1. ** PATTERNS ** How many cubes are in the tenth figure if the pattern below continues? (Lesson 1-1)

2. ** SPACE EXPLORATION ** On one flight, the space shuttle *Endeavour* traveled 6.9 million miles and circled Earth 262 times. About how many miles did the shuttle travel on each trip around Earth? (Lesson 1-1)

3. ** TREES ** A conservation group collects seeds from trees at historic homes, grows them into saplings, and sells them to the public. Each sapling costs $35, and $7 is added to each order for shipping and handling. Write and then evaluate an expression for the total cost of one order of six saplings. (Lesson 1-2)

4. ** SALES ** For a school fund-raiser, Sophia sold 15 white chocolate hearts at $4.25 each, 36 milk chocolate hearts at $3.75 each, and 22 milk chocolate assortments at $7.45 each. How much money did Sophia raise? (Lesson 1-2)

5. ** SPACE ** For Exercises 5 and 6, use the following information.

   Objects weigh six times more on Earth than they do on the moon because the force of gravity is greater. (Lesson 1-3)

6. Write an expression for the weight of an object on Earth if its weight on the moon is $x$.

7. A scientific instrument weighs 34 pounds on the moon. How much does the instrument weigh on Earth?

8. Voluntary Application: The volleyball net is 3 feet 3 inches tall. The bottom of the net is to be set 4 feet 8 inches from the floor. (Lesson 1-4)

9. ** NEWSPAPERS ** Nick sold 86 newspapers on Monday, 79 on Tuesday, 68 on Wednesday, and 83 on Friday. How many newspapers did Nick sell on Thursday if he sold a total of 391 in the five days? (Lesson 1-5)

10. ** FOOD ** Kristin is planning to buy twice as many blueberry bagels as plain bagels for a staff meeting. Write a relation to show the different possibilities. (Lesson 1-6)

11. ** GEOLOGY ** For Exercises 11 and 12, use the following information.

    The underground temperature of rocks in degrees Celsius is estimated by the expression $35x + 20$, where $x$ is the depth in kilometers. (Lesson 1-6)

12. Make a list of ordered pairs in which the $x$-coordinate represents the depth and the $y$-coordinate represents the temperature for depths of 0, 2, and 4 kilometers.

13. ** EMPLOYMENT ** The scatter plot shows the years of experience and salaries of twenty people. Do the data show a positive, negative, or no relationship? Explain. (Lesson 1-7)

14. ** BIRDS ** The table shows the average lengths and widths of five bird eggs.

<table>
<thead>
<tr>
<th>Bird</th>
<th>Length (cm)</th>
<th>Width (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian goose</td>
<td>8.6</td>
<td>5.8</td>
</tr>
<tr>
<td>robin</td>
<td>1.9</td>
<td>1.5</td>
</tr>
<tr>
<td>turtledove</td>
<td>3.1</td>
<td>2.3</td>
</tr>
<tr>
<td>hummingbird</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>raven</td>
<td>5.0</td>
<td>3.3</td>
</tr>
</tbody>
</table>

Source: *Animals as Our Companions*

Make a scatter plot of the data and predict the width of an egg 6 centimeters long. (Lesson 1-7)
1. **ASTRONOMY** Mars is about 228 million kilometers from the Sun. Earth is about 150 million kilometers from the Sun. Write two inequalities that compare the two distances. *(Lesson 2-1)*

2. **GAMES** In a popular television game show, one contestant finished the regular round with a score of $-200$, and another contestant finished with a score of $-500$. Write two inequalities that compare their scores. *(Lesson 2-1)*

3. **MONEY** Tino had $250 in his checking account at the beginning of April. During the month he wrote checks in the amounts of $72, $37, and $119. He also made one deposit of $45. Find Tino’s account balance at the end of April. *(Lesson 2-2)*

4. **ASTRONOMY** At noon, the average temperature on the moon is $112\degree C$. During the night, the average temperature drops $252\degree C$. What is the average temperature of the moon’s surface during the night? *(Lesson 2-2)*

5. **SUBMARINES** The research submarine Alvin is located at 1500 meters below sea level. It descends another 1250 meters to the ocean floor. How far below sea level is the ocean floor? *(Lesson 2-3)*

6. **METEOROLOGY** Wind chill factor is an estimate of the cooling effect the wind has on a person in cold weather. If the outside temperature is $10\degree F$ and the wind makes it feel like $-25\degree F$, what is the difference between the actual temperature and how cold it feels? *(Lesson 2-3)*

7. **GEOGRAPHY** The highest point in Africa is Mount Kilimanjaro. Its altitude is 5895 meters. The lowest point on the continent is Lake Assal. Its altitude is $-155$ meters. Find the difference between these altitudes. *(Lesson 2-3)*

8. **GEOLOGY** In December, 1994, geologists found that the Bering Glacier had come to a stop. The glacier had been retreating at a rate of about 2 feet per day. If the retreat resumes at the old rate, what integer represents how far the glacier will have advanced after 28 days? *(Lesson 2-4)*

9. **SPORTS** The Wildcat football team was penalized the same amount of yardage four times during the third quarter. The total of the four penalties was 60 yards. If $-60$ represents a loss of 60 yards, write a division sentence to represent this situation. Then express the number of yards of each penalty as an integer. *(Lesson 2-5)*

10. **AEROSPACE** To simulate space travel, NASA’s Lewis Research Center in Cleveland, Ohio, uses a 430-foot shaft. If the free fall of an object in the shaft takes 5 seconds to travel the $-430$ feet, on average how far does the object travel in each second? *(Lesson 2-5)*

11. **MAPS** A map of a city can be created by placing the following buildings at the given coordinates: City Hall (1, 2), High School ($-3$, 6), Fire Department (4, $-2$), Recreation Center (0, 3). Draw and label the map. *(Lesson 2-6)*

**GEOMETRY** For Exercises 12 and 13, use the following information.
A vertex of a polygon is a point where two sides of the polygon intersect.

12. Identify the coordinates of the vertices in the triangle below.

13. Add 2 to each x-coordinate. Graph the new ordered pairs. Describe how the position of the new triangle relates to the original triangle. *(Lesson 2-6)*
1. **BUSINESS** A local newspaper can be ordered for delivery on weekdays or Sundays. A weekday paper is 35¢, and the Sunday edition is $1.50. The Stadlers ordered delivery of the weekday papers. The month of March had 23 weekdays and April had 20. How much should the carrier charge the Stadlers for those two months? (Lesson 3-1)

2. **SHOPPING** For Exercises 2 and 3, use the following information.
   One pair of jeans costs $23, and one T-shirt costs $15. (Lesson 3-1)
   2. Write two equivalent expressions for the total cost of 3 pairs of jeans and 3 T-shirts.
   3. Find the total cost.

4. **ENTERTAINMENT** Kyung bought 3 CDs that each cost $x dollars, 2 tapes that each cost $10, and a video that cost $14. Write an expression in simplest form that represents the total amount that Kyung spent. (Lesson 3-2)

5. **TRANSPORTATION** For Exercises 5 and 6, use the following information.
   A minivan is rated for maximum carrying capacity of 900 pounds.
   5. If the luggage weighs 100 pounds, what is the maximum weight allowable for passengers?
   6. What is the maximum average weight allowable for each of 5 passengers? (Lesson 3-3)

7. **GEOMETRY** The perimeter of any square is 4 times the length of one of its sides. If the perimeter of a square is 72 centimeters, what is the length of each side of the square? (Lesson 3-4)

8. **PURCHASING** Mr. Rockwell bought a television set. The price was $362. He paid $75 down and will pay the balance in 7 equal payments. How much is each payment? (Lesson 3-5)

9. **SPORTS** Marcie paid $75 to join a tennis club for the summer. She will also pay $10 for each hour that she plays. If Marcie has budgeted $225 to play tennis this summer, how many hours can she play tennis? (Lesson 3-5)

10. **FENCING** For Exercises 10 and 11, use the following information.
    Wanda uses 130 feet of fence to enclose a rectangular flower garden. She also used the 50-foot wall of her house as one side of the garden. What is the width of the garden? (Lesson 3-6)
    10. Write an equation that represents this situation.
    11. Solve the equation to find the width of the garden.

12. **WORKING** For Exercises 12 and 13, use the following information.
    Kate worked a 40-hour week and was paid $410. This amount included a $50 bonus. (Lesson 3-6)
    12. Write an equation that represents this situation.
    13. What was Kate paid per hour?

14. **GEOMETRY** The perimeter of the triangle below is 27 yards.
    \[ x - 2 \quad x + 2 \quad x \]
    Find the lengths of the sides of the triangle. (Lesson 3-7)

15. **TRAVEL** The Flynn family plans to drive 600 miles for their summer vacation. The speed limit on the highways they plan to use is 55 miles per hour. If they do not exceed the speed limit, how many hours of driving should it take them? (Lesson 3-7)

16. **SCIENCE** For Exercises 16 and 17, use the following information.
    Acceleration is the rate at which velocity is changing with respect to time. To find the acceleration, find the change in velocity by subtracting the starting velocity, \( s \), from the final velocity, \( f \). Then divide by the time, \( t \). (Lesson 3-7)
    16. Write the formula for acceleration, \( a \).
    17. A motorcycle goes from 2 m/s to 14 m/s in 6 seconds. Find its acceleration.
1. **LUNCHTIME** A group of 136 sixth graders needs to be seated in the cafeteria for lunch. If all of the tables need to be full, should the school use tables that seat 6, 8, or 10 students each? ([Lesson 4-1](#))

2. ** PATTERNS** In a pattern, the number of colored tiles used in row $x$ is $3^x$. Find the number of tiles used in rows 4, 5, and 6 of the pattern. ([Lesson 4-2](#))

3. **ELECTRICITY** The amount of power lost in watts $P$ can be found by using the formula $P = I^2R$, where $I$ is current in amps, and $R$ is resistance in ohms. The resistance of the wire leading from the source of power to a home is 2 ohms. If an electric stove causes a current of 41 amps to flow through the wire, find the power lost from the wire powering the stove. ([Lesson 4-2](#))

4. **CODES** Prime numbers are used to code and decode information. Suppose two prime numbers $p$ and $q$ are chosen so that $n = pq$. Then the key to the code is $n$. Find $p$ and $q$ if $n = 1073$. ([Lesson 4-3](#))

5. **INTERIOR DESIGN** Mrs. Garcia has two different fabrics to make square pillows for her living room. One fabric is 48 inches wide, and the other fabric is 60 inches wide. How long should each side of the pillows be if they are all the same size and no fabric is wasted? ([Lesson 4-4](#))

6. **ECONOMICS** The graph below shows how each dollar spent by the Federal Government is used. Write a fraction in simplest form comparing the amount spent on housing assistance and the total amount spent. ([Lesson 4-5](#))

7. **BASKETBALL** Sydney made 8 out of 14 free throws in her last basketball game. Write her success as a fraction in simplest form. ([Lesson 4-5](#))

8. **TRANSPORTATION** Cameron spends 18 minutes traveling to work. What fraction of the day is this? ([Lesson 4-5](#))

9. **EARTHQUAKES** The table below describes different earthquake intensities.

<table>
<thead>
<tr>
<th>Earthquake</th>
<th>Richter Scale</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>8</td>
<td>$10^7$</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>$10^3$</td>
</tr>
</tbody>
</table>

   Find $10^7 \div 10^3$ to determine how much more intense Earthquake A was than Earthquake B. ([Lesson 4-6](#))

10. **ASTRONOMY** For Exercises 10 and 11, use the following information. Any two objects in space have an attraction that can be calculated by using a formula that includes the universal gravitational constant, $6.67 \times 10^{-11}$ Nm²/kg². (N is newtons.) ([Lesson 4-7](#))

11. Write the universal gravitational constant using positive exponents.

12. Write the universal gravitational constant as a decimal.

13. **BIOLOGY** For Exercises 12 and 13, use the following information. Deoxyribonucleic acid, or DNA, contains the genetic code of an organism. The length of a DNA strand is about $10^{-7}$ meter. ([Lesson 4-7](#))

14. Write the length of a DNA strand using positive exponents.

15. **SCIENCE** Atoms are extremely small particles about two millionths of an inch in diameter. Write this measure in standard form and in scientific notation. ([Lesson 4-8](#))

16. **BUSINESS** A large corporation estimates its yearly revenue at $4.72 \times 10^8$. Write this number in standard form. ([Lesson 4-8](#))
Chapter 5  Rational Numbers

1. **FURNITURE**  A shelf $16\frac{5}{8}$ inches wide is to be placed in a space that is $16\frac{3}{4}$ inches wide. Will the shelf fit in the space? Explain.  *(Lesson 5-1)*

2. **MEASUREMENT**  A piece of metal is 0.025 inch thick. What fraction of an inch is this?  *(Lesson 5-2)*

3. **HEALTH**  You can stay in the Sun 15 times longer than usual without burning by applying SPF number 15. If you usually burn after $\frac{1}{3}$ hour in the Sun, how long could you stay in the Sun using SPF 15 lotion?  *(Lesson 5-3)*

4. **MONEY**  A dollar bill remains in circulation about $1\frac{1}{4}$ years. A coin lasts about $22\frac{1}{2}$ times longer. How long is a coin in circulation?  *(Lesson 5-3)*

5. **FOOD**  If each guest at a party eats two-thirds of a small pizza, how many guests would finish 12 small pizzas?  *(Lesson 5-4)*

6. **PUBLISHING**  A magazine page is 8 inches wide. The articles are printed in three columns with $\frac{1}{4}$ inch of space in between and $\frac{3}{8}$-inch margins on each side, as shown below.

   ![Magazine page diagram]

   How wide should an author set the columns on her computer so that they are the same width as in the magazine?  *(Lesson 5-4)*

7. **REMODELING**  In their basement, the Jacksons installed $\frac{3}{8}$-inch thick paneling over a layer of drywall that is $\frac{5}{8}$ inch thick. How thick are the wall coverings?  *(Lesson 5-5)*

8. **COLLEGE**  In a college dormitory $\frac{3}{8}$ of the residents are from Ohio, and $\frac{2}{5}$ of the residents are from New York. Which state has a greater representation?  *(Lesson 5-6)*

9. **NUTRITION**  A survey found that $\frac{1}{6}$ of American households bought bottled water in 2000. Only $\frac{1}{17}$ of American households bought bottled water in 1993. What fraction of the population bought bottled water in 2000 that did not in 1993?  *(Lesson 5-7)*

10. **EMPLOYMENT**  The table below shows the earnings per woman for every $100 earned by a man in the same occupation for two years.  *(Lesson 5-8)*

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Earnings ($)</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse</td>
<td>99.50</td>
<td>104.70</td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>88.60</td>
<td>90.30</td>
<td></td>
</tr>
<tr>
<td>Police Officer</td>
<td>91.20</td>
<td>94.20</td>
<td></td>
</tr>
<tr>
<td>Food Service</td>
<td>102.50</td>
<td>105.60</td>
<td></td>
</tr>
<tr>
<td>Postal Clerk</td>
<td>93.40</td>
<td>94.60</td>
<td></td>
</tr>
</tbody>
</table>

Find the mean, median, and mode of the earnings for each year.

11. **OIL PRODUCTION**  Texas and Alaska produced a total of 1372.2 million barrels of oil. Alaska produced 684.0 million barrels. How many barrels of oil were produced in Texas?  *(Lesson 5-9)*

12. **ON-LINE SERVICE**  The cost of using an Internet service provider for 5, 6, 7, and 8 hours is given by the sequence $9.95, \$12.90, \$15.85,$ and $\$18.80,$ respectively. Is the cost an arithmetic or geometric sequence? Explain.  *(Lesson 5-10)*
1. **SHOPPING**  Best buys in grocery stores are generally found by comparing unit rates such as cents per ounce. Which bag of nachos shown in the table at the right is the better buy?  *(Lesson 6-1)*

<table>
<thead>
<tr>
<th>Size</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-oz</td>
<td>$2.49</td>
</tr>
<tr>
<td>32-oz</td>
<td>$3.69</td>
</tr>
</tbody>
</table>

2. **COOKING**  A recipe that makes 72 cookies calls for $4\frac{1}{2}$ cups of flour. How many cups of flour would be needed to make 48 cookies?  *(Lesson 6-2)*

3. **FERRIS WHEEL**  In a scale model of a Ferris wheel, the diameter of the wheel is 5 inches. If the actual height of the wheel is 55 feet, what is the scale of the model?  *(Lesson 6-3)*

4. **BUSINESS**  An executive of a marshmallow company said that marshmallows are 80% air. What fraction of a marshmallow is air?  *(Lesson 6-4)*

5. **HEALTH**  Doctors estimate that 3 babies out of every 1000 are likely to get a cold during their first month. What percent is this?  *(Lesson 6-4)*

6. **NUTRITION**  Refer to the nutritional label from a bag of pretzels shown below.

```
Nutrition Facts
Serving Size 1 package (46.8g)
Servings per container 1

Amount per serving
Calories 190 Calories from Fat 15

% Daily Value*
Total Fat 1.5g 3%
  Saturated Fat 0g 0%
  Cholesterol 0mg 0%
  Sodium 760mg 32%
  Total Carbohydrate 37g 12%
```

The 760 milligrams of sodium (salt) in one serving is 32% of the recommended daily value. What is the total recommended daily value of sodium?  *(Lesson 6-5)*

7. **FAST FOOD**  A certain hamburger has 560 Calories, and 288 of these are from fat. About what percent of the Calories are from fat?  *(Lesson 6-6)*

8. **MONEY**  If Simone wants to leave a tip of about 15% on a dinner check of $23.85, how much should she leave?  *(Lesson 6-6)*

9. **BUSINESS**  Many car dealers offer special interest rates as incentives to attract buyers. How much interest would a person pay for the first month of a $5500 car loan if the monthly interest rate is 0.24%?  *(Lesson 6-7)*

10. **PETS**  Hedgehogs are becoming so popular as pets that some breeders have reported a 250% increase in sales in recent years. If a breeder sold 50 hedgehogs one year before the increase, how many should he or she expect to sell a year from now?  *(Lesson 6-8)*

11. ** BRAND NAMES**  The graph below shows the results of a survey.

   ```
   Brand Name Buying (age 8–17)
   ```

   ![Graph showing brand name buying (age 8–17)]

   How many of a class of 423 ninth grade students would you expect to say that they consider brand name when buying jeans?  *(Lesson 6-9)*

12. **CANDY**  In a small bag of colored chocolate candies, there are 15 green, 23 red, and 18 yellow candies. What is the probability of selecting a red candy if one is taken from the bag at random?  *(Lesson 6-9)*
Chapter 7 Equations and Inequalities
(pages 326–365)

Mixed Problem Solving

1. Write an expression for the population of Buffalo after \( x \) years.
2. Write an expression for the population of Corpus Christi after \( x \) years.
3. In how many years would the population of the two cities be the same?

4. **INTERNET** One Internet provider charges $19.95 a month plus $0.21 per minute, and a second provider charges $24.95 a month plus $0.16 per minute. For how many minutes is the cost of the plans the same? (Lesson 7-1)

5. **GEOMETRY** The length of a rectangle is three times the difference between its width and two. Find the width if the length is 15 inches. (Lesson 7-2)

6. **SPORTS** More than 100,000 fans attended the opening football game of the season. Write an inequality for the number of people who attended. (Lesson 7-3)

7. **SCHOOL** Julie has math and English homework tonight. She has no more than 90 minutes to spend on her homework. Suppose Julie spends 35 minutes completing her math homework. Write and solve an inequality to find how much time she can spend on her English homework. (Lesson 7-4)

8. **SAVINGS** Curtis is saving money to buy a new mountain bike. The bikes that he likes start at $375, and he has already saved $285. Write and solve an inequality to find the amount he must still save. (Lesson 7-4)

9. **STATISTICS** The Boston Marathon had more than 2,600,000 spectators along its 26-mile route. Write and solve an inequality to find the average number of spectators per mile. (Lesson 7-5)

10. **GROCERY SHOPPING** Mrs. Hiroshi spends at least twice as much on her weekly grocery shopping as she did one year ago. Last year, she spent $54 each week. How much is Mrs. Hiroshi now spending each week on groceries? (Lesson 7-5)

11. **GEOMETRY** An acute angle has a measure less than 90°. If the measure of an acute angle is \( 2x \), write and solve an inequality to find the possible values of \( x \). (Lesson 7-5)

12. **SHOPPING** Luis plans to spend at most $85 on jeans and shirts. He bought 2 shirts for $15.30 each. How much can he spend on jeans? (Lesson 7-6)

13. **CAR SALES** A car salesperson receives a monthly salary of $1000 plus a 3% commission on every car sold. For what amount of monthly sales will the salesperson earn more than $2500? (Lesson 7-6)

14. **SCHOOL** Dave has earned scores of 73, 85, 91, and 82 on the first four of five math tests for the grading period. He would like to finish the grading period with a test average of at least 82. What is the minimum score Dave needs to earn on the fifth test in order to achieve his goal? (Lesson 7-6)
1. What is the shipping cost of merchandise totaling $75?

2. For what price of merchandise is the shipping cost $5.75?

3. Does the table represent a function? Explain.

PHYSICS  For Exercises 4 and 5, use the following information.
As a thunderstorm approaches, you see lightning as it occurs, but you hear the accompanying thunder a short time afterward. The distance $y$ in miles that sound travels in $x$ seconds is given by $y = 0.21x$. (Lesson 8-2)

4. Find three ordered pairs that relate $x$ and $y$.

5. How far away is lightning when thunder is heard 2.5 seconds after the lightning is seen?

AVIATION  For Exercises 6 and 7, use the following information.
The steady descent of a jetliner is represented by the equation $a = 24,000 - 1500t$, where $t$ is the time in minutes and $a$ is the altitude in feet. (Lesson 8-3)

6. Name the $x$-intercept of the graph of the equation.

7. What does the $x$-intercept represent?

8. KITES  Drew is flying a kite in the park. The kite is a horizontal distance of 20 feet from Drew’s position and a vertical distance of 70 feet. Find the slope of the kite string. (Lesson 8-4)

9. FUEL  The cost of gasoline varies directly as the number of gallons bought. If it costs $27.80 to fill a 20-gallon tank, what would it cost to fill a 12-gallon tank? (Lesson 8-5)

10. BUSINESS  A company’s monthly cost $y$ is given by $y = 1500 + 12x$, where $x$ represents the number of items produced. State the slope and $y$-intercept of the graph of the equation and describe what they represent. (Lesson 8-6)

CAR RENTAL  For Exercises 11 and 12, use the following information.
It costs $59 per day plus $0.12 per mile driven to rent a minivan. (Lesson 8-7)

11. Write an equation in slope-intercept form that shows the cost $y$ for renting a minivan for one day and driving $x$ miles.

12. Find the daily rental cost if 30 miles are driven.

13. NUTRITION  The graph below shows energy bar sales in the United States during the month of October.

Use the graph to predict energy bar sales during October 2002. (Lesson 8-8)

14. SCHOOL CONCERT  Tickets for the fall concert cost $3 for students and $5 for nonstudents. If a total of 140 tickets were sold and $590 was collected, how many of each type of ticket was sold? (Lesson 8-9)

FINANCE  For Exercises 15–17, use the following information.
Silvina earns $3.50 per hour for weeding the garden and $5.00 per hour for mowing the lawn. Suppose she wants to earn at least $35 this week. (Lesson 8-10)

15. Write an inequality to represent this situation. Let $x$ represent the number of hours she weeds and let $y$ represent the number of hours she mows.

16. Graph the inequality.

17. Determine two possible ways that she can earn at least $35 this week.
1. **CONSTRUCTION** A banquet facility must allow at least 4 square feet for each person on the dance floor. Reston’s Hotel is adding a square dance floor that will be large enough for 100 people. How long should it be on each side? *(Lesson 9-1)*

2. **PHYSICS** The time $t$ in seconds that it takes an object to fall $d$ feet can be estimated by using $d = 0.5gt^2$. In this formula, $g$ is acceleration due to gravity, 32 ft/s². If a ball is dropped from the top of a 55-foot building, how long does it take to hit the ground? *(Lesson 9-2)*

3. **BOOKS** For Exercises 3 and 4, use the following information.
   The graph shows the results of a survey, which asked which types of books people buy the most. *(Lesson 9-3)*

   - **Books Americans Buy**
   - **Source:** USA TODAY

   3. Classify the angle labeled Self Help as **acute**, **obtuse**, **right**, or **straight**.
   4. Find the measure of the angle labeled Fiction.

5. **AVIATION** Airplane flight paths can be described using angles and compass directions. The path of a particular airplane is described as 36° west of north. Draw a diagram that represents this path. *(Lesson 9-3)*

6. **UTILITIES** A support cable is sometimes attached to give a utility pole stability. If the cable makes an angle of 65° with the ground, what is the measure of the angle formed by the cable and the pole? *(Lesson 9-4)*

7. **BASEBALL** A baseball diamond is actually a square with 90 feet between the bases. What is the distance between home plate and second base? *(Lesson 9-5)*

8. **SAILING** A rope from the top of a sailboat mast is attached to a point 6 feet from the base of the mast. If the rope is 24 feet long, how high is the mast? *(Lesson 9-5)*

9. **TRAVEL** Matt’s home is at (−4, 9) on the map. His friend Carlos’ home is at (6, 3) on the same map. They want to meet halfway between their two homes. What are the coordinates on the map where they should plan to meet? *(Lesson 9-6)*

10. **HISTORY** The largest known pyramid is Khufu’s pyramid. At a certain time of day, a yardstick casts a shadow 1.5 feet long, and the pyramid casts a shadow 241 feet long. Use shadow reckoning to find the height of the pyramid. *(Lesson 9-7)*

11. **SURVEYING** A surveyor needs to find the distance across a river and draws the sketch shown below.

12. **RECREATION** Maxine is flying a kite on a 75-yard string. The string is making a 45° angle with the ground. How high above the ground is the kite? *(Lesson 9-8)*

13. **MAINTENANCE** A 15-foot ladder is propped against a house. The angle it forms with the ground is 60°. To the nearest foot, how far up the side of the house does the ladder reach? *(Lesson 9-8)*
1. **TRANSPORTATION** The angle at the corner where two streets intersect is 125°. If a bus cannot make a turn at an angle of less than 70°, can bus service be provided on a route that includes turning that corner in both directions? Explain. *(Lesson 10-1)*

2. **BRIDGES** For Exercises 2 and 3, use the following information.
The figure below shows part of the support structure of a bridge. Name a triangle that seems to be congruent to each triangle below. *(Lesson 10-2)*

3. **MOVING** A historic house in the shape of a rectangle has coordinates \(A(-3, 5)\), \(B(4, 5)\), \(C(4, -3)\), and \(D(-3, -3)\) on a map. The house is going to be moved to a new site 3 units east and two units north. Find the coordinates of the house once it reaches the new site. *(Lesson 10-3)*

4. **SHAPES** Name three items in your room that are quadrilaterals. Classify the shapes. *(Lesson 10-4)*

5. **GEOGRAPHY** The state of Indiana is shaped almost like a trapezoid. Estimate the area of the state. *(Lesson 10-5)*

6. **SIGNS** For Exercises 7 and 8, use the following information.
Part of a driver’s license exam includes identifying road signs by color and by shape. Identify the shape of each road sign pictured below. *(Lesson 10-6)*

7. 

8. 

9. What is the shape of the tray?

10. Find the measure of each angle of the tray so that the trays will fit side-to-side around the table.

11. **PUBLIC SAFETY** A tornado warning system can be heard for a 2-mile radius. Find the area that will benefit from the warning. *(Lesson 10-7)*

12. **CITY PLANNING** The circular region inside the streets at DuPont Circle in Washington, D.C., is 250 feet across. What is the area of the region? *(Lesson 10-7)*

13. **GEOMETRY** Find the area of a figure that is formed using a rectangle having width equal to 8 feet and length equal to 5 feet and a half circle with a diameter of 6 feet. *(Lesson 10-8)*
1. PRESENTS Mateo received a gift wrapped in the shape of a rectangular pyramid. How many faces, edges, and vertices are on the gift box? (Lesson 11-1)

2. PET CARE Tina has an old fish tank in the shape of a circular cylinder. The tank is 2 feet in diameter and 6 feet high. How many cubic feet of water does it hold? Round to the nearest cubic foot. (Lesson 11-2)

3. CHEMISTRY A quartz crystal is a hexagonal prism. It has a base area of 1.41 square centimeters and a volume of 4.64 cubic centimeters. What is its height? If necessary, round to the nearest hundredth. (Lesson 11-2)

4. BAKING A rectangular cake pan is 30 centimeters by 21 centimeters by 5 centimeters. A round cake pan has a diameter of 21 centimeters and a height of 4 centimeters. Which holds more batter, the rectangular pan or two round pans? (Lesson 11-2)

5. MONUMENTS The top of the Washington Monument is a square pyramid 54 feet high and 34 feet long on each side. What is the volume of this top part of the monument? (Lesson 11-3)

6. MANUFACTURING A carton of canned fruit holds 24 cans. Each can has a diameter of 7.6 centimeters and a height of 10.8 centimeters. Approximately how much paper is needed to make the labels for the 24 cans? If necessary, round to the nearest tenth. (Lesson 11-4)

7. CAMPING How much canvas was used to make the A-frame tent shown below? (Hint: Be sure to include the floor of the tent.) (Lesson 11-4)

8. HISTORY The Pyramid of Cestius is a monument in Rome. It is a square pyramid with the dimensions shown below.

What is its lateral area? If necessary, round to the nearest tenth. (Lesson 11-5)

9. TEPEES The largest tepee in the United States is in the shape of a cone with a diameter of 42 feet and a slant height of about 47.9 feet. How much canvas was used for the cover of the tepee? If necessary, round to the nearest tenth. (Lesson 11-5)

10. SHIPPING Are the two packing tubes shown below similar solids? (Lesson 11-6)

11. MODELS A miniature greenhouse is a rectangular prism with a volume of 16 cubic feet. The scale factor of this greenhouse to a larger greenhouse of the same shape is \( \frac{1}{4} \). What is the volume of the larger greenhouse? (Hint: scale factor = \( \frac{a}{b} \), ratio of volumes = \( \left(\frac{a}{b}\right)^3 \)) (Lesson 11-6)

12. DECORATING Alicia is wallpapering a wall that is 8.25 feet high and 23.7 feet wide. What is the area of the wall? Round to the correct number of significant digits. (Lesson 11-7)
1. **ARCHITECTURE** The *World Almanac* lists fifteen tall buildings in New Orleans, Louisiana. The number of floors in each of these buildings is listed below.

   Make a stem-and-leaf plot of the data. 
   *(Lesson 12-1)*

2. **WORLD CULTURES** Many North American Indians hold conferences called *powwows*, to celebrate their culture and heritage through various ceremonies and dances. The ages of participants and observers in a Menominee Indian powwow are shown in the chart below.

   Find the range and interquartile range for each group. *(Lesson 12-2)*

3. **CONSUMERISM** The average retail price for one gallon of unleaded gasoline at a certain station are shown in the table below.

   Make a box-and-whisker plot of the data. *(Lesson 12-3)*

4. **HOMEWORK** The frequency table below shows the amount of time students spend doing homework each week.

   Display the data in a histogram. *(Lesson 12-4)*

5. **ENTERTAINMENT** The graph below displays data about movie attendance.

   Tell why the graph appears to be misleading. *(Lesson 12-5)*

6. **BUSINESS** The Yogurt Oasis advertises that there are 1512 ways to enjoy a one-topping sundae. They offer six flavors of frozen yogurt, six different serving sizes, and several different toppings. How many toppings do they offer? *(Lesson 12-6)*

7. **VOLLEYBALL** How many different 6-player starting squads can be formed from a volleyball team of 15 players? *(Lesson 12-7)*

8. **TELEVISION** The odds in favor of a person in North America appearing on television sometime in their lifetime is 1:3. If there are 32 students in your class, predict how many will appear on television. *(Lesson 12-8)*

9. **BUSINESS** An auto dealer finds that of the cars coming in for service, 70% need a tune up and 50% need a new air filter. What is the probability that a car brought in for service needs both a tune up and a new air filter? *(Lesson 12-9)*

10. **ECONOMICS** Thirty-one percent of minimum-wage workers are between 16 and 19 years old. Twenty-two percent of the minimum-wage workers are between 20 and 24 years old. If a person who makes minimum wage is selected at random, what is the probability that he or she will be between 16 and 24 years old? *(Lesson 12-9)*

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### Mixed Problem Solving

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### Chapter 12 More Statistics and Probability

*(pages 604–665)*
1. Find the degree of the polynomial.

2. Find an expression to represent the area of the living room. Then classify the expression as a monomial, binomial, or trinomial.

3. CONSTRUCTION  A standard unit of measurement for a window is the united inch. You can find the united inches of a window by adding the length and width of the window. If the length of a window is $3x - 5$ inches and the width is $x + 7$ inches, what is the size of the window in united inches? (Lesson 13-2)

4. GEOMETRY  The perimeter of the triangle below is $4x + 4$ centimeters. Find the length of the hypotenuse of the triangle. (Lesson 13-3)

5. GEOMETRY  Find the area of the shaded region. Write in simplest form. (Lesson 13-4)

6. Find the area of each rectangular region and add to find a formula for the number of square inches of cardboard needed.

7. Find the surface area if $x$ is 2.5 inches.

8. PRODUCTION  The XYZ Production Company states that the cost $y$ of producing $x$ items is given by the equation $y = 2500 + 3.2x$. Does this equation represent a linear or nonlinear function? (Lesson 13-5)

9. INTERNET  The graph below shows the increase in electronic mailboxes in the United States.

Does this graph represent a linear or nonlinear function? Explain. (Lesson 13-5)

10. POPULATION  The population growth of a particular species of insect is given by the equation $y = 2x^3$, where $x$ represents time elapsed in days and $y$ represents the population size. Graph this equation. (Lesson 13-6)