

**Holt McDougal**

# **Algebra 1**

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## **Practice Workbook**

The Practice Workbook provides additional practice for every lesson in the textbook. The workbook covers essential vocabulary, skills, and problem solving. Space is provided for students to show their work.

**HOLT McDOUGAL**

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**HOUGHTON MIFFLIN HARCOURT**

**COMMON  
CORE**

**EDITION**

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**LESSON**  
**1.1****Practice***For use with the lesson "Evaluate Expressions"***Evaluate the expression.**

1.  $y + 12$  when  $y = 29$

2.  $47 - x$  when  $x = 38$

3.  $0.8a$  when  $a = 7.5$

4.  $12.5 + m$  when  $m = 7.6$

5.  $r(4.6)$  when  $r = 8.1$

6.  $6.25 \div g$  when  $g = 2.5$

7.  $\frac{x}{0.9}$  when  $x = 54$

8.  $\frac{62}{d}$  when  $d = 3.1$

9.  $\frac{4}{7} \cdot t$  when  $t = \frac{7}{8}$

10.  $r(8.3)$  when  $r = 10.2$

11.  $w + \frac{2}{5}$  when  $w = \frac{1}{2}$

12.  $\frac{n}{2.4}$  when  $n = 12$

**Write the power in words and as a product.**

13.  $8^7$

14.  $(0.1)^4$

15.  $x^5$

**Evaluate the power.**

16.  $9^2$

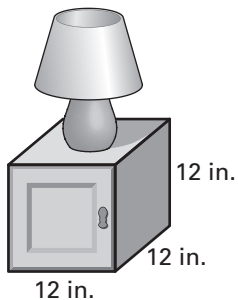
17.  $2^6$

18.  $(0.4)^3$

LESSON  
1.1**Practice** *continued*  
For use with the lesson "Evaluate Expressions"

19.  $x^2$  when  $x = \frac{1}{5}$                       20.  $m^4$  when  $m = 0.6$                       21.  $2y^3$  when  $y = 4$

22. **Side Table** A side table has interior storage space in the shape of a cube. What is the volume of the storage space if the interior length is 12 inches?



23. **Playing Cards** There are 52 cards in a standard deck of playing cards. You are combining decks of cards so that you can play a game with a large number of people. The expression  $52d$  represents the number of cards in  $d$  decks. If you combine 4 decks of cards, how many cards will you have altogether?
24. **Sales Tax** An item costs  $c$  dollars and 6% sales tax is charged. The total cost including sales tax is given by the expression  $1.06c$ . You are buying a skateboard that costs \$75. What is the cost of the skateboard including sales tax?
25. **Flower Arranging** You are creating a flower arrangement for a friend. The total cost (in dollars) for one vase and  $f$  flowers is given by the expression  $8 + 2.5f$ . How much will it cost to make an arrangement with 8 flowers?

**LESSON**  
**1.2****Practice***For use with the lesson "Apply Order of Operations"***Evaluate the expression.**

1.  $16 \div 8 \cdot 5$

2.  $7^2 - 24 \div 3$

3.  $5 + 1.2 \div 0.3$

4.  $18 \div 6 + 4 \cdot 3$

5.  $13 - 15 \div 5 + 9$

6.  $\frac{2}{3} \cdot 3^2 - 5$

7.  $8(6 - 2) + 4$

8.  $28 - 3(4 + 5)$

9.  $1.2 \cdot 5 - 6 \div 3$

10.  $(11 + 15) \div 13$

11.  $35 - 3^2 \cdot 2$

12.  $\frac{4}{5}(3 \cdot 20) - 17$

**Evaluate the expression.**

13.  $3x^4 - 5$  when  $x = 5$

14.  $8m^3 \div 6$  when  $m = 3$

15.  $200 - 3y^2$  when  $y = 8$

16.  $5c^2 - 2c$  when  $c = 9$

17.  $3 \cdot 18t^2$  when  $t = \frac{1}{3}$

18.  $\frac{42}{n} + n$  when  $n = 6$

19.  $7(x + 5)$  when  $x = 10$

20.  $\frac{5a}{a - 6}$  when  $a = 8$

21.  $\frac{4d^2}{d + 1}$  when  $d = 3$

**LESSON**  
**1.2****Practice** *continued*  
*For use with the lesson "Apply Order of Operations"*

22. Was the expression evaluated correctly using the order of operations? If not, find and correct the error.

$$80 - \frac{1}{3}(15)^2 = 80 - 5^2 = 80 - 25 = 55$$

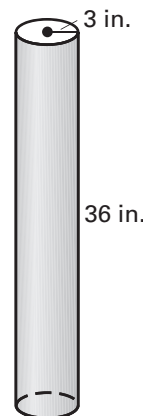
23. **Tournament** During a bowling tournament, you bowled three games with scores of 110, 130, and 129, respectively. Your average bowling score is given

by  $\frac{110 + 130 + 129}{3}$ . What is your average score?

24. **Painting** Three weeks ago, an art supply store started selling a paint kit for 75% of the original price. Now the kit is 15% off of the sale price. The expression  $0.75x - 0.15(0.75x)$  represents the current price of the paint kit where  $x$  is the kit's original price (in dollars). Find the current price of the kit if it originally cost \$48.

25. **Crown Molding** You are decorating the perimeter of the ceiling of your living room with crown molding. The expression  $2x + 2y$  represents the total amount of molding you need where  $x$  is the width of the room (in feet) and  $y$  is the length of the room (in feet). Find the total amount of wood you need if the room is 11 feet wide and 10.5 feet long.

26. **Core Sample** Before a structure is built on a plot of land, it is sometimes necessary to test the surface beneath the plot of land to determine its integrity. So, it may be necessary to take a core sample which is cylindrical in shape. Find the volume of the core sample shown by using the expression  $\pi r^2 h$  where  $r$  is the radius (in inches) and  $h$  is the height (in inches) of the cylinder. Use 3.14 for  $\pi$ .



**LESSON**  
**1.3****Practice***For use with the lesson "Write Expressions"***Translate the verbal phrase into an expression.**

1. The difference of 9 and a number  $n$
2. The quotient of a number  $y$  and 22
3. The sum of 57 and a number  $b$
4.  $\frac{2}{3}$  of a number  $x$
5. 18 less than a number  $c$
6. 25 more than twice a number  $m$
7. The quotient of 8 and twice a number  $z$
8. The sum of 2 and the square of a number  $r$

**Write an expression for the situation.**

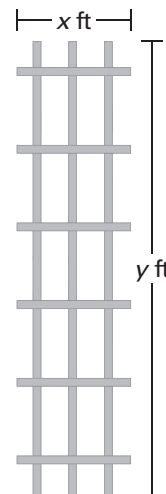
9. The amount of money you spent if you started with \$40 and now have  $d$  dollars
10. The total height of a 1-foot tall birdbath if it is placed on a base that is  $b$  feet tall
11. Each person's share of baseball cards if 4 people share  $c$  cards equally
12. Number of minutes in  $h$  hours

**Find the unit rate.**

13.  $\frac{\$75}{5 \text{ video games}}$
14.  $\frac{600 \text{ students}}{8 \text{ classes}}$
15.  $\frac{32 \text{ pencils}}{4 \text{ boxes}}$

LESSON  
1.3**Practice** *continued*  
For use with the lesson "Write Expressions"

- 16. Candle Making** You are making candles for your friends. A mold for the candles costs \$22.50 and wax to make one candle costs \$5. Write an algebraic expression for the total cost of making  $x$  candles. You make 8 candles. Find the total cost.
- 17. Baseball** Last season, a baseball player scored 14 runs in 18 games. This season, the baseball player scored 12 runs in 15 games. Find the number of runs scored per game in each season. Round your answers to the nearest hundredth. Then identify the season in which the player scored more runs per game.
- 18. Car Trip** You are getting ready to make a 640-mile car trip. In general, your car can drive 160 miles on 5 gallons of gasoline. How many gallons of gasoline will you use for the trip? You started out with 4 gallons of gasoline in your car and gasoline is \$2.29 per gallon. How much money will you spend on gasoline on the trip?
- 19. Plant Trellis** You are building the wood trellis shown in the figure so that you can grow a vine up the side of your home. Write an expression for the total number of feet of wood needed to build the trellis. *Hint:* Write separate expressions for the number of feet of vertical pieces needed and the number of feet of horizontal pieces needed. Then find the total number of feet of wood needed if the trellis is 8 feet tall and 2 feet wide.





**LESSON**  
**1.4****Practice***For use with the lesson "Write Equations and Inequalities"***Write an equation or an inequality.**

1. The difference of a number  $c$  and 17 is more than 33.
2. The product of 3 and a number  $x$  is at most 21.
3. The sum of 14 and twice a number  $y$  is equal to 78.
4. The difference of 22 and the quotient of a number  $m$  and 4 is 54.
5. The sum of 7 and three times a number  $b$  is at least 12.

**Check whether the given number is a solution of the equation or inequality.**

6.  $6x + 7 = 25$ ; 3

7.  $22 - 5c = 8$ ; 3

8.  $\frac{b}{4} - 7 = 1$ ; 36

9.  $7a + 4 \geq 20$ ; 2.7

10.  $4y - 3 > 12$ ; 4

11.  $\frac{m}{3} + 14 < 33$ ; 9

LESSON  
1.4**Practice** *continued*  
For use with the lesson "Write Equations and Inequalities"**Solve the equation using mental math.**

12.  $x + 9 = 17$

13.  $y - 5 = 12$

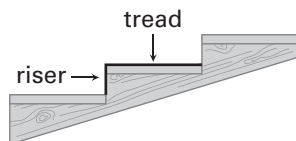
14.  $8w = 48$

15.  $\frac{m}{4} = 16$

16.  $2x - 1 = 15$

17.  $3x + 2 = 20$

18. **Computers** You are buying a new printer and a new scanner for your computer, and you cannot spend over \$150. The printer you want costs \$80. Write an inequality that describes the most that you can spend on the scanner and still stay within your budget. If you buy a scanner that costs \$75, will you remain within your budget?
19. **Go-Carts** You and three of your friends are going to race go-carts. The last time you went, you had a coupon for \$3 off each admission and paid \$48 for the 4 admissions. What was the total price without the coupon? You pay the regular price this time and share it equally. How much does each person pay?
20. **Bracelets** You are making beaded bracelets for your friends. You want to use 30 beads for each bracelet and want to use no more than 145 beads. Write an inequality that models this situation. Can you make 4 bracelets?
21. **Staircase** When building a staircase, you need to be concerned with the height of the riser and the depth of the tread so that people can go up and down the stairs comfortably. One rule of thumb used to determine proper riser height and tread depth is that the sum of the tread depth (in inches) and twice the riser height (in inches) should equal 26 inches. Write an equation that models this situation. The riser height of a set of steps is 5 inches. What should the depth be?



**LESSON**  
**1.5****Practice***For use with the lesson "Use a Problem Solving Plan"*

**In Exercises 1 and 2, identify what you know and what you need to find out. You do *not* need to solve the problem.**

1. You are making cookies for a bake sale and need to make enough cookies to fill 24 boxes containing 6 cookies each. How many dozen cookies do you need to make?
2. The cellular phone plan you signed up for gives you 400 minutes a month for \$35 and charges \$.15 for each additional minute over 400 minutes. How long can you talk on the phone each month and stay within a budget of \$45?

**In Exercises 3 and 4, state the formula that is needed to solve the problem. You do *not* need to solve the problem.**

3. You invest \$200 into a savings account that earns 2% simple interest. How long will it take to earn \$50 in interest?
4. It takes you half an hour to travel 26 miles to work. What is your average speed?
5. **Sticker Collection** Your sticker collection consists of 175 stickers. Each sticker is either an animated cartoon character or an animal. There are 43 less stickers that are animated characters than stickers that are animals. Let  $x$  be the number of stickers that are animals. Which equation correctly models this situation?
  - A.  $x - 43 = 175$
  - B.  $x + (x + 43) = 175$
  - C.  $x + (x - 43) = 175$

**LESSON**  
**1.5****Practice** *continued*  
*For use with the lesson "Use a Problem Solving Plan"*

- 6. Bookshelf** You installed a bookshelf on the wall to organize some of your books. The books that you absolutely want on the shelf weigh a total of  $6\frac{3}{4}$  pounds. The bookshelf can handle no more than 9 pounds. You plan on filling the rest of the shelf with your paperbacks that each weigh about  $\frac{1}{8}$  pound. Assuming you won't run out of room, how many paperback books can you add to the shelf?
- 7. Camping** You are responsible for buying supplies for an upcoming camping trip. You can buy packages of stew that just need water added and then are heated. Each package costs \$4.95 and contains enough stew for 2 people. You need to buy enough packages so that you can have stew for 3 days of the trip. There will be 8 people on the trip. How many packages do you need? What is the total cost?
- 8. Banking** You are going to open a certificate of deposit (CD) that earns simple interest. One bank offers a CD in which you must deposit \$500 for 3 years with 2% interest. Another bank offers a CD in which you must deposit \$250 for 4 years with 3% interest. Which CD will earn more interest?

**LESSON**  
**1.6****Practice***For use with the lesson "Use Precision and Measurement"***Choose the more precise measurement.**

1. 6.5 qt; 6.54 qt
2. 11.7 lb; 9 lb
3. 19 km; 21.3 km
4. 7.2 hr; 14 min
5. 3.1 in.; 7.02 ft
6. 1 kL; 1000 L

**Determine the number of significant digits in the measurement.**

7. 47.2 mi
8. 0.004 mm
9. 1002 yr
10. 3.20 gal
11. 2.6075 ft
12. 1.004 in.
13. 10.0500 sec
14. 0.0205 mL

**Perform the indicated operation. Write the answer with the correct number of significant digits.**

15.  $6.2 \text{ qt} - 1.19 \text{ qt}$
16.  $4.1 \text{ yd} \times 6.7 \text{ yd}$
17.  $11.1 \text{ cm} + 49.9 \text{ cm}$
18.  $17 \text{ m}^2 \div 0.20 \text{ m}$
19.  $0.04 \text{ in.} + 0.007 \text{ in.}$
20.  $72.01 \text{ ft} \times 2.220 \text{ ft}$
21. The quotient  $0.002 \text{ cm}^2 \div 0.0006 \text{ cm}$  contains how many significant digits?  
**A.** 1                      **B.** 2                      **C.** 3                      **D.** 4
22. The product  $10.1 \text{ in.} \times 21.01 \text{ in.}$  contains how many significant digits?  
**A.** 1                      **B.** 2                      **C.** 3                      **D.** 4

**LESSON**  
**1.6****Practice** *continued*  
*For use with the lesson "Use Precision and Measurement"*

- 23. Height** At her first volleyball practice of the season, Lilly was measured and told that she was 1.9 meters tall. When she got home that evening she asked her mother to measure her. Her mother told Lilly she was 2 meters tall. Which measure is more precise? *Explain* your answer.
- 24. Skyscraper** The Willis Tower, formerly known as the Sears Tower, is located in Chicago, Illinois. Its base is a square with each side measuring approximately 675 feet. Using the correct number of significant digits, what are the perimeter and area of the base of the tower?
- 25. Fountains** Brooke completed her flower garden by placing a circular water fountain at its center. If the radius of her fountain is 3 feet, what is the area of her fountain? Use the area equation  $A = \pi r^2$  where  $\pi = 3.14$  and  $r = 3$ . Give your answer using the correct number of significant digits.
- 26. Measurement** A micrometer is a device used in mechanical engineering to measure very small distances. Suppose Tara and Kwan each measure the thickness of a sheet of notebook paper using a micrometer. Tara reports the thickness as 0.0001 millimeter and Kwan reports the thickness as 0.00015 millimeter. Which of the two measurements is more precise? *Explain* your answer.
- 27. Coins** The thickness of a penny, nickel, dime, and quarter are approximately 1.55 millimeters, 1.95 millimeters, 1.35 millimeters, and 1.75 millimeters, respectively. If a penny, nickel, dime, and quarter are stacked up, how high would the stack be? Give your answer using the correct number of significant digits.

**LESSON**  
**1.7****Practice***For use with the lesson "Represent Functions as Rules and Tables"***Complete the sentence.**

- The input variable is called the \_\_\_\_\_ variable.
- The output variable is called the \_\_\_\_\_ variable.

**Tell whether the pairing is a function.**

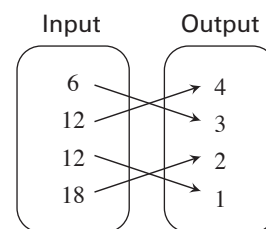
3.

| Input | Output |
|-------|--------|
| 1     | 15     |
| 3     | 20     |
| 5     | 15     |
| 7     | 20     |

4.

| Input | Output |
|-------|--------|
| 5     | 5      |
| 6     | 5      |
| 7     | 5      |
| 8     | 5      |

5.

**Make a table for the function. Identify the range of the function.**

6.  $y = 4x - 2$

Domain: 1, 2, 3, 4

7.  $y = 0.1x + 3$

Domain: 10, 20, 30, 40

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

Domain: 6, 7, 8, 9

LESSON  
1.7**Practice** *continued**For use with the lesson "Represent Functions as Rules and Tables"***Write a rule for the function.**

9.

|                               |   |    |    |    |
|-------------------------------|---|----|----|----|
| <b>Input, <math>x</math></b>  | 1 | 2  | 3  | 4  |
| <b>Output, <math>y</math></b> | 5 | 10 | 15 | 20 |

10.

|                               |    |    |    |    |
|-------------------------------|----|----|----|----|
| <b>Input, <math>x</math></b>  | 10 | 11 | 12 | 13 |
| <b>Output, <math>y</math></b> | 3  | 4  | 5  | 6  |

11. **Shoe Sizes** The table shows men's shoe sizes in the United States and Australia. Write a rule for the Australian size as a function of the United States' size.

|                        |   |   |   |   |   |    |
|------------------------|---|---|---|---|---|----|
| <b>U.S. size</b>       | 5 | 6 | 7 | 8 | 9 | 10 |
| <b>Australian size</b> | 3 | 4 | 5 | 6 | 7 | 8  |

12. **Balloon Bunches** You are making balloon bunches to attach to tables for a charity event. You plan on using 8 balloons in each bunch. Write a rule for the total number of balloons used as a function of the number of bunches created. Identify the independent and dependent variables. How many balloons will you use if you make 10 bunches?

13. **Baking** A baker has baked 10 loaves of bread so far today and plans on baking 3 loaves more each hour for the rest of his shift. Write a rule for the total number of loaves baked as a function of the number of hours left in the baker's shift. Identify the independent and dependent variables. How many loaves will the baker make if he has 4 hours left in his shift?

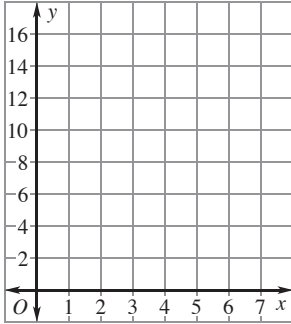


**LESSON 1.8 Practice**

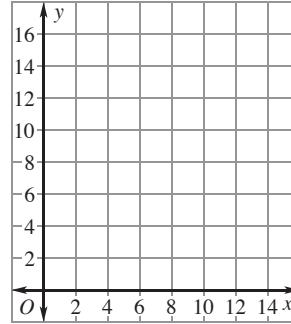
For use with the lesson "Represent Functions as Graphs"

**Graph the ordered pairs.**

1. (3, 4), (4, 7), (5, 10), (6, 13), (7, 16)



2. (2, 5), (6, 7), (4, 6), (12, 10), (10, 9)



**Complete the input-output table for the function.**

3.  $y = 3x + 2$

|          |   |   |   |   |
|----------|---|---|---|---|
| <b>x</b> | 0 | 1 | 2 | 3 |
| <b>y</b> |   |   |   |   |

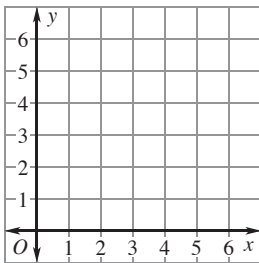
4.  $y = 4x - 1$

|          |   |   |   |   |
|----------|---|---|---|---|
| <b>x</b> | 1 | 2 | 3 | 4 |
| <b>y</b> |   |   |   |   |

**Graph the function.**

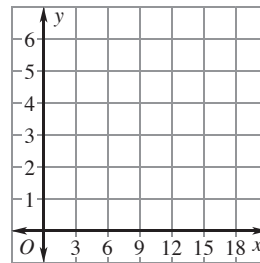
5.  $y = 6 - x$

Domain: 6, 5, 4, 3, 2



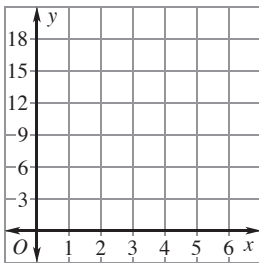
6.  $y = \frac{1}{3}x$

Domain: 6, 9, 12, 15, 18



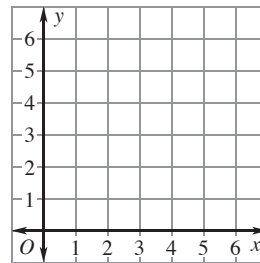
7.  $y = 4x - 3$

Domain: 1, 2, 3, 4, 5



8.  $y = 1.2x$

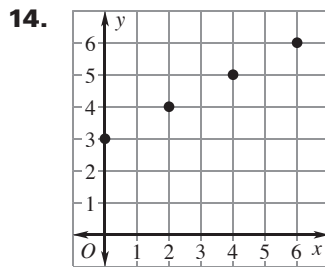
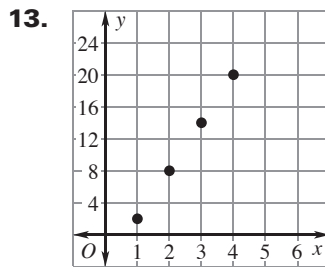
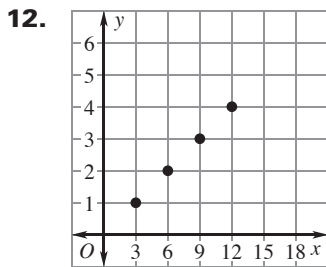
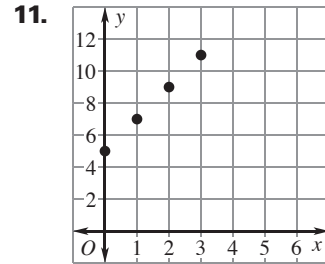
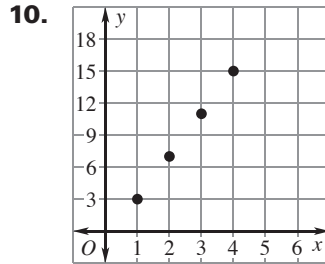
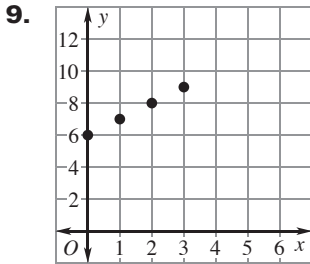
Domain: 1, 2, 3, 4, 5



**LESSON**  
**1.8**

**Practice** *continued*  
*For use with the lesson "Represent Functions as Graphs"*

**Write a rule for the function represented by the graph. Identify the domain and range of the function.**

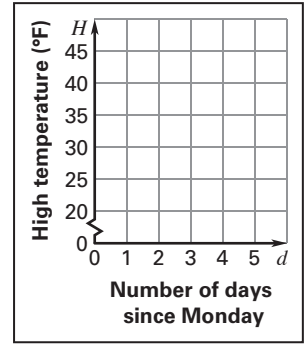


**LESSON**  
**1.8**

**Practice** *continued*  
For use with the lesson "Represent Functions as Graphs"

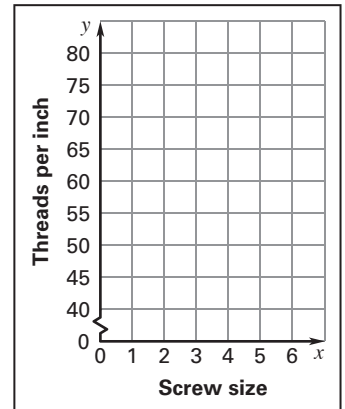
- 15. High Temperatures** The table shows the high temperature  $H$  (in degrees Fahrenheit) in a city during the week as a function of the number of days  $d$  since Monday. Graph the function. Describe how the high temperatures change as the week progresses.

|  |    |    |    |    |    |    |
|--|----|----|----|----|----|----|
| <b>Number of days since Monday, <math>d</math></b>           | 0  | 1  | 2  | 3  | 4  | 5  |
| <b>High temperature (degrees Fahrenheit), <math>H</math></b> | 24 | 34 | 41 | 39 | 37 | 39 |



- 16. Metal Screws** The table shows the number of threads per inch on a screw as a function of screw size.

|   |    |    |    |    |    |    |    |
|---|----|----|----|----|----|----|----|
| <b>Screw size number, <math>x</math></b>          | 0  | 1  | 2  | 3  | 4  | 5  | 6  |
| <b>Number of threads per inch, <math>y</math></b> | 80 | 72 | 64 | 56 | 48 | 44 | 40 |



- Graph the function.
- Describe how the number of threads per inch changes as the screw size increases.
- Would it be reasonable to expect a #8 screw to have 32 threads per inch? *Explain.*

**LESSON**  
**2.1****Practice***For use with the lesson "Find Square Roots and Compare Real Numbers"***Evaluate the expression.**

1.  $\pm\sqrt{81}$

2.  $\pm\sqrt{25}$

3.  $-\sqrt{400}$

4.  $\sqrt{625}$

5.  $\sqrt{4900}$

6.  $\pm\sqrt{169}$

**Approximate the square root to the nearest integer.**

7.  $-\sqrt{29}$

8.  $\sqrt{108}$

9.  $-\sqrt{53}$

10.  $\sqrt{138}$

11.  $-\sqrt{55}$

12.  $\sqrt{640}$

**Tell whether each number in the list is a real number, a rational number, an irrational number, an integer, or a whole number. Then order the numbers from least to greatest.**

13.  $-\sqrt{16}, 3.2, -\frac{3}{2}, \sqrt{9}$

14.  $\sqrt{5}, -6, 2.5, -\frac{24}{5}$

**LESSON**  
**2.1**
**Practice** *continued*
*For use with the lesson "Find Square Roots and Compare Real Numbers"*
**Evaluate the expression for the given value of  $x$ .**

**15.**  $14 + \sqrt{x}$  when  $x = 16$

**16.**  $\sqrt{x} - 5.5$  when  $x = 4$

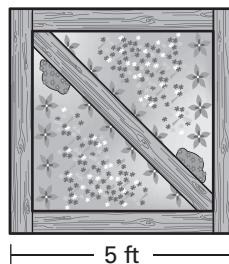
**17.**  $-9 \cdot \sqrt{x}$  when  $x = 25$

**18.**  $2\sqrt{x} - 1$  when  $x = 100$

**19. Park** A local park is in the shape of a square and covers an area of 3600 square feet. Find the side length of the park.

**20. Wall Poster** You are considering buying a square wall poster that has an area of 6.25 square feet. Find the side length of the wall poster.

**21. Road Sign** The U.S. Department of Transportation determines the sizes of the traffic control signs that you see along the roadways. The square Pennsylvania state route sign at the right has an area of 1296 square inches. Find the side length of the sign.

**22. Flower Bed** You are building the square flower bed shown using railroad ties. You want to place another railroad tie on the diagonal to form two triangular beds. Find the length of the diagonal by using the expression  $\sqrt{2s^2}$  where  $s$  is the side length of the flower bed. Round your answer to the nearest tenth.


Name \_\_\_\_\_

Date \_\_\_\_\_

**LESSON**  
**2.2****Practice***For use with the lesson "Solve One-Step Equations"***Solve the equation.**

1.  $x + 16 = 25$

2.  $n - 9 = 17$

3.  $-30 = w + 8$

4.  $y + 5 = -13$

5.  $a - 17 = -10$

6.  $41 = 52 + m$

7.  $c - 2.4 = 1.8$

8.  $z + 4.1 = 9.6$

9.  $-3.2 = 4.5 + p$

10.  $9x = 54$

11.  $-5b = 55$

12.  $-42 = 3m$

13.  $-52 = -4y$

14.  $\frac{1}{3}n = 36$

15.  $-\frac{3}{4}a = 12$

16.  $0.5y = 17$

17.  $-1.4a = 2.8$

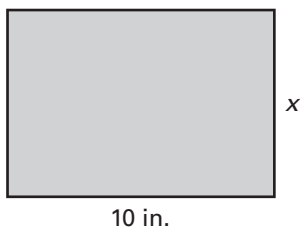
18.  $-6.5 = -1.3m$

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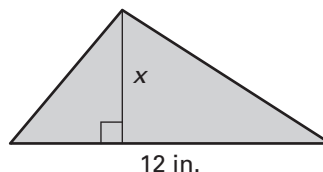
**LESSON**  
**2.2**
**Practice** *continued*  
 For use with the lesson "Solve One-Step Equations"

**The rectangle or triangle has area  $A$ . Write and solve an equation to find the value of  $x$ .**

19.  $A = 70 \text{ in.}^2$



20.  $A = 30 \text{ in.}^2$



21. **Caves** Cumberland Caverns in Tennessee is 44.4 kilometers long. This cave is 10.9 kilometers longer than Carlsbad Caverns in New Mexico. How long is Carlsbad Caverns?

22. **Bocce** Bocce is a lawn bowling game that originated in Italy. The bocce court below has an area of 1032 square feet. The width of the court is 12 feet. What is the length of the court?



23. **Speedskating** In the 2002 Winter Olympics, Cartriona LeMay Doan won the 500-meter race. Her winning time was 74.75 seconds. Find her average speed to the nearest tenth of a meter per second.

24. **Part-Time Job** You work at a grocery store part-time. You estimate that you spend  $\frac{3}{5}$  of your time stocking shelves. You work 20 hours each week. How many hours of your work week do you spend stocking shelves?

**LESSON**  
**2.3****Practice***For use with the lesson "Solve Two-Step Equations"***Solve the equation.**

1.  $3n + 14 = 35$

2.  $7y - 10 = 11$

3.  $14 = 9 - x$

4.  $9c - 5 = 13$

5.  $4.6 = 4m - 3.4$

6.  $1.2 = 2.4 - 3b$

7.  $\frac{p}{6} + 9 = 14$

8.  $\frac{w}{7} - 2 = 9$

9.  $\frac{z}{3} - 8 = -4$

**Write an equation for the function described. Then find the input.**

10. The output of a function is 5 more than 2 times the input. Find the input when the output is 17.
11. The output of a function is 10 more than 4 times the input. Find the input when the output is  $-26$ .
12. The output of a function is 14 less than 6 times the input. Find the input when the output is 22.



**LESSON**  
**2.3**
**Practice** *continued*  
*For use with the lesson "Solve Two-Step Equations"*
**Solve the equation.**

13.  $9a + 4a = 26$

14.  $14y - 6y = 48$

15.  $38 = 26x - 7x$

16.  $16x - 3x = -52$

17.  $-9 = 11m - 8m$

18.  $4.5z - 2.5z = 24$

**19. Yoga Class** A fitness center offers yoga classes for \$10 per class and sells yoga mats for \$19.95. A person paid a total of \$139.95 to the fitness center for yoga classes and a mat. Find the number of yoga classes the person took.

**20. Library Books** Your school has a \$1200 grant to buy books and magazine subscriptions for the school library. The average cost of a magazine subscription is \$30. Your school decides to spend \$870 on books and the remaining amount on magazine subscriptions. How many magazine subscriptions can the school buy?

**21. Walking** You have already walked 5 miles of an 18-mile trail. If you walk the rest of the trail at a pace of 1 mile in 17 minutes, how many hours will it take you to finish the trail? Use the following verbal model to answer the question. Round your answer to the nearest tenth.

|                          |   |                            |   |  |   |                                      |
|--------------------------|---|----------------------------|---|--|---|--------------------------------------|
| Walking rate<br>(mi/min) | • | Number of<br>minutes (min) | + | Number of miles<br>already walked (mi) | = | Total number of<br>miles walked (mi) |
|--------------------------|---|----------------------------|---|--|---|--------------------------------------|

**22. Swimming Pool** The capacity of a small children's swimming pool is 106 gallons of water. There are currently 15 gallons of water in the pool. You are filling the pool with water at a rate of 2 gallons per minute.

**a.** Write an equation that gives the amount  $y$  (in gallons) of water in the pool as a function of the number  $x$  of minutes from now.

**b.** After how many minutes will the pool be full?

**LESSON**  
**2.4****Practice***For use with the lesson "Solve Multi-Step Equations"***Solve the equation.**

1.  $16x - 15 - 9x = 13$

2.  $15m + 4 - 9m = -32$

3.  $3b - 9 - 8b = 11$

4.  $-31 = 8 - 6p - 7p$

5.  $9 + 4(x + 1) = 25$

6.  $7(d - 5) + 12 = 5$

7.  $10a + 5(a - 3) = 15$

8.  $19a - 3(a - 6) = 66$

9.  $\frac{1}{4}(x - 8) = 7$

10.  $\frac{1}{3}(d + 9) = -12$

11.  $\frac{3}{4}(n + 3) = 9$

12.  $-\frac{5}{2}(w - 1) = 15$

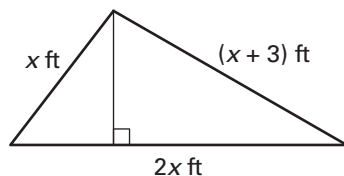
13.  $6.4 + 2.1(z - 2) = 8.5$

14.  $4.5 - 1.5(6m + 2) = 6$

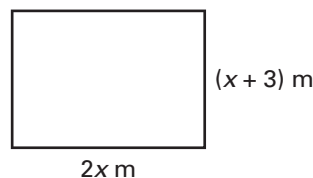
15.  $15 = 4.3n - 2.1(n - 4)$

**Find the value of  $x$  for the triangle or rectangle.**

16. Perimeter = 23 feet

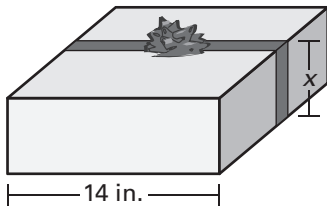


17. Perimeter = 24 meters



**LESSON**  
**2.4****Practice** *continued*  
For use with the lesson "Solve Multi-Step Equations"

- 18. Wrapping a Package** It takes 70 inches of ribbon to make a bow and wrap the ribbon around a box. The bow takes 32 inches of ribbon. The width of the box is 14 inches. What is the height of the box?



- 19. Vacation** You are driving to a vacation spot that is 1500 miles away. Including rest stops, it takes you 42 hours to get to the vacation spot. You estimate that you drove at an average speed of 50 miles per hour. How many hours were you *not* driving?
- 20. Moving** You helped a friend move a short distance recently. The friend rented a truck for \$15 an hour and rented a dolly for \$5. Your friend paid a total of \$80 for the rental. For how long did your friend rent the truck?
- 21. Painting** You and your friend are painting the walls in your apartment. You estimate that there is 1000 square feet of space to be painted. You paint at a rate of 4 square feet per minute and your friend paints at a rate of 3 square feet per minute. Your friend shows up to help you paint 45 minutes after you have already started painting.
- Write an equation that gives the total number of square feet  $y$  as a function of the number of minutes  $x$  it takes to paint all of the walls.
  - How long will it take you and your friend to finish painting? Round your answer to the nearest minute.

**LESSON**  
**2.5****Practice***For use with the lesson "Solve Equations with Variables on Both Sides"***Solve the equation and describe each step you use.**

1.  $5x + 11 = 4x + 18$

2.  $11p - 4 = 6p + 1$

3.  $-6 = 2(w + 5)$

**Solve the equation, if possible.**

4.  $15x - 8 = 14x + 13$

5.  $9n - 7 = 5n + 5$

6.  $4z - 15 = 4z + 11$

7.  $-7a + 9 = 3a + 49$

8.  $4(w + 3) = w - 15$

9.  $8(y - 5) = 6y - 18$

10.  $14m - 10 = 3(4 + m)$

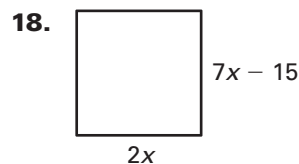
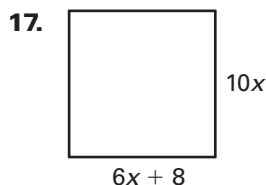
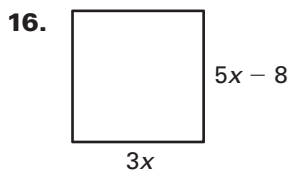
11.  $7 + x = \frac{1}{2}(4x - 2)$

12.  $8b + 11 - 3b = 2b + 2$

13.  $10d - 6 = 4d - 15 - 3d$

14.  $16p - 4 = 4(2p - 3)$

15.  $0.25(8z - 4) = z + 8 - 2z$

**LESSON**  
**2.5**
**Practice** *continued*
*For use with the lesson "Solve Equations with Variables on Both Sides"*
**Find the perimeter of the square.**


19. **Saving and Spending** Currently, you have \$80 and your sister has \$145. You decide to save \$6 of your allowance each week, while your sister decides to spend her whole allowance plus \$7 each week. How long will it be before you have as much money as your sister?
20. **Botanical Gardens** The membership fee for joining a gardening association is \$24 per year. A local botanical garden charges members of the gardening association \$3 for admission to the garden. Nonmembers of the association are charged \$6. After how many visits to the garden is the total cost for members, including the membership fee, the same as the total cost for nonmembers?
21. **College Enrollment** Information about students' choices of majors at a small college is shown in the table. In how many years will there be 2 times as many students majoring in engineering than in business? In how many years will there be 2 times as many students majoring in engineering than in biology?

| Major       | Number of students enrolled in major | Average rate of change     |
|-------------|--------------------------------------|----------------------------|
| Engineering | 120                                  | 22 more students each year |
| Business    | 105                                  | 4 fewer students each year |
| Biology     | 98                                   | 6 more students each year  |

**LESSON**  
**2.6****Practice***For use with the lesson "Write Ratios and Proportions"***Tell whether the ratio is in simplest form. If not, write it in simplest form.**

1. 16 to 34

2. 17:65

3.  $\frac{33}{108}$

**Solve the proportion.**

4.  $\frac{1}{2} = \frac{p}{14}$

5.  $\frac{2}{3} = \frac{x}{21}$

6.  $\frac{14}{8} = \frac{y}{20}$

7.  $\frac{y}{6} = \frac{15}{9}$

8.  $\frac{10}{15} = \frac{m}{39}$

9.  $\frac{b}{8} = \frac{50}{20}$

10.  $\frac{8}{2.5} = \frac{d}{0.5}$

11.  $\frac{1.4}{1.6} = \frac{z}{10}$

12.  $\frac{n}{4} = \frac{0.3}{1.5}$

**Write the sentence as a proportion. Then solve the proportion.**

13. 5 is to 12 as  $x$  is to 48.

14.  $w$  is to 9 as 7 is to 36.

15.  $d$  is to 4 as 32 is to 56.

16. 22 is to 50 as  $x$  is to 500.

17. 10 is to 45 as  $b$  is to 225.

18.  $n$  is to 18 as 64 is to 72.

**LESSON**  
**2.6****Practice** *continued*  
*For use with the lesson "Write Ratios and Proportions"*

- 19. Books** Over the summer, you read 20 books. Eight of these books were biographies.
- Find the ratio of biographies to the total number of books.
  - Find the ratio of non-biographies to biographies.
  - Find the ratio of non-biographies to the total number of books.

- 20. Fitness Center** The table shows the number of people attending classes at a fitness center during a recent evening.

| <b>Class</b>            | Aerobics | Spinning | Yoga |
|-------------------------|----------|----------|------|
| <b>Number of people</b> | 32       | 28       | 16   |

- Find the ratio of the number of people taking yoga to the number of people taking spinning class.
  - Find the ratio of the number of people taking aerobics to the total number of people taking classes.
- 21. Mailroom** You work in the local mailroom at a college. One of your duties is to sort local mail from all of the other mail. You can sort 8 pieces of mail in 10 seconds. How many pieces of mail should you be able to sort in 45 minutes?
- 22. Music** A music downloading website reports that nearly 5 out of every 7 songs downloaded are classified as pop music. According to this information, predict how many of the next 500 songs downloaded will be pop songs. Round your answer to the nearest whole number.

**LESSON**  
**2.7****Practice***For use with the lesson "Solve Proportions Using Cross Products"***Name the cross products of the proportion.**

1.  $\frac{n}{11} = \frac{40}{55}$

2.  $\frac{4}{9} = \frac{1}{x}$

3.  $\frac{1.8}{1.9} = \frac{b}{3.8}$

4.  $\frac{a+6}{21} = \frac{4}{7}$

5.  $\frac{5x}{x+1} = \frac{30}{9}$

6.  $\frac{2.2}{3.3} = \frac{a-2}{a-1}$

**Solve the proportion.**

7.  $\frac{3}{5} = \frac{21}{m}$

8.  $\frac{12}{7} = \frac{60}{d}$

9.  $\frac{24}{x} = \frac{48}{60}$

10.  $\frac{5}{7} = \frac{3w}{21}$

11.  $\frac{2w}{16} = \frac{30}{80}$

12.  $\frac{2z}{24} = \frac{6}{8}$

13.  $\frac{8}{9} = \frac{30+a}{45}$

14.  $\frac{9-y}{44} = \frac{5}{22}$

15.  $\frac{26}{15} = \frac{104}{70-w}$

16.  $\frac{35}{16} = \frac{c-8}{2}$

17.  $\frac{1}{9} = \frac{a}{a+24}$

18.  $\frac{2}{n} = \frac{14}{n+30}$



**LESSON**  
**2.7****Practice** *continued**For use with the lesson "Solve Proportions Using Cross Products"*

**A map has a scale of 1 in. : 38 ft. Use the given map distance to find the actual distance.**

19. 5.5 in.

20. 2.25 in.

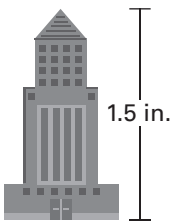
21. 1.75 in.

**22. Concrete** You are making up your own mix of concrete to patch a set of stairs. In order to have the proper mix, you need to mix 1 part of Portland cement with 2 parts of sand and 3 parts of gravel.

a. How many total parts are in one batch of concrete?

b. You make a mix with 4 parts of sand. How many total parts of cement, sand, and gravel are in your mix?

**23. Architectural Firm** An architectural firm makes a model of a science center they are building. The ratio of the model to the actual size is 1 in. : 85 ft. Estimate the height of the building if the model is 1.5 inches tall.



**24. Tall Buildings** You made a model of the Space Needle in Seattle, Washington, for a report on architecture in the United States. You used a scale of 1 in. : 50 ft. Your model is 12.1 inches tall. Estimate the actual height of the Space Needle.

**LESSON**  
**2.8****Practice***For use with the lesson "Rewrite Equations and Formulas"***Write the equation in function form.**

1.  $4x + y = -10$

2.  $6 - y = 17x$

3.  $y - 3x - 11 = 0$

4.  $2x + 2y = 8$

5.  $6x - 3y = 12$

6.  $16 - 8y = 4x$

7.  $5x - 7y = 14$

8.  $9y - 4x - 9 = 0$

9.  $15 + 3y = -24x$

10.  $4 + 6y = 12x - 2$

11.  $4 - 10y = 22 - 6x$

12.  $8x - 2y - 5 = 11$

**Solve the literal equation.**

13. Solve  $R = R_1 + R_2$  for  $R_2$ .

14. Solve  $I = Prt$  for  $r$ .

15. Solve  $C = \frac{Q}{V}$  for  $V$ .

16. Solve  $y = mx + b$  for  $m$ .

**Solve the formula for the indicated variable.**

17. Area of a trapezoid:  $A = \frac{h}{2}(b_1 + b_2)$ . Solve for  $h$ .

18. Area of a rhombus:  $A = \frac{1}{2}d_1d_2$ . Solve for  $d_1$ .

**LESSON**  
**2.8****Practice** *continued*  
*For use with the lesson "Rewrite Equations and Formulas"*

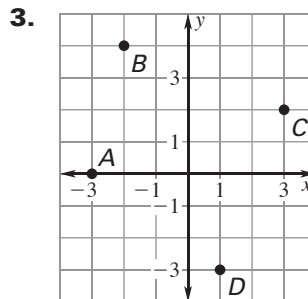
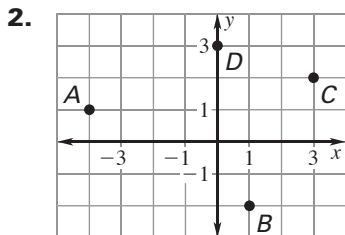
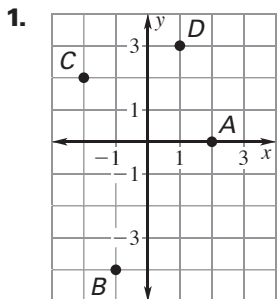
- 19. Guitar Practice** You practice playing your guitar every day. You spend 15 minutes practicing chords and the rest of the time practicing a new song. So the total number of minutes  $y$  you practice for the week is given by  $y = 7(15 + x)$ , where  $x$  is the number of minutes you spend on practicing a new song.
- Solve the equation for  $x$ .
  - How many minutes did you spend on a new song if you practiced 210 minutes last week? 245 minutes? 315 minutes?
- 20. Discounts** Solve for  $r$  in the formula  $S = L - rL$  where  $S$  is the sale price,  $L$  is the list price, and  $r$  is the discount rate.
- An item with a list price of \$128 goes on sale for \$51.20. Find the discount rate.
  - An item with a list price of \$56.80 goes on sale for \$36.92. Find the discount rate.
- 21. Cookbook** You bought a cookbook while on a recent trip overseas. All of the oven temperatures are in degrees Celsius and the only formula you can remember for temperature is how to convert Fahrenheit to Celsius:  $C = \frac{5}{9}(F - 32)$ .
- Solve the equation for  $F$ .
  - A recipe tells you to bake a pie in the oven at  $149^{\circ}\text{C}$ . What is this temperature in degrees Fahrenheit? Round your answer to the nearest whole degree.

**LESSON**  
**3.1**

**Practice**

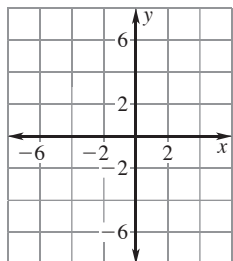
For use with the lesson "Plot Points in a Coordinate Plane"

Give the coordinates of the points labeled **A**, **B**, **C**, and **D**.

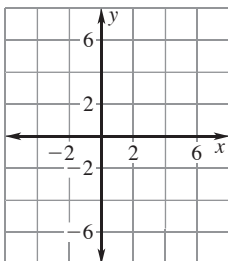


Plot the point in a coordinate plane. *Describe* the location of the point.

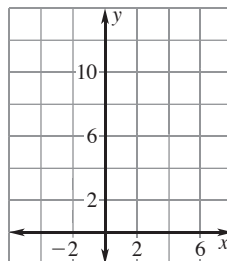
4.  $A(-4, 3)$



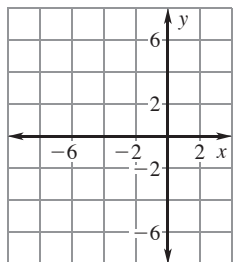
5.  $P(5, -6)$



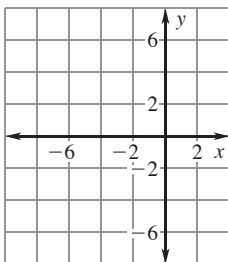
6.  $Q(0, 7)$



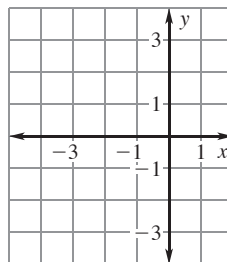
7.  $B(-7, -5)$



8.  $W(-5, 0)$



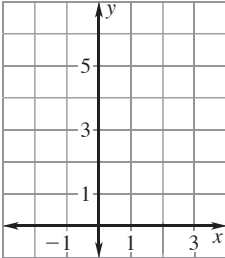
9.  $V(-3, -3)$



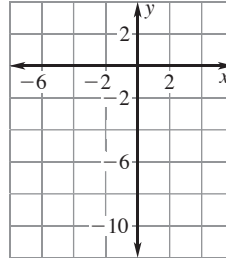
**LESSON**  
**3.1**
**Practice** *continued*  
 For use with the lesson "Plot Points in a Coordinate Plane"

**Graph the function with the given domain. Then identify the range of the function.**

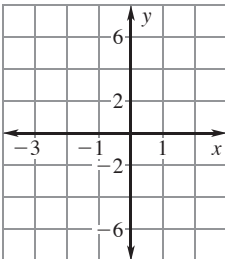
**10.**  $y = x + 4$ ; domain:  $-2, -1, 0, 1, 2$



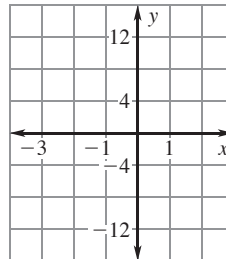
**11.**  $y = 2x - 5$ ; domain:  $-2, -1, 0, 1, 2$



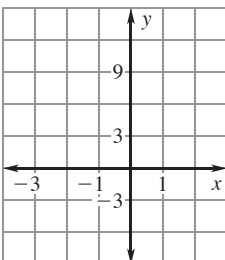
**12.**  $y = 3x - 1$ ; domain:  $-2, -1, 0, 1, 2$



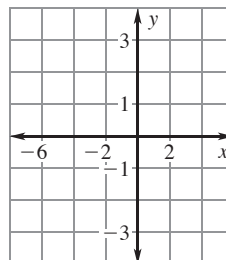
**13.**  $y = 6x - 2$ ; domain:  $-2, -1, 0, 1, 2$



**14.**  $y = 4x + 3$ ; domain:  $-2, -1, 0, 1, 2$



**15.**  $y = \frac{1}{2}x + 1$ ; domain:  $-4, -2, 0, 2, 4$



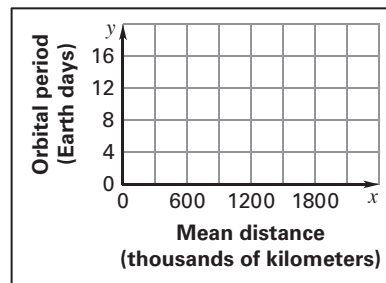
**LESSON 3.1 Practice** *continued*  
 For use with the lesson "Plot Points in a Coordinate Plane"

Without plotting the point, tell whether it is in Quadrant I, Quadrant II, Quadrant III, or Quadrant IV. Explain your reasoning.

16.  $(-4, -2)$                       17.  $(9, -2)$                       18.  $(-1, 8)$

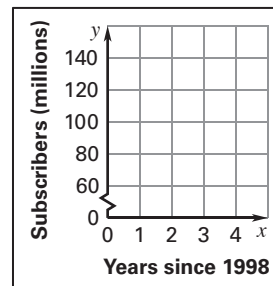
19. **Jupiter's Moons** The table shows some of the moons of Jupiter, their mean distances from Jupiter (in thousand kilometers), and their orbital periods (in Earth days). Graph the data from the table. Does the graph represent a function? Why or why not?

| Moon                                | Io  | Thebe | Ganymede | Callisto | Europa |
|-------------------------------------|-----|-------|----------|----------|--------|
| Mean distance (thousand kilometers) | 422 | 222   | 1070     | 1883     | 671    |
| Orbital period (Earth days)         | 1.8 | 0.7   | 7.2      | 16.7     | 3.6    |



20. **Cell Phone Use** The table shows the number of cellular telephone subscribers in the United States since 1998.

| Years since 1998       | 0  | 1  | 2   | 3   | 4   |
|------------------------|----|----|-----|-----|-----|
| Subscribers (millions) | 69 | 86 | 109 | 128 | 141 |



- a. Graph the data from the table. Does the graph represent a function? Why or why not?
- b. Describe any trend in the change in the number of subscribers.

**LESSON**  
**3.2****Practice***For use with the lesson "Graph Linear Equations"***Decide which of the two points lies on the graph of the line.**

1.  $2x + y = 10$

a. (4, 3)    b. (-4, 18)

2.  $x - 3y = 12$

a. (9, 1)    b. (6, -2)

3.  $2y - x = 9$

a. (5, 1)    b. (1, 5)

**Solve the equation for y.**

4.  $-6x + y = 11$

5.  $8x + 2y = 10$

6.  $6x - 3y = -9$

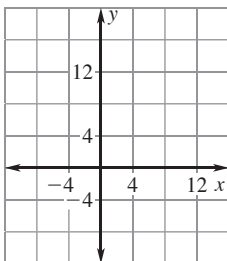
7.  $-4x + 2y = 16$

8.  $10x - 5y = 25$

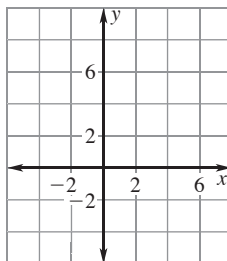
9.  $3x + 2y = -8$

**Graph the equation.**

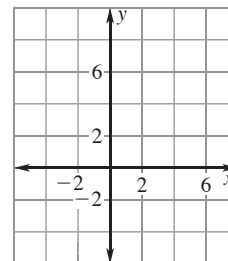
10.  $y + x = 14$



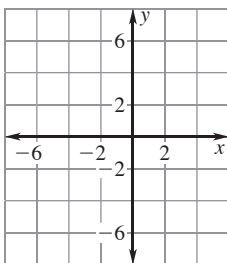
11.  $y - 5x = 2$



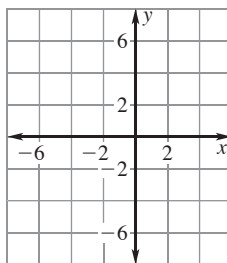
12.  $2y - 4x = 10$



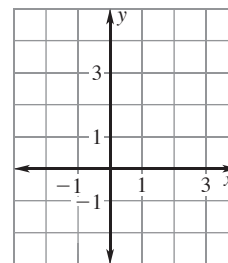
13.  $x = -6$



14.  $y = 4$



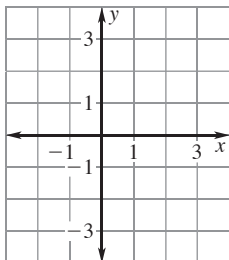
15.  $3x - 2y = 0$



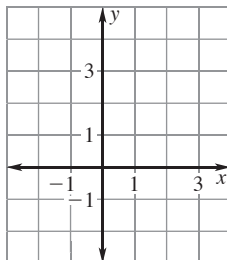
**LESSON**  
**3.2**
**Practice** *continued*  
 For use with the lesson "Graph Linear Equations"

**Graph the function with the given domain. Then identify the range of the function.**

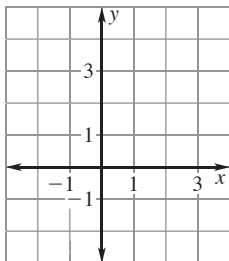
16.  $y = 2x - 2$ ; domain:  $x \geq 0$



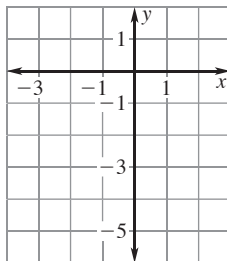
17.  $y = -3x + 1$ ; domain:  $x \leq 0$



18.  $y = 3$ ; domain:  $x \leq 2$



19.  $y = -1$ ; domain:  $x \geq -1$

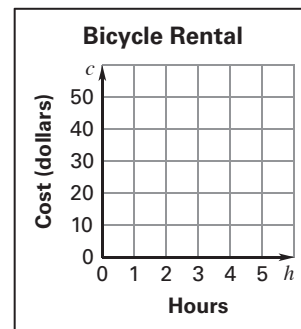


**Identify the range of the function with the given domain.**

20.  $x + 3y = -8$ ; domain  $x > 0$

21.  $6x - 3y = 9$ ; domain:  $x < 1$

22. **Bicycle Rental** A bicycle rental shop rents bicycles for \$8 per hour. The total cost  $c$  (in dollars) for renting a bicycle  $h$  hours is given by the function  $c = 8h$ . Once you get to the rental shop, you figure you can rent a bicycle for at most 5 hours. Graph the function and identify its domain and range. What is the most that you will pay for renting the bicycle?



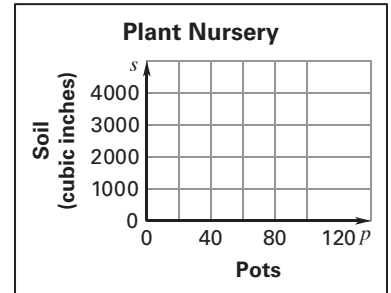


**LESSON**  
**3.2**

**Practice** *continued*  
For use with the lesson "Graph Linear Equations"

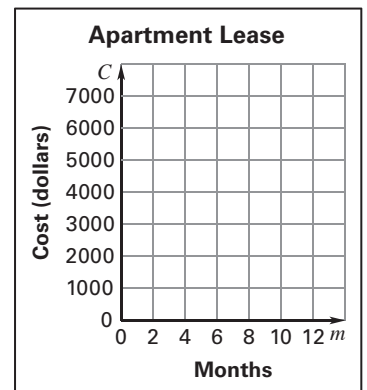
**23. Plant Nursery** A gardener at a nursery is filling pots with soil to prepare to transplant seedlings into these larger pots. Each new pot needs about 27 cubic inches of soil. The amount of soil  $s$  (in cubic inches) it takes to fill  $p$  pots is given by the function  $s = 27p$ .

- a. The gardener is filling the pots from a bag of soil that contains 3456 cubic inches of soil. Graph the function and identify its domain and range. How many pots can be filled from the bag?



- b. Suppose the gardener needs to fill 100 pots. Graph the function on the same coordinate plane in part (a) and identify its domain and range. How much soil (in cubic inches) will the gardener need?

**24. Apartment Lease** Whenever you sign a lease for an apartment, you typically have to pay a security deposit in case you have caused any wear or tear on the apartment that has to be repaired before it can be re-leased. If no repairs need to be made, you get your entire deposit back. One apartment building has apartments that rent for \$500 a month and a security deposit of \$700. The total cost  $C$  (in dollars) it costs to rent the apartment for  $m$  months is given by the function  $C = 500m + 700$ . Graph the function and identify its domain and range. Identify the domain and range if a renter only leases an apartment for one year and then moves out and doesn't get the security deposit back. How does this change the appearance of the graph? *Explain.*



**LESSON**  
**3.3****Practice***For use with the lesson "Graph Linear Equations"***Find the  $x$ -intercept and the  $y$ -intercept of the graph of the equation.**

1.  $x + y = 1$

2.  $x - y = -5$

3.  $6x - 3y = -3$

4.  $5x + 10y = 30$

5.  $9y - 5x = 20$

6.  $8x - 2y = 16$

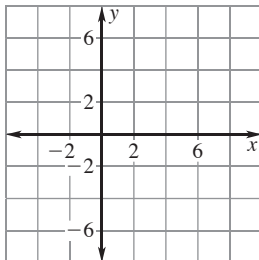
7.  $7x + 8y = 18$

8.  $2y - 12x = -6$

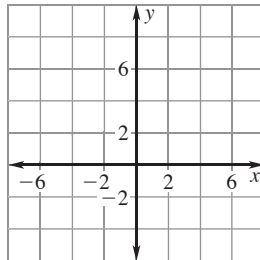
9.  $2x - 0.5y = 8$

**Draw the line that has the given intercepts.**

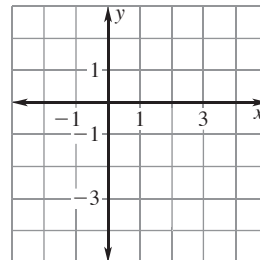
- 10.
- $x$
- intercept: 5
- 
- $y$
- intercept: 4



- 11.
- $x$
- intercept:
- $-1$
- 
- $y$
- intercept: 6



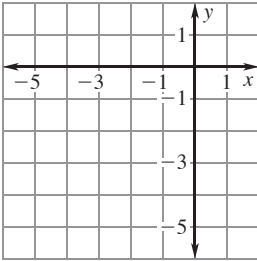
- 12.
- $x$
- intercept: 2
- 
- $y$
- intercept:
- $-3$



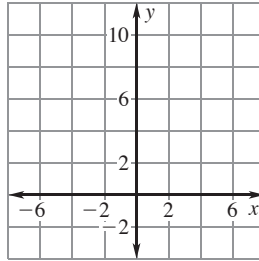
**LESSON**  
**3.3**
**Practice** *continued*  
 For use with the lesson "Graph Linear Equations"

**Graph the equation. Label the points where the line crosses the axes.**

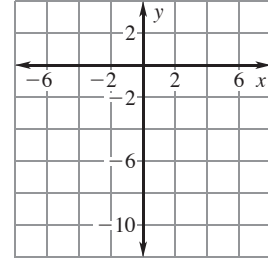
**13.**  $y = -x - 4$



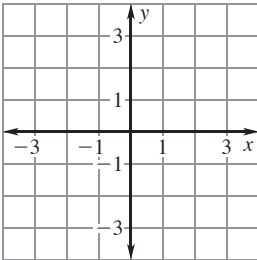
**14.**  $y = 6 + 3x$



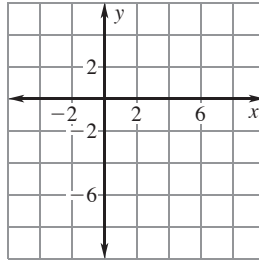
**15.**  $y = 8x - 7$



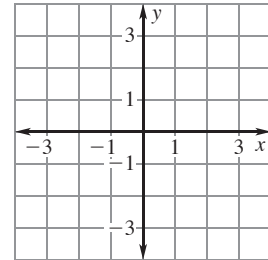
**16.**  $y = 1 - 3x$



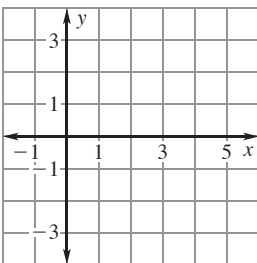
**17.**  $7x - 7y = 42$



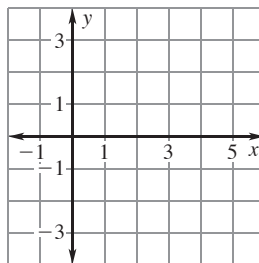
**18.**  $3y + 2x = -5$



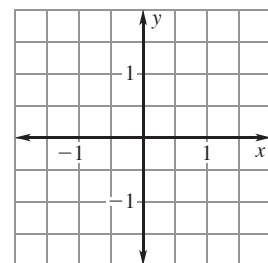
**19.**  $4x - 9y = 16$



**20.**  $y = 0.5x - 2$



**21.**  $y = 3x + 0.2$



**Match the equation with its intercepts.**

**22.**  $7y = 28 - 4x$

- A.**  $x$ -intercept: 4  
 $y$ -intercept:  $-7$

**23.**  $7x = 4y + 28$

- B.**  $x$ -intercept:  $-4$   
 $y$ -intercept: 7

**24.**  $4y = 7x + 28$

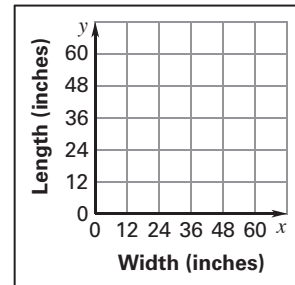
- C.**  $x$ -intercept: 7  
 $y$ -intercept: 4

**LESSON**  
**3.3**

**Practice** *continued*  
For use with the lesson "Graph Linear Equations"

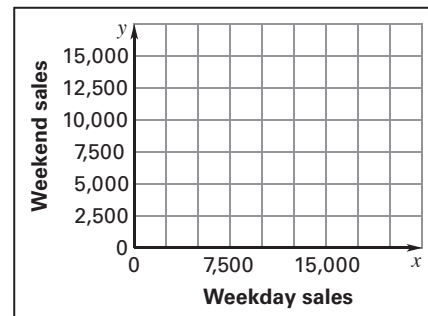
**25. Rabbit Hutch** The bottom of a rabbit cage is a rectangle with a perimeter of 118 inches. Let  $x$  be the cage's width (in inches) and let  $y$  be its length (in inches).

- a. Write an equation for the perimeter.
- b. Find the intercepts of the graph of the equation you wrote. Then graph the equation.



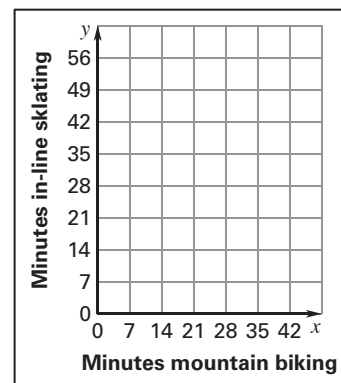
**26. Home and Garden Show** Admission to a home and garden show costs \$7 per person during the week and \$9 per person on the weekend. During one week of the show, a total of \$142,506 was paid in admissions. This situation can be represented by the equation  $7x + 9y = 142,506$  where  $x$  is the number of tickets sold during the week and  $y$  is the number of tickets sold on the weekend.

- a. Find the intercepts of the graph of the equation. Graph the equation.
- b. Give three possibilities for the number of each kind of ticket that could have been sold for the week.



**27. Burning Calories** A man burns 10 calories per minute mountain biking and 7.5 calories per minute in-line skating. His goal is to burn approximately 420 calories daily. This situation can be represented by the equation  $10x + 7.5y = 420$  where  $x$  is the number of minutes spent mountain biking and  $y$  is the number of minutes spent in-line skating.

- a. Find the intercepts of the graph of the equation. Graph the equation.
- b. What do the intercepts mean in this situation?
- c. What are three possible numbers of minutes of biking and skating the man could do to reach his goal



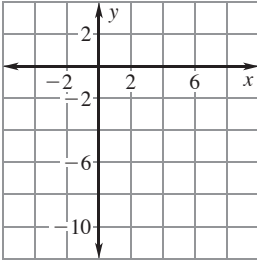
**LESSON**  
**3.4**

# Practice

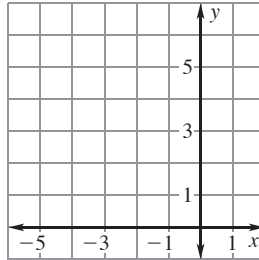
For use with the lesson "Find Slope and Rate of Change"

**Plot the points and draw a line through them. Without calculating, tell whether the slope of the line is *positive, negative, zero, or undefined*.**

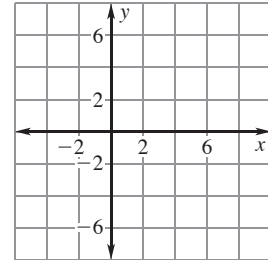
1.  $(1, -4)$  and  $(5, -8)$



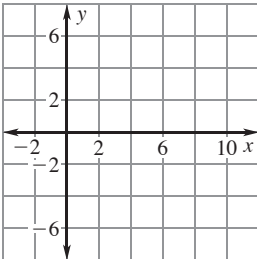
2.  $(-3, 6)$  and  $(-3, 0)$



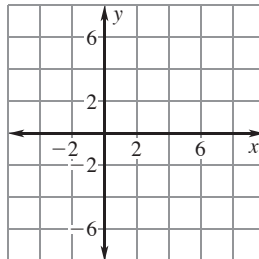
3.  $(-3, 3)$  and  $(7, -1)$



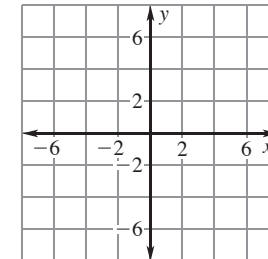
4.  $(0, -2)$  and  $(9, -5)$



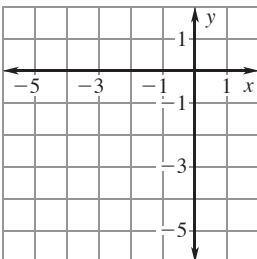
5.  $(7, 1)$  and  $(-2, 1)$



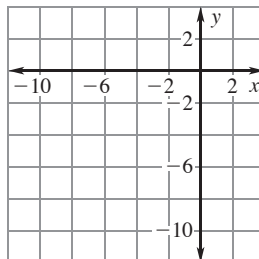
6.  $(-3, -1)$  and  $(6, -2)$



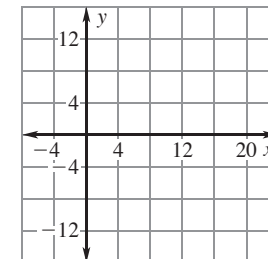
7.  $(-4, -5)$  and  $(-3, -2)$

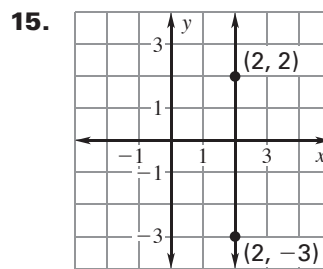
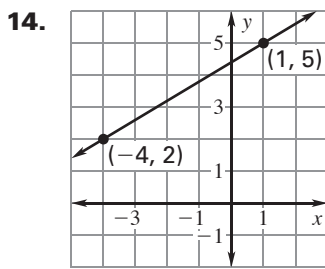
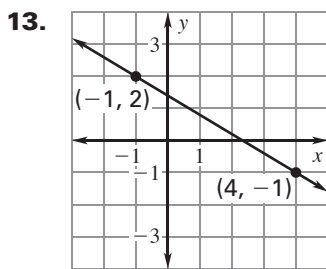
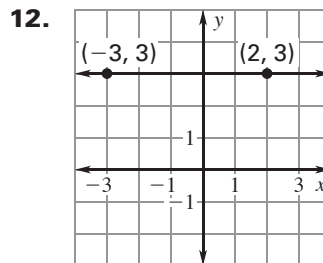
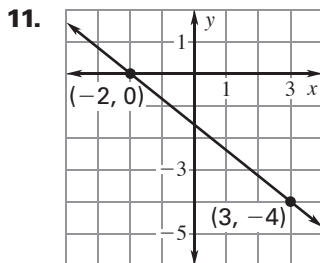
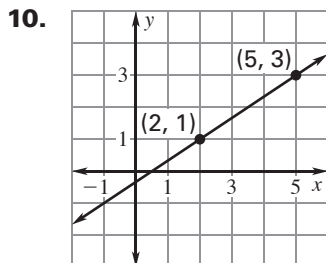


8.  $(-7, 1)$  and  $(-7, -8)$



9.  $(2, -10)$  and  $(12, 10)$



**LESSON**  
**3.4****Practice** *continued*  
*For use with the lesson "Find Slope and Rate of Change"***Find the slope of the line that passes through the points.****Find the slope of the line that passes through the points.**

16.  $(1, 2)$  and  $(7, 7)$

17.  $(3, 4)$  and  $(-5, 0)$

18.  $(5, -2)$  and  $(5, 8)$

19.  $(3, 1)$  and  $(-5, 3)$

20.  $(-7, 1)$  and  $(1, 5)$

21.  $(2, -5)$  and  $(5, -2)$

22.  $(3, 0)$  and  $(8, 0)$

23.  $(-6, -6)$  and  $(-2, -2)$

24.  $(-5, -4)$  and  $(1, -2)$

**LESSON**  
**3.4**
**Practice** *continued*  
 For use with the lesson "Find Slope and Rate of Change"

**Find the value of  $x$  or  $y$  so that the line passing through the two points has the given slope.**

25.  $(-3, y), (-9, -2); m = 1$     26.  $(-1, 4), (x, 3); m = \frac{1}{5}$     27.  $(8, 1), (1, y); m = -1$

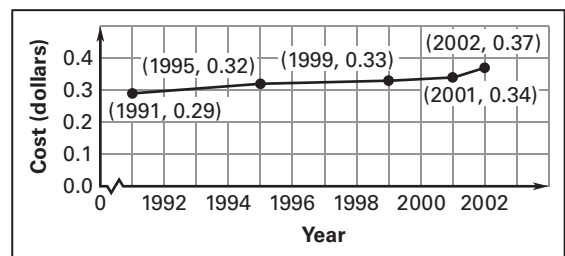
28.  $(x, -7), (1, 2); m = 3$     29.  $(9, y), (3, 2); m = \frac{2}{3}$     30.  $(7, 5), (x, 2); m = \frac{3}{4}$

31. **Trolley Bus** The table shows the number of trolley buses in operation in the United States during certain years.

| Year            | 1980 | 1985 | 1990 | 1995 | 2000 |
|-----------------|------|------|------|------|------|
| Number of buses | 823  | 676  | 832  | 885  | 951  |

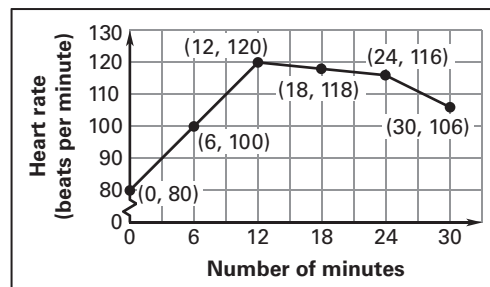
- a. Describe the rates of change in the number of buses during the time period.
- b. Determine the time intervals during which the number of trolley buses showed the greatest and least rates of change.

32. **Postage Rate** The graph shows the cost (in dollars) to mail a letter that weighs one ounce during certain years.



- a. Determine the time interval during which the cost to mail a one-ounce letter showed the greatest rate of change.
- b. Determine the time interval during which the cost to mail a one-ounce letter showed the least rate of change.

33. **Heart Rate** The graph shows the heart rate of a person during 30 minutes of exercise. Give a verbal description of the workout.



**LESSON**  
**3.5****Practice**

For use with the lesson "Graph Using Slope-Intercept Form"

**Identify the slope and y-intercept of the line with the given equation.**

1.  $y = 5x - 4$

2.  $y = 10 - 4x$

3.  $9x + y = 8$

4.  $12x + 3y = 9$

5.  $6x - 2y = 2$

6.  $2x + 5y = 10$

7.  $9x - 3y = -1$

8.  $4y + 6x = 2$

9.  $8y - 2x = 5$

10.  $5x + 5y = 3$

11.  $-4y = 16$

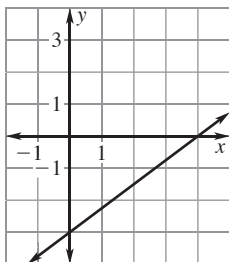
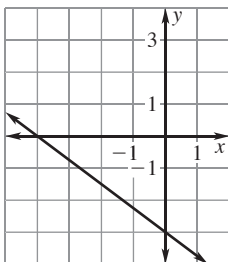
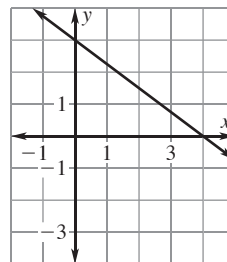
12.  $6x = 12$

**Match the equation with its graph.**

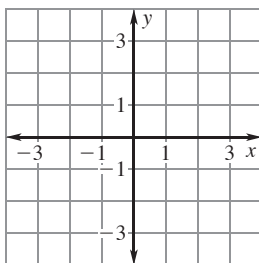
13.  $3x + 4y = 12$

14.  $3x + 4y = -12$

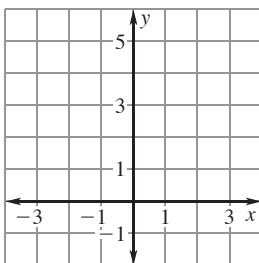
15.  $3x - 4y = 12$

**A.****B.****C.****Graph the equation.**

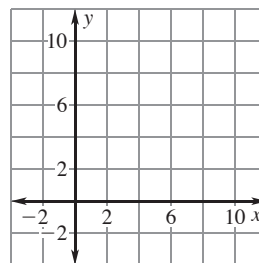
16.  $y = -7x + 2$



17.  $y = 5x + 4$



18.  $y = -x + 9$

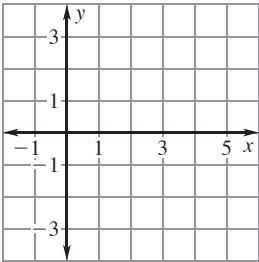




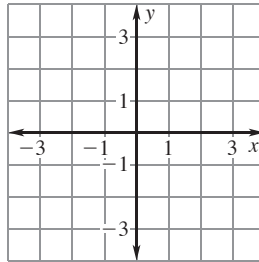
**LESSON**  
**3.5**

**Practice** *continued*  
For use with the lesson "Graph Using Slope-Intercept Form"

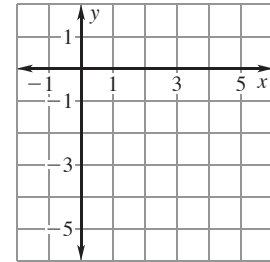
19.  $y = \frac{1}{5}x$



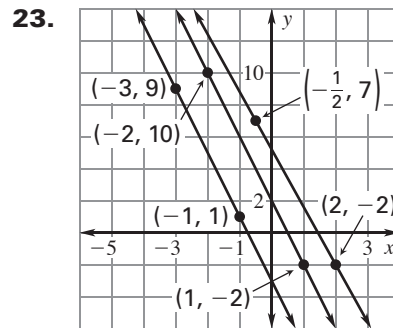
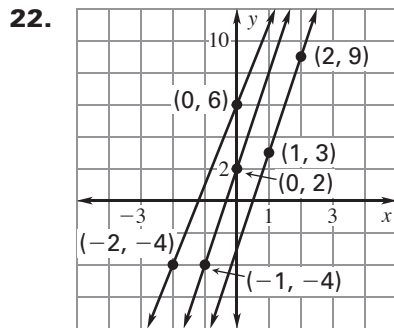
20.  $y = -\frac{2}{3}x + 1$



21.  $y = \frac{4}{3}x - 5$



**Determine which lines are parallel.**



**Tell whether the graphs of the two equations are parallel lines.**

24.  $y = 8x - 3, 8x + y = 3$

25.  $2x + y = 5, -6 + 2x = y$

26.  $2x + y = 5, y = 0.5x - 3$

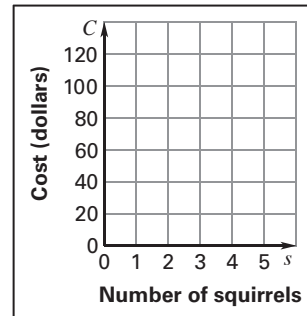
27.  $y = -0.6x + 2, 5y + 3x = 8$

28.  $8x + 3y = 9, 3y - 4 = 8x$

29.  $10x + 2y = 7, 5x - y = 6$

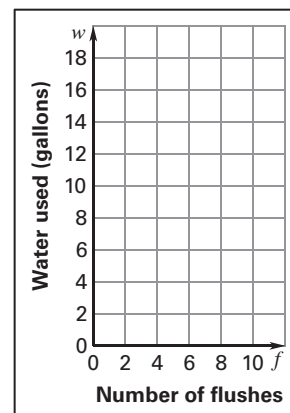
**LESSON**  
**3.5**
**Practice** *continued*  
 For use with the lesson "Graph Using Slope-Intercept Form"

- 30. Squirrels** A family of squirrels takes up residence in the roof of your house. You call a company to get rid of the squirrels. The company traps the squirrels and then releases them in a wooded area. The company charges \$30 to drop off the traps and then charges \$15 for each squirrel it traps. The total cost  $C$  (in dollars) is given by the equation  $C = 30 + 15s$  where  $s$  is the number of squirrels that are taken away.



- Graph the equation.
- Suppose the company raises its fee to \$18 to take away each squirrel so that the total cost for  $s$  squirrels is given by the equation  $C = 30 + 18s$ . Graph the equation in the same coordinate plane as the equation in part (a).
- How much more does it cost for the company to trap 4 squirrels after the fee is raised?

- 31. Water Usage** A new toilet model has two different flush settings in order to conserve water. One setting uses 1.6 gallons of water per flush and the other setting uses 0.8 gallon of water per flush. The total amount  $w$  (in gallons) of water used in the first setting is given by the equation  $w = 1.6f$  where  $f$  is the number of times the toilet is flushed. The total amount of water used in the second setting is given by the equation  $w = 0.8f$ .



- Graph both equations in the same coordinate plane. What do the slopes and the  $w$ -intercepts mean in this situation?
- How much more water is used by the first setting if the toilet is flushed 10 times?

**LESSON 3.6 Practice**  
 For use with the lesson "Model Direct Variation"

**Tell whether the equation represents direct variation. If so, identify the constant of variation.**

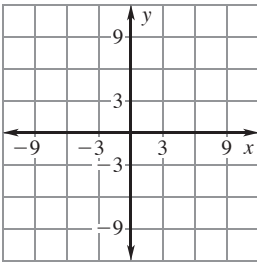
1.  $y = 8x$

2.  $y = 2x + 1$

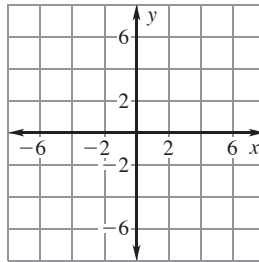
3.  $3x + y = 6$

**Graph the direct variation equation.**

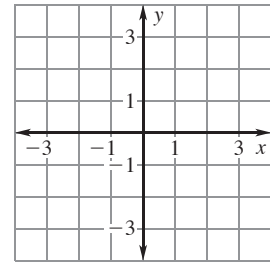
4.  $y = 9x$



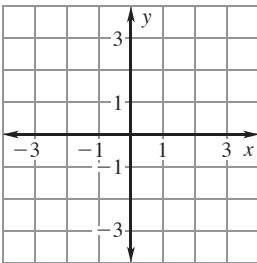
5.  $y = -7x$



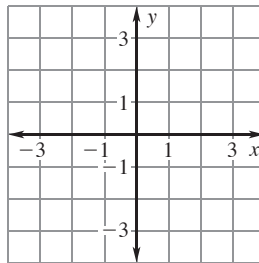
6.  $3y = 4x$



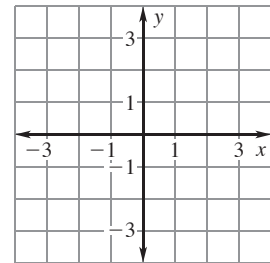
7.  $4y = -12x$



8.  $8y = x$

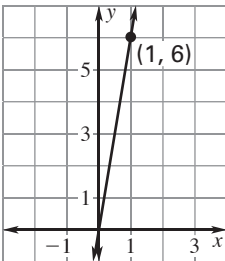


9.  $8y = 6x$

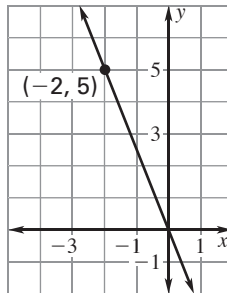


**The graph of a direct variation equation is shown. Write the direct variation equation. Then find the value of  $y$  when  $x = 10$ .**

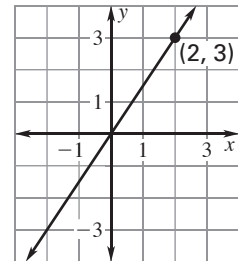
10.



11.

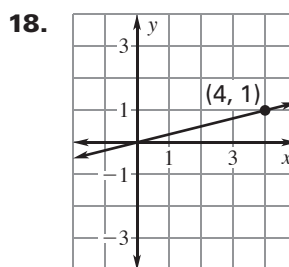
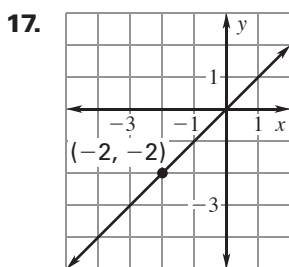
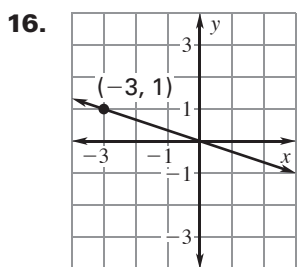
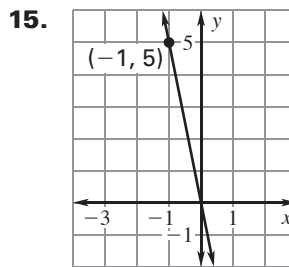
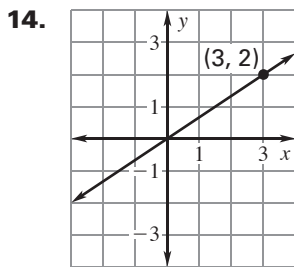
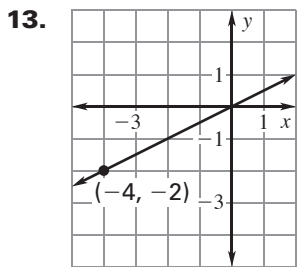


12.



**LESSON**  
**3.6**

**Practice** *continued*  
For use with the lesson "Model Direct Variation"



**Tell whether the table represents direct variation. If so, write the direct variation equation.**

19. 

|          |     |    |     |    |      |
|----------|-----|----|-----|----|------|
| <b>x</b> | 0.5 | 3  | -2  | 1  | -8   |
| <b>y</b> | 9   | 54 | -36 | 18 | -144 |

20. 

|          |    |     |      |    |    |
|----------|----|-----|------|----|----|
| <b>x</b> | -5 | 3   | -2   | 10 | 20 |
| <b>y</b> | -2 | 1.2 | -0.8 | 4  | 8  |

21. 

|          |   |    |    |      |    |
|----------|---|----|----|------|----|
| <b>x</b> | 8 | 2  | -4 | -0.5 | 14 |
| <b>y</b> | 7 | 28 | 7  | -112 | 4  |

22. 

|          |      |    |    |      |    |
|----------|------|----|----|------|----|
| <b>x</b> | -0.2 | -2 | 1  | 12   | 18 |
| <b>y</b> | 30   | 3  | -6 | -0.5 | 3  |

**Given that  $y$  varies directly with  $x$ , use the specified values to write a direct variation equation that relates  $x$  and  $y$ .**

23.  $x = 24, y = 3$

24.  $x = -16, y = -4$

25.  $x = 28, y = -4$

**LESSON**  
**3.6**
**Practice** *continued*  
 For use with the lesson "Model Direct Variation"

26.  $x = 5, y = -30$

27.  $x = \frac{1}{6}, y = 1$

28.  $x = 8, y = -3$

29.  $x = 6, y = 102$

30.  $x = -8, y = 64$

31.  $x = 15, y = 9$

**32. Hooke's Law** The force  $F$  required to stretch a spring varies directly with the amount the spring is stretched  $s$ . Eight pounds is needed to stretch a spring 8 inches.

- Write a direct variation equation that relates  $F$  and  $s$ .
- How much force is required to stretch a spring 25 inches?

**33. Basement Waterproofing** One way to keep moisture out of your basement is to paint the walls with a waterproof paint. The number  $g$  (of gallons) of paint you need varies directly with the area  $A$  of the basement. One gallon of paint covers 100 square feet.

- Write a direct variation equation that relates  $g$  and  $A$ .
- How many gallons do you need to cover 530 square feet?
- How many square feet does 8.5 gallons of paint cover?

**34. Downloading Files** The table shows the amount of time  $t$  (in seconds) it takes to download a file of size  $s$  (in kilobytes).

- Explain why  $s$  varies directly with  $t$ .
- Write a direct variation equation that relates  $s$  and  $t$ .

| Time, $t$ (sec) | File size, $s$ (kb) |
|-----------------|---------------------|
| 15              | 420                 |
| 30              | 840                 |
| 45              | 1260                |

- How long will it take to download an 800-kilobyte file?  
Round your answer to the nearest second.

**LESSON**  
**3.7****Practice***For use with the lesson "Graph Linear Functions"***Evaluate the function when  $x = -3, 0,$  and  $2$ .**

1.  $f(x) = 15x + 4$

2.  $g(x) = -9x + 1$

3.  $p(x) = -7x - 5$

4.  $h(x) = 3.25x$

5.  $m(x) = -4.4x$

6.  $f(x) = 6.1x - 3.3$

7.  $s(x) = \frac{4}{5}x - 2$

8.  $d(x) = -\frac{5}{3}x + 4$

9.  $h(x) = \frac{3}{8}x - 6$

10.  $f(x) = -2.5x + 7$

11.  $h(x) = 4.2x - 3$

12.  $g(x) = 6.1x - 2.2$

**Find the value of  $x$  so that the function has the given value.**

13.  $f(x) = 4x - 2; 18$

14.  $n(x) = 7x + 4; 39$

15.  $q(x) = 6 - 5x; 21$

16.  $g(x) = -3x + 8; 14$

17.  $h(x) = 9x - 13; 23$

18.  $m(x) = 12x - 30; 30$

19.  $s(x) = -4x - 9; 3$

20.  $m(x) = 8.5x - 3; 82$

21.  $p(x) = -2.4x + 6; 18$

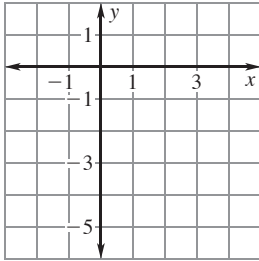
22.  $d(x) = 3.3x - 1.1; 31.9$

**LESSON**  
**3.7**

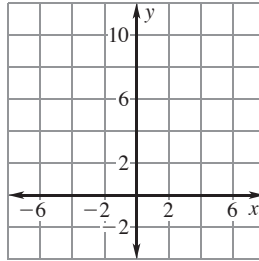
**Practice** *continued*  
For use with the lesson "Graph Linear Functions"

**Graph the function. Compare your graph to the graph of  $f(x) = x$ .**

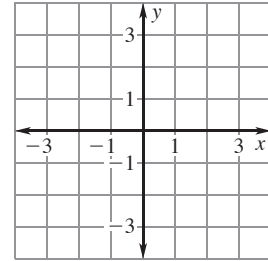
**23.**  $h(x) = x - 4$



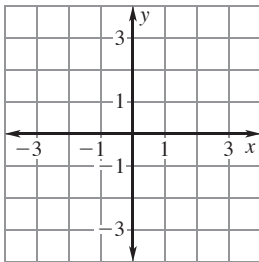
**24.**  $g(x) = x + 7$



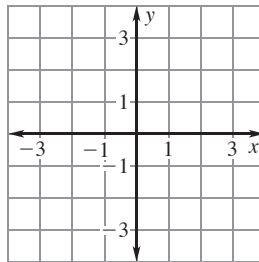
**25.**  $m(x) = 5x$



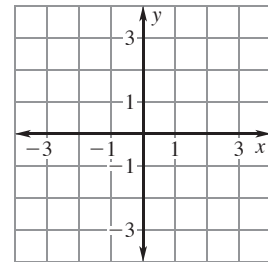
**26.**  $m(x) = 8x$



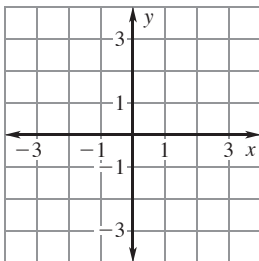
**27.**  $p(x) = \frac{1}{3}x$



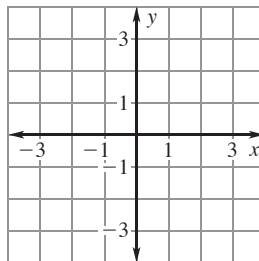
**28.**  $n(x) = -2x$



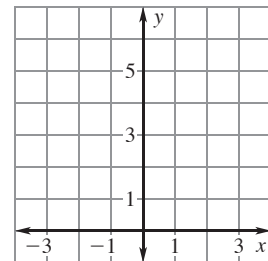
**29.**  $p(x) = -\frac{1}{4}x$



**30.**  $d(x) = x - 1.5$



**31.**  $g(x) = x + 4.5$



LESSON  
3.7**Practice** *continued*  
For use with the lesson "Graph Linear Functions"**Match the function with the description of its graph in relation to the graph of  $f(x) = x$ .**

32.  $g(x) = 4x$

- A. graph of
- $f$
- shifted
- 
- up 4 units

33.  $g(x) = x + 4$

- B. graph of
- $f$
- shifted
- 
- down 4 units

34.  $g(x) = x - 4$

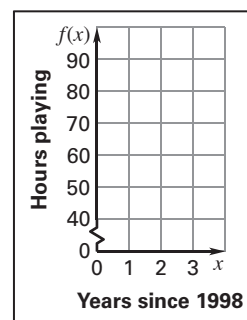
- C. graph of
- $f$
- dilated
- 
- by factor of 4

35. **Video Games** The number of hours people in the United States spent playing video games each year from 1998 to 2001 can be modeled by the function  $f(x) = 11.9x + 46.4$  where  $x$  is the number of years since 1998.

- a. Graph the function and identify its domain and range.

- b. Find the value of
- $f(x)$
- when
- $x = 2$
- .
- Explain*
- what the solution means in this situation.

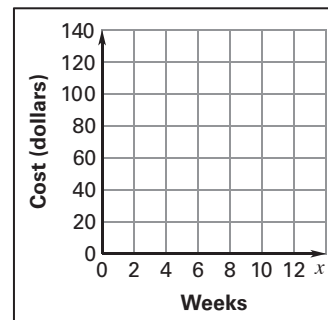
- c. Find the value of
- $x$
- so that
- $f(x) = 60$
- .
- Explain*
- what the solution means in this situation.



36. **Pool Membership** A pool membership during the summer costs \$7 per week. The total cost of a membership is given by  $f(x) = 7x$ . The pool also rents out lockers for \$2 per week. The total cost of a membership and a rental is given by  $g(x) = 9x$ .

- a. Graph both functions. How is the graph of
- $f$
- related to the graph of
- $g$
- ?

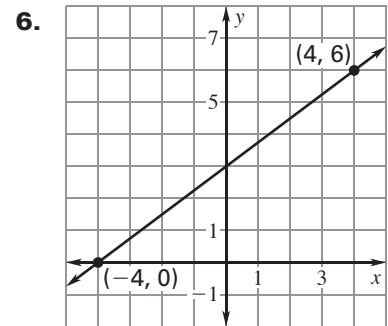
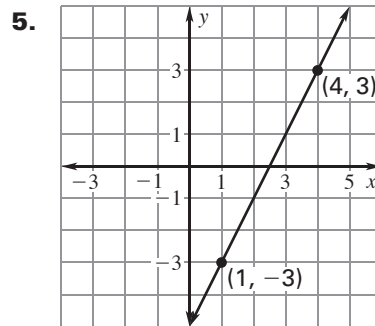
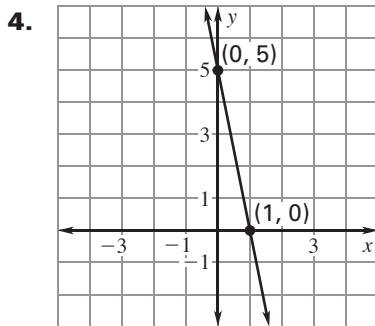
- b. What is the difference between a 12-week membership if you get a locker and if you don't?
- Explain*
- how you got your answer.





**LESSON**  
**4.1****Practice***For use with the lesson "Write Linear Equations in Slope-Intercept Form"***Write an equation of the line with the given slope and y-intercept.**

1. slope: 7; y-intercept: 4      2. slope:  $-3$ ; y-intercept: 5      3. slope: 1; y-intercept:  $-6$

**Write an equation of the line shown.****Write an equation of the line that passes through the given points.**

7.  $(-1, 0), (0, -2)$       8.  $(0, 4), (6, 13)$       9.  $(4, 5), (8, 2)$
10.  $(-1, -9), (6, 5)$       11.  $(2, -13), (-3, 12)$       12.  $(-4, -21), (1, -1)$

**Write an equation for the linear function  $f$  with the given values.**

13.  $f(0) = -1, f(3) = -10$       14.  $f(-4) = 5, f(2) = 2$       15.  $f(-4) = -2, f(2) = 7$

**LESSON**  
**4.1****Practice** *continued**For use with the lesson "Write Linear Equations in Slope-Intercept Form"*

- 16. Landscape Supply** A landscape supply business charges \$30 to deliver mulch. The mulch costs \$23 per cubic yard.
- Write an equation that gives the total cost (in dollars) of having mulch delivered to a site as a function of the number of cubic yards ordered.
  - Identify* the dependent and independent variables in this situation.
  - Find the cost of having 8 cubic yards of mulch delivered to a site.
- 17. Cable Television** A cable company charges \$44 per month for basic service. Each premium channel costs an additional \$16 per month.
- Write an equation that gives the total cost (in dollars) of cable each month as a function of the number of premium channels.
  - Identify* the dependent and independent variables in this situation.
  - Explain* how you can use the equation from part (a) to approximate how many premium channels you can have for \$80 a month.
- 18. Laser Printer** A laser printer has a "sleep" mode that is an energy-saving feature. When a job is sent to the printer, it takes 45 seconds for the printer to warm up and then the printer prints pages at a rate of 6 pages per minute.
- Write the time it takes the printer to warm up in minutes.
  - Write an equation that gives the total amount of time (in minutes) it takes the printer to warm up and print a job as a function of the number of pages in the job.
  - Find out how long it takes the printer to print a 50-page job if it must first warm up.

**LESSON**  
**4.2**
**Practice**
*For use with the lesson "Use Linear Equations in Slope-Intercept Form"*

**Write an equation of the line that passes through the given point and has slope  $m$ .**

1.  $(-1, 6); m = 5$

2.  $(10, 3); m = -2$

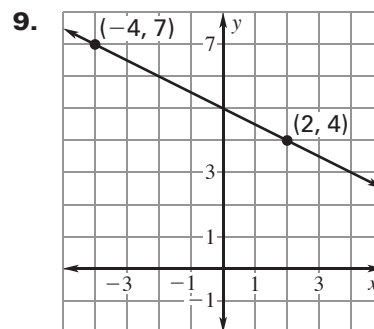
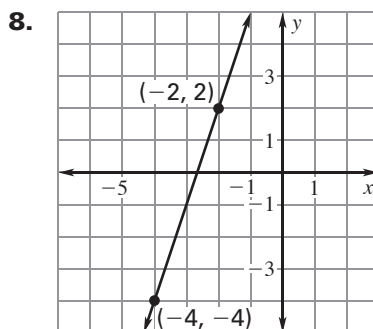
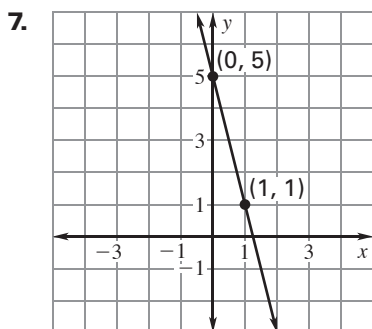
3.  $(2, -3); m = 7$

4.  $(-4, -9); m = 2$

5.  $(5, -4); m = \frac{1}{3}$

6.  $(-8, 1); m = -\frac{3}{4}$

**Write an equation of the line shown.**



**Write an equation of the line that passes through the given points.**

10.  $(-10, 7), (5, -3)$

11.  $(-5, -3), (12, 17.4)$

12.  $(-8, 84), (5, -46)$

**Write an equation for the linear function  $f$  with the given values.**

13.  $f(4) = -8, f(-3) = 1$

14.  $f(6) = -4, f(9) = -9$

15.  $f(-1) = -6, f(4) = -14$

LESSON  
4.2**Practice** *continued**For use with the lesson "Use Linear Equations in Slope-Intercept Form"*

- 16. Oil Changes** You are scheduled to start your job at an oil change shop 2 hours after the shop opens. Two hours after you start, a total of 11 cars have had their oil changed since the shop opened. Three hours later, a total of 14 cars have had their oil changed. At what rate are cars getting their oil changed since you started working? How many cars had their oil changed before you started work?
- 17. Motor Vehicle Licenses** The amount of revenue brought in by states from motor vehicle licenses increased at a relatively constant rate of 499.79 million dollars per year from 1990 to 2000. In 2000, the states brought in 15,099 million dollars in revenue from motor vehicle licenses.
- What was the approximate revenue (in million dollars) from licenses in 1990?
  - Write an equation that gives the revenue (in million dollars) as a function of the number of years since 1990.
  - Find the revenue from licenses in 1999.
- 18. Imports** The number of metric tons of fruits, nuts, and vegetables imported into the United States increased at a relatively constant rate of 437.5 thousand metric tons per year from 1990 to 2002. In 2002, about 9900.5 thousand metric tons of fruits, nuts, and vegetables were imported. Write an equation that gives the number of thousand metric tons imported as a function of the number of years since 1990. Find the year in which the number of metric tons reached 8000 thousand metric tons.

**LESSON**  
**4.3****Practice**

For use with the lesson "Write Linear Equations in Point-Slope Form"

**Write an equation in point-slope form of the line that passes through the given point and has the given slope  $m$ .**

1.  $(1, 9); m = -3$

2.  $(4, -10); m = 2$

3.  $(-5, 6); m = 4$

4.  $(-2, -8); m = 3$

5.  $(-4, -7); m = -\frac{1}{2}$

6.  $(-9, 2); m = -5$

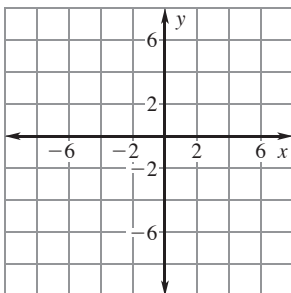
7.  $(6, -4); m = \frac{2}{3}$

8.  $(0, 15); m = \frac{4}{5}$

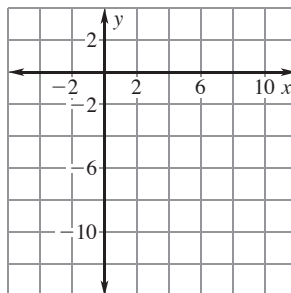
9.  $(-8, 0); m = 2$

**Graph the equation.**

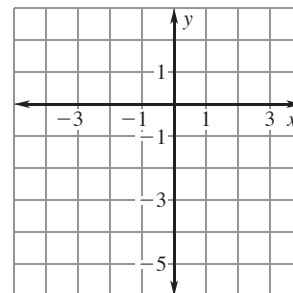
10.  $y - 6 = 3(x - 4)$



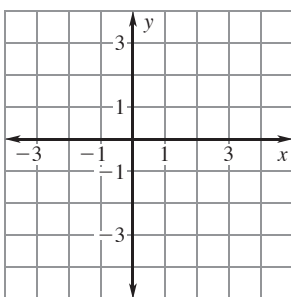
11.  $y + 1 = 2(x - 5)$



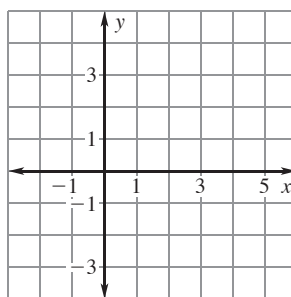
12.  $y - 2 = -4(x + 3)$



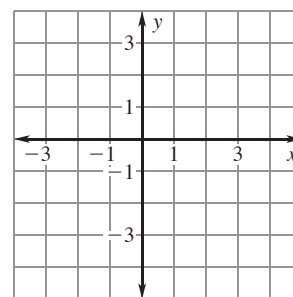
13.  $y + 2 = -(x - 1)$



14.  $y = \frac{1}{2}(x - 5)$



15.  $y + 3 = 5x$

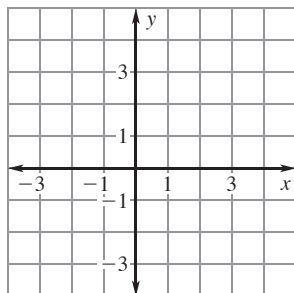


**LESSON**  
**4.3**

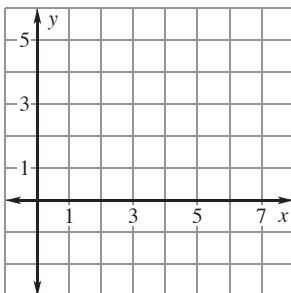
**Practice** *continued*

For use with the lesson "Write Linear Equations in Point-Slope Form"

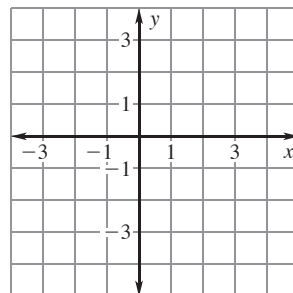
16.  $y + 1 = \frac{2}{3}(x + 1)$



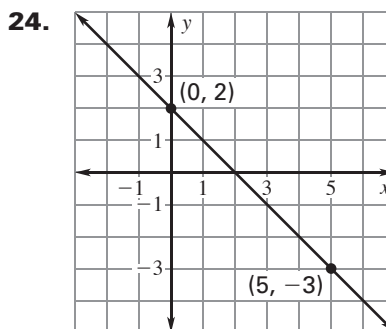
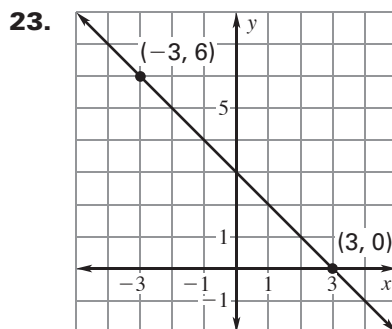
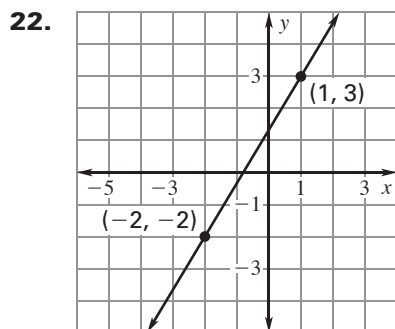
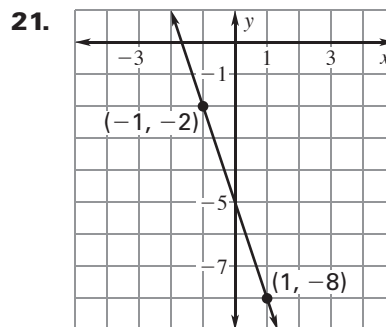
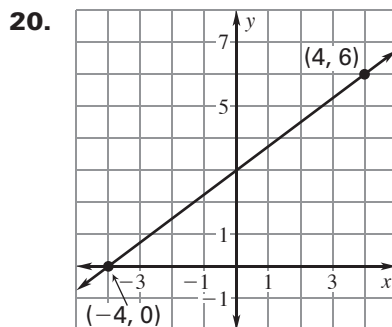
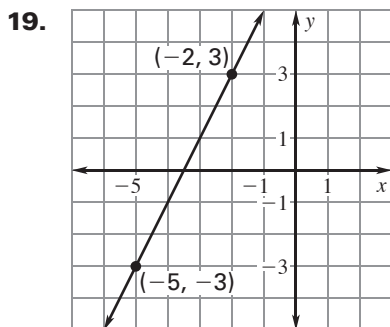
17.  $y - 2 = -\frac{1}{2}(x - 3)$



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



Write an equation of the line shown. Use the right-hand point to write the equation.



**LESSON**  
**4.3**
**Practice** *continued*
*For use with the lesson "Write Linear Equations in Point-Slope Form"*

**Write an equation of the line that passes through the given points. Use the first point to write the equation.**

25.  $(9, 4), (17, 6)$

26.  $(-3, 10), (4, 2)$

27.  $(3, -8), (7, -2)$

28.  $(-4, -4), (2, 5)$

**29. Bryce Canyon National Park** From 1990 to 2000, the number of visits by people to Bryce Canyon National Park increased by about 23.9 thousand visits per year. In 2000, there were about 1102.4 thousand visits to the park.

**a.** Write an equation that gives the number of visits (in thousands) as a function of the number of years since 1990.

**b.** How many visits were made to the park in 1995?

**30. Airmail Letter Rates** The table shows the cost of mailing different weights of airmail letters to Canada in 2005.

|                       |      |      |      |      |
|-----------------------|------|------|------|------|
| <b>Weight (oz)</b>    | 2    | 3    | 4    | 8    |
| <b>Cost (dollars)</b> | 0.85 | 1.10 | 1.35 | 2.35 |

**a.** *Explain* why the situation can be modeled using a linear equation.

**b.** Write an equation that gives the cost (in dollars) as a function of the weight of an airmail letter (in ounces).

**c.** How much does it cost to mail a 5-ounce airmail letter to Canada?

**31. New Mexico** The population density of New Mexico increased at a relatively constant rate from 1980 to 1999. In 1985, the population density was about 11.62 people per square mile. In 1999, the population density was about 14.28 people per square mile. Write an equation that gives the population density (in people per square mile) as a function of the number of years since 1980. What was the population density in 1990?

**LESSON**  
**4.4****Practice***For use with the lesson "Write Linear Equations in Standard Form"*

**Write two equations in standard form that are equivalent to the given equation.**

1.  $6x + 24y = 18$

2.  $8x - 14y = 2$

3.  $6x + y = 1$

4.  $-4x - 2y = 16$

5.  $2x + 3y = 11$

6.  $-9x + 4y = 5$

**Write an equation in standard form of the line that passes through the given point and has the given slope  $m$ .**

7.  $(4, 3), m = 7$

8.  $(5, -1), m = 2$

9.  $(-2, 6), m = 1$

10.  $(-7, 8), m = -3$

11.  $(9, -10), m = -4$

12.  $(-15, -4), m = \frac{1}{2}$

**Write an equation in standard form of the line that passes through the given points.**

13.  $(2, 6), (3, 8)$

14.  $(-1, 2), (5, 4)$

15.  $(7, -3), (4, 1)$

16.  $(3, -8), (5, -9)$

17.  $(-5, 6), (2, -3)$

18.  $(-3, -1), (6, -8)$



**LESSON**  
**4.4**
**Practice** *continued*
*For use with the lesson "Write Linear Equations in Standard Form"*

**Write equations of the horizontal and the vertical lines that pass through the given point.**

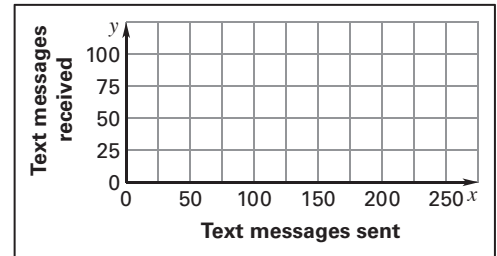
19.  $(8, 3)$

20.  $(-2, 6)$

21.  $(5, -5)$

**22. Text Messaging** Your cell phone plan charges you \$.02 to send a text message and \$.07 to receive a text message. You plan to spend no more than \$5 a month on text messaging.

- Write an equation in standard form that models the possible combinations of sent text messages and received text messages.
- Graph the equation from part (a). *Explain* what the intercepts of the graph mean in this situation.
- List three other possible combinations of the number of messages you can send and receive.



**23. Potting Soil Mix** You are making 24 pounds of your own potting soil mix of sphagnum peat moss and coarse sand. You buy the peat moss in bags that weigh approximately 2 pounds.

- The last time you made 24 pounds of potting soil, you used 9 bags of sphagnum peat moss and 4 bags of coarse sand. Use this information to find the number of pounds in a bag of coarse sand.
- Write an equation in standard form that models the possible combinations of bags of sphagnum peat moss and coarse sand you can use.
- List three possible combinations of whole bags of sphagnum peat moss and coarse sand you can use to make the potting soil.

**LESSON**  
**4.5****Practice***For use with the lesson "Write Equations of Parallel and Perpendicular Lines"*

**Write an equation of the line that passes through the given point and is parallel to the given line.**

1.  $(4, 7), y = 5x - 3$

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

3.  $(-6, 1), 4x + y = 7$

4.  $(-5, -5), 6x - y = 1$

5.  $(0, -8), 8x + 4y = 5$

6.  $(-9, 11), 5x - 10y = 3$

**Write an equation of the line that passes through the given point and is perpendicular to the given line.**

7.  $(1, -1), y = 3x + 2$

8.  $(5, 0), y = \frac{2}{3}x - 4$

9.  $(3, -7), y = -\frac{1}{5}x + 1$

10.  $(-9, 2), 10x - 5y = 6$

11.  $(10, -11), -2x + 5y = 1$

12.  $(-4, -8), 8x + 3y = 7$

**Determine which of the following lines, if any, are parallel or perpendicular.**

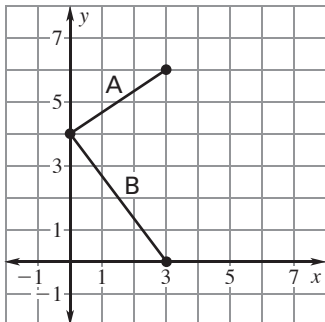
13. Line  $a: y = 8x - 5$ , Line  $b: y = \frac{1}{8}x + 1$ , Line  $c: 8x + y = 2$

14. Line  $a: y = -2x + 5$ , Line  $b: 2y - x = 3$ , Line  $c: 2x + y = 1$

15. Line  $a: 6x + 2y = 5$ , Line  $b: y = \frac{1}{3}x - 4$ , Line  $c: y = -3x + 5$

**LESSON**  
**4.5**
**Practice** *continued*
*For use with the lesson "Write Equations of Parallel and Perpendicular Lines"*

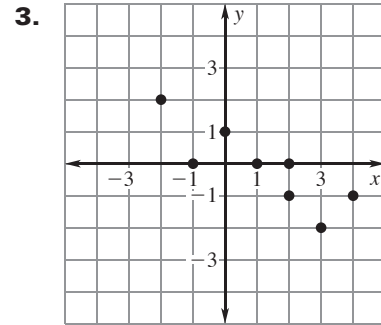
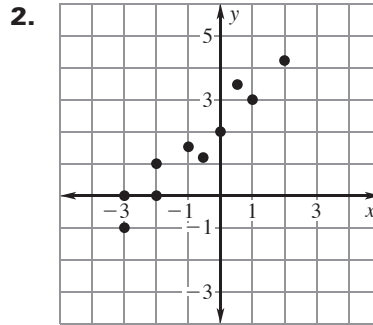
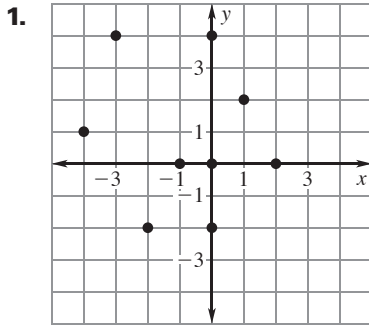
- 16. Kite Design** You are beginning to model a kite design on the coordinate plane, as shown.



- Write an equation that models part A of the kite.
  - Write an equation that models part B of the kite.
  - Do the kite parts form a right angle? *Justify* your answer.
- 17. Lunch Duty** Everyone at camp takes turns being on lunch duty. You and your friend are in charge of making sandwiches. You both can make 1 sandwich in 2 minutes. Your friend arrives 10 minutes earlier than you and starts making sandwiches.
- Write equations that model the number of sandwiches made as a function of the number of minutes it takes you and your friend to each make sandwiches.
  - How many sandwiches will each of you make in 20 minutes?
  - How are the graphs of the equations from part (a) related? *Justify* your answer.

**LESSON 4.6 Practice**  
For use with the lesson "Fit a Line to Data"

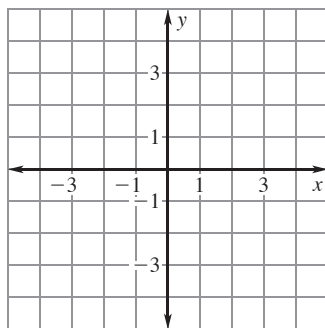
Tell whether  $x$  and  $y$  show a **positive correlation**, a **negative correlation**, or **relatively no correlation**.



Make a scatter plot of the data. Draw a line of fit. Write an equation for the line.

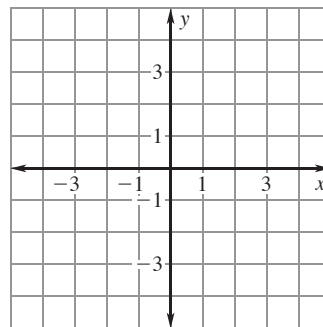
4. 

|          |    |    |   |    |    |    |
|----------|----|----|---|----|----|----|
| <b>x</b> | -2 | -1 | 0 | 1  | 2  | 3  |
| <b>y</b> | 4  | 2  | 1 | -2 | -1 | -2 |



5. 

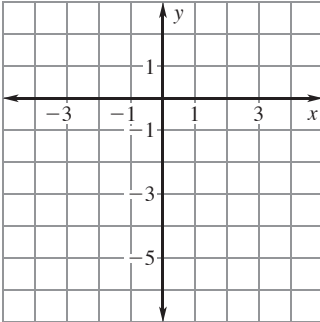
|          |    |    |      |     |   |     |
|----------|----|----|------|-----|---|-----|
| <b>x</b> | 0  | 0  | 0.5  | 1.5 | 2 | 2.5 |
| <b>y</b> | -4 | -3 | -1.5 | 1   | 3 | 4   |



**LESSON**  
**4.6**
**Practice** *continued*  
 For use with the lesson "Fit a Line to Data"

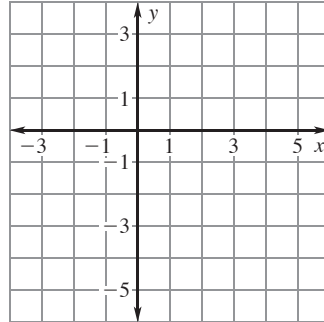
6.

|          |    |    |    |    |    |    |
|----------|----|----|----|----|----|----|
| <b>x</b> | -3 | -2 | -1 | 0  | 1  | 2  |
| <b>y</b> | 1  | -1 | 0  | -2 | -4 | -5 |



7.

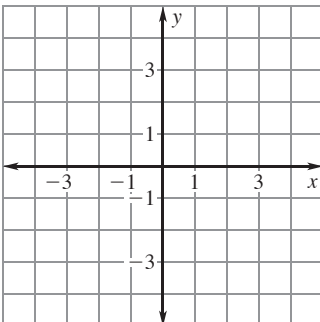
|          |    |    |   |    |   |   |
|----------|----|----|---|----|---|---|
| <b>x</b> | 0  | 4  | 3 | 2  | 1 | 0 |
| <b>y</b> | -3 | -2 | 0 | -1 | 1 | 1 |



**Make a scatter plot of the data. Describe the correlation of the data. If possible, fit a line to the data and write an equation of the line.**

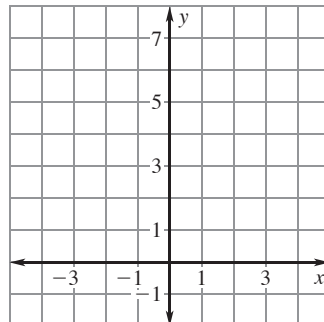
8.

|          |    |    |    |    |   |   |   |
|----------|----|----|----|----|---|---|---|
| <b>x</b> | -2 | -2 | -1 | 0  | 1 | 1 | 2 |
| <b>y</b> | -4 | -3 | -2 | -1 | 0 | 2 | 1 |



9.

|          |    |    |    |    |    |   |   |
|----------|----|----|----|----|----|---|---|
| <b>x</b> | -4 | -3 | -2 | -2 | -1 | 0 | 1 |
| <b>y</b> | 7  | 5  | 6  | 3  | 4  | 2 | 1 |

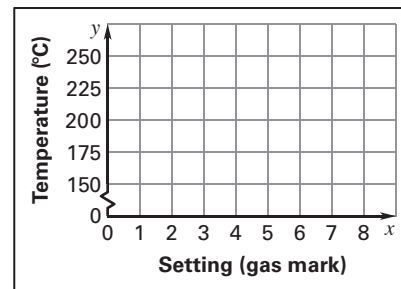


**LESSON**  
**4.6**
**Practice** *continued*  
*For use with the lesson "Fit a Line to Data"*

- 10. Thermostat** The table shows the thermostat setting (in units called gas marks) on a British gas oven and the corresponding temperature in degrees Celsius.

|                           |     |     |     |     |     |     |     |
|---------------------------|-----|-----|-----|-----|-----|-----|-----|
| <b>Setting (gas mark)</b> | 2   | 3   | 4   | 5   | 6   | 7   | 8   |
| <b>Temperature (°C)</b>   | 150 | 160 | 180 | 190 | 200 | 220 | 230 |

- a. Make a scatter plot of the data where  $x$  represents the thermostat setting (in gas marks) and  $y$  represents the temperature (in degrees Celsius).



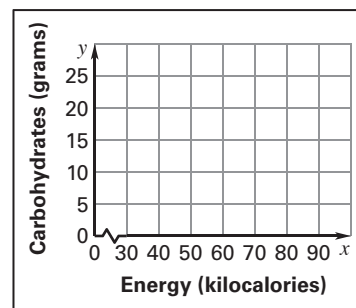
- b. Describe the correlation of the data.

- c. An oven set to gas mark 10 heats to a temperature of  $260^{\circ}\text{C}$ . Does this fit the trend shown by your scatter plot? Explain your reasoning.

- 11. Fruits** The table shows the amount of energy (in kilocalories) and the amount of carbohydrates (in grams) in a 100-gram serving of different fruits.

|                          |       |        |             |       |       |              |       |
|--------------------------|-------|--------|-------------|-------|-------|--------------|-------|
| <b>Fruit</b>             | Apple | Banana | Blueberries | Kiwi  | Pear  | Strawberries | Mango |
| <b>Energy (kcal)</b>     | 59    | 92     | 56          | 61    | 59    | 30           | 65    |
| <b>Carbohydrates (g)</b> | 15.25 | 23.43  | 14.13       | 14.88 | 15.11 | 7.02         | 17    |

- a. Make a scatter plot of the data where  $x$  represents the energy (in kilocalories) and  $y$  represents the carbohydrates (in grams).



- b. Describe the correlation of the data.

- c. A 100-gram serving of an avocado contains 161 kilocalories of energy and 7.39 grams of carbohydrates. Does an avocado fit the trend shown by your scatter plot? Explain your reasoning.

**LESSON**  
**4.7**

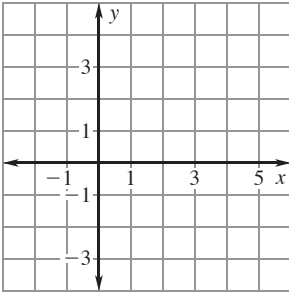
# Practice

*For use with the lesson "Predict with Linear Models"*

**Make a scatter plot of the data. Find the equation of the best-fitting line.**  
**Approximate the value of  $y$  for  $x = 3$ .**

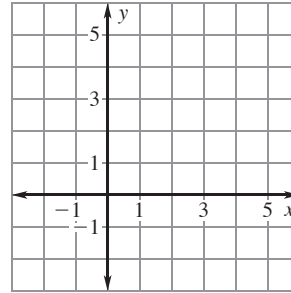
1.

|          |    |   |   |   |    |
|----------|----|---|---|---|----|
| <b>x</b> | -1 | 0 | 1 | 2 | 4  |
| <b>y</b> | 3  | 3 | 1 | 0 | -3 |



2.

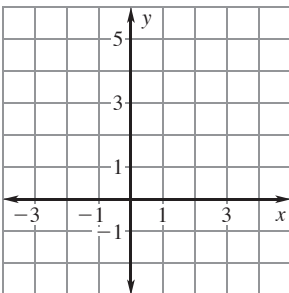
|          |    |   |   |   |   |
|----------|----|---|---|---|---|
| <b>x</b> | -1 | 0 | 1 | 2 | 4 |
| <b>y</b> | -1 | 1 | 2 | 1 | 5 |



**Make a scatter plot of the data. Find the equation of the best-fitting line.**  
**Approximate the value of  $y$  for  $x = 5$ .**

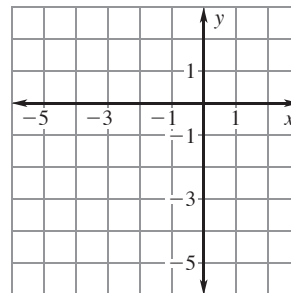
3.

|          |    |   |   |   |    |
|----------|----|---|---|---|----|
| <b>x</b> | -1 | 0 | 1 | 2 | 3  |
| <b>y</b> | 5  | 3 | 2 | 0 | -2 |



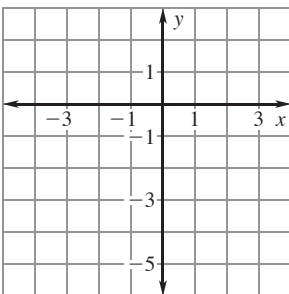
4.

|          |    |    |    |   |   |
|----------|----|----|----|---|---|
| <b>x</b> | -5 | -3 | -1 | 1 | 2 |
| <b>y</b> | -4 | -2 | -1 | 1 | 0 |



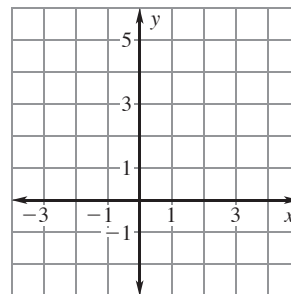
5.

|          |    |    |    |    |   |
|----------|----|----|----|----|---|
| <b>x</b> | -2 | -1 | 0  | 1  | 2 |
| <b>y</b> | -4 | -2 | -1 | -1 | 1 |



6.

|          |    |   |   |   |   |
|----------|----|---|---|---|---|
| <b>x</b> | -1 | 0 | 1 | 2 | 3 |
| <b>y</b> | -2 | 0 | 1 | 3 | 5 |



**LESSON**  
**4.7****Practice** *continued*  
*For use with the lesson "Predict with Linear Models"***Find the zero of the function.**

7.  $f(x) = 16x - 4$

8.  $f(x) = 2 - 4x$

9.  $f(x) = 0.5x + 5$

10.  $f(x) = -0.1x - 3$

11.  $f(x) = \frac{3}{4}x - 3$

12.  $f(x) = -\frac{2}{5}x + 4$

13.  $f(x) = 0.25x + 0.5$

14.  $f(x) = 9 - 0.7x$

15.  $f(x) = 1.2x + 10$

16.  $f(x) = \frac{1}{2}x - 6$

17.  $f(x) = -\frac{2}{5}x - 4$

18.  $f(x) = -0.8x + 15$

19.  $f(x) = 1.25x - 5$

20.  $f(x) = 6 - 0.2x$

21.  $f(x) = 2.5x - 3$

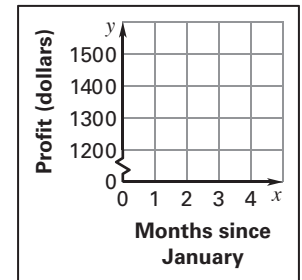


**LESSON**  
**4.7**
**Practice** *continued*  
 For use with the lesson "Predict with Linear Models"

- 22. Profit** The table shows the monthly profit of a small company.

| Month                   | January | February | March | April | May  |
|-------------------------|---------|----------|-------|-------|------|
| <b>Profit (dollars)</b> | 1200    | 1250     | 1400  | 1380  | 1450 |

- a. Make a scatter plot of the data. Let  $x$  represent the number of months since January and let  $y$  represent the profit.
- b. Find an equation that models the profit (in dollars) as a function of the number of months since January.

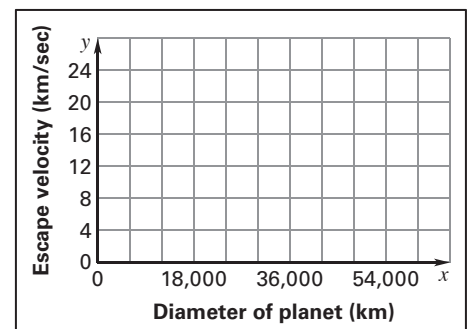


- c. Approximate the profit in August.

- 23. Escape Velocity** The table shows several planet diameters and escape velocities. The escape velocity is the velocity at which an object has to travel in order to escape the effect of a planet's gravity.

| Planet                          | Mercury | Uranus | Earth  | Mars | Venus  |
|---------------------------------|---------|--------|--------|------|--------|
| <b>Diameter (km)</b>            | 4879    | 51,118 | 12,756 | 6794 | 12,104 |
| <b>Escape velocity (km/sec)</b> | 4.3     | 21.3   | 11.186 | 5.03 | 10.36  |

- a. Make a scatter plot of the data. Let  $x$  represent the diameter of the planet and let  $y$  represent the escape velocity.
- b. Find an equation that models the escape velocity (in kilometers per second) as a function of the diameter (in kilometers).



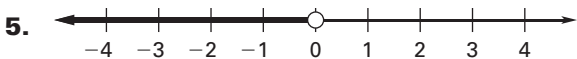
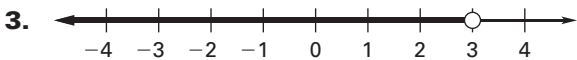
- c. Approximate the escape velocity of Neptune, which has a diameter of 49,528 kilometers.

**LESSON**  
**5.1**

**Practice**

For use with the lesson "Solve Inequalities Using Addition and Subtraction"

**Write an inequality that is represented by the graph.**



**Solve the inequality. Graph your solution.**

7.  $x + 7 > 1$



8.  $n - 3 \leq 9$



9.  $10 \geq a + 7$



10.  $m - 3 < -2$



11.  $p - 5 > -5$



12.  $x + 3 \leq -4.5$



**LESSON**  
**5.1**
**Practice** *continued*
*For use with the lesson "Solve Inequalities Using Addition and Subtraction"*

**13.**  $b + 9.5 \leq -6.4$



**14.**  $y + 2.5 < 7.3$



**15.**  $z - 10.2 > 18.3$



**16.**  $d - 8 > 2.2$



**Write the verbal sentence as an inequality. Then solve the inequality and graph your solution.**

**17.** The sum of 15 and  $n$  is less than 8.



**18.** The difference of  $m$  and 3 is greater than or equal to 10.



**19.** Twenty-four is less than or equal to the sum of 35 and  $x$ .



**20.** Eighty-five is greater than the difference of  $x$  and 63.



LESSON  
5.1**Practice** *continued**For use with the lesson "Solve Inequalities Using Addition and Subtraction"*

- 21. Summer Reading** During the summer you want to read at least 32 books. You have read 21 books so far this summer. What are the possible numbers of books you can read to pass your goal?
- 22. Baseball Hats** You are a big baseball fan. You have a goal of attending a baseball game in every major league stadium in the country. Every time you go to a different stadium, you buy a baseball hat. You keep your hats in a display case that holds 25 hats. You have 8 baseball hats so far. What are the possible numbers of hats you can collect without needing another display case?
- 23. Gift Card** You received a \$25 gift card to a sporting goods store for your birthday. You are looking at skateboards and want to spend no more than \$85 of your own money.
- Write and solve an inequality to find the prices  $p$  in dollars of skateboards you can buy.
  - What is the most expensive skateboard you can buy?
- 24. Video Games** You and your friend are having a video game competition. The person with the highest score after two games wins. The table shows your friend's first and second scores and your first score.

| Game | Friend's score | Your score |
|------|----------------|------------|
| 1    | 6532           | 5034       |
| 2    | 4887           | ?          |

- Write and solve an inequality to find the scores  $s$  that you can earn in your second game in order to beat your friend.
- Will you win if you earn 6392 points? 6385 points? 6377 points? *Justify* your answers.

**LESSON**  
**5.2****Practice***For use with the lesson "Solve Inequalities Using Multiplication and Division"***Match the verbal sentence with the inequality. Then solve the inequality.**

1. The product of 3 and  $x$  is less than or equal to 18.      **A.**  $\frac{x}{18} \geq 3$

2. The product of 18 and  $x$  is greater than or equal to 3.      **B.**  $18x \geq 3$

3. The quotient of  $x$  and 18 is greater than or equal to 3.      **C.**  $3x \leq 18$

**Solve the inequality. Graph your solution.**

4.  $3y \geq 4$



5.  $\frac{x}{2} < 6$



6.  $\frac{m}{5} > -5$



7.  $\frac{c}{-10} \leq -2$



8.  $8n > -1$



9.  $42 < 6z$



10.  $-5p \leq 2$



11.  $\frac{w}{-4} < 8$



LESSON  
5.2**Practice** *continued**For use with the lesson "Solve Inequalities Using Multiplication and Division"*

12.  $-7a \geq -3$



13.  $52 \leq -13x$



14.  $0.25x > 18$



15.  $-2d < 3$



**Write the verbal sentence as an inequality. Then solve the inequality and graph your solution.**

16. The product of 12 and
- $y$
- is greater than or equal to 60.



17. The product of 7 and
- $b$
- is less than
- $-35$
- .



18. The quotient of
- $m$
- and 2 is greater than 23.



19. The quotient of
- $p$
- and 4.5 is less than or equal to 10.



**LESSON**  
**5.2****Practice** *continued**For use with the lesson "Solve Inequalities Using Multiplication and Division"*

- 20. Flower Beds** You are in charge of buying the flowers for the flower beds around your school. You cannot spend over \$80 on flowers. The flowers cost \$10.99 for a flat of flowers. What are the possible numbers of flats of flowers you can buy?
- 21. Pavilion Rental** You and three of your friends decide to rent a pavilion at a local park for an end-of-the-school-year party. The group budget is \$80. The group decides to split the cost equally.
- What are the possible amounts of money that each of you can spend?
  - If two more of your friends decide to pitch in for the party, what are the possible amounts of money that each of you can spend if you all split the cost equally?
- 22. Waiting Tables** Restaurants typically pay wait staff an hourly wage that is lower than minimum wage. The wait staff is expected to make up the difference in tips. The minimum wage is \$7.21 per hour and a restaurant pays the wait staff \$6.06 per hour.
- If a waitress works an 8-hour shift, write and solve an inequality that gives the total tips  $t$  in dollars that the waitress must earn in an 8-hour shift in order to meet or exceed the minimum wage.
  - If the waitress makes \$10.40 in tips during an 8-hour shift, will she meet or exceed the minimum wage? By how much?
  - If the waitress makes \$9.20 in tips during an 8-hour shift, will she meet or exceed the minimum wage? By how much?

**LESSON**  
**5.3****Practice***For use with the lesson "Solve Multi-Step Inequalities"***Solve the inequality. Graph your solution.**

1.  $4x - 7 \geq 1$



2.  $7p + 3 < -11$



3.  $8 - 2n \geq 26$



4.  $3(a - 4) \leq 33$



5.  $6(y + 1) > 6$



6.  $-2(c - 1) < -22$



7.  $8m - 7 < 4m + 5$



8.  $10 - 11d > -5d - 4$



9.  $9z \leq -7z + 14$



10.  $6w + 3 < 2w + 15$

**Solve the inequality, if possible.**

11.  $6y - 9 \leq 4y + 2y - 16$

12.  $7p - 11p + 3 \geq 3 - 4p$

13.  $4(c - 5) < 2(c - 10)$

14.  $5(a - 3) \leq 5a - 6$

15.  $6(x - 8) > 6x - 48$

16.  $2(3d - 4) < 4 + 6d - 15$



**LESSON**  
**5.3**
**Practice** *continued*  
 For use with the lesson "Solve Multi-Step Inequalities"

17.  $4m + 14 - 2m \leq 2(m + 7)$

18.  $-2(n - 3) \geq 1 - 2n + 5$

19.  $4(3 - 2x) > 2(6 - 4x)$

20.  $2(5 - a) > 4a + 13 - 6a$

21.  $-4n + 11 < -4(n + 6)$

22.  $3(5 - 6x) \leq 2(11 - 9x)$

23.  $2m + 10 - 7m \leq 5(4 - m)$

24.  $6(1 - 2n) \leq 5 - 12n$

**Translate the verbal phrase into an inequality. Then solve the inequality and graph your solution.**

25. Six more than 5 times a number
- $x$
- is greater than or equal to 31.



26. Twice the sum of 4 and
- $x$
- is less than
- $-16$
- .



27. The difference of
- $10x$
- and
- $3x$
- is less than or equal to the sum of
- $4x$
- and 21.



28. The sum of
- $2x$
- and
- $4x$
- is greater than or equal to the sum of
- $2x$
- and 36.



29. The difference of
- $2x$
- and 15 is less than or equal to the sum of
- $4x$
- and 17.



LESSON  
5.3**Practice** *continued*  
*For use with the lesson "Solve Multi-Step Inequalities"*

- 30. Weaving** A weaver spends \$420 on supplies to make wall hangings and plans to sell the wall hangings for \$80 each.
- Write an inequality that gives the possible numbers  $w$  of wall hangings the weaver needs to sell in order for the profit to be positive.
  - What are the possible numbers of wall hangings the weaver needs to sell in order for the profit to be positive?
- 31. School Spirit** Your club is in charge of making pins that students can buy to show their school spirit for the upcoming football game. You have made 225 pins so far, and you only have 2 hours left to make the rest of the pins. You need to make at least 400 pins.
- Write an inequality that gives the possible numbers  $p$  of pins you have to make per minute in order to exceed your goal.
  - What are the possible numbers of pins you have to make per minute in order to exceed your goal?
- 32. Aquarium** You are getting a larger aquarium for your neon tetra fish and you also want to add more neon tetras to the larger aquarium. The general rule is that each fish needs 2 gallons of water. You currently have 6 neon tetras. If you buy a 20-gallon aquarium, what are the possible numbers of fish you can put in your aquarium? *Explain* how you got your answer.

**LESSON**  
**5.4**

# Practice

For use with the lesson "Solve Compound Inequalities"

**Translate the verbal phrase into an inequality. Then graph the inequality.**

1. All real numbers that are less than or equal to  $-3$  and greater than or equal to  $-8$



2. All real numbers that are greater than  $5$  or less than or equal to  $-1$



3. All real numbers that are greater than or equal to  $-2.5$  and less than  $3.5$



**Solve the inequality. Graph your solution.**

4.  $-3 < x + 1 \leq 5$



5.  $-7 < x - 8 < 2$



6.  $-5 < -5x \leq 20$



7.  $0 \leq 2(x - 3) < 8$



LESSON  
5.4**Practice** *continued*  
For use with the lesson "Solve Compound Inequalities"

8.  $3x + 2 < 8$  or  $-x + 3 < -2$



9.  $2(x + 4) < 6$  or  $-x - 3 \leq -7$



10.  $5x < -30$  or  $x + 10 > 7$



11.  $3x + 5 \leq 1$  or  $8 - x < 5$



**Write the verbal sentence as an inequality. Then solve the inequality and graph your solution.**

12. Three times  $x$  is less than  $-6$  and greater than  $-21$ .



13. One less than  $x$  is less than  $-1$  or 3 more than  $x$  is greater than or equal to 7.



14. The difference of  $2x$  and 5 is greater than  $-3$  and less than or equal to 11.



15. The sum of  $3x$  and 1 is greater than  $-5$  and less than or equal to 10.



**LESSON**  
**5.4**
**Practice** *continued*  
 For use with the lesson "Solve Compound Inequalities"

- 16. Temperature** The high temperature in a city last year was  $95^{\circ}\text{F}$ . The low temperature in this city last year was  $-5^{\circ}\text{F}$ . Write and graph a compound inequality that represents the temperatures  $T$  throughout the year.

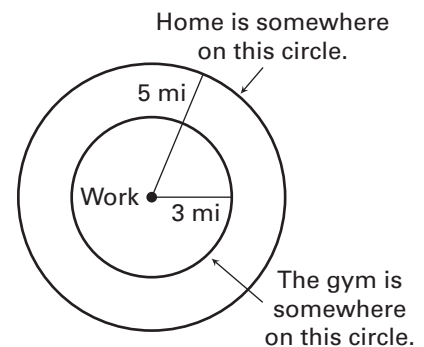


- 17. Pollen Count** Weather forecasts will often give reports on the pollen count. For people suffering from allergies, the pollen count indicates the severity of their symptoms. If a pollen count is high, the severity of the symptoms are increased. The table shows ranges for high, medium, and low pollen counts. Write an inequality to find the range at which the pollen count is not medium.

| Pollen Count | High           | Medium                                     | Low                     |
|--------------|----------------|--|-------------------------|
| Range        | Greater than 8 | Greater than 4 and less than or equal to 8 | Less than or equal to 4 |

- 18. Distances** You live 5 miles from work and the gym you go to is 3 miles from work.

- Find the minimum distance  $d$  between your home and the gym.
- Find the maximum distance  $d$  between your home and the gym.
- Write an inequality that describes the possible distances  $d$  between your home and the gym.



**LESSON**  
**5.5****Practice**

For use with the lesson "Solve Absolute Value Equations"

**Solve the equation.**

1.  $|x| = 9$

2.  $|x| = 2.25$

3.  $|x| = \frac{3}{2}$

4.  $|x - 6| = 14$

5.  $|x + 1| = 8$

6.  $|2x - 3| = 15$

7.  $|4x + 1| = 15$

8.  $|7x + 2| = 23$

9.  $|5 - 2x| = 9$

10.  $3|2x - 2| = 18$

11.  $4|5x - 1| = 36$

12.  $2|6x + 5| - 1 = 25$

**Solve the equation, if possible.**

13.  $|x + 3| - 4 = -1$

14.  $|x - 8| - 9 = -5$

15.  $|x + 3| + 2.5 = 3$

16.  $-6|10 - 2x| = 24$

17.  $-3|4x + 3| = -9$

18.  $-4|5 + 2x| = -16$

19.  $-\frac{1}{3}|1 - 8x| = 2$

20.  $|3x - 8| + 0.25 = 0.75$

21.  $|6x + 5| - 1.3 = -1.9$

**LESSON**  
**5.5****Practice** *continued*  
*For use with the lesson "Solve Absolute Value Equations"*

**Find the values of  $x$  that satisfy the definition of absolute value for the given value and the given absolute deviation.**

- 22.** Given value: 3; absolute deviation: 5      **23.** Given value: 1; absolute deviation: 7
- 24.** Given value:  $-4$ ; absolute deviation: 2      **25.** Given value:  $-2.5$ ; absolute deviation: 8
- 26. Food Scale** Bakers will typically weigh out flour for recipes rather than use a measuring cup because weighing is a more accurate measure. A baker is using a scale that has an absolute error of 0.05 gram.
- Find the minimum and maximum possible weights if the scale is used to measure out 225 grams of flour.
  - Find the minimum and maximum possible weights if the scale is used to measure out 300 grams of flour.
  - Find the minimum and maximum possible weights if the scale is used to measure out 420 grams of flour.
- 27. Toothpaste Prices** The average price of the brand of toothpaste that you buy is \$2.49 for an 8.2-ounce tube. Depending on where you shop, the prices vary by as much as \$.15.
- Write an absolute value equation that represents the minimum and maximum prices of the toothpaste.
  - Find the minimum and maximum prices of the toothpaste.
  - You have a coupon for \$.50 off two tubes of toothpaste. If you go to the store that has the minimum price for the toothpaste, how much will you pay for two tubes?

**LESSON**  
**5.6****Practice***For use with the lesson "Solve Absolute Value Inequalities"***Solve the inequality. Graph your solution.**

1.  $|x| \geq 5$



2.  $|x| < 6.5$



3.  $|x| \geq \frac{3}{2}$



4.  $|x - 6| \leq 1$



5.  $|x + 7| > 11$



6.  $|10 - x| < 2$



7.  $|-x - 5| < 1$



8.  $|2x + 1| \geq 5$



9.  $|3x - 2| \leq 7$



10.  $|8 - 3x| \geq 7$



11.  $|\frac{1}{2}x - 4| > 20$



12.  $|1 - \frac{4}{3}x| < 5$





**LESSON**  
**5.6**
**Practice** *continued*
*For use with the lesson "Solve Absolute Value Inequalities"*

**Write the verbal sentence as an inequality. Then solve the inequality and graph your solution.**

- 13.** The distance between  $x$  and 8 is less than 14.



- 14.** The distance between  $x$  and  $-5$  is greater than or equal to 12.



- 15.** The distance between 9 and  $x$  is less than or equal to 8.



- 16.** The distance between 10 and  $2x$  is greater than 34.



**Tell whether the statement is *true* or *false*. If it is false, give a counterexample.**

- 17.** If  $a$  is a solution of  $|x + 4| < 7$ , then  $a$  is also a solution of  $x + 4 < 7$ .

- 18.** If  $a$  is a solution of  $|x - 6| \geq 4$ , then  $a$  is also a solution of  $x - 6 \leq -4$ .

LESSON  
5.6**Practice** *continued*  
For use with the lesson "Solve Absolute Value Inequalities"

- 19. DVDs** The average price of a standard DVD is \$15.99 with a standard deviation of \$4. Write an absolute value inequality that describes this range in prices.
- 20. Body Temperature** A canine's body temperature is considered to be normal if it is  $101^{\circ}\text{F}$  with an absolute deviation of  $1.5^{\circ}\text{F}$ .
- Write an absolute value inequality that represents the normal temperature range.
  - Solve the inequality. What is the normal temperature range?
- 21. Baseball** A baseball should weigh 5.12 ounces with an absolute deviation of 0.035 ounce. The circumference of a baseball should be 9.05 inches with an absolute deviation of 0.05 inch.
- Write absolute value inequalities that represent the ranges for the weight and circumference of a baseball.
  - Is a ball that weighs 5.16 ounces and has a circumference of 9 inches within the ranges that it should be? *Explain* why or why not.
  - What are the maximum and minimum circumferences of a baseball?
  - What are the maximum and minimum weights of a baseball?

**LESSON**  
**5.7****Practice***For use with the lesson "Graph Linear Inequalities in Two Variables"***Tell whether the ordered pair is a solution of the inequality.**

1.  $x + y > -9$ ; (0, 0)

2.  $x - y \geq 8$ ; (14, 9)

3.  $2x - y > 4$ ; (-6, -15)

4.  $2x + y > -5$ ; (-5, 12)

5.  $5x + 2y \leq 8$ ; (-3, 6)

6.  $4x - 3y \geq -5$ ; (6, 8)

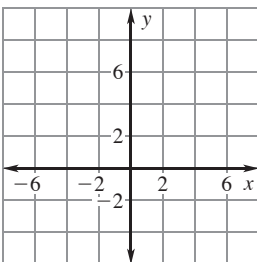
7.  $0.5x + 2.5y \geq 2$ ; (0, 0)

8.  $1.2x - 3.1y < 4$ ; (3, -1)

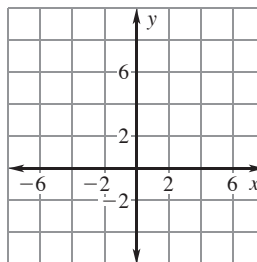
9.  $0.2y - 0.5x > -1$ ; (-4, -8)

**Graph the inequality.**

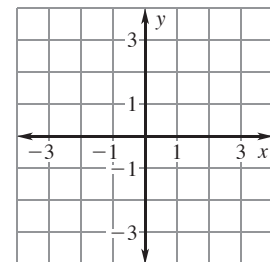
10.  $y - x < 6$



11.  $x - y > -4$



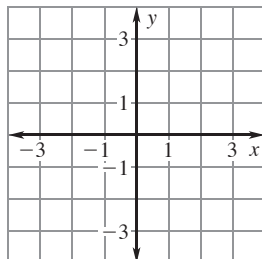
12.  $2y - x < 2$



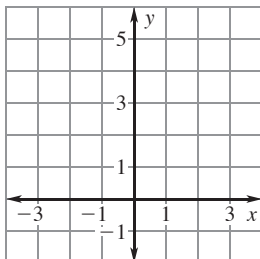
**LESSON**  
**5.7**

**Practice** *continued*  
For use with the lesson "Graph Linear Inequalities in Two Variables"

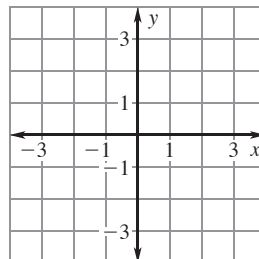
13.  $4y \leq 6x - 2$



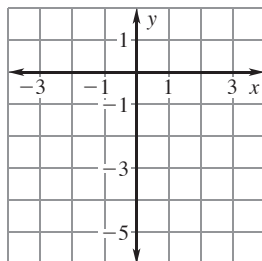
14.  $5y \leq 10x + 15$



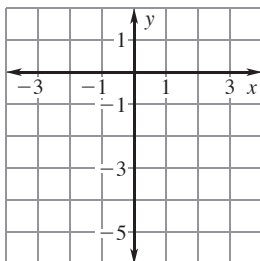
15.  $6y + 3 \geq -18x$



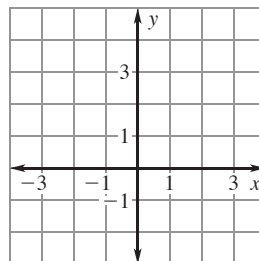
16.  $2(y + 3) < 4x$



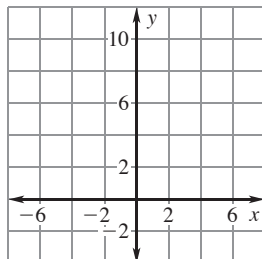
17.  $2y - 3x \geq -8$



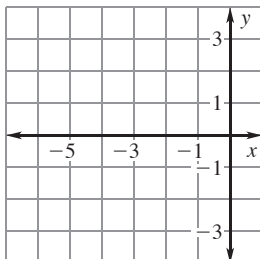
18.  $2(x - y) < -5$



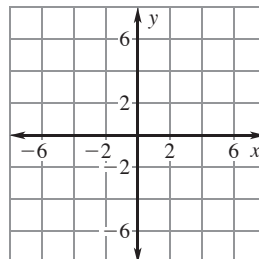
19.  $y > 7$



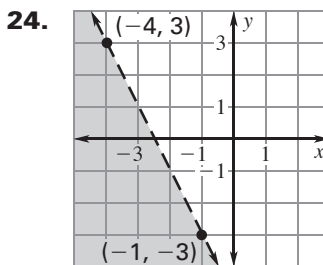
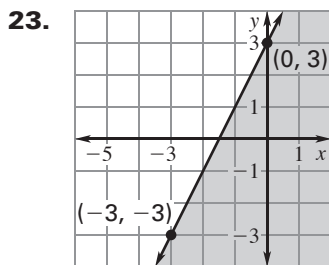
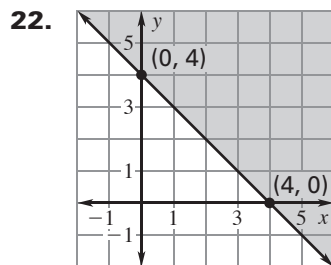
20.  $x \leq -5$



21.  $y < -4$



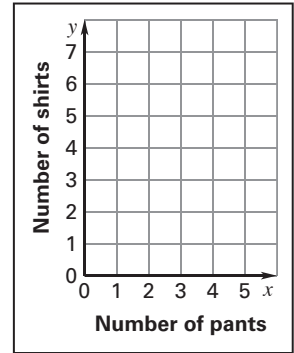
Write an inequality of the graph shown.



**LESSON**  
**5.7**

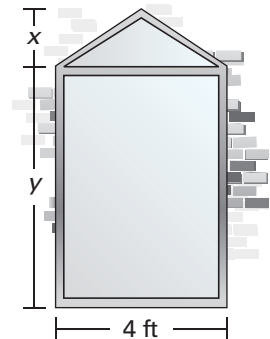
**Practice** *continued*  
For use with the lesson "Graph Linear Inequalities in Two Variables"

- 25. Clothes** You are going clothes shopping and can spend at most \$130 on clothes. It costs \$30 for a pair of pants and \$22 for a shirt. Let  $x$  represent the number of pants you can buy. Let  $y$  represent the number of shirts you can buy.
- a.** Write and graph an inequality that describes the different number of shirts and pants you can buy.

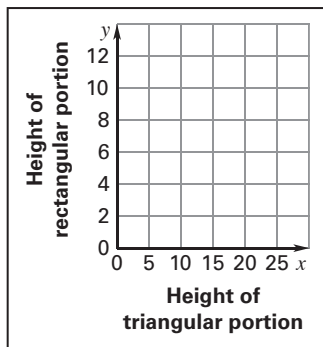


- b.** Give three possible combinations of pants and shirts that you can buy.

- 26. Window** The area of the window shown is less than 42 square feet. Let  $x$  and  $y$  represent the heights of the triangular and rectangular portions of the window, respectively.
- a.** Write and graph an inequality that describes the different dimensions of the window.



- b.** Could the height of the triangular portion be 2 feet and the height of the rectangular portion be 8 feet?



**LESSON**  
**6.1****Practice***For use with the lesson "Solve Linear Systems by Graphing"***Tell whether the ordered pair is a solution of the linear system.**

1.  $(4, 1);$

$x + 2y = 6$

$3x + y = 11$

2.  $(-2, 1);$

$5x - 2y = -12$

$x + 3y = 1$

3.  $(4, -3);$

$-3x + 2y = -18$

$6x - y = 27$

4.  $(-4, -6);$

$3x - y = 6$

$-x + 2y = 8$

5.  $(-4, 3);$

$4x + 3y = -12$

$x + 2y = -6$

6.  $(-2, -5);$

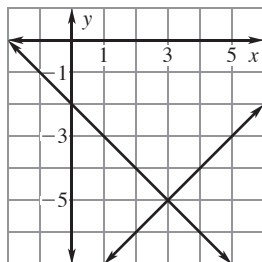
$-x + y = -3$

$-x + 3y = -13$

**Use the graph to solve the linear system. Check your solution.**

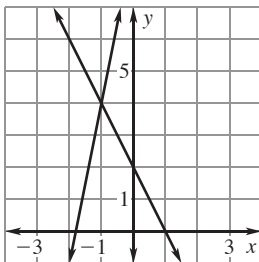
7.  $x - y = 8$

$x + y = -2$



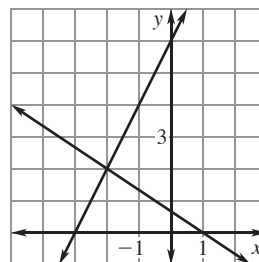
8.  $5x - y = -9$

$y + 2x = 2$



9.  $2x + 3y = 2$

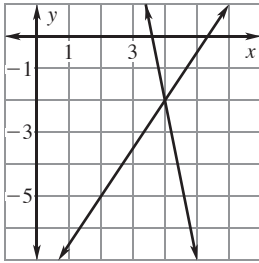
$-2x + y = 6$



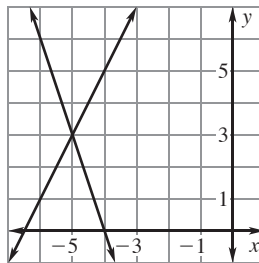
**LESSON**  
**6.1**

**Practice** *continued*  
For use with the lesson "Solve Linear Systems by Graphing"

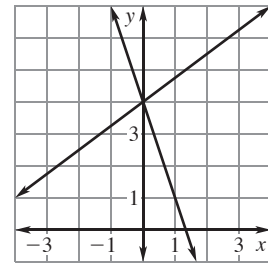
**10.**  $3x - 2y = 16$   
 $5x + y = 18$



**11.**  $2x - y = -13$   
 $y + 3x = -12$

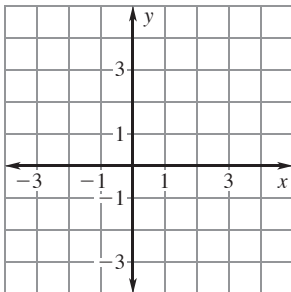


**12.**  $6x + 2y = 8$   
 $-3x + 4y = 16$

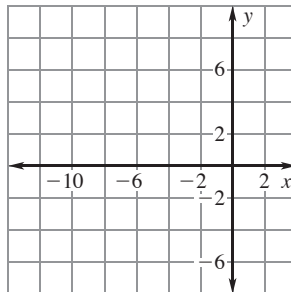


**Solve the linear system by graphing. Check your solution.**

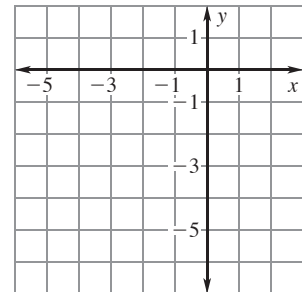
**13.**  $y = 3x$   
 $y = 4x - 1$



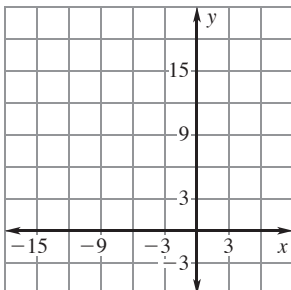
**14.**  $2x + y = -4$   
 $x - y = -8$



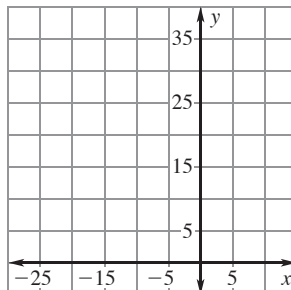
**15.**  $-3x - y = -1$   
 $2x + 4y = -16$



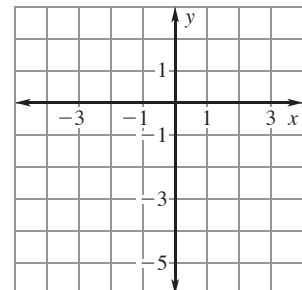
**16.**  $2x + 2y = -6$   
 $-5x + y = 15$



**17.**  $-6x + y = 33$   
 $2x - 8y = -34$



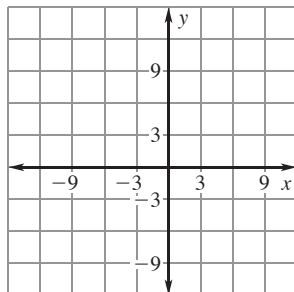
**18.**  $-9x + 6y = -6$   
 $2x - 3y = 8$



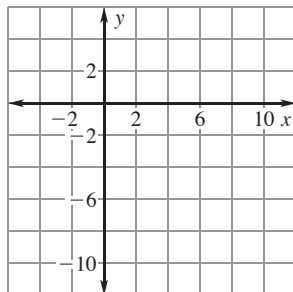
**LESSON**  
**6.1**

**Practice** *continued*  
For use with the lesson "Solve Linear Systems by Graphing"

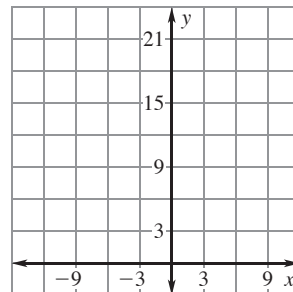
**19.**  $3x + 2y = 3$   
 $5x + y = -9$



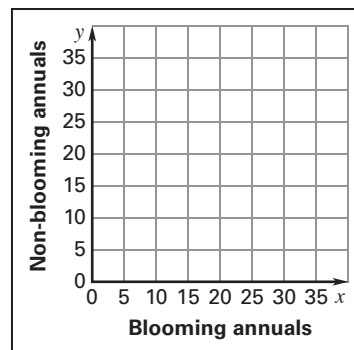
**20.**  $x - y = 9$   
 $3x + 2y = 2$



**21.**  $6x + y = 19$   
 $5x - 2y = -4$

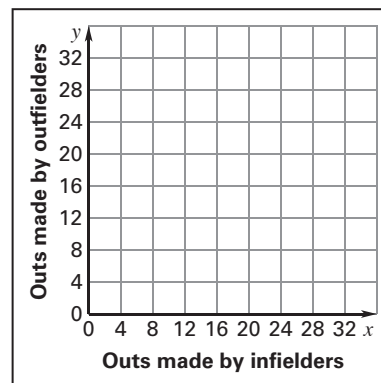


**22. Hanging Flower Baskets** You will be making hanging flower baskets. The plants you have picked out are blooming annuals and non-blooming annuals. The blooming annuals cost \$3.20 each and the non-blooming annuals cost \$1.50 each. You bought a total of 24 plants for \$49.60. Write a linear system of equations that you can use to find how many of each type of plant you bought. Then graph the linear system and use the graph to find how many of each type of plant you bought.



**23. Baseball Outs** In a game, 12 of a baseball team's 27 outs were fly balls. Twenty-five percent of the outs made by infielders and 100% of the outs made by outfielders were fly balls.

a. Write a linear system you can use to find the number of outs made by infielders and the number of outs made by outfielders. (*Hint:* Write one equation for the total number of outs and another equation for the number of fly ball outs.)



- b. Graph your linear system.
- c. How many outs were made by infielders? How many outs were made by outfielders?



**LESSON**  
**6.2****Practice**

For use with the lesson "Solve Linear Systems by Substitution"

**Solve for the indicated variable.**

1.  $8x + 4y = 12; y$

2.  $3x - 4y = 12; y$

3.  $6x - 4y = 8; x$

**Tell which equation you would use to isolate a variable. Explain your reasoning.**

4.  $x = 8y - 3$

$3x - 4y = 1$

5.  $-4x + 5y = 11$

$y = 4x - 1$

6.  $9 - 3x = y$

$3x - y = -2$

**Solve the linear system by using substitution.**

7.  $x = 6 - 4y$

$2x - 3y = 1$

8.  $4x + 3y = 0$

$2x + y = -2$

9.  $-x + 2y = -6$

$8x + y = 31$

10.  $6x - y = -35$

$5x - 2y = -35$

11.  $-x + 3y = -9$

$8x - 4y = 32$

12.  $3x + 3y = -18$

$4x - y = -14$

13.  $2x + 2y = 6$

$-3x + 5y = -33$

14.  $5x + 2y = 43$

$-6x + 3y = -30$

15.  $4x - 2y = -4$

$7x - 5y = -19$

**LESSON**  
**6.2****Practice** *continued*  
*For use with the lesson "Solve Linear Systems by Substitution"*

16.  $3x + 2y = 5$   
 $5x - 9y = -4$

17.  $4x - 3y = 28$   
 $2x + 3y = -4$

18.  $8x + 8y = 24$   
 $x + 5y = 11$

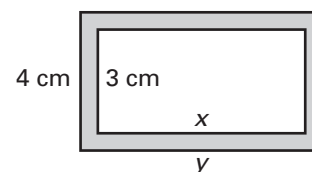
19. **Drum Sticks** A drummer is stocking up on drum sticks and brushes. The wood sticks that he buys are \$10.50 a pair and the brushes are \$24 a pair. He ends up spending \$90 on sticks and brushes and buys two times as many pairs of sticks as brushes. How many pairs of sticks and brushes did he buy?

20. **Mowing and Shoveling** Last year you mowed grass and shoveled snow for 12 households. You earned \$225 for mowing a household's lawn for the entire year and you earned \$200 for shoveling a household's walk and driveway for an entire year. You earned a total of \$2600 last year.

- a. Let  $x$  be the number of households you mowed for and let  $y$  be the number of households you shoveled for. Write an equation in  $x$  and  $y$  that shows the total number of households you worked for. Then write an equation in  $x$  and  $y$  that shows the total amount of money you earned.

- b. How many households did you mow the lawn for and how many households did you shovel the walk and driveway for?

21. **Dimensions of a Metal Sheet** A rectangular hole 3 centimeters wide and  $x$  centimeters long is cut in a rectangular sheet of metal that is 4 centimeters wide and  $y$  centimeters long. The length of the hole is 1 centimeter less than the length of the metal sheet. After the hole is cut, the area of the remaining metal sheet is 20 square centimeters. Find the length of the hole and the length of the metal sheet.



**LESSON**  
**6.3****Practice***For use with the lesson "Solve Linear Systems by Adding or Subtracting"***Rewrite the linear system so that the like terms are arranged in columns.**

1.  $8x - y = 19$   
 $y + 3x = 7$

2.  $4x = y - 11$   
 $6y + 4x = -3$

3.  $9x - 2y = 5$   
 $2y = -11x + 8$

**Describe the first step you would use to solve the linear system.**

4.  $22x - y = -4$   
 $y = 6x - 5$

5.  $25 = x - 7y$   
 $x + 12y = -8$

6.  $3x + 7 = 2y$   
 $-2y - 1 = 10x$

7.  $x + 9y = 2$   
 $14x - 9y = -4$

8.  $4x + 3y = -6$   
 $3y = -5x + 1$

9.  $4x + y = -10$   
 $x + y = -14$

**Solve the linear system by using elimination.**

10.  $x + 5y = 28$   
 $-x - 2y = -13$

11.  $7x - 4y = -30$   
 $3x + 4y = 10$

12.  $6x + y = 39$   
 $-2x + y = -17$

13.  $3x = y - 20$   
 $-7x - y = 40$

14.  $2x - 6y = -10$   
 $4x = 10 + 6y$

15.  $x - 3y = 6$   
 $-2x = 3y + 33$

**LESSON**  
**6.3****Practice** *continued**For use with the lesson "Solve Linear Systems by Adding or Subtracting"*

16.  $-3x = y - 20$   
 $-y = -5x + 4$

17.  $x - \frac{1}{2}y = \frac{11}{2}$   
 $-x + 4y = 26$

18.  $-\frac{2}{3}x + 6y = 38$   
 $x - 6y = -33$

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

20.  $7x - \frac{1}{3}y = -29$   
 $2x - \frac{1}{3}y = -9$

21.  $\frac{1}{2}x - \frac{3}{2}y = -\frac{29}{2}$   
 $-\frac{1}{2}x + 3y = 33$

22. **Fishing Barge** A fishing barge leaves from a dock and moves upstream (against the current) at a rate of 3.8 miles per hour until it reaches its destination. After the people on the barge are done fishing, the barge moves the same distance downstream (with the current) at a rate of 8 miles per hour until it returns to the dock. The speed of the current remains constant. Use the models below to write and solve a system of equations to find the average speed of the barge in still water and the speed of the current.

**Upstream:** Speed of barge in still water – Speed of current = Speed of barge

**Downstream:** Speed of barge in still water + Speed of current = Speed of barge

23. **Floor Sander Rental** A rental company charges a flat fee of  $x$  dollars for a floor sander rental plus  $y$  dollars per hour of the rental. One customer rents a floor sander for 4 hours and pays \$63. Another customer rents a floor sander for 6 hours and pays \$87.

a. Find the flat fee and the cost per hour for the rental.

b. How much would it cost someone to rent a sander for 11 hours?

**LESSON**  
**6.4****Practice***For use with the lesson "Solve Linear Systems by Multiplying First"***Describe the first step you would use to solve the linear system.**

**1.**  $3x - 4y = 7$   
 $5x + 8y = 10$

**2.**  $9x + 4y = 13$   
 $3x + 5y = 9$

**3.**  $5x + 7y = -3$   
 $15x + 4y = -5$

**4.**  $7x - 4y = 6$   
 $3x - 2y = -15$

**5.**  $7x + 9y = -6$   
 $-5x + 14y = 11$

**6.**  $9x - 5y = 14$   
 $-6x + 8y = 13$

**Solve the linear system by using elimination.**

**7.**  $x + 3y = 1$   
 $-5x + 4y = -24$

**8.**  $-3x - y = -15$   
 $8x + 4y = 48$

**9.**  $x + 7y = -37$   
 $2x - 5y = 21$

**10.**  $8x - 4y = -76$   
 $5x + 2y = -16$

**11.**  $-3x + 10y = 23$   
 $5x + 2y = 55$

**12.**  $9x - 4y = 26$   
 $18x + 7y = 22$

**13.**  $4x - 3y = 16$   
 $16x + 10y = 240$

**14.**  $20x + 10y = 100$   
 $-5x + 4y = 53$

**15.**  $3x - 10y = -25$   
 $5x - 20y = -55$

**16.**  $-3x - 4y = 27$   
 $5x - 6y = -7$

**17.**  $2x + 7y = 2$   
 $5x - 2y = 83$

**18.**  $3x - 5y = -16$   
 $2x - 3y = -8$

LESSON  
6.4**Practice** *continued**For use with the lesson "Solve Linear Systems by Multiplying First"*

- 19. Hockey Game** Two families go to a hockey game. One family purchases two adult tickets and four youth tickets for \$28. Another family purchases four adult tickets and five youth tickets for \$45.50. Let  $x$  represent the cost in dollars of one adult ticket and let  $y$  represent the cost in dollars of one youth ticket.
- Write a linear system that represents this situation.
  - Solve the linear system to find the cost of one adult and one youth ticket.
  - How much would it cost two adults and five youths to attend the game?
- 20. Travel Agency** A travel agency offers two Chicago outings. Plan A includes hotel accommodations for three nights and two pairs of baseball tickets worth a total of \$557. Plan B includes hotel accommodations for five nights and four pairs of baseball tickets worth a total of \$974. Let  $x$  represent the cost in dollars of one night's hotel accommodations and let  $y$  represent the cost in dollars of one pair of baseball tickets.
- Write a linear system you could use to find the cost of one night's hotel accommodations and the cost of one pair of baseball tickets.
  - Solve the linear system to find the cost of one night's hotel accommodations and the cost of one pair of baseball tickets.
- 21. Highway Project** There are fifteen workers employed on a highway project, some at \$180 per day and some at \$155 per day. The daily payroll is \$2400. Let  $x$  represent the number of \$180 per day workers and let  $y$  represent the number of \$155 per day workers. Write and solve a linear system to find the number of workers employed at each wage.

**LESSON**  
**6.5**

**Practice**

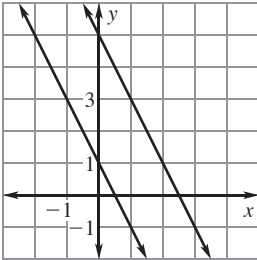
For use with the lesson "Solve Special Types of Linear Systems"

**Match the linear system with its graph. Then use the graph to tell whether the linear system has *one solution*, *no solution*, or *infinitely many solutions*.**

1.  $y + 3 = 4x$

$3y = 12x - 9$

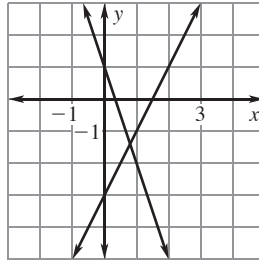
A.



2.  $2x + y = 1$

$2x + y = 5$

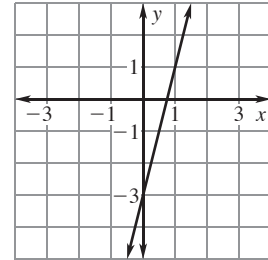
B.



3.  $3x + y = 1$

$-2x + y = -3$

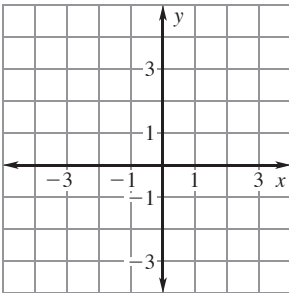
C.



**Graph the linear system. Then use the graph to tell whether the linear system has *one solution*, *no solution*, or *infinitely many solutions*.**

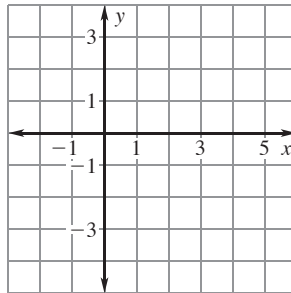
4.  $-6x + 2y = -2$

$-3x + y = 2$



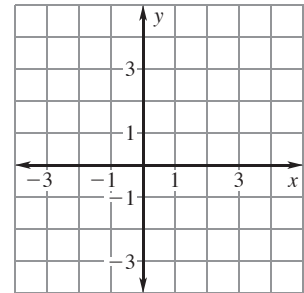
5.  $2y - x = -4$

$2x + y = 3$



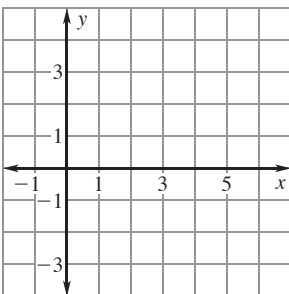
6.  $4x - y = 2$

$-x + 3y = 9$



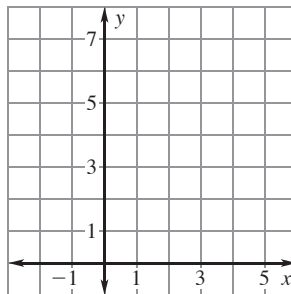
7.  $x + 2y = 3$

$-x + 2y = -2$



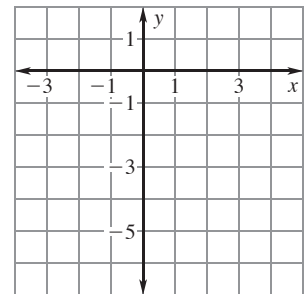
8.  $3x + y = 4$

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



9.  $2x - y = 4$

$-2x + y = -4$



**LESSON**  
**6.5****Practice** *continued*  
*For use with the lesson "Solve Special Types of Linear Systems"***Solve the linear system by using substitution or elimination.**

**10.**  $3x - 2y = 24$   
 $x + 2y = 8$

**11.**  $3x + 2y = 4$   
 $-6x - 4y = -8$

**12.**  $x + y = 50$   
 $-3x + 2y = 0$

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

**14.**  $-x + 3y = 9$   
 $2x + y = 10$

**15.**  $2x + y = 6$   
 $2x + y = -7$

**Without solving the linear system, tell whether the linear system has *one solution, no solution, or infinitely many solutions.***

**16.**  $-6x + 6y = -4$   
 $2x - 2y = 5$

**17.**  $y + 2x = \frac{8}{3}$   
 $2x + y = -10$

**18.**  $4x + 3y = 9$   
 $\frac{3}{4}x + y = 3$

**19.**  $4x - 6y = -1$   
 $-\frac{3}{2}x + y = \frac{1}{4}$

**20.**  $-\frac{2}{3}x + y = 2$   
 $-6x + 3y = 6$

**21.**  $9x - 15y = 15$   
 $x + \frac{3}{5}y = 1$

**22.**  $-3x + 4y = 2$   
 $2y = \frac{3}{2}x + 1$

**23.**  $3x + y = 4$   
 $x + \frac{1}{3}y = 2$

**24.**  $-4x + 3y = 2$   
 $4 - 6y = -8x$



**LESSON**  
**6.5****Practice** *continued**For use with the lesson "Solve Special Types of Linear Systems"*

- 25. Golf Clubs** A sporting goods store stocks a “better” set of golf clubs in both left-handed and right-handed sets. The set of left-handed golf clubs sells for  $x$  dollars and the set of right-handed golf clubs sells for  $y$  dollars. In one month, the store sells 2 sets of left-handed golf clubs and 12 sets of right-handed golf clubs for a total of \$1859.30. The next month, the store sells 2 sets of left-handed golf clubs and 22 sets of right-handed golf clubs for a total of \$3158.80. Is there enough information to determine the cost of each kind of set? *Explain.*

- 26. Comedy Tickets** The table below shows the ticket sales at an all-ages comedy club on a Friday night and a Saturday night.

| Day      | Number of adult tickets | Number of student tickets | Total sales (dollars) |
|----------|-------------------------|---------------------------|-----------------------|
| Friday   | 30                      | 20                        | 910                   |
| Saturday | 45                      | 30                        | 1365                  |

- a.** Let  $x$  represent the cost (in dollars) of one adult ticket and let  $y$  represent the cost (in dollars) of one student ticket. Write a linear system that models the situation.
- b.** Solve the linear system.
- c.** Can you determine how much each kind of ticket costs? Why or why not?

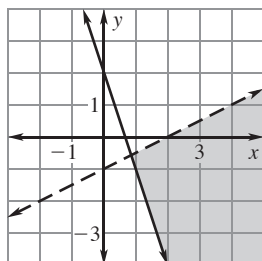
**LESSON**  
**6.6**

**Practice**

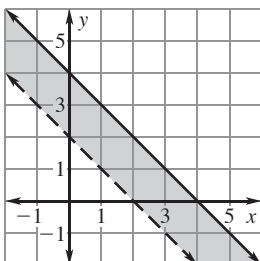
For use with the lesson "Solve Systems of Linear Inequalities"

**Tell whether the ordered pair is a solution of the system of inequalities.**

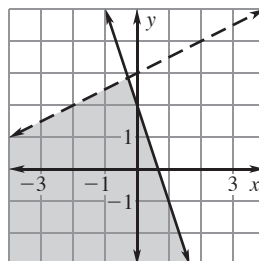
1. (3, 0)



2. (2, 2)

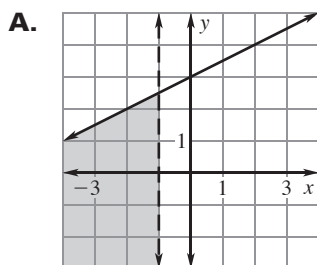


3. (-2, 2)

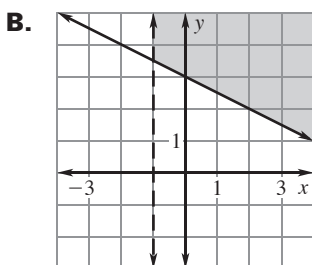


**Match the system of inequalities with its graph.**

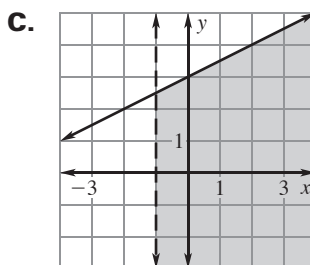
4.  $\frac{1}{2}x + y \geq 3$   
 $x > -1$



5.  $y - \frac{1}{2}x \leq 3$   
 $x < -1$

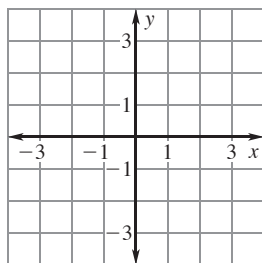


6.  $y \leq \frac{1}{2}x + 3$   
 $x > -1$

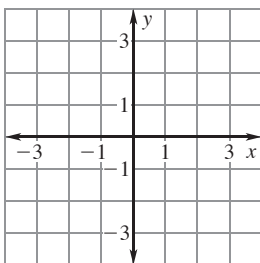


**Graph the system of inequalities.**

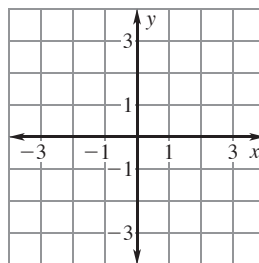
7.  $x > -1$   
 $x < 1$



8.  $y \geq 2$   
 $y < 3$



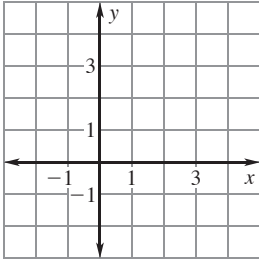
9.  $x + y > 1$   
 $x \leq y$



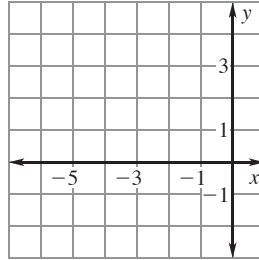
**LESSON**  
**6.6**

**Practice** *continued*  
*For use with the lesson "Solve Systems of Linear Inequalities"*

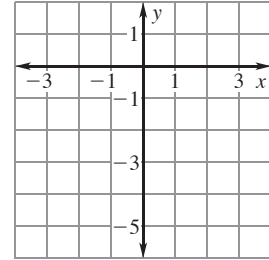
**10.**  $x \geq y + 2$   
 $2x + y < 4$



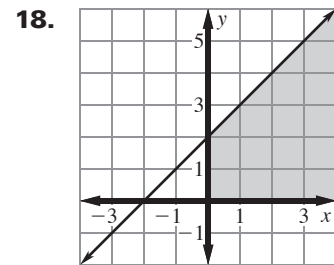
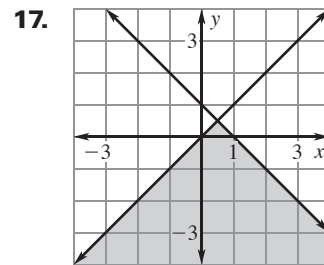
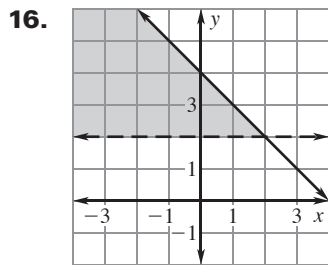
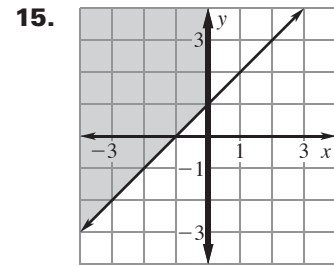
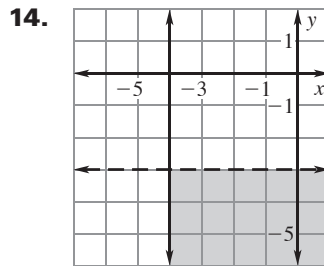
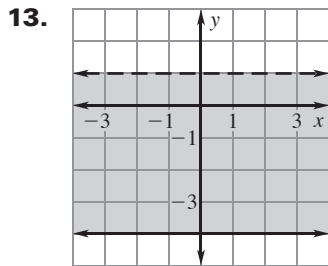
**11.**  $y \geq 2$   
 $x + y \leq -3$



**12.**  $x \leq -y$   
 $2x - y < 4$



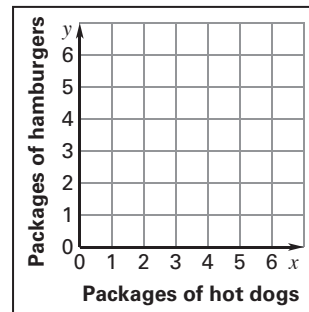
**Write a system of inequalities for the shaded region.**



**LESSON**  
**6.6**
**Practice** *continued*
*For use with the lesson "Solve Systems of Linear Inequalities"*

- 19. Cookout** You are planning a cookout. You figure that you will need at least 5 packages of hot dogs and hamburgers. A package of hot dogs costs \$1.90 and a package of hamburgers costs \$5.20. You can spend a maximum of \$20 on the hot dogs and hamburgers.

- a. Let  $x$  represent the number of packages of hot dogs and let  $y$  represent the number of packages of hamburgers. Write a system of linear inequalities for the number of packages of each that can be bought.

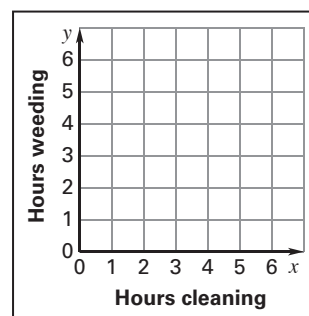


- b. Graph the system of inequalities.

- c. Identify two possible combinations of packages of hot dogs and hamburgers you can buy.

- 20. Chores** You need at least 4 hours to do your chores, which are cleaning out the garage and weeding the flower beds around your house. It is 1:30 P.M. on Sunday and your friend wants you to go to the movies at 7:00 P.M.

- a. How much time do you have between now and 7:00 P.M. to do your chores?



- b. Let  $x$  represent the number of hours spent cleaning out the garage and let  $y$  represent the number of hours spent on weeding the flower beds. Write and graph a system of linear inequalities that shows the number of hours you can work on each chore if you go to the movies.

- c. Identify two possible combinations of time you can spend on each chore.

**LESSON**  
**7.1****Practice***For use with the lesson "Apply Exponent Properties Involving Products"***Simplify the expression. Write your answer using exponents.**

1.  $5^4 \cdot 5^8$

2.  $(-4)^7 \cdot (-4)^3$

3.  $(-10)^5 \cdot (-10)^2$

4.  $8^2 \cdot 8^4 \cdot 8$

5.  $2^5 \cdot 2 \cdot 2^4$

6.  $(3^5)^2$

7.  $(9^3)^7$

8.  $(15^2)^4$

9.  $[(-4)^5]^9$

10.  $(13 \cdot 19)^4$

11.  $(48 \cdot 27)^6$

12.  $(135 \cdot 8)^5$

**Simplify the expression.**

13.  $x^5 \cdot x^2$

14.  $y^3 \cdot y \cdot y^4$

15.  $a^{10} \cdot a^2 \cdot a^6$

16.  $(z^5)^5$

17.  $(b^7)^2$

18.  $[(b + 1)^2]^3$

19.  $(-3x)^4$

20.  $-(3x)^4$

**LESSON**  
**7.1****Practice** *continued**For use with the lesson "Apply Exponent Properties Involving Products"*

21.  $(2ab)^5$

22.  $(2x^3y)^6$

23.  $(3m^7)^4 \cdot m^3$

24.  $4p^2 \cdot (3p^5)^2$

**Find the missing exponent.**

25.  $x^6 \cdot x^? = x^{12}$

26.  $(x^4)^? = x^{12}$

27.  $(3z^?)^3 = 27z^{18}$

- 28. Newspaper Circulation** In 1996, the newspaper circulation in the country of Algeria was approximately  $10^3$  times the newspaper circulation in the country of Mauritania. The newspaper circulation in Mauritania was  $10^3$ . What was the newspaper circulation in Algeria?
- 29. Metric System** The metric system has names for very large weights.
- One gigaton is  $10^2$  times the weight of a hectaton. One hectaton is  $10^2$  ton. Write one gigaton in tons.
  - One teraton is  $10^9$  times the weight of a kiloton. One kiloton is  $10^3$  ton. Write one teraton in tons.
  - One exaton is  $10^6$  times the weight of a teraton. Use your answer to part (b) to write one exaton in tons.
- 30. Wall Mural** You are designing a wall mural that will be composed of squares of different sizes. One of the requirements of your design is that the side length of each square is itself a perfect square.
- If you represent the side length of a square as  $x^2$ , write an expression for the area of a mural square.
  - Find the area of a mural square when  $x = 5$ .
  - Find the area of a mural square when  $x = 10$ .

**LESSON**  
**7.2****Practice***For use with the lesson "Apply Exponent Properties Involving Quotients"***Simplify the expression. Write your answer using exponents.**

1.  $\frac{6^{14}}{6^8}$

2.  $\frac{14^5}{14^4}$

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

4.  $\frac{12^5 \cdot 12^3}{12^4}$

5.  $\frac{8^{17}}{8^3 \cdot 8^7}$

6.  $\left(\frac{3}{4}\right)^5$

7.  $\left(-\frac{1}{5}\right)^6$

8.  $3^8 \cdot \frac{1}{3^1}$

9.  $\left(\frac{1}{4}\right)^5 \cdot 4^{13}$

**Simplify the expression.**

10.  $\frac{1}{y^9} \cdot y^{15}$

11.  $z^{16} \cdot \frac{1}{z^7}$

12.  $\left(\frac{a}{b}\right)^8$

13.  $\left(-\frac{6}{z}\right)^3$

14.  $\left(\frac{a^3}{2b^5}\right)^4$

15.  $\left(\frac{3x^4}{y^6}\right)^5$

16.  $\left(\frac{m^4}{5n^9}\right)^3$

17.  $\left(\frac{3x^7}{2y^{12}}\right)^4$

18.  $\left(\frac{2m^5}{3n^9}\right)^5$

**LESSON**  
**7.2****Practice** *continued**For use with the lesson "Apply Exponent Properties Involving Quotients"*

- 19. Area** The area of New Zealand is 104,454 square miles and the area of Saint Kitts and Nevis, islands in the Caribbean Sea, is 104 square miles. Use order of magnitude to estimate how many times greater New Zealand's area is than Saint Kitts and Nevis' area.

- 20. Cell Phone Subscribers** The table below shows the approximate number of cell phone subscribers in selected countries in 2001.

| Country               | Algeria | Dominican Republic | Poland | Solomon Islands |
|-----------------------|---------|--------------------|--------|-----------------|
| Number of subscribers | $10^5$  | $10^6$             | $10^7$ | $10^3$          |

- a.** How many times greater is the number of cell phone subscribers in Poland than in the Solomon Islands?
- b.** How many times greater is the number of cell phone subscribers in the Dominican Republic than in the Solomon Islands?
- 21. Glass Vase** You are taking a glass-blowing class and have created a vase in the shape of a sphere. The vase will have a hole in the top so you can put flowers in it and it will sit on a stand. The radius of your vase is  $\frac{21}{2}$  inches. Use the formula  $V = \frac{4}{3}\pi r^3$  to write an expression for the volume of your vase.



**LESSON**  
**7.3****Practice***For use with the lesson "Define and Use Zero and Negative Exponents"***Evaluate the expression.**

1.  $3^{-5}$

2.  $10^{-3}$

3.  $(-2)^{-6}$

4.  $5^0$

5.  $(-6)^0$

6.  $\left(\frac{4}{3}\right)^0$

7.  $\left(\frac{5}{8}\right)^{-2}$

8.  $\left(\frac{7}{4}\right)^3$

9.  $0^{-5}$

10.  $10^{-2} \cdot 10^{-3}$

11.  $4^{-6} \cdot 4^3$

12.  $\frac{1}{5^{-4}}$

**Simplify the expression. Write your answer using only positive exponents.**

13.  $x^{-7}$

14.  $6y^{-4}$

15.  $(2b)^{-5}$

16.  $(-3m)^{-4}$

17.  $a^2b^{-4}$

18.  $3x^{-2}y^{-5}$

**LESSON**  
**7.3****Practice** *continued**For use with the lesson "Define and Use Zero and Negative Exponents"*

19.  $(4x^{-4}y^2)^{-3}$

20.  $(8mn^3)^0$

21.  $\frac{c^{-3}}{d^{-5}}$

22.  $\frac{x^2}{y^{-4}}$

23.  $\frac{x^{-6}}{4y^5}$

24.  $\frac{1}{3x^{-3}y^{-7}}$

25. **Paper** A sheet of 67-pound paper has a thickness of  $100^{-1}$  inch.

a. Write and evaluate an expression for the total thickness of 5 sheets of 67-pound paper.

b. Write and evaluate an expression for the total thickness of  $2^3$  sheets of 67-pound paper.

26. **Frogs** A frog egg currently has a radius of  $5^{-1}$  centimeter. Write an expression for the volume of the frog egg. Use the formula for the volume of a sphere

$$V = \frac{4}{3}\pi r^3.$$

27. **Metric System** The metric system has names for very small lengths.

a. One micrometer is  $10^3$  times the length of one nanometer. One nanometer is  $10^{-9}$  meter. Write one micrometer in meters.

b. One femtometer is  $10^3$  times the length of one attometer. One attometer is  $10^{-18}$  meter. Write one femtometer in meters.

c. One centimeter is  $10^{10}$  times the length of one picometer. One picometer is  $10^{-12}$  meter. Write one centimeter in meters.

**LESSON**  
**7.4**

**Practice**

For use with the lesson "Write and Graph Exponential Growth Functions"

**Write a rule for the function.**

1.

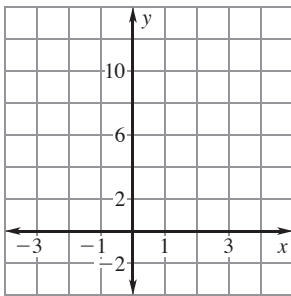
|          |                 |                |   |    |     |
|----------|-----------------|----------------|---|----|-----|
| <b>x</b> | -2              | -1             | 0 | 1  | 2   |
| <b>y</b> | $\frac{1}{121}$ | $\frac{1}{11}$ | 1 | 11 | 121 |

2.

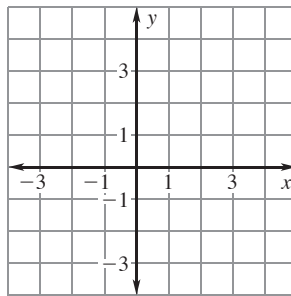
|          |               |               |               |   |   |
|----------|---------------|---------------|---------------|---|---|
| <b>x</b> | -1            | 0             | 1             | 2 | 3 |
| <b>y</b> | $\frac{1}{8}$ | $\frac{1}{4}$ | $\frac{1}{2}$ | 1 | 2 |

**Graph the function and identify its domain and range.**

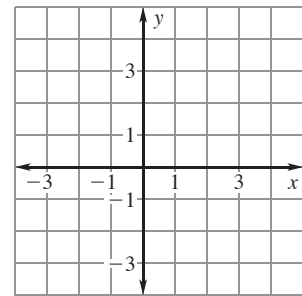
3.  $y = 12^x$



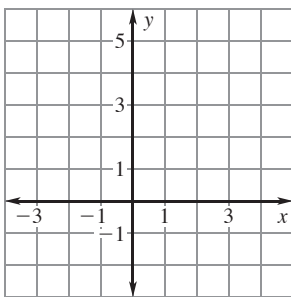
4.  $y = (1.75)^x$



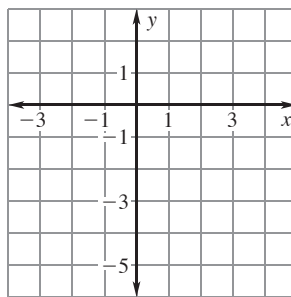
5.  $y = (3.1)^x$



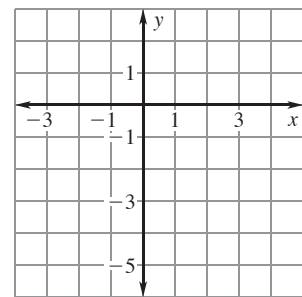
6.  $y = \left(\frac{9}{2}\right)^x$



7.  $y = -5^x$

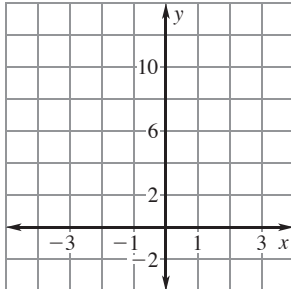


8.  $y = -\left(\frac{3}{2}\right)^x$

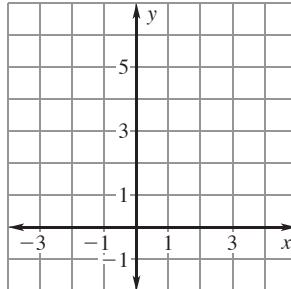


**LESSON**  
**7.4**
**Practice** *continued*
*For use with the lesson "Write and Graph Exponential Growth Functions"*

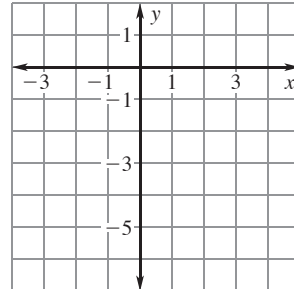
**9.**  $y = 5 \cdot 2^x$



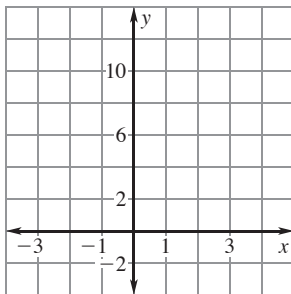
**10.**  $y = 2 \cdot \left(\frac{4}{3}\right)^x$



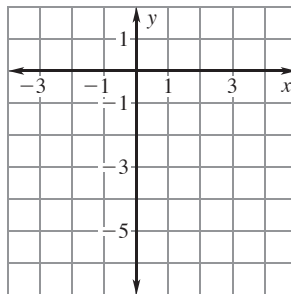
**11.**  $y = -3 \cdot 2^x$


**Graph the function. Compare the graph with the graph of  $y = 6^x$ .**

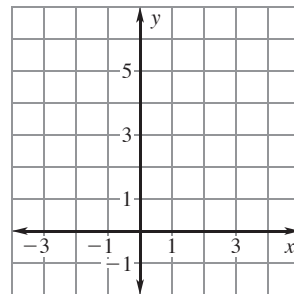
**12.**  $y = 2 \cdot 6^x$



**13.**  $y = -6^x$

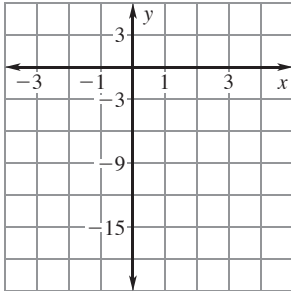


**14.**  $y = \frac{1}{2} \cdot 6^x$

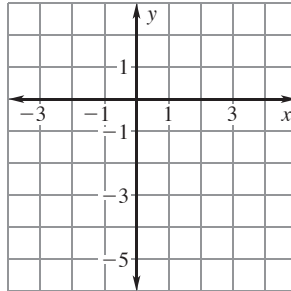


**LESSON**  
**7.4**
**Practice** *continued*
*For use with the lesson "Write and Graph Exponential Growth Functions"*

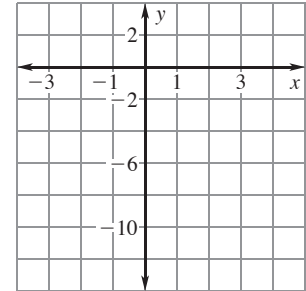
**15.**  $y = -3 \cdot 6^x$



**16.**  $y = -\frac{1}{4} \cdot 6^x$



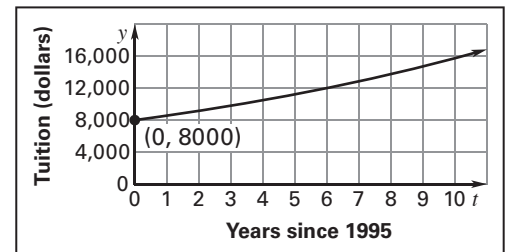
**17.**  $y = -\frac{3}{2} \cdot 6^x$



- 18. Investments** You deposit \$500 in a savings account that earns 2.5% interest compounded yearly. Find the balance in the account after the given amounts of time.

- 1 year
- 5 years
- 20 years

- 19. College Tuition** From 1995 to 2005, the tuition at a college increased by about 7% per year. Use the graph to write an exponential growth function that models the tuition over time.



- 20. Profit** A business had \$10,000 profit in 2000. Then the profit increased by 8% each year for the next 10 years.

- Write a function that models the profit in dollars over time.
- Use the function to predict the profit in 2009.

**LESSON**  
**7.5****Practice**

For use with the lesson "Write and Graph Exponential Decay Functions"

**Tell whether the table represents an exponential function. If so, write a rule for the function.**

1.

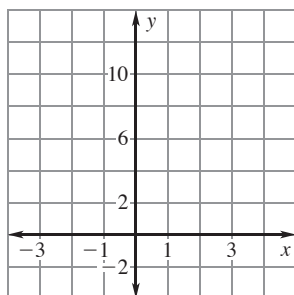
|          |    |    |   |               |                |
|----------|----|----|---|---------------|----------------|
| <b>x</b> | -2 | -1 | 0 | 1             | 2              |
| <b>y</b> | 25 | 5  | 1 | $\frac{1}{5}$ | $\frac{1}{25}$ |

2.

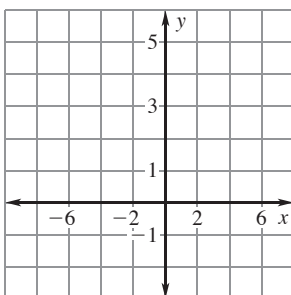
|          |    |   |   |    |    |
|----------|----|---|---|----|----|
| <b>x</b> | -1 | 0 | 1 | 2  | 3  |
| <b>y</b> | 1  | 4 | 7 | 10 | 13 |

**Graph the function and identify its domain and range.**

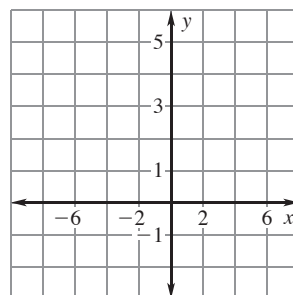
3.  $y = \left(\frac{1}{12}\right)^x$



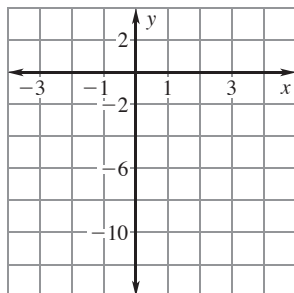
4.  $y = \left(\frac{7}{8}\right)^x$



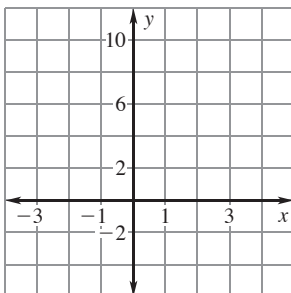
5.  $y = \left(\frac{8}{9}\right)^x$



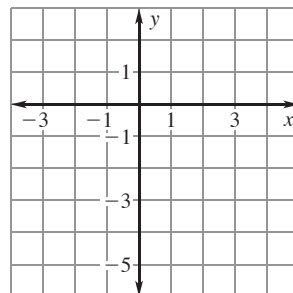
6.  $y = -\left(\frac{1}{8}\right)^x$



7.  $y = 2 \cdot \left(\frac{1}{5}\right)^x$



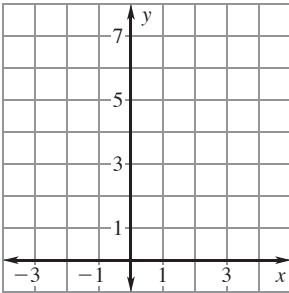
8.  $y = -2 \cdot \left(\frac{2}{3}\right)^x$



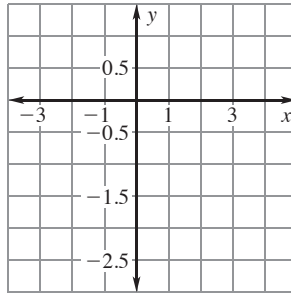
**LESSON**  
**7.5**

**Practice** *continued*  
For use with the lesson "Write and Graph Exponential Decay Functions"

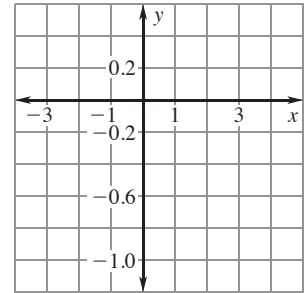
9.  $y = 2 \cdot (0.25)^x$



10.  $y = -0.5 \cdot (0.3)^x$

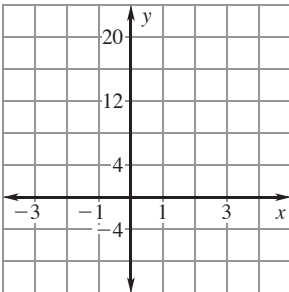


11.  $y = -0.2 \cdot (0.2)^x$

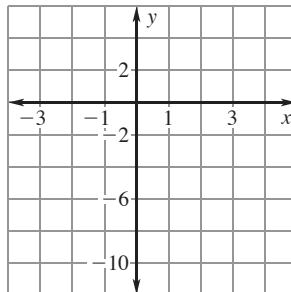


**Graph the function. Compare the graph with the graph of  $y = \left(\frac{1}{8}\right)^x$ .**

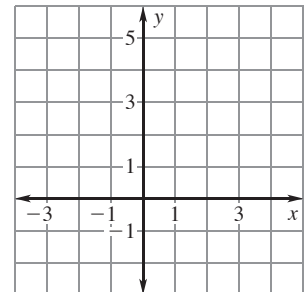
12.  $y = 2 \cdot \left(\frac{1}{8}\right)^x$



13.  $y = -\left(\frac{1}{8}\right)^x$

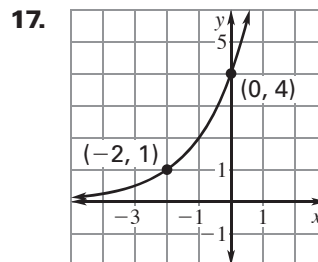
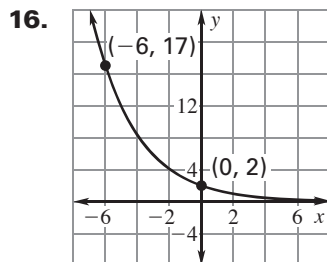
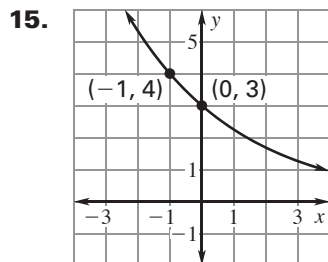


14.  $y = \frac{1}{4} \cdot \left(\frac{1}{8}\right)^x$



**LESSON**  
**7.5**
**Practice** *continued*
*For use with the lesson "Write and Graph Exponential Decay Functions"*

**Tell whether the graph represents exponential growth or exponential decay. Then write a rule for the function.**

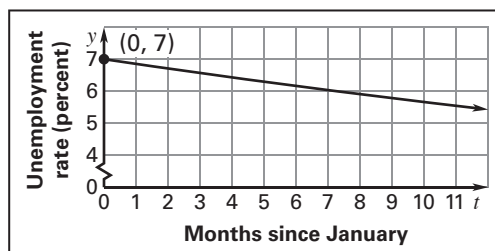


18. **Computer Value** You buy a computer for \$3000. It depreciates at the rate of 20% per year. Find the value of the computer after the given number of years.

- 1 year
- 3 years
- 5 years

19. **Unemployment Rate** In 2000, the unemployment rate of a city decreased by approximately 2.1% each month. In January, the unemployment rate was 7%.

- Use the graph at the right to write a function that models the unemployment rate of the city over time.



- What was the unemployment rate in December?

20. **Indoor Water Park** An indoor water park had a declining attendance from 2000 to 2005. The attendance in 2000 was 18,000. Each year for the next 5 years, the attendance decreased by 5.5%.

- Write a function that models the attendance since 2000.

- What was the attendance in 2005?



**LESSON**  
**8.1****Practice***For use with the lesson "Add and Subtract Polynomials"*

**Write the polynomial so that the exponents decrease from left to right. Identify the degree and leading coefficient of the polynomial.**

1.  $4n^5$

2.  $4x - 2x^2 + 3$

3.  $6y^3 - 2y^2 + 4y^4 - 5$

**Tell whether the expression is a polynomial. If it is a polynomial, find its degree and classify it by the number of its terms. Otherwise, tell why it is not a polynomial.**

4.  $10^x$

5.  $-6n^2 - n^3 + 4$

6.  $w^{-3} + 5$

**Find the sum or difference.**

7.  $(3z^2 + z - 4) + (2z^2 + 2z - 3)$

8.  $(8c^2 - 4c + 1) + (-3c^2 + c + 5)$

9.  $(2x^2 + 5x - 1) + (x^2 - 5x + 7)$

10.  $(10b^2 - 3b + 2) - (4b^2 + 5b + 1)$

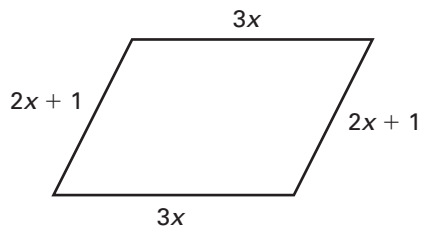
11.  $(-4m^2 + 3m - 1) - (m + 2)$

12.  $(3m + 4) - (2m^2 - 6m + 5)$

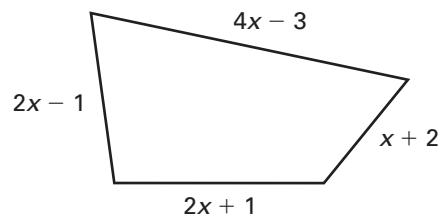
**LESSON**  
**8.1**
**Practice** *continued*  
*For use with the lesson "Add and Subtract Polynomials"*

Write a polynomial that represents the perimeter of the figure.

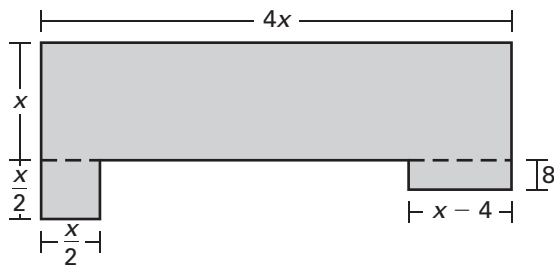
13.



14.



15. **Floor Plan** The first floor of a home has the floor plan shown. Find the area of the first floor.



16. **Profit** For 1995 through 2005, the revenue  $R$  (in dollars) and the cost  $C$  (in dollars) of producing a product can be modeled by

$$R = \frac{1}{4}t^2 + \frac{21}{4}t + 400 \quad \text{and} \quad C = \frac{1}{12}t^2 + \frac{13}{4}t + 200$$

where  $t$  is the number of years since 1995. Write an equation for the profit earned from 1995 to 2005. (*Hint: Profit = Revenue - Cost*)

**LESSON**  
**8.2****Practice***For use with the lesson "Multiply Polynomials"***Find the product.**

1.  $x^2(6x^2 - 3x - 1)$

2.  $-5a^3(4a^4 - 3a + 1)$

3.  $4d^2(-2d^3 + 5d^2 - 6d + 2)$

4.  $(3x + 1)(2x - 5)$

5.  $(2y + 3)(y - 5)$

6.  $(6a - 3)(4a - 1)$

7.  $(b - 8)(5b - 2)$

8.  $(8m + 7)(2m + 3)$

9.  $(-p + 2)(3p^2 + 1)$

10.  $(2z - 7)(-z + 3)$

11.  $(-3d + 10)(2d - 1)$

12.  $(n + 1)(n^2 + 4n + 5)$

13.  $(w - 3)(w^2 + 8w + 1)$

14.  $(2s + 5)(s^2 + 3s - 1)$

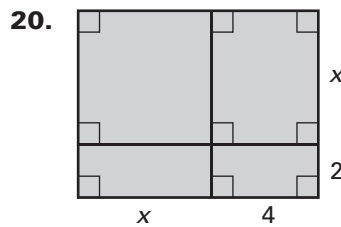
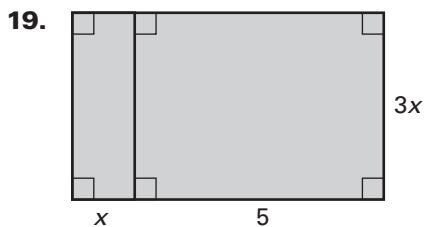
15.  $(x^2 - 4xy + y^2)(5xy)$

**Simplify the expression.**

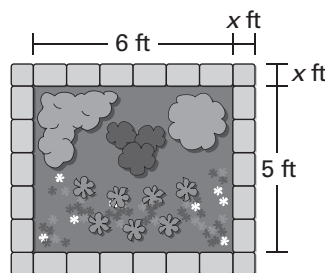
16.  $a(3a + 1) + (a + 1)(a - 1)$

17.  $(x + 2)(x + 5) - x(4x - 1)$

18.  $(m + 7)(m - 3) + (m - 4)(m + 5)$

LESSON  
8.2**Practice** *continued*  
For use with the lesson "Multiply Polynomials"**Write a polynomial for the area of the shaded region.**

21. **Flower Bed** You are designing a rectangular flower bed that you will border using brick pavers. The width of the border around the bed will be the same on every side, as shown.



- a. Write a polynomial that represents the total area of the flower bed and the border.
- b. Find the total area of the flower bed and border when the width of the border is 1.5 feet.
22. **School Enrollment** During the period 1995–2002, the number  $S$  of students (in thousands) enrolled in school in the U.S. and the percent  $P$  (in decimal form) of this amount that are between 7 and 13 years old can be modeled by
- $$S = 32.6t^3 - 376.45t^2 + 1624.2t + 66,939$$
- and
- $$P = 0.000005t^4 - 0.0003t^3 + 0.003t^2 - 0.007t + 0.4$$
- where  $t$  is the number of years since 1995.
- a. Find the values of  $S$  and  $P$  for  $t = 0$ . What does the product  $S \cdot P$  mean for  $t = 0$  in the context of this problem?
- b. Write an equation that models the number of students (in thousands) that are between 7 and 13 years old as a function of the number of years since 1995.
- c. How many students between 7 and 13 years old were enrolled in 1995?

**LESSON**  
**8.3****Practice***For use with the lesson "Find Special Products of Polynomials"***Find the product of the square of the binomial.**

1.  $(x - 9)^2$

2.  $(m + 11)^2$

3.  $(5s + 2)^2$

4.  $(3m + 7)^2$

5.  $(4p - 5)^2$

6.  $(7a - 6)^2$

7.  $(10z - 3)^2$

8.  $(2x + y)^2$

9.  $(3y - x)^2$

**Find the product of the sum and difference.**

10.  $(a - 9)(a + 9)$

11.  $(z - 20)(z + 20)$

12.  $(5r + 1)(5r - 1)$

13.  $(6m + 10)(6m - 10)$

14.  $(7p - 2)(7p + 2)$

15.  $(9c - 1)(9c + 1)$

16.  $(4x + 3)(4x - 3)$

17.  $(4 - w)(4 + w)$

18.  $(5 - 2y)(5 + 2y)$

**Describe how you can use mental math to find the product.**

19.  $15 \cdot 25$

20.  $43 \cdot 57$

21.  $18^2$

**LESSON**  
**8.3**
**Practice** *continued*  
 For use with the lesson "Find Special Products of Polynomials"

Perform the indicated operation using the functions  $f(x) = 4x + 0.5$  and  $g(x) = 4x - 0.5$ .

22.  $f(x) \cdot g(x)$

23.  $(f(x))^2$

24.  $(g(x))^2$

- 25. Pea Plants** In pea plants, the gene  $S$  is for spherical seed shape, and the gene  $s$  is for wrinkled seed shape. Any gene combination with an  $S$  results in a spherical seed shape. Suppose two pea plants have the same gene combination  $Ss$ .
- Make a Punnett square that shows the possible gene combinations of an offspring pea plant and the resulting seed shape.
  - Write a polynomial that models the possible gene combinations of an offspring pea plant.
  - What percent of the possible gene combinations of the offspring results in a wrinkled seed shape?

- 26. Basketball Statistics** You are on the basketball team and you want to figure out some statistics about foul shots. The area model shows the possible outcomes of two attempted foul shots.

- What percent of the two possible outcomes of two attempted foul shots results in you making at least one foul shot? *Explain* how you found your answer using the table.

|        |      |        |
|--------|------|--------|
|        | Made | Missed |
| Made   |      |        |
| Missed |      |        |

- Show how you could use a polynomial to model the possible results of two attempted foul shots.

**LESSON**  
**8.4****Practice***For use with the lesson "Solve Polynomial Equations in Factored Form"***Solve the equation.**

1.  $(x + 14)(x - 3) = 0$

2.  $(m - 12)(m + 5) = 0$

3.  $(p + 15)(p + 24) = 0$

4.  $(n - 8)(n - 9) = 0$

5.  $(d + 8)\left(d - \frac{1}{2}\right) = 0$

6.  $\left(c + \frac{3}{4}\right)(c - 6) = 0$

7.  $(2z - 8)(z + 5) = 0$

8.  $(y - 3)(5y + 10) = 0$

9.  $(6b - 4)(b - 8) = 0$

10.  $(8x + 4)(6x - 3) = 0$

11.  $(3x + 9)(6x - 3) = 0$

12.  $(4x + 5)(4x - 5) = 0$

**Factor out the greatest common monomial factor.**

13.  $10x - 10y$

14.  $8x^2 + 20y$

15.  $18a^2 - 6b$

16.  $4x^2 - 4x$

17.  $r^2 + 2rs$

18.  $2m^2 + 6mn$

19.  $5p^2q + 10q$

20.  $9a^5 + a^3$

21.  $6w^3 - 14w^2$

**Solve the equation.**

22.  $m^2 - 10m = 0$

23.  $b^2 + 14b = 0$

24.  $5w^2 - 5w = 0$

25.  $24k^2 + 24k = 0$

26.  $8r^2 - 24r = 0$

27.  $9p^2 + 18p = 0$

LESSON  
8.4**Practice** *continued**For use with the lesson "Solve Polynomial Equations in Factored Form"*

28.  $6n^2 - 15n = 0$

29.  $-8y^2 - 10y = 0$

30.  $-10b^2 + 25b = 0$

31.  $8c^2 = 4c$

32.  $30r^2 = -15r$

33.  $-24y^2 = 9y$

34. **Diving Board** A diver jumps from a diving board that is 24 feet above the water. The height of the diver is given by

$$h = -16(t - 1.5)(t + 1)$$

where the height  $h$  is measured in feet, and the time  $t$  is measured in seconds. When will the diver hit the water? Can you see a quick way to find the answer? *Explain.*

35. **Dog** To catch a frisbee, a dog leaps into the air with an initial velocity of 14 feet per second.

a. Write a model for the height of the dog above the ground.

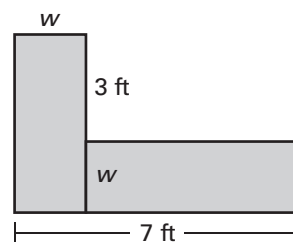
b. After how many seconds does the dog land on the ground?

36. **Desktop Areas** You have two components to the desktop where you do your homework that fit together into an L shape. The two components have the same area.

a. Write an equation that relates the areas of the desktop components.

b. Find the value of  $w$ .

c. What is the combined area of the desktop components?





**LESSON**  
**8.5****Practice***For use with the lesson "Factor  $x^2 + bx + c$ "***Factor the trinomial.**

1.  $x^2 + 8x + 7$

2.  $b^2 - 7b + 10$

3.  $w^2 - 12w - 13$

4.  $p^2 + 10p + 25$

5.  $m^2 - 10m + 24$

6.  $y^2 - 5y - 24$

7.  $a^2 + 13a + 36$

8.  $n^2 + 2n - 48$

9.  $z^2 - 14z + 40$

**Solve the equation.**

10.  $y^2 + 17y + 72 = 0$

11.  $a^2 - 9a - 36 = 0$

12.  $w^2 - 13w + 42 = 0$

13.  $m^2 - 5m - 14 = 0$

14.  $x^2 + 11x + 24 = 0$

15.  $n^2 - 12n + 27 = 0$

16.  $d^2 + 5d - 50 = 0$

17.  $p^2 + 16p + 48 = 0$

18.  $z^2 - z - 30 = 0$

**LESSON**  
**8.5**
**Practice** *continued*  
 For use with the lesson "Factor  $x^2 + bx + c$ "

**Find the zeros of the polynomial function.**

19.  $f(x) = x^2 - 5x - 36$

20.  $g(x) = x^2 + 8x - 20$

21.  $h(x) = x^2 - 11x + 24$

22.  $f(x) = x^2 + 11x + 28$

23.  $g(x) = x^2 + 11x - 12$

24.  $h(x) = x^2 + 3x - 18$

**Solve the equation.**

25.  $x(x + 17) = -60$

26.  $p(p - 4) = 32$

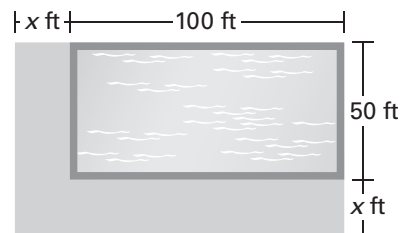
27.  $w(w + 8) = -15$

28.  $n(n + 6) = 7$

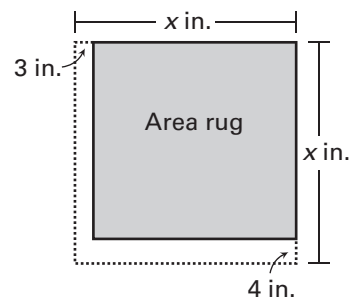
29.  $s^2 - 3(s + 2) = 4$

30.  $d^2 + 18(d + 4) = -9$

- 31. Patio Area** A community center is building a patio area along two sides of its pool. The pool is rectangular with a width of 50 feet and a length of 100 feet. The patio area will have the same width on each side of the pool.



- Write a polynomial that represents the combined area of the pool and the patio area.
  - The combined area of the pool and patio area should be 8400 square feet. How wide should the patio area be?
- 32. Area Rug** You are creating your own area rug from a square piece of remnant carpeting. You plan on cutting 4 inches from the length and 3 inches from the width. The area of the resulting area rug is 1056 square inches.
- Write a polynomial that represents the area of your area rug.
  - What is the perimeter of the original piece of remnant carpeting?



**LESSON**  
**8.6****Practice***For use with the lesson "Factor  $ax^2 + bx + c$ "***Factor the trinomial.**

1.  $-x^2 - 3x + 28$

2.  $-p^2 + 8p - 12$

3.  $-m^2 - 13m - 40$

4.  $2y^2 + 15y + 7$

5.  $3a^2 - 13a + 4$

6.  $5d^2 - 18d - 8$

7.  $6c^2 + 7c + 2$

8.  $10n^2 - 26n + 12$

9.  $12w^2 + 8w - 15$

10.  $-2b^2 - 5b + 12$

11.  $-3r^2 - 17r - 10$

12.  $-4s^2 + 6s + 4$

**Solve the equation.**

13.  $-x^2 + x + 20 = 0$

14.  $-m^2 - 10m - 16 = 0$

15.  $-p^2 + 13p - 42 = 0$

16.  $2c^2 - 11c + 5 = 0$

17.  $2y^2 + y - 10 = 0$

18.  $16r^2 + 18r + 5 = 0$

19.  $3w^2 + 19w + 6 = 0$

20.  $12n^2 - 11n + 2 = 0$

21.  $15a^2 - 2a - 8 = 0$

22.  $-2x^2 - 9x - 4 = 0$

23.  $-3s^2 - s + 10 = 0$

24.  $8d^2 - 6d - 5 = 0$

**LESSON**  
**8.6**
**Practice** *continued*  
 For use with the lesson "Factor  $ax^2 + bx + c$ "

**Find the zeros of the polynomial function.**

**25.**  $f(x) = -x^2 + 6x + 27$       **26.**  $f(x) = 6x^2 + 45x - 24$       **27.**  $f(x) = -3x^2 - 14x + 24$

**28.**  $f(x) = -2x^2 + 2x + 4$       **29.**  $f(x) = 3x^2 - 17x + 20$       **30.**  $f(x) = 8x^2 + 53x - 21$

**31.**  $f(x) = 4x^2 + 29x + 30$       **32.**  $f(x) = -2x^2 - 17x + 30$       **33.**  $f(x) = 10x^2 + 5x - 5$

**34. Summer Business** Your weekly revenue  $R$  (in dollars) from your tie-dye T-shirt business can be modeled by

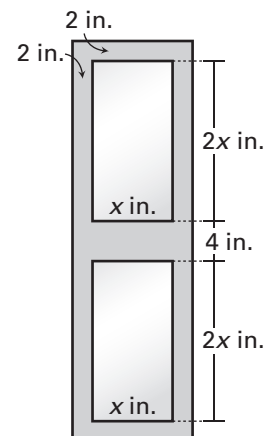
$$R = -2t^2 + 87t + 90$$

 where  $t$  represents the number of weeks since the first week you started selling T-shirts. How much did you make your first week?

**35. Cliff Diving** A cliff diver jumps from a ledge 96 feet above the ocean with an initial upward velocity of 16 feet per second. How long will it take until the diver enters the water?

**36. Wall Mirror** You plan on making a wall hanging that contains two small mirrors as shown.

**a.** Write a polynomial that represents the area of the wall hanging.

**b.** The area of the wall hanging will be 480 square inches. Find the length and width of the mirrors you will use.


**LESSON**  
**8.7****Practice***For use with the lesson "Factor Special Products"***Factor the polynomial.**

1.  $x^2 - 36$

2.  $25p^2 - 144$

3.  $4b^2 - 100$

4.  $36m^2 - 81$

5.  $-2x^2 + 32$

6.  $-4r^2 + 100s^2$

7.  $y^2 + 24y + 144$

8.  $9c^2 + 24c + 16$

9.  $25w^2 - 20w + 4$

10.  $16n^2 - 56n + 49$

11.  $-18a^2 - 12a - 2$

12.  $20z^2 - 140z + 245$

**Solve the equation.**

13.  $x^2 + 14x + 49 = 0$

14.  $8w^2 = 50$

15.  $64p^2 - 16p + 1 = 0$

16.  $8a^2 - 72 = 0$

17.  $3m^2 + 30m + 75 = 0$

18.  $-4y^2 + 32y - 64 = 0$

19.  $-5x^2 + 125 = 0$

20.  $-7r^2 + 140r - 700 = 0$

21.  $24w^2 - 24w + 6 = 0$

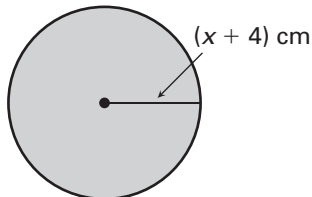
22.  $18n^2 + 60n + 50 = 0$

23.  $\frac{25}{2}x^2 + 15x + \frac{9}{2} = 0$

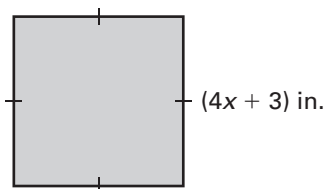
24.  $4x^2 = \frac{9}{16}$

LESSON  
8.7**Practice** *continued*  
For use with the lesson "Factor Special Products"**Find the value of  $x$  in the geometric shape.**

25. Area =  $144\pi \text{ cm}^2$



26. Area =  $225 \text{ in.}^2$

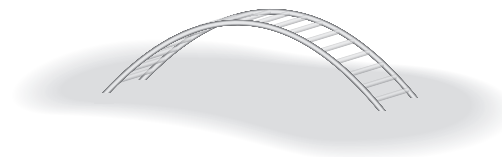


27. **Measuring Tape** A measuring tape drops from a roof that is 16 feet above the ground. After how many seconds does the measuring tape land on the ground?

28. **Playground** A curved ladder that children can climb on can be modeled by the equation

$$y = -\frac{1}{20}x^2 + x$$

where  $x$  and  $y$  are measured in feet.

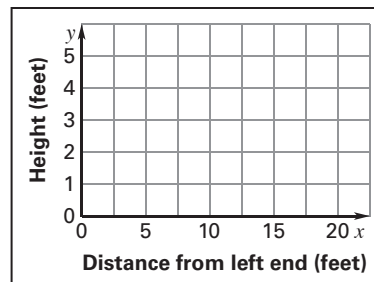


a. Make a table of values that shows the height of the ladder for  $x = 0, 5, 10, 15,$  and 20 feet from the left end.

b. For what additional values of  $x$  does the equation make sense? *Explain.*

c. Plot the ordered pairs in the table from part (a) as points in the coordinate plane. Connect the points with a smooth curve.

d. At approximately what distance from the left end does the ladder reach a height of 5 feet? Check your answer algebraically.



**LESSON**  
**8.8****Practice***For use with the lesson "Factor Polynomials Completely"***Factor the expression.**

1.  $4x(x + 5) - 3(x + 5)$

2.  $12(a - 3) - 2a(a - 3)$

3.  $w^2(w + 8) - 5(w + 8)$

4.  $2b^2(b + 6) + 3(b + 6)$

5.  $y(15 + x) - (x + 15)$

6.  $3x(4 + y) - 6(4 + y)$

**Factor the polynomial by grouping.**

7.  $x^3 + x^2 + x + 1$

8.  $y^3 - 14y^2 + y - 14$

9.  $m^3 - 6m^2 + 2m - 12$

10.  $p^3 + 9p^2 + 4p + 36$

11.  $t^3 + 12t^2 - 2t - 24$

12.  $3n^3 - 3n^2 + n - 1$

**Factor the polynomial completely.**

13.  $7x^3 + 28x^2$

14.  $4m^3 - 16m$

15.  $-16p^3 - 2p$

16.  $48r^3 - 30r^2$

17.  $15y - 60y^2$

18.  $18xy - 24x^2$

19.  $5m^2 + 20m + 40$

20.  $6x^2 + 6x - 120$

21.  $4z^3 - 4z^2 - 8z$

22.  $9x^3 + 36x^2 + 36$

23.  $x^3 + x^2 + 5x + 5$

24.  $d^3 + 4d^2 + 5d + 20$

**LESSON**  
**8.8****Practice** *continued*  
*For use with the lesson "Factor Polynomials Completely"***Solve the equation.**

**25.**  $3x^2 + 18x + 24 = 0$

**26.**  $10x^2 = 250$

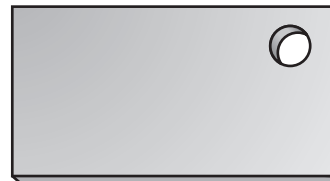
**27.**  $4m^2 - 28m + 49 = 0$

**28.**  $12x^2 + 18x + 6 = 0$

**29.**  $18x^2 - 48x + 32 = 0$

**30.**  $-18x^2 - 60x - 50 = 0$

- 31. Countertop** A countertop will have a hole drilled in it to hold a cylindrical container that will function as a utensil holder. The area of the entire countertop is given by  $5x^2 + 12x + 7$ . The area of the hole is given by  $x^2 + 2x + 1$ . Write an expression for the area in factored form of the countertop that is left after the hole is drilled.



- 32. Film Canister** A film canister in the shape of a cylinder has a height of 8 centimeters and a volume of  $32\pi$  cubic centimeters.
- Write an equation for the volume of the film canister.
  - What is the radius of the film canister?
- 33. Badminton** You hit a badminton birdie upward with a racket from a height of 4 feet with an initial velocity of 12 feet per second.
- Write an equation that models this situation.
  - How high is the birdie at 0.1 second?
  - How high is the birdie at 0.25 second?
  - How long will it take the birdie to reach the ground?



**LESSON 9.1 Practice**  
For use with the lesson "Graph  $y = ax^2 + c$ "

Use the quadratic function to complete the table of values.

1.  $y = 9x^2$

|          |    |    |   |   |   |
|----------|----|----|---|---|---|
| <b>x</b> | -2 | -1 | 0 | 1 | 2 |
| <b>y</b> |    |    |   |   |   |

2.  $y = -5x^2$

|          |    |    |   |   |   |
|----------|----|----|---|---|---|
| <b>x</b> | -2 | -1 | 0 | 1 | 2 |
| <b>y</b> |    |    |   |   |   |

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

|          |    |    |   |   |   |
|----------|----|----|---|---|---|
| <b>x</b> | -4 | -2 | 0 | 2 | 4 |
| <b>y</b> |    |    |   |   |   |

4.  $y = -\frac{1}{8}x^2 - 2$

|          |     |    |   |   |    |
|----------|-----|----|---|---|----|
| <b>x</b> | -16 | -8 | 0 | 8 | 16 |
| <b>y</b> |     |    |   |   |    |

5.  $y = -4x^2 + 3$

|          |    |    |   |   |   |
|----------|----|----|---|---|---|
| <b>x</b> | -2 | -1 | 0 | 1 | 2 |
| <b>y</b> |    |    |   |   |   |

6.  $y = 6x^2 - 5$

|          |    |    |   |   |   |
|----------|----|----|---|---|---|
| <b>x</b> | -2 | -1 | 0 | 1 | 2 |
| <b>y</b> |    |    |   |   |   |

Match the function with its graph.

7.  $y = -4x^2 + 3$

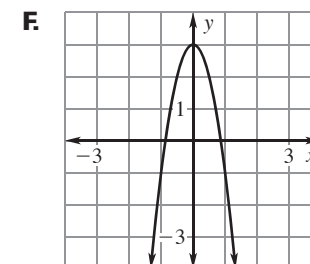
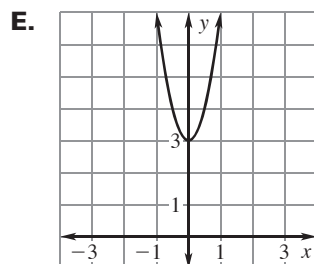
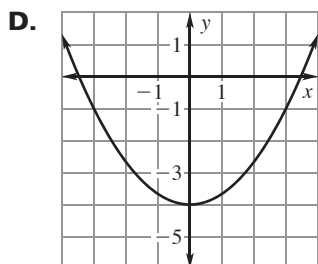
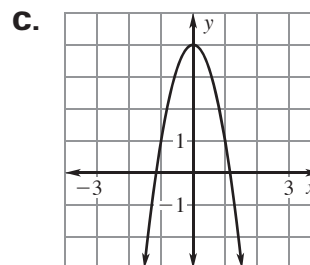
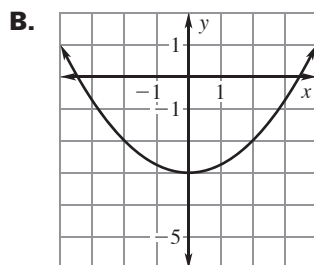
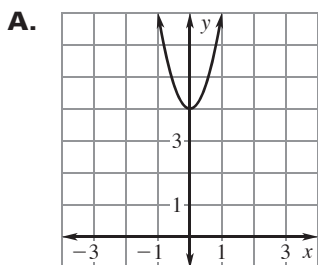
8.  $y = 3x^2 + 4$

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

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

11.  $y = -3x^2 + 4$

12.  $y = 4x^2 + 3$



**LESSON**  
**9.1**
**Practice** *continued*  
 For use with the lesson "Graph  $y = ax^2 + c$ "

Describe how you can use the graph of  $y = x^2$  to graph the given function.

13.  $y = x^2 - 8$

14.  $y = -x^2 + 4$

15.  $y = 2x^2 + 3$

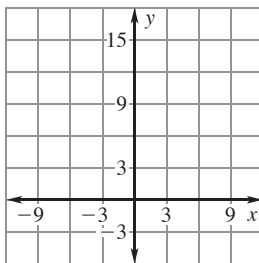
16.  $y = -5x^2 + 1$

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

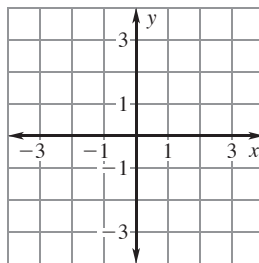
18.  $y = -\frac{3}{4}x^2 + 5$

Graph the function and identify its domain and range. Compare the graph with the graph of  $y = x^2$ .

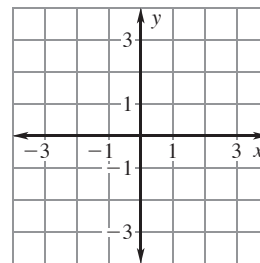
19.  $y = x^2 + 9$



20.  $y = -\frac{1}{5}x^2$



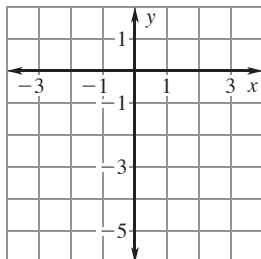
21.  $y = -\frac{3}{2}x^2$



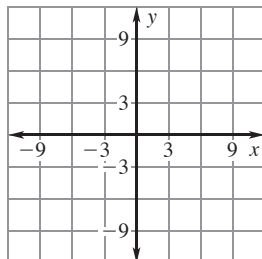
**LESSON**  
**9.1**

**Practice** *continued*  
For use with the lesson "Graph  $y = ax^2 + c$ "

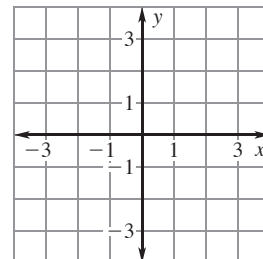
22.  $y = x^2 - 3.5$



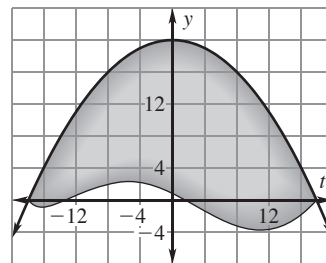
23.  $y = 2x^2 - 9$



24.  $y = -5x^2 + 2$

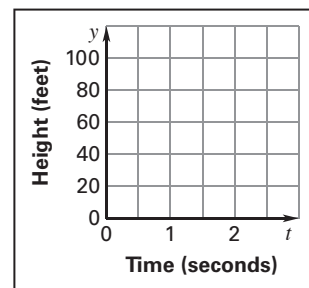


25. **Serving Plate** The top view of a freeform serving plate you made in a ceramics class is shown in the graph. One edge of the plate can be modeled by the graph of the function  $y = -\frac{5}{81}x^2 + 20$  where  $x$  and  $y$  are measured in inches.



- Find the domain of the function in this situation.
- Find the range of the function in this situation.

26. **Roof Shingle** A roof shingle is dropped from a rooftop that is 100 feet above the ground. The height  $y$  (in feet) of the dropped roof shingle is given by the function  $y = -16t^2 + 100$  where  $t$  is the time (in seconds) since the shingle is dropped.



- Graph the function.
- Identify the domain and range of the function in this situation.
- Use the graph to estimate the shingle's height at 1 second.
- Use the graph to estimate when the shingle is at a height of 50 feet.
- Use the graph to estimate when the shingle is at a height of 0 feet.

**LESSON**  
**9.2****Practice***For use with the lesson "Graph  $y = ax^2 + bx + c$ "***Identify the values of  $a$ ,  $b$ , and  $c$  in the quadratic function.**

1.  $y = 6x^2 + 3x + 5$

2.  $y = \frac{3}{2}x^2 - x + 8$

3.  $y = 7x^2 - 3x - 1$

4.  $y = -2x^2 + 9x$

5.  $y = \frac{3}{4}x^2 - 10$

6.  $y = -8x^2 + 3x - 7$

**Tell whether the graph opens upward or downward. Then find the axis of symmetry and vertex of the graph of the function.**

7.  $y = x^2 - 5$

8.  $y = -x^2 + 9$

9.  $y = -2x^2 + 6x + 7$

10.  $y = 3x^2 - 12x + 1$

11.  $y = 3x^2 + 6x - 2$

12.  $y = -2x^2 + 7x - 21$

13.  $y = \frac{1}{2}x^2 + 5x - 4$

14.  $y = -\frac{1}{4}x^2 - 24$

15.  $y = -3x^2 + 9x - 8$

16.  $y = 3x^2 - 2x + 3$

17.  $y = -2x^2 + 7x + 1$

18.  $y = 3x^2 + 2x - 5$

**LESSON**  
**9.2**

**Practice** *continued*  
For use with the lesson "Graph  $y = ax^2 + bx + c$ "

**Find the vertex of the graph of the function. Make a table of values using  $x$ -values to the left and right of the vertex.**

19.  $y = x^2 - 10x + 3$

|          |  |  |  |  |  |
|----------|--|--|--|--|--|
| <b>x</b> |  |  |  |  |  |
| <b>y</b> |  |  |  |  |  |

20.  $y = -x^2 + 6x - 2$

|          |  |  |  |  |  |
|----------|--|--|--|--|--|
| <b>x</b> |  |  |  |  |  |
| <b>y</b> |  |  |  |  |  |

21.  $y = \frac{1}{2}x^2 - x + 7$

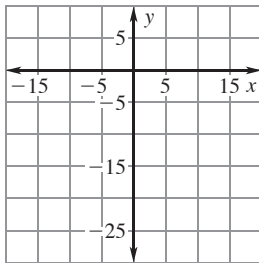
|          |  |  |  |  |  |
|----------|--|--|--|--|--|
| <b>x</b> |  |  |  |  |  |
| <b>y</b> |  |  |  |  |  |

22.  $y = \frac{1}{3}x^2 - 2x + 3$

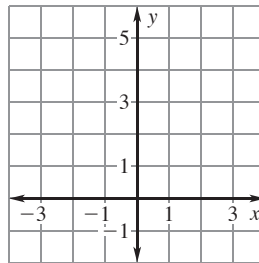
|          |  |  |  |  |  |
|----------|--|--|--|--|--|
| <b>x</b> |  |  |  |  |  |
| <b>y</b> |  |  |  |  |  |

**Graph the function. Label the vertex and axis of symmetry.**

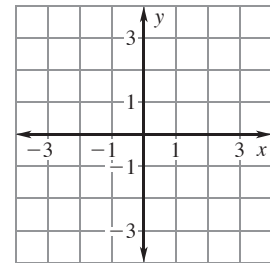
23.  $y = -x^2 - 10$



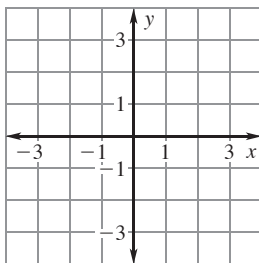
24.  $y = 2x^2 + 3$



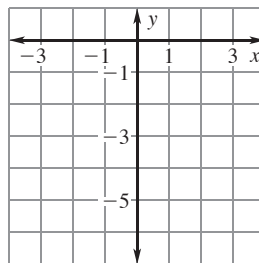
25.  $y = -2x^2 + 2x + 1$



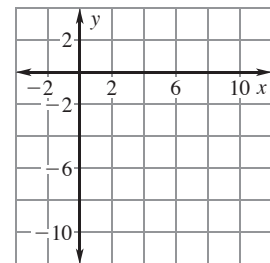
26.  $y = 5x^2 + 2x$



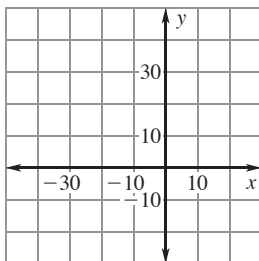
27.  $y = -2x^2 + x - 4$



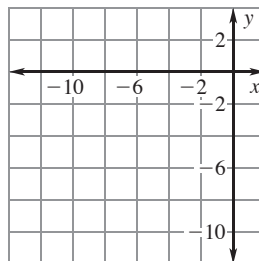
28.  $y = x^2 - 8x + 5$



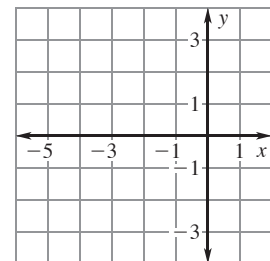
29.  $y = -\frac{1}{2}x^2 - 8x + 3$



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



31.  $y = -\frac{3}{4}x^2 - 2x + 2$



**LESSON**  
**9.2**
**Practice** *continued*

 For use with the lesson "Graph  $y = ax^2 + bx + c$ "

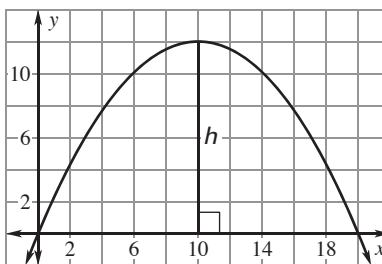
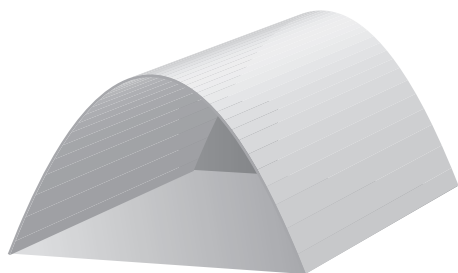
**Tell whether the function has a *minimum value* or a *maximum value*.**
**Then find the minimum or maximum value.**

**32.**  $f(x) = 8x^2 - 40$

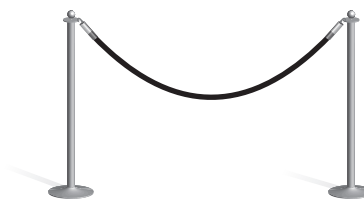
**33.**  $f(x) = -5x^2 + 10x - 2$

**34.**  $f(x) = 8x^2 - 4x + 4$

- 35. Storage Building** The storage building shown can be modeled by the graph of the function  $y = -0.12x^2 + 2.4x$  where  $x$  and  $y$  are measured in feet. What is the height  $h$  at the highest point of the building as shown in the diagram?



- 36. Velvet Rope** A parabola is formed by a piece of velvet rope found around a museum display as shown. This parabola can be modeled by the graph of the function  $y = \frac{4}{225}x^2 - \frac{16}{15}x + 40$  where  $x$  and  $y$  are measured in inches and  $y$  represents the number of inches the parabola is above the ground. How far above the ground is the lowest point on the rope?



**LESSON**  
**9.3****Practice**

For use with the lesson "Solve Quadratic Equations by Graphing"

**Determine whether the given value is a solution of the equation.**

1.  $x^2 - 2x + 15 = 0$ ; 3

2.  $x^2 - 4x - 12 = 0$ ; 2

3.  $-x^2 - 5x - 6 = 0$ ; 3

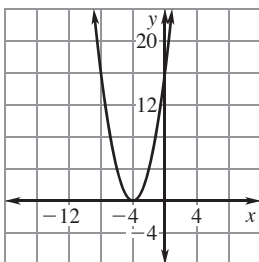
4.  $x^2 + 3x - 4 = 0$ ; 1

5.  $2x^2 + 9x - 5 = 0$ ; -2

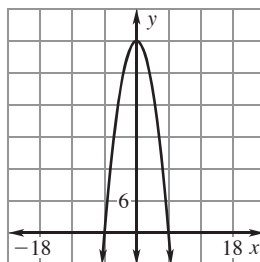
6.  $3x^2 - 5x - 2 = 0$ ; 2

**Use the graph to find the solutions of the given equation.**

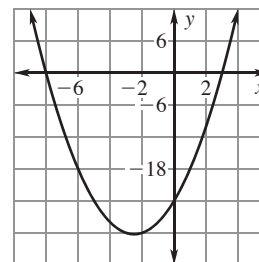
7.  $x^2 + 8x + 16 = 0$



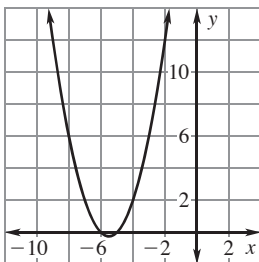
8.  $-x^2 + 36 = 0$



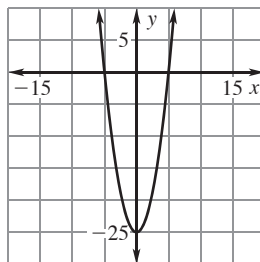
9.  $x^2 + 5x - 24 = 0$



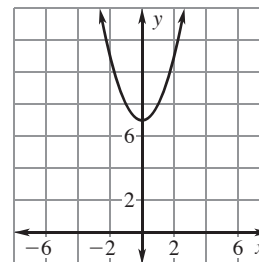
10.  $x^2 + 11x + 30 = 0$



11.  $x^2 - 25 = 0$

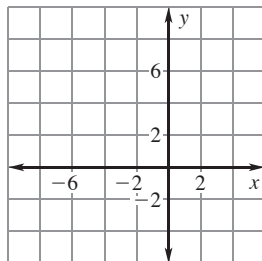


12.  $x^2 + 7 = 0$

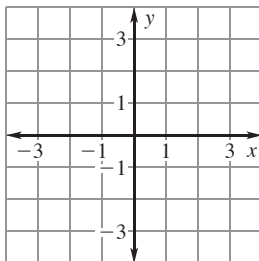


**LESSON**  
**9.3****Practice** *continued**For use with the lesson "Solve Quadratic Equations by Graphing"***Solve the equation by graphing.**

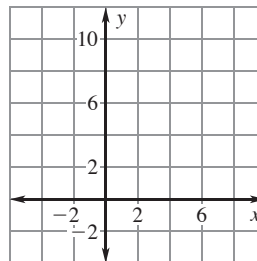
13.  $-x^2 - 6x = 0$



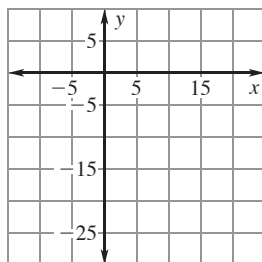
14.  $2x^2 = 2$



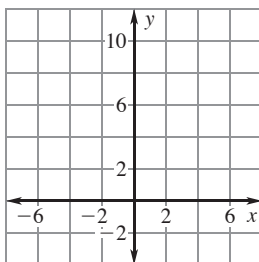
15.  $x^2 - 7x + 10 = 0$



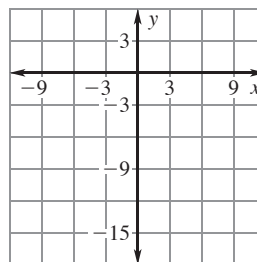
16.  $x^2 = 10x$



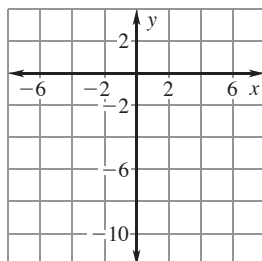
17.  $x^2 - 6x + 9 = 0$



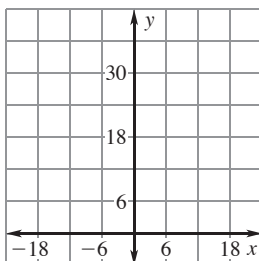
18.  $-x^2 + 9x = 18$

**Find the zeros of the function by graphing.**

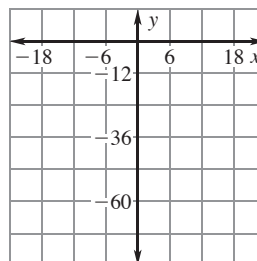
19.  $f(x) = -x^2 - 5x - 10$



20.  $f(x) = x^2 + 12x + 36$



21.  $f(x) = 2x^2 + 24x$

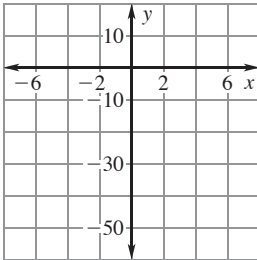




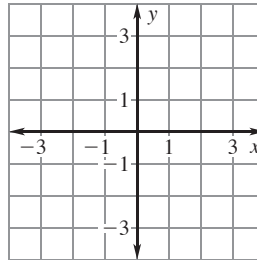
**LESSON**  
**9.3**

**Practice** *continued*  
For use with the lesson "Solve Quadratic Equations by Graphing"

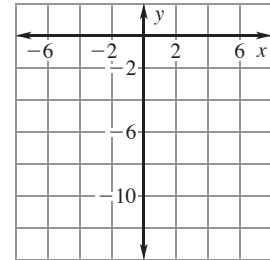
22.  $f(x) = x^2 - 49$



23.  $f(x) = -x^2 + 1$

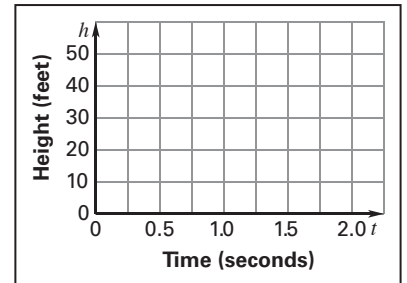


24.  $f(x) = 3x^2 + 12x$



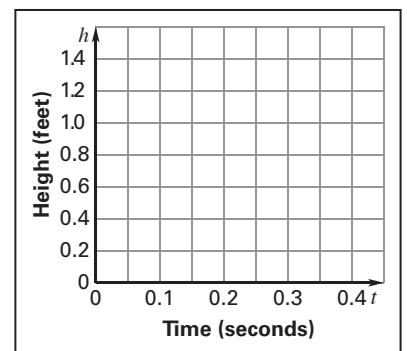
25. **Stunt Double** A movie stunt double jumps from the top of a building 50 feet above the ground onto a pad on the ground below. The stunt double jumps with an initial vertical velocity of 10 feet per second.

- a. Write and graph a function that models the height  $h$  (in feet) of the stunt double  $t$  seconds after she jumps.
- b. How long does it take the stunt double to reach the ground?



26. **Wastebasket** You throw a wad of used paper towards a wastebasket from a height of about 1.3 feet above the floor with an initial vertical velocity of 3 feet per second.

- a. Write and graph a function that models the height  $h$  (in feet) of the paper  $t$  seconds after it is thrown.
- b. If you miss the wastebasket and the paper hits the floor, how long does it take for the ball of paper to reach the floor?
- c. If the ball of paper hits the rim of the wastebasket one-half foot above the ground, how long was the ball in the air?



**LESSON**  
**9.4****Practice***For use with the lesson "Use Square Roots to Solve Quadratic Equations"***Solve the equation.**

1.  $6x^2 - 24 = 0$

2.  $8x^2 - 128 = 0$

3.  $x^2 - 13 = 23$

4.  $3x^2 - 60 = 87$

5.  $2x^2 - 33 = 17$

6.  $5x^2 - 200 = 205$

7.  $4x^2 - 125 = -25$

8.  $7x^2 - 50 = 13$

9.  $\frac{1}{2}x^2 - \frac{1}{2} = 0$

**Solve the equation. Round the solutions to the nearest hundredth.**

10.  $x^2 + 15 = 23$

11.  $x^2 - 16 = -13$

12.  $12 - x^2 = 17$

13.  $3x^2 - 8 = 7$

14.  $9 - x^2 = 9$

15.  $4 + 5x^2 = 34$

16.  $48 = 14 + 2x^2$

17.  $8x^2 = 50$

18.  $3x^2 + 23 = 18$

19.  $(x - 3)^2 = 5$

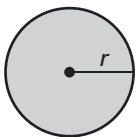
20.  $(x + 2)^2 = 10$

21.  $3(x - 4)^2 = 18$

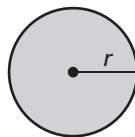
**LESSON**  
**9.4**
**Practice** *continued*
*For use with the lesson "Use Square Roots to Solve Quadratic Equations"*

**Use the given area  $A$  of the circle to find the radius  $r$  or the diameter  $d$  of the circle. Round the answer to the nearest hundredth, if necessary.**

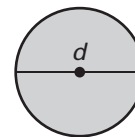
**22.**  $A = 169\pi \text{ m}^2$



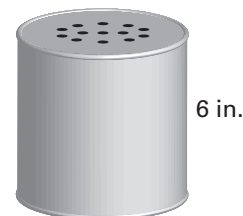
**23.**  $A = 38\pi \text{ in.}^2$



**24.**  $A = 45\pi \text{ cm}^2$



- 25. Flower Seed** A manufacturer is making a cylindrical can that will hold and dispense flower seeds through small holes in the top of the can. The manufacturer wants the can to have a volume of 42 cubic inches and be 6 inches tall. What should the diameter of the can be? (*Hint:* Use the formula for volume,  $V = \pi r^2 h$ , where  $V$  is the volume,  $r$  is the radius, and  $h$  is the height.) Round your answer to the nearest inch.



- 26. Stockpile** You can find the diameter  $D$  (in feet) of a conical pile of sand, dirt, etc. by using the formula  $V = 0.2618hD^2$  where  $h$  is the height of the pile (in feet) and  $V$  is the volume of the pile (in cubic feet). Find the diameter of each stockpile in the table. Round your answers to the nearest foot.

| Stockpile | Height (ft) | Diameter (ft) | Volume (ft <sup>3</sup> ) |
|-----------|-------------|---------------|---------------------------|
| A         | 10          | ?             | 68                        |
| B         | 15          | ?             | 230                       |
| C         | 20          | ?             | 545                       |

**LESSON**  
**9.5****Practice***For use with the lesson "Solve Quadratic Equations by Completing the Square"*

**Find the value of  $c$  that makes the expression a perfect square trinomial. Then write the expression as a square of a binomial.**

1.  $x^2 + 12x + c$

2.  $x^2 + 50x + c$

3.  $x^2 - 26x + c$

4.  $x^2 - 18x + c$

5.  $x^2 + 13x + c$

6.  $x^2 - 9x + c$

7.  $x^2 - 11x + c$

8.  $x^2 + \frac{1}{2}x + c$

9.  $x^2 - \frac{6}{5}x + c$

**Solve the equation by completing the square. Round your solutions to the nearest hundredth, if necessary.**

10.  $x^2 + 6x = 1$

11.  $x^2 + 4x = 13$

12.  $x^2 - 10x = 15$

13.  $x^2 + 8x = 10$

14.  $x^2 - 2x - 7 = 0$

15.  $x^2 - 12x - 21 = 0$

16.  $x^2 + 3x - 2 = 0$

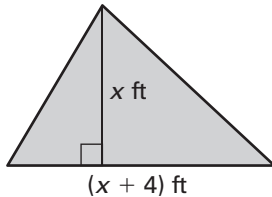
17.  $x^2 + 5x - 3 = 0$

18.  $x^2 - x = 1$

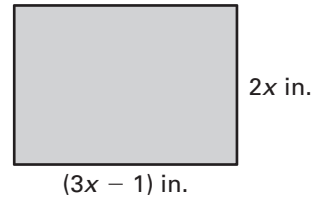
**LESSON**  
**9.5**
**Practice** *continued*
*For use with the lesson "Solve Quadratic Equations by Completing the Square"*

**Find the value of  $x$ . Round your answer to the nearest hundredth, if necessary.**

- 19.** Area of triangle =  $30 \text{ ft}^2$



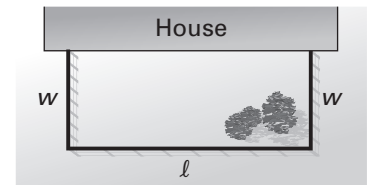
- 20.** Area of rectangle =  $140 \text{ in.}^2$



- 21. Colorado** The state of Colorado is almost perfectly rectangular, with its north border 111 miles longer than its west border. If the state encompasses 104,000 square miles, estimate the dimensions of Colorado. Round your answer to the nearest mile.

- 22. Baseball** After a baseball is hit, the height  $h$  (in feet) of the ball above the ground  $t$  seconds after it is hit can be approximated by the equation  $h = -16t^2 + 64t + 3$ . Determine how long it will take for the ball to hit the ground. Round your answer to the nearest hundredth.

- 23. Fenced-In Yard** You have 60 feet of fencing to fence in part of your backyard for your dog. You want to make sure that your dog has 400 square feet of space to run around in. The back of your house will be used as one side of the enclosure as shown.
- a.** Write equations in terms of  $\ell$  and  $w$  for the amount of fencing and the area of the enclosure.



- b.** Use substitution to solve the system of equations from part (a). What are the possible lengths and widths of the enclosure?

**LESSON**  
**9.6****Practice***For use with the lesson "Solve Quadratic Equations by the Quadratic Formula"*

**Use the quadratic formula to solve the equation. Round your solutions to the nearest hundredth, if necessary.**

1.  $x^2 + 7x - 80 = 0$

2.  $3x^2 - x - 16 = 0$

3.  $8x^2 - 2x - 30 = 0$

4.  $x^2 + 4x + 1 = 0$

5.  $-x^2 + x + 12 = 0$

6.  $-3x^2 - 4x + 10 = 0$

7.  $5x^2 + 30x + 32 = 0$

8.  $x^2 + 6x - 100 = 0$

9.  $4x^2 - x - 20 = 0$

10.  $5x^2 + x - 9 = 0$

11.  $6x^2 + 7x - 3 = 0$

12.  $10x^2 - 7x + 5 = 0$

**Tell which method(s) you would use to solve the quadratic equation.**

**Explain your choice(s).**

13.  $6x^2 - 216 = 0$

14.  $8x^2 = 56$

15.  $5x^2 - 10x = 0$

16.  $x^2 + 8x + 7 = 0$

17.  $x^2 - 6x + 1 = 0$

18.  $-9x^2 + 10x = 5$

LESSON  
9.6**Practice** *continued**For use with the lesson "Solve Quadratic Equations by the Quadratic Formula"*

**Solve the quadratic equation using any method. Round your solutions to the nearest hundredth, if necessary.**

19.  $-10x^2 = -50$

20.  $x^2 - 16x = -64$

21.  $x^2 + 3x - 8 = 0$

22.  $x^2 = 14x - 49$

23.  $x^2 + 6x = 14$

24.  $-5x^2 + x = 13$

- 25. Pasta** For the period 1990–2003, the amount of biscuits, pasta, and noodles  $y$  (in thousands of metric tons) imported into the United States can be modeled by the function  $y = 1.36x^2 + 27.8x + 304$  where  $x$  is the number of years since 1990.
- Write and solve an equation that you can use to approximate the year in which 500 thousand metric tons of biscuits, pasta, and noodles were imported.
  - Write and solve an equation that you can use to approximate the year in which 575 thousand metric tons of biscuits, pasta, and noodles were imported.
- 26. Eggs** For the period 1997–2003, the number of eggs  $y$  (in billions) produced in the United States can be modeled by the function  $y = -0.27x^2 + 3.3x + 77$  where  $x$  is the number of years since 1997.
- Write and solve an equation that you can use to approximate the year(s) in which 80 billion eggs were produced.
  - Graph the function on a graphing calculator. Use the *trace* feature to find the year when 80 billion eggs were produced. Use the graph to check your answer from part (a).

**LESSON**  
**9.7****Practice***For use with the lesson "Solve Systems with Quadratic Equations"***Solve the system of equations using the substitution method.**

1.  $y = x^2 - 3x - 1$   
 $y = -2x + 5$

2.  $y = -x^2 + 2x$   
 $y = x - 2$

3.  $y = 2x^2 - 1$   
 $y = -4x + 5$

**Use a graphing calculator to find the points of intersection, if any, of the graph of the system of equations.**

4.  $y = x^2 + 3x + 2$   
 $y = 4x + 4$

5.  $y = -x^2 - 9$   
 $y = -10$

6.  $y = 3x^2 + x + 2$   
 $y = -5x + 2$

7.  $y = -3x^2 + 6$   
 $y = -3x$

8.  $y = x^2 + 2x - 8$   
 $y = -x - 8$

9.  $y = -4x^2 + 2x$   
 $y = 6x$

10.  $y = 2x^2 - 7$   
 $y = 2x + 5$

11.  $y = -4x^2 + 2x + 1$   
 $y = 10x + 1$

12.  $y = x^2 + 5x - 6$   
 $y = 5x + 3$

**Solve the equation using a system.**

13.  $-8 = x^2 - 6x + 1$

14.  $x^2 - 6x + 4 = -1$

15.  $3x - 5 = -2x^2 + x - 5$

16.  $2x^2 + 2x + 1 = 2x + 9$

17.  $9x - 3 = -x^2 + 7x$

18.  $x - 1 = 2x^2 - x - 1$



**LESSON**  
**9.7****Practice** *continued**For use with the lesson "Solve Systems with Quadratic Equations"*

**Use a graphing calculator to find the points of intersection, if any, of the graph of the system of equations.**

19.  $y = -2^x$   
 $y = -2$

20.  $y = 0.5^x$   
 $y = -x$

21.  $y = 3^x$   
 $y = 6x - 3$

22. **Internet** Miranda and Dakota each host their own blog. The number of individuals who follow Miranda's blog can be modeled by the equation  $y = 2x + 3$ , while the number of followers of Dakota's blog can be modeled by the equation  $y = 3(1.4)^x$ . In both equations,  $x$  represents the number of weeks since the girls started blogging and  $y$  represents, in hundreds, the number of individuals following their blog. Graph the two equations. Explain what the points where the graphs intersect represents in this situation. When will Dakota have more followers?

23. **Cycling** Toby is riding his bicycle in a large park, following a path that can be modeled by the equation  $y = 2x^2 - x + 3$ . Cecil is also riding his bicycle in the park, following a path modeled by the equation  $y = 7x - 5$ . Do their paths intersect? If so, what are the coordinates of the point(s) where their paths intersect?

24. **Wind** Carmen's hat was blown off her head by a sudden gust of wind. The wind is pushing the hat away from Carmen following a path that can be modeled by the equation  $y = x^2 + 2$ . Carmen races after the hat following a path modeled by the equation  $y = x + 1$ . Will Carmen catch up to her hat? Explain.

**LESSON**  
**9.8**

**Practice**

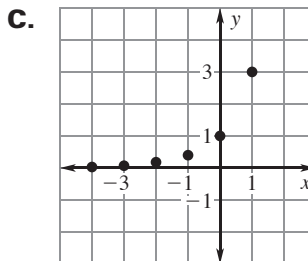
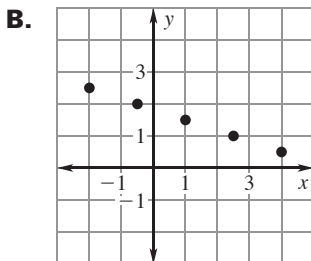
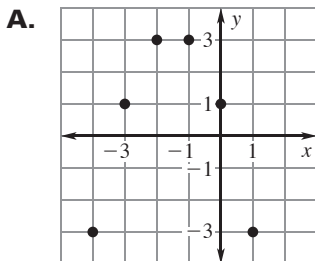
For use with the lesson "Compare Linear, Exponential, and Quadratic Models"

**Match the function with the graph it represents.**

1. Linear function

2. Exponential function

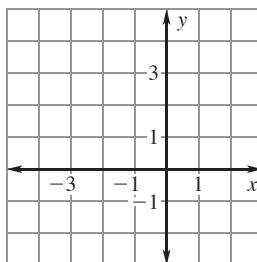
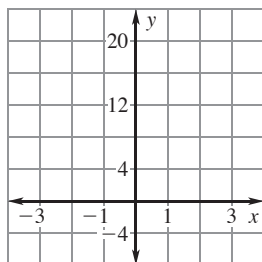
3. Quadratic function



**Use a graph to tell whether the ordered pairs represent a linear function, an exponential function, or a quadratic function.**

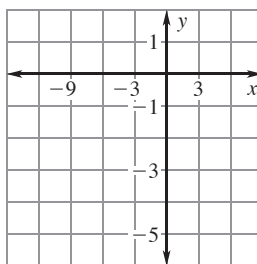
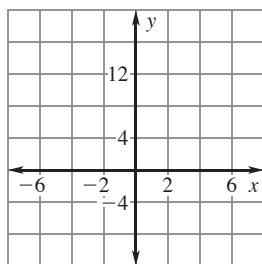
4.  $(-2, 16), (-1, 8), (0, 4), (1, 2), (2, 1)$

5.  $(-3, 4), (-2, 0), (-1, -2), (0, -2), (1, 0)$



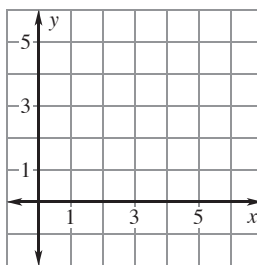
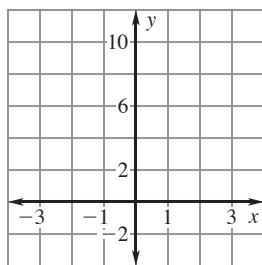
6.  $(-4, 17), (-2, 11), (0, 5), (2, -1), (4, -7)$

7.  $(-9, -1), (-6, -2), (-3, -3), (0, -4), (3, -5)$



8.  $(-2, \frac{1}{9}), (-1, \frac{1}{3}), (0, 1), (1, 3), (2, 9)$

9.  $(2, 5), (3, 2), (4, 1), (5, 2), (6, 5)$



**LESSON**  
**9.8**
**Practice** *continued*
*For use with the lesson "Compare Linear, Exponential, and Quadratic Models"*

**Tell whether the table of values represents a *linear function*, an *exponential function*, or a *quadratic function*.**

10.

|          |   |   |    |     |     |
|----------|---|---|----|-----|-----|
| <b>x</b> | 0 | 1 | 2  | 3   | 4   |
| <b>y</b> | 1 | 5 | 25 | 125 | 625 |

11.

|          |     |    |    |    |   |
|----------|-----|----|----|----|---|
| <b>x</b> | -2  | -1 | 0  | 1  | 2 |
| <b>y</b> | -10 | -7 | -4 | -1 | 2 |

12.

|          |    |   |   |   |   |
|----------|----|---|---|---|---|
| <b>x</b> | -1 | 0 | 1 | 2 | 3 |
| <b>y</b> | 4  | 1 | 0 | 1 | 4 |

13.

|          |     |     |   |     |    |
|----------|-----|-----|---|-----|----|
| <b>x</b> | -10 | -5  | 0 | 5   | 10 |
| <b>y</b> | 4   | 3.5 | 3 | 2.5 | 2  |

14.

|          |    |    |   |               |               |
|----------|----|----|---|---------------|---------------|
| <b>x</b> | -2 | -1 | 0 | 1             | 2             |
| <b>y</b> | 32 | 8  | 2 | $\frac{1}{2}$ | $\frac{1}{8}$ |

15.

|          |    |    |    |    |    |
|----------|----|----|----|----|----|
| <b>x</b> | -4 | -3 | -2 | -1 | 0  |
| <b>y</b> | -3 | 0  | 1  | 0  | -3 |

16.

|          |    |    |   |   |   |
|----------|----|----|---|---|---|
| <b>x</b> | -2 | -1 | 0 | 1 | 2 |
| <b>y</b> | 1  | 3  | 5 | 7 | 9 |

17.

|          |    |    |    |   |               |
|----------|----|----|----|---|---------------|
| <b>x</b> | -3 | -2 | -1 | 0 | 1             |
| <b>y</b> | 27 | 9  | 3  | 1 | $\frac{1}{3}$ |

**LESSON**  
**9.8**

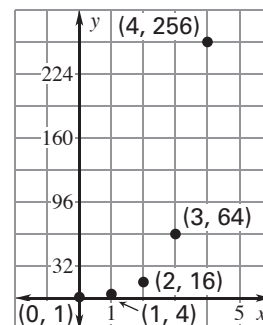
**Practice** *continued*

For use with the lesson "Compare Linear, Exponential, and Quadratic Models"

**18.** Use the graph shown.

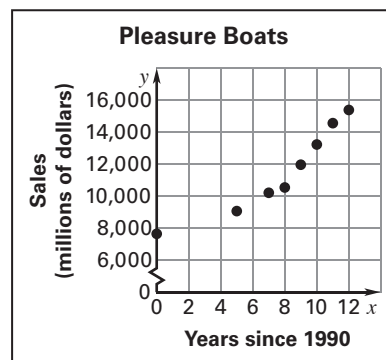
**a.** Which function does the graph represent, an *exponential function* or a *quadratic function*? *Explain* your reasoning.

**b.** Make a table of values for the points on the graph. Then use differences or ratios to check your answer in part (a).



**c.** Write an equation for the function that the table of values from part (b) represents.

**19. Pleasure Boats** The graph shows total amount of sales (in millions of dollars) of pleasure boats in the United States for the period 1990–2002. Tell whether the data should be modeled by a *linear function*, an *exponential function*, or a *quadratic function*. *Explain* your reasoning.



**20. Computer Value** The value  $V$  of a computer between 1999 and 2003 is given in the table. Tell whether the data should be modeled by a *linear function*, an *exponential function*, or a *quadratic function*. Then write an equation for the function.

|   |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|
| <b>Years since 1999, <math>t</math></b> | 0   | 1   | 2   | 3   | 4   |
| <b>Value, <math>V</math> (dollars)</b>  | 800 | 725 | 650 | 575 | 500 |

**CHAPTER**  
**9.9****Practice***For use with the lesson "Model Relationships"*

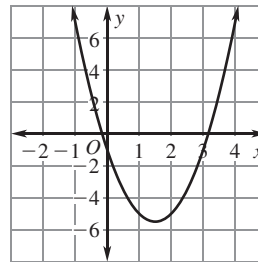
1. Use the given information to decide which linear function is increasing more rapidly.

- Linear Function 1: The function whose equation is  $y = 4x - 3$ .
- The table shows the coordinates of five points found on the line representing Linear Function 2.

|          |     |    |   |   |    |
|----------|-----|----|---|---|----|
| <b>x</b> | -4  | -2 | 0 | 2 | 4  |
| <b>y</b> | -11 | -5 | 1 | 7 | 13 |

2. Use the given information to decide which quadratic function has the lesser minimum.

- Quadratic Function 1: The function whose equation is  $y = 2x^2 - 4x + 1$ .
- Quadratic Function 2: The function whose graph is shown.



**In Exercises 3–6, choose an appropriate type of function to use to model the situation.**

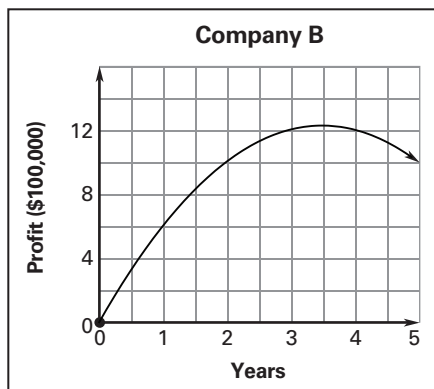
3. While roofing a house, Tydra drops her hammer. Model the height of the hammer as a function of the time before it hits the ground.
4. Maddie bought a rare painting for \$200,000. Model the value of the painting as a function of time if the value increases by the same percent each month.
5. Toni's coin collection currently includes 20 coins. Beginning this month, she plans to add 3 coins to her collection each month. Model the number of coins in her collection as a function of time.
6. Hector bought a new car for \$15,000. On average, the value of the car decreases by the same amount each month. Model the value of the car over time.

**LESSON**  
**9.9****Practice** *continued*  
*For use with the lesson "Model Relationships"*

7. **Running** The table shows the distance in miles Renee ran during each 10-minute interval on her Saturday run. Indicate whether the number of miles she ran represents *growth*, *decay*, or *neither*. Identify the growth or decay rate, if it exists, expressing it as a percent.

|                |     |     |      |       |
|----------------|-----|-----|------|-------|
| <b>Minutes</b> | 10  | 20  | 30   | 40    |
| <b>Miles</b>   | 1.5 | 0.9 | 0.54 | 0.324 |

8. **Business** The profit in dollars Company A earned in the first four years of business can be modeled by the equation  $y = -x^2 + 11$ , where  $y$  represents profit in hundreds of thousands of dollars and  $x$  represents years,  $0 < x < 4$ . The profit in dollars Company B earned in the first four years of business are modeled by the graph. Which company earned the greatest profit in any one year?



**LESSON**  
**10.1****Practice***For use with the lesson "Analyze Surveys and Samples"*

**In Exercises 1 and 2, identify the population and classify the sampling method.**

1. The manager of a music store wants to evaluate how customers rate the selection of music the store has in stock. Customers are given comment cards with their receipts.
2. Your school's administrators want to know if students are satisfied with the choices of activities for activity period. In each grade, every seventh student in alphabetical order is surveyed.

**Tell whether the survey method used is likely to result in a biased sample.**

3. A bicycling club wants to gather information about biking conditions throughout a city. A survey for bicycle riders is posted on the club's website.
4. A management company that owns several apartment buildings wants to gather information about tenant satisfaction with the condition of the apartments. They send a survey to 30 random tenants in each of the buildings.

**In Exercises 5 and 6, tell whether the question is potentially biased.**

***Explain your answer.***

5. Don't you think that the lunch menu should include grilled chicken rather than pizza because grilled chicken is healthier for you?
6. Do you think that the city's excess revenue should be spent on road repairs or building a new sports stadium?





**LESSON  
10.2****Practice***For use with the lesson "Use Measures of Central Tendency and Dispersion"***Find the mean, median, and mode(s) of the data.**

1. 6, 1, 3, 8, 5, 11, 1, 5
2. 60, 81, 52, 75, 59, 81
3. 15, 27, 10, 25, 9, 22, 25
4. 23, 6, 8, 14, 28, 8, 13, 28
5. 16, 11, 14, 30, 22, 9, 19, 15
6. 4.2, 2.2, 3.7, 2.8, 1.1

**For the set of data, determine which measure of central tendency best represents the data.**

7. 89, 86, 96, 87, 100, 86
8. 38, 35, 40, 36, 36, 33, 42, 37, 39, 34
9. 50, 47, 48, 49, 72, 47, 54, 50
10. 115, 112, 127, 116, 123, 113
11. 87, 77, 151, 105, 65, 141, 104, 166
12. 100, 106, 180, 41, 161, 292, 116, 213

**Find the range and mean absolute deviation of the data. Round to the nearest hundredth, if necessary.**

13. 10, 7, 13, 10, 8
14. 110, 114, 104, 108, 106
15. 87, 75, 85, 77, 74, 82
16. 15, 17, 15, 17, 21, 17, 15, 23
17. 40, 46, 41, 46, 49, 49, 46, 44, 44
18. 50.8, 51.6, 51.9, 52, 52.5, 52.8, 53.1

**LESSON**  
**10.2****Practice** *continued**For use with the lesson "Use Measures of Central Tendency and Dispersion"*

- 19. Bean Plants** The heights (in inches) of eight bean plants are 28, 36, 41, 50, 35, 42, 46, and 52.
- What is the range of the bean plant heights?
  - Find the mean, median, and mode(s) of the bean plant heights.
  - Which measure of central tendency best represents the data? *Explain.*
- 20. Hotel Stay** You are planning a trip to Washington, D.C. and are looking up hotel room rates. On the Internet, you find the following rates for a one-night stay in a hotel in Washington, D.C.  
\$109, \$126.50, \$175.95, \$139, \$77.50, \$145, \$162.35, \$173, \$181.50, \$105
- Find the mean, median, and mode(s) of the rates.
  - Which measure of central tendency best represents the data? *Explain.*
- 21. Temperature** The high and low temperatures for the last seven days are given.  
High temperatures: 81°F, 78°F, 83°F, 89°F, 90°F, 87°F, 89°F  
Low temperatures: 64°F, 53°F, 62°F, 66°F, 68°F, 69°F, 67°F
- Find the mean, median, and mode of each data set. Round your answers to the nearest tenth.
  - For each data set, determine which measure of central tendency best represents the data. *Explain.*
  - Compare* the spreads of data by using the range.
  - Compare* the spreads of data by using the mean absolute deviation. Round your answers to the nearest hundredth.

**LESSON**  
**10.3****Practice***For use with the lesson "Analyze Data"*

**In Exercises 1–3, use the table showing the number of students who preferred the book or the movie of two genres.**

- How many students preferred the book for a drama?
- How many students preferred the movie for these genres together?
- How many more students preferred the book than the movie for these genres together?

|              | <b>Mystery</b> | <b>Drama</b> | <b>Total</b> |
|--------------|----------------|--------------|--------------|
| <b>Book</b>  | 12             | 17           | 29           |
| <b>Movie</b> | 15             | 13           | 28           |
| <b>Total</b> | 27             | 30           | 57           |

**Complete the two-way table.**

4.

|              | <b>Vanilla</b> | <b>Chocolate</b> | <b>Total</b> |
|--------------|----------------|------------------|--------------|
| <b>Cone</b>  |                |                  | 72           |
| <b>Cup</b>   | 49             | 11               |              |
| <b>Total</b> |                | 36               |              |

5.

|                | <b>T-shirts</b> | <b>Sweat-shirts</b> | <b>Total</b> |
|----------------|-----------------|---------------------|--------------|
| <b>Men's</b>   | 41              |                     | 59           |
| <b>Women's</b> |                 | 7                   |              |
| <b>Total</b>   | 64              |                     |              |

**In Exercises 6–7, make a two-way table for the given information.**

- Homes** In a neighborhood there are 82 houses. Thirty of these are 1-story and the rest are 2-story. Eleven of the 1-story are frame and 37 of the 2-story are brick.
- Vacations** You surveyed 107 students about their vacation plans. Twenty-nine are going less than 500 miles and 41 are going more than 1000 miles. Twenty-three are going by train. Of these, 12 are going between 500 and 1000 miles. Twenty-eight are going by car. Three who are going less than 500 miles are going on an airplane and 36 who are going more than 1000 miles are going on an airplane. Seventeen going less than 500 miles are traveling by car.

**LESSON**  
**10.3****Practice** *continued*  
*For use with the lesson "Analyze Data"*

8. The table shows the number of tacos sold at a restaurant.

|            | Pork | Beef | Chicken | Total |
|------------|------|------|---------|-------|
| Mild Sauce | 57   | 56   | 32      | 145   |
| Hot Sauce  | 35   | 41   | 19      | 95    |
| Total      | 92   | 97   | 51      | 240   |

- Which type of taco with mild sauce sold the most?
- Which type of meat taco sold the most?
- If the store needs to cut back and eliminate one type of meat, which kind should it be? Explain your choice.

**In Exercises 9–12, use the table showing the number of swimming pools sold.**

9. Complete the table.

|              | Rectangular | Round | Oval | Total |
|--------------|-------------|-------|------|-------|
| Above-Ground |             | 58    |      | 78    |
| In-Ground    | 47          |       | 24   |       |
| Total        | 56          |       | 35   | 159   |

- How many more in-ground pools than above-ground pools were sold?
- Which shape of pool sold the most?
- Is the most popular shape for in-ground pools the same as that for above-ground pools? Explain.

**LESSON**  
**10.4****Practice***For use with the lesson "Interpret Stem-and-Leaf Plots and Histograms"***Give two possible keys for the stem-and-leaf plot.**

1. 

|   |         |
|---|---------|
| 4 | 1 1 5   |
| 5 | 0 2 7 8 |
| 6 | 3 9     |
| 7 | 4 5 6 9 |
| 8 | 0 1 3   |

2. 

|   |           |
|---|-----------|
| 0 | 0 2 3 8 9 |
| 1 | 0 2 5 5 8 |
| 2 | 4 6 8     |
| 3 | 3 3 4 5   |
| 4 | 6 7       |

**Make a stem-and-leaf plot of the data.**

3. 21, 10, 14, 26, 8, 30, 17, 15, 34, 27,  
36, 20, 7, 19, 25, 33, 19, 32, 12, 25

4. 52, 66, 61, 82, 51, 60, 62, 54, 73, 70,  
89, 85, 74, 53, 61, 75, 89, 85, 77, 55

5. 3, 5, 11, 34, 28, 19, 4, 6, 14, 17, 22, 30,  
1, 1, 9, 10, 24, 27, 33, 20, 9, 4

6. 0.1, 3.6, 2.2, 1.0, 2.1, 1.1, 0.2, 3.5,  
3.1, 2.4, 0.3, 1.5, 2.3, 0.5, 1.2

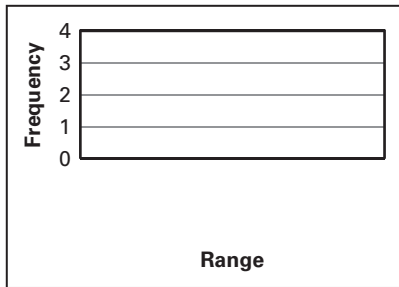
**LESSON**  
**10.4**

**Practice** *continued*

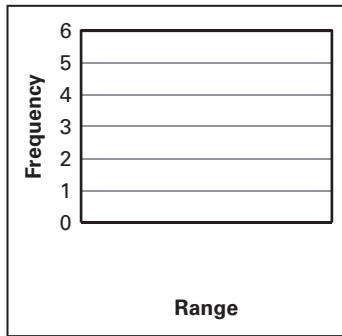
For use with the lesson "Interpret Stem-and-Leaf Plots and Histograms"

**Make a histogram of the data.**

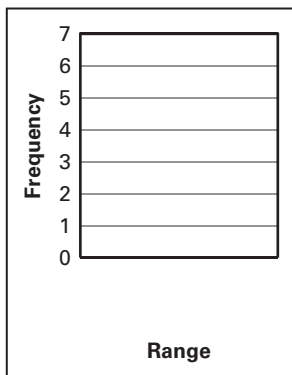
7. 78, 96, 72, 108, 82, 108, 99, 118, 94, 100, 86, 74



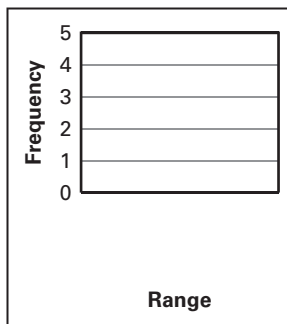
8. 58, 55, 65, 69, 66, 53, 60, 68, 61, 52, 66, 51



9. 4, 2.7, 3.2, 3, 3.7, 2.9, 3.1, 2.6, 3.4, 3, 3.6, 2.9



10. 18, 17.1, 15.5, 16.3, 15.2, 17.4, 16.6, 17.2, 15.1



**LESSON**  
**10.4**
**Practice** *continued*
*For use with the lesson "Interpret Stem-and-Leaf Plots and Histograms"*

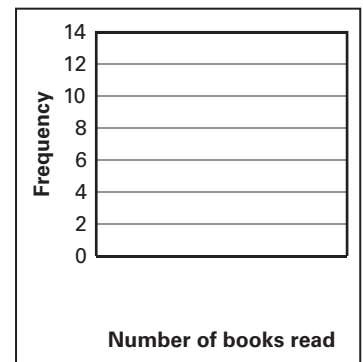
- 11. Mountains** The table shows the heights of the world's 14 tallest mountains (in thousands of meters). Make a stem-and-leaf plot of the data.

| Mountain    | Height | Mountain                | Height |
|-------------|--------|-------------------------|--------|
| Aconagua    | 7.0    | Mt. Damavand            | 5.8    |
| Annapurna   | 8.1    | Mt. Everest             | 8.8    |
| Cotopoxi    | 5.9    | Mt. Godwin Austen (K-2) | 8.6    |
| Illampu     | 6.6    | Mt. Logan               | 6.1    |
| Kanchenjuga | 8.6    | Mt. Makalu              | 8.5    |
| Kilimanjaro | 5.9    | Mt. McKinley            | 6.2    |
| Lenin       | 7.1    | Orizaba                 | 5.7    |

- 12. Books** A survey asked people how many books they have read in the last month. The results are shown in the table.

| Books     | 0–5 | 6–11 | 12–17 | 18–23 |
|-----------|-----|------|-------|-------|
| Frequency | 12  | 4    | 3     | 1     |

- Make a histogram of the data.
- What is the probability that a person surveyed, chosen at random, has read 0–5 books in the last month?

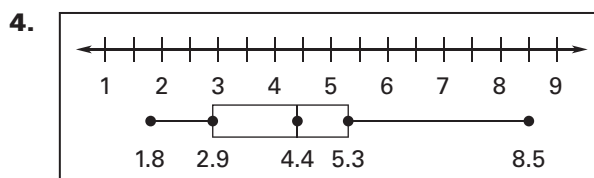
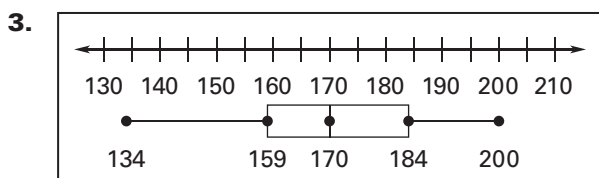
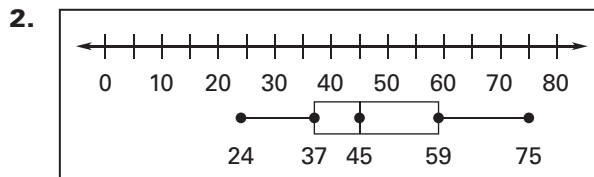
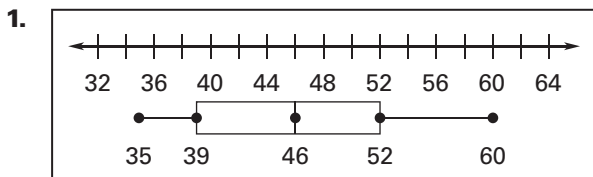


**LESSON**  
**10.5**

**Practice**

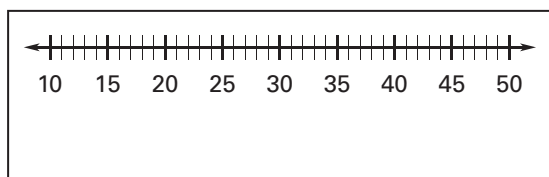
For use with the lesson "Interpret Box-and-Whisker Plots"

**Identify the median, quartiles, and interquartile range of the data from the box-and-whisker plot.**

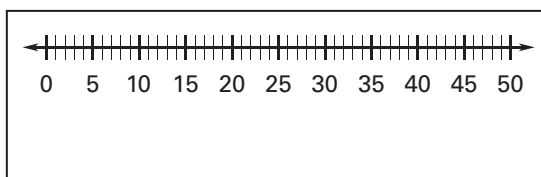


**Make a box-and-whisker plot of the data.**

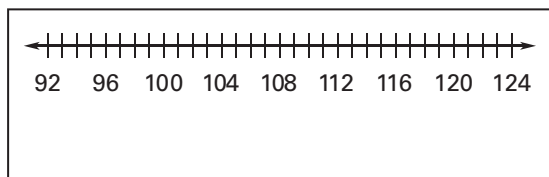
5. 11, 33, 39, 27, 25, 31, 28, 33, 31, 49



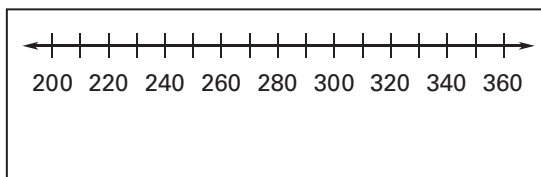
6. 10, 16, 18, 10, 13, 7, 10, 13, 2, 48



7. 108, 124, 92, 110, 117, 102, 100, 98, 120



8. 350, 225, 300, 314, 210, 321, 275, 290, 310

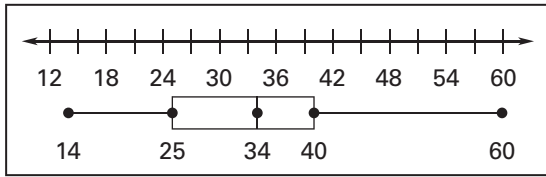




**LESSON**  
**10.5**

**Practice** *continued*  
*For use with the lesson "Interpret Box-and-Whisker Plots"*

**In Exercises 9 and 10, use the box-and-whisker plot.**



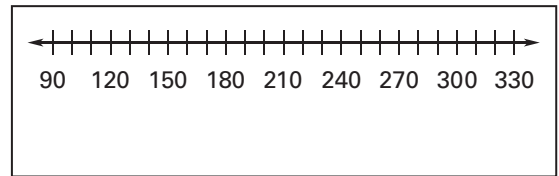
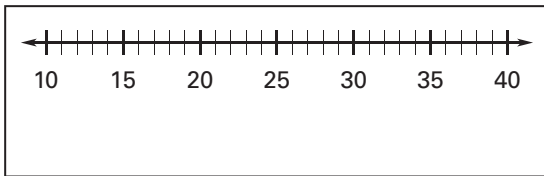
**9.** About what percent of the data are greater than 25?

**10.** About what percent of the data are less than 34?

**Make a box-and-whisker plot of the data. Identify any outliers.**

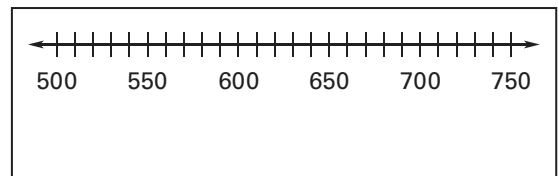
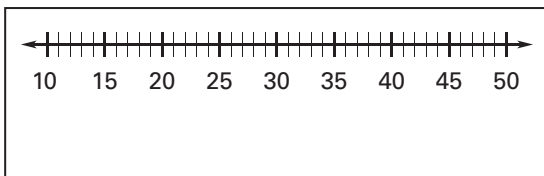
**11.** 17, 38, 22, 15, 13, 24, 18, 10, 20, 13, 17, 12

**12.** 134, 115, 105, 100, 115, 134, 200, 310, 124



**13.** 45, 30, 30, 17, 15, 27, 23, 25, 26, 30, 33, 30

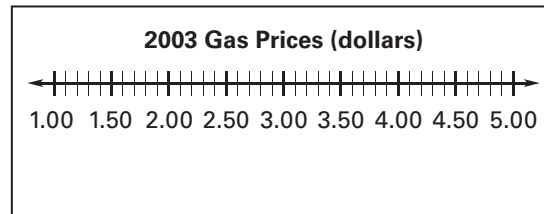
**14.** 730, 640, 500, 719, 620, 645, 740, 703, 690



LESSON  
10.5**Practice** *continued*  
*For use with the lesson "Interpret Box-and-Whisker Plots"*

- 15. Gas Prices** The prices of a gallon of gasoline (in dollars) for selected countries in 2003 are listed below.

Australia: \$2.20                  Canada: \$2.02  
 Germany: \$4.58                  Japan: \$3.47  
 Mexico: \$2.09                  Taiwan: \$2.16  
 United States: \$1.59



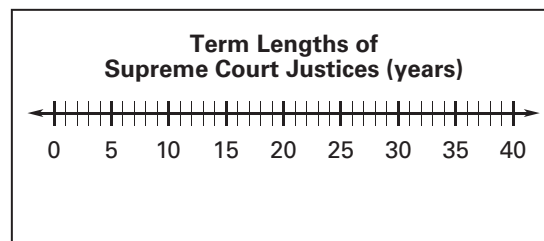
- a. Make a box-and-whisker plot of the gasoline prices.
- b. Which countries, if any, had gasoline prices that can be considered outliers?

- 16. Supreme Court Justices** The stem-and-leaf plot shows the lengths of the terms (in years) of Supreme Court justices appointed from 1902 until 1986.

| Stems | Leaves                            |
|-------|-----------------------------------|
| 0     | 1 3 3 4 4 5 5 5 5 5 6 6 7 7 7 8 9 |
| 1     | 0 0 1 2 3 5 5 5 6 6 6 6 6 7 8 9 9 |
| 2     | 2 3 3 4 4 6 6 9                   |
| 3     | 1 3 4 6                           |

**Key:** 1 | 5 = 15

- a. Make a box-and-whisker plot of the lengths of the terms.
- b. William Douglas has served the longest so far with a term of 36 years. Can his term be considered an outlier? *Explain why or why not.*



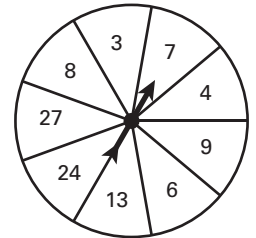
**LESSON**  
**11.1****Practice***For use with the lesson "Find Probabilities and Odds"*

**Find the number of possible outcomes in the sample space. Then list the possible outcomes.**

1. A bag contains 6 blue cards numbered 1–6 and 8 red cards numbered 1–8. You choose a card at random.
2. You roll one 4-sided number cube and toss two coins.
3. You roll two 6-sided number cubes.

**In Exercises 4–9, refer to the spinner shown. The spinner is divided into sections with the same area.**

4. What is the probability that the spinner stops on an even number?
5. What is the probability that the spinner stops on an odd number?
6. You spin the spinner 24 times. It stops on 27 twice. What is the experimental probability of stopping on 27?
7. You spin the spinner 30 times. It stops on a multiple of 3 five times. What is the experimental probability of stopping on a multiple of 3?
8. What are the odds in favor of stopping on a multiple of 4?
9. What are the odds against stopping on a multiple of 6?



LESSON  
11.1**Practice** *continued*  
For use with the lesson "Find Probabilities and Odds"

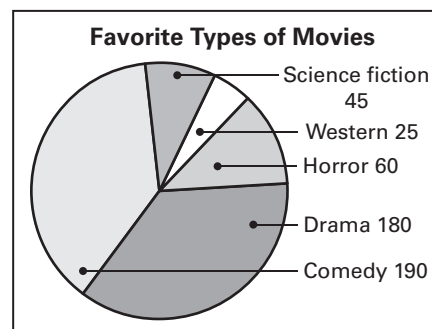
- 10. Favorite Spectator Sport** A survey asked a total of 180 students in your school about their favorite spectator sports. The table shows the results of the survey.

| Sport              | Basketball | Soccer | Football | Baseball | Volleyball | Wrestling | Hockey |
|--------------------|------------|--------|----------|----------|------------|-----------|--------|
| Number of students | 40         | 20     | 45       | 20       | 16         | 18        | 21     |

- a. What is the probability that a randomly selected student who participated in this survey chose football as his or her favorite spectator sport?
- b. What is the probability that a randomly selected student who participated in this survey chose wrestling or hockey as his or her favorite spectator sport?
- c. What are the odds in favor of a randomly selected student who participated in this survey choosing basketball as his or her favorite spectator sport?

- 11. Movies** A local movie theater did a survey of students to determine their favorite types of movies. The circle graph shows the results of the survey.

- a. What is the probability that a randomly selected student chose science fiction as his or her favorite type of movie?
- b. What is the probability that a randomly selected student chose drama or comedy as his or her favorite type of movie?



**LESSON**  
**11.2****Practice***For use with the lesson "Find Probabilities Using Permutations"*

**Find the number of ways you can arrange (a) all of the letters in the given word and (b) 2 of the letters in the word.**

1. TACK

2. MAR

3. GAMER

**Write the meaning of the notation in words.**

4.  ${}_{14}P_3$

5.  ${}_{24}P_{10}$

6.  ${}_{30}P_{20}$

**Evaluate the expression.**

7.  $6!$

8.  $9!$

9.  $11!$

10.  $\frac{8!}{3!}$

11.  $\frac{12!}{9!}$

12.  $\frac{15!}{14!}$

13.  ${}_6P_3$

14.  ${}_4P_4$

15.  ${}_{15}P_3$

16.  ${}_8P_7$

17.  ${}_{10}P_6$

18.  ${}_5P_0$

**LESSON**  
**11.2****Practice** *continued*  
*For use with the lesson "Find Probabilities Using Permutations"*

Complete the statement using  $>$ ,  $<$ , or  $=$ .

19.  ${}_6P_4$  \_\_\_\_\_  ${}_4P_1$

20.  ${}_8P_6$  \_\_\_\_\_  ${}_{10}P_8$

21.  ${}_3P_0$  \_\_\_\_\_  ${}_6P_5$

22.  ${}_6P_3$  \_\_\_\_\_  ${}_4P_1$

23.  ${}_{24}P_1$  \_\_\_\_\_  ${}_4P_4$

24.  ${}_7P_5$  \_\_\_\_\_  ${}_{12}P_3$

25. **Summer Reading List** At the beginning of the summer, you have 6 books to read. In how many orders can you read the books?
26. **Air Conditioning Repair** An air conditioner repair person has repairs to make at 7 different homes. The destinations are all so close, it doesn't matter the order in which the repairs are made. In how many orders can the repairs be made?
27. **Boat Racing** You are in a boat racing competition. In each heat, 4 boats race and the positions of the boats are randomly assigned.
- In how many ways can a position be assigned?
  - What is the probability that you are chosen to be in the last position?  
*Explain* how you found your answer.
  - What is the probability that you are chosen to be in the first or second position of the heat that you are racing in? *Explain* how you found your answer.
  - What is the probability that you are chosen to be in the second or third position of the heat that you are racing in? *Compare* your answer with that in part (c).
28. **Math Exam** On an exam, you are asked to list the 6 steps to solving a particular kind of problem in order. You guess the order of the steps at random. What is the probability that you choose the correct order?

**LESSON**  
**11.3****Practice***For use with the lesson "Find Probabilities Using Combinations"***Evaluate the expression.**

1.  ${}_8C_4$

2.  ${}_5C_5$

3.  ${}_{12}C_0$

4.  ${}_7C_1$

5.  ${}_{15}C_{11}$

6.  ${}_{10}C_3$

7.  ${}_6C_5$

8.  ${}_4C_2$

9.  ${}_{16}C_8$

**Complete the statement using  $>$ ,  $<$ , or  $=$ .**

10.  ${}_{10}C_6$  \_\_\_\_\_  ${}_8C_5$

11.  ${}_{22}C_3$  \_\_\_\_\_  ${}_{18}C_4$

12.  ${}_9C_6$  \_\_\_\_\_  ${}_9C_3$

13.  ${}_8C_2$  \_\_\_\_\_  ${}_{15}C_{14}$

14.  ${}_7C_7$  \_\_\_\_\_  ${}_{14}C_{14}$

15.  ${}_5C_3$  \_\_\_\_\_  ${}_8C_3$

**In Exercises 16–18, tell whether the question can be answered using combinations or permutations. Explain your choice, then answer the question.**

16. Five students from the 90 students in your class not running for class president will be selected to count the ballots for the vote for class president. In how many ways can the 5 students be selected?
17. Twenty students are running for 3 different positions on student council. In how many ways can the 3 positions be filled?
18. To complete a quiz, you must answer 3 questions from a list of 6 questions. In how many ways can you complete the quiz?

**LESSON**  
**11.3****Practice** *continued*  
*For use with the lesson "Find Probabilities Using Combinations"*

- 19. Sweaters** The buyer for a retail store must decide which sweaters to stock for the upcoming fall season. A sweater from one manufacturer comes in 5 different colors and 3 different textures. The buyer decides that the store will stock the sweater in 3 different colors and 2 different textures. How many different sweaters are possible?
- 20. Greeting Cards** A greeting card company packages 4 different cards together that are randomly selected from 10 different cards with a different animal on each card. What is the probability that one of the cards in a package is the card that has a dog on it?
- 21. Open-Mike Night** A coffee shop offers an open-mike night for poetry. Tonight, 15 people would like to read, but there is only enough time to have 7 people read.
- Seven of the 15 people that would like to read are randomly chosen. How many combinations of 7 readers from the group of people that would like to read are possible?
  - You and your friend are part of the group that would like to read. What is the probability that you and your friend are chosen? What is the probability that you are chosen first and your friend is chosen second? Which event is more likely to occur?



**LESSON**  
**11.4**

# Practice

*For use with the lesson "Find Probabilities of Disjoint and Overlapping Events"*
**Events  $A$  and  $B$  are disjoint. Find  $P(A \text{ or } B)$ .**

1.  $P(A) = 0.1, P(B) = 0.45$       2.  $P(A) = 0.85, P(B) = 0.05$       3.  $P(A) = \frac{1}{2}, P(B) = \frac{1}{5}$

**Find the indicated probability.**

4.  $P(A) = \frac{1}{6}, P(B) = \frac{5}{6}$       5.  $P(A) = 0.23, P(B) = 0.36$       6.  $P(A) = \frac{5}{8}, P(B) = \frac{1}{4}$
- $P(A \text{ or } B) = \frac{1}{3}$        $P(A \text{ or } B) = 0.25$        $P(A \text{ or } B) = \frac{1}{2}$
- $P(A \text{ and } B) = \underline{\quad?}$        $P(A \text{ and } B) = \underline{\quad?}$        $P(A \text{ and } B) = \underline{\quad?}$

**Find  $P(\bar{A})$ .**

7.  $P(A) = 1$       8.  $P(A) = 0.25$       9.  $P(A) = \frac{9}{16}$

**Find the indicated probability. State whether  $A$  and  $B$  are disjoint events.**

10.  $P(A) = \frac{2}{13}, P(B) = \underline{\quad?}$       11.  $P(A) = 17\%, P(B) = 35\%$       12.  $P(A) = \frac{5}{6}, P(B) = \frac{2}{5}$
- $P(A \text{ or } B) = \frac{8}{13}$        $P(A \text{ or } B) = 52\%$        $P(A \text{ or } B) = \underline{\quad?}$
- $P(A \text{ and } B) = \frac{4}{13}$        $P(A \text{ and } B) = \underline{\quad?}$        $P(A \text{ and } B) = \frac{2}{3}$

LESSON  
11.4**Practice** *continued**For use with the lesson "Find Probabilities of Disjoint and Overlapping Events"*

**Two six-sided dice are rolled. Find the probability of the given event.  
(Refer to Example 4 on page 709 of the textbook for the possible outcomes.)**

- 13.** The sum is greater than 4.
- 14.** The sum is 6 or 11.
- 15.** The sum is neither 5 nor 9.
- 16.** The sum is greater than 7 and less than 11.
- 17. Honors Banquet** Of the 120 students honored at an academic banquet, 40% won awards for mathematics and 55% for English. Fourteen of these students won awards for both mathematics and English. One of the 120 students is chosen at random to be interviewed for a newspaper article. What is the probability that the student won an award in mathematics or English?
- 18. Parakeets** A pet store has 18 light green parakeets (5 females and 13 males) and 25 sky blue parakeets (15 females and 10 males). You randomly choose one of the parakeets. What is the probability that it is a male or a sky blue parakeet?
- 19. Potluck Dinner** The organizer of a potluck dinner sends 6 people a list of 10 different recipes and asks each person to bring one of the items on the list. If all 6 people randomly choose a recipe from the list, what is the probability that at least 2 will bring the same thing?

**LESSON**  
**11.5**

# Practice

For use with the lesson "Find Probabilities of Independent and Dependent Events"

**Tell whether the events are independent or dependent.**

1. A shelf contains 50 travel books, one for each state. You randomly choose a book and put it back. Then you randomly choose another book.

Event  $A$ : You choose the Alaska book first.

Event  $B$ : You choose the Hawaii book second.

2. You have bottles of water and bottles of juice in your refrigerator. You randomly choose one, drink it, then randomly choose another.

Event  $A$ : You choose a bottle of water first.

Event  $B$ : You choose a bottle of juice second.

**Events  $A$  and  $B$  are independent. Find the missing probability.**

3.  $P(A) = 0.6$

$P(B) = 0.5$

$P(A \text{ and } B) = \underline{\quad? \quad}$

4.  $P(A) = 0.35$

$P(B) = \underline{\quad? \quad}$

$P(A \text{ and } B) = 0.28$

5.  $P(A) = \underline{\quad? \quad}$

$P(B) = 0.8$

$P(A \text{ and } B) = 0.24$

**Events  $A$  and  $B$  are dependent. Find the missing probability.**

6.  $P(A) = 0.2$

$P(B|A) = 0.3$

$P(A \text{ and } B) = \underline{\quad? \quad}$

7.  $P(A) = 0.7$

$P(B|A) = \underline{\quad? \quad}$

$P(A \text{ and } B) = 0.56$

8.  $P(A) = \underline{\quad? \quad}$

$P(B|A) = 0.76$

$P(A \text{ and } B) = 0.19$

**LESSON**  
**11.5****Practice** *continued**For use with the lesson "Find Probabilities of Independent and Dependent Events"*

**Find the probability of drawing the given cards from a standard deck of 52 cards (a) with replacement and (b) without replacement.**

9. A red card, then a black card                      10. A ten, then the ace of hearts
11. A face card, then a two                              12. A club, then a four

**HONORS CLASSES** The table shows the number of students taking honors classes.

|                   | <b>1 Honors class</b> | <b>2 Honors classes</b> | <b>3 Honors classes</b> |
|-------------------|-----------------------|-------------------------|-------------------------|
| <b>Freshmen</b>   | 66                    | 52                      | 31                      |
| <b>Sophomores</b> | 58                    | 68                      | 43                      |
| <b>Juniors</b>    | 51                    | 72                      | 60                      |
| <b>Seniors</b>    | 48                    | 59                      | 64                      |

13. Find the probability that a student is a junior.
14. Find the probability that a sophomore who is taking honor classes is taking two honors classes.
15. Find the probability that a student taking two honors classes is a freshman.
16. **TIC-TAC-TOE** Woodrow wins a tic-tac-toe game 65% of the time when he chooses the first square and 32% of the time when his opponent chooses the first square. The player who plays first is chosen by a coin toss. What is the probability that Woodrow wins a given game?