)$

Answer: C

Use interval notation to write the intervals over which f is (a) increasing, (b) decreasing, and (c) constant.

320)



A) a. $(-\infty, 2) \cup (2, \infty)$
b. never decreasing
c. $(-2, 2)$

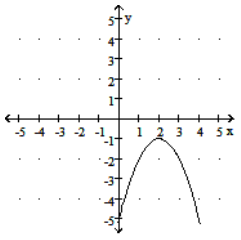
B) a. $(-4, \infty)$
b. $(-\infty, -4)$
c. never constant

C) a. never increasing
b. $(-\infty, -2) \cup (2, \infty)$
c. $(-2, 2)$

D) a. $(-\infty, -2) \cup (2, \infty)$
b. never decreasing
c. $(-2, 2)$

Answer: D

321)



A) a. $(-\infty, 2)$
b. $(2, \infty)$
c. never constant

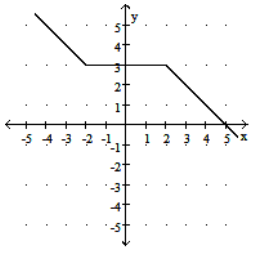
B) a. $(-\infty, -2)$
b. $(-2, \infty)$
c. never constant

C) a. $(-\infty, -1)$
b. $(-1, \infty)$
c. never constant

D) a. $(-\infty, 2)$
b. $(2, \infty)$
c. $x = 2$

Answer: A

322)



A) a. $(-\infty, -3) \cup (-3, \infty)$
b. never decreasing
c. (-2, 2)

B) a. never increasing
b. $(-\infty, -2) \cup (2, \infty)$
c. (-2, 2)

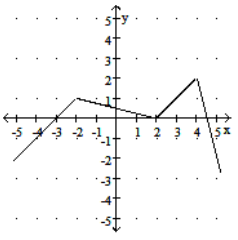
C) a. $(-\infty, -2) \cup (2, \infty)$
b. never decreasing
c. (-2, 2)

D) a. $(5, \infty)$
b. $(-\infty, 5)$
c. never constant

Answer: B

Identify the location and value of any relative maxima or minima of the function.

323)



A) At $x = 0$, the function has a relative minimum of 2.
At $x = 2$, the function has a relative maximum of 4.

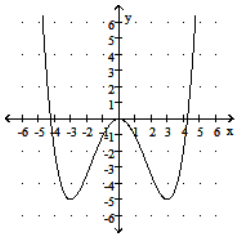
B) At $x = 1$, the function has a relative maximum of -2.
At $x = 0$, the function has a relative minimum of 2.
At $x = 2$, the function has a relative maximum of 4.

C) At $x = -2$, the function has a relative maximum of 1.
At $x = 2$ the function has a relative minimum of 0.
At $x = 4$ the function has a relative maximum of 2.

D) At $x = 2$, the function has a relative minimum of 0.
At $x = 4$, the function has a relative maximum of 2.

Answer: C

324)



A) At x = -3, the function has a relative minimum of -5.
At x = 0, the function has a relative maximum of 0.
At x = 3, the function has a relative minimum of -5.

B) At x = -3, the function has a relative minimum of 0.
At x = 0, the function has a relative maximum of 0.
At x = 3, the function has a relative minimum of 0.

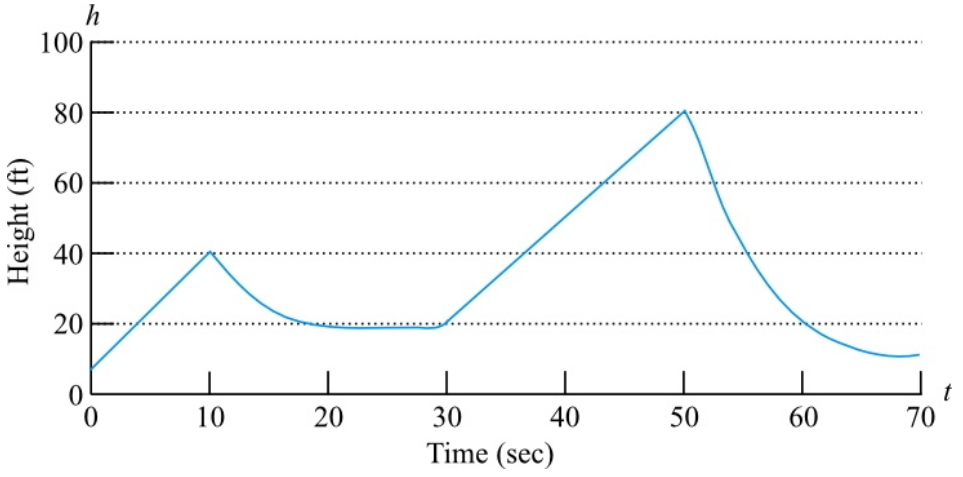
C) At x = -3, the function has a relative minimum of -5.
At x = 3, the function has a relative minimum of -5.

D) At x = -4.2, the function has a relative minimum of 0.
At x = 0, the function has a relative maximum of 0.
At x = 4.2, the function has a relative minimum of 0.

Answer: A

Solve the problem.

325) The graph shows the height h (in meters) of a roller coaster t seconds after the ride starts.



a. Over what interval(s) does the height increase?

b. Over what interval(s) does the height decrease?

A) **a.** (10, 50)
b. (50, 70)

B) **a.** (10, 20) and (30, 40)
b. (50, 70)

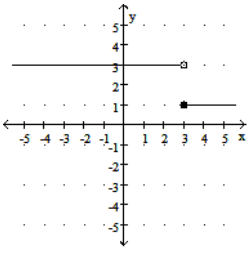
C) **a.** (0, 10) and (30, 50)
b. (10, 20) and (50, 70)

D) **a.** (50, 70)
b. (10, 50)

Answer: C

Produce a rule for the function whose graph is shown.

326)



A) $g(x) = \begin{cases} 1 & \text{for } x \geq 3 \\ 3 & \text{for } x < 3 \end{cases}$

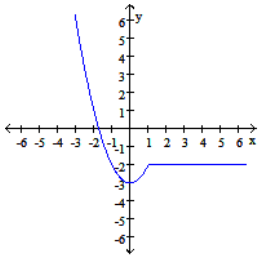
B) $g(x) = \begin{cases} 1 & \text{for } x \leq 3 \\ 3 & \text{for } x > 3 \end{cases}$

C) $g(x) = \begin{cases} 1 & \text{for } x < 3 \\ 3 & \text{for } x \geq 3 \end{cases}$

D) $g(x) = \begin{cases} 3 & \text{for } x \geq 1 \\ 3 & \text{for } x < 3 \end{cases}$

Answer: A

327)



A) $m(x) = \begin{cases} x^2 + 3 & \text{for } x < 1 \\ -2 & \text{for } x \geq 1 \end{cases}$

B) $m(x) = \begin{cases} x^2 - 3 & \text{for } x < 1 \\ -2 & \text{for } x \geq 1 \end{cases}$

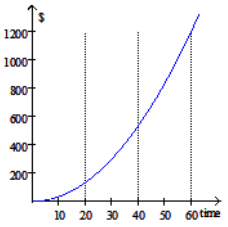
C) $m(x) = \begin{cases} x^2 - 3 & \text{for } x > 1 \\ -2 & \text{for } x \leq 1 \end{cases}$

D) $m(x) = \begin{cases} (x + 3)^2 & \text{for } x < 1 \\ -2 & \text{for } x \geq 1 \end{cases}$

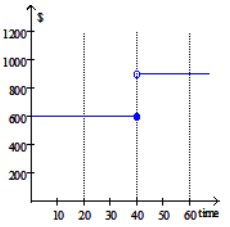
Answer: B

328) A math tutor makes $15.00 per hour in the tutoring lab at her school. During final exam week, she earns overtime at $22.50 per hour for the work exceeding her normal 40-hr work week. Which graph best depicts her total salary for the week as a function of the number of hours worked?

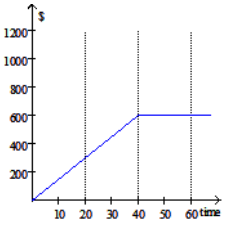
A)



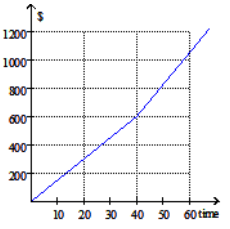
B)



C)



D)



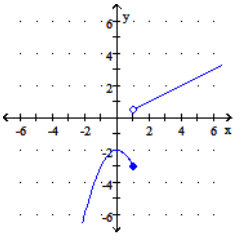
Answer: D

Use the given information to
a. Graph the function.
b. Write the domain in interval notation.
c. Write the range in interval notation.

329) $f(x) = \begin{cases} -x^2 - 2 & \text{for } x \le 1 \\ \frac{1}{2}x & \text{for } x > 1 \end{cases}$

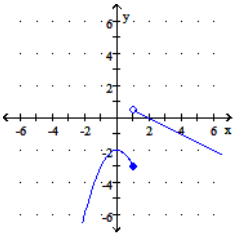
A) domain: $(-\infty, \infty)$

range: $(-\infty, -2) \cup (\frac{1}{2}, \infty)$



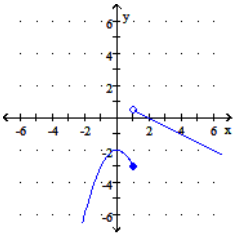
B) domain: $(-\infty, \infty)$

range: $(-\infty, \frac{1}{2})$



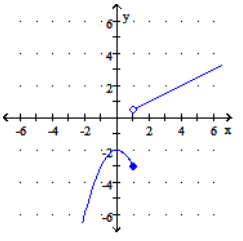
C) domain: $(-\infty, \infty)$

range: $(-\infty, -2) \cup (\frac{1}{2}, \infty)$



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

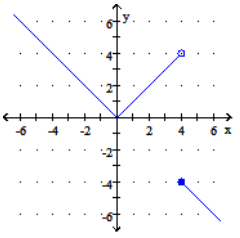
range: $(-\infty, \infty)$



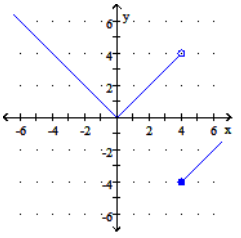
Answer: A

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

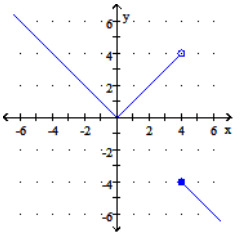
A) domain: $(-\infty, \infty)$
range: $(-\infty, -4) \cup (0, \infty)$



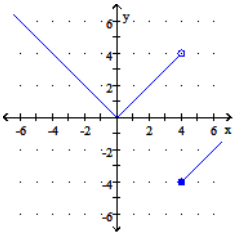
B) domain: $(-\infty, \infty)$
range: $[-4, \infty)$



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



D) domain: $(-\infty, \infty)$
range: $(-4, \infty)$



Answer: C

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

Provide the missing information.

331) The function $f + g$ is defined by $(f + g)(x) =$ _____ + _____.

Answer: $f(x) + g(x)$

332) The function $\left(\frac{f}{g}\right)(x)$ is defined by _____ provided that _____ = 0.

Answer: $\frac{f(x)}{g(x)}$; $g(x)$

333) Let h represent a positive real number. Given a function defined by $y = f(x)$, the difference quotient is given by _____.

Answer: $\dfrac{f(x+h) - f(x)}{h}$

334) The composition of f and g, denoted by $(f \circ g)(x)$ is defined by = _____.

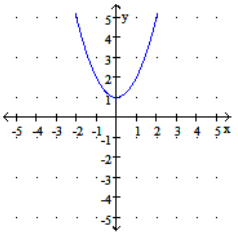
Answer: $f(g(x))$

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

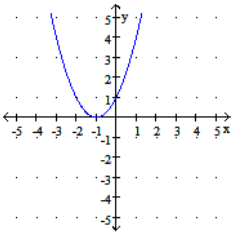
Find $(f + g)(x)$ and identify the graph of $f + g$.

335) $f(x) = x^2$ and $g(x) = 1$

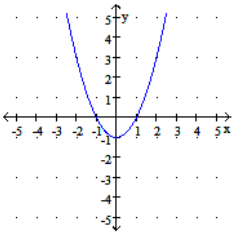
A) $(f + g)(x) = x^2 + 1$



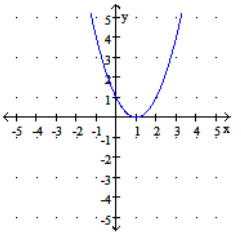
B) $(f + g)(x) = (x + 1)^2$



C) $(f + g)(x) = x^2 + 1$



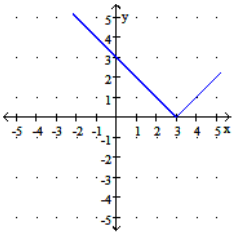
D) $(f + g)(x) = (x + 1)^2$



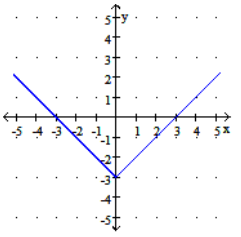
Answer: A

336) $f(x) = |x|$ and $g(x) = -3$

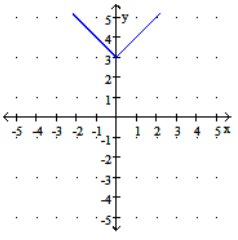
A) $(f + g)(x) = |x - 3|$



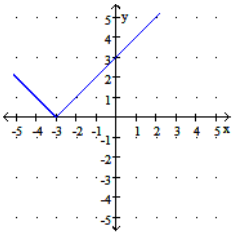
B) $(f + g)(x) = |x| - 3$



C) $(f + g)(x) = |x| - 3$



D) $(f + g)(x) = |x - 3|$



Answer: B

Evaluate the function for the given value of *x*.

337) $f(x) = -3x$, $g(x) = |x - 6|$, $(f \cdot g)(-4) = ?$

A) $(f \cdot g)(-4) = 120$ B) $(f \cdot g)(-4) = 6$ C) $(f \cdot g)(-4) = -120$ D) $(f \cdot g)(-4) = -30$

Answer: A

338) $f(x) = -2x$, $g(x) = \dfrac{1}{x + 2}$, $(f - g)(1) = ?$

A) $(f - g)(1) = -\dfrac{7}{3}$ B) $(f - g)(1) = -\dfrac{5}{3}$ C) $(f - g)(1) = \dfrac{5}{3}$ D) $(f - g)(1) = \dfrac{7}{3}$

Answer: A

339) $f(x) = -2x$, $g(x) = |x + 2|$, $\left(\frac{f}{g}\right)(-5) = ?$

A) $\left(\frac{f}{g}\right)(-5) = \frac{10}{3}$ B) $\left(\frac{f}{g}\right)(-5) = -\frac{10}{3}$ C) $\left(\frac{f}{g}\right)(-5) = -\frac{3}{10}$ D) $\left(\frac{f}{g}\right)(-5) = \frac{3}{10}$

Answer: A

340) $f(x) = 8x$, $g(x) = -5x^2 - 5$, $(g + f)(x) = ?$

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

C) $(g + f)(x) = -5x^2 - 8x + 5$ D) $(g + f)(x) = -5x^2 - 8x - 5$

Answer: B

341) $p(x) = x^2 + 7x$, $q(x) = \sqrt{x + 3}$, $(p \cdot q)(x) = ?$

A) $x + 3 + 7\sqrt{x + 3}$ B) $(p \cdot q)(x) = (x^2 + 7x)\sqrt{x + 3}$

C) $(p \cdot q)(x) = \sqrt{(x^2 + 7x)(x + 3)}$ D) $(p \cdot q)(x) = x^2 + 7x \cdot \sqrt{x + 3}$

Answer: B

342) $r(x) = 3x$, $p(x) = x^2 + 6x$, $(p - r)(x)$

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

C) $(p - r)(x) = x^2 + 9x$ D) $(p - r)(x) = x^2 + 18x$

Answer: B

Find the indicated function and write its domain in interval notation.

343) $p(x) = x^2 + 6x$, $q(x) = \sqrt{4 - x}$, $\left(\frac{q}{p}\right)(x) = ?$

A) $\left(\frac{q}{p}\right)(x) = \frac{\sqrt{4 - x}}{x^2 + 6x}$; $(-\infty, -6) \cup (-6, 0) \cup (0, 4]$ B) $\left(\frac{q}{p}\right)(x) = \sqrt{\frac{4 - x}{x^2 + 6x}}$; $(-\infty, -6) \cup (-6, 0) \cup (0, 4)$

C) $\left(\frac{q}{p}\right)(x) = \sqrt{\frac{4 - x}{x^2 + 6x}}$; $(-\infty, -6) \cup (-6, 0) \cup (0, \infty)$ D) $\left(\frac{q}{p}\right)(x) = \frac{\sqrt{4 - x}}{x^2 + 6x}$; $(-\infty, -6)$ $(-6, 0) \cup (0, \infty)$

Answer: A

344) $s(x) = \frac{x - 5}{x^2 - 49}$, $t(x) = \frac{x - 7}{5 - x}$, $(s \cdot t)(x) = ?$

A) $-\frac{1}{x + 7}$; $(-\infty, -7) \cup (7, \infty)$ B) $\frac{1}{7 - x}$; $(-\infty, 7) \cup (7, \infty)$

C) $-\frac{1}{x + 7}$; $(-\infty, -7) \cup (-7, 5) \cup (5, 7) \cup (7, \infty)$ D) $\frac{1}{7 - x}$; $(-\infty, -7) \cup (-7, 5) \cup (5, 7) \cup (7, \infty)$

Answer: C

345) $s(x) = \dfrac{x - 4}{x^2 - 36}$, $t(x) = \dfrac{x - 6}{4 - x}$, $(\dfrac{s}{t})(x) = ?$

A) $-\dfrac{(x - 4)^2}{(x - 6)^2(x + 6)}; (-\infty, -6) \cup (-6, 4) \cup (4, 6) \cup (6, \infty)$

B) $-\dfrac{1}{x + 6}; (-\infty, -6) \cup (-6, \infty)$

C) $-\dfrac{(x - 4)^2}{(x - 6)^2(x + 6)}; (-\infty, -6) \cup (6, \infty)$

D) $-\dfrac{1}{x + 6}; (-\infty, -6) \cup (-6, 4) \cup (4, 6) \cup (6, \infty)$

Answer: A

346) $s(x) = \dfrac{x - 2}{x^2 - 9}$, $t(x) = \dfrac{x - 3}{2 - x}$, $(s + t)(x) = ?$

A) $\dfrac{x^3 - 2x^2 - 13x + 31}{(x + 3)(x - 3)(x - 2)}; (-\infty, -3) \cup (3, \infty)$

B) $-\dfrac{x^3 - 4x^2 - 5x + 23}{(x + 3)(x - 3)(x - 2)}; (-\infty, -3) \cup (-3, 2) \cup (2, 3) \cup (3, \infty)$

C) $\dfrac{x^3 - 2x^2 - 13x + 31}{(x + 3)(x - 3)(x - 2)}; (-\infty, -3) \cup (-3, 2) \cup (2, 3) \cup (3, \infty)$

D) $-\dfrac{x^3 - 4x^2 - 5x + 23}{(x + 3)(x - 3)(x - 2)}; (-\infty, -3) \cup (3, \infty)$

Answer: B

347) $s(x) = \dfrac{x - 5}{x^2 - 36}$, $t(x) = \dfrac{x - 6}{5 - x}$, $(s + t)(x) = ?$

A) $-\dfrac{x^3 - 7x^2 - 26x + 191}{(x + 6)(x - 6)(x - 5)}; (-\infty, -6) \cup (-6, 5) \cup (5, 6) \cup (6, \infty)$

B) $\dfrac{x^3 - 5x^2 - 46x + 241}{(x + 6)(x - 6)(x - 5)}; (-\infty, -6) \cup (6, \infty)$

C) $-\dfrac{x^3 - 7x^2 - 26x + 191}{(x + 6)(x - 6)(x - 5)}; (-\infty, -6) \cup (6, \infty)$

D) $\dfrac{x^3 - 5x^2 - 46x + 241}{(x + 6)(x - 6)(x - 5)}; (-\infty, -6) \cup (-6, 5) \cup (5, 6) \cup (6, \infty)$

Answer: D

348) $s(x) = \dfrac{x - 2}{x^2 - 64}$, $t(x) = \sqrt{x + 8}$, $(s \cdot t)(x) = ?$

A) $\dfrac{(x - 2)}{(x + 8)(x - 8)\sqrt{x + 8}}$; $(-8, 8) \cup (8, \infty)$

B) $\dfrac{(x - 2)}{(x + 8)(x - 8)\sqrt{x + 8}}$; $(-8, 2) \cup (2, 8) \cup (8, \infty)$

C) $\dfrac{(x - 2)\sqrt{x + 8}}{(x + 8)(x - 8)}$; $(-8, 2) \cup (2, 8) \cup (8, \infty)$

D) $\dfrac{(x - 2)\sqrt{x + 8}}{(x + 8)(x - 8)}$; $(-8, 8) \cup (8, \infty)$

Answer: D

Find $\dfrac{f(x + h) - f(x)}{h}$ for the given function.

349) $f(x) = x^2 + 8x$.

A) 1 B) $2x + h + 8$ C) $2xh + h^2 + 8$ D) $2x + 8$

Answer: B

Find the difference quotient and simplify.

350) $f(x) = -3x - 6$

A) $-3h$ B) $-3h - 12$ C) -3 D) -6

Answer: C

Find $\dfrac{f(x + h) - f(x)}{h}$ for the given function.

351) $f(x) = \dfrac{1}{x - 4}$

A) $\dfrac{1}{2x + h - 8}$

B) $\dfrac{1}{(x - 4)(x + h - 4)}$

C) $-\dfrac{1}{2x + h - 8}$

D) $-\dfrac{1}{(x - 4)(x + h - 4)}$

Answer: D

352) $f(x) = 5x^2 - 6x + 4$

A) $10x - 6$ B) $10x + 5h - 6$ C) $5h^2 + 10xh - 6h$ D) $-2x + 5h + 2$

Answer: B

353) $f(x) = x^3 - 11$

A) $3x^2 + 3x + h^2 - 22$

B) $3x^2 + 3xh + h^2$

C) $3x^2 + 3x + h^2$

D) $3x^2 + 3xh + h^2 - 22$

Answer: B

Evaluate the function for the given value of x.

354) $f(x) = x^2 + 3x,\ g(x) = 5x + 2,\ (f \circ g)(3) = ?$

A) $(f \circ g)(3) = 272$ B) $(f \circ g)(3) = 306$ C) $(f \circ g)(3) = 340$ D) $(f \circ g)(3) = 92$

Answer: C

355) $f(x) = x^2 + 3x,\ g(x) = 5x - 4,\ (g \circ f)(-3) = ?$

A) $(g \circ f)(-3) = -4$ B) $(g \circ f)(-3) = -0$ C) $(g \circ f)(-3) = 304$ D) $(g \circ f)(-3) = 0$

Answer: A

356) $g(x) = \sqrt{3x},\ h(x) = x^3 + 5x,\ (g \circ h)(2) = ?$

A) $5\sqrt{3}$ B) $3\sqrt{2}$ C) $18\sqrt{6}$ D) $3\sqrt{6}$

Answer: D

357) $g(x) = 4x - 3,\ h(x) = 3\sqrt{x - 7},\ (h \circ g)(1) = ?$

A) $12\sqrt{6} - 3$ B) Undefined C) $3\sqrt{6}$ D) $24\sqrt{3} - 3$

Answer: B

358) $f(x) = x^3 + 6x,\ (f \circ f)(3) = ?$

A) 91,395 B) 2025 C) 45 D) 90

Answer: A

359) $f(x) = x^3 - 4x,\ g(x) = \sqrt{5x},\ h(x) = 4x + 5,\ (f \circ h \circ g)(5) = ?$

A) 15,525 B) 425 C) 13,125 D) 135

Answer: A

Find the indicated function and write its domain in interval notation.

360) $m(x) = \sqrt{x + 2},\ n(x) = x - 3,\ (m \circ n)(x) = ?$

A) $(m \circ n)(x) = (x - 3)\sqrt{x + 2}$; domain: $[-2, \infty)$ B) $(m \circ n)(x) = \sqrt{x - 1}$; domain: $[1, \infty)$

C) $(m \circ n)(x) = \sqrt{x^2 - 6}$; domain: $[-6, \infty)$ D) $(m \circ n)(x) = \sqrt{x + 2} - 3$; domain: $[-2, \infty)$

Answer: B

361) $n(x) = x + 3,\ q(x) = \dfrac{1}{x + 6},\ (q \circ n)(x) = ?$

A) $(q \circ n)(x) = \dfrac{1}{x + 9}$; domain: $(-\infty, -9) \cup (-9, \infty)$

B) $(q \circ n)(x) = \dfrac{1}{x + 9}$; domain: $(-\infty, 9) \cup (9, \infty)$

C) $(q \circ n)(x) = \dfrac{1}{x + 6} + 3$; domain: $(-\infty, -6) \cup (-6, \infty)$

D) $(q \circ n)(x) = \dfrac{1}{x + 6} + 3$; domain: $(-\infty, 6) \cup (6, \infty)$

Answer: A

362) $r(x) = |-3x - 7|,\ n(x) = x + 4,\ (r \circ n)(x) = ?$

A) $(r \circ n)(x) = |-3x - 7| + 4$; domain: $(-\infty, \infty)$

B) $(r \circ n)(x) = |-3x - 19|$; domain: $(-\infty, \infty)$

C) $(r \circ n)(x) = |-3x - 7| + 4$; domain: $(-\infty, -\dfrac{7}{3})$

D) $(r \circ n)(x) = |-3x - 19|$; domain: $(-\infty, -\dfrac{19}{3})$

Answer: B

363) $n(x) = x - 5,\ p(x) = x^2 + 6x,\ (p \circ n)(x) = ?$

A) $(p \circ n)(x) = x^2 + 6x - 5$; domain $[0, \infty)$

B) $(p \circ n)(x) = x^2 - 4x - 5$; domain $(-\infty, -6) \cup (-6, \infty)$

C) $(p \circ n)(x) = x^2 + 6x - 5$; domain $(-\infty, \infty)$

D) $(p \circ n)(x) = x^2 - 4x - 5$; domain $(-\infty, \infty)$

Answer: D

364) $f(x) = \dfrac{9}{x^2 - 11},\ g(x) = \sqrt{4 - x},\ (f \circ g)(x) = ?$

A) $-\dfrac{9}{x + 7}$; $(-\infty, -7) \cup (-7, 4]$

B) $-\dfrac{9}{x + 7}$; $(-\infty, -7) \cup (-7, \infty)$

C) $\dfrac{9\sqrt{4 - x}}{x^2 - 11}$; $(-\infty, \sqrt{11}) \cup (\sqrt{11}, 4]$

D) $\dfrac{9\sqrt{4 - x}}{x^2 - 11}$; $(-\infty, \sqrt{11}) \cup (\sqrt{11}, \infty)$

Answer: A

365) $f(x) = \dfrac{x}{x - 1}$, $g(x) = \dfrac{36}{x^2 - 64}$, $(f \circ g)(x) = ?$

A) $\dfrac{36}{100 - x^2}; (-\infty, -10) \cup (-10, 10) \cup (10, \infty)$

B) $\dfrac{36}{x^2 + 100}; (-\infty, \infty)$

C) $\dfrac{36}{x^2 + 100}; (-\infty, -8) \cup (-8, 8) \cup (8, \infty)$

D) $\dfrac{36}{100 - x^2}; (-\infty, -10) \cup (-10, -8) \cup (-8, 8) \cup (8, 10) \cup (10, \infty)$

Answer: D

Solve the problem.

366) The cost to buy tickets online for a dance show is \$60 per ticket, that is, the cost function is $C(x) = 60x$ for x tickets to the show. There is a sales tax of 4.5% and a processing fee of \$7 for a group of tickets, that is, $T(x) = 1.045x + 7$ is the total cost for x dollars spent on tickets.

(a) Find $(T \circ C)(x)$

(b) Find $(T \circ C)(7)$ and interpret its meaning in the context of the problem.

A) (a) $(T \circ C)(x) = 62.7x + 420$; (b) $(T \circ C)(7) = 858.9$; The average cost per ticket.

B) (a) $(T \circ C)(x) = 62.7x + 7$; (b) $(T \circ C)(7) = 445.9$; The average cost per ticket.

C) (a) $(T \circ C)(x) = 62.7x + 420$; (b) $(T \circ C)(7) = 858.9$; The total cost to purchase 7 tickets.

D) (a) $(T \circ C)(x) = 62.7x + 7$; (b) $(T \circ C)(7) = 445.9$; The total cost to purchase 7 tickets.

Answer: D

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

367) $h(x) = (x + 5)^6$

A) $f(x) = x^6$ and $g(x) = x + 5$

B) $f(x) = x$ and $g(x) = x^6 + 5$

C) $f(x) = x + 5$ and $g(x) = x^6$

D) $f(x) = (x + 5)$ and $g(x) = (x + 5)^5$

Answer: A

368) $h(x) = \sqrt[5]{8x - 3}$

A) $f(x) = \sqrt[5]{8x}$ and $g(x) = x - 3$

B) $f(x) = \sqrt[5]{x}$ and $g(x) = 8x - 3$

C) $f(x) = 8x - 3$ and $g(x) = \sqrt[5]{x}$

D) $f(x) = x - 3$ and $g(x) = \sqrt[5]{8x}$

Answer: B

369) $h(x) = \dfrac{6}{x - 6}$

A) $f(x) = 6$ and $g(x) = \dfrac{1}{x - 6}$

B) $f(x) = \dfrac{6}{x}$ and $g(x) = x - 6$

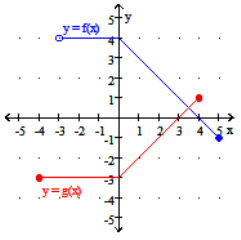
C) $f(x) = -6$ and $g(x) = \dfrac{6}{x}$

D) $f(x) = \dfrac{1}{x - 6}$ and $g(x) = 6$

Answer: B

The graphs of f and g are shown. Find the values for the given values of x, if possible.

370) **a.** $(f + g)(-2)$; **b.** $\left(\dfrac{g}{f}\right)(1)$; **c.** $(g \circ f)(3)$



A) **a.** 7; **b.** $-\dfrac{3}{2}$; **c.** 3

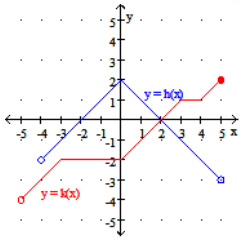
B) **a.** 1; **b.** $-\dfrac{2}{3}$; **c.** -2

C) **a.** 1; **b.** $-\dfrac{2}{3}$; **c.** 3

D) **a.** 7; **b.** $-\dfrac{3}{2}$; **c.** -2

Answer: B

371) **a.** $(h \cdot k)(0)$; **b.** $\left(\frac{k}{h}\right)(-4)$; **c.** $(k - h)(1)$



A) **a.** -4; **b.** undefined; **c.** -2

B) **a.** -4; **b.** undefined; **c.** 2

C) **a.** undefined; **b.** $\frac{2}{3}$; **c.** -2

D) **a.** -4; **b.** $\frac{2}{3}$; **c.** -2

Answer: A

Refer to the values of $k(x)$ and $p(x)$ in the table, and evaluate the function for the given value of x.

372)

x	$k(x)$	$p(x)$
-3	-6	-7
-2	6	1
1	2	4
6	-2	5

$(p \circ k)(-2)$

A) 5 B) 2 C) 4 D) -3

Answer: A

Solve the problem.

373) A chess master creates instructional videos about various opening strategies. She sells the videos in 3-hr packages for $35 each. Her one-time initial cost to produce each 3-hr video package is $4600 (this includes labor and the cost of computer supplies). The cost to package and ship each DVD is $2.95.

a. Write a linear cost function that represents the cost $C(x)$ to produce, package, and ship x 3-hr video packages.

b. Write a linear revenue function to represent the revenue $R(x)$ for selling x 3-hr video packages.

c. Evaluate $(R - C)(x)$ and interpret its meaning in the context of this problem.

A) a. $C(x) = 8.85x + 4600$;
b. $R(x) = 35x$
c. $(R - C)(x) = 26.15x - 4600$ represents the profit for selling x DVDs.

B) a. $C(x) = 2.95x + 4600$;
b. $R(x) = 35x$
c. $(R - C)(x) = 32.05x - 4600$ represents the profit for selling x DVDs.

C) a. $C(x) = 35x$
b. $R(x) = 2.95x + 4600$;
c. $(R - C)(x) = 32.05x - 4600$ represents the profit for selling x DVDs.

D) a. $C(x) = 8.85x + 4600$;
b. $R(x) = 35x$
c. $(R - C)(x) = 4600 - 26.15x$ represents the profit for selling x DVDs.

Answer: B

374) $f(x) = \{(-6, 6), (-2, -3), (5, -8), (1, 9)\}$, $g(x) = (2, 5), (1, 8), (9, -6), (-2, -3)\}$
Find $(f \circ g)(1)$

A) -3 B) 6 C) undefined D) 9

Answer: C

375) A car accelerates from 0 to 91.2 ft/sec in 8 sec. The distance $d(t)$ (in ft) that the car travels t seconds after motion begins is given by $d(t) = 5.7t^2$, where $0 \le t \le 8$.

a. Find the difference quotient $\frac{d(t + h) - d(t)}{h}$.

b. Use the difference quotient to determine the average rate of speed on the interval $4 \le t \le 6$.

A) **a.** $5.7(t + h)$; **b.** 79.8 ft/sec
B) **a.** $11.4t + 5.7h$; **b.** 79.8 ft/sec
C) **a.** $11.4t + 5.7h$; **b.** 57 ft/sec
D) **a.** $5.7(t + h)$; **b.** 34.2 ft/sec

Answer: C

376) If a is b plus nine, and c is the square of a, write c as a function of b.

A) $c(b) = 2b + 18$ B) $c(b) = b + 81$ C) $c(b) = (b + 9)^2$ D) $c(b) = b^2 + 81$

Answer: C

377) If q is r minus six, and s is the square root of q, write s as a function of r.

A) $s(r) = \sqrt{6 - r}$ B) $s(r) = 6 - \sqrt{r}$ C) $s(r) = \sqrt{r - 6}$ D) $s(r) = \sqrt{r} - 6$

Answer: C

378) If x is twice y, and z is two less than x, write z as a function of y.

A) $z(y) = 2y - 2$ B) $z(y) = 2 - 2y$ C) $z(y) = 2(2 - y)$ D) $z(y) = 2(y - 2)$

Answer: A

379) If m is one-sixth of n, and p is five less than m, write p as a function of n.

A) $p(n) = n - \frac{5}{6}$ B) $p(n) = \frac{1}{6}(n - 5)$ C) $p(n) = \frac{1}{6}n - 5$ D) $p(n) = 5n - \frac{1}{6}$

Answer: C

380) Given $f(x) = |-5x^3 + 8|$, define m, n, h, and k such that $f(x) = (m \circ n \circ h \circ k)(x)$.

A) $m(x) = x^3$, $n(x) = -5x$, $h(x) = x + 8$, $k(x) = |x|$ B) $m(x) = |x|$, $n(x) = x + 8$, $h(x) = -5x$, $k(x) = x^3$

C) $m(x) = |x|$, $n(x) = x + 8$, $h(x) = x^3$, $k(x) = -5x$ D) $m(x) = x^3$, $n(x) = x + 8$, $h(x) = -5x$, $k(x) = |x|$

Answer: B