Miller   O'Neill   Hyde

Intermediate *Algebra*

Third Edition
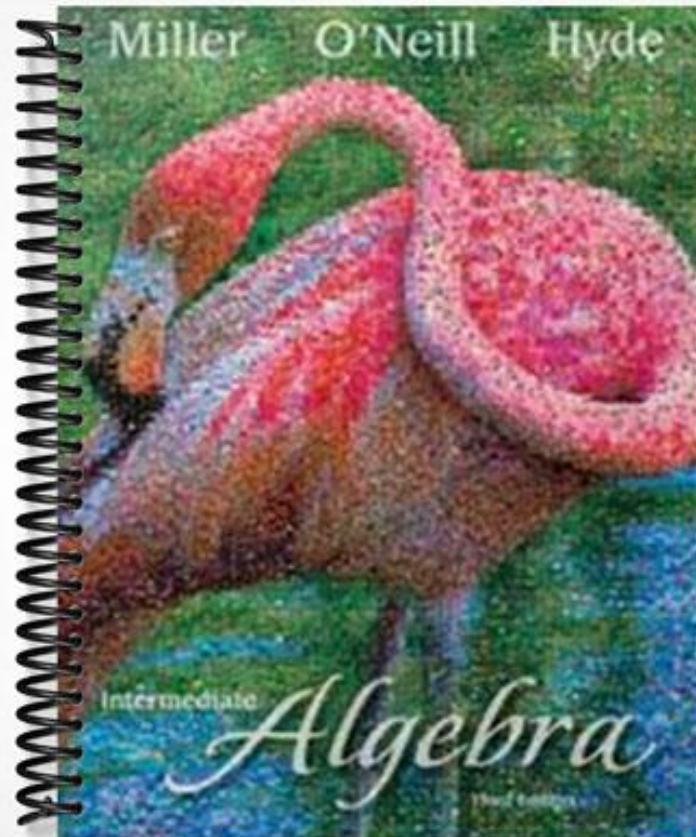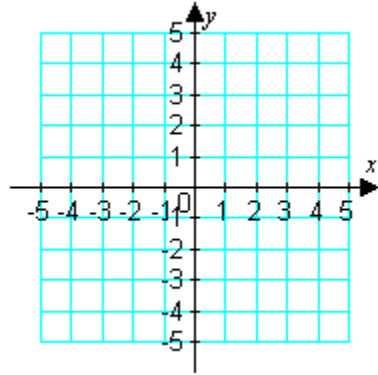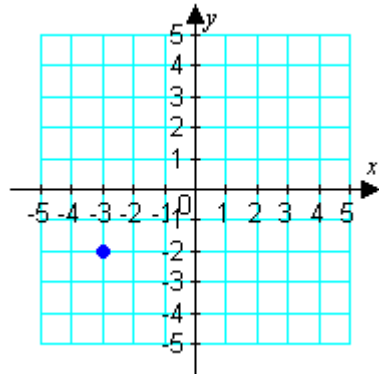
Chapter 2 - Linear Equations in Two Variables and Functions

1. Plot the point on the rectangular coordinate system.
   (−3, −2)

A)

B)

C)

D)

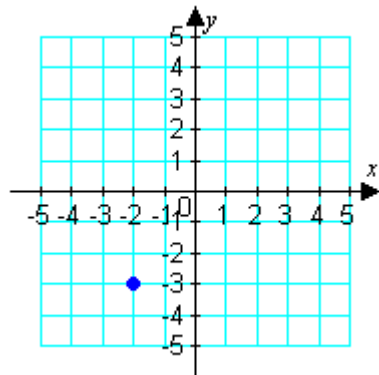

Ans: A   Concept: Plotting Points   Difficulty: Easy   Section: 2.1

2. Plot the point on the rectangular coordinate system.

$$\left(-\frac{7}{4}, -\frac{5}{2}\right)$$
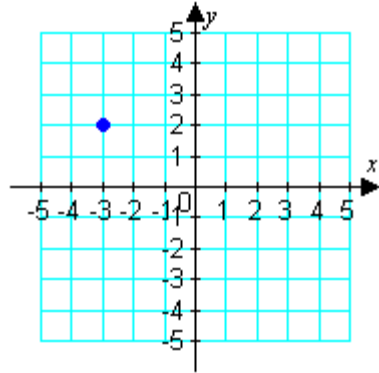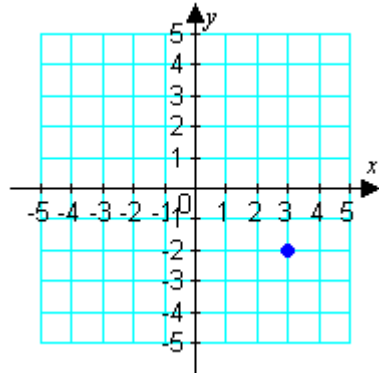
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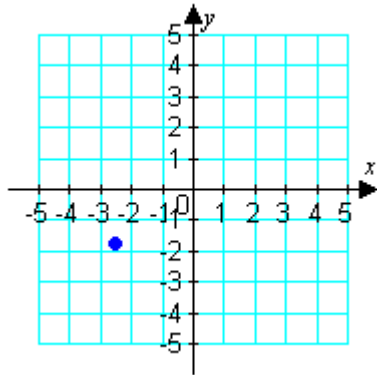
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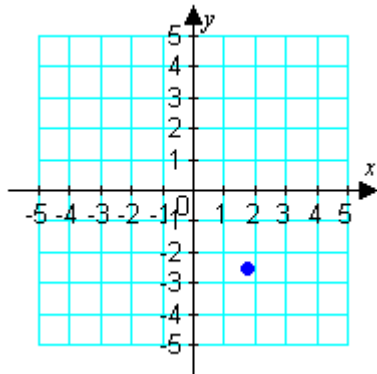
C)

D)

Ans: C   Concept: Plotting Points   Difficulty: Easy   Section: 2.1

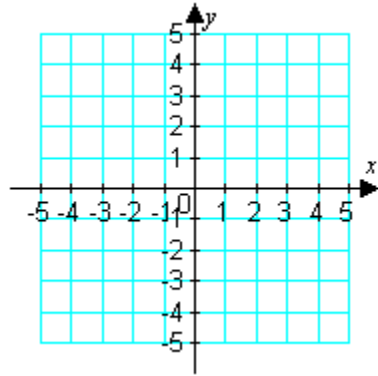3. Plot the point on the rectangular coordinate system.
   (3.2, 2.7)

A)
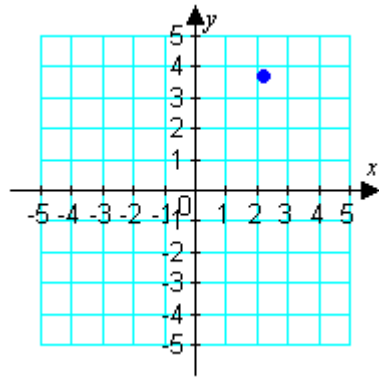
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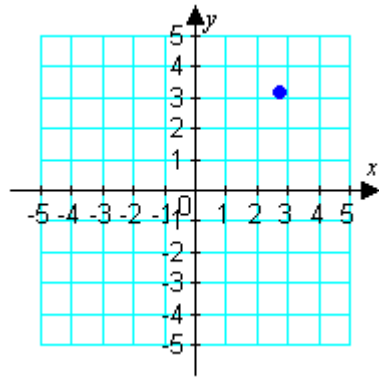
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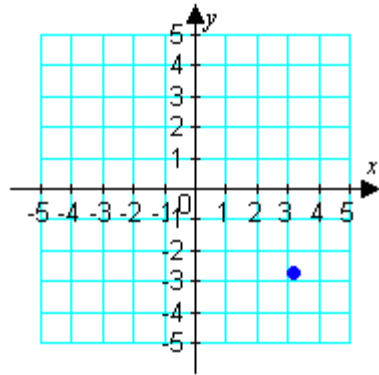
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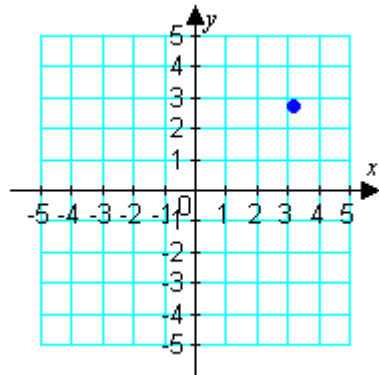
Ans: D   Concept: Plotting Points   Difficulty: Easy   Section: 2.1
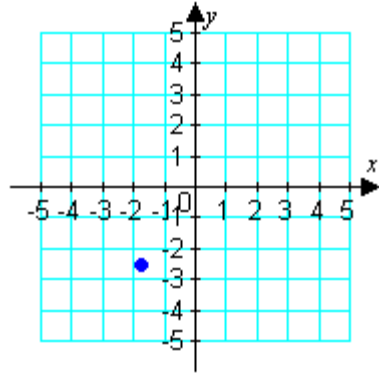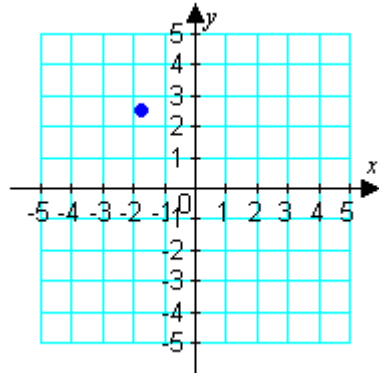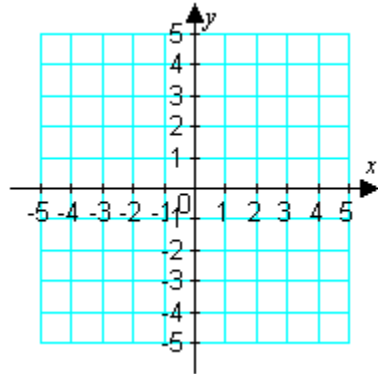
4. Give the coordinates of the specified point.
       point VI
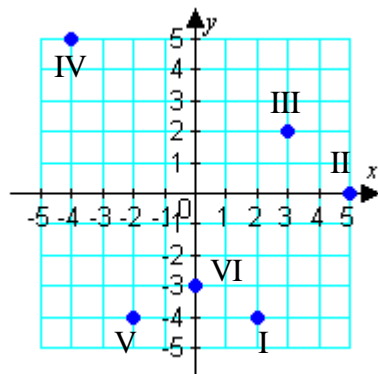
A) $(0,3)$ B) $(0,-3)$ C) $(-3,0)$ D) $(3,0)$

Ans: B   Concept: Plotting Points   Difficulty: Easy   Section: 2.1

5. Determine if the ordered pair is a solution to the linear equation.

$-3x - 4y = 44$; $(-4, -8)$

A) Yes   B) No

Ans: A   Concept: Linear Equations in Two Variables   Difficulty: Easy
Section: 2.1

6. Determine if the ordered pair is a solution to the linear equation.

$8x + 3y = 82$; $(9, 4)$

A) Yes   B) No

Ans: B   Concept: Linear Equations in Two Variables   Difficulty: Easy
Section: 2.1

7. Determine if the ordered pair is a solution to the linear equation.

$y = -\dfrac{8}{9}x + 9$; $(9, 1)$

A) Yes   B) No

Ans: A   Concept: Linear Equations in Two Variables   Difficulty: Easy
Section: 2.1

8. Determine if the ordered pair is a solution to the linear equation.

$y = \dfrac{9}{7}x - 2$; $(28, 36)$

A) Yes   B) No

Ans: B   Concept: Linear Equations in Two Variables   Difficulty: Easy
Section: 2.1

9. Complete the table. Then graph the line defined by the points.
$$9x + 2y = 6$$

x	y
0	
	0
1	
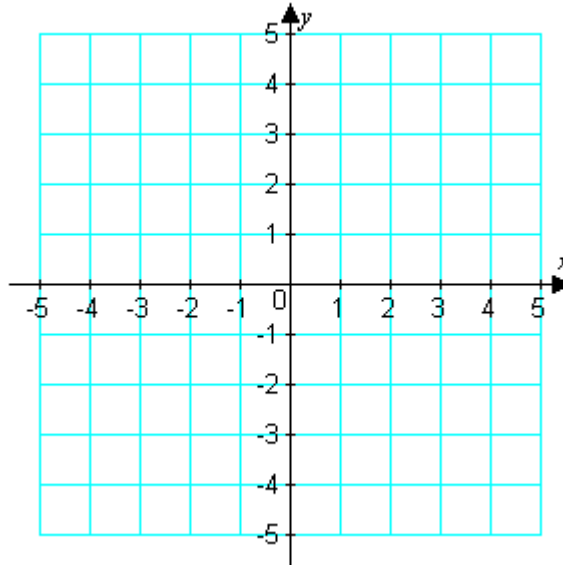
Ans:

x	y
0	3
$\dfrac{2}{3}$	0
1	$-\dfrac{3}{2}$
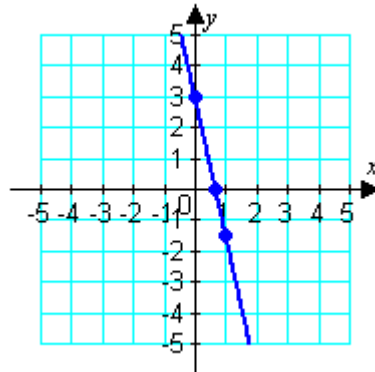
Concept: Graphing Linear Equations in Two Variables   Difficulty: Moderate
Section: 2.1

10. Graph the linear equation.
    $$y = -3x - 2$$
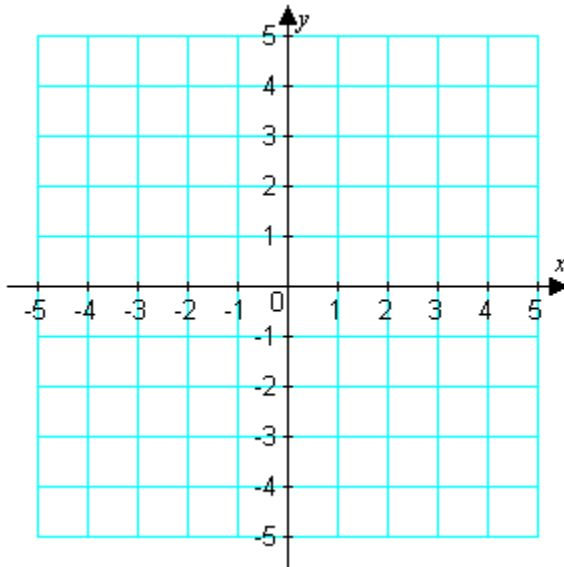
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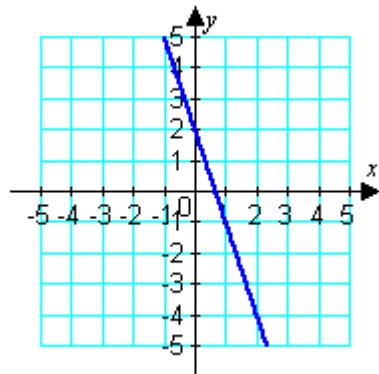
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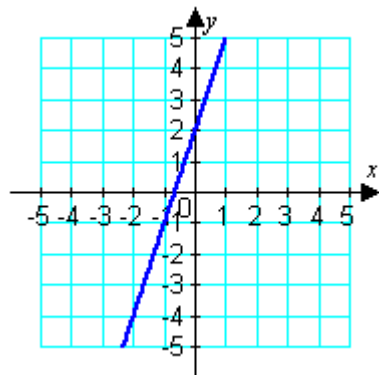
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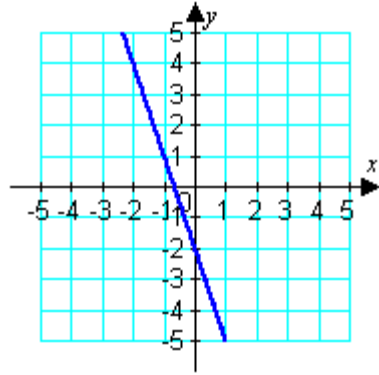
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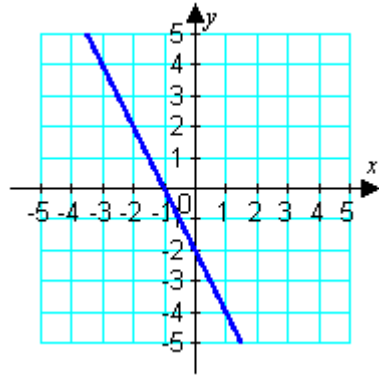
Ans: C   Concept: Graphing Linear Equations in Two Variables
Difficulty: Moderate   Section: 2.1

11. Graph the linear equation.

$$y = -\frac{3}{4}x - 3$$
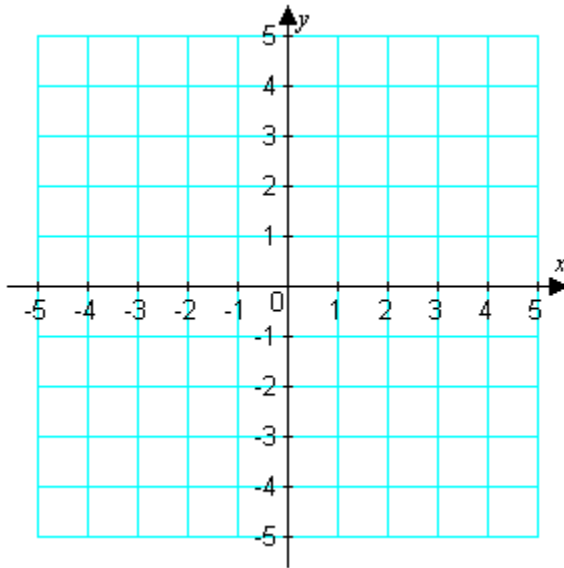
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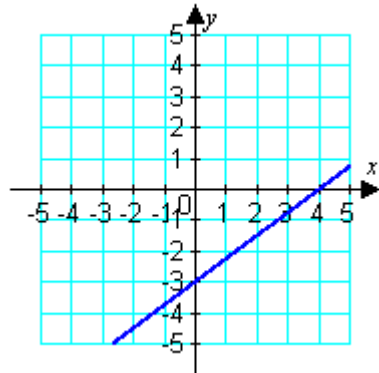
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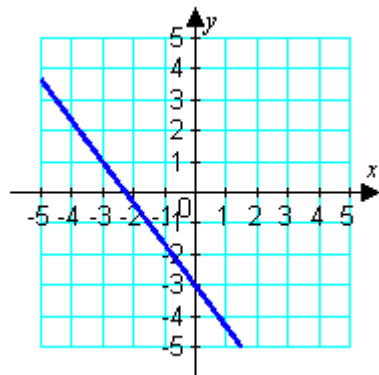
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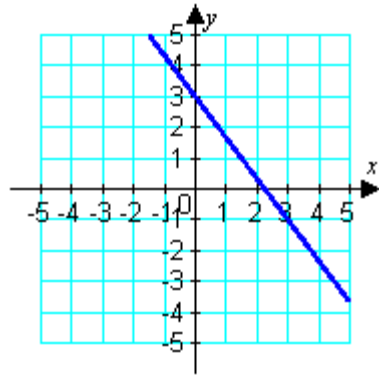
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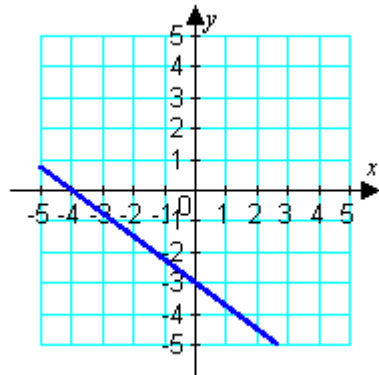
Ans: D   Concept: Graphing Linear Equations in Two Variables
Difficulty: Moderate   Section: 2.1

12. Graph the linear equation.

$$x = 3y - 2$$
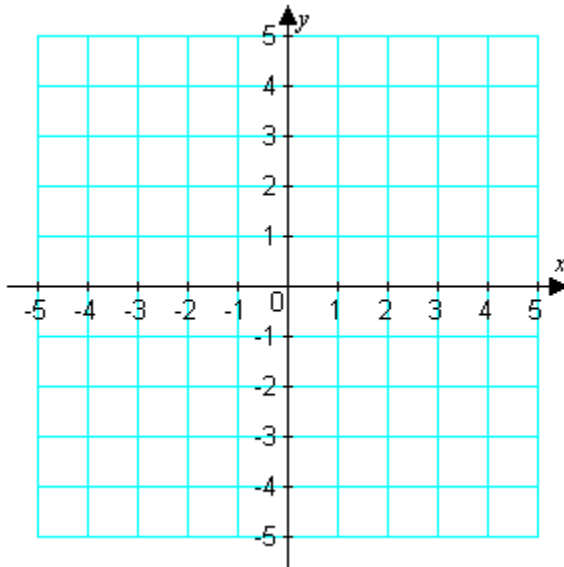
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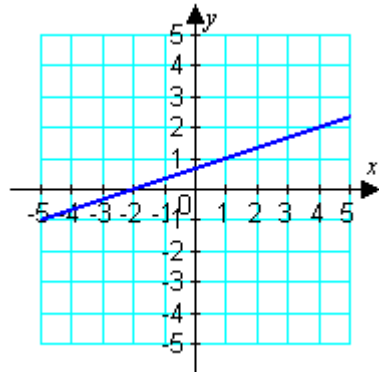
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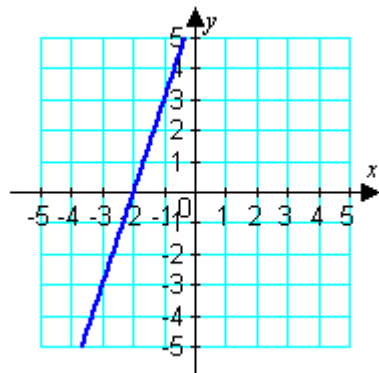
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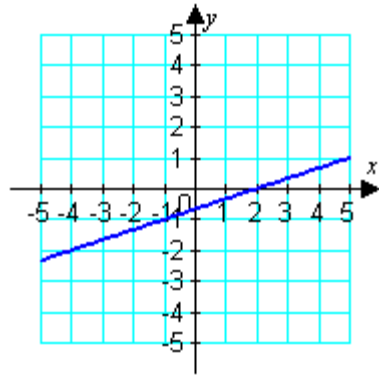
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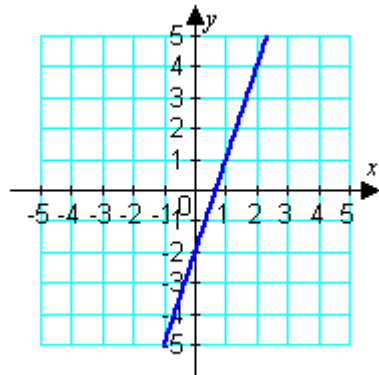
Ans: A   Concept: Graphing Linear Equations in Two Variables
Difficulty: Moderate   Section: 2.1

13. Graph the linear equation.

$$2y = 3x - 6$$
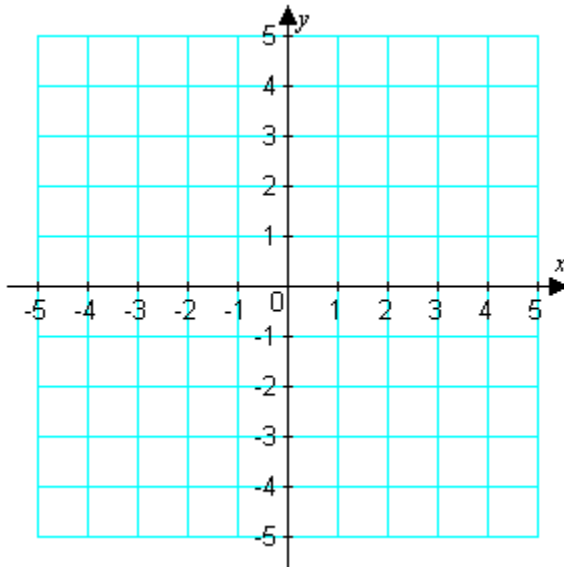
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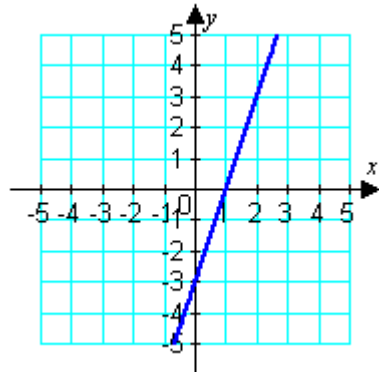
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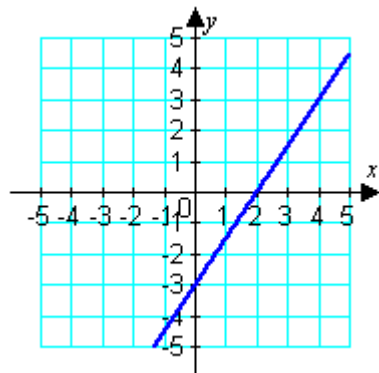
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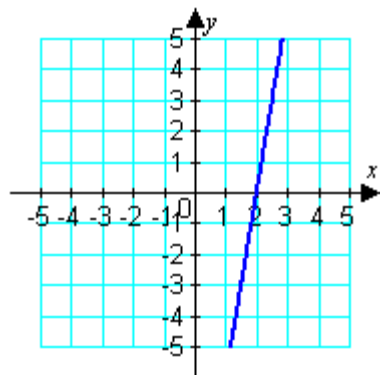
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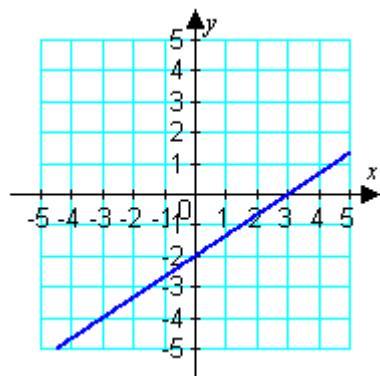
Ans: B   Concept: Graphing Linear Equations in Two Variables
Difficulty: Moderate   Section: 2.1

14. Find the *x*-intercept and the *y*-intercept.
$$-4x - 3y = -12$$

A)   *x*-intercept: $(4,0)$; *y*-intercept: $(0,3)$

B)   *x*-intercept: $(3,0)$; *y*-intercept: $(0,4)$

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

D)   *x*-intercept: $\left(-\dfrac{4}{3},0\right)$; *y*-intercept: $\left(0,-\dfrac{3}{4}\right)$

Ans: B   Concept: x-Intercepts and y-Intercepts   Difficulty: Moderate   Section: 2.1

15. Find the *x*-intercept and the *y*-intercept.

$$y = -\frac{5}{2}x + 4$$

A) *x*-intercept: $(4,0)$; *y*-intercept: $\left(0,\frac{8}{5}\right)$

B) *x*-intercept: $\left(\frac{2}{5},0\right)$; *y*-intercept: $(0,4)$

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

D) *x*-intercept: $\left(\frac{8}{5},0\right)$; *y*-intercept: $(0,4)$

Ans: D   Concept: x-Intercepts and y-Intercepts   Difficulty: Moderate
Section: 2.1

16. Find the *x*-intercept and the *y*-intercept.

$$\frac{x}{5} + \frac{y}{2} = 1$$

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: $\left(\frac{1}{5},0\right)$; *y*-intercept: $\left(0,\frac{1}{2}\right)$

Ans: A   Concept: x-Intercepts and y-Intercepts   Difficulty: Moderate
Section: 2.1

17. Find the *x*-intercept and the *y*-intercept and graph both. Then graph the line.
$-2x - 5y = 20$
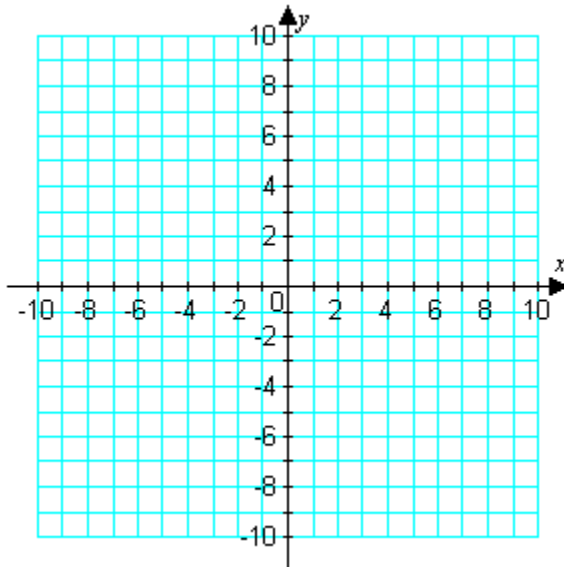
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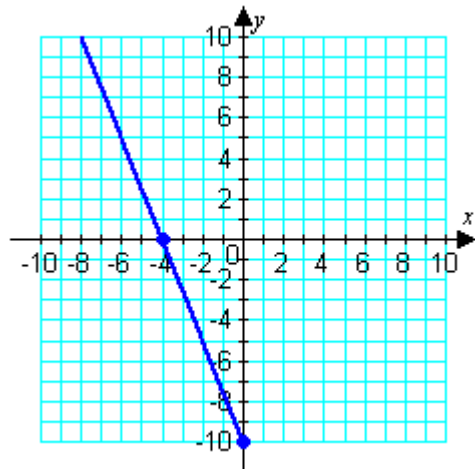
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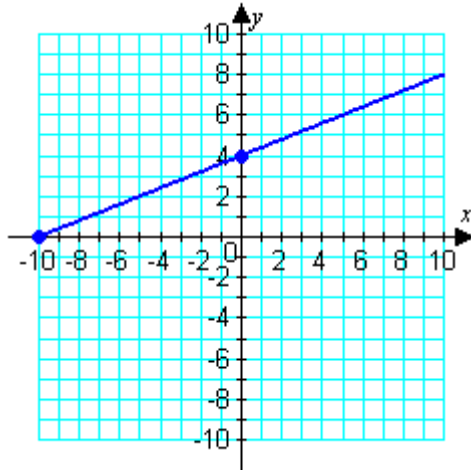
C)

D)
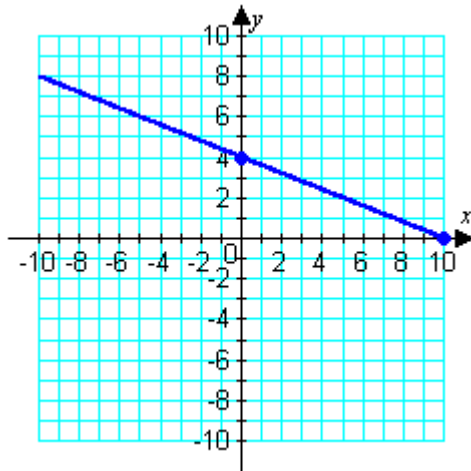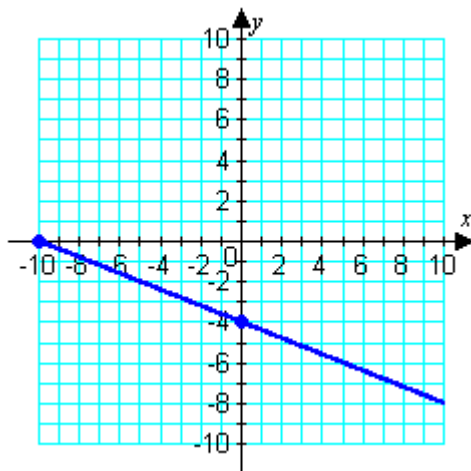
Ans: D   Concept: x-Intercepts and y-Intercepts   Difficulty: Moderate
Section: 2.1

18. Find the *x*-intercept and the *y*-intercept and graph both. Then graph the line.

$$y = \frac{3}{4}x - 3$$
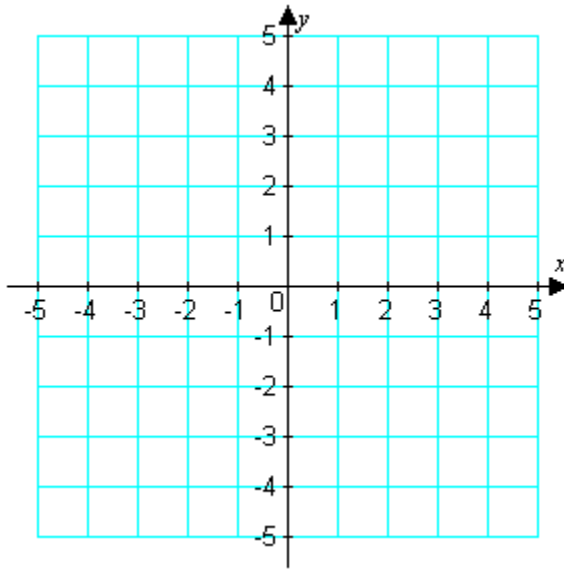
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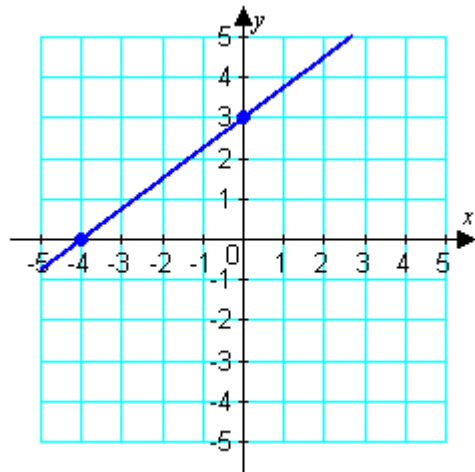
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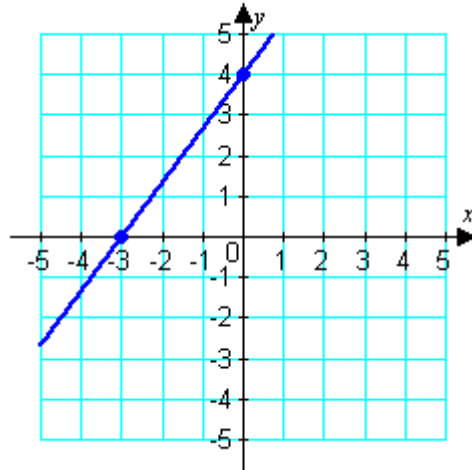
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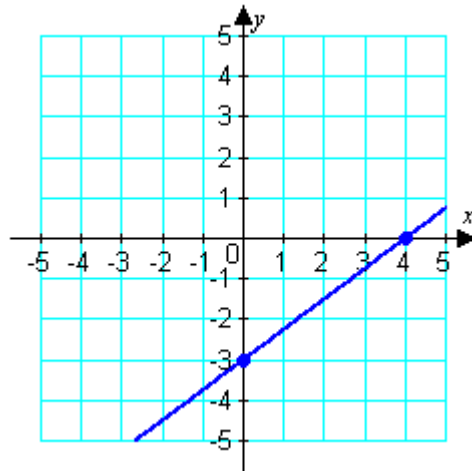
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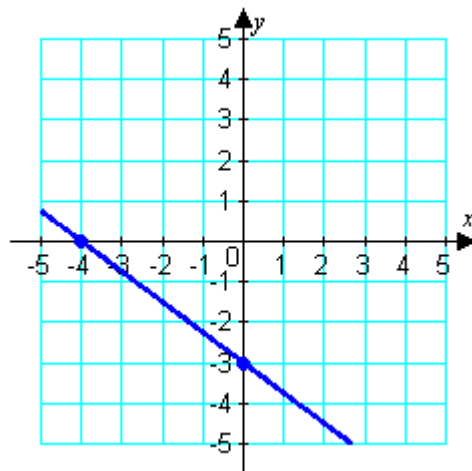
Ans: C   Concept: x-Intercepts and y-Intercepts   Difficulty: Moderate   Section: 2.1

19. A manufacturing company produces plastic pipe used in wastewater treatment applications. The pipe measures 4 inches in diameter and is cut to 10-foot lengths. The manufacturer's fixed costs are $10,000 per month (The fixed cost is the cost to operate the company even if it produces no pipe. It includes rent, debt payments, salaries, etc.). It costs an additional $1.40 for each unit of pipe produced. The overall monthly production costs are described by the linear equation

$$y = 1.40x + 10,000$$

where y represents the total monthly operating cost and x represents the number of units of pipe produced.

What does the y-intercept mean in the context of this problem?
A)   The y-intercept represents the increase in total cost when production is increased by one unit of pipe.
B)   The y-intercept represents the fixed cost of $10,000.
C)   The y-intercept indicates that the fixed cost increases by $10,000 per month.
D)   The y-intercept represents the cost ($1.40) per unit of pipe.
Ans: B   Concept: x-Intercepts and y-Intercepts   Difficulty: Easy   Section: 2.1

20. Identify the line as either vertical or horizontal, and graph the line.
$y = -3$

A)   Vertical
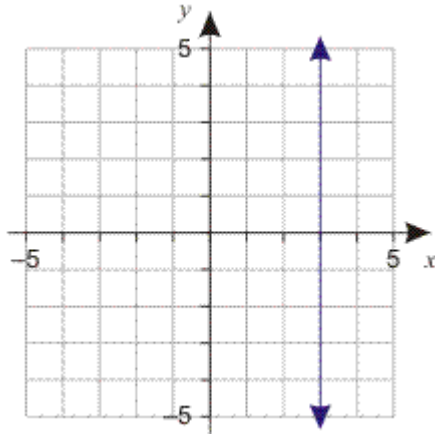
B)   Vertical
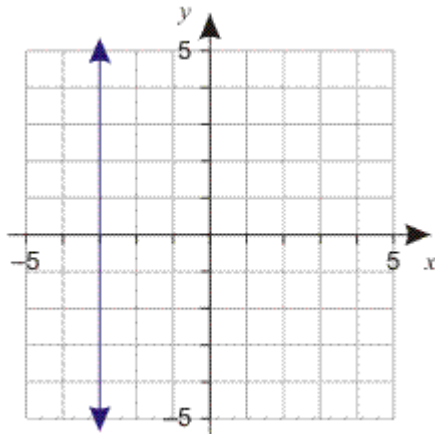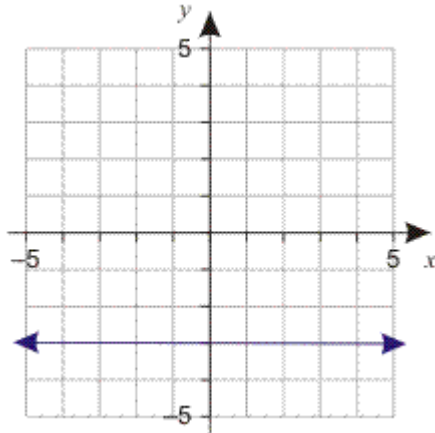
C)   Horizontal
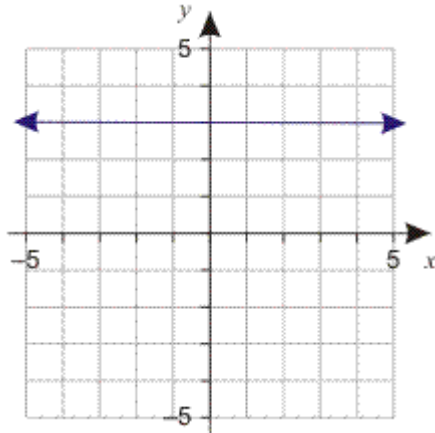
D)   Horizontal

Ans: C   Concept: Horizontal and Vertical Lines   Difficulty: Easy   Section: 2.1

21. Identify the line as either vertical or horizontal, and graph the line.

$2y - 9 = -3$

A) Vertical
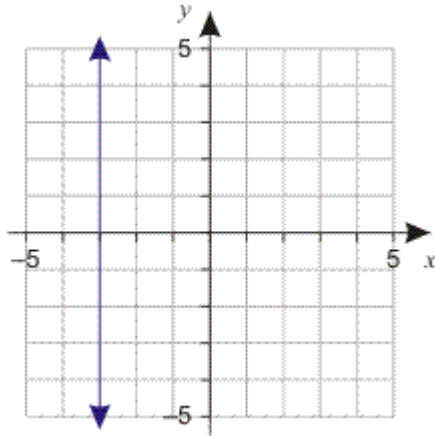
B) Vertical
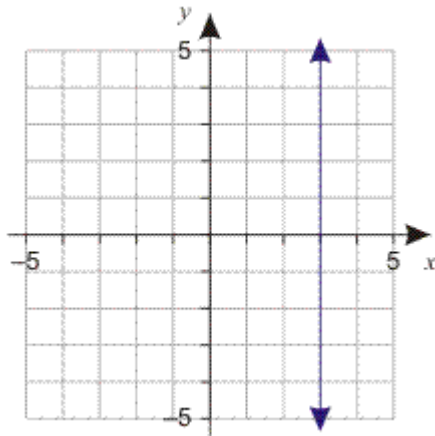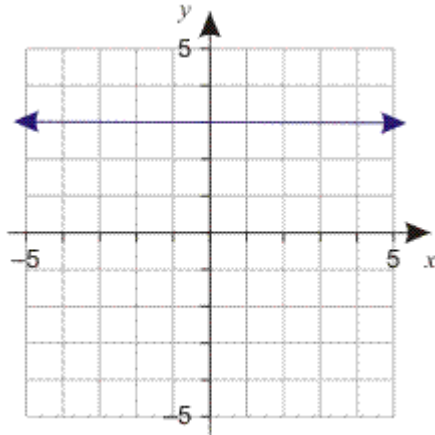
C) Horizontal
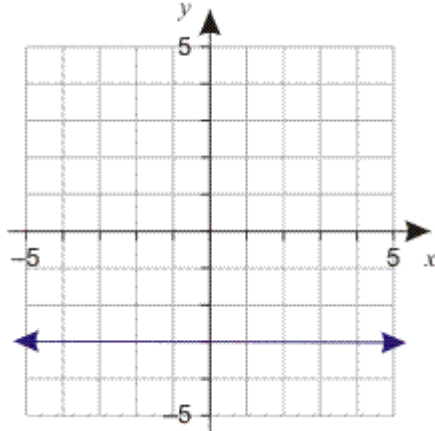
D) Horizontal

Ans: C   Concept: Horizontal and Vertical Lines   Difficulty: Easy   Section: 2.1

22. Which of the lines defined here have only one unique intercept?
   a. $x = 7$
   b. $7x + 4y = -5$
   c. $2y = 7$
   d. $-9x - 5y = 0$
   A) b.   B) a. and c.   C) b., and d   D) a., c., and d.
   Ans: D   Concept: x-Intercepts and y-Intercepts   Difficulty: Easy   Section: 2.1

23. A metal mast is stabilized with 3 guy wires (see figure). Find the slope of one of the guy wires if $d = 90$ feet and $h = 80$ ft.
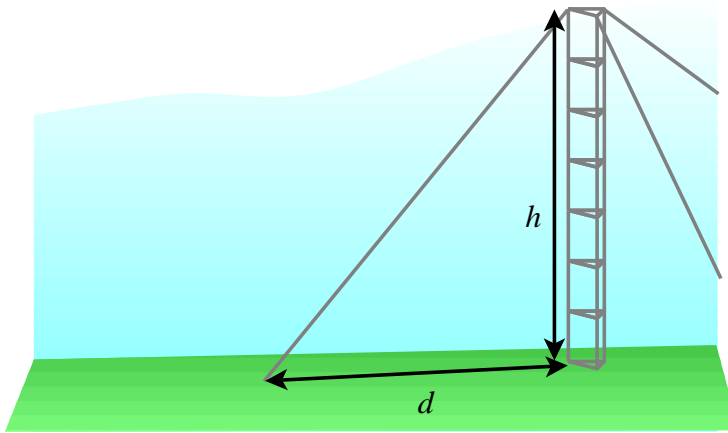
[*The figure is not necessarily drawn to scale.*]
   A) $\dfrac{8}{17}$ B) $\dfrac{9}{8}$ C) $\dfrac{8}{9}$ D) 120

   Ans: C   Concept: Introduction to the Slope of a Line   Difficulty: Easy
   Section: 2.2

24. Find the slope of the hill.

14 yd

247 yd
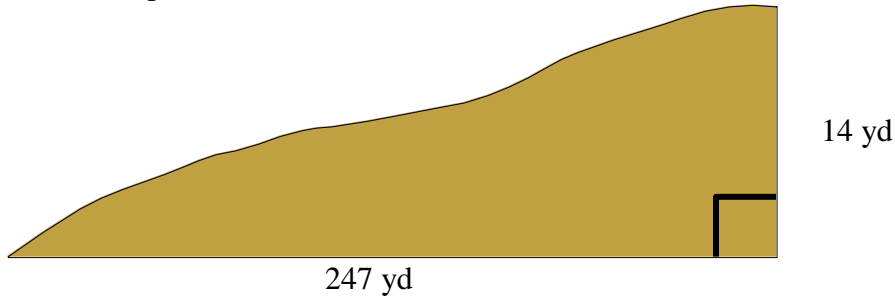
[*The figure is not necessarily drawn to scale.*]

A) $\dfrac{14}{247}$ B) $\dfrac{247}{14}$ C) $\dfrac{14}{261}$ D) 247

Ans: A   Concept: Introduction to the Slope of a Line   Difficulty: Easy
Section: 2.2

25. If a plane loses 1100 feet in altitude over a horizontal distance of 15,000 feet, what is the slope?

A) $-\dfrac{11}{150}$ B) $-\dfrac{150}{11}$ C) $\dfrac{11}{161}$ D) $\dfrac{11}{150}$

Ans: A   Concept: Introduction to the Slope of a Line   Difficulty: Easy
Section: 2.2

26. Use the slope formula to determine the slope of the line containing the two points.
    $(3,0)$ and $(0,-5)$

A) $\dfrac{3}{5}$ B) $-\dfrac{5}{3}$ C) $-\dfrac{3}{5}$ D) $\dfrac{5}{3}$

Ans: D   Concept: The Slope Formula   Difficulty: Easy   Section: 2.2

27. Use the slope formula to determine the slope of the line containing the two points.
    $(5,2)$ and $(-8,-9)$

A) $\dfrac{7}{3}$ B) $\dfrac{11}{13}$ C) $\dfrac{13}{11}$ D) $\dfrac{1}{3}$

Ans: B   Concept: The Slope Formula   Difficulty: Easy   Section: 2.2

28. Use the slope formula to determine the slope of the line containing the two points. Round to the nearest hundredth.
    $(0.7,-5.9)$ and $(-3,5.2)$

A) –3   B) 0.3   C) –0.33   D) –1.24

Ans: A   Concept: The Slope Formula   Difficulty: Easy   Section: 2.2

29. Use the slope formula to determine the slope of the line containing the two points.

$(3, 2)$ and $(3, -5)$

A) 0   B) $-\dfrac{7}{6}$ C) $-\dfrac{1}{2}$ D) undefined

Ans: D   Concept: The Slope Formula   Difficulty: Easy   Section: 2.2

30. Use the slope formula to determine the slope of the line containing the two points.

$(-3, -9)$ and $(-4, -9)$

A) 0   B) $-\dfrac{5}{6}$ C) $\dfrac{13}{6}$ D) undefined

Ans: A   Concept: The Slope Formula   Difficulty: Easy   Section: 2.2

31. Use the slope formula to determine the slope of the line containing the two points.

$\left(\dfrac{3}{4}, \dfrac{9}{2}\right)$ and $\left(\dfrac{3}{8}, -\dfrac{2}{3}\right)$

A) $\dfrac{124}{9}$ B) $\dfrac{92}{27}$ C) $-\dfrac{18}{5}$ D) $-\dfrac{124}{27}$

Ans: A   Concept: The Slope Formula   Difficulty: Easy   Section: 2.2

32. Estimate the slope of the line from its graph.
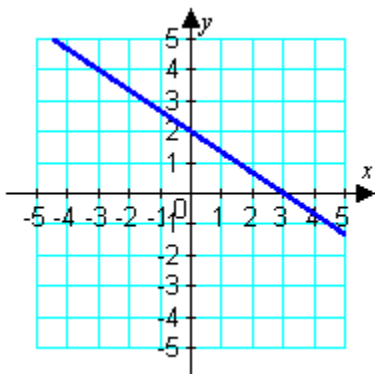
A)
$$\frac{3}{2}$$

B)
$$\frac{2}{3}$$

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

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

Ans: C   Concept: The Slope Formula   Difficulty: Moderate   Section: 2.2

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

$$m = \frac{13}{11}$$

A) $-\frac{13}{11}$ B) $\frac{13}{11}$ C) $\frac{11}{13}$ D) $-\frac{11}{13}$

Ans: B   Concept: Parallel and Perpendicular Lines   Difficulty: Easy   Section: 2.2

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

$$m = \frac{5}{23}$$

A) $-\frac{5}{23}$ B) $\frac{5}{23}$ C) $\frac{23}{5}$ D) $-\frac{23}{5}$

Ans: D   Concept: Parallel and Perpendicular Lines   Difficulty: Easy   Section: 2.2

35. Two points are given from each of two lines L_1 and L_2. Without graphing the points, determine if the lines are perpendicular, parallel, or neither.

   L_1: $(4, -4)$ and $(-9, 9)$

   L_2: $(-8, -1)$ and $(-7, -2)$

   A) Perpendicular   B) Parallel   C) Neither
   Ans: B   Concept: Parallel and Perpendicular Lines   Difficulty: Moderate
   Section: 2.2

36. Two points are given from each of two lines L_1 and L_2. Without graphing the points, determine if the lines are perpendicular, parallel, or neither.

   L_1: $(-8, 12)$ and $(7, -3)$

   L_2: $(-1, 3)$ and $(0, 4)$

   A) Perpendicular   B) Parallel   C) Neither
   Ans: A   Concept: Parallel and Perpendicular Lines   Difficulty: Moderate
   Section: 2.2

37. Two points are given from each of two lines L_1 and L_2. Without graphing the points, determine if the lines are perpendicular, parallel, or neither.

   L_1: $(1, 7)$ and $(9, 39)$

   L_2: $(-5, -11)$ and $(-1, -7)$

   A) Perpendicular   B) Parallel   C) Neither
   Ans: C   Concept: Parallel and Perpendicular Lines   Difficulty: Moderate
   Section: 2.2

38. The graph shows the enrollment at Riverside Community College for selected years. Use the coordinates of the given points to find the slope of the line. Interpret the meaning of the slope in the context of this problem.
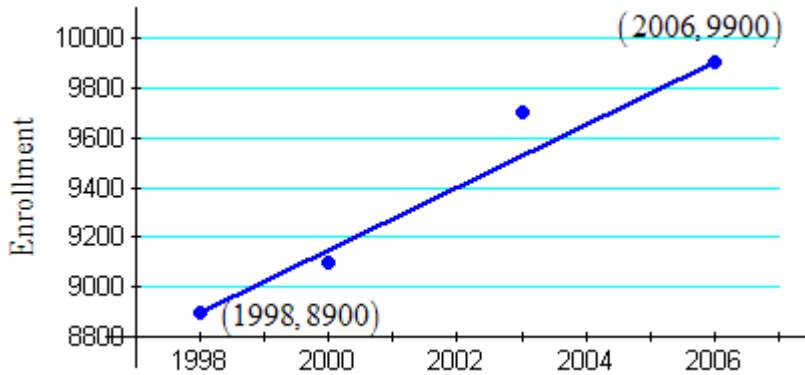
A) $m = 250$; Enrollment increases by an approximate factor of 250 students per year.
B) $m = 125$; Enrollment increases by an approximate factor of 125 students per year.
C) $m = 250$; Enrollment increases by approximately 250 students per year.
D) $m = 125$; Enrollment increases by approximately 125 students per year.
Ans: D   Concept: Applications and Interpretation of Slope   Difficulty: Moderate
Section: 2.2

39. Determine the slope and the y-intercept of the line.
$$72 = 8y$$
A) Slope: 0; y-intercept: (0, 9)   C) Slope: 1; y-intercept: (0, 9)
B) Slope: 0; y-intercept: (9, 0)   D) Slope: undefined; y-intercept: (9, 0)
Ans: A   Concept: Slope-Intercept Form   Difficulty: Easy   Section: 2.3

40. Determine the slope and the y-intercept of the line.
$$-7x - 2y = 3$$
A) Slope: $\dfrac{7}{2}$; y-intercept: $\left(0, -\dfrac{3}{2}\right)$ C) Slope: $-\dfrac{2}{7}$; y-intercept: $\left(0, -\dfrac{2}{3}\right)$

B) Slope: $-\dfrac{7}{2}$; y-intercept: $\left(0, -\dfrac{3}{2}\right)$ D) Slope: $-\dfrac{7}{2}$; y-intercept: $(0, 3)$

Ans: B   Concept: Slope-Intercept Form   Difficulty: Easy   Section: 2.3

41. Determine the slope and the y-intercept of the line. Round your answer to three decimal place, if necessary.
$$y = 2.2x + 1.25$$
A) Slope: 0.455; y-intercept: (0, 1.25)   C) Slope: –1.25; y-intercept: (0, 2.2)
B) Slope: 2.2; y-intercept: (0, 1.25)   D) Slope: 2.2; y-intercept: (0, –1.25)
Ans: B   Concept: Slope-Intercept Form   Difficulty: Easy   Section: 2.3

42. Match the equation with the correct graph below.

$$y = \frac{3}{4} + 1$$

A)

B)

C)

D)
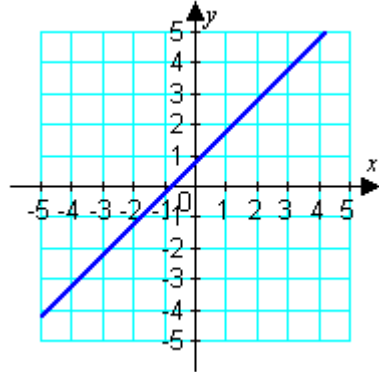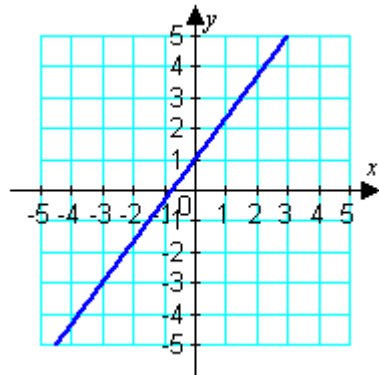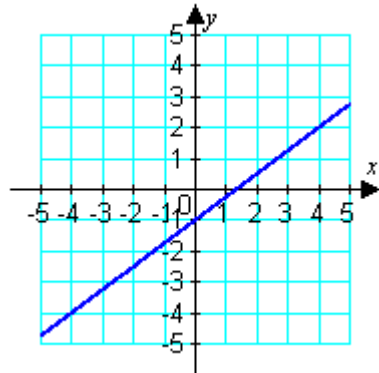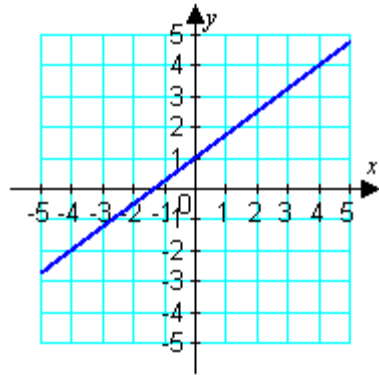
Ans: D   Concept: Slope-Intercept Form   Difficulty: Moderate   Section: 2.3

43. Match the equation with the correct graph below.

$x = 2$

A)
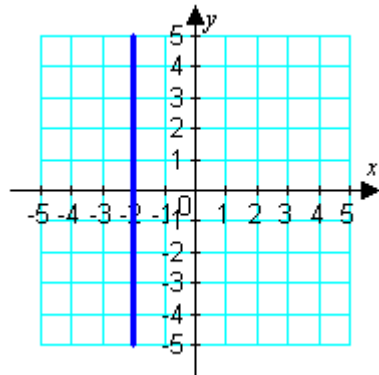
B)
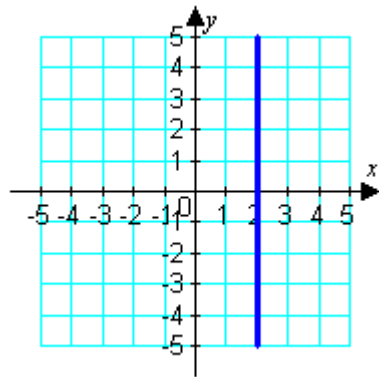
C)
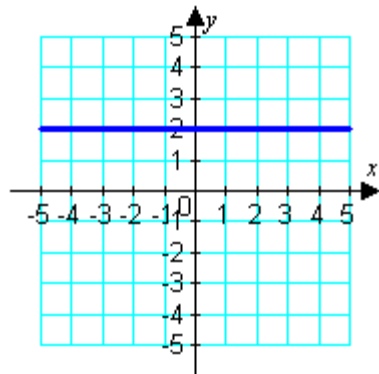
D)
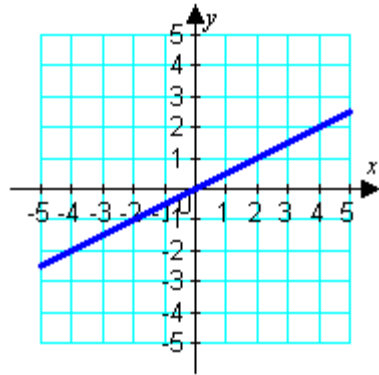
Ans: B   Concept: Slope-Intercept Form   Difficulty: Moderate   Section: 2.3

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

$3x = -2 - y$
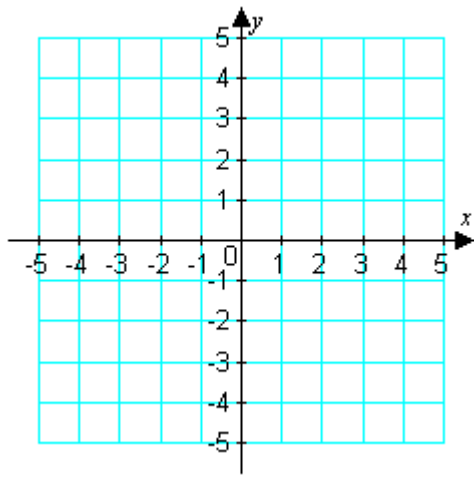
A) $y = -3x - 2$
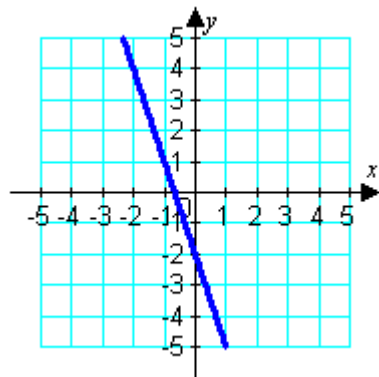
B) $y = -3x + 2$
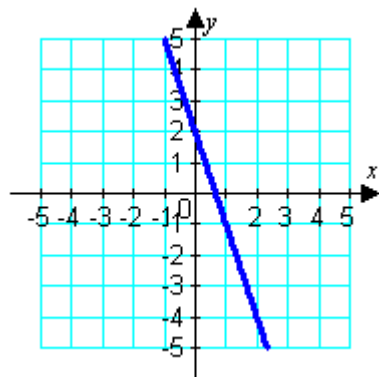
C) $y = 3x + 2$
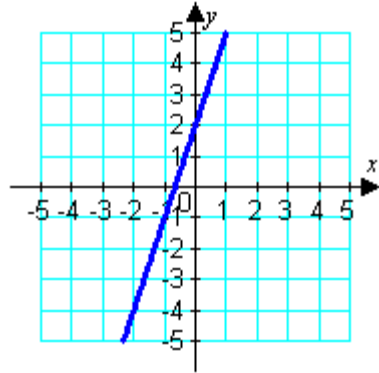
D) $y = 3x - 2$
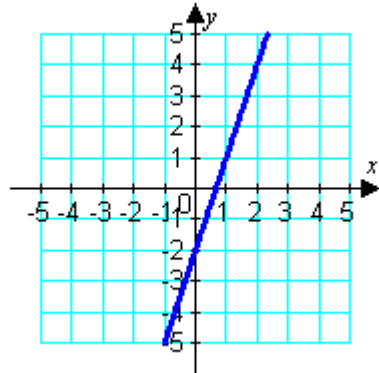
Ans: A   Concept: Slope-Intercept Form   Difficulty: Moderate   Section: 2.3

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

$$2x - 3y = 6$$
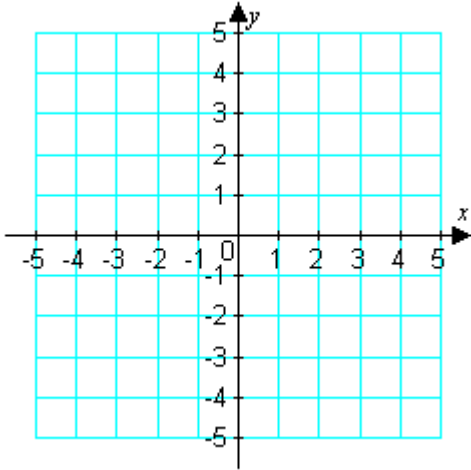
A) $y = -\dfrac{2}{3}x - 2$
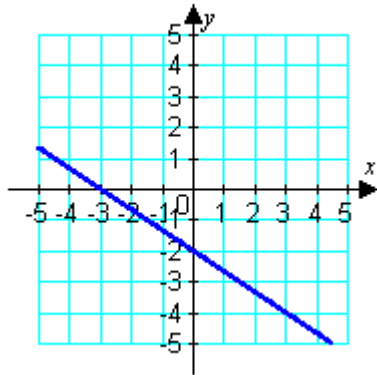
B) $y = \dfrac{3}{2}x + 2$
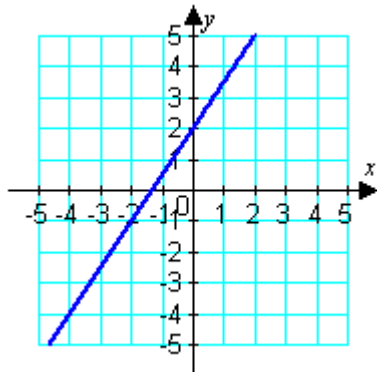
C) $y = \dfrac{2}{3}x - 2$
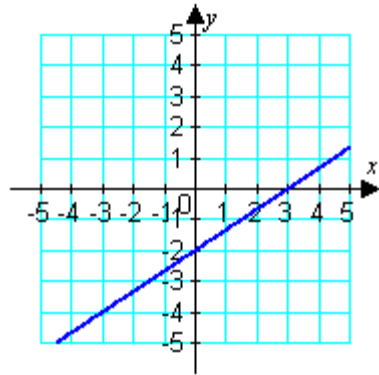
D) $y = \dfrac{2}{3}x + 2$
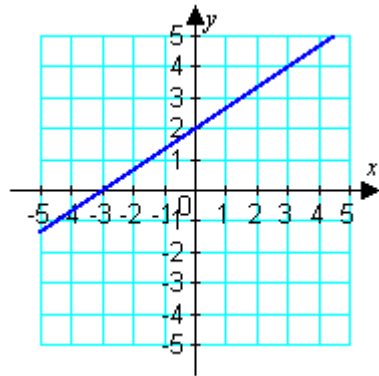
Ans: C   Concept: Slope-Intercept Form   Difficulty: Moderate   Section: 2.3

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

$$4x + 3y = 0$$
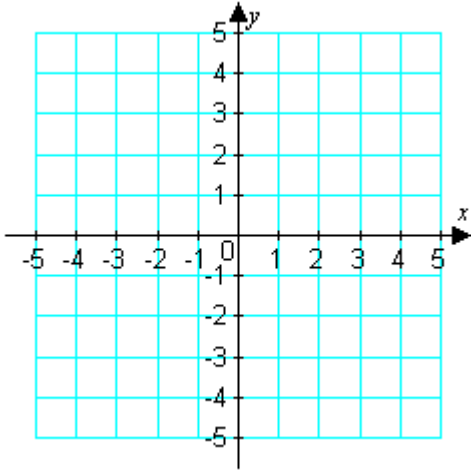
A) $y = -\dfrac{4}{3}x$
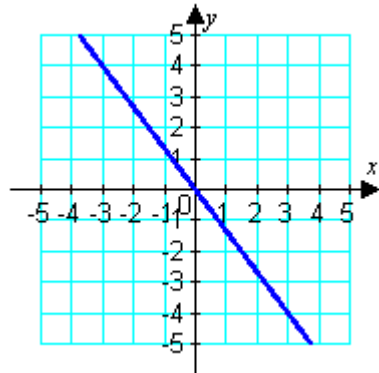
B) $y = \dfrac{4}{3}x$
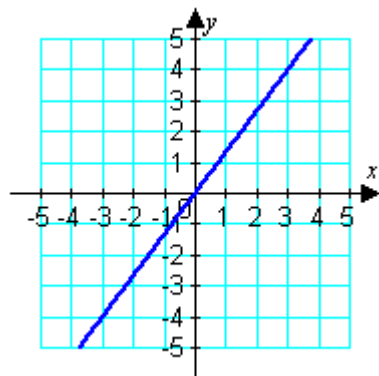
C) $y = -\dfrac{3}{4}x$
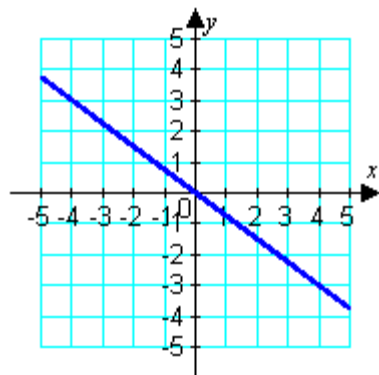
D) $y = \dfrac{3}{4}x$
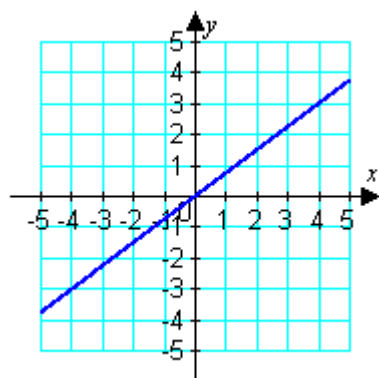
Ans: A   Concept: Slope-Intercept Form   Difficulty: Moderate   Section: 2.3

47. Determine if the lines are parallel, perpendicular, or neither parallel nor perpendicular.

$-3y = 2x - 6$

$-6x = 9y + 4$

A) parallel   B) perpendicular   C) neither

Ans: A   Concept: Slope-Intercept Form   Difficulty: Easy   Section: 2.3

48. Determine if the lines are parallel, perpendicular, or neither parallel nor perpendicular.

$-4y = -x - 2$

$12x = -3y + 7$

A) parallel   B) perpendicular   C) neither

Ans: B   Concept: Slope-Intercept Form   Difficulty: Easy   Section: 2.3

49. Determine if the lines are parallel, perpendicular, or neither parallel nor perpendicular.

$-2y = -2x + 6$

$-5x = -2y + 2$

A) parallel   B) perpendicular   C) neither

Ans: C   Concept: Slope-Intercept Form   Difficulty: Easy   Section: 2.3

50. Determine if the lines are parallel, perpendicular, or neither parallel nor perpendicular.

$$-8x - 3y = -7$$

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

A) parallel   B) perpendicular   C) neither

Ans: A   Concept: Slope-Intercept Form   Difficulty: Easy   Section: 2.3

51. Determine if the lines are parallel, perpendicular, or neither parallel nor perpendicular.

$$3x + 8y = 8$$

$$\frac{4}{3}x - \frac{1}{2}y = -5$$

A) parallel   B) perpendicular   C) neither

Ans: B   Concept: Slope-Intercept Form   Difficulty: Easy   Section: 2.3

52. Determine if the lines are parallel, perpendicular, or neither parallel nor perpendicular.

$$-4x + 7y = -1$$

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

A) parallel   B) perpendicular   C) neither

Ans: C   Concept: Slope-Intercept Form   Difficulty: Easy   Section: 2.3

53. Determine if the lines are parallel, perpendicular, or neither parallel nor perpendicular.

$$1.6x = 0.8y - 6$$

$$y - 6 = 2x$$

A) parallel   B) perpendicular   C) neither

Ans: A   Concept: Slope-Intercept Form   Difficulty: Easy   Section: 2.3

54. Determine if the lines are parallel, perpendicular, or neither parallel nor perpendicular.

$$-0.4x = 1.2y - 1$$

$$y - 2 = 3x$$

A) parallel   B) perpendicular   C) neither

Ans: B   Concept: Slope-Intercept Form   Difficulty: Easy   Section: 2.3

55. Determine if the lines are parallel, perpendicular, or neither parallel nor perpendicular.

$$-5.4x = -1.1y - 9$$

$$y - 2 = -2x$$

A) parallel   B) perpendicular   C) neither

Ans: C   Concept: Slope-Intercept Form   Difficulty: Easy   Section: 2.3

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

   The line passes through the point $(-3, 10)$ and has a slope of -4.

   A) $y = -4x + 10$ B) $y = -4x - 3$ C) $y = -4x - 2$ D) $y = 4x + 10$

   Ans: C   Concept: The Point-Slope Formula   Difficulty: Moderate   Section: 2.3

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

   The line passes through the point $(-12, 20)$ and has a slope of $-\dfrac{5}{4}$.

   A) $y = -\dfrac{5}{4}x + 5$ B) $y = -\dfrac{5}{4}x + 65$ C) $y = \dfrac{5}{4}x + 5$ D) $y = -\dfrac{5}{4}x - 12$

   Ans: A   Concept: The Point-Slope Formula   Difficulty: Moderate   Section: 2.3

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

   The line passes through (2, 3) and (3, 5).

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

   Ans: A   Concept: The Point-Slope Formula   Difficulty: Moderate   Section: 2.3

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

   The line passes through (7, 5) and (5, 13).

   A) $y = -4x - 33$ B) $y = -4x + 23$ C) $y = 4x + 23$ D) $y = -4x + 33$

   Ans: D   Concept: The Point-Slope Formula   Difficulty: Moderate   Section: 2.3

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

   The line passes through (10, 4) and (10, –11).

   A) $x = 10$ B) $y = 10$ C) $y = -\dfrac{3}{4}x + \dfrac{7}{2}$ D) $y = -\dfrac{3}{4}x - \dfrac{7}{2}$

   Ans: A   Concept: The Point-Slope Formula   Difficulty: Moderate   Section: 2.3

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

   The line passes through (–3, –9) and (–5, –9).

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

   Ans: A   Concept: The Point-Slope Formula   Difficulty: Moderate   Section: 2.3

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

   The line contains the point $(8,3)$ and is parallel to a line with a slope of $\frac{3}{4}$.

   A) $y = \frac{3}{4}x - 3$ B) $y = \frac{3}{4}x + 3$ C) $y = -\frac{3}{4}x - 3$ D) $y = \frac{3}{4}x + 8$

   Ans: A   Concept: The Point-Slope Formula   Difficulty: Moderate   Section: 2.3

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

   The line contains the point $(-5,6)$ and is perpendicular to a line with a slope of $\frac{5}{3}$.

   A) $y = -\frac{3}{5}x + 3$ B) $y = -\frac{3}{5}x + 6$ C) $y = \frac{3}{5}x + 3$ D) $y = -\frac{3}{5}x - 5$

   Ans: A   Concept: The Point-Slope Formula   Difficulty: Moderate   Section: 2.3

64. Write an equation of the line satisfying the given conditions. Write the answer in slope-intercept from.
   The line contains the point (1, 20) and is parallel to $2y - 6x = 12$.
   A) $y = 6x + 14$ B) $y = 3x + 17$ C) $2y - 6x = 20$ D) $y = 3x + 6$
   Ans: B   Concept: The Point-Slope Formula   Difficulty: Moderate   Section: 2.3

65. Write an equation of the line satisfying the given conditions. Write the answer in slope-intercept from.
   The line is perpendicular to the line defined by $y = 3x - 8$ and passes through the point (12, 3).
   A) $y = -\frac{1}{3}x + 7$ B) $y = \frac{1}{3}x + 7$ C) $y = -3x - 7$ D) $y = -\frac{1}{3}x - 7$
   Ans: A   Concept: The Point-Slope Formula   Difficulty: Difficult   Section: 2.3

66. Write an equation of the line satisfying the given conditions.
   The line passes through $(-8,2)$ and has a zero slope.
   A) $y = -8$ B) $y = 2$ C) $x = -8$ D) $x = 2$
   Ans: B   Concept: Different Forms of Linear Equations   Difficulty: Moderate
   Section: 2.3

67. Write an equation of the line satisfying the given conditions.
   The line passes through $(-2,5)$ and has an undefined slope.
   A) $y = -2$ B) $y = 5$ C) $x = -2$ D) $x = 5$
   Ans: C   Concept: Different Forms of Linear Equations   Difficulty: Moderate
   Section: 2.3

68. Write an equation of the line satisfying the given conditions.

    The line is perpendicular to the *x*-axis and passes through $(9, -4)$.

    A) $y = 9$ B) $y = -4$ C) $x = 9$ D) $x = -4$
    Ans: C   Concept: Different Forms of Linear Equations   Difficulty: Moderate
    Section: 2.3

69. A tool rental store charges a flat fee of $5.00 to rent a chain saw, and $6.00 for each day, including the first. Write an equation that expresses the cost *y* of renting this saw if it is rented for *x* days.

    A) $y = 6.00x - 5.00$ C) $y = 6.00x + 5.00$
    B) $y = 5.00x + 6.00$ D) $y = 6.00(x + 5.00)$
    Ans: C   Concept: Writing a Linear Model   Difficulty: Moderate   Section: 2.4

70. A tool rental store charges a flat fee of $8.50 to rent a chain saw, and $6.50 for each day, including the first. Use a linear equation to find the cost of renting the saw for one week.

    A) $15.00   B) $47.50   C) $45.50   D) $54.00
    Ans: D   Concept: Writing a Linear Model   Difficulty: Moderate   Section: 2.4

71. A tool rental store charges a flat fee of $8.00 to rent a chain saw, and $3.25 for each day, including the first. If you need to rent the saw and absolutely refuse to spend more than $40.50, what's the maximum number of days you can keep the saw?

    A) 5 days   B) 7 days   C) 10 days   D) 14 days
    Ans: C   Concept: Writing a Linear Model   Difficulty: Moderate   Section: 2.4

72. The S-Cargo shipping company calculates shipping charges using the linear model
    $$y = 3.18x,$$
    where *y* is the cost in dollars and *x* is the weight of the package in pounds ($1 \le x \le 9$). Use the linear model to compute the shipping cost for a package weighing 7 lb. Round to the nearest cent.

    A) $10.18   B) $2.20   C) $7.00   D) $22.26
    Ans: D   Concept: Interpreting a Linear Model   Difficulty: Easy   Section: 2.4

73. The S-Cargo shipping company calculates shipping charges using the linear model
    $$y = 3.02x,$$
    where *y* is the cost in dollars and *x* is the weight of the package in pounds ($1 \le x \le 11$). Use the linear model to compute weight of a package with a shipping cost of $15.10. Round to the nearest hundredth of a pound, if necessary.

    A) 8.02 lb   B) 1.66 lb   C) 5.00 lb   D) 15.10 lb
    Ans: C   Concept: Interpreting a Linear Model   Difficulty: Easy   Section: 2.4

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

Average Hourly Wage, MegaMart
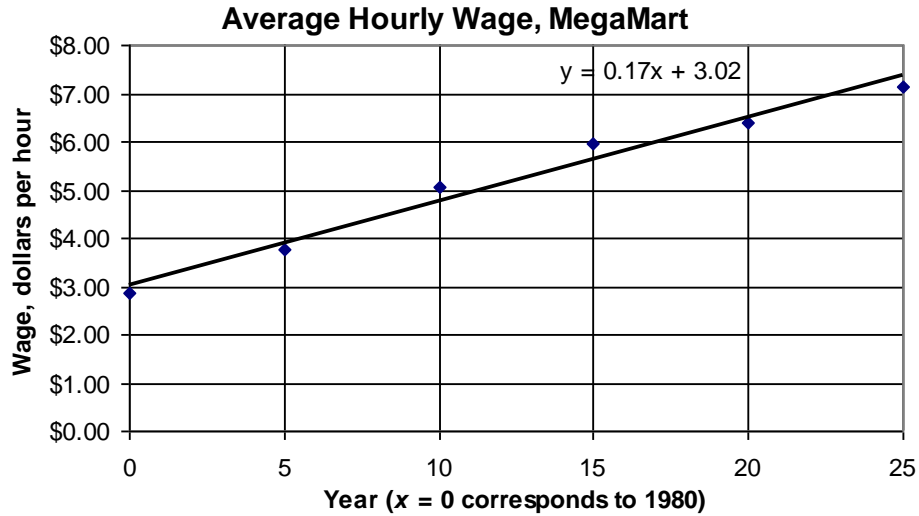
Let y represent the hourly wage and let x represent the year, where $x = 0$ corresponds to the year 1980, $x = 1$ represents 1981, and so on. Then the average wage can be approximated by the equation $y = 0.17x + 3.02$, where $0 \leq x \leq 25$.

Use the linear equation to approximate the average wage for the year 2000 and compare it to the actual wage of $6.40 per hour.
A) $5.57 per hour; the calculated wage was $0.38 less than the actual wage.
B) $5.57 per hour; the calculated wage was $0.83 less than the actual wage.
C) $6.42 per hour; the calculated wage was $0.02 more than the actual wage.
D) $7.27 per hour; the calculated wage was $0.87 more than the actual wage.
Ans: C   Concept: Interpreting a Linear Model   Difficulty: Moderate   Section: 2.4

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

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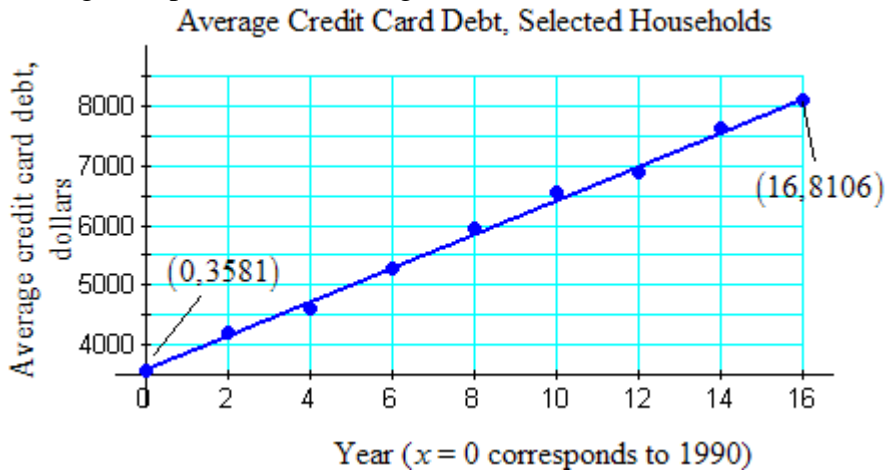
Let y represent the credit card debt in dollars. Let x represent the year, where $x = 0$ corresponds to the year 1990, $x = 4$ represents 1994, and so on.

a. Use the ordered pairs given in the graph, (0, 3581) and (16, 8106), to find a linear equation to estimate the 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.
Ans: a. $y = 282.8x + 3581$
        b. $7257 in 2003
        c. The average household credit card debt is increasing at approximately $283 per year.
Concept: Finding a Linear Model From Observed Data   Difficulty: Moderate
Section: 2.4

76. 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 99% of the defective cookies at a conveyor belt speed of 10 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 50% of defective cookies at a belt speed of 18 feet per minute.

a. Make a graph with the belt speed on the *x*-axis and the corresponding inspection efficiency, in percent, on the *y*-axis. Graph the points (10, 99) and (18, 50).
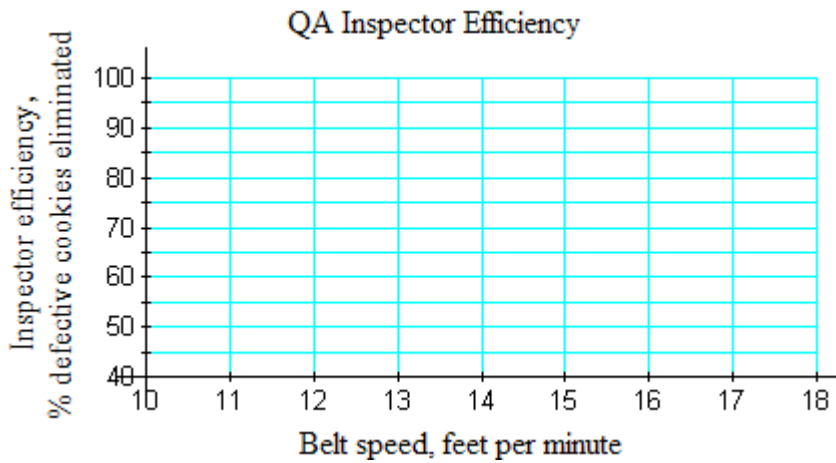
b. Find an equation of the line through the given points. Write the equation in slope-intercept form. Round the slope and *y*-intercept each to 1 decimal place.
c. Use the equation from part (b) to predict the efficiency of the inspectors at a belt speed of 16 feet per minute. Round to the nearest percent.
Ans: a.
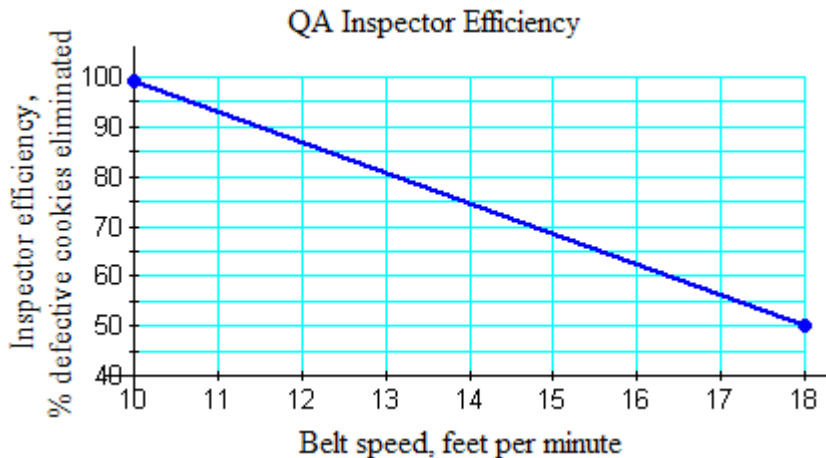
b. $y = 160.3 - 6.1x$

c. 63% at a belt speed of 16 feet per minute.
Concept: Finding a Linear Model From Observed Data   Difficulty: Moderate
Section: 2.4

77. Points are collinear if they lie on the same line. Use the slope formula to determine if the points are collinear.

$$(1,-11),(5,-23),(4,-20)$$

A) collinear   B) not collinear

Ans: A   Concept: Collinear Points   Difficulty: Moderate   Section: 2.4

78. Points are collinear if they lie on the same line. Use the slope formula to determine if the points are collinear.

$$(-4,-1),(-5,-3),(6,7)$$

A) collinear   B) not collinear

Ans: B   Concept: Collinear Points   Difficulty: Moderate   Section: 2.4

79. Write the relation as a set of ordered pairs:

Town	Population
Springfield	82,000
Shelbyville	62,000
Capital City	940,000

Ans: { (Springfield, 82,000), (Shelbyville, 62,000), (Capital City, 940,000) }

Concept: Domain and Range of a Relation   Difficulty: Easy   Section: 2.5

80. Find the domain and range of the relation:

State	Year Entered the Union
Vermont	1791
New York	1788
Delaware	1787
Georgia	1788

Ans: Domain: {Vermont, New York, Delaware, Georgia}
    Range: {1787, 1788, 1791}

Concept: Domain and Range of a Relation   Difficulty: Easy   Section: 2.5

81.

List the domain and range.

x	y
0	6
–9	9
8	4
–8	3
–9	5
8	3

A)   Domain {0, –9, 8, –8, –9, 8}; range {6, 9, 4, 3, 5, 3}
B)   Domain {0, –9, 8, –8}; range {6, 9, 4, 3, 5}
C)   Domain {0, –9, 8, –8); range {6, 9, 4, 3, 5, 3}
D)   None of the above
Ans: B   Concept: Domain and Range of a Relation   Difficulty: Easy   Section: 2.5

82. Write the relation as a set of ordered pairs:
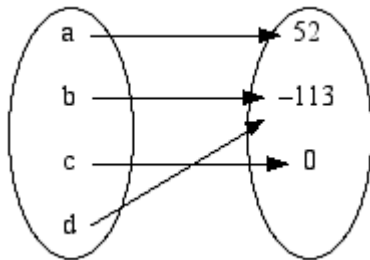
Ans: {(a, 52), (b, –113), (c, 0), (d, –113)}
Concept: Domain and Range of a Relation   Difficulty: Easy   Section: 2.5

83. Find the domain and range of the relation:
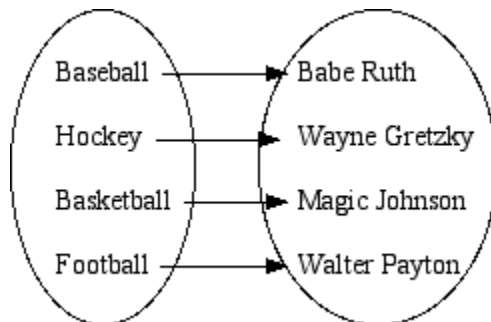
Ans: Domain = {Baseball, Hockey, Basketball, Football}
       Range = {Babe Ruth, Wayne Gretzky, Magic Johnson, Walter Payton}
Concept: Domain and Range of a Relation   Difficulty: Easy   Section: 2.5

84. a. Write the relation as a set of ordered pairs.
    b. Determine the domain and range.
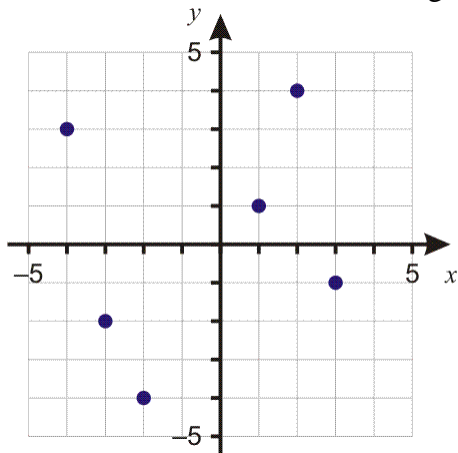
A)   a. {(–4, 3), (–3, –2), (–2, –4), (1, 1), (2, 4), (3, –1)}
     b. Domain: {–4, –3, –2, 1, 2, 3}
        range: {–4, –2, –1, 1, 3, 4}
B)   a. {(–4, 3), (–3, –2), (–2, –4), (1, 1), (2, 4), (3, –1)}
     b. Domain: [–4, 3]
        range: [–4, 4]
C)   a. {(–4, –2), (–2, –3), (–1, 3), (1, 1), (3, –4), (4, 2)}
     b. Domain: [–4, 4]
        range: [–4, 3]
D)   a. {(–4, –2), (–2, –3), (–1, 3), (1, 1), (3, –4), (4, 2)}
     b. Domain: {–4, –2, –1, 1, 3, 4}
        range: {–4, –3, –2, 1, 2, 3}
Ans: A   Concept: Domain and Range of a Relation   Difficulty: Easy   Section: 2.5

85. Find the domain and range of the relation. Use interval notation where appropriate.
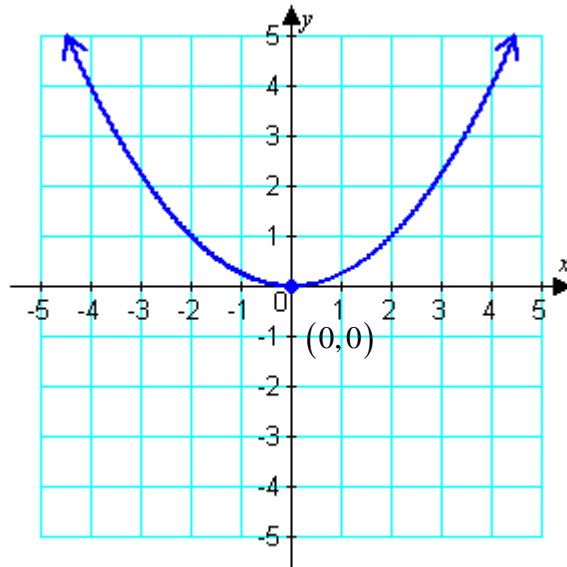
Ans: Domain: $(-\infty, \infty)$
      Range: $[0, \infty)$
Concept: Domain and Range of a Relation   Difficulty: Moderate   Section: 2.5

86. Find the range of the relation. Use interval notation where appropriate.
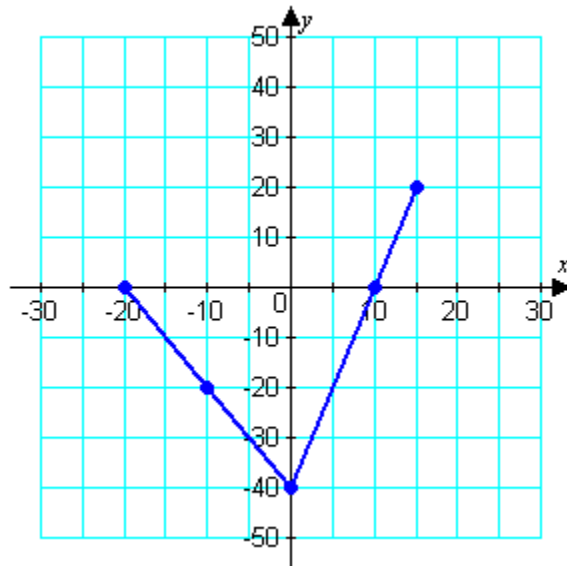
A) $[-20, 15]$ B) $\{-20, -10, 0, 10, 15\}$ C) $[-40, 20]$ D) $\{0, -20, -40, 20\}$
Ans: C   Concept: Domain and Range of a Relation   Difficulty: Moderate
Section: 2.5

87. Find the domain of the relation. Use interval notation where appropriate.
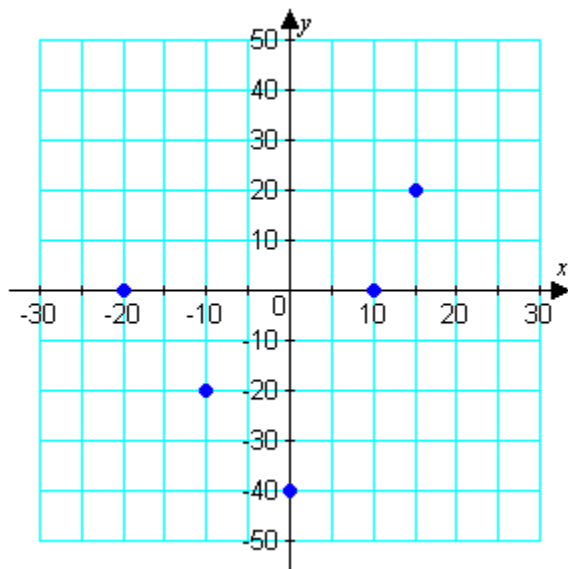
A) [–20, 15]   B) {–20, –10, 0, 10, 15}   C) [–40, 20]   D) {0, –20, –40, 20}
Ans: B   Concept: Domain and Range of a Relation   Difficulty: Moderate
Section: 2.5

88. The following table describes the temperature (*y*) inside an oven, in degrees, *x* minutes after it was turned on.

Temp. (*y*)	72	133	186	237	285	333	379	425	425	425
Minutes (*x*)	0	1	2	3	4	5	6	7	8	9

Complete the ordered pair for this relation: (2, ____)
Ans: 186
Concept: Applications Involving Relations   Difficulty: Easy   Section: 2.5

89. The following table describes the temperature (*y*) inside an oven, in degrees, *x* minutes after it was turned on.

Temp. (*y*)	72	133	186	237	285	333	379	425	425	425
Minutes (*x*)	0	1	2	3	4	5	6	7	8	9

What is the domain of this relation?
A)   {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}
B)   (72, 133, 186, 237, 285, 333, 379, 425}
C)   [0, 9]
D)   [72, 425]
Ans: A   Concept: Applications Involving Relations   Difficulty: Easy   Section: 2.5

90. Write a mathematical equation to define a relation whose second component y is 2 less than its first component x.
    A) $y - 2 = x$ B) $y + x - 2$ C) $y = x - 2$ D) $y = -2x$
    Ans: C   Concept: Use Mathematical Equation to Describe Relation
    Difficulty: Moderate   Section: 2.5

91. Write a mathematical equation to define a relation whose second component y is 4 more than the cube of its first component x.
    A) $x = y^3 + 4$ B) $y = \sqrt[3]{x} + 4$ C) $y = 4x^3$ D) $y = x^3 + 4$
    Ans: D   Concept: Use Mathematical Equation to Describe Relation
    Difficulty: Moderate   Section: 2.5

92. Determine if the relation defines y as a function of x.
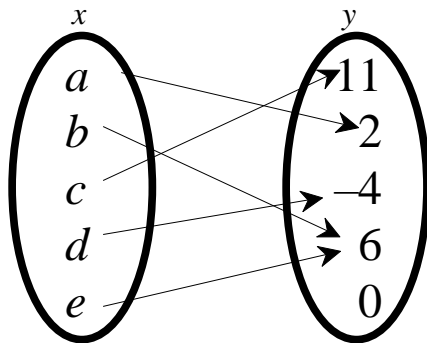
    A) Function B) Not a function
    Ans: A   Concept: Definition of a Function   Difficulty: Easy   Section: 2.6

93. Determine if the relation defines y as a function of x.
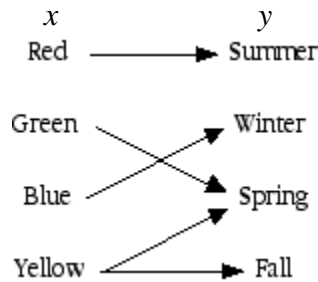
    A) True B) False
    Ans: B   Concept: Definition of a Function   Difficulty: Easy   Section: 2.6

94. Which relation is NOT a function?
    A)   {(–7, 2), (3, 15), (0, 15), (5, 15)}   C)   {(7, 15), (15, 5), (–7, 5), (5, 15)}
    B)   {(7, 7), (15, 15), (5, 5), (0, 0)}   D)   {(7, 15), (0, 5), (15, 7), (7, 5)}
    Ans: D   Concept: Definition of a Function   Difficulty: Easy   Section: 2.6

95. Is the graph below the graph of a function?
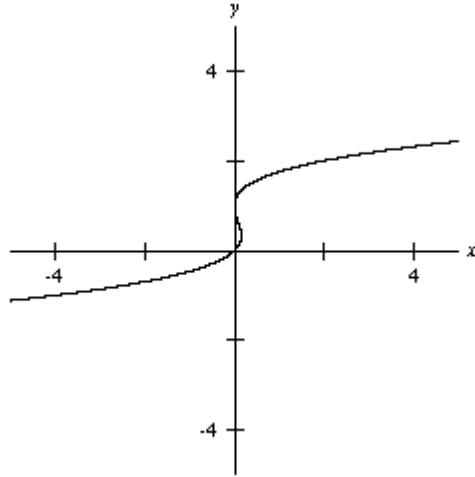
A) Yes   B) No

Ans: B   Concept: Vertical Line Test   Difficulty: Moderate   Section: 2.6

96. Is the graph below the graph of a function?
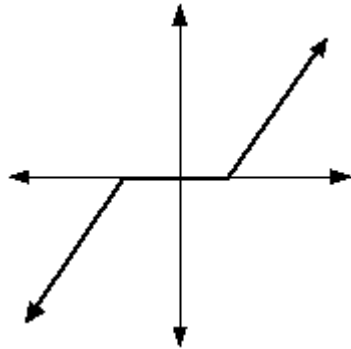
A) Yes   B) No

Ans: A   Concept: Vertical Line Test   Difficulty: Moderate   Section: 2.6

97. If $z(t) = 2t^2 + 7t - 4$, find $z(-6)$ and $z(4)$.

A)	$z(-6) = -118$; $z(4) = 56$	C) $z(-6) = 75$; $z(4) = 35$
B)	$z(-6) = 26$, $z(4) = 56$	D) $z(-6) = 98$; $z(4) = 88$

Ans: B   Concept: Evaluating Functions   Difficulty: Easy   Section: 2.6

98. If $f(x) = -9x - 8$, find $f(-5)$.

Ans: $f(-5) = 37$

Concept: Evaluating Functions   Difficulty: Moderate   Section: 2.6

99. If $g(y) = -5y^2 + 9y - 3$, find $g(m)$.

Ans: $g(m) = -5m^2 + 9m - 3$

Concept: Evaluating Functions   Difficulty: Easy   Section: 2.6

100. If $f(x) = 3x^2 + 10x - 7$, find and simplify $f(2 + x)$.

A) $25 + x$ B) $3x^2 + 2x + 25$ C) $3x^2 + 22x + 25$ D) $3x^2 + 10x - 9$

Ans: C   Concept: Evaluating Functions   Difficulty: Moderate   Section: 2.6

101. If $K(x) = |x - 5| + x$, find $K(2)$.

Ans: 5

Concept: Evaluating Functions   Difficulty: Easy   Section: 2.6

102. Consider the function $g(y) = \{(-5, 22), (-2, 1), (1, -2), (4, 13), (9, 78)\}$. Find the function value $g(1)$.

Ans: $g(1) = -2$

Concept: Evaluating Functions   Difficulty: Easy   Section: 2.6

103. Consider the function $z = \{(-4, -5), (-9, 9), (-7, -4)\}$. Find the function value $z(-7)$.

Ans: -4

Concept: Evaluating Functions   Difficulty: Easy   Section: 2.6

104. For what value(s) of x is $f(x) = -4$?
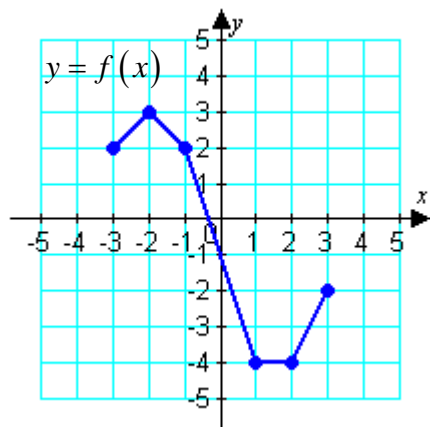
A) $x = $ undefined   B) $x = 4$ C) $x = -4$ D) $x = 1$ and $x = 2$

Ans: D   Concept: Finding Function Values From a Graph   Difficulty: Moderate
Section: 2.6

105. For what value(s) of x is $g(x) = -2$?
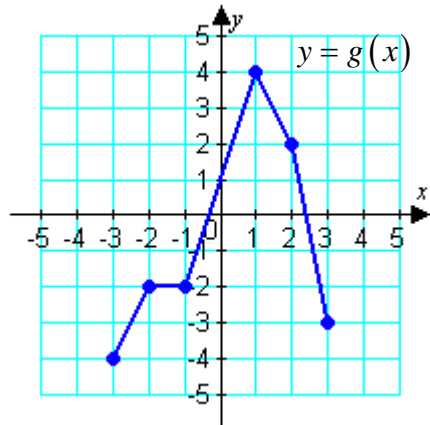
A) $x = 1$ B) $x = -3$ C) $x = 2$ D) $x = -2$ and $x = -1$
Ans: D   Concept: Finding Function Values From a Graph   Difficulty: Moderate
Section: 2.6

106. Identify the domain and range of the function:
     $g(x) = \{(5, -11), (20, 18), (-11, -19), (2, -7)\}$
Ans: Domain = $\{5, 20, -11, 2\}$; Range = $\{-11, 18, -19, -7\}$
Concept: Domain and Range of a Relation   Difficulty: Easy   Section: 2.6

107. For what value(s) of x is $f(x) = 8$
     $f(x) = \{(-11, -6), (19, -5), (-7, 8), (-19, 0)\}$
Ans: -7
Concept: Domain and Range of a Relation   Difficulty: Easy   Section: 2.6

108. Find the domain. Write the answer in interval notation.
     $$f(x) = \frac{9+x}{x-16}$$
A) $(-\infty, 16) \cup (16, \infty)$ B) $(-\infty, -9) \cup (-9, \infty)$ C) $(-9, 16)$ D) $(-\infty, \infty)$

Ans: A   Concept: Domain of a Function   Difficulty: Moderate   Section: 2.6

109. Find the domain. Write the answer in interval notation.
     $$k(x) = \frac{x-9}{x+4}$$
A) $[-\infty, -4) \cup (-4, \infty]$ C) $(-\infty, -4] \cup [-4, \infty)$
B) $(-\infty, -4) \cup (-4, \infty)$ D) $(-\infty, \infty)$
Ans: B   Concept: Domain of a Function   Difficulty: Easy   Section: 2.6

110. Find the domain of the function. Write your answer in interval notation.

$$g(y) = \sqrt{y-3}$$

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

Ans: C   Concept: Domain of a Function   Difficulty: Moderate   Section: 2.6

111. Find the domain. Write the answer in interval notation.

$$d(x) = \sqrt{x+7}$$

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

Ans: A   Concept: Domain of a Function   Difficulty: Easy   Section: 2.6

112. The height (in feet) of a ball that is dropped from a 110-ft building is given by $h(t) = -16t^2 + 110$, where t is the time in seconds after the ball is dropped.
Find $h(2)$ and interpret its meaning. Round your answer to the nearest hundredth.
A) $h(2) = 46.00$ means that after 2 seconds the height of the ball has dropped by 46.00 ft.
B) $h(2) = 46.00$ means that after 2 seconds the height of the ball is 46.00 ft.
C) $h(2) = 2.60$ means that after 2 seconds the height of the ball has dropped by 2.60 ft.
D) $h(2) = 2.60$ means that after 2 seconds the height of the ball is 2.60 ft.
Ans: B   Concept: Applications of Quadratic Equations   Difficulty: Moderate   Section: 2.6

113. For over 20 years, the population of Tressel, Ohio has been increasing linearly according to the function
$$P(t) = 400t + 10{,}000$$
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.
Ans: $P(0) = 10{,}000$; This was the population of the town in 1980.
Concept: Applications of Linear Functions   Difficulty: Moderate   Section: 2.6

114. For over 20 years, the population of Tressel, Ohio has been increasing linearly according to the function
$$P(t) = 325t + 8{,}500$$
where P is the number of residents, and t is years after 1980. Compute $P(22)$ and interpret its meaning in the context of this problem.
Ans: $P(22) = 15{,}650$; This was the population of the town in 2002.
Concept: Applications of Linear Functions   Difficulty: Moderate   Section: 2.6

115. For over 20 years, the population of Tressel, Ohio has been increasing linearly according to the function
$$P(t) = 325t + 8{,}000$$
where P is the number of residents, and t is years after 1980. In what year will the population reach 17,100?
Ans: The year 2008
Concept: Applications of Linear Functions   Difficulty: Difficult   Section: 2.6

116. At one college, a study found that the average grade point average decreased linearly according to the function
$$g(h) = 3.15 - 0.05h$$
where h is the number of hours per week spent watching reality shows on television. Compute $g(6)$ and interpret its meaning.
Ans: $g(6) = 2.85$. This tells us that the average GPA of students that watch 6 hours of reality programming per week is 2.85.
Concept: Applications of Linear Functions   Difficulty: Moderate   Section: 2.6

117. Write a function defined by $y = f(x)$ subject to the following conditions:
The value of $f(x)$ is five less than nine times x.
A) $f(x) = 9x + 5$ B) $f(x) = -5x - 9$ C) $f(x) = -5x + 9$ D) $f(x) = 9x - 5$
Ans: D   Concept: Linear and Constant Functions   Difficulty: Easy   Section: 2.6

118. Write a function defined by $y = f(x)$ subject to the following conditions:
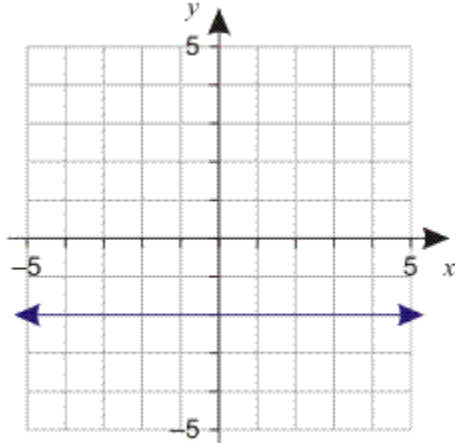The value of $f(x)$ is seventeen times the square root of x.
A) $f(x) = 17x^2$ B) $f(x) = (17x)^2$ C) $f(x) = 17\sqrt{x}$ D) $f(x) = \sqrt{17x}$
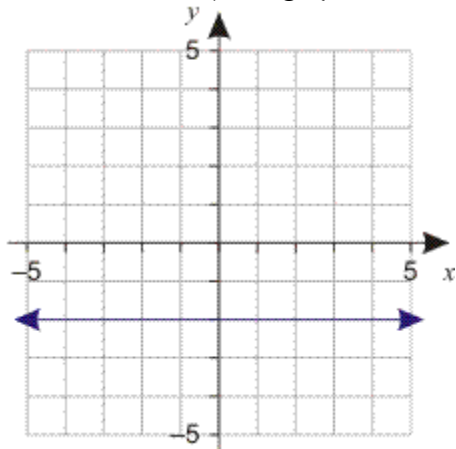Ans: C   Concept: Linear and Constant Functions   Difficulty: Easy   Section: 2.6

119. Graph the constant function $f(x) = -2$. Then use the graph to identify the domain and range of f.
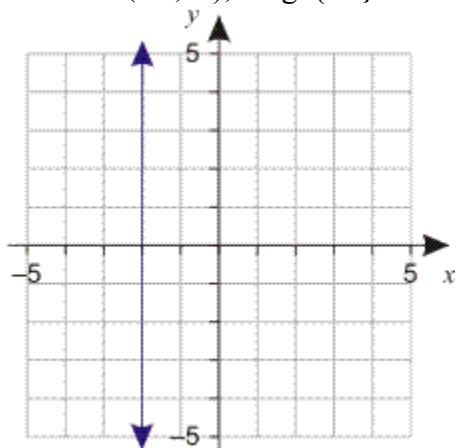
   A)   Domain: $\{-2\}$; range $(-\infty, \infty)$

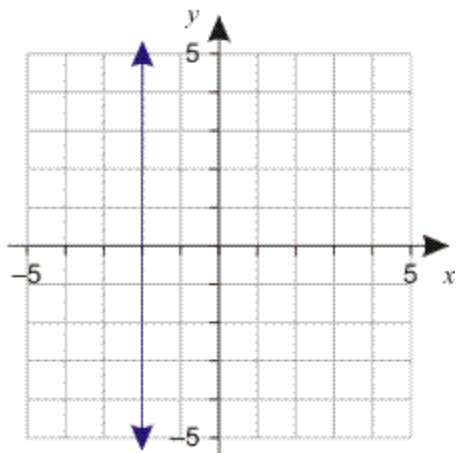   B)   Domain: $(-\infty, \infty)$; range $\{-2\}$

   C)   Domain: $(-\infty, \infty)$; range $\{-2\}$

   D)   Domain: $\{-2\}$; range $(-\infty, \infty)$

Ans: B   Concept: Linear and Constant Functions   Difficulty: Easy   Section: 2.7

120. Which of the following is a constant function?

A) $f(x) = 9x$ B) $f(x) = 21x^2$ C) $f(x) = 48$ D) $f(x) = \dfrac{8}{x}$

Ans: C   Concept: Linear and Constant Functions   Difficulty: Easy   Section: 2.7

121. Which of the following is a linear function?

A) $f(x) = \dfrac{-7}{x} + 2$ C) $f(x) = \sqrt{-7x + 2}$

B) $f(x) = -7 + x + x^2$ D) $f(x) = -7 - 2x$

Ans: D   Concept: Linear and Constant Functions   Difficulty: Easy   Section: 2.7

122. Determine if the function is constant, linear, quadratic, or none of these.

$$m(x) = -\frac{2}{7}$$

A) Constant   B) Linear   C) Quadratic   D) None of these

Ans: A   Concept: Function Notation   Difficulty: Easy   Section: 2.7

123. Determine if the function is constant, linear, quadratic, or none of these.

$$t(x) = -|x - 5| + 2$$

A) Constant   B) Linear   C) Quadratic   D) None of these

Ans: D   Concept: Function Notation   Difficulty: Easy   Section: 2.7

124. Determine if the function is constant, linear, quadratic, or none of these.

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

A) Constant   B) Linear   C) Quadratic   D) None of these

Ans: C   Concept: Function Notation   Difficulty: Easy   Section: 2.7

125. Determine if the function is constant, linear, quadratic, or none of these.

$f(x) = x + 11$

A) Constant   B) Linear   C) Quadratic   D) None of these

Ans: B   Concept: Function Notation   Difficulty: Easy   Section: 2.7

126. Find the x- and y-intercepts of the function

$g(x) = -10x - 13$

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

B) x-intercept: (0, –13); y-intercept: $\left(-\dfrac{13}{10}, 0\right)$

C) x-intercept: $\left(0, -\dfrac{13}{10}\right)$; y-intercept: (–13, 0)

D) x-intercept: (0, –13); y-intercept: (23, 0)

Ans: B   Concept: Finding the x and y Intercepts of a Function Defined by y=f(x)
Difficulty: Moderate   Section: 2.7

127. Find the x- and y-intercepts of the function.

$J(x) = 9x + 8$

A) x-intercept: $\left(-\dfrac{8}{9}, 0\right)$; y-intercept: (0, –8)

B) x-intercept: $\left(-\dfrac{8}{9}, 0\right)$; y-intercept: (0, 8)

C) x-intercept: $\left(-\dfrac{9}{8}, 0\right)$; y-intercept: (8, 0)

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

Ans: B   Concept: Finding the x and y Intercepts of a Function Defined by y=f(x)
Difficulty: Moderate   Section: 2.7