3. \( x = 76 \)

4. a. \( \angle B \) is congruent to itself. \( \angle A \) and \( \angle D \) have the same line of sight, and so they are congruent. Because two angles are congruent, the third angles are congruent. Because the triangles have the same angle measures, they are similar.

b. \( \frac{3}{x} = \frac{5}{22} \); \( 5x = 66 \); \( x = 13.2 \text{ ft} \);

\( 13.2 + 4.5 = 17.7 \text{ ft} \); The height of the flag pole is 17.7 feet.

5. a. \( \angle B \) and \( \angle E \) are right angles, and thus congruent. \( \angle BCA \) and \( \angle ECD \) are vertical angles, and so they are congruent. Because two angles are congruent, the third angles are congruent. Because the triangles have the same angle measures, they are similar.

b. \( \frac{0.2}{x} = \frac{0.1}{0.3} \); \( 0.1x = 0.06 \); \( x = 0.6 \text{ mi} \)

3.4 Enrichment and Extension

1. yes; The pattern repeats across the entire plane with no gaps or overlap.

2. triangles and hexagons

3. \( 60^\circ \) 

4. \( 120^\circ \)

5. Check students’ work.

6. triangle, triangle, triangle, triangle, hexagon

7. \( 360^\circ \)

8. Sample answer: floor tiles, quilts

9. Sampler answer: rectangles

3.4 Puzzle Time

SEA WEED

Technology Connection

1. Sample answer:

Chapter 4

4.1 Start Thinking!

For use before Activity 4.1

A and C; the graphs are lines.

4.1 Warm Up

For use before Activity 4.1

1. 

<table>
<thead>
<tr>
<th>( x )</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>-5</td>
<td>-3</td>
<td>-1</td>
<td>1</td>
</tr>
</tbody>
</table>

2. 

<table>
<thead>
<tr>
<th>( x )</th>
<th>-1</th>
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<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>-1</td>
</tr>
</tbody>
</table>

3. 

<table>
<thead>
<tr>
<th>( x )</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

4. 

<table>
<thead>
<tr>
<th>( x )</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>1.5</td>
<td>2</td>
<td>2.5</td>
<td>3</td>
</tr>
</tbody>
</table>
Answers

4.1 Start Thinking!
For use before Lesson 4.1
Answers will vary. Check students’ graphs.

4.1 Warm Up
For use before Lesson 4.1
1–2. Answers will vary. Sample answers are given.

1. $x$  
   
   0  
   2  
   
   $y = 4x - 2$  
   
   $-2$  
   6

A different solution point on the line is $(1, 2)$.

2. $x$  
   
   0  
   5  
   
   $y = -x + 5$  
   
   5  
   0

A different solution point on the line is $(2, 3)$.

4.1 Practice A
1–2. Sample answers are given.

1. $(-1, -1)$  
   
   $x$  
   
   0  
   1  
   
   $y = 4x + 3$  
   
   3  
   7

2. $(4, 5)$  
   
   $x$  
   
   0  
   2  
   
   $y = \frac{3}{2}x - 1$  
   
   $-1$  
   2

b. $y = 2x + 5$  
   
   c. $y = -\frac{6}{5}x + 3$

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

b. 40 school days
4.1 Practice B

1. [Graph of 2x – 3]
2. [Graph of y = 2x]
3. [Graph of y = x]
4. [Graph of y = x + 2]
5. [Graph of y = x]
6. [Graph of y = x + 2]

7. a. Family Meal
   ![Family Meal Graph]
   b. Sample answer: about $42
c. $42.50
8. \( y = -\frac{3}{2}x - 3 \)
9. \( y = -4x + 6 \)

10. a. \( y = 10 + 6x \)

   ![Falling Coconuts Graph]
   b. after 7 weeks

4.1 Enrichment and Extension

1. \[
\begin{array}{c|c}
  x & y \\
  \hline
  -2 & 7 \\
  -1 & 5 \\
  0 & 3 \\
  1 & 1 \\
  2 & -1 \\
\end{array}
\]
2. \[
\begin{array}{c|c}
  x & y \\
  \hline
  -2 & 11 \\
  -1 & 2 \\
  0 & -1 \\
  1 & 2 \\
  2 & 11 \\
\end{array}
\]
3. \[
\begin{array}{c|c}
  x & y \\
  \hline
  -2 & 0 \\
  -1 & 1 \\
  0 & 2 \\
  1 & 1 \\
  2 & 0 \\
\end{array}
\]
4. \( y = -2x + 3 \)
5. \( y = 3x^2 - 1 \); The graph of the quadratic equation is shaped like a U.
6. \( y = -|x| + 2 \); The graph of the absolute value equation is shaped like an upside-down V, or mountain peak.
7. Sample answer: They all have different shapes.
8. The y-intercept would change and the graph would shift up or down.
4.1 Puzzle Time
A CREAM PUFFIN

4.2 Start Thinking!
For use before Activity 4.2
Sample answer: A ski slope is a natural incline, usually a mountain or hill. The mathematical term slope refers to how steep an incline is.

4.2 Warm Up
For use before Activity 4.2
1. 3  2. \( \frac{2}{7} \)  3. \( \frac{2}{5} \)
4. \( \frac{5}{4} \)  5. \( \frac{2}{3} \)  6. \( \frac{4}{3} \)

4.2 Start Thinking!
For use before Lesson 4.2
Monitor students during activity.

4.2 Warm Up
For use before Lesson 4.2
1. The lines are parallel.  2. The lines are parallel.

4.2 Practice A
1. a. lines A and C  b. line B  
   c. lines A and C; Both have a slope of \( \frac{1}{3} \).
2. The lines are parallel.  3. The lines are parallel.
4. slope = \( \frac{3}{2} \)  5. slope = -1  6. slope = 4
7. slope = 0  8. slope = 2

4.2 Practice B
1. slope = \( \frac{1}{5} \)  2. slope = 0
3. slope = -6  4. slope = \( \frac{4}{3} \)
5. slope = \( \frac{3}{2} \)  6. slope = -1
7. 10 feet
8. a. slope = 0.1  
   b. The phone calls cost $0.10 per minute.  
   c. $0.50  
   d. 30 minutes

4.2 Enrichment and Extension
1. 

2. Sample answer: yes; The opposite sides appear to have the same slope. It looks like the pairs of opposite sides are slanted the same way.
3. From the top, going clockwise around the octagon, the slopes are 0, -1, undefined, 1, 0, -1, undefined, and 1. Sample answer: yes; The predictions were correct.
4. yes; The opposite sides have the same slope, so opposite sides are parallel.
5. Sample answer: yes; There are three sets of line segments that look like they have the same slope—the horizontal segments, the segments slanted up to the right, and the segments slanted up to the left.
6. From the top, going clockwise around the shape, the slopes are \( -\frac{4}{3}, 0, \frac{4}{3}, -\frac{4}{3}, 0, \frac{4}{3}, -\frac{4}{3}, 0, -\frac{4}{3} \) and \( \frac{4}{3} \). Sample answer: yes; The predictions were correct.
7. no; None of the segments are perpendicular because \( \frac{4}{3} \cdot 0 \neq -1, \frac{4}{3} \cdot 0 \neq -1, \) and \( \frac{4}{3} \cdot \frac{4}{3} \neq -1. \)
4.2 Puzzle Time
I’M ON A ROLL.

Extension 4.2 Start Thinking!
For use before Extension 4.2

The two lines do not appear to intersect.
The graphs appear to intersect at right angles.

Extension 4.2 Warm Up
For use before Extension 4.2

1. slope of line $B$: 2; slope of line $G$: 2

2. slope of line $B$: 3; slope of line $G$: $\frac{1}{3}$

Extension 4.2 Practice

1. $A$ and $B$; They both have a slope of 3.

2. $A$ and $C$; They both have a slope of $-\frac{1}{6}$.

3. no; $x = -1$ has an undefined slope and $y = 2$ has a slope of 0.

4. yes; Both lines are vertical and have an undefined slope.

5. yes; Both lines are horizontal and have a slope of 0.

6. yes; Opposite sides have the same slope.

7. $B$ and $C$; Line $B$ has a slope of 2. Line $C$ has a slope of $-\frac{1}{2}$. The product of their slopes is $2 \cdot \left(-\frac{1}{2}\right) = -1$.

8. $A$ and $C$; Line $A$ has a slope of $\frac{1}{3}$. Line $C$ has a slope of $-3$. The product of their slopes is $\frac{1}{3} \cdot (-3) = -1$.

9. yes; Line $x = 1$ is vertical. Line $y = 0$ is horizontal. A vertical line is perpendicular to a horizontal line.

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

11. yes; Line $x = -2$ is vertical. Line $y = 2$ is horizontal. A vertical line is perpendicular to a horizontal line.

12. no; Adjacent sides are not perpendicular.

4.3 Start Thinking!
For use before Activity 4.3

Sample answer:

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

4.3 Warm Up
For use before Activity 4.3

1. $x = 12$  2. $x = 18$  3. $x = 6$

4. $x = 2$  5. $x = 7$  6. $x = 10$

4.3 Start Thinking!
For use before Lesson 4.3

Check student’s sketches; The line that passes through the origin will have an equation of the form $y = mx$.

4.3 Warm Up
For use before Lesson 4.3

1. no; The graph of the equation does not pass through the origin.

2. yes; $y = 5x$; The graph is a line that passes through the origin.

3. yes; $y = \frac{1}{2}x$; The rate of change in the table is constant.

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

4.3 Practice A

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.
Answers

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.

4.3 Practice B
1. no; The graph does not pass through the origin.
2. yes; $y = 12x$; The graph is a line that passes through the origin.
3. yes; $y = 4x$; The rate of change in the table is constant.
4. yes; $y = \frac{2}{3}x$; The rate of change in the table is constant.
5. a. $y = 9x$
   b. It costs $9 to rent the lane for 1 hour.
   c. $27$
6. a. yes; The graph is a line that passes through the origin.
   b. $y = \frac{1}{20}x$; The height of the water in the tank rises $\frac{1}{20}$ inch per gallon of water.
   c. 12.5 in.

4.3 Enrichment and Extension
1. a. decrease b. increase c. It equals 1.
2. No, it does not have a constant rate of change.
3. direct variation 4. inverse variation
5. neither 6. neither
7. direct variation 8. inverse variation
9. inverse variation; $c = \frac{200}{n}$
10. direct variation; $p = 20r$

4.3 Puzzle Time
CHEERIOS

4.4 Start Thinking!
For use before Activity 4.4
Sample answer: The point (4, 290) means that about 290 people attended the book fair on the 4th day. The graph is approximately linear. The approximate slope is 2.8. So, the book fair attendance increased by about 2.8 people each day.

4.4 Warm Up
For use before Activity 4.4

<table>
<thead>
<tr>
<th>1.</th>
<th>x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>-1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.</th>
<th>x</th>
<th>-2</th>
<th>0</th>
<th>2</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
4.4 Warm Up
For use before Lesson 4.4
1. B; slope = 2, y-intercept = -1
2. A; slope = -1, y-intercept = 2
3. C; slope = -2, y-intercept = -1

4.4 Practice A
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. [Graph of Value of a Car]

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.

11. 2
12. 48

13. -3
14. -\(\frac{2}{5}\)

15. a. [Graph of Fertilizing Grass]
b. \(\frac{1}{4}\) cup of fertilizer is needed per square foot of grass.

4.4 Practice B
1. \(m = -\frac{3}{8}; b = 10\)
2. \(m = 4.5; b = 7\)
3. \(m = -\frac{4}{5}; b = -\frac{1}{5}\)
4. \(m = 5.5; b = -2.5\)
5. \(m = 4; b = \frac{2}{7}\)
6. \(m = \frac{2}{3}; b = -5\)
7. \(\frac{6}{5}\)
8. 7.5

9. -6
10. -\(\frac{7}{2}\)

11. a. \(y = 0.50x + 10\)
b. [Graph of Downloading Music]
c. $17.50
Answers

12. a. \( y = 6x \)

b. \( 6x = y \)

c. 184 items per month  
d. 46 items per week

4.4 Enrichment and Extension

1. 1  
2. 4  
3. \(-\frac{3}{5}\)  
4. -4

5. 3  
6. -2  
7. \(-\frac{2}{3}\)

4.4 Puzzle Time

THE LADY WHO GOT STOPPED FOR SPEEDING  
SO MANY TIMES THE POLICE GAVE HER SEASON TICKETS

4.5 Start Thinking!

For use before Activity 4.5

\(2x + 5y = 10; \) Sample answer: The graphs are the same. Multiplying the original equation by 5 and then adding \(2x\) to each side yields \(2x + 5y = 10\).

4.5 Warm Up

For use before Activity 4.5

1. \( y = -x + 4 \)  
2. \( y = -2x + 10 \)  
3. \( y = \frac{3}{4}x + 3 \)  
4. \( y = \frac{1}{2}x + \frac{4}{5} \)  
5. \( y = 2x + 5 \)  
6. \( y = \frac{1}{2}x + 2 \)

4.5 Start Thinking!

For use before Lesson 4.5

Sample answer: It is easier to write in standard form because of the information you are given. You know that the sum of the two costs is $40, or \(10x + 6y = 40\).

4.5 Practice A

1. \( y = -4x + 10 \)  
2. \( y = 3x - 7 \)  
3. \( y = -3x + 2 \)  
4. \( y = \frac{1}{2}x + 2 \)  
5. 3; -2  
6. -2; 5

7. \( y = 2x + 3 \)  
8. \( y = -x + 4 \)

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.
Answers

10. a. $8x + 6y = 144$  
   b. 18; 24
   c. 
   d. 10.5 h

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

3. 

4. 

5. 0; 0  
   6. no x-intercept; 5

7. 

8. 

9. a. $80x + 40y = 480$  
   b. 6; 12
   c. 
   d. 5 days

10. a. $y = 80 + 32x$  
    b. -2.5; 80
    c. 
    d. no; The visit cannot last a negative number of hours.

4.5 Enrichment and Extension
1. no; The graph is not a straight line.
2. 40  
3. The trapeze artist starts 40 feet right of center.
4. 8
5. The trapeze artist swings back and forth past center more than once.
6. 16 seconds  
7. 80 feet
8. no; The peaks and valleys on the graph do not vary. Realistically, the trapeze artist would not always swing to the same horizontal position.
9. no; It does not make sense to include negative numbers for time in this situation.

4.5 Puzzle Time
THEY JUMP SHIP

4.6 Start Thinking!
For use before Activity 4.6
The graph shows the temperature of an oven while it is preheating. The y-intercept, 70, represents the temperature of the stove before it was turned on. The slope, 35 degrees per minute, represents the heating rate.

4.6 Warm Up
For use before Activity 4.6
1. $-\frac{2}{3}$  
2. 2

4.6 Start Thinking!
For use before Lesson 4.6
$y = 40x + 20$; the slope represents the monthly cost; the y-intercept represents the enrollment fee.
4.6 Warm Up
For use before Lesson 4.6

1. \( y = \frac{1}{2}x, y = \frac{1}{2}x + 3, y = 2x + 6, y = 2x \)

2. \( y = x + 1, y = x - 5, y = -x + 5, y = -x + 1 \)

4.6 Practice A

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. \( y = \frac{-1}{2}x \)

6. \( y = \frac{-3}{2}x + 3 \)

7. a.

<table>
<thead>
<tr>
<th>Filling a Bucket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches of water</td>
</tr>
<tr>
<td>0 4 8 12 16 20 24</td>
</tr>
<tr>
<td>Time (seconds)</td>
</tr>
<tr>
<td>0 2 4 6 8 10 12</td>
</tr>
</tbody>
</table>

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

c. The inches of water \( y \) in the bucket after \( x \) seconds.

e. \( y = 3x \)

4.6 Practice B

1. \( y = 1, y = 3x - 5, y = -2, y = -3x - 5 \)

2. \( y = \frac{-1}{4}x - 1 \)

3. \( y = \frac{7}{5}x + 4 \)

4. a. 5.7 inches per year

b. \( y = 5.7x + 6 \)

c. 28.8 inches

5. \( y = \frac{3}{2}x + 5 \)

6. \( y = -2x - 3 \)

4.6 Enrichment and Extension

The equations match up with the graph in the corresponding position.

4.6 Puzzle Time

MORE THAN THE LION

4.7 Start Thinking!
For use before Activity 4.7

Sample answer: yes; You can plot the point and use the slope to graph the line. From the graph, you can write the equation.

4.7 Warm Up
For use before Activity 4.7

1. 

2. 

3. 

4. 

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5. \[ y = -2x + 24 \]
   b. 24 feet  c. after 12 seconds

4.7 Enrichment and Extension
1. The slope is the negative of the grade, written as a fraction or decimal.
2. Bunny Slope: \(-\frac{1}{25}\), Medium Trail: \(-\frac{3}{20}\)
   Expert Trail: \(-\frac{3}{10}\)
3. \[ y = -\frac{1}{25}x + 58 \]
4. 58; The starting height of the trail is 58 meters.
5. 1450; The length of the trail is 1450 meters.
6. \[ y = -\frac{3}{20}x + 1530 \]
7. \[ y = -\frac{3}{10}x + 6000 \]
8. no; It has a grade of 8%.

4.7 Puzzle Time
THE TEAM SPIRIT

Technology Connection
1. 1.5
2. a. -1.5
   b. The sign changed.
   c. Sample answer: Visualize the points and determine whether the slope should be positive or negative to check your answer.
3. a. 0.667
   b. The are reciprocals.
   c. Sample answer: Compare the change in \(y\) to the change in \(x\) to determine whether the slope is steeper (magnitude greater than 1) or shallower (magnitude less than 1) to check your answer.
4. -0.57  5. 3.33  6. 0  7. 5

Chapter 5
5.1 Start Thinking!
For use before Activity 5.1
The only solution is (3, 2). Methods may vary. Sample answer: Trial and error, to find two numbers where one number is 1 greater than the other and whose sum is 5. Other methods are substitution and graphing.