# Student Workbook Answers

3. Bound the area, perimeter, or volume by a number and find possibilities for the missing side.

4. *Sample answer:* Solve a two-step inequality in the same way you solve a two-step equation. Use inverse operations to isolate the variable. Then find values that are solutions.

$$-3x + 11 \leq -4$$
$$\underline{-11 \quad -11}$$
$$-3x \leq -15$$
$$\frac{-3x}{-3} \geq \frac{-15}{-3}$$
$$x \geq 5$$

2.4 Practice

1. $m < 3$;
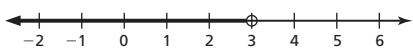
**2.** $r \leq 3$;
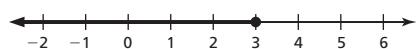
3. $k > \dfrac{1}{3}$;
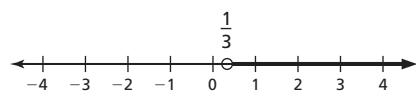
**4.** $c \geq -3.8$;
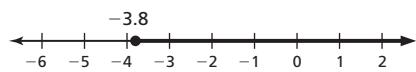
5. $20 + 0.75m \leq 65$; $m \leq 60$; at most 60 miles

6. $b > 1$;
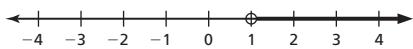

7. $p \geq -5$;
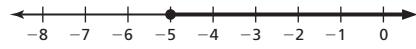

8. $d \leq 15$;

**9.** $a > -3.5$;
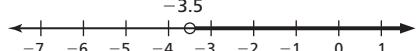
10. $5(x - 2) \geq 35$; $x \geq 9$; at least 9

11. $x > 1$;
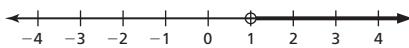
12. $w \geq 0.45$;
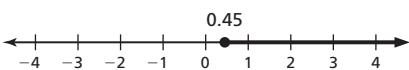
13. a. \$150

b. $150 + 20c \geq 630$; $c \geq 24$; at least 24 cell phones

c. $150 + 20c \geq 750$; $c \geq 30$; at least 30 cell phones

d. $150 + 20c \leq 950$; $c \leq 40$; at most 40 cell phones

Chapter 3

3.1 Activity

1. a. *Sample answer:*

	Solution Points	
x	-2	2
$y = \dfrac{1}{2}x + 1$	0	2

b. *Sample answer:* $(-2, 0), (2, 2)$

c. *Sample answer:*
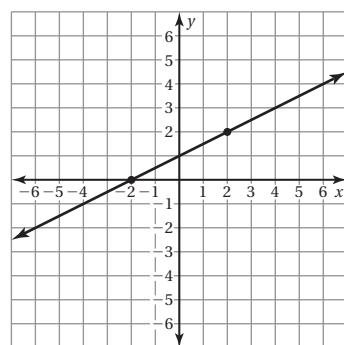
d. *Sample answer:* Choose $(0, 1)$.

$$y = \frac{1}{2}x + 1$$
$$1 \overset{?}{=} \frac{1}{2}(0) + 1$$
$$1 = 1 \checkmark$$

Student Workbook Answers

e. yes; Because the line is the graph of the equation, all points on the line are solution points.

f. *Sample answer:*

|	Solution Points				
x	-6	-4	1	4	6
$y = \dfrac{1}{2}x + 1$	-2	-1	$1\dfrac{1}{2}$	3	4
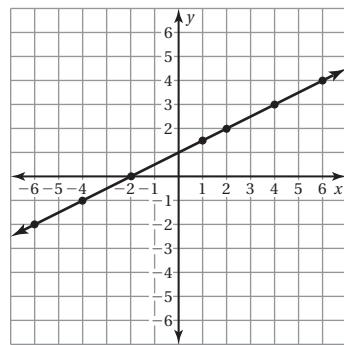
Each point lies on the line.

g. yes; The graph of the equation is the set of all solutions to the equation. So, each of these solutions falls on the line.

h. The graph of an equation of this form is a line.

2. a–c. Check students' work.

**d.** In the second graph, it is easier to see where the line crosses the x-axis and the y-axis.

3. A linear equation is of the form $y = ax + b$.

Its graph is a line and can be drawn by finding solution points to an equation and drawing a line through them.

Sample answer: $y = 4x + 3$ (linear)

$\qquad\qquad\quad y = 8x^2 + 9$ (not linear)

4.
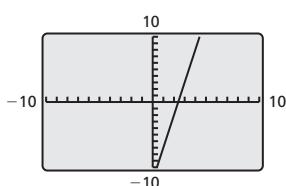
a. yes; no; You can see that the graph crosses the x-axis between 2 and 3. You cannot see where the graph crosses the y-axis.

**b.** *Sample answer:* You can choose a lower minimum y-value.

5. *Sample answer:* You should use a graphing calculator because if you graph it by hand you will have to scale your axes by tenths.

3.1 Practice

1. *Sample answer:*

x	0	1
$y = 4x + 3$	3	7

$(-1, -1)$
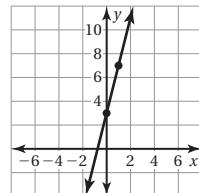
2. *Sample answer:*

x	0	2
$y = \dfrac{3}{2}x - 1$	-1	2

$(4, 5)$

3.

4.

5.

6.

7.

8.

9. a.
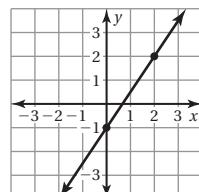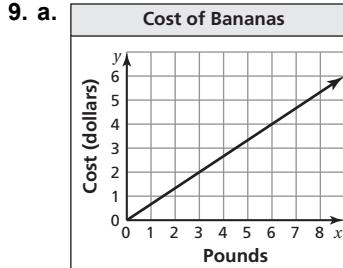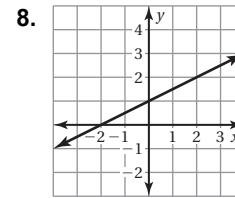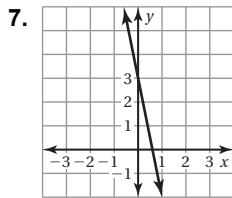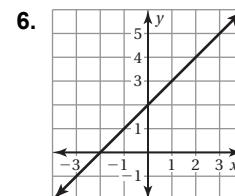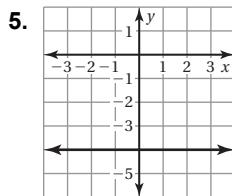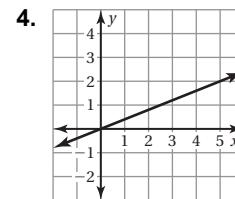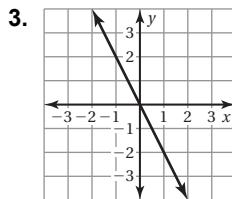
b. *Sample answer:* about $5.30   **c.** $5.33

Student Workbook Answers
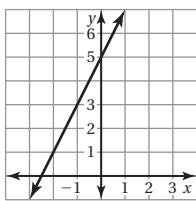
10. $y = 2x + 5$ **11.** $y = -\dfrac{6}{5}x + 3$

12. a. $y = 110 - 2.75x$

School Lunch Account
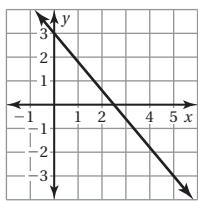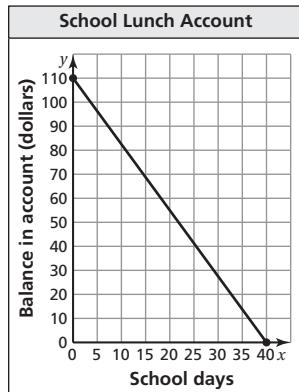
b. 40 school days

3.2 Activity

1. a. $\dfrac{1}{2}; \dfrac{1}{2}$; yes; It appears that the slope between any two points on a line is the same.

b. $-1; -1$; yes; It appears that the slope between any two points on a line is the same.

c. $\dfrac{2}{3}; \dfrac{2}{3}$; yes; It appears that the slope between any two points on a line is the same.

d. $-3; -3$; yes; It appears that the slope between any two points on a line is the same.

**2. a.**
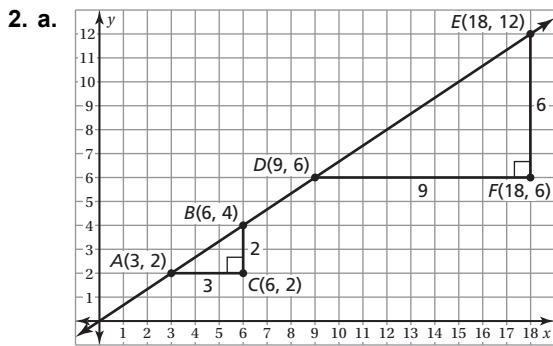
b. They are similar; *Sample answer:* The lines $\overleftrightarrow{BC}$ and $\overleftrightarrow{EF}$ are both vertical lines and are parallel. The line that contains the points A, B, D, and E is a transversal. So, $\angle ABC$ is congruent to $\angle DEF$ because corresponding angles are congruent.

The lines $\overleftrightarrow{AC}$ and $\overleftrightarrow{DF}$ are both horizontal lines and are parallel. The line that contains the points A, B, D, and E is a transversal. So, $\angle BAC$ is congruent to $\angle EDF$ because corresponding angles are congruent.

Both are right triangles. So, you can conclude that $\triangle ABC$ and $\triangle DEF$ are similar because their angles are congruent.

c. The ratio is $\dfrac{2}{3}$ for each triangle. This ratio represents the slope of the line between points A and B and between points D and E. So, the slope of the line is $\dfrac{2}{3}$.

d. *Sample answer:* It is constant.

3. a.

The two lines are parallel.

b.
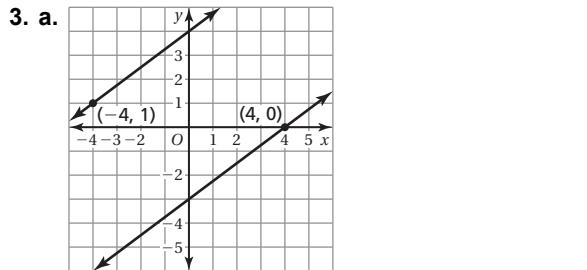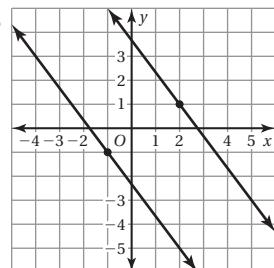
The two lines are parallel.

c. Two different nonvertical lines in the same plane that have the same slope are parallel.

Student Workbook Answers

d.
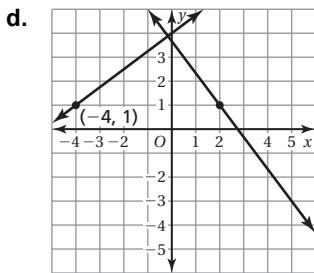
The two lines form a right angle. The product of the slopes of the two lines is −1.

e.
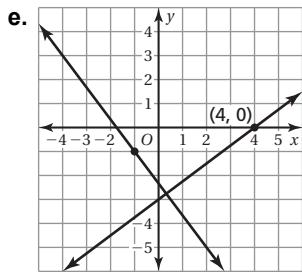
Two lines in the same plane whose slopes have a product of −1 are perpendicular.

4. The slope can tell you whether the line rises or falls from left to right and how steep the line is.

3.2 Practice

1. a. lines A and C **b.** line B

   c. lines A and C; Both have a slope of $-\dfrac{1}{3}$.

**2.** The lines are parallel.   **3.** The lines are parallel.
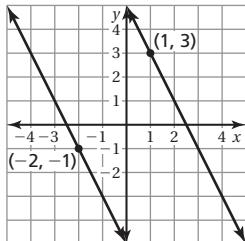
4. slope $= \dfrac{3}{2}$ **5.** slope $= -1$ **6.** slope $= 4$

7. slope $= 0$ **8.** slope $= 2$

3.2 Extension Practice

1. line B and line G; They both have a slope of $\dfrac{5}{3}$.

2. line B and line R; They both have a slope of 9.

3. yes; Both lines are vertical and have undefined slopes.

4. no; The line $x = 3$ has an undefined slope and the line $y = -3$ has a slope of 0.

5. yes; Because opposite sides have the same slope, they are parallel. Because opposite sides are parallel, the quadrilateral is a parallelogram.

6. line B and line R; Line B has a slope of 1. Line R has a slope of −1. The product of their slopes is

$1 \bullet (-1) = -1.$

7. line R and line G; Line R has a slope of 4. Line G has a slope of $-\dfrac{1}{4}$. The product of their slopes is

$4 \bullet \left(-\dfrac{1}{4}\right) = -1.$

8. yes; The line $x = 0$ is vertical. The line $y = 3$ is horizontal. A vertical line is perpendicular to a horizontal line.

9. no; Both lines are horizontal and have a slope of 0.

10. yes; Because the products of the slopes of intersecting sides are equal to −1, the parallelogram is a rectangle.

3.3 Activity

1. a. proportional relationship; *Sample answer:* The graph is a line through the origin.

   b. not a proportional relationship; *Sample answer:* The graph does not pass through the origin.

   c. not a proportional relationship; *Sample answer:* The graph does not pass through the origin.

   **d.** proportional relationship; *Sample answer:* The graph is a line through the origin.

   e. not a proportional relationship; *Sample answer:* The rate of change in the table is not constant.

   f. proportional relationship; *Sample answer:* The rate of change in the table is constant.
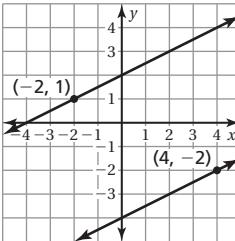
Student Workbook Answers

2. The quantities in parts (a), (d), and (f) are in a proportional relationship.

For part (a): slope $= 10$; The value of y for $(1, y)$ is 10.

For part (d): slope $= 6$; The value of y for $(1, y)$ is 6.

For part (f): slope $= 2$; The value of y for $(1, y)$ is 2.

The value of y is equal to the slope of the line. The value of y represents the unit rate.

3. a. Both triangles share the same angle and each has a right angle. So, their angles are congruent making them similar.

b.
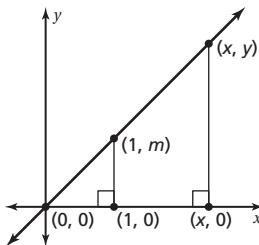
$$\frac{y - 0}{x - 0} = \frac{m}{1}$$

$$\frac{y}{x} = m$$

$$y = mx$$

It represents the general equation for two quantities x and y that are in a proportional relationship.

c. For part (a): $y = 10x$

For part (d): $y = 6x$

For part (f): $y = 2x$

4. The graph of $y = mx$ is a line with a slope of m that passes through the origin. The value of m affects the steepness of the line.

5. *Sample answer:* amount of gasoline purchased (gallons) and the amount spent (dollars); $y = 3.5x$;
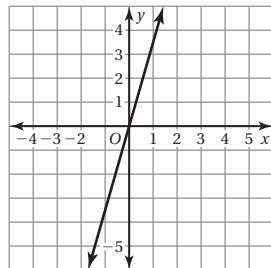

3.3 Practice

1. yes; $y = 3x$; The graph is a line that passes through the origin.

2. no; The graph does not pass through the origin.

3. no; The rate of change in the table is not constant.

4. yes; $y = \frac{1}{4}x$; The rate of change in the table is constant.

5. a.
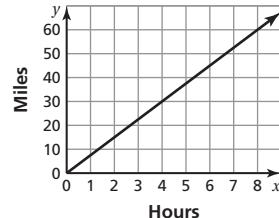
Your friend runs 7.5 miles in 1 hour.

b. *Sample answer:* 8 min

6. a. hamburgers; *Sample answer:* Hamburgers sell at a rate of about 2.67 per minute and wraps sell at a rate of 2.5 per minute.

b.
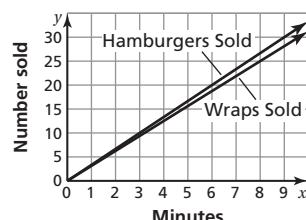
Sample answer: The graph of the hamburgers sold is steeper. Hamburgers are selling at a faster rate than wraps.

3.4 Activity

1. a.

b.

$-\dfrac{1}{2}; (0, 1)$ $-1; (0, 2)$

Student Workbook Answers

c. $y = -x - 2$

$-1;\ (0, -2)$

d. $y = \frac{1}{2}x + 1$

$\frac{1}{2};\ (0, 1)$

e. $y = x + 2$

$1;\ (0, 2)$

f. $y = x - 2$

$1;\ (0, -2)$

g. $y = \frac{1}{2}x - 1$

$\frac{1}{2};\ (0, -1)$

h. $y = -\frac{1}{2}x - 1$

$-\frac{1}{2};\ (0, -1)$

i. $y = 3x + 2$

$3;\ (0, 2)$
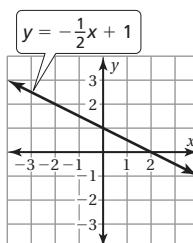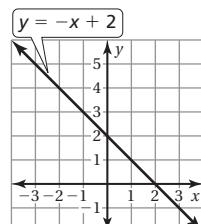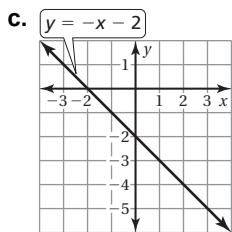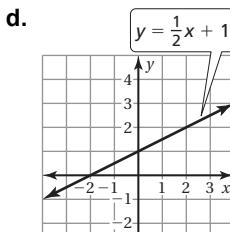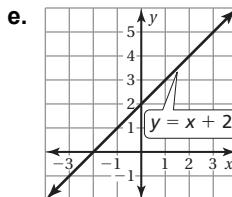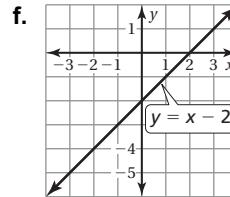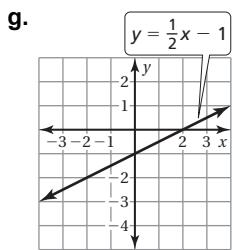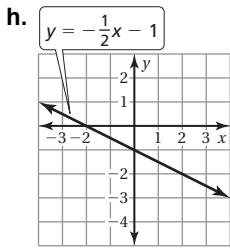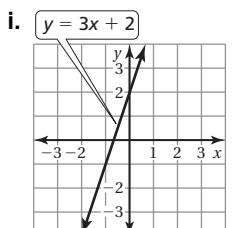
j. $y = 3x - 2$
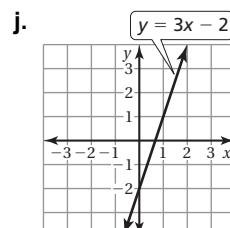
$3;\ (0, -2)$

k. yes; yes; *Sample answer:* The slope of the graph is the coefficient of the *x*-term in the equation. The *y*-coordinate of the point of intersection with the *y*-axis is the constant term in the equation.

2. a. no; *Sample answer:* None of the graphs of the lines pass through the origin.

b.
$$\frac{y_2 - y_1}{x_2 - x_1} = m$$
$$\frac{y - b}{x - 0} = m$$
$$\frac{y - b}{x} = m$$
$$\frac{y - b}{x} \bullet x = m \bullet x$$
$$y - b = m \bullet x$$
$$y = mx + b$$

c. *m* represents the slope. *b* represents the *y*-coordinate of the point of intersection with the *y*-axis.

3. A line with slope *m* that crosses the *y*-axis at $(0, b)$.

   a. It affects the steepness of the line and whether it rises or falls from left to right.

   b. It affects where the graph crosses the *y*-axis.

   c. Works for any equation.

4. Because *m* is the slope and *b* is the *y*-intercept.

3.4 Practice

1. $C;\ -\frac{1}{2};\ 5$ **2.** $A;\ -3;\ -1$

3. $B;\ \frac{2}{3};\ 2$ **4.** $m = 1;\ b = 4$

5. $m = -8;\ b = 3$ **6.** $m = -\frac{5}{7};\ b = -2$

7. $m = 1.75;\ b = -1$ **8.** $m = 6;\ b = 2$

**9.** $m = \frac{1}{9};\ b = -7$

10. a.
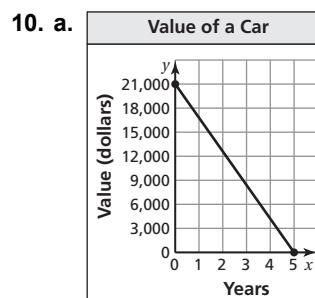
b. The value of the car decreases $4200 per year.

c. $21,000 is the initial cost of the car.

**d.** The value of the car is $0 after 5 years.

Student Workbook Answers

11. 2

12. 48

13. -3

14. $-\dfrac{2}{5}$

15. a.

Fertilizing Grass
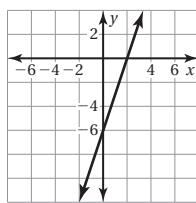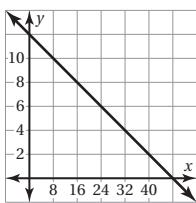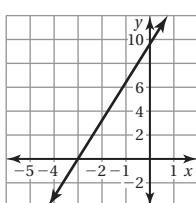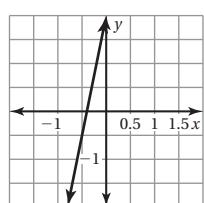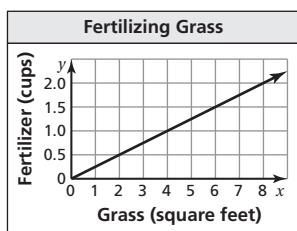
b. $\dfrac{1}{4}$ cup of fertilizer is needed per square foot of grass.

3.5 Activity

1. $4; $2; $16

a. $4x + 2y = 16$

b.

Number of Adult Tickets, x	0	1	2	3	4
Number of Student Tickets, y	8	6	4	2	0

c.
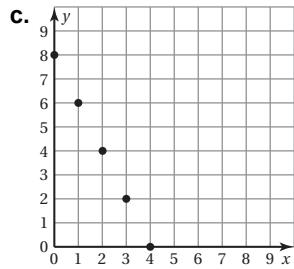
The points form a line.

d. yes; Solve the equation from part (a) for y.

2. $4; $2; $16

a. $4x + 2y = 16$

b. $y = -2x + 8$
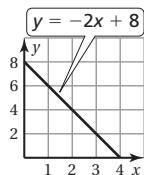
c. 3 lb

d. yes; You can have 2.5 pounds of swiss cheese.

3. *Sample answer:* It is a line with a slope of $\dfrac{-a}{b}$ and y-intercept of $\dfrac{c}{b}$.

4. Activity 1 uses a table. Activity 2 uses the slope-intercept form. *Sample answer:* The slope-intercept form may be considered easier because you can use the slope and y-intercept to graph the equation.

5. *Sample answer:* You sold $20 worth of lemonade. You sell large cups for $4 and small cups for $2.

6. When the equation is in standard form, you can see that when $x = 0$, $y = 10$, and when $y = 0$, $x = 10$. You can graph the equation through its x-intercept and its y-intercept.

3.5 Practice

1. $y = -4x + 10$

2. $y = 3x - 7$

3.

4.

5. $3; -2$

6. $-2; 5$

7.

8.
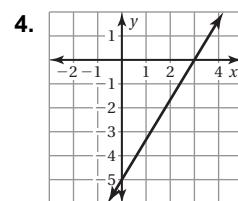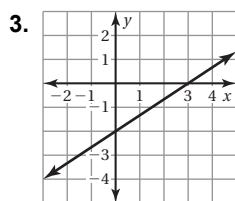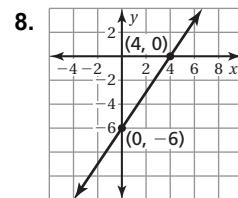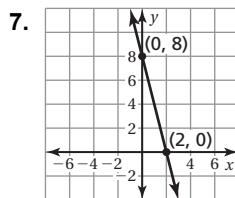
Student Workbook Answers

9. a. 11; 11 oranges and 0 apples contain 110 grams of fiber.

b. 22; 22 apples and 0 oranges contain 110 grams of fiber.

c. 10 g **d.** 5 g

e. no; There cannot be 3.5 oranges in the package.

10. a. $8x + 6y = 144$ **b.** 18; 24

c.

Jobs

(graph titled "Jobs" — y-axis: Hours worked as hair washer, x-axis: Hours worked as host)
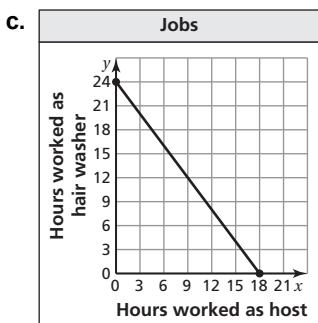
d. 10.5 h

3.6 Activity

1. a. top line: slope: $\frac{1}{2}$; y-intercept: 4; $y = \frac{1}{2}x + 4$

middle line: slope: $\frac{1}{2}$; y-intercept: 1;

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

bottom line: slope: $\frac{1}{2}$; y-intercept: -2;

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

The lines are parallel.

b. right line: slope: -2; y-intercept: 3;

$$y = -2x + 3$$

middle line: slope: -2; y-intercept: -1;

$$y = -2x - 1$$

left line: slope: -2; y-intercept: -5;

$$y = -2x - 5$$

The lines are parallel.

c. line passing through $(3, 2)$:

slope: $-\frac{1}{3}$; y-intercept: 3; $y = -\frac{1}{3}x + 3$

line passing through $(3, 7)$:

slope: $\frac{4}{3}$; y-intercept: 3; $y = \frac{4}{3}x + 3$

line passing through $(6, 4)$:

slope: $\frac{1}{6}$; y-intercept: 3; $y = \frac{1}{6}x + 3$

The lines have the same y-intercept.

d. line passing through $(1, 2)$:

slope: 2; y-intercept: 0; $y = 2x$

line passing through $(1, -1)$:

slope: -1; y-intercept: 0; $y = -x$

line passing through $(3, 1)$:

slope: $\frac{1}{3}$; y-intercept: 0; $y = \frac{1}{3}x$

The lines have the same y-intercept.

2. a. 42 square units; $y = 4$; $y = -2$; $y = -2x + 8$; $y = -2x - 6$

b. 28 square units; $y = 5$; $y = -2$; $y = x + 5$; $y = x + 1$

3. a. 100; distance from Phoenix at the beginning of the trip

b. 50; the speed of the car in miles per hour

c. 6 hours **d.** 400 mi **e.** $y = 50x + 100$

4. Let the slope be *m* and the y-intercept be *b*. Then the equation of the line is $y = mx + b$.

Sample answer: What is the equation of a line with a slope of $\frac{2}{3}$ and y-intercept of 1?

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

5. *Sample answer:* $y = 2x + 5$ and $y = -x + 7$.

3.6 Practice

**1.** $y = 3x + 1$, $y = 4$, $y = 3x - 11$, $y = -2$

**2.** $y = -\frac{3}{2}x + 1$　　　　**3.** $y = \frac{3}{5}x + 2$

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

Student Workbook Answers

6. $y = -\dfrac{3}{2}x + 3$

7. a.

Filling a Bucket
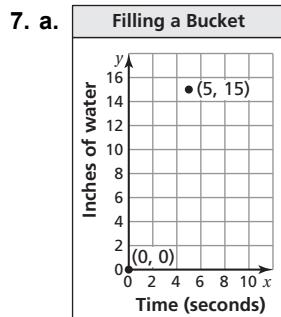
b. There are 0 inches of water at 0 seconds. There are 15 inches of water after 5 seconds.

c.

Filling a Bucket
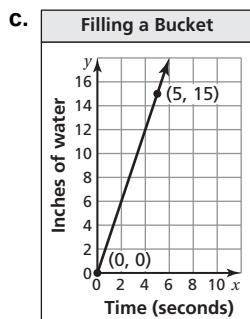
d. The inches of water y in the bucket after x seconds.

e. $y = 3x$

3.7 Activity

1. a.

y-intercept: -2

$y = -2x - 2$

b.
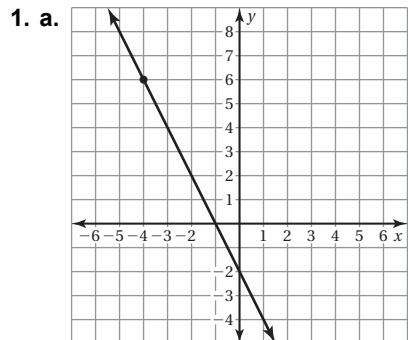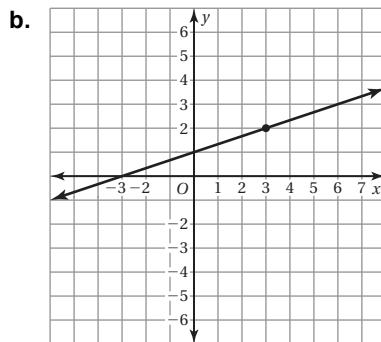
y-intercept: 1

$y = \dfrac{1}{3}x + 1$

c.
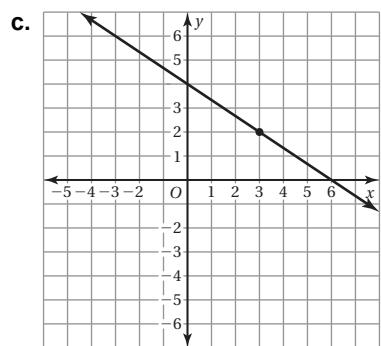
y-intercept: 4

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

d.
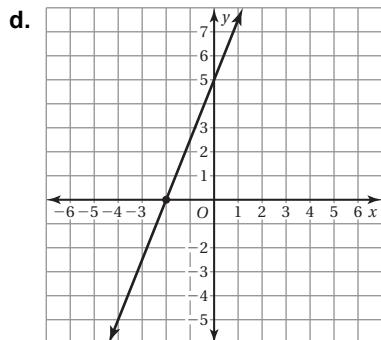
y-intercept: 5

$y = \dfrac{5}{2}x + 5$

2. a–c. *Sample answer:*
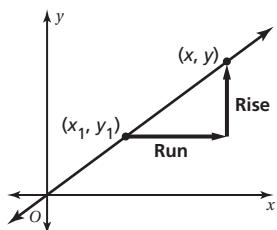
Student Workbook Answers

**d.** *Sample answer:* The rise is the change in y, or difference in the y-coordinates. The run is the change in x, or difference in the x-coordinates.

e. $m = \dfrac{y - y_1}{x - x_1}$

f. $y - y_1 = m(x - x_1)$; This result represents the equation of a line with slope m that passes through the point (x_1, y_1).

3.

Savings Account
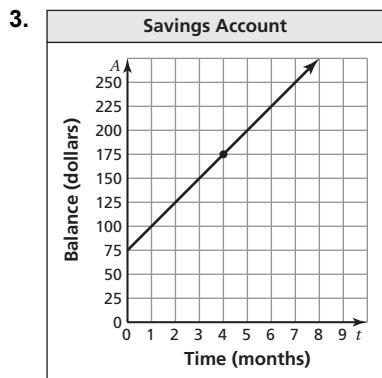
$A - 175 = 25(t - 4)$

$A = 25t + 75$

4. The results are the same. The formula from Activity 2 can be used to write the equations in slope-intercept form.

5. It is the formula that can be used to write the equation of a line given a "point" on the line and the "slope" of the line. The "slope" and the coordinates of the "point" are substituted into the formula to get the equation. It is important because it allows you to write the equation of a line given a point and a slope.

6. Use the point-slope form of the equation of a line, $y - y_1 = m(x - x_1)$. Substitute the slope form and the point for (x_1, y_1).

Sample answer: Write an equation of the line that passes through the point $(2, -1)$ with slope -2.

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

$y - (-1) = -2(x - 2)$

$y + 1 = -2(x - 2)$

$y + 1 = -2x + 4$

$y = -2x + 3$

So, the equation is $y = -2x + 3$.

3.7 Practice

1. $y = 3x + 4$

2. $y = -\dfrac{2}{3}x + 2$

3. $y + 2 = \dfrac{1}{4}(x - 4)$

4. $y - 5 = -\dfrac{4}{3}(x + 3)$

5. $y - 2 = -(x - 2)$

6. $y + 5 = 4(x + 1)$

7. $y = \dfrac{1}{3}x - 3$

8. $y = -\dfrac{5}{2}x + 2$

9. $y = -2x - 4$

10. $y = 5x + 1$

11. a. $V = -150x + 900$ **b.** $900 **c.** $150

Chapter 4

4.1 Activity

1. a. 2; 4; 6; 8 **b.** 6; 8; 10; 12

c. $2\pi, 4\pi, 6\pi, 8\pi$ **d.** 9; 18; 27; 36

2. a. Each input has one output. *Sample answer:* This relationship is possible if the input values represent the jersey numbers of basketball players and the output values represent the number of points each player scored in a basketball game.

b. Input 10 has two outputs. Input 11 has one output. Input 12 has two outputs. Input 13 has one output. *Sample answer:* This relationship is possible if the input values represent the ages of players on a Little League team and the output values represent the number of homeruns hit.

3. a. As each input increases by 1, the output increases by 2.

14; 16; 18; 20

b. As each input increases by 1, the output increases by $\dfrac{1}{3}$.

$\dfrac{7}{3}; \dfrac{8}{3}; 3; \dfrac{10}{3}$

4. List the inputs and outputs. Draw arrows from the inputs to their outputs. Describe and interpret any patterns.