

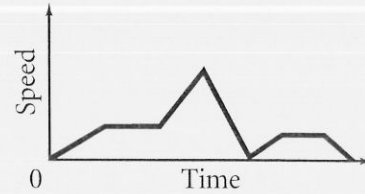
Practice 5-1

Relating Graphs to Events

The graph shows the speed a student traveled on the way to school.

1. What do the flat parts of the graph represent?
2. Circle the sections of the graph that show the speed decreasing.

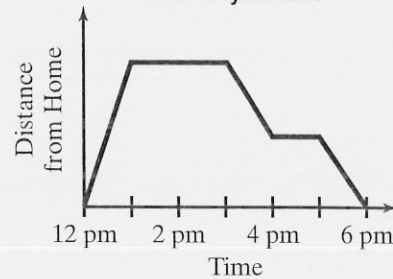
Trip to School



The graph shows the relationship between time and distance from home.

3. What do the flat parts of the graph represent?
4. What do the sections from 3 P.M. to 4 P.M. and from 5 P.M. to 6 P.M. represent?
5. What does the section from 12 P.M. to 1 P.M. represent?

Your Bicycle Ride



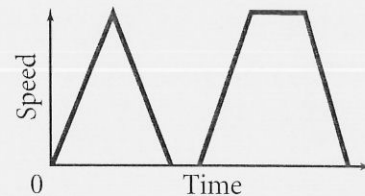
Sketch a graph to describe the following. Explain the activity in each section of the graph.

6. your elevation above sea level as you hike in the mountains
7. your speed as you travel from home to school
8. the height of an airplane above the ground flying from Dallas, Texas to Atlanta, Georgia
9. the speed of a person driving to the store and having to stop at two stoplights

The graph shows the relationship between time and speed for an airplane.

10. Circle the sections of the graph that show the speed increasing.
11. Circle the section of the graph that shows the plane not moving.
12. Circle the section of the graph that shows the plane moving at a constant speed.

Speed vs. Time



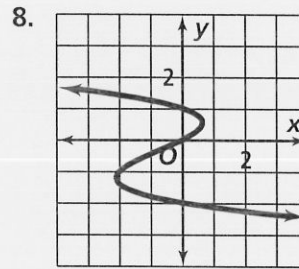
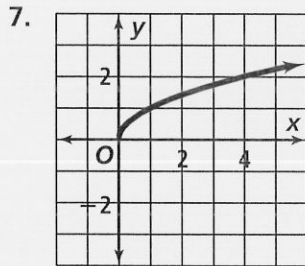
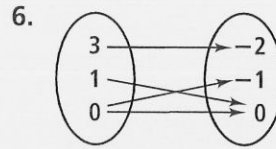
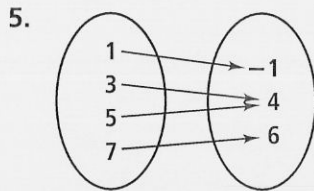
Practice 5-2

Find the domain and range of each relation.

1. $\{(-3, -7), (-1, -3), (0, -1), (2, 3), (4, 7)\}$ 2. $\{(-5, -4), (-4, 2), (0, 2), (1, 3), (2, 4)\}$

Determine whether each of the following relations is a function.

3. $\{(-4, -3), (-2, -2), (0, -1), (1, -\frac{1}{2})\}$ 4. $\{(0, 0), (1, 1), (4, 2), (1, -1)\}$



Evaluate each function rule for $x = 3$.

9. $f(x) = 2x - 15$ 10. $f(x) = -x + 3$
 11. $g(x) = \frac{2}{3}x - 1$ 12. $h(x) = -\frac{1}{2}x - \frac{1}{2}$
 13. $h(x) = -0.1x + 2.1$ 14. $g(x) = -\frac{x}{6} + \frac{3}{2}$

Evaluate each function rule for $x = -\frac{1}{2}$.

15. $f(x) = 4x - 2$ 16. $f(x) = -\frac{1}{2}x + 1$
 17. $g(x) = -|x| + 3$ 18. $h(x) = x - \frac{1}{2}$

Find the range of each function for the given domain.

19. $f(x) = -3x + 1; \{-2, -1, 0\}$ 20. $f(x) = x^2 + x - 2; \{-2, 0, 1\}$
 21. $h(x) = -x^2; \{-3, -1, 1\}$ 22. $g(x) = -\frac{1}{2}|x| + 1; \{-2, -1, 1\}$

23. For a car traveling at a constant rate of 60 mi/h, the distance traveled is a function of the time traveled.

- a. Express this relation as a function.
 b. Find the range of the function when the domain is $\{1, 5, 10\}$.
 c. What do the domain and range represent?

Practice 5-3

Function Rules, Tables, and Graphs

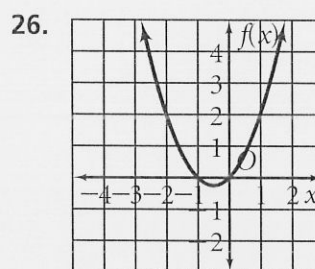
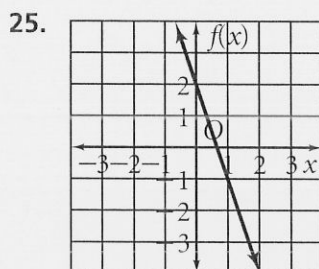
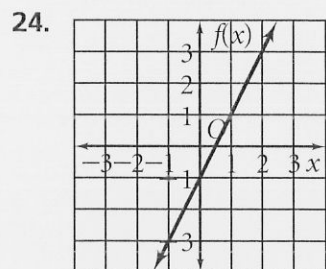
Model each rule with a table of values and a graph.

1. $f(x) = x + 1$
 2. $f(x) = 2x$
 3. $f(x) = 3x - 2$
 4. $f(x) = \frac{3}{2}x - 2$
 5. $f(x) = \frac{1}{2}x$
 6. $f(x) = -\frac{2}{3}x + 1$
 7. $f(x) = x^2 + 1$
 8. $f(x) = -x^2 + 2$
 9. $f(x) = x - 3$
10. Suppose a van gets 22 mi/gal. The distance traveled $D(g)$ is a function of the gallons of gas used.
- a. Use the rule $D(g) = 22g$ to make a table of values and then a graph.
 - b. How far did the van travel if it used 10.5 gallons of gas?
 - c. Should the points of the graph be connected by a line? Explain.
11. The admission to a fairgrounds is \$3.00 per vehicle plus \$.50 per passenger. The total admission is a function of the number of passengers.
- a. Use the rule $T(n) = 3 + 0.50n$ to make a table of values and then a graph.
 - b. What is the admission for a car with six people in it?
 - c. Should the points of the graph be connected by a line? Explain.

Graph each function.

12. $f(x) = 4x + 2$
13. $f(x) = |-2x|$
14. $f(x) = -3x + 7$
15. $f(x) = -|x| - 1$
16. $f(x) = 8 - \frac{3}{4}x$
17. $f(x) = \frac{2}{3}x - 7$
18. $f(x) = -\frac{2}{3}x + 6$
19. $f(x) = x^2 - 2x + 1$
20. $f(x) = -\frac{1}{2}x + 3$
21. $y = -x^2 + 1$
22. $y = 9 - x^2$
23. $y = 2x^2 + x - 2$

Make a table of values for each graph.



Practice 5-4

Writing a Function Rule

Write a function rule for each table.

1.

x	$f(x)$
0	3
2	5
4	7
6	9

2.

x	$f(x)$
0	0
1	3
3	9
5	15

3.

x	$f(x)$
5	0
10	5
15	10
20	15

4. a. Write a function rule to calculate the cost of buying bananas at \$.39 a pound.
 b. How much would it cost to buy 3.5 pounds of bananas?
5. To rent a cabin, a resort charges \$50 plus \$10 per person.
 a. Write a function rule to calculate the total cost of renting the cabin.
 b. Use your rule to find the total cost for six people to stay in the cabin.

Write a function rule for each table.

6.

x	$f(x)$
-4	-2
-2	-1
6	3
8	4

7.

x	$f(x)$
-3	9
0	0
1	1
5	25

8.

x	$f(x)$
0	20
2	18
4	16
8	12

9. Pens are shipped to the office supply store in boxes of 12 each.
 a. Write a function rule to calculate the total number of pens when you know the number of boxes.
 b. Calculate the total number of pens in 16 boxes.
10. a. Write a function rule to determine the change you would get from a \$20 bill when purchasing items that cost \$1.25 each.
 b. Calculate the change when five of these items are purchased.
 c. Can you purchase 17 of these items with a \$20 bill?
11. You invest \$209 to buy shirts and then sell them for \$9.50 each.
 a. Write a function rule to determine your profit.
 b. Use your rule to find your profit after selling 24 shirts.
 c. How many shirts do you need to sell to get back your investment?

Practice 5-5

Direct Variation

Is each equation a direct variation? If it is, find the constant of variation.

- | | | | |
|-------------------|-----------------------|---------------------------|-------------------|
| 1. $y = 5x$ | 2. $8x + 2y = 0$ | 3. $y = \frac{3}{4}x - 7$ | 4. $y = 2x + 5$ |
| 5. $3x - y = 0$ | 6. $y = \frac{3}{5}x$ | 7. $-3x + 2y = 0$ | 8. $-5x + 2y = 9$ |
| 9. $8x + 4y = 12$ | 10. $6x - 3y = 0$ | 11. $x - 3y = 6$ | 12. $9x + 5y = 0$ |

The ordered pairs in each exercise are for the same direct variation. Find each missing value.

- | | | | |
|-----------------------------------|-------------------------|---------------------------|-------------------------|
| 13. (3, 2) and (6, y) | 14. (-2, 8) and (x, 12) | 15. (4, y) and (16, 12) | 16. (x, 8) and (6, -16) |
| 17. (3, y) and (9, 15) | 18. (2, y) and (10, 15) | 19. (-4, 3) and (x, 6) | 20. (3, y) and (1.5, 6) |
| 21. $(\frac{2}{3}, 2)$ and (x, 6) | 22. (2.5, 5) and (x, 9) | 23. (4.8, 5) and (2.4, y) | 24. (9, 3) and (x, -2) |

For the data in each table, tell whether y varies directly with x. If it does, write an equation for the direct variation.

- | 25. | <table border="1"><tr><th>x</th><th>y</th></tr><tr><td>4</td><td>8</td></tr><tr><td>7</td><td>14</td></tr><tr><td>10</td><td>20</td></tr></table> | x | y | 4 | 8 | 7 | 14 | 10 | 20 | 26. | <table border="1"><tr><th>x</th><th>y</th></tr><tr><td>-3</td><td>-2</td></tr><tr><td>3</td><td>2</td></tr><tr><td>9</td><td>6</td></tr></table> | x | y | -3 | -2 | 3 | 2 | 9 | 6 | 27. | <table border="1"><tr><th>x</th><th>y</th></tr><tr><td>4</td><td>3</td></tr><tr><td>5</td><td>4.5</td></tr><tr><td>11</td><td>13.5</td></tr></table> | x | y | 4 | 3 | 5 | 4.5 | 11 | 13.5 | 28. | <table border="1"><tr><th>x</th><th>y</th></tr><tr><td>-2</td><td>-2.8</td></tr><tr><td>3</td><td>4.2</td></tr><tr><td>8</td><td>11.2</td></tr></table> | x | y | -2 | -2.8 | 3 | 4.2 | 8 | 11.2 |
|-----|---|---|---|---|---|---|----|----|----|-----|--|---|---|----|----|---|---|---|---|-----|--|---|---|---|---|---|-----|----|------|-----|---|---|---|----|------|---|-----|---|------|
| x | y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| x | y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -3 | -2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| x | y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 4.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | 13.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| x | y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -2 | -2.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 4.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 11.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

29. Charles's Law states that at constant pressure, the volume of a fixed amount of gas varies directly with its temperature measured in degrees Kelvin. A gas has a volume of 250 mL at 300° K.
- Write an equation for the relationship between volume and temperature.
 - What is the volume if the temperature increases to 420° K?
30. Your percent grade varies directly with the number of correct answers. You got a grade of 80 when you had 20 correct answers.
- Write an equation for the relationship between percent grade and number of correct answers.
 - What would your percent grade be with 24 correct answers?
31. The amount of simple interest earned in a savings account varies directly with the amount of money in the savings account. You have \$1000 in your savings account and earn \$50 in simple interest. How much interest would you earn if you had \$1500 in your savings account?

© Pearson Education, Inc. All rights reserved.

Practice 5-6

Describing Number Patterns

Find the common difference of each arithmetic sequence.

- | | |
|--|--|
| 1. 10, 16, 22, 28, ... | 2. 9, 6, 3, 0, ... |
| 3. -12, -17, -22, -27, ... | 4. -11, -8, -5, -2, ... |
| 5. $4, 4\frac{1}{2}, 5, 5\frac{1}{2}, \dots$ | 6. $7\frac{1}{2}, 7, 6\frac{1}{2}, 6, \dots$ |
| 7. 9, 10.5, 12, 13.5, ... | 8. 1, -1.5, -4, -6.5, ... |
| 9. 8, 9.1, 10.2, 11.3, ... | 10. -9, -8.1, -7.2, -6.3, ... |
| 11. -3, -0.6, 1.8, 4.2, ... | 12. 6.2, 4.5, 2.8, 1.1, ... |

Find the next two terms in each sequence.

- | | |
|--|--|
| 13. 1, 7, 13, 19, ... | 14. -8, -5, -2, 1, ... |
| 15. 1, -4, -9, -14, ... | 16. $\frac{1}{2}, -\frac{1}{2}, -\frac{3}{2}, -\frac{5}{2}, \dots$ |
| 17. 2.7, 4, 5.3, 6.6, ... | 18. 9.8, 0.7, -8.4, -17.5, ... |
| 19. $6\frac{1}{3}, 4\frac{2}{3}, 3, 1\frac{1}{3}, \dots$ | 20. $2\frac{1}{2}, \frac{3}{4}, -1, -2\frac{3}{4}, \dots$ |

Find the fifth, tenth, and hundredth terms of each sequence.

- | | |
|--|--|
| 21. 4, 14, 24, 34, ... | 22. 14, 6, -2, -10, ... |
| 23. 3, 10, 17, 24, ... | 24. -19, -22, -25, -28, ... |
| 25. $\frac{1}{4}, -\frac{1}{4}, -\frac{3}{4}, -\frac{5}{4}, \dots$ | 26. -1.3, -0.3, 0.7, 1.7, ... |
| 27. 0, 101, 202, 303, ... | 28. -1, -100, -199, -298, ... |
| 29. 5, 3.9, 2.8, 1.7, ... | 30. $-3\frac{1}{2}, -3\frac{3}{4}, -4, -4\frac{1}{4}, \dots$ |

Determine whether each sequence is arithmetic. Justify your answer.

- | | |
|------------------------------|--------------------------|
| 31. 0.5, 0.3, 0.1, -0.1, ... | 32. -1, 1, -1, 1, ... |
| 33. 3, 6, 12, 24, ... | 34. 100, 81, 64, 49, ... |
35. Renting a backhoe costs a flat fee of \$65 plus an additional \$35 per hour.
- Write the first four terms of a sequence that represents the total cost of renting the backhoe for 1, 2, 3, and 4 hours.
 - What is the common difference?
 - What are the 5th, 24th, 48th, and 72nd terms in the sequence?