Additional Practice

For Exercises 1–2, refer to this table.

<table>
<thead>
<tr>
<th>Cycling time (hours)</th>
<th>Distance (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Francine</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>4.5</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>13.5</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
</tr>
</tbody>
</table>

1. a. How fast was each person traveling? Explain.

b. Assume that each person continued at this rate. Find the distance each person traveled in 6 hours.

2. a. For each rider, write an equation you can use to calculate the distance traveled after a given number of hours.

b. Describe how you could use your equations to calculate the distance each person traveled in 2.5 hours.

c. How does each person’s biking rate show up in the equation?

d. Are these examples of proportional or nonproportional relationships?
For Exercise 3, refer to this table.

<table>
<thead>
<tr>
<th>Cycling time (hours)</th>
<th>Francine</th>
<th>Geraldo</th>
<th>Jennifer</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>4.5</td>
<td>6</td>
<td>7.5</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>13.5</td>
<td>18</td>
<td>22.5</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
<td>24</td>
<td>30</td>
</tr>
</tbody>
</table>

3. a. Graph the time and distance for all three people on the same coordinate axes.

b. Use the graphs to find the distance each person traveled in 2.5 hours.

c. Use the graphs to find the time it took each person to travel 70 miles.

d. How does the rate at which each person rides affect the graphs?

4. Stilton was also on the bike trip. The distance he traveled after \( t \) hours is represented by \( d = 7.25t \).

a. At what rate of speed is Stilton traveling?

b. If you graphed Stilton’s distance and time on the same set of axes as the graphs for the bike riders in Exercise 3, how would it compare to the other three graphs?
5. Martin used some rules to generate the following tables:

<table>
<thead>
<tr>
<th></th>
<th>i. x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>ii. x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>iii. x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>-5</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>-4.5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-2.5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>-2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>-1.5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>iv. x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>12.5</td>
<td></td>
</tr>
</tbody>
</table>

a. Make a graph of the data in each table. Show the graphs on the same coordinate axes.

b. Which sets of data represent a linear relationship? How do you know?

c. Do any sets of data represent proportional relationships? Explain.
6. A car travels at a constant speed so that every minute it travels 1.4 km. Circle the number or phrase that makes each statement true.

a. The distance traveled in 40 minutes is
- 41 km.
- 43 km.
- 54 km.
- 56 km.
- 64 km.

b. It takes the car
- 14 minutes to travel
- 15 minutes to travel
- 20 minutes to travel
- 22.4 minutes to travel
- 29.4 minutes to travel

21 kilometers.

c. This situation [does does not] represent a proportional relationship.

7. Brenna saves $7 per week.

a. Which equation represents the relationship between Brenna’s total savings, B, and time, w?
- $B = \frac{1}{7}w$
- $B = 7w$
- $B = -7w$
- $7B = w$

b. Which are descriptions of the graph that models the situation? Select all that apply.
- The graph is a line.
- The graph has a y-intercept of 7.
- The graph passes through the origin.
- The graph is increasing.
- The graph intersects the point (21, 3).

8. Apples are on sale for $0.75 per apple. Using the numbers on the tiles provided, fill in each space in the table to model the relationship between cost and number of apples purchased.

<table>
<thead>
<tr>
<th>Number of Apples</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>$1.50</td>
</tr>
<tr>
<td>3</td>
<td>$</td>
</tr>
<tr>
<td>5</td>
<td>$</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>$</td>
</tr>
<tr>
<td>3.75</td>
<td></td>
</tr>
</tbody>
</table>
Skill: Linear Relationships

1. You order books through a catalog. Each book costs $12 and the shipping and handling cost is $5. Write an equation and make a graph that represents your total cost.

   a. What is the total cost if you buy 6 books?

   b. What is the total cost if you buy 4 books?

2. A ride in a taxicab costs $2.50 for the first mile and $1.50 for each additional mile or part of a mile. Write an equation and make a graph that represents the total cost.

   a. What is the total cost of a 10-mile ride?

   b. What is the total cost of a 25-mile ride?
3. A tree is 3 feet tall and grows 3 inches each day. Write an equation and make a graph that represents how much the tree grows over time.

a. How tall is the tree in a week?

b. How tall is the tree in 4 weeks?
1. Do parts (a)–(e) for each equation below.
   a. Graph the equation on your calculator, and make a sketch of the line you see.
   b. Do the y-values increase, decrease, or stay the same as the x-values increase?
   c. Give the y-intercept.
   d. List the coordinates of three points on the line.
      i. \( y = 2.5x \)
      ii. \( y = -2x + 7 \)
1. Do parts (a)–(c) for each equation below.
   a. Graph the equation on your calculator, and make a sketch of the line you see.
   b. Do the y-values increase, decrease, or stay the same as the x-values increase?
   c. Give the y-intercept.
   d. List the coordinates of three points on the line.
      iii. \( y = -4x - 8 \)
      iv. \( y = 3x - 3 \)
2. The volleyball team decided to raise money for an end-of-season party by selling school buttons. The costs and the revenue of selling the buttons are shown on the graph below.

a. If the team sells 50 buttons, what will be their cost? What will be the revenue?

b. If the team sells 50 buttons, how much profit will they make? (Remember that the profit is the revenue minus the cost.)

c. If the team sells 100 buttons, how much profit will they make?

3. a. Graph the equation \( y = 5x + 7 \) on your calculator. Use the graph to find the missing coordinates for these points on the graph: \((2, ?),(?, 52),(2.9, ?)\).

b. Graph the equation \( y = 1.5x - 4 \) on your calculator. Use the graph to find the missing coordinates for these points on the graph: \((10, ?),(?, 32)\).

c. Graph the equation \( y = 6.25 - 3x \) on your calculator. Use the graph to find the missing coordinates for these points on the graph: \((5, ?), (-2.75, ?)\).
4. Use the graph at the right to answer parts (a)–(d).
   a. List the coordinates of three points on the line.

   b. Which equation below is the equation of the line?
      i.  \( y = x + 4 \)
      ii.  \( y = 0.5x + 2 \)
      iii.  \( y = 0.5x - 5 \)
      iv.  \( y = 4 - 0.5x \)

   c. Does the point \((56, 35)\) lie on the line? Explain.

   d. Does the point \((-20, -8)\) lie on the line? Explain.

5. Use the graph of the three lines to complete the table.

<table>
<thead>
<tr>
<th>Line</th>
<th>Constant Rate of Change</th>
<th>( y )-intercept</th>
<th>( x )-intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   b. Match each line on the graph with one of these equations:
      \( y = 2 + x, \quad y = -4 + 2x, \quad y = 3 - x \)

      line \( A \): \________,  line \( B \): \________,  line \( C \): \________
6. Use the graph of the two lines at the right.
   a. What is alike about these lines? What is different?
   b. The equation for line A is \( y = x + 3 \). What do you think would have to change in the equation to make the equation for line B? Explain.
   c. Write the equation for line B.
   d. Imagine a line halfway between lines A and B. What is its equation? Explain.
   e. Do any of these lines represent a proportional relationship?

7. a. Use the graph below to complete the table.
   b. Explain your reasoning for the last three y-values.
8. a. For each pair of lines, find the point of intersection.

\[ y = x \quad \text{and} \quad y = -x \]
\[ y = x + 1 \quad \text{and} \quad y = -x + 1 \]
\[ y = x + 3 \quad \text{and} \quad y = -x + 3 \]
\[ y = x - 4 \quad \text{and} \quad y = -x - 4 \]

b. What pattern do you see?

c. Without graphing the lines, where is the point of intersection of these lines?

\[ y = x + 137 \quad \text{and} \quad y = -x + 137 \]
For Exercises 9–11, use the graph at the right.

9. Make a table showing the coordinates of four points located on line A. What is the equation for line A?

10. Make a table showing the coordinates of four points located on line B. What is the equation for line B?

11. Is there a point with \((x, y)\) coordinates that satisfies both the equation for line A and the equation for line B? Explain your reasoning.
Additional Practice (continued)

Moving Straight Ahead

Does the point represent a point on the graph of \( y = x - 4 \)?
12. \((0, -4)\)  
13. \((5, -1)\)  
14. \((-3, -7)\)  
15. \((-7, -3)\)

16. Each set of \((x, y)\) coordinates below is generated by a linear rule. For each set of coordinates, write an equation to describe the rule.
   a. \((-1, -7), (0, -3), (1, 1), (2, 5), (4, 13), (5, 17)\)
   b. \((-2, 19), (-1, 14), (0, 9), (2, -1), (4, -11), (6, -21)\)
   c. \((-2, -1), (0, 3), (1, 5), (3, 9), (5, 13), (6, 15)\)

Write an equation for each graph.

17. \[ \text{Graph 1} \]
18. \[ \text{Graph 2} \]
19. Circle the number that makes the ordered pair a solution of the equation $y = 5 - 2x$.

- **a.** $(-1, -5)$
- **b.** $(-3, 1)$

20. Which equation represents the equation of the line? Select all that apply.

- $y = 2 + x$
- $y = x + 2$
- $y = 2x + 4$
- $y = 2x - 4$
- $y = 4 + 2x$
- $y = 4x - 2$

21. Write each equation in the box with the correct category.

- $y = \frac{1}{2}x + 3$
- $y = 6 - x$
- $y = -3x + 14$
- $y = \frac{1}{4}x - 5$
- $y = 5x$
- $y = 5 + x$

<table>
<thead>
<tr>
<th>Increasing</th>
<th>Decreasing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Skill: Linear Functions, Graphs, and Tables

1. A ride in a cab costs $0.60 plus $0.14 per mile.
   a. Write an equation for traveling \( x \) miles in the cab.

   b. The cab charges $0.88 for a ride of how many miles?

   c. How much does the cab charge for a trip of 8 miles?

Graph each linear equation.

2. \( y = -4x + 6 \)

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

4. \( y = -3x - 1 \)
Skill: Linear Functions, Graphs, and Tables (continued)  

Moving Straight Ahead

On which of the following lines does each point lie? A point may lie on more than one line.

A. \( y = x + 5 \)  
B. \( y = -x + 7 \)  
C. \( y = 2x - 1 \)

5. \((0, 5)\)  
6. \((1, 6)\)  
7. \(\frac{8}{3}, \frac{13}{3}\)  
8. \((0, -1)\)

9. \((4, 9)\)  
10. \((4, 3)\)  
11. \((-2, -5)\)  
12. \((-8, 15)\)

Decide if each table represents a linear relationship. For those that do, write an equation that represents the relationship.

13.  

<table>
<thead>
<tr>
<th>(x)</th>
<th>(y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>18</td>
</tr>
<tr>
<td>-1</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>-6</td>
</tr>
<tr>
<td>3</td>
<td>-18</td>
</tr>
</tbody>
</table>

14.  

<table>
<thead>
<tr>
<th>(x)</th>
<th>(y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>-2</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>4</td>
</tr>
</tbody>
</table>

15.  

<table>
<thead>
<tr>
<th>(x)</th>
<th>(y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>-17</td>
</tr>
<tr>
<td>-1</td>
<td>-11</td>
</tr>
<tr>
<td>1</td>
<td>-5</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

16.  

<table>
<thead>
<tr>
<th>(x)</th>
<th>(y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4</td>
<td>4</td>
</tr>
<tr>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>
1. The equations below represent the costs to print brochures at three printers.
   a. For which equation does the point (20, 60) lie on the graph? Explain.
      i. \( C = 15 + 2.50N \)  
      ii. \( C = 50 + 1.75N \)  
      iii. \( C = 30 + 1.50N \)

   b. For each equation, give the coordinates of one point on the graph of the equation.

2. The equations below represent the distances in meters traveled after \( t \) seconds by three cyclists.
   a. For which equation does the point (10, 74) lie on the graph? Explain.
      i. \( D = 2.4t + 32 \)  
      ii. \( D = 4.2t + 32 \)  
      iii. \( D = 6t + 32 \)

   b. For each equation, give the coordinates of a point on the graph of the equation.

3. Do parts (a) and (b) for each pair of equations below.
   i. \( y = -\frac{12}{5}x - 6 \)  
      \( y = 4x + 14 \)  
   ii. \( y = x - 3 \)  
      \( y = -1.5x + 12 \)
   iii. \( y = x + 9 \)  
      \( y = 7 - 3x \)  
   iv. \( y = 2x - 6 \)  
      \( y = -2 \)

   a. Using your calculator, graph the two equations on the same axes. Use window settings that allow you to see the points where the graphs intersect. What ranges of \( x \)- and \( y \)-values did you use for your window?

   b. Find the point of intersection of the graphs. Then test each point of intersection you found by substituting its coordinates into the equations. Did the points fit the equation exactly? Explain why or why not.
4. **a.** Find \( r \) if \( 2r + 10 = 22 \).  
**b.** Find \( x \) if \( 4.5x = 45 \).  
**c.** Find \( z \) if \( 3z - 19 = 173 \).  
**d.** Find \( w \) if \( 67.1 = 29.7 - 0.2w \).  

5. Betty is thinking of two consecutive integers whose sum is 41. Let \( x \) represent the smaller unknown integer. 
   **a.** How could you represent the larger unknown integer in terms of \( x \)?  
   **b.** Write and solve an equation showing that the sum of the two unknown integers is 41. What integers is Betty thinking of?  

6. Find the number described in each problem by writing and solving an equation. 
   **a.** If Sarah subtracts five times her number from 24, she gets 4. What is Sarah’s number?  
   **b.** Twice Bill’s number added to 17 is 7. What is Bill’s number?  
   **c.** If Susan subtracts 11 from one fourth of her number, she gets 11. What is Susan’s number?
Additional Practice (continued)

7. The school drama club is performing a play at the community theater. Props cost $250, and the theater is charging the drama club $1.25 for each ticket sold. So, the total cost $C$ for the drama club to put on the play is $C = 1.25N + 250$, where $N$ is the number of tickets sold. Customers pay $4 for each ticket, so the total amount collected from ticket sales is $T = 4N$.

a. What is the cost if 213 tickets are sold?

b. How much are the total ticket sales if 213 tickets are sold?

c. What is the drama club’s profit or loss if 213 tickets are sold?

d. If the total ticket sales are $780, how many people attended the play?

e. What is the cost of putting on the play for the number of people you found in part (d)?

f. How many tickets does the drama club need to sell to break even?

g. The drama club would like to earn a profit of $500 from the play. How many tickets need to be sold for the club to meet this goal?
8. In each pair of equations, solve the first equation and graph the second equation:
   a. \( 0 = 3x + 6 \) \( y = 3x + 6 \)

   b. \( 0 = x - 2 \) \( y = x - 2 \)

   c. \( 0 = 3x + 10 \) \( y = 3x + 10 \)

   d. In each pair, how is the solution to the first equation related to the graph?
9. Marsha said there are two ways to solve the equation $3x + 15 = 24$.

\[
\begin{align*}
3x + 15 &= 24 & \text{Subtract 15 from each side.} & & 3x + 15 &= 24 & \text{Divide each side by 3.} \\
3x &= 9 & \text{Divide each side by 3.} & & x + 5 &= 8 & \text{Subtract 5 from each side.} \\
x &= 3 & \\
& \\
\end{align*}
\]

a. Are both strategies correct? Explain.

b. Which strategy do you think is easier? Explain.

c. How do you know when you can divide first?

d. Solve this equation in two ways: $5x + 20 = 5$.

10. Find $x$ if

\[
\begin{align*}
a. \quad x + 7 &= 20 & b. \quad 3x + 7 &= 20 & c. \quad -2x + 7 &= 20 \\
& & & \\
& & \\
\end{align*}
\]

d. How are the solutions similar? How are they different?
11. If \( y = \frac{2}{3}x + 4 \), find \( y \) if
   a. \( x = 0 \)  
   b. \( x = 3 \)  
   c. \( x = 9 \)  
   d. \( x = -9 \)  
   e. \( x = 10 \)  
   f. \( x = \frac{1}{2} \)

12. Kelli is having a graduation party and needs to stay within a budget of $1,250 for the food. One caterer charges $13.50 per person, \( p \). A second caterer charges $100 to set up, and then $12.00 per person.
   a. Write an inequality to show the number of people that can attend if Kelli stays within her budget and uses the first caterer.
   
   b. Write an inequality to show the number of people that can attend if Kelli stays within her budget and uses the second caterer.
   
   c. For each inequality:
      i. find the number of people who can attend if Kelli stays within her budget. Remember to round your solution to the nearest whole value that makes sense in the context.
      
      ii. record the solution on a number line.
   
   d. Which caterer would you choose? Explain why.
13. Entry into a theme park costs $25. Inside the theme park, there is an arcade where each game is $0.50. Which equations relate the cost, $C$, of going to the theme park to the number of games played, $g$? Select all that apply.

- $C = 25 + 0.5g$
- $C = 0.5 + 25g$
- $C = 0.5g + 25$
- $C = 25 - 0.5g$
- $C = -25 + 0.5g$
- $C = -25 - 0.5g$

14. Circle the coordinates of the point that is a solution to both equations.

\[
\begin{align*}
y &= 4 - 3x \\
y &= \frac{1}{2}x - 3
\end{align*}
\]

\[
\begin{bmatrix}
-2 \\
1 \\
2 \\
4 \\
6
\end{bmatrix}
\begin{bmatrix}
-3 \\
-2 \\
0 \\
1 \\
10
\end{bmatrix}
\]

15. Write each equation in the box with the correct solution.

\[
\begin{align*}
-3 &= 2x + 3 \\
3 &= 6 - x \\
5 &= -3x + 14 \\
-6 &= \frac{1}{3}x - 5 \\
6 &= -2x \\
2 &= 5 + x
\end{align*}
\]
Skill: Exploring Equality

1. Determine whether each point is a solution of \( y = 3x - 8 \).
   a. \((0, -8)\)  
   b. \((6, -10)\)  
   c. \((-2, -2)\)  
   d. \((4, 4)\)

2. Determine whether each point is a solution of \( y = -5x + 19 \).
   a. \((-3, 4)\)  
   b. \((0, 19)\)  
   c. \((2, 9)\)  
   d. \((-4, 39)\)

Use the equation \( y = -2x + 1 \). Complete each solution.

3. \((0, )\) 
4. \((-5, )\) 
5. \((20, )\) 
6. \((-68, )\)

Use each equation. Find \( y \) for \( x = 1, 2, 3, \) and \( 4 \).

7. \( y = 2x \)
8. \( y = 3x + 1 \)

9. \( y = x - 5 \)
10. \( y = -5x + 6 \)
Skill: Finding the Point of Intersection

Will these lines intersect? Explain.

1. \(y = 6x + 12\)
   \(y = 2x - 4\)

2. \(y = -3x\)
   \(y = \frac{1}{4}x - \frac{1}{8}\)

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

4. Find the point of intersection of the two lines by graphing.

   \(y = -x + 3\)
   \(y = x + 1\)

5. Tomatoes are $0.80 per pound at Rob’s Market, and $1.20 per pound at Sal’s Produce. You have a coupon for $1.40 off at Sal’s. (Assume that you buy at least $1.40 worth of tomatoes.)
   
   a. Write an equation relating the cost \(y\) to the number of pounds \(x\) at each market.
      
      Rob’s: 
      Sal’s: 
   
   b. Use a graph to estimate the number of pounds for which the cost is the same at either store.
Skill: Solving Linear Equations

Solve each equation. Check your answers.

1. \(10 + 5h = 25\)
2. \(8s - 8 = 64\)
3. \(3y + 78 = 81\)

4. \(2g + 4 = 12\)
5. \(5j + 5 = 15\)
6. \(3w + 8 = 20\)

7. For a walk-a-thon, a sponsor committed to give you a flat fee of $5 plus $2 for every mile you walk. Write an expression for the total amount of money you will collect from your sponsor at the end of the walk-a-thon. Then evaluate your expression for 20 miles walked.

8. To win the neighborhood tomato-growing contest, Johnny needs his tomato plants to produce 8 tomatoes per week. He needs 30 tomatoes to win the contest. He already has 6 tomatoes. Write and solve an equation to find the number of weeks he needs to produce 30 tomatoes.
Skill: Solving Linear Equations  (continued)  

For Exercises 9–14, solve each equation.

9. \(4r + 6 = 14\)  
10. \(9y - 11 = 7\)  
11. \(-5b - 6 = -11\)

12. \(-9i - 17 = -26\)  
13. \(14.9 = 8.6 + 0.9m\)  
14. \(15w - 21 = -111\)

15. Hugo received $100 for his birthday. He then saved $20 per week until he had a total of $460 to buy a printer. Use an equation to show how many weeks it took him to save the money.

16. A health club charges a $50 initial fee plus $2 for each visit. Moselle has spent a total of $144 at the health club this year. Use an equation to find how many visits she has made.
Additional Practice

1. Find the slope and \( y \)-intercept of the line represented by each equation.
   a. \( y = 2x - 10 \)  
   b. \( y = 4x + 3 \)  
   c. \( y = 4x - 4.5 \)  
   d. \( y = 2.6x \)  
   e. \( y = 7x + 1 \)

2. Each table in (i.)–(v.) below represents a linear relationship. Do parts (a)–(c) for each table.
   a. Find the slope of the line that represents the relationship.
   b. Find the \( y \)-intercept for the graph of the relationship.
   c. Determine which of the following equations represents the relationship:
      \( y = 3 - 4x \)  
      \( y = x + 6 \)  
      \( y = 4x - 3 \)  
      \( y = 3x - 1.5 \)  
      \( y = 2.5x \)

   i.  
   \[
   \begin{array}{c|c}
   x & y \\
   \hline
   0 & 0 \\
   1 & 2.5 \\
   2 & 5 \\
   3 & 7.5 \\
   4 & 10 \\
   \end{array}
   \]

   ii.  
   \[
   \begin{array}{c|c}
   x & y \\
   \hline
   0 & 6 \\
   1 & 7 \\
   2 & 8 \\
   3 & 9 \\
   4 & 10 \\
   \end{array}
   \]

   iii.  
   \[
   \begin{array}{c|c}
   x & y \\
   \hline
   0 & -1.5 \\
   1 & 1.5 \\
   2 & 4.5 \\
   3 & 7.5 \\
   4 & 10.5 \\
   \end{array}
   \]

   iv.  
   \[
   \begin{array}{c|c}
   x & y \\
   \hline
   1 & -1 \\
   2 & -5 \\
   3 & -9 \\
   4 & -13 \\
   \end{array}
   \]

   v.  
   \[
   \begin{array}{c|c}
   x & y \\
   \hline
   1 & 5 \\
   2 & 9 \\
   3 & 13 \\
   4 & 17 \\
   \end{array}
   \]
3. For each of the lines below, find the slope and write an equation that represents the line.

a.

b.

c.

4. Do parts (a)–(d) for each pair of points below.

a. Plot the points on a coordinate grid, and draw the line through the points.

b. Find the slope of the line through the points.

c. Estimate the $y$-intercept from the graph.

d. Using your answers from parts (a) and (b), write an equation for the line through the points.

i. $(0,0)$ and $(-3,-3)$

ii. $(1,-1)$ and $(-3,3)$
5. On Saturdays, Jim likes to go to the mall to play video games or pinball. Round-trip bus fare to and from the mall is $1.80. Jim spends $0.50 for each video or pinball game.
   a. Write an equation for the amount of money $M$ it costs Jim to go to the mall and play $n$ video or pinball games.
   b. What is the slope of the line your equation represents? What does the slope tell you about this situation?
   c. What is the $y$-intercept of the line? What does the $y$-intercept tell you about the situation?
   d. How much will it cost Jim to travel to the mall and play 8 video or pinball games?
   e. If Jim has $6.75, how many video or pinball games can he play at the mall?

6. The graph below shows the total cost (including bus fare and the cost of comics) for Angie to go to the Comic Shop to buy new comic books.
   a. What is Angie’s round-trip bus fare? Explain your reasoning.
   c. Write an equation that shows how much money $M$ it costs Angie to buy $n$ comic books at the Comic Shop. What information did you use from the graph to write the equation? Is this a proportional relationship?
7. Tonya is siphoning all the water from a full aquarium to clean it. The graph at the right shows the amount of water left in the aquarium as Tonya siphons the water.
   a. How much water was in the aquarium when it was full? Explain.
   b. How much water does the siphon remove from the aquarium in 1 minute? Explain.
   c. Write an equation that shows the amount of water \( G \) left in the aquarium after \( t \) minutes.
   d. How many gallons of water are left in the aquarium after 10 minutes?
   e. How long will it take the siphon to remove all of the water from the aquarium? Explain.

8. For parts (a)–(e), write an equation for the line that satisfies the given conditions.
   a. The slope is 7 and the \( y \)-intercept is \(-2\).
   b. The slope is 0 and the \( y \)-intercept is 9.18.
   c. The line passes through the points \((-24, -11)\) and \((-8, -3)\).
   d. The line passes through the points \((-4.5, 2)\) and \((6.3, 5.8)\).
   e. The slope is \(-\frac{2}{3}\), and the line passes through the point \((5, 0)\).
9. Write an equation for each of the four lines shown on the graph below.

10. At Midtown Bowling Center, the cost to bowl four games is $8.40, and the cost to rent shoes is $1.15.
   a. Write an equation for the cost \( C \) for renting shoes and bowling \( n \) games.

   b. What is the \( y \)-intercept for your equation, and what does it represent?

   c. What is the slope of your equation, and what does the slope represent?

   d. What is the cost of renting shoes and bowling 6 games?

   e. Tony paid $7.45 for his games and shoe rental. How many games did Tony bowl?
11. Here are some possible descriptions of a line:

<table>
<thead>
<tr>
<th>Slope</th>
<th>y-intercept</th>
<th>x-axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>positive</td>
<td>positive</td>
<td>passes through the origin (0, 0)</td>
</tr>
<tr>
<td>equals 0</td>
<td>equals 0</td>
<td>crosses the x-axis to the right of the origin</td>
</tr>
<tr>
<td>negative</td>
<td>negative</td>
<td>crosses the x-axis to the left of the origin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>never crosses the x-axis</td>
</tr>
</tbody>
</table>

Use the descriptions above to describe the properties of the slope, y-intercept, and x-axis for the graph of each equation.

a. \( y = x \)

b. \( y = 2x + 1 \)

c. \( y = -5 \)

d. \( y = 4 - 3x \)

e. \( y = -3 - x \)

12. These two points determine a line: \((-2, 10)\) and \((1, 4)\). Which of these points is also on that line?

(2, 0) (2, 2) (2, 10)
13. Below are four patterns:

Pattern 1:

Pattern 2:

Pattern 3:

Pattern 4:

a. In each cell in the chart below, write the perimeter of the figure:

<table>
<thead>
<tr>
<th>Shape</th>
<th>Figure 1</th>
<th>Figure 2</th>
<th>Figure 3</th>
<th>Figure 4</th>
<th>Figure 10</th>
<th>Figure 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pattern 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pattern 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pattern 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. Describe the pattern of change within each pattern.

c. Explain how you found the values for the last three columns.

d. Write an equation for the perimeter of the figures for each pattern.
14. Line A is the graph of this equation: \( y = 2x + 2 \).
Line B is the graph of this equation: \( y = 2x \).

a. What is alike about lines A and B? What is different?

b. Write the equation of a line that lies between line A and line B. How is your equation similar to the equations above? How is it different?

c. Explain why your equation is correct.
15. Which are interpretations of the slope of the equation \( y = 2x - 1 \)? Select all that apply.

- As \( x \) increases by 2, \( y \) increases by 1.
- As \( x \) decreases by 2, \( y \) increases by 1.
- As \( x \) decreases by 2, \( y \) decreases by 1.
- As \( x \) increases by 1, \( y \) increases by 2.
- As \( x \) decreases by 1, \( y \) decreases by 2.

16. Circle the numbers that complete the equation of the line with a slope of 3 and a \( y \)-intercept of 5.

\[
y = \begin{bmatrix} -5 \\ -3 \\ 3 \\ 5 \end{bmatrix} x + \begin{bmatrix} -5 \\ -3 \\ 3 \\ 5 \end{bmatrix}
\]

17. Circle the numbers that complete the equation of the line that passes through the points \((1, -1)\) and \((-2, 0)\).

\[
y = \begin{bmatrix} 1 \\ 3 \\ 1 \\ 3 \\ 1 \\ 3 \\ 1 \end{bmatrix} x + \begin{bmatrix} -2 \\ -3 \\ 2 \\ 3 \\ 1 \\ 3 \\ 0 \end{bmatrix}
\]

18. Write each equation in the box with the correct category. Some equations may fit in more than one category.

\[
y = 3x \quad y = -2x + 5 \quad y = \frac{1}{2}x - 1 \quad y = 1 - x \quad y = -x \quad y = 2 - 3x
\]

<table>
<thead>
<tr>
<th>Positive Slope</th>
<th>Passes Through the Origin</th>
<th>Positive ( y )-intercept</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Skill: Finding Slope

Find the slope of each line.

1. 2. 3.

4. 5.
Skill: Finding Slope (continued)

For Exercises 6–7, the points from each table lie on a line. Use the table to find the slope of each line. Then graph the line.

6. \[
\begin{array}{c|ccccc}
  x & 0 & 1 & 2 & 3 & 4 \\
  y & -3 & -1 & 1 & 3 & 5 \\
\end{array}
\]

slope =

7. \[
\begin{array}{c|ccccc}
  x & 0 & 1 & 2 & 3 & 4 \\
  y & 5 & 3 & 1 & -1 & -3 \\
\end{array}
\]

slope =

Find the slope of the line that passes through each pair of points.

8. \(A(1, 1), B(6, 3)\)  

9. \(J(-4, 6), K(-4, 2)\)

10. \(P(3, -7), Q(-1, -7)\)  

11. \(M(7, 2), N(-1, 3)\)
Skill: Using Slope

For Exercises 1–4, determine if the line that represents each equation has the same slope as the equation \( y = 2x - 4 \).

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

5. Which hill would it be easiest to push a heavy cart up: one with a slope of \( \frac{1}{2} \), \( \frac{1}{6} \), 3, or 5? Explain.

6. Which ski run would probably give you the greatest speed down a hill when you are skiing: one with a slope of \( \frac{1}{8} \), \( \frac{1}{4} \), 1, or 2?

7. Which roof would be the most dangerous for a roofer: one with a slope of \( \frac{1}{16} \), \( \frac{1}{10} \), \( \frac{1}{2} \), or \( \frac{3}{2} \)?

8. Which of the slopes from Exercise 7 would be the easiest for the roofer?

Draw a line with the given slope through the given point.

9. \( P (5, 1) \), slope = \( \frac{-1}{3} \)  
10. \( K (-2, 4) \), slope = 3
Skill: Writing Equations

Write an equation for each line.

1. 

2. 

3. 

Use the graph at the right for Exercises 4–8.

4. What earnings will produce $225 in savings?

5. How much is saved from earnings of $400?

6. What is the slope of the line in the graph?

7. For each increase of $200 in earnings, what is the increase in savings?

8. Write an equation for the line.