

Glencoe McGraw-Hill

California  
**Mathematics**  
Grade 6

**Practice Workbook**



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**TO THE STUDENT** This *Practice Workbook* gives you additional examples and problems for the concept exercises in each lesson. The exercises are designed to aid your study of mathematics by reinforcing important mathematical skills needed to succeed in the everyday world. The materials are organized by chapter and lesson, with one *Practice* worksheet for every lesson in *Glencoe California Mathematics, Grade 6*.

Always keep your workbook handy. Along with your textbook, daily homework, and class notes, the completed *Practice Workbook* can help you review for quizzes and tests.

**TO THE TEACHER** These worksheets are the same as those found in the Chapter Resource Masters for *Glencoe California Mathematics, Grade 6*. The answers to these worksheets are available at the end of each Chapter Resource Masters booklet as well as in your Teacher Wraparound Edition interleaf pages.



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**1-1 Practice**

6MR1.1, 5NS2.1

***A Plan for Problem Solving*****Use the four-step plan to solve each problem.**

- 1. ENGINES** A car engine turns 900 revolutions per minute while idling. How many revolutions does a car engine turn in one second while idling?
- 2. DISTANCE** While traveling in Montana from Butte to Sidney, Mr. Kowalski, recorded that the distance from Butte to Sidney was about 6 times the distance from Butte to Bozeman. Bozeman lies between Butte and Sidney. If the distance from Butte to Bozeman is 82 miles, what is the approximate distance from Bozeman to Sidney?
- 3. NUMBERS** What are the next two numbers in the pattern?  
3.1, 3.11, 33.11, 33.111, \_\_\_\_\_, \_\_\_\_\_
- 4. TIDES** The Bay of Fundy in Nova Scotia, Canada is known for large tides. On a particular day low tide was at 2.3 feet. The tide then rose 6.6 feet every hour for the next six hours. What was the height of high tide on that particular day?
- 5. BASKETBALL** If team A won by 2 points what was the number of points scored by team A in the 3rd quarter?
- 6. COOKING** A cake recipe requires a total 16 tablespoons of butter for one cake, some for the batter and some for the frosting. If 4 tablespoons of butter are needed for the batter for one cake, how many tablespoons of butter are needed for the frosting if Samantha wants to bake three cakes?

Team	Quarter Scores				Final Score
	1st	2nd	3rd	4th	
<b>A</b>	21	18	?	17	?
<b>B</b>	15	19	20	25	79

**1-2 Practice**

5NSI.3

***Powers and Exponents*****Write each power as a product of the same factor.**

1.  $5^7$

2.  $2^4$

3.  $7^2$

4.  $10^5$

5.  $3^3$

6.  $6^8$

7. *four to the eighth power*8. *eight cubed*9. *ten squared***Write each product in exponential form.**

10.  $9 \cdot 9 \cdot 9 \cdot 9 \cdot 9 \cdot 9$

11.  $1 \cdot 1 \cdot 1 \cdot 1 \cdot 1$

12.  $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

13.  $6 \cdot 6 \cdot 6 \cdot 6 \cdot 6 \cdot 6 \cdot 6 \cdot 6 \cdot 6$

14.  $5 \cdot 5$

15.  $4 \cdot 4 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

**Evaluate each expression.**

16.  $4^3$

17.  $1^{11}$

18.  $2^5$

19.  $10^3$

20.  $9^3$

21.  $8^1$

22. *five to fourth power*23. *7 squared*24. *zero to the sixth power***Use a calculator to determine whether each sentence is *true* or *false*.**

25.  $2^8 = 8^2$

26.  $17^2 < 172$

27.  $3^2 > 1^{19}$

**Order the following powers from least to greatest.**

28.  $7^2, 5^3, 3^4, 2^5$

29.  $4^3, 1^{13}, 12^2, 8^3$

30.  $3^9, 5^7, 7^5, 9^3$

31. **INTERACTIVE MAPS** Mansi is using an interactive map on her computer that allows her to zoom in or zoom out. Each time she zooms out the scale of the map increases by a power of ten. If she zooms out four times the scale is  $10^4$  times greater. Write this number in standard form.

32. **BACTERIA** A lab technician observed 5 bacteria growing in a lab dish. One hour later he observed 25 bacteria. Every hour he notices about 5 times as many as the hour before. After several hours of observation, he determined the lab dish had  $5^9$  bacteria. Use a calculator to find the number in standard form that represents the bacteria in the lab dish.

**1-3 Practice**

7NS2.4

**Squares and Square Roots****Find the square of each number.**

1. 2

2. 8

3. 10

4. 11

5. 15

6. 25

7. What is the square of 5?

8. Find the square of 16.

9. Find the square of 21.

**Find each square root.**

10.  $\sqrt{64}$

11.  $\sqrt{121}$

12.  $\sqrt{169}$

13.  $\sqrt{0}$

14.  $\sqrt{81}$

15.  $\sqrt{289}$

16.  $\sqrt{900}$

17.  $\sqrt{1}$

18.  $\sqrt{484}$

**PACKAGING** An electronics company uses three different sizes of square labels to ship products to customers. The area of each type of label is shown in the table.

Labels	
Type	Area
Priority:	100 cm <sup>2</sup>
Caution:	225 cm <sup>2</sup>
Address:	144 cm <sup>2</sup>

19. If the length of a side of a square is the square root of the area, what is the length of a side for each label?

20. How much larger is the Caution label than the Address label?

21. **RECREATION** A square hot tub is outlined by a 2-foot wide tile border. In an overhead view, the area of the hot tub and the border together is 144 square feet. What is the length of one side of the hot tub itself?

**1-4 Practice****6AF1.3, 6AF1.4****Order of Operations****Evaluate each expression.**

1.  $(2 + 9) \times 4$

2.  $8 - (5 + 2)$

3.  $(15 \div 3) + 7$

4.  $(14 + 7) \div 7$

5.  $5 \cdot 6 - 12 \div 4$

6.  $8 \div 2 + 8 - 2$

7.  $16 - 8 \div 2 + 5$

8.  $15 - 3 \cdot 5 + 7$

9.  $7 \times 10^3$

10.  $2 \times 5^2 + 6$

11.  $7 \cdot 2^3 - 9$

12.  $27 \div 3 \times 2 + 4^2$

13.  $6^3 - 12 \times 4 \cdot 3$

14.  $(15 - 3) \div (8 + 4)$

15.  $(9 - 4) \cdot (7 - 7)$

16.  $8 + 3(5 + 2) - 7 \cdot 2$

17.  $5(6 - 1) - 4 \cdot 6 \div 3$

18.  $(5 + 7)^2 \div 12$

19.  $12 \div (8 - 6)^2$

20.  $(7 + 2)^2 \div 3^2$

21.  $(11 - 9)^2 \cdot (8 - 5)^2$

22.  $64 \div 8 - 3(4 - 3) + 2$

23.  $8 \times 5.1 - (4.1 + 1.4) + 7.1$

**For Exercises 24 and 25, write an expression for each situation. Then evaluate the expression to find the solution.**

**24. LAWN AREA** The Solomons need to find the area of their front and side yards since they want to reseed the lawn. Both side yards measure 3 meters by 10 meters, while the front yard is a square with a side of 9 meters. They do not need to reseed a portion of the front yard covering 16 square meters where a flower bed is located. What is the area of the yard that the Solomons want to reseed?

**25. COMMUNITY SERVICE** Jariah volunteers at the hospital during the week. She volunteers 3 hours on Monday and Thursday, 4 hours on Saturday and Sunday, and 2 hours on Tuesday. How many hours does Jariah volunteer at the hospital during the week?



**1-5**

**Practice**

6MR1.1, 5NS2.1

**Problem Solving Investigation: Guess and Check**

**Mixed Problem Solving**

**For Exercises 1 and 2, choose the appropriate method of computation. Then use the method to solve the problem.**

**1. NUMBERS** A number is multiplied by 7. Then 5 is added to the product. The result is 33. What is the number?

**2. FOOD** Mr. Jones paid \$23 for food for his family of seven at the ballpark. Everyone had a drink and either one hot dog or one hamburger. How many hamburgers were ordered?

MENU	
ITEM	PRICE
Hot Dog	\$2
Hamburger	\$3
Drink	\$1

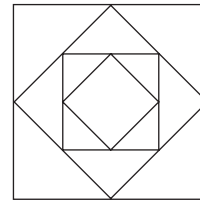
**Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.**

PROBLEM-SOLVING STRATEGIES
<ul style="list-style-type: none"> <li>• Use the four-step plan.</li> <li>• Guess and Check</li> </ul>

**3. PATTERNS** What are the next two “words” in the pattern?

*ace, bdf, ceg, dfh, egi, \_\_\_\_\_, \_\_\_\_\_*

**4. GEOMETRY** The area of each square is twice the area of the next smaller square drawn in it. If the area of the smallest square is 3 square centimeters, what is the area of the largest square?



**Select the Operation**

**For Exercises 5 and 6, select the appropriate operation to solve the problem. Justify your solution and solve the problem.**

**5. MONEY** Duane has four dimes, half as many nickels as dimes, and three times as many quarters as nickels. How much money does Duane have?

**6. LIBRARY** Mr. Shuck, the librarian, counted 157 books checked-in during the day. This number was 8 less than 3 times the number of books checked-out that same day. How many books were checked-out that day?

**1-6****Practice**

6AF1.2, 6AF1.4

**Algebra: Variables and Expressions**Evaluate each expression if  $r = 5$ ,  $s = 2$ ,  $t = 7$ , and  $u = 1$ .

1.  $s + 7$

2.  $9 - u$

3.  $3t + 1$

4.  $5r - 4$

5.  $t - s$

6.  $u + r$

7.  $11t - 7$

8.  $6 + 3u$

9.  $4r - 10s$

10.  $3u^2$

11.  $2t^2 - 18$

12.  $r^2 + 8$

13.  $\frac{s}{2}$

14.  $\frac{30}{r}$

15.  $\frac{(3 + u)^2}{8}$

Evaluate each expression if  $a = 4.1$ ,  $b = 5.7$ , and  $c = 0.3$ .

16.  $a + b - c$

17.  $10 - (a + b)$

18.  $b - c + 2$

19. **MOON** The expression  $\frac{w}{6}$  gives the weight of an object on the Moon in pounds with a weight of  $w$  pounds on Earth. What is the weight of a space suit on the Moon if the space suit weighs 178.2 pounds on Earth?

20. Complete the table.

Pounds ( $p$ )	Ounces ( $16p$ )
1	16
2	32
3	
4	
5	

**1-7 Practice****6AF1.1****Algebra: Equations****Solve each equation mentally.**

1.  $a + 5 = 14$

2.  $7 + y = 24$

3.  $t - 13 = 33$

4.  $b - 17 = 11$

5.  $12 - r = 0$

6.  $x + 18 = 59$

7.  $63 = 9g$

8.  $8d = 96$

9.  $n = \frac{42}{7}$

10.  $9 = \frac{z}{7}$

11.  $10 = h \div 4$

12.  $55 \div m = 11$

13.  $1.2 + k = 3.0$

14.  $2.7 = f - 1.1$

15.  $v - 0.5 = 0.2$

16.  $12.6 - c = 7.0$

17.  $8.8 + j = 18.7$

18.  $w + 13.5 = 16.0$

**19. WEATHER** The temperature was  $78^{\circ}\text{F}$ . A cold front moved in, and the temperature dropped to  $54^{\circ}\text{F}$ . Solve the equation  $78 - d = 54$  to find the drop in temperature.

**20. HOBBIES** Elissa can cut out the pieces of cloth to make four pillows in one hour. Solve the equation  $4h = 20$  to find how many hours Elissa needs to cut cloth for 20 pillows.

**21. BOWLING** Jean Conrad is an amateur bowler with an average score of 187. She recently bowled a perfect 300 score. Write an equation that can be used to find how much the perfect score was above her average score and then solve the equation.

**1-8 Practice****6AF1.3****Algebra: Properties****Use the Distributive Property to evaluate each expression.**

1.  $4(5 + 7)$

2.  $6(3 + 1)$

3.  $(10 + 8)2$

4.  $5(8 - 3)$

5.  $7(4 - 1)$

6.  $(9 - 2)3$

**Name the property shown by each statement.**

7.  $7 + (6 + t) = (7 + 6) + t$

8.  $23 \cdot 15 = 15 \cdot 23$

9.  $0 + x = x$

10.  $3(g + 7) = 3 \cdot g + 3 \cdot 7$

11.  $8 \times 1 = 8$

12.  $y + 11 = 11 + y$

13.  $5(w + 1) = (w + 1)5$

14.  $(4 \cdot d) \cdot 1 = 4 \cdot (d \cdot 1)$

15.  $(6 + 2)7 = (6)7 + (2)7$

**Use one or more properties to rewrite each expression as an equivalent expression that does not use parentheses.**

16.  $(b + 3) + 6$

17.  $7(5x)$

18.  $4(a + 4)$

19.  $7 + (3 + t)$

20.  $(2z)0$

21.  $(9 + k)5$

22.  $8(y - 5) + y$

23.  $(h + 2)3 - 2h$

24. **GROCERY** A grocery store sells an imported specialty cheesecake for \$11 and its own store-baked cheesecake for \$5. Use the Distributive Property to mentally find the total cost for 6 of each type of cheesecake.

25. **CHECKING ACCOUNT** Mr. Kenrick balances his checking account statement each month two different ways as shown by the equation,  $(b + d) - c = b + (d - c)$ , where  $b$  is the previous balance,  $d$  is the amount of deposits made, and  $c$  is the amount of checks written. Name the property that Mr. Kenrick uses to double check his arithmetic.

26. **SPEED** A train is traveling at a speed of 65 miles per hour. The train travels for one hour. What property is used to solve this problem as shown by the statement  $65 \cdot 1 = 65$ ?

**1-9****Practice**

6AF1.2

**Algebra: Arithmetic Sequences**

Describe the relationship between the terms in each arithmetic sequence. Then write the next three terms in each sequence.

1. 0, 5, 10, 15, ...

2. 1, 3, 5, 7, ...

3. 18, 27, 36, 45, ...

4. 7, 19, 31, 43, ...

5. 8, 18, 28, 38, ...

6. 25, 26, 27, 28, ...

7. 0.4, 0.8, 1.2, 1.6, ...

8. 3.7, 3.7, 3.7, 3.7, ...

9. 5.1, 6.2, 7.3, 8.4, ...

10. 17, 31, 45, 59, ...

11. 30, 50, 70, 90, ...

12. 14, 41, 68, 95, ...

In a *geometric sequence*, each term is found by multiplying the previous term by the same number. Write the next three terms of each geometric sequence.

13. 5, 10, 20, 40, ...

14. 3, 9, 27, 81, ...

15. 2, 8, 32, 128, ...

**NUMBER SENSE** Find the 40th term in each arithmetic sequence.

16. 4, 8, 12, 16, ...

17. 13, 26, 39, 52, ...

18. 6, 12, 18, 24, ...

**19. GEOMETRY** The lengths of the sides of a 6-sided polygon are in arithmetic sequence. The length of the shortest side is 3 meters. If the length of the next longer side is 5 meters, what is the length of the longest side?

**20. FREE FALLING OBJECT** A free falling object increases speed by a little over 22 miles per hour each second. The arithmetic sequence 22, 44, 66, ..., represents the speed after each second, in miles per hour, of a dropped object. How fast is a rock falling after 8 seconds if it is dropped over the side of a cliff?

**1-10****Practice**

6AF1.2, 6MR2.4

**Algebra: Equations and Functions**

Complete each function table. Then identify the domain and range.

1.  $y = 5x$

$x$	$5x$	$y$
1		
2		
3		
4		

2.  $y = 8x$

$x$	$8x$	$y$
1		
2		
3		
4		

3.  $y = 7x$

$x$	$7x$	$y$
3		
4		
5		
6		

4.  $y = x - 2$

$x$	$x - 2$	$y$
2		
3		
4		
5		

5.  $y = x + 3$

$x$	$x + 3$	$y$
2		
3		
4		
5		

6.  $y = x + 0.75$

$x$	$x + 0.75$	$y$
0		
1		
2		
3		

7. **PRODUCTION** A car manufacturer makes 15,000 hybrid cars a month. Using the function table, find the number of hybrid cars produced after 3, 6, 9, and 12 months.

$m$	$15,000m$	$P$
3		
6		
9		
12		

8. **SUNSPOTS** The changing activity of sunspots, which are cooler and darker areas of the sun, occur in 11-year cycles. Use the function  $y = 11c$  to find the numbers of years necessary to complete 1, 2, 3, and 4 sunspot cycles.

**2-1****Practice**

6NS1.1

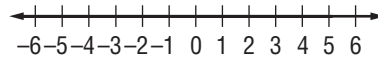
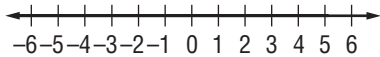
***Integers and Absolute Value*****Write an integer for each situation.**

1. a profit of \$12
2. 1,440 feet below sea level
3. 22°F below 0
4. a gain of 31 yards

**Graph each set of integers on a number line.**

5.  $\{-5, 0, 5\}$

6.  $\{-3, -2, 1, -4\}$

**Evaluate each expression.**

7.  $|-11|$

8.  $|-5| + 8$

9.  $|-4| - |-4|$

10.  $|12| \div 2 \times |-5|$

11.  $|-4| + 7 - |3|$

12.  $9 + |-6| \div 1^2$

13. **HEALTH** A veterinarian recommends that a St. Bernard lose weight. Write an integer to describe the dog losing 25 pounds.

14. **GEOGRAPHY** Mount Kilimanjaro is the highest peak in Africa. Write an integer to represent the elevation of Mount Kilimanjaro of 5,895 meters above sea level.

15. **ECONOMY** Gasoline prices occasionally fluctuate during a two month period of time. Prices increased 34 cents per gallon during the month of April and decreased 17 cents per gallon during the month of May. What integers can be used to describe each change in price?

**2-2****Practice**

6NS1.1

**Comparing and Ordering Integers**

Replace each ● with &lt; or &gt; to make a true sentence.

1.  $-5 \bullet 1$

2.  $-27 \bullet -31$

3.  $7 \bullet 0$

4.  $4 \bullet -11$

5.  $7 \bullet -7$

6.  $12 \bullet -14$

7.  $-54 \bullet -31$

8.  $-49 \bullet 3$

9.  $-1 \bullet 2$

Order the integers in each set from least to greatest.

10.  $\{-4, 4, -1, 7, 2\}$

11.  $\{8, -5, 0, 1, -2\}$

12.  $\{11, -17, 12, -9, 3, -1\}$

Replace each ● with &lt;, &gt;, or = to make a true sentence.

13.  $4 \bullet |-4|$

14.  $|-27| \bullet |-31|$

15.  $12 \bullet |-18|$

16. **ANALYZE TABLES** Elements melt at different temperatures. Five elements and their melting points in °C, are listed in the table. Order the elements from the lowest melting point to the highest melting point.

Element	Melting Point °C
Carbon	3,500
Helium	-272
Mercury	-39
Oxygen	-218
Sodium	98

Source: science.co.il

**BUSINESS** For Exercises 17 and 18, use the information in the table. It shows the net profit or loss of a used-car dealership during the spring and summer months of a recent year.

Month	March	April	May	June	July	August	September
<b>Net Profit Or Loss</b>	\$8,500	\$1,800	-\$2,300	\$300	-\$1,000	\$9,400	\$2,500

17. Order the months from the lowest net value to the highest.

18. Which net value is the middle, or **median**, value?

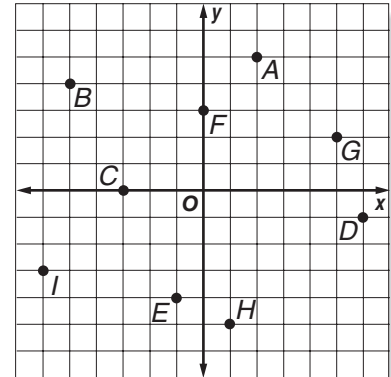


# 2-3 Practice

5AF1., 6MR2.4

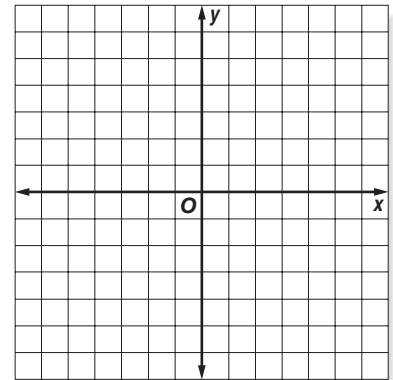
## The Coordinate Plane

Write the ordered pair for each point graphed at the right. Then name the quadrant or axis on which each point is located.



- |      |      |      |
|------|------|------|
| 1. A | 2. B | 3. C |
| 4. D | 5. E | 6. F |
| 7. G | 8. H | 9. I |

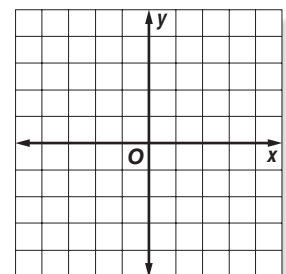
Graph and label each point on the coordinate plane at the right.



- |                 |                |                 |
|-----------------|----------------|-----------------|
| 10. $J(2, 2)$   | 11. $K(-3, 4)$ | 12. $L(-4, 1)$  |
| 13. $M(-3, -3)$ | 14. $N(1, -4)$ | 15. $O(0, 0)$   |
| 16. $P(4, 5)$   | 17. $Q(4, -3)$ | 18. $R(-6, -5)$ |

Determine whether each statement is *sometimes*, *always*, or *never* true. Explain or give a counterexample to support your answer.

- The  $y$ -coordinate of a point in quadrant II is negative.
- The  $x$ -coordinate of a point on the  $y$ -axis is zero.
- In quadrants I and III, the  $x$ -coordinate of a point is positive.
- GEOMETRY** Graph the points  $A(-3, -1)$ ,  $B(0, 4)$ ,  $C(4, 3)$ , and  $D(1, -2)$  on the coordinate plane at the right. Connect the points from  $A$  to  $B$ ,  $B$  to  $C$ ,  $C$  to  $D$ , and  $D$  to  $A$ . Name the figure.



**2-4****Practice**

6NS2.3

**Adding Integers****Add.**

1.  $34 + 22$

2.  $-29 + 30$

3.  $9 + (-32)$

4.  $-16 + (-28)$

5.  $4 + (-50)$

6.  $-12 + (-63)$

7.  $-42 + 42$

8.  $-28 + 14$

9.  $13 + 63$

10.  $18 + (-12) + 5$

11.  $-22 + (-10) + 15$

12.  $-14 + 0 + 13$

**Write an addition expression to describe each situation. Then find each sum and explain its meaning.**

**13. WEIGHT** An actor gains 20 pounds for a part and then loses 15 pounds during the filming of a movie to go along with the story.

**14. TEMPERATURE** At 4:00 A.M., the outside temperature was  $-28^{\circ}\text{F}$ . By 4:00 P.M. that same day, it rose 38 degrees.

**ALGEBRA** Evaluate each expression if  $a = 12$ ,  $b = -15$ , and  $c = -10$ .

15.  $a + (-12)$

16.  $-20 + b$

17.  $c + 23$

18.  $b + c$

19.  $a + c$

20.  $a + b$

**21. ROLLER COASTERS** The latest thrill ride at a popular theme park takes roller coaster fans on an exciting ride. In the first 20 seconds, it carries its passengers up a 100-meter hill, plunges them down 72 meters, and quickly takes them back up a 48-meter rise. How much higher or lower from the start of the ride are they after these 20 seconds?

**2-5****Practice****6NS2.3****Subtracting Integers****Subtract.**

1.  $16 - 14$

2.  $-4 - 2$

3.  $9 - (-2)$

4.  $-6 - (-8)$

5.  $-20 - 10$

6.  $-28 - (-13)$

7.  $-33 - 33$

8.  $28 - 14$

9.  $13 - (-63)$

10.  $-18 - (-12)$

11.  $52 - (-30)$

12.  $-15 - 0$

13. **WEATHER** The highest and lowest recorded temperatures for the state of Texas are  $120^{\circ}\text{F}$  and  $-23^{\circ}\text{F}$ . Find the difference in these extreme temperatures.

**ALGEBRA** Evaluate each expression if  $x = -8$ ,  $y = 7$ , and  $z = -11$ .

14.  $x - 7$

15.  $-13 - y$

16.  $-11 - z$

17.  $x - z$

18.  $z - y$

19.  $y - x$

20.  $x - (-z)$

21.  $|y - z|$

22.  $x - z - y$

**ANALYZE TABLES** In golf, scores are often stated as the number of strokes above or below par for the course. Four golfers played two rounds of golf during the weekend. The table lists their scores for each round in relation to par.

Golfer	Patrick	Diane	James	Juanita
Round 1	-6	+1	+2	-3
Round 2	-2	-4	+7	+6

**For Exercises 23 and 24, use the information in the table.**

23. Find the difference between James's Round 2 score and Diane's Round 2 score.
24. Find the difference between Patrick's lower score and Juanita's higher score.

**2-6****Practice****6NS2.3*****Multiplying Integers*****Multiply.**

- |              |               |               |
|--------------|---------------|---------------|
| 1. $4(-7)$   | 2. $-14(5)$   | 3. $9(-12)$   |
| 4. $-6(-8)$  | 5. $27(-3)$   | 6. $-11(-13)$ |
| 7. $-55(0)$  | 8. $(-7)(-7)$ | 9. $78(-1)$   |
| 10. $(-3)^3$ | 11. $(-1)^4$  | 12. $(-8)^2$  |
13. Find  $-5$  cubed.
14. Find the product of 13 and  $-31$ .

**ALGEBRA Evaluate each expression  $a = -5$ ,  $b = 4$ ,  $c = -1$ , and  $d = 8$ .**

- |             |               |                 |
|-------------|---------------|-----------------|
| 15. $5b$    | 16. $3c$      | 17. $ad$        |
| 18. $-7bd$  | 19. $abc$     | 20. $-5c^3$     |
| 21. $-a^2b$ | 22. $-4d - a$ | 23. $b^2 - 4ac$ |
24. **RECREATION** Hiking up a mountain, you notice that the air temperature drops  $10^\circ\text{C}$  for every 1,000 meters increase in elevation. Write a multiplication expression to represent the decrease in temperature if you hike up the mountain 3,000 meters. Then evaluate the expression and explain its meaning.

**2-7 Practice**

6MRI.1, 6NS2.3

**Problem-Solving Investigation: Look for a Pattern****Mixed Problem Solving**

Use the look for a pattern strategy to solve Exercises 1 and 2.

1. **NUMBERS** What are the next two numbers in the pattern below?

3, 15, 75, 375, ...

2. **QUILTING** Mrs. Perez is a talented quilter. In the center of the design of her quilt are four identical red squares in the shape of a square. Surrounding these red squares is a border of 12 identical white squares. Surrounding these white squares is a border of 20 identical blue squares. How many squares are in the next border surrounding the 20 blue squares?

B	B	B	B	B	B
B	W	W	W	W	B
B	W	R	R	W	B
B	W	R	R	W	B
B	W	W	W	W	B
B	B	B	B	B	B

Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.

**PROBLEM-SOLVING STRATEGIES**

- Use the four-step plan.
- Guess and Check.
- Look for a pattern.

3. **TRANSPORTATION** A college needs to transport the swim team to a state meet. The large van carries 15 people and each smaller van carries 9 people. How many smaller vans are needed to provide rides for 54 people if the large van is used?

4. **ALPHABET** What are the next three letters in each pattern shown?

D, H, L, P, ...

C, F, I, L, ...

**Select the Operation**

For Exercises 5 and 6, select an appropriate operation to solve the problem. Justify your solution and solve the problem.

5. **POPULATION** The land area of Ebeye, an island in the Pacific, is 90 acres. About 155 persons per acre live on this island. What is the population of Ebeye?
6. **ASTRONOMY** Earth is 93 million miles from the sun, while Mars is 142 million miles from the sun. Theoretically, what is the closest distance Mars could be to Earth?

**2-8****Practice**

6NS2.3

**Dividing Integers****Divide.**

1.  $42 \div (-7)$

2.  $45 \div (-5)$

3.  $-9 \div 3$

4.  $-64 \div (-8)$

5.  $-39 \div (-13)$

6.  $-121 \div 11$

7.  $\frac{-48}{12}$

8.  $\frac{-35}{7}$

9.  $\frac{-38}{-2}$

10.  $\frac{32}{-16}$

11.  $\frac{55}{-5}$

12.  $(-8)^2$

13. Divide 75 by  $-25$ .14. Find the quotient of  $-30$  and  $-15$ .**ALGEBRA** Evaluate each expression if  $f = -15$ ,  $g = 5$ , and  $h = -45$ .

15.  $-20 \div g$

16.  $90 \div h$

17.  $h \div f$

18.  $fg \div 25$

19.  $\frac{f-h}{10}$

20.  $\frac{g-5}{-1}$

21.  $-f^2 \div g$

22.  $\frac{h-3g}{f}$

23.  $\frac{f+h}{-g}$

**ZOOLOGY** The table below shows the weight in pounds of large adult males in the cat family.

Cat	Cheetah	Cougar	Leopard	Lion	Tiger
<b>Weight</b>	143	227	200	550	400

Source: [www.sandiegozoo.org](http://www.sandiegozoo.org)**For Exercises 24 and 25 use the information in the table.**24. What is the mean weight of these *cats*?25. What is the mean weight of the two largest *cats*?

**3-1****Practice**

6AF1.2

**Writing Expressions and Equations****Write each phrase as an algebraic expression.**

1. the product of  $-5$  and  $x$
2. twenty increased by  $k$
3. five inches more than the height
4. one fourth of  $y$
5. Bill's weight decreased by eighteen
6. the quotient of 3 and a number
7. five less than four times as many women
8. \$60 more than the rent payment
9. 9 minutes less than Chang's time
10. three more pancakes than his brother ate

**Write each sentence as an algebraic equation.**

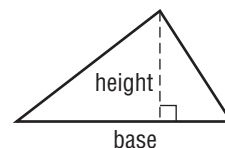
11. Five times the number of books is 95.
12. The difference of nine and a number is nine.
13. The sum of the average and four is  $-6$ .
14. Three meters longer than the pool is 8.
15. Twelve less a number is 40.
16. The product of seven and Lynn's age is 28.

**For Exercises 17 and 18, write an equation that models each situation.**

17. **FURNITURE** width of a bookshelf is 2 feet shorter than the height. If the width is 1.5 feet, what is the height of the bookshelf?
18. **SPORTS** The circumference of a basketball, the distance around, is about three times the circumference of a softball. If the circumference of the basketball is 75 centimeters, what is the circumference of a softball?

**GEOMETRY For Exercises 19 and 20, describe the relationship that exists between the base and the height of each triangle.**

19. The base is  $b$ , and the height is  $b - 4$ .
20. The height is  $h$ , and the base is  $2h$ .



**3-2****Practice**

6AF1.1, 6MR2.4

**Solving Addition and Subtraction Equations****Solve each equation. Check your solution.**

1.  $a + 4 = 11$

2.  $6 = g + 8$

3.  $x - 3 = -2$

4.  $k + 8 = 3$

5.  $j + 0 = 9$

6.  $12 + y = 15$

7.  $h - 4 = 0$

8.  $m - 7 = 1$

9.  $w + 5 = 4$

10.  $b - 28 = 33$

11.  $45 + f = 48$

12.  $n + 7.1 = 8.6$

13.  $-14 + t = 26$

14.  $d - 3.03 = 2$

15.  $10 = z + 15$

16.  $c - 5.3 = -6.4$

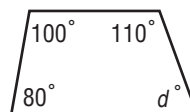
17.  $35 + p = 77$

18.  $-15 = -15 + u$

**For Exercises 19 and 20, write an equation. Then solve the equation.**

**19. CAFFEINE** A cup of brewed tea has 54 milligrams less caffeine than a cup of brewed coffee. If a cup of tea has 66 milligrams of caffeine, how much caffeine is in a cup of coffee?

**20. GEOMETRY** The sum of the measures of the angles of a trapezoid is  $360^\circ$ . Find the missing measure.





**3-3****Practice**

6AF1.1, 6AF2.3

***Solving Multiplication Equations*****Solve each equation. Check your solution.**

1.  $8e = 32$

2.  $4v = -8$

3.  $7k = -7$

4.  $18 = 3y$

5.  $4j = 0$

6.  $-11x = -44$

7.  $5a = 5$

8.  $-1c = 8$

9.  $15 = 5b$

10.  $-2w = -14$

11.  $9f = 45$

12.  $13m = -26$

13.  $1.4t = 2.8$

14.  $0.9g = 5.4$

15.  $2.5 = 0.5h$

16.  $3.74 = 1.7d$

17.  $4.1z = 16.81$

18.  $5.2q = 3.64$

**For Exercises 19 and 20, write an equation. Then solve the equation.**

**19. TRAVEL** A cheetah can travel at an amazing speed of 32 meters per second when chasing its prey. At that rate, how long would it take the cheetah to run 2,000 meters?

**20. AUTO LOAN** Mrs. Kim borrowed \$1,350 to buy a used automobile. If she repays \$75 a month, how many months will it take to pay back the loan?

**3-4****Practice**

6MR2.7, 6NS2.3

**Problem-Solving Investigation: Work Backward****Mixed Problem Solving**

Use the work backward strategy to solve Exercises 1 and 2.

- 1. NUMBER THEORY** A number is divided by 5. Then 3 is added to the quotient. After subtracting 10, the result is 30. What is the number?
- 2. COUPONS** Kendra used 35 cents more in coupons at the store than Leanne. Leanne used 75 cents less than Teresa, who used 50 cents more than Jaclyn. Jaclyn used 40 cents in coupons. What was the value of the coupons Kendra used?

Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.

**PROBLEM-SOLVING STRATEGIES**

- Use the four-step plan.
- Guess and check.
- Look for a pattern
- Choose the method of computation.
- Work backward

- 3. PATTERNS** What are the next three numbers in the following pattern?

2, 3, 5, 9, 17, 33, . . .

- 4. AGES** Mr. Gilliam is 3 years younger than his wife. The sum of their ages is 95. How old is Mr. Gilliam?

**Select the Operation**

For Exercises 5 and 6, select the appropriate operation to solve the problem. Justify your solution and solve the problem.

- 5. GRAND CANYON** The elevation of the North Rim of the Grand Canyon is 2,438 meters above sea level. The South Rim averages 304 meters lower than the North Rim. What is the average elevation of the South Rim?
- 6. WATER BILL** The water company charges a residential customer \$41 for the first 3,000 gallons of water used and \$1 for every 200 gallons used over 3,000 gallons. If the water bill was \$58, how many gallons of water were used?

**3-5****Practice**

7AF4.1

***Solving Two-Step Equations*****Solve each equation. Check your solution.**

1.  $4h + 6 = 30$

2.  $7y + 5 = -9$

3.  $-3t + 6 = 0$

4.  $-8 + 8g = 56$

5.  $5k - 7 = -7$

6.  $19 + 13x = 32$

7.  $-5b - 12 = -2$

8.  $-1n + 1 = 11$

9.  $9f + 15 = 51$

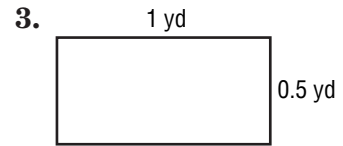
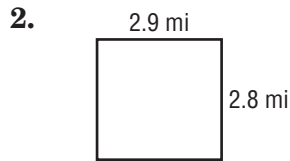
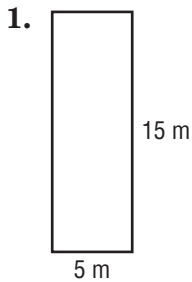
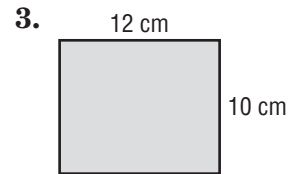
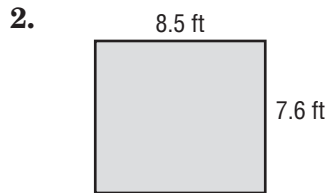
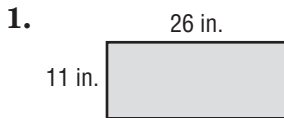
10.  $5d - 3.3 = 7.2$

11.  $3 = 0.2m - 7$

12.  $1.3z + 1.5 = 5.4$

**13. KITTENS** Kittens weigh about 100 grams when born and gain 7 to 15 grams per day. If a kitten weighed 100 grams at birth and gained 8 grams per day, in how many days will the kitten triple its weight?

**14. TEMPERATURE** Room temperature ranges from  $20^{\circ}\text{C}$  to  $25^{\circ}\text{C}$ . Find the range of room temperature in  $^{\circ}\text{F}$ . Use the formula,  $F - 32 = 1.8C$ , to convert from the Celsius scale to the Fahrenheit scale.

**3-6****Practice****6AF3.1, 6AF3.2****Measurement: Perimeter and Area****Find the perimeter of each rectangle.****Find the area of each rectangle.****Find the missing side.**

7.  $P = 83.4$  km,  $\ell = 27.8$  km

8.  $A = 337.68$  yd<sup>2</sup>,  $w = 60.3$  yd

**LAWN CARE For Exercises 9 and 10, use the following information.**

Yuri's dad needs to fertilize the grass in the yard. The back yard measures 55 feet by 30 feet, while the front yard is a square with a length of 42 feet on each side.

9. Yuri's dad wants to rope off the two areas to keep people from disturbing the lawn after he fertilizes the grass. How much rope will he need to go around both areas?
10. If a bag of fertilizer covers 600 square feet of lawn, how many bags of fertilizer will Yuri's dad need to fertilize the front and back yards?

**3-7**

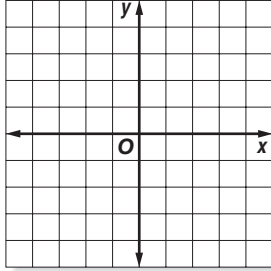
**Practice**

6AF2.3, 6MR2.4

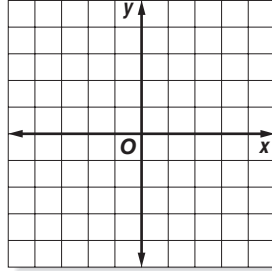
**Functions and Graphs**

Graph each equation.

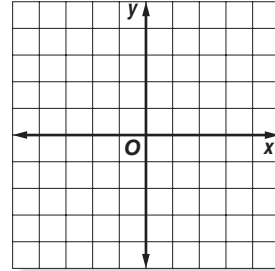
1.  $y = x - 2$



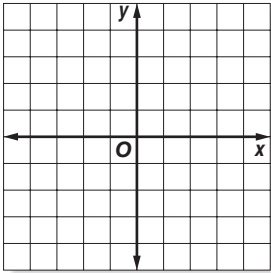
2.  $y = -x$



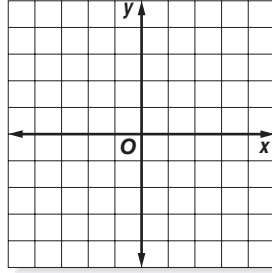
3.  $y = 2x - 1$



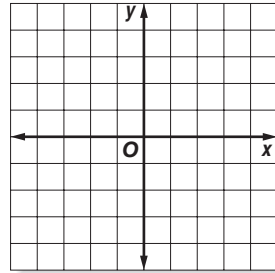
4.  $y = 0.75x$



5.  $y = x - 0.5$



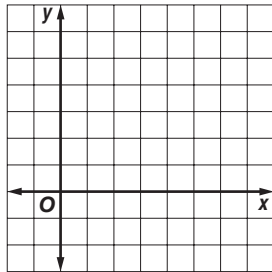
6.  $y = 0.5x + 2$



Graph the function represented by each table.

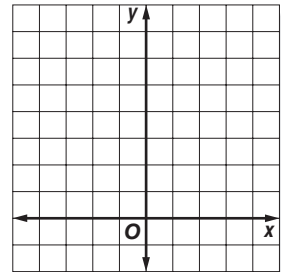
7.

x	y
0	3.5
1	2.5
2	1.5
3	0.5

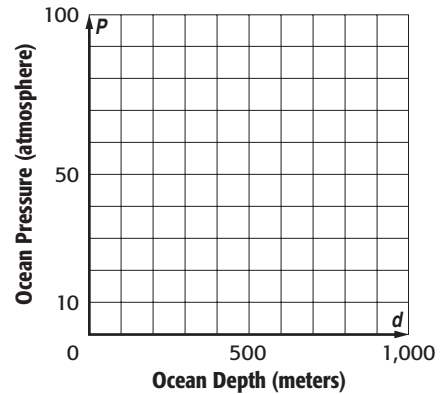


8.

x	y
1	6
0	4.5
-1	3
-2	1.5



9. **PRESSURE** Ocean pressure increases about one atmosphere for every 10 meters of water depth. This can be represented by the function  $p = 0.1d$  where  $p$  represents the pressure in atmospheres at a depth  $d$ . Represent this function with a graph.



**4-1****Practice**

6NS2.4

**Prime Factorization**

Determine whether each number is *prime* or *composite*.

1. 45

2. 17

3. 21

4. 51

5. 11

6. 71

7. 3

8. 27

9. 47

Find the prime factorization of each number.

10. 88

11. 39

12. 75

13. 124

14. 165

15. 225

16. 100

17. 91

18. 27

**ALGEBRA** Factor each expression.

19.  $20xy$

20.  $18bc$

21.  $11pqr$

22.  $36g^2h^2$

23.  $44m^2n$

24.  $25z^2$

Replace each ● with prime factors to make a true sentence.

25.  $2^2 \cdot \bullet \cdot 7 = 252$

26.  $2 \cdot \bullet \cdot 5^3 = 750$

27.  $2^3 \cdot \bullet \cdot 3^2 = 1,800$

28. **ALGEBRA** Is  $2x + y$  *prime* or *composite* if  $x = 2$  and  $y = 7$ ?

29. **ATHLETICS** The distance around an oval running track is 440 yards. Write this distance as a product of primes.

**4-2****Practice**

6NS2.4

***Greatest Common Factor*****Find the GCF of each set of numbers.**

1. 16, 44

2. 15, 35

3. 24, 32

4. 27, 63

5. 20, 80

6. 18, 38

7. 14, 49

8. 66, 99

9. 9, 35

10. 6, 24, 42

11. 30, 50, 70

12. 32, 48, 96

13.  $10w$ ,  $5w$

14.  $16xy$ ,  $24xy$

15.  $21ab$ ,  $35a$

16.  $10jk$ ,  $15k$

17.  $3mn$ ,  $9mn$ ,  $12mn$

18.  $6xy$ ,  $9x$ ,  $3y$

19. 4 inches, 1 foot, 6 inches, 2 feet

20. 10 gallons, 55 gallons, 35 gallons, 20 gallons

**Find two numbers whose GCF is the given number.**

21. 10

22. 8

23. 14

**24. SPORTS CARDS** Jason wants to organize his sports cards in packets for each type of sport. Each packet has the same number of cards. If he has 24 baseball cards, 60 hockey cards, and 48 football cards, find the greatest number of cards in each packet.

**25. FORESTRY** A forest ranger needs to remove three tree trunks by cutting the trunks into equal lengths. If the lengths of the tree trunks are 6 feet, 8 feet, and 12 feet, what is the length of the longest log that can be cut?

**4-3****Practice****6MRI.1, 6SDAP3.1****Problem-Solving Investigation: Make An Organized List****Mixed Problem Solving**

**For Exercises 1 and 2, solve each problem by making an organized list.**

- VACATION** Kessler, Kacy, and their parents sit in different seats in the car while driving to their grandparents for vacation. If only the parents take turns driving, how many different ways can all four people sit in the car with 2 front and 2 back seats?
- PIZZA** Everyone at the table likes pepperoni, sausage, onions, and black olives on pizza. List the different possibilities of ordering a 2-topping pizza.

**Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.**

**PROBLEM-SOLVING STRATEGIES**

- Use the four-step plan.
- Guess and check.
- Work backward.
- Make an organized list

- NUMBER SENSE** A number is increased by 12. When this sum is divided by 3, the result is the original number. What is the number?

- COINS** Three coins are tossed: a quarter, a nickel, and a dime. Complete the table showing the 8 different ways the coins could land by using H for heads and T for tails.

<b>Quarter</b>	H	H						
<b>Nickel</b>	H	H						
<b>Dime</b>	H	T						

**Select the Operation**

**For Exercises 5 and 6, select the appropriate operation(s) to solve the problem. Justify your solution(s) and solve the problem.**

- MEASUREMENT** Eight furlongs is equal to one mile. If a mile is 5,280 feet, how many feet are in 5 furlongs?
- TIME** Greg works at the hardware store on weekends. He worked a total of 53 hours during the month of April. How many hours did Greg work during the last weekend in April, if he worked 14 hours, 12 hours, and 15 hours the other weekends?



**4-4****Practice**

6NS2.4

***Simplifying Fractions*****Write each fraction in simplest form.**

1.  $\frac{12}{15}$

2.  $\frac{20}{45}$

3.  $\frac{8}{24}$

4.  $\frac{22}{30}$

5.  $\frac{30}{90}$

6.  $\frac{29}{29}$

7.  $\frac{77}{88}$

8.  $\frac{32}{48}$

9.  $\frac{21}{35}$

10.  $\frac{63}{99}$

11.  $\frac{18}{36}$

12.  $\frac{24}{30}$

13.  $\frac{30}{75}$

14.  $\frac{12}{60}$

15.  $\frac{16}{36}$

16.  $\frac{42}{49}$

17.  $\frac{55}{100}$

18.  $\frac{150}{180}$

19.  $\frac{35}{140}$

20.  $\frac{90}{135}$

**21. STATES** Eight states in the United States start with the letter M. What fraction of states, in simplest form, begins with the letter M?

**22. MEASUREMENT** Fifteen inches is what fraction, in simplest form, of a yard?

**23. PERIMETER** A rectangle has length 7 centimeters and width 4 centimeters. What fraction of the perimeter, in simplest form, is the width?

**24. MONEY** Thirty-five cents is what fraction, in simplest form, of a dollar?

**25. AGE** Angie is 6 years old. Her dad is 30 years old. Angie's age is what fraction, in simplest form, of her dad's age?

**4-5****Practice**

6NS1.1

***Fractions and Decimals***

Write each fraction or mixed number as a decimal. Use bar notation if the decimal is a repeating decimal.

1.  $\frac{5}{8}$

2.  $\frac{2}{9}$

3.  $\frac{37}{16}$

4.  $\frac{3}{4}$

5.  $\frac{27}{50}$

6.  $\frac{121}{25}$

7.  $\frac{5}{6}$

8.  $\frac{1}{33}$

9.  $\frac{62}{11}$

10.  $\frac{2}{3}$

11.  $\frac{11}{40}$

12.  $\frac{13}{20}$

13.  $\frac{83}{5}$

14.  $\frac{3}{10}$

15.  $\frac{1}{9}$

16.  $\frac{3}{7}$

17.  $\frac{111}{24}$

18.  $\frac{7}{32}$

Write each decimal as a fraction or mixed number in simplest form.

19. 0.4

20. 0.83

21. 3.75

22. 2.42

23. 0.16

24. 0.65

25. **KILOMETERS** One kilometer is approximately 0.62 mile. What fraction represents this length?

26. **MARATHON** Jake completed a marathon race in 3 hours and 12 minutes. Write Jake's running time as a decimal.

**4-6****Practice**

6NS1.1

**Fractions and Percents****Write each ratio as a percent.**

- |                                      |                                 |
|--------------------------------------|---------------------------------|
| 1. 56 out of 100 CDs sold            | 2. 75 per 100 adults            |
| 3. 89.2 out of 100 hours worked      | 4. 26.5:100 Calories            |
| 5. $45\frac{7}{8}$ out of 100 meters | 6. $33\frac{1}{3}$ :100 minutes |

**Write each fraction as a percent.**

- |                   |                   |                     |                     |
|-------------------|-------------------|---------------------|---------------------|
| 7. $\frac{6}{10}$ | 8. $\frac{7}{20}$ | 9. $\frac{21}{25}$  | 10. $\frac{12}{50}$ |
| 11. $\frac{1}{2}$ | 12. $\frac{4}{5}$ | 13. $\frac{20}{90}$ | 14. $\frac{24}{25}$ |

**Write each percent as a fraction in simplest form.**

- |         |         |         |         |
|---------|---------|---------|---------|
| 15. 40% | 16. 35% | 17. 72% | 18. 44% |
| 19. 90% | 20. 17% | 21. 5%  | 22. 26% |

**Replace each ● with >, <, or = to make a true sentence.**

- |                           |                           |                           |
|---------------------------|---------------------------|---------------------------|
| 23. $\frac{1}{10}$ ● 15%  | 24. $\frac{3}{4}$ ● 72%   | 25. 85% ● $\frac{17}{20}$ |
| 26. $\frac{21}{25}$ ● 21% | 27. 27% ● $\frac{27}{50}$ | 28. $\frac{4}{5}$ ● 60%   |

**29. SPORTS** If twenty-seven out of every 50 sports fans attend at least one professional game every year, what percent of sports fans attend at least one professional game every year?

**30. WEATHER** It rained 18 days during the month of April. What percent of the days during the month of April did it not rain?

**4-7****Practice**

6NS1.1

**Percents and Decimals****Write each percent as a decimal.**

1. 35%                      2. 90%                      3. 5 %                      4. 1%
5. 21.8%                      6. 64.8%                      7. 4.1%                      8. 8.5%
9.  $39\frac{21}{50}\%$                       10.  $17\frac{2}{5}\%$                       11.  $40\frac{3}{4}\%$                       12.  $88\frac{3}{5}\%$

**Write each decimal as a percent.**

13. 0.4                      14. 0.8                      15. 3.7                      16. 9.1
17. 0.77                      18. 0.03                      19. 0.25                      20. 0.59
21. 0.375                      22. 0.123                      23. 0.005                      24. 0.6019

**Replace each ● with >, <, or = to make a true sentence.**

25. 1.5 ● 15%                      26. 0.88 ● 8.8%                      27. 33% ● 0.33
28. 90% ● 0.09                      29. 0.26 ● 27%                      30. 65.4% ● 0.645

**ANALYZE TABLES** For Exercises 31–33, use the table and the information given.

The table lists the approximate milk fat content of 5 types of milk products.

31. Which product has the highest milk fat content?

32. Find the approximate number of grams of milk fat in a 200-gram serving of whole milk.

33. Which milk product will have approximately 15.36 grams of milk fat in an 80-gram serving?

Milk Product	Percent Milk Fat
Heavy Cream	36.7%
Light Cream	19.2%
Whole Milk	3.5%
Low-Fat Milk	1.5%
Skim Milk	0.05%

**Least Common Multiple**

Find the LCM of each set of numbers.

- |                    |                  |                          |
|--------------------|------------------|--------------------------|
| 1. 8, 12           | 2. 10, 25        | 3. 12, 18                |
| 4. 20, 30          | 5. 8, 9          | 6. 15, 35                |
| 7. 3, 5, 7         | 8. 4, 10, 12     | 9. 9, 12, 15             |
| 10. 5, 15, 20      | 11. 14, 21, 42   | 12. 15, 18, 30           |
| 13. 2 feet, 1 yard | 14. 6¢, 18¢, 24¢ | 15. 40 seconds, 1 minute |

Write two numbers whose LCM is the given number.

- |        |        |        |
|--------|--------|--------|
| 16. 24 | 17. 63 | 18. 50 |
|--------|--------|--------|

- 19. SECURITY** In a large industrial complex, three security teams work different types of security checks. The first team makes a complete round in 3 hours, the second team makes a complete round in 2 hours, while the third team makes a complete round in 4 hours. If all three teams start security checks at 7 A.M., when will be the next time all three teams finish a security check at the same time?
- 20. COOKIES** A recipe for large oatmeal cookies will make 15 cookies. A recipe for chocolate chip cookies will make 2 dozen cookies. If you want to have the same number of each type of cookie, what is the least number of each that you will need to make using complete recipes?
- 21. ICE SKATING** Three friends ice skate at different speeds. Parcel skates one lap in 45 seconds. It takes Hansel  $1\frac{1}{2}$  minutes to skate one lap and Forrest takes only 30 seconds to skate a lap. If they started out together, in how many minutes will they meet next?

**4-9****Practice****6NS1.1, 6NS2.4****Comparing and Ordering Rational Numbers**Replace each ● with  $>$ ,  $<$ , or  $=$  to make a true sentence.

1.  $\frac{5}{6}$  ●  $\frac{1}{3}$

2.  $\frac{4}{5}$  ●  $\frac{9}{10}$

3.  $\frac{6}{9}$  ●  $\frac{4}{6}$

4.  $\frac{2}{7}$  ●  $\frac{1}{8}$

5.  $\frac{15}{21}$  ●  $\frac{12}{18}$

6.  $\frac{24}{32}$  ●  $\frac{36}{48}$

7.  $\frac{8}{11}$  ●  $\frac{10}{13}$

8.  $\frac{14}{15}$  ●  $\frac{19}{20}$

9.  $4\frac{1}{5}$  ●  $4\frac{2}{10}$

10.  $7\frac{4}{9}$  ●  $7\frac{2}{3}$

11.  $1\frac{17}{20}$  ●  $1\frac{8}{10}$

12.  $9\frac{3}{2}$  ●  $9\frac{5}{6}$

13. 50% ● 8 out of 10

14. 0.65 ● 65 out of 100

15. 4 out of 5 ● 75%

16. 1 out of 3 ● 1.3

17.  $\frac{2}{3}$  mile ●  $\frac{2}{5}$  mile

18.  $\frac{7}{10}$  gram ● 0.72 gram

Determine whether each number is rational. Write *yes* or *no*. Explain your reasoning.

19.  $\frac{8}{21}$

20. 0.50550555 ...

21.  $1.\overline{142857}$

Order each set of numbers from least to greatest.

22. 63%,  $\frac{2}{3}$ , 0.65

23.  $\frac{7}{8}$ , 0.98, 98.5%,

24. 0.2, 2%,  $\frac{1}{12}$

25. **BASEBALL** The pitchers for the home team had 12 strikeouts for 32 batters, while the pitchers for the visiting team had 15 strikeouts for 35 batters. Which pitching team had a greater fraction of strikeouts?

26. **TRANSPORTATION** To get to school, 38% of the students ride in the family vehicle, 5 out of 12 students ride on the school bus, and 0.12 of the students ride a bike. Order the types of transportation students use to get to school from least to greatest.

**5-1****Practice**

6NS2.1

**Estimating with Fractions****Estimate.**

1.  $7\frac{1}{6} + 5\frac{8}{9}$

2.  $4\frac{2}{10} + 1\frac{1}{2}$

3.  $\frac{11}{13} - \frac{15}{16}$

4.  $6\frac{4}{5} \cdot 3\frac{2}{7}$

5.  $\frac{6}{11} - \frac{1}{5}$

6.  $8\frac{1}{4} \div 3\frac{7}{8}$

7.  $\frac{1}{8} \div \frac{17}{20}$

8.  $\frac{5}{8} \cdot \frac{9}{10}$

9.  $9\frac{14}{15} - 2\frac{3}{4}$

10.  $5\frac{3}{5} \div \frac{5}{6}$

11.  $\frac{10}{11} \cdot 1\frac{1}{9}$

12.  $4\frac{1}{14} + 5\frac{7}{8}$

13.  $5\frac{1}{9} + 1\frac{6}{7} + \frac{5}{6}$

14.  $4\frac{9}{10} \left( 2\frac{1}{3} + \frac{7}{8} \right)$

15.  $3\frac{1}{5} \left( 7\frac{2}{3} - 1\frac{8}{9} \right)$

**Estimate using compatible numbers.**

16.  $\frac{1}{5} \cdot 44$

17.  $\frac{1}{7} \cdot 29$

18.  $33\frac{1}{10} \div 4\frac{1}{3}$

19.  $\frac{1}{8} \cdot 62$

20.  $20\frac{5}{6} \div 6\frac{2}{5}$

21.  $19\frac{4}{5} \div 8\frac{2}{3}$

**ANALYZE TABLES** For Exercises 22–24, use the following information and the table shown.

For a recent year, the table shows the approximate number of dollars spent in each category by consumers in Kansas City for every \$100 spent.

22. About how many dollars are spent on apparel and entertainment for every \$100 spent?

23. What is the approximate difference in spending for health care and entertainment for every \$100 spent?

Expenditure	Dollars Spent for Every \$100 Spent
Apparel	$3\frac{7}{10}$
Health Care	$5\frac{3}{5}$
Entertainment	$5\frac{3}{10}$

Source: bls.gov

24. What is the approximate amount of money spent for all three areas for every \$100 spent?

**5-2 Practice****6NS2.1, 6NS2.4****Adding and Subtracting Fractions****Add or subtract. Write in simplest form.**

1.  $\frac{2}{5} + \frac{3}{5}$

2.  $\frac{2}{9} + \frac{4}{9}$

3.  $\frac{8}{11} - \frac{7}{11}$

4.  $\frac{4}{8} + \frac{5}{8}$

5.  $\frac{1}{18} + \frac{5}{6}$

6.  $\frac{7}{15} - \frac{1}{5}$

7.  $\frac{9}{16} - \frac{5}{12}$

8.  $\frac{5}{14} - \frac{2}{21}$

9.  $\frac{7}{8} - \frac{1}{6}$

10.  $\frac{7}{10} - \frac{4}{15}$

11.  $\frac{5}{6} - \frac{3}{4}$

12.  $\frac{2}{3} - \frac{1}{2}$

13.  $1 + \frac{1}{6}$

14.  $1 - \frac{3}{5}$

15.  $4 + \frac{8}{9}$

16.  $5 - \frac{1}{4}$

17.  $\frac{2}{3} + \frac{4}{15} + \frac{1}{5}$

18.  $\frac{7}{8} + \frac{1}{2} + \frac{3}{16}$

19.  $\left(\frac{3}{4} + \frac{1}{3}\right) - \frac{11}{12}$

20.  $\left(\frac{4}{5} - \frac{7}{10}\right) + \frac{1}{4}$

**21. STATES** Most of the state names in the United States end in a vowel. Of the 50 states,  $\frac{1}{2}$  of the state names end in either an *a* or an *e* and  $\frac{3}{25}$  end in either an *i* or an *o*. If none of the state names end in a *u*, what is the fraction of state names that end in a vowel?

**22. JIGSAW PUZZLES** Over the weekend, Halverson had put together  $\frac{3}{16}$  of a jigsaw puzzle, while Jaime put together  $\frac{5}{8}$  of the puzzle. Who had completed a greater fraction of the jigsaw puzzle, and by how much?

**ALGEBRA** Evaluate each expression if  $x = \frac{5}{8}$  and  $y = \frac{5}{4}$ .

23.  $x - \frac{1}{2}$

24.  $y - x$

25.  $\frac{5}{16} + y$

26.  $x + y$



**5-3 Practice**

6NS2.1, 6NS2.4

**Adding and Subtracting Mixed Numbers****Add or Subtract. Write in simplest form.**

1.  $3\frac{1}{8} + 5\frac{3}{8}$

2.  $4\frac{1}{6} + 7\frac{1}{6}$

3.  $9\frac{3}{4} - 6\frac{1}{4}$

4.  $5\frac{5}{9} - 4\frac{2}{9}$

5.  $8\frac{2}{3} - 3\frac{1}{6}$

6.  $10\frac{3}{4} - 5\frac{3}{8}$

7.  $7\frac{3}{10} + 12\frac{2}{5}$

8.  $1\frac{1}{6} + 1\frac{1}{8}$

9.  $5\frac{1}{3} - 3\frac{2}{3}$

10.  $8\frac{4}{7} - 7\frac{5}{7}$

11.  $11\frac{1}{12} - 6\frac{5}{6}$

12.  $3\frac{2}{5} - 1\frac{3}{4}$

13.  $5\frac{4}{5} + 6\frac{5}{6}$

14.  $8\frac{2}{7} + 6\frac{5}{14}$

15.  $9 - 7\frac{3}{8}$

16.  $6\frac{4}{5} + 7\frac{1}{5}$

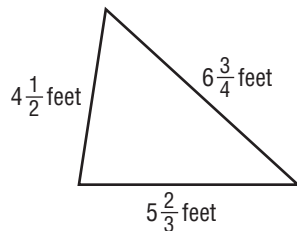
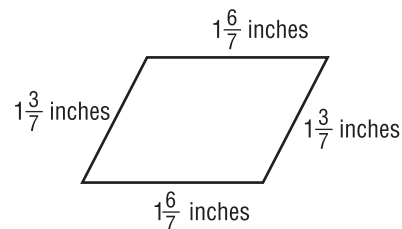
17.  $4\frac{3}{5} + 1\frac{11}{20} + 5\frac{7}{10}$

18.  $10 - 9\frac{1}{3}$

19.  $2\frac{1}{4} + 5\frac{3}{8} + 3\frac{1}{2}$

20.  $7 - 6\frac{7}{8}$

- 21. LAND MEASUREMENT** Mr. Alfonso owns two adjacent pieces of land totaling  $13\frac{3}{8}$  acres. One piece of land is  $8\frac{7}{12}$  acres. Find the area of the other piece of land.

**GEOMETRY Find the perimeter of each figure.****22.****23.**

**5-4 Practice**

6MRI.1, 6NS2.1

**Problem-Solving Investigation: Eliminate Possibilities****Mixed Problem Solving****Eliminate the possibilities to solve Exercises 1 and 2.**

1. **STAIRCASE** A staircase has 14 steps between floors. If the second floor is 10 feet above the first floor, what is the approximate height of each step of the staircase?

A 2 inches      C 9 inches

B 12 inches      D 15 inches

2. **NEWSPAPER** Mr. Kemper delivers the morning newspaper to about 500 customers each day. About how many newspapers does he deliver in a month?

F 50      H 500

G 5,000      J 15,000

**Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.****PROBLEM-SOLVING STRATEGIES**

- Use the four-step plan.
- Look for a pattern.
- Choose the method of computation.
- Eliminate possibilities.

3. **PATTERNS** What are the next three fractions in the pattern?

$$\frac{1}{12}, \frac{1}{6}, \frac{1}{4}, \frac{1}{3}, \frac{5}{12}, \dots$$

4. **OFFICE SUPPLIES** Printer ink costs \$23.42 per cartridge if bought separately. If bought by the case of 24 cartridges, the cost per cartridge is only \$19.53. About how much is the difference in cost of buying 4 cases than buying the same number of cartridges separately?

A \$4      C \$84

B \$374      D \$1,550

**Select the Operation****For Exercises 5 and 6, select the appropriate operation(s) to solve the problem. Justify your selection(s) and solve the problem.**

5. **YARDWORK** David mowed  $\frac{3}{10}$  of the yard while his brother mowed  $\frac{1}{4}$  of it. What fraction of the yard still needs to be mowed?

6. **DOGS** On average, dogs require about 35 Calories per pound of body weight per day. The Parkers own three dogs that weigh 22 pounds, 34 pounds, and 9 pounds. What is the total Calorie requirement for the dogs each day?

**5-5****Practice**

6NS2.1, 6NS2.2

**Multiplying Fractions and Mixed Numbers****Multiply. Write in simplest form.**

1.  $\frac{3}{5} \times \frac{1}{2}$

2.  $\frac{3}{4} \times \frac{2}{7}$

3.  $10 \times \frac{1}{3}$

4.  $\frac{5}{8} \times 7$

5.  $\frac{1}{7} \times \frac{7}{9}$

6.  $\frac{6}{11} \times \frac{1}{6}$

7.  $\frac{5}{6} \times \frac{1}{5}$

8.  $\frac{1}{8} \times \frac{4}{5}$

9.  $\frac{3}{8} \times \frac{8}{9}$

10.  $\frac{4}{7} \times \frac{21}{32}$

11.  $\frac{5}{8} \times \frac{18}{25}$

12.  $\frac{20}{21} \times \frac{3}{5}$

13.  $3\frac{1}{5} \times \frac{3}{8}$

14.  $\frac{2}{3} \times 4\frac{1}{3}$

15.  $15 \times 2\frac{2}{5}$

16.  $5\frac{1}{2} \times 4$

17.  $8 \times 3\frac{3}{8}$

18.  $10 \times 1\frac{1}{15}$

19.  $5\frac{1}{4} \times 4\frac{2}{3}$

20.  $2\frac{2}{7} \times 1\frac{1}{8}$

**For Exercises 21 and 22, use measurement conversions.**

21. Find  $\frac{1}{10}$  of  $\frac{1}{100}$  of a meter.

22. Find  $\frac{1}{60}$  of  $\frac{1}{60}$  of an hour.

**For Exercises 23–25, evaluate each verbal expression.**

23. one-fourth of two-thirds    24. three-fifths of one-sixth    25. two-fifths of one-half

26. **GASOLINE** Jamal filled his gas tank and then used  $\frac{7}{16}$  of the tank for traveling to visit his grandfather. He then used  $\frac{1}{3}$  of the remaining gas in the tank to run errands around town. What fraction of the tank is filled with gasoline?

27. **HIKING** A hiker averages  $6\frac{3}{8}$  kilometers per hour. If he hikes for  $5\frac{1}{3}$  hours, how many kilometers did he hike?

**ALGEBRA** Evaluate each expression if  $x = 3\frac{1}{3}$ ,  $y = 4\frac{5}{6}$ , and  $z = 2$ .

28.  $x \times z - y$

29.  $y \times z + x$

30.  $3yz$

**5-6****Practice**

6AF1.1

**Algebra: Solving Equations****Find the multiplicative inverse of each number.**

1.  $\frac{7}{9}$

2.  $\frac{5}{2}$

3.  $\frac{1}{9}$

4.  $\frac{1}{12}$

5. 4

6. 15

7.  $4\frac{1}{3}$

8.  $5\frac{4}{5}$

**Solve each equation. Check your solution.**

9.  $\frac{a}{8} = 5$

10.  $15 = \frac{y}{2}$

11.  $\frac{h}{3.1} = 7$

12.  $1 = \frac{x}{6.3}$

13.  $0.9 = \frac{m}{2.5}$

14.  $\frac{t}{5.4} = 9$

15.  $\frac{3}{7}g = 9$

16.  $28 = \frac{4}{5}d$

17.  $\frac{3}{8}n = \frac{1}{4}$

18.  $\frac{2}{5} = \frac{4}{5}c$

19.  $\frac{2}{3}z = 4\frac{1}{4}$

20.  $\frac{5}{6}b = 1\frac{7}{8}$

21.  $\frac{p}{-4} = 7$

22.  $-3 = \frac{w}{-5}$

23.  $27.3 = \frac{3}{4}y$

24.  $\frac{4}{7}x = -1.6$

**25. DRAWING** An architect needs to make a scale drawing of a home. The width  $w$  of the home in the drawing, in inches, is given by the equation  $\frac{w}{0.6} = 9.5$ . What is the width of the home in the scale drawing?

**26. VOLUNTEERS** At a local shelter, 36 people volunteered to help prepare meals for disaster victims. If this represented  $\frac{9}{16}$  of the volunteers at the shelter, write and solve an equation to determine how many volunteers helped at the local shelter.

**5-7****Practice**

6NS2.1, 6NS2.2

**Dividing Fractions and Mixed Numbers****Divide. Write in simplest form.**

1.  $\frac{3}{5} \div \frac{3}{4}$

2.  $\frac{4}{7} \div \frac{8}{9}$

3.  $\frac{6}{7} \div \frac{5}{6}$

4.  $\frac{1}{4} \div \frac{1}{2}$

5.  $7 \div \frac{1}{3}$

6.  $\frac{6}{11} \div 2$

7.  $4\frac{1}{5} \div 7$

8.  $8 \div 4\frac{2}{3}$

9.  $\frac{3}{4} \div 1\frac{1}{6}$

10.  $\frac{7}{9} \div 2\frac{5}{8}$

11.  $3\frac{2}{5} \div 5\frac{1}{10}$

12.  $4\frac{8}{9} \div \frac{2}{3}$

13.  $2\frac{3}{5} \div 1\frac{1}{4}$

14.  $7\frac{1}{2} \div 2\frac{1}{2}$

15.  $5\frac{1}{4} \div \frac{7}{8}$

16.  $8\frac{1}{3} \div \frac{5}{9}$

17. **COOKING** Mrs. Lau rolls out  $2\frac{3}{4}$  feet of dough to make noodles. If the noodles are  $\frac{3}{8}$  of an inch wide, how many noodles will she make?

**PIZZA** For Exercises 18 and 19, use the table that shows the weights of three sizes of pizza.

18. How many times heavier is the extra-large pizza than the small pizza?

19. How many times heavier is the medium pizza than the small pizza?

Pizza Size	Weight (lbs)
Extra large	$6\frac{1}{2}$
Medium	$3\frac{1}{4}$
Small	$1\frac{5}{8}$

**ALGEBRA** Evaluate each expression if  $a = \frac{2}{5}$ ,  $b = \frac{3}{10}$ , and  $c = 2\frac{1}{2}$ .

20.  $b \div a$

21.  $a \div c$

22.  $3a \div b$

23.  $\frac{1}{5}c \div a$

**6-1****Practice**

6NS1.2

**Ratios**

**SURVEY** For Exercises 1–3, use the responses to a survey to write each ratio as a fraction in simplest form.

Survey Responses		
Yes	No	Not Sure
18	4	6

1. *yes* responses: \_\_\_\_\_  
   *no* responses
2. *no* responses: \_\_\_\_\_  
   *not sure* responses
3. *not sure* responses: \_\_\_\_\_  
   total responses

**COUNTY FAIR** For Exercises 4–9, use the following information to write each ratio as a fraction in simplest form.

At its annual fair, Westborough County had 27 food booths and 63 game booths. A total of 1,350 adults and 3,600 children attended. The fair made a profit of \$42,000. Of this money, \$12,600 came from food sales.

4. adults:children                      5. game booths:food booths            6. booths:profits
7. children:people                      8. children:booths                      9. non-food sale profits:profits

**Determine whether the ratios are equivalent. Explain.**

10. 18 trucks to 4 cars,                      11. \$6 for every 10 people,                      12. 33 dinners to 6 packages,  
    21 trucks to 6 cars                              \$9 for every 15 people                              14 dinners to 4 packages

13. **ENGINES** A four cylinder engine produces a maximum of 110 horsepower. A six cylinder engine produces a maximum of 180 horsepower. Do these engines have an equivalent horsepower-to-cylinder ratio? Justify your answer.

**ANALYZE TABLES** For Exercises 14 and 15, use the information in the table that shows the crop statistics for three farms.

Farm	Acres of Soybeans	Acres of Corn
A	585	225
B	2,990	1,150
C	1,120	400

14. For which two farms is the soybeans-to-corn ratio the same? Explain.
15. Which farm has the highest soybeans-to-corn ratio? Justify your answer.

**6-2 Practice**

6NS1.2, 6AF2.2, 6AF2.3

**Rates****Find each unit rate. Round to the nearest hundredth if necessary.**

1. \$11.49 for 3 packages      2. 2,550 gallons in 30 days      3. 88 students for 4 classes
4. 15.6 °F in 13 minutes      5. 175 Calories in 12 ounces      6. 258.5 miles in 5.5 hours
7. 549 vehicles on 9 acres      8. \$920 for 40 hours      9. 13 apples for 2 pies

10. **SPORTS** The results of a track meet are shown. Who ran the fastest? Explain your reasoning. Round to the nearest ten thousandth.

Name	Event	Time (min)
Theo	3K Run	9.6
Esteban	5K Run	13.5
Tetsuo	10K Run	31.9

11. **MANUFACTURING** A machinist can produce 114 parts in 6 minutes. At this rate, how many parts can the machinist produce in 15 minutes?
12. **RECIPES** A recipe that makes 8 jumbo blueberry muffins calls for  $1\frac{1}{2}$  teaspoons of baking powder. How much baking powder is needed to make 3 dozen jumbo muffins?

**Estimate the unit price for each item. Justify your answers.**

13. \$299 for 4 tires      14. 3 yards of fabric for \$13.47

**UTILITIES** For Exercises 15 and 16, use the table that shows the average monthly electricity and water usage.

Family Name	Family Size	Electricity (kilowatt-hours)	Water (gal)
Melendez	4	1,560	3,500
Barton	6	2,130	6,400
Stiles	2	1,490	2,500

15. Which family uses about twice the amount of electricity per person than the other two families? Explain your reasoning.
16. Which family uses the least amount of water per person? Explain your reasoning.

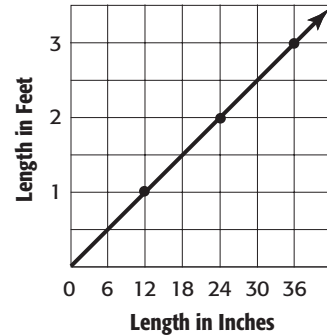
**6-3****Practice**

6AF2.1

**Measurement: Changing Customary Units****Complete.**

1. 4 c = \_\_\_ fl oz
  2. 5 c = \_\_\_ pt
  3. 3 lb = \_\_\_ oz
  4. 24 ft = \_\_\_ yd
  5.  $1\frac{1}{2}$  pt = \_\_\_ c
  6. 64 oz = \_\_\_ lb
  7. 4 mi = \_\_\_ ft
  8.  $2\frac{3}{4}$  mi = \_\_\_ ft
  9. 3,000 lb = \_\_\_ T
  10. 5 gal = \_\_\_ qt
  11.  $3\frac{1}{4}$  qt = \_\_\_ pt
  12.  $4\frac{5}{8}$  T = \_\_\_ lb
  13.  $3\frac{1}{2}$  gal = \_\_\_ qt
  14. 7 c = \_\_\_ qt
  15. 40 fl oz = \_\_\_ qt
  16. 660 yd = \_\_\_ mi
  17. 1.9 yd = \_\_\_ in.
  18.  $2\frac{1}{4}$  T = \_\_\_ oz
19. **SPORTS** The track surrounding a football field is  $\frac{1}{4}$  mile long. How many yards long is the track?
20. **STRAWBERRIES** One quart of strawberries weighs about 2 pounds. About how many quarts of strawberries would weigh  $\frac{1}{4}$  ton?

**ANALYZE GRAPHS** For Exercises 21–23, use the graph shown.



21. What does an ordered pair from this graph represent?
22. Write two sentences that describe the graph.
23. Use the graph to find the length in inches of a 1.5 foot iguana. Explain your reasoning.



**6-4 Practice**

6AF2.1

**Measurement: Changing Metric Units****Complete.**

1.  $570 \text{ cm} = \underline{\quad} \text{ m}$

2.  $356 \text{ mm} = \underline{\quad} \text{ m}$

3.  $4.7 \text{ m} = \underline{\quad} \text{ cm}$

4.  $0.4 \text{ m} = \underline{\quad} \text{ mm}$

5.  $0.63 \text{ cm} = \underline{\quad} \text{ mm}$

6.  $0.18 \text{ mm} = \underline{\quad} \text{ cm}$

7.  $0.42 \text{ km} = \underline{\quad} \text{ m}$

8.  $0.09 \text{ km} = \underline{\quad} \text{ mm}$

9.  $0.13 \text{ km} = \underline{\quad} \text{ cm}$

10.  $27 \text{ kg} = \underline{\quad} \text{ g}$

11.  $8.3 \text{ g} = \underline{\quad} \text{ mg}$

12.  $257 \text{ mg} = \underline{\quad} \text{ g}$

13.  $486 \text{ g} = \underline{\quad} \text{ kg}$

14.  $55.5 \text{ g} = \underline{\quad} \text{ kg}$

15.  $68,700 \text{ mg} = \underline{\quad} \text{ kg}$

16.  $308 \text{ mL} = \underline{\quad} \text{ L}$

17.  $1.7 \text{ L} = \underline{\quad} \text{ mL}$

18.  $88 \text{ L} = \underline{\quad} \text{ kL}$

19.  $0.059 \text{ kL} = \underline{\quad} \text{ L}$

20.  $64,000 \text{ mL} = \underline{\quad} \text{ L}$

21.  $30,000 \text{ mL} = \underline{\quad} \text{ kL}$

**Order each set of measures from least to greatest.**

22.  $0.06 \text{ km}, 47 \text{ m}, 15,800 \text{ cm}$

23.  $891 \text{ g}, 7,800 \text{ mg}, 0.5 \text{ kg}$

24. **SPELUNKING** The survey length of an underground cave is 0.914 kilometers. How many meters in length is this cave?

25. **FOOD** A 15-ounce box of granola contains 0.425 kilograms of cereal. How many grams of cereal are in the box of granola?

**6-5****Practice**

6NS1.3

**Algebra: Solving Proportions**

**Determine if the quantities in each pair of ratios are proportional. Explain your reasoning.**

- 5 pounds of grass seed for 350 square feet and 8 pounds of grass seed for 560 square feet
- 34 students from 8 schools and 25 students from 6 schools

**Solve each proportion.**

3.  $\frac{5}{6} = \frac{a}{36}$

4.  $\frac{k}{8} = \frac{8}{16}$

5.  $\frac{7}{c} = \frac{14}{38}$

6.  $\frac{4}{9} = \frac{40}{x}$

7.  $\frac{12}{d} = \frac{5}{7}$

8.  $\frac{6}{m} = \frac{42}{7}$

9.  $\frac{n}{3.2} = \frac{3}{8}$

10.  $\frac{2.8}{7.7} = \frac{z}{4.4}$

11.  $\frac{1.5}{3.5} = \frac{4.5}{y}$

- CONDIMENTS** A store sells a 9-ounce jar of mustard for \$1.53 and a 15-ounce jar for \$2.55. Is the cost of the mustard proportional to the number of ounces for each jar? Explain your reasoning.
- SCIENCE** There are 113.2 grams in 4 ounces of compound. How many grams are in 5 ounces of compound?
- FURNITURE** A furniture company has 15 trucks that make about 120 deliveries each day. The company is expanding and expects an additional 40 deliveries each day. Write and solve a proportion to find how many more trucks are needed so the truck-to-delivery ratio remains the same.
- CHARITY** Karthik spent \$35 of his allowance and gave \$5 to a charity. If the number of dollars he spends is proportional to the number of dollars he gives to a charity, how much of a \$100-allowance will he give to a charity?

**6-6**

**Practice**

6MR2.5

**Problem-Solving Investigation: Draw a Diagram**

**Mixed Problem Solving**

Use the draw a diagram strategy to solve Exercises 1 and 2.

**1. ANTS** An ant went 2 meters away from its nest searching for food. The next time, the ant went 3 meters away. Each successive time the ant leaves the nest to search for food, the ant travels the sum of the two previous times. How far will the ant travel on his fifth trip?

**2. NECKLACES** The center bead of a pearl necklace has a 16 millimeter diameter. Each successive bead in each direction is  $\frac{3}{4}$  the diameter of the previous one. Find the diameter of the beads that are three away from the center bead.

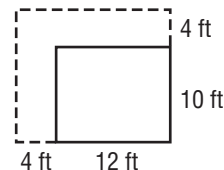
Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.

PROBLEM-SOLVING STRATEGIES
<ul style="list-style-type: none"> <li>• Use the four-step plan.</li> <li>• Work backward.</li> <li>• Eliminate possibilities</li> <li>• Draw a diagram.</li> </ul>

**3. TALENT SHOW** At a talent show, 60% of the acts were singing. One-third of the remaining acts were instrumental. If 12 acts were instrumental, how many acts were in the talent show?

**4. GEOMETRY**

Miss Greenwell is adding 4 feet to the length and width of her rectangular garden as shown in the diagram. How much additional area will the garden have?



- A. 16 ft<sup>2</sup>
- B. 104 ft<sup>2</sup>
- C. 120 ft<sup>2</sup>
- D. 224 ft<sup>2</sup>

**Select the Operation**

For Exercises 5 and 6, select the appropriate operation(s) to solve the problems. Justify your selection(s) and solve the problem.

**5. YARD SALE** Myron has sold \$18.50 worth of items at his yard sale. A neighbor bought two items and handed Myron a \$10 bill. Myron returned \$7.75 in change. How much has Myron now sold?

**6. COUNTRIES** The table shows the total land area of five countries.

Country	Total Area
<b>Brazil</b>	8.5 million sq km
<b>Canada</b>	10.0 million sq km
<b>China</b>	9.6 million sq km
<b>Russia</b>	17.1 million sq km
<b>United States</b>	9.6 million sq km

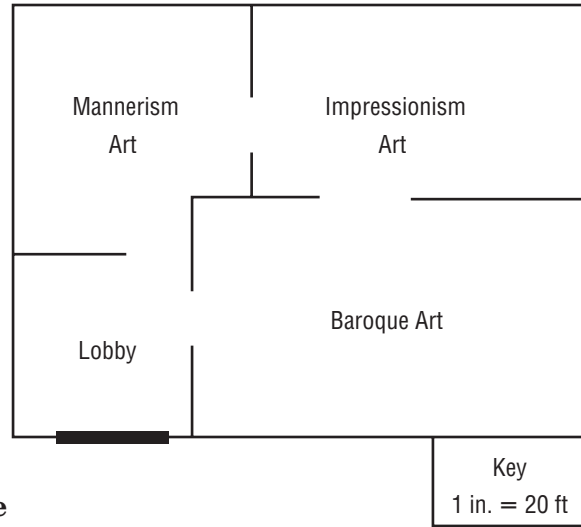
Estimate how much more total area Russia has than China. Write in scientific notation.

# 6-7 Practice

6NS1.3

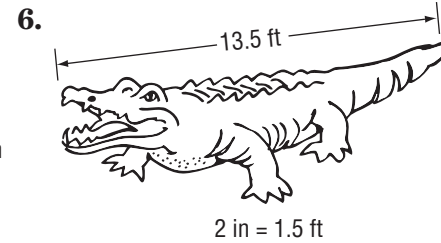
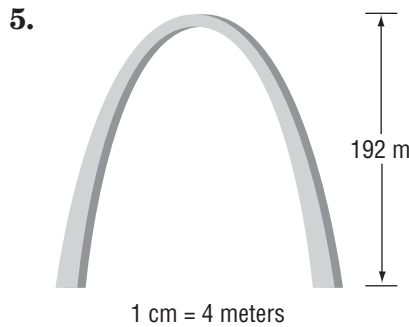
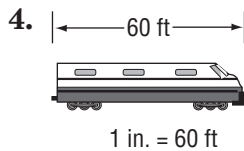
## Scale Drawings

For Exercises 1–3, use the diagram of a section of the art museum shown. Use a ruler to measure.



1. What is the actual length of the *Impressionism Art* room?
2. Find the actual dimensions of the *Baroque Art* room.
3. Find the scale factor for this blueprint.

Find the length of each model on the scale drawing with the given scale.



7. **SKYSCRAPER** A model of a skyscraper is made using a scale of 1 inch:75 feet. What is the height of the actual building if the height of the model is  $19\frac{2}{5}$  inches?
8. **GEOGRAPHY** Salem and Eugene, Oregon, are 64 miles apart. If the distance on the map is  $3\frac{1}{4}$  inches, find the scale of the map.
9. **PYRAMIDS** The length of a side of the Great Pyramid of Khufu at Giza, Egypt, is 751 feet. If you were to make a model of the pyramid to display on your desk, which would be an appropriate scale: 1 in. = 10 ft or 1 ft = 500 ft? Explain your reasoning.

**Fractions, Decimals, and Percents**

Write each percent as a fraction in simplest form.

1. 37.5%                      2. 5.8%                      3. 43.75%                      4. 52.5%
5.  $83\frac{1}{3}\%$                       6.  $66\frac{2}{3}\%$                       7.  $12\frac{1}{2}\%$                       8.  $21\frac{3}{4}\%$

Write each fraction as a percent. Round to the nearest hundredth if necessary.

9.  $\frac{13}{20}$                       10.  $\frac{9}{25}$                       11.  $\frac{7}{8}$                       12.  $\frac{39}{40}$
13.  $\frac{5}{9}$                       14.  $\frac{6}{7}$                       15.  $\frac{49}{200}$                       16.  $\frac{4}{15}$

Replace each  $\square$  with  $>$ ,  $<$  or  $=$  to make a true statement.

17.  $\frac{3}{16} \square 24\%$                       18.  $0.775 \square \frac{31}{40}$                       19.  $16\% \square 0.016$

Order each set of numbers from least to greatest.

20. 0.6, 23%, 0.07,  $\frac{2}{3}$                       21.  $\frac{4}{5}\%$ , 0.37,  $\frac{1}{4}$ , 0.4

22. **SAVINGS** Kayla has 14.5% of her salary placed into an Individual Retirement Account. What fraction is this?
23. **INTERNET** At home, 2 out of 5 people have access to broadband technology. What percent is this?
24. **SPORTS** A golfer made par on 13 of 18 holes. To the nearest tenth, on what percent of the holes did he make par?

**ANALYZE TABLES** For Exercises 25 and 26, use the table that shows the percent of households with the listed appliance.

25. What fraction of households have a clothes dryer?
26. Approximately 34 out of 67 households have a coffeemaker. Is this greater or less than the percent of households with a dishwasher? Explain.

Appliance	Percent of Households
Refrigerator	99.3%
Washing Machine	82.0%
Dryer	77.8%
Dishwasher	56.0%

Source: census.gov

**6-9****Practice**

5NS1.2

**Percents Greater Than 100% and Percents Less Than 1%**

Write each percent as a decimal and as a mixed number or fraction in simplest form.

1. 225%                      2. 550%                      3. 300%                      4. 800%
5. 0.8%                      6. 0.06%                      7. 0.45%                      8. 0.02%

Write each decimal as a percent.

9. 7.2                      10. 12                      11. 4.56                      12. 1.04
13. 0.001                      14. 0.008                      15. 0.0078                      16. 0.0092

Write each mixed number or fraction as a percent.

17.  $4\frac{1}{2}$                       18.  $8\frac{1}{4}$                       19.  $\frac{1}{250}$                       20.  $\frac{3}{400}$

Write each percent as a decimal.

21.  $\frac{3}{8}\%$                       22.  $\frac{7}{10}\%$                       23.  $\frac{17}{20}\%$                       24.  $\frac{13}{25}\%$

25. **ATMOSPHERE** Helium gas accounts for less than 0.01% of Earth's atmospheric gases. Write this percent as a decimal and as a mixed number or fraction in simplest form. Then interpret its meaning.
26. **STOCKS** The stock of a particular company skyrocketed 1,550% in a one month period. Write this percent as a decimal and as a mixed number. Then interpret its meaning.

**ANALYZE TABLES** For Exercises 27 and 28, refer to the table shown.

27. Write the percent of Venus's diameter compared to the Sun's diameter as a decimal.
28. Which planet's diameter is approximately  $\frac{1}{200}$  of the sun's diameter? Explain.

Diameter Size Compared to the Sun's Diameter	
Planet	Percent
Mercury	0.35
Venus	0.87
Earth	0.92
Mars	0.49

Source: motivate.maths.org

**7-1****Practice**

6NS1.4

***Percent of a Number*****Find each number. Round to the nearest tenth if necessary.**

1. 55% of 140                      2. 40% of 123                      3. 37% of \$150
4. 25% of 96                      5. 11% of \$333                      6. 99% of 14
7. 140% of 30                      8. 165% of 10                      9. 150% of 150
10. 225% of 16                      11. 106% of \$40                      12. 126% of 350
13. 4.1% of 30                      14. 8.9% of 75                      15. 24.2% of \$120
16. 97.5% of 80

17. **SALES** Mr. Redding sells vehicles to 20% of the people that come to the sales lot. If 65 people came to the lot last month, how many vehicles did he sell?

**Find each number. Round to the hundredth tenth if necessary.**

18.  $\frac{5}{6}\%$  of 600                      19.  $30\frac{1}{3}\%$  of 3                      20. 1,000% of 87
21. 100% of 56                      22. 0.25% of 150                      23. 0.7% of 50

**ANALYZE TABLES** For Exercises 24–26, use the table that shows the percents of blood types of 145 donors during a recent blood drive.

Blood Type	Percent
O	45%
A	40%
B	11%
AB	4%

24. Write a proportion that can be used to find how many donors had type B blood. Then solve. Round to the nearest whole if necessary.
25. How many donors did *not* have type O blood? Round to the nearest whole if necessary.
26. Which blood type had less than 10 donors?





**7-3****Practice**

6NS1.4

**Percent and Estimation****Estimate.**

1. 39% of 80
2. 31% of 40
3. 28% of 110
4. 74% of 160
5. 87% of 19
6. 91% of 82
7. 34% of 59
8. 66% of 148
9. 9% of 71
10. 73% of 241
11. 126% of 80
12. 234% of 145
13.  $\frac{1}{3}\%$  of 307
14.  $\frac{1}{4}\%$  of 798
15. 1.1% of 62
16. 4.1% of 101
17. 67% of 11.9
18. 31% of 68.7
19. 9.8% of 359
20. 97.9% of 39
21. 52% of 57.9
22. 33% of 15.3
23. 21.1% of 151
24. 2.9% of 61.2
25. **ELEVATION** The highest point in Arizona is Humphreys Peak with an elevation of 12,633 feet. Estimate the elevation of the highest point in Florida, located in Walton County, if it is about 2.7% of the highest point in Arizona.
26. **BRAIN** The brain weight of a newborn baby is about 13% of the body weight of the newborn. If a newborn weighs 2,900 grams, about how much does the brain weigh?
27. **STOCKS** The value of a share of stock in an electronics company increased by  $\frac{2}{3}\%$  during one week. If the value of a share of stock was \$141 at the beginning of the week, estimate the increase in value of a share of stock at the end of the week.

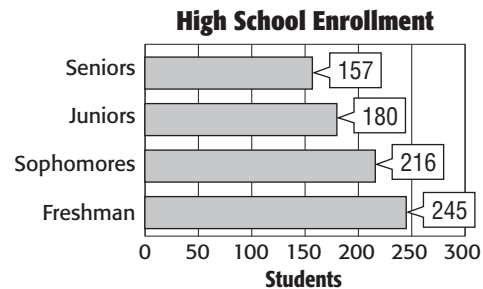
**7-4****Practice****6NSI.4, 6AFI.1****Algebra: The Percent Equation**

Write an equation for each problem. Then solve. Round to the nearest tenth if necessary.

- What number is 27% of 52?
- Find 41% of 48.
- What percent of 88 is 33?
- 8 is what percent of 18?
- What number is 33% of 360?
- What percent of 62 is 58?
- 55 is what percent of 100?
- 22% of what number is 24.2?
- 19 is 50% of what number?
- 25 is 32% of what number?
- 40% of what number is 28?
- 30 is what percent of 60?
- What percent of 5 is 2?
- 44% of 10 is what number?
- Find 110% of 88.
- What number is 60% of 21.8?
- What percent of 180 is 210?
- 220 is 95.3% of what number?
- BASEBALL** A baseball player was at bat 473 times during the regular season. If he made a hit 31.5% of the times he was at bat, how many hits did he make during the regular season? Round to the nearest whole number if necessary.

**ANALYZE GRAPHS** For Exercises 20 and 21, use the graph shown. The total enrollment at Central High School is 798 students.

- About what percent of the students at Central High are freshmen? Round to the nearest tenth if necessary.
- About what percent of the students at Central High are seniors? Round to the nearest tenth if necessary.



# 7-5 Practice

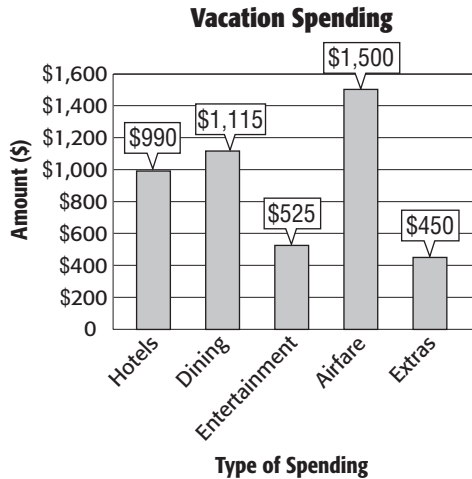
6NS1.4, 6MR3.1

## Problem-Solving Investigation: Determine Reasonable Answers

### Mixed Problem Solving

For Exercises 1 and 2, determine a reasonable answer.

- HOMES** In a retirement village, 86% of the residents own their home. If the village has 540 homes, how many homes are owned by the residents, about 250, 350, or 450?
- ANALYZE GRAPHS** The graph shows how the Forenzo family spent their money on their summer vacation. Is 25% a reasonable estimate of how much money they spent on dining? Justify your answer.

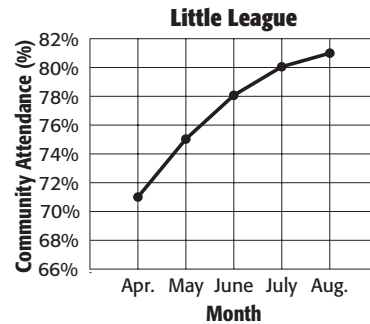


Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.

PROBLEM-SOLVING STRATEGIES
<ul style="list-style-type: none"> <li>• Use the four-step plan.</li> <li>• Guess and check.</li> <li>• Choose the method of computation.</li> <li>• Make an organized list.</li> <li>• Determine reasonable answers.</li> </ul>

- NUMBER SENSE** 12 is added to 25% of a number. The result is 30. What is the number?

- ANALYZE GRAPHS** The graph shows the percent of community attendance during a little league season. Is 90% a reasonable estimate for the percent of community attendance for September? Explain.



### Select The Operation

For Exercises 5 and 6, select the appropriate operation(s) to solve the problem. Justify your solution(s) and solve the problem.

- TRAVEL** Cecil averages 31 miles per gallon when driving his car on the highway to visit friends 461 miles away. If he filled the 16-gallon gasoline tank before leaving and did not buy any gasoline along the way, about how many gallons of gasoline are left in the tank when he arrives?
- FABRIC** Mrs. Tillman is making identical dresses for her three granddaughters. She needs  $2\frac{1}{8}$  yards of fabric for each dress. If she purchased  $8\frac{1}{2}$  yards of fabric, how much fabric will be leftover?

**7-6****Practice**

6NS1.2

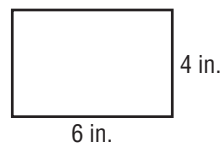
**Percent of Change**

Find each percent of change. Round to the nearest whole percent if necessary. State whether the percent of change is an *increase* or *decrease*.

1. 8 feet to 10 feet
2. 136 days to 85 days
3. \$0.32 to \$0.37
4. 62 trees to 31 trees
5. 51 meters to 68 meters
6. 16.5 grams to 24.8 grams
7. 0.55 minutes to 0.1 minutes
8. \$180 to \$210
9. 2.9 months to 4.9 months
10.  $\frac{1}{4}$  to  $\frac{3}{8}$
11.  $\frac{1}{6}$  to  $\frac{1}{3}$
12.  $\frac{4}{3}$  to  $\frac{1}{3}$
13. **SURGERY** Recent developments in surgical procedures change the average healing time for some operations from 8 weeks to 3 weeks.
14. **ROADS** The city added an extra lane in each direction to the 5-lane road.

**GEOMETRY** For Exercises 15 and 16, refer to the rectangle shown. Suppose the width is decreased by 3 inches.

15. Find the percent change in the perimeter.



16. Find the percent change in the area.

**ANALYZE TABLES** For Exercises 17 and 18, refer to the table that shows the average monthly rainfall during the first six months of the year for Singapore.

17. Between which two consecutive months is the percent of decrease the greatest? What is the percent change? Round to the nearest whole percent.
18. Between which two consecutive months is the percent of increase the least? What is the percent change? Round to the nearest whole percent.

Month	Average Rainfall (inches/month)
January	9.4
February	6.5
March	6.8
April	6.6
May	6.7
June	6.4

Source: worldclimate.com

***Sales Tax and Discount*****Find the total cost or sale price to the nearest cent.**

1. \$18 haircut; 10% discount    2. \$299 lawn mower; 5% tax    3. \$9.99 meal; 25% discount

4. \$149 guitar; 20% discount

5. \$15.75 music CD; 4% tax

6. \$24 gym bag; 8% tax

7. \$32.88 jacket; 50% discount

8. \$3.45 coffee; 33% discount

9. \$9.99 chair;  $8\frac{1}{2}\%$  tax

**Find the original price to the nearest cent.**

10. bracelet: discount, 40%  
sale price, \$13.80

11. bicycle: discount, 35%  
sale price, \$79

12. **TICKETS** State residents get discounts at various theme parks throughout the state. One theme park charges a state resident \$51.70. If this price represents a 15% discount from the regular adult admission, find the cost of the regular adult admission to the nearest cent.

13. **TRUCKS** What is the sales tax on a \$17,500 truck if the tax rate is 6%?

**COMPUTERS For Exercises 14–16, use the following information.**

Lionel is buying a computer that normally sells for \$890. The state sales tax is 6%.

14. What is the total cost of the computer including tax?

15. If the computer is on sale with a 10% discount, what is the sale price of the computer before adding the sales tax?

16. What is the sales tax on the discounted price?

**7-8****Practice**

6NS1.4

**Simple Interest**

**Find the simple interest earned to the nearest cent for each principal, interest rate, and time.**

1. \$750, 7%, 3 years
2. \$1,200, 3.5%, 2 years
3. \$450, 5%, 4 months
4. \$1,000, 2%, 9 months
5. \$530, 6%, 1 year
6. \$600, 8%, 1 month

**Find the simple interest paid to the nearest cent for each loan, interest rate, and time.**

7. \$668, 5%, 2 years
8. \$720, 4.25%, 3 months
9. \$2,500, 6.9%, 6 months
10. \$500, 12%, 18 months
11. \$300, 9%, 3 years
12. \$2,000, 20%, 1 year

**13. ELECTRONICS** Rita charged \$126 for a DVD player at an interest rate of 15.9%. How much will Rita have to pay after 2 months if she makes no payments?

**14. VACATION** The average cost for a vacation is \$1,050. If a family borrows money for the vacation at an interest rate of 11.9% for 6 months, what is the total cost of the vacation including the interest on the loan?

**For Exercises 15–17, use the following information.**

Robin has \$2,500 to invest in a CD (certificate of deposit).

15. If Robin invests the \$2,500 in the CD that yields 4% interest, what will the CD be worth after 2 years?
16. Robin would like to have \$3,000 altogether. If the interest rate is 5%, in how many years will she have \$3,000?
17. Suppose Robin invests the \$2,500 for 3 years and earns \$255. What was the rate of interest?

**8-1**

**Practice**

6SDAPI.1, 6SDAPI.2

**Line Plots**

Display each set of data in a line plot.

1. 

Weights of Dogs (pounds)				
21	12	33	14	17
8	30	18	15	25
14	21	14	19	12

2. 

Quiz Scores				
88	94	83	94	90
99	78	88	94	84
90	88	96	86	93

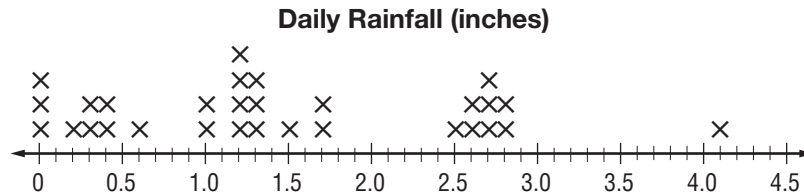
3. 

Miles Driven					
132	115	95	111	108	94
124	113	125	95	110	115
122	107	99	115	121	133

4. 

Drying Time (minutes)					
15	16	13	14	15	16
14	16	13	16	15	14
14	13	16	15	14	15

**RAINFALL** For Exercises 5–9, analyze the line plot that shows the amount of daily rainfall in inches during 30 consecutive days in a rainy season.



5. Find the range of the data.
6. How many days did it rain more than 1.0 inch?
7. What rainfall amount occurred most often?
8. Identify any clusters, gaps, or outliers.

# 8-2 Practice

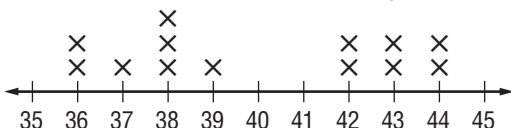
6SDAPI.1, 6SDAPI.2,  
6SDAPI.4

## Measures of Central Tendency and Range

Find the mean, median, and mode for each set of data. Round to the nearest tenth if necessary.

- Number of parking spaces used: 45, 39, 41, 45, 44, 64, 51
- Prices of plants: \$10, \$8, \$20, \$25, \$14, \$39, \$10, \$10, \$8, \$16
- Points scored during football season: 14, 20, 3, 9, 18, 35, 21, 24, 31, 12, 7
- Golf scores:  $-3, -2, +1, +1, -1, -1, +2, -5$
- Percent increase: 3.3, 4.1, 3.9, 5.0, 3.5, 2.9, 3.9

6. **Dollars Spent Shopping**



7. **CHILDREN** The table shows the number of children living at home in a neighborhood of 24 homes. Which measure best describes the data: mean, median, or mode? Explain.

Children at Home							
2	1	3	0	4	4	1	2
0	6	2	2	5	0	2	3
3	1	1	4	2	0	1	4

8. **WORK** The table shows the hours Sam worked each week during the summer. How many hours did he work during the twelfth week to average 20 hours per week?

Hours Worked					
18	24	20	19	15	21
20	19	18	22	22	?



**8-3**

**Practice**

6SDAP1.3, 6SDAP1.1

**Stem-and-Leaf Plots**

Display each set of data in a stem-and-leaf plot.

1. 

Test Scores				
78	99	83	92	90
94	88	88	94	87
70	86	85	86	93

2. 

Weight of Male Lions (pounds)			
440	425	452	433
445	436	440	475
426	444	455	485
437	450	466	470

**GOLD MEDALS** For Exercises 3–5, use the stem-and-leaf plot that shows the number of gold medals won by each of the top 15 countries at the 2004 Summer Olympics.

Stem	Leaf
0	6 8 8 9 9 9 9
1	0 1 4 6 7
2	7
3	2 5      1   4 = 14 gold medals

Source: athens2004.com

- Find the range of gold medals won.
- Find the median and the mode of the data.
- Based on the data, write one inference that can be made about the data.

**PRESIDENTS** For Exercises 6–10, use the stem-and-leaf plot that shows the age of each United States President at inauguration.

Ages of U.S. Presidents at Inauguration	
Stem	Leaf
4	2 3 6 6 7 8 9 9
5	0 0 1 1 1 1 2 2 4 4 4 4 5 5 5 5 6 6 6 7 7 7 7 8
6	0 1 1 1 2 4 4 5 8 9      4   1 = 41 years

Source: factmonster.com

- How many presidents were under the age of 45 when inaugurated?
- Find the ages of the youngest and oldest president at inauguration.
- Find the range of the data.
- Find the median and the mode of the data
- Based on the data, in what age group were the majority of the presidents when inaugurated?

**8-4**

**Practice**

6SDAP2.3

**Bar Graphs and Histograms**

Select the appropriate graph to display each set of data: bar graph or histogram. Then display the data in the appropriate graph.

1.

Ages of Children Taking Swimming Lessons	
Age	Children
0–2	8
3–5	12
6–8	18
9–11	17
12–14	12
15–17	13

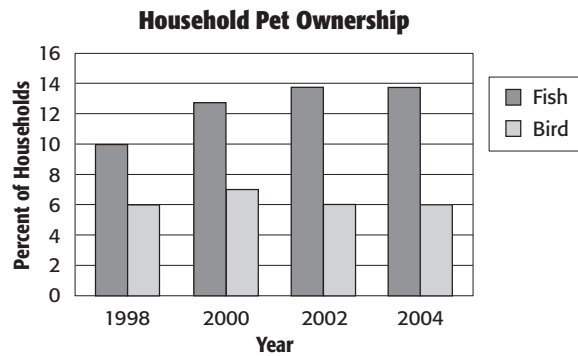
2.

Home Run Derby 2005 Round 1 Home Runs	
Player	Home Runs
Bobby Abreu	24
Ivan Rodriguez	7
Carlos Lee	11
David Ortiz	17
Hee-Seop Choi	5

Source: baseball-almanac.com

**PET OWNERSHIP** For Exercises 3–5, use the bar graph that shows the percent of households that owned fish or birds for the years 1998, 2000, 2002, and 2004.

- Which type of pet increased in percent ownership from 1998 to 2004?
- For every 100 households, how many more households had fish for pets than birds in the year 1998?



Source: infoplease.com

- During which years did the percent ownership not change for either type of pet?

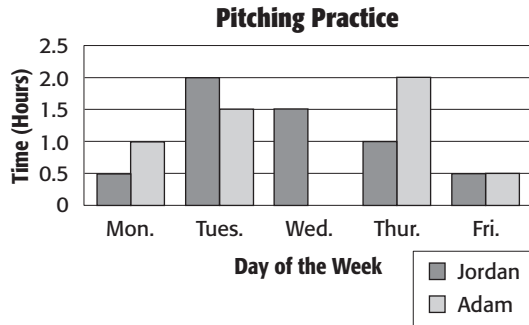
# 8-5 Practice

6MR2.3, 6SDAP2.3

## Problem-Solving Investigation: Use a Graph

### Mixed Problem Solving

**PITCHING** For Exercises 1 and 2, use the graph that shows the amount of pitching practice time for Adam and Jordan during a particular week.

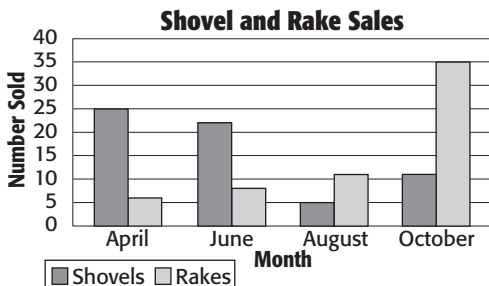


- Who practiced more during the week and by how much time?
- What was Adam's average practice time per day for the five days?

Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.

PROBLEM-SOLVING STRATEGIES
<ul style="list-style-type: none"> <li>Use the four-step plan.</li> <li>Guess and check.</li> <li>Look for a pattern.</li> <li>Make a graph.</li> </ul>

- LAWN TOOLS** The bar graph shows the number of shovels and rakes sold during particular months at a hardware store. During which month was the number of rakes sold about twice the number of shovels sold?



- NUMBER THEORY** 42 is subtracted from 42% of a number. The result is 42. What is the number?

### Select the Operation

For Exercises 5 and 6, select the appropriate operation(s) to solve the problem. Justify your solution(s) and solve the problem.

- MONEY** The value of the number of dimes is equal to the value of the number of quarters. If the total value of the quarters and dimes is \$6.00, find the total number of coins.
- SKIING** Mrs. Roget is taking her family of 2 adults and 4 children skiing for the day. They need to rent ski equipment. What will it cost to ski for the day including equipment rental and lift tickets?

Daily Ski Costs		
Item	Adults	Children
Left Ticket	\$10.00	\$8.00
Skis	\$7.00	\$4.25
Boots	\$6.25	\$4.25
Poles	\$2.25	\$1.75

**8-6**

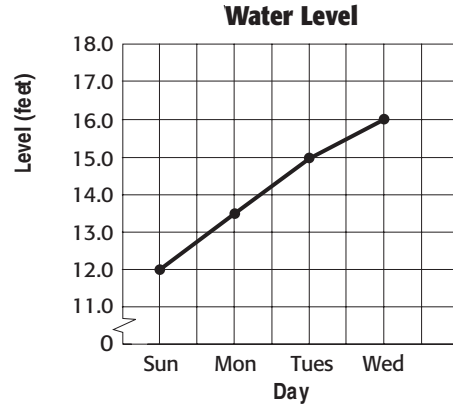
**Practice**

**6MR2.3, 6SDAP2.5**

**Using Graphs to Predict**

**WATER LEVEL** For Exercises 1 and 2, use the graph that shows the level of rising water of a lake after several days of rainy weather.

1. If the water continues to rise, predict the day when the water level will be above flood stage of 20.5 feet.
2. How many days did it take for the water level to rise 4 feet?



**PROPERTY** For Exercises 3–5, use the table that shows the property value per acre for five years.

3. Make a scatter plot of the data. Use the time on the horizontal axis and the property value on the vertical axis.

Property Value (per acre)	
Time	Value
2001	\$14,000
2002	\$16,600
2003	\$18,900
2004	\$21,500
2005	\$24,000

4. Describe the relationship, if any, between the two sets of data.
5. Predict the property value per acre in 2006.

**8-7****Practice**

6SDAP2.2, 6SDAP2.5

**Using Data to Predict****Match each situation with the appropriate equation or proportion.**

1. 85% of commuters use the expressway.  
Predict how many commuters out of 750 commuters will use the expressway.

$$\text{a. } n = 0.85 \cdot 750$$

$$\text{b. } \frac{85}{750} = \frac{n}{100}$$

$$\text{c. } 7.5 \cdot 85 = n$$

2. 750% of 85 is what number?

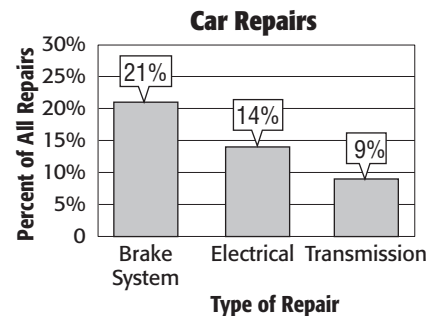
3. 85 commuters is what percent of 750 commuters?

4. **ESKIMOS** In the year 2000, the population of Alaska was about 627 thousand. Predict the number of Eskimos in Alaska if the Eskimo population was about 7.5% of the population of Alaska. Round to the nearest thousand.

5. **DOGS** A survey showed that about 40% of American households own at least one dog. Based on that survey, how many households in a community of 800 households own at least one dog?

**CAR REPAIRS** For Exercises 6–8, use the graph that shows the percent of all repairs for 3 car repair problems at a car repair shop.

6. Suppose a mechanic repairs 478 cars. Predict how many repairs will be made on transmissions.
7. For every 100 repairs, predict how many more repairs will be made on a brake system problem than on an electrical problem.
8. Predict the percent of repairs that will be one of the three problems in the graph.



**8-8****Practice**6SDAP2.1, 6SDAP2.2,  
6SDAP2.5***Using Sampling to Predict***

**Determine if the sample method is valid (unbiased) and if so, use the results to make predictions. If the sample is not valid (biased), write *not valid* on the line and explain why.**

1. A representative from the cable company randomly calls 100 households to determine the number of customers who receive movie channels. Of these, 15% do have movie channel access. If there are 2,300 customers total, how many can be expected to have the movie channels?
2. An electronics store just received a huge shipment of video games. Kenny has been put in charge of making sure the goods are not damaged. There are 350 boxes and 50 games in each box. Kenny decides to take the nearest 5 boxes and check for damages. He finds only 2 damaged games, so what can he predict for the total number of damaged games in the boxes?
3. Taylor was given the following problem:

*A researcher, who was trying to link after-school students from 20 different schools around the country, surveyed 50 children from each school. He found that 74% of students were involved in after-school sports. How many students surveyed were involved in sports?*

This is how Taylor solved the problem:

$$\begin{array}{r} 50 \\ \times 20 \\ \hline 1,000 \end{array}$$

$$\begin{array}{r} 1000 \\ \times 74 \\ \hline 74,000 \end{array}$$

It's valid because it is a simple random sample and there were 74,000 students.

Explain what Taylor did wrong.

**8-9**

**Practice**

6SDAP2.3, 6SDP2.4

**Misleading Statistics**

**ANTIQUES** For Exercises 1–3, use the table.

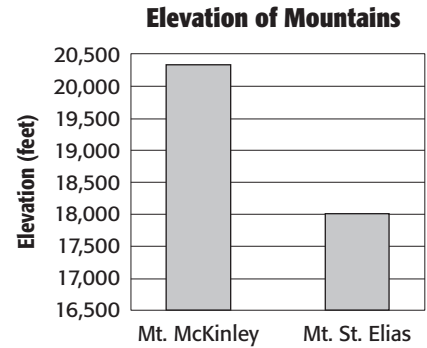
1. Find the mean, median, and mode of the data.
2. Which measure might be misleading in describing the value of each item? Explain.

Antiques	
Item	Value
Desk	\$150
Table	\$850
Painting	\$850
Dishes	\$750
Sewing Machine	\$200

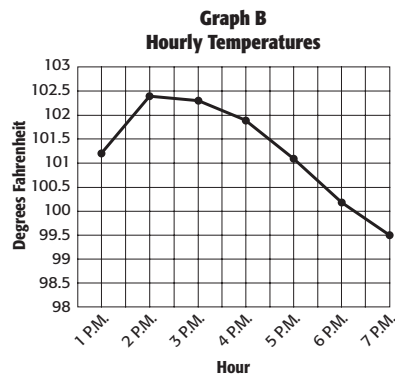
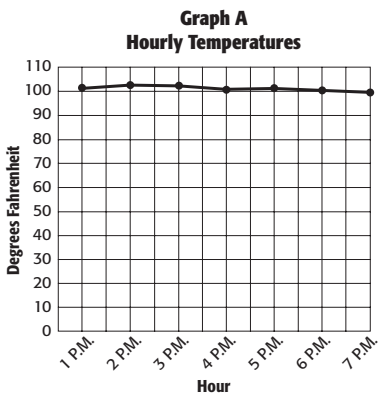
3. Which measure would best describe the value of each item? Explain.

**MOUNTAINS** For Exercises 4 and 5, use the graph that shows the elevation of the two highest mountain peaks in Alaska.

4. Based on the size of the bars compare the elevations of the mountains.
5. Explain how this graph may be misleading.



6. **BODY TEMPERATURE** The graphs below show the hourly body temperature for a hospital patient. Which graph would be more helpful to the doctor in showing the change in body temperature? Explain.



**9-1****Practice****6SDAP3.3****Simple Events**

A set of cards is numbered 1, 2, 3, ... 24. Suppose you pick a card at random without looking. Find the probability of each event. Write as a fraction in simplest form.

1.  $P(5)$
2.  $P(\text{multiple of } 4)$
3.  $P(6 \text{ or } 17)$
4.  $P(\text{not equal to } 15)$
5.  $P(\text{not a factor of } 6)$
6.  $P(\text{odd number})$

**COMMUNITY SERVICE** The table shows the students involved in community service. Suppose one student is randomly selected to represent the school at a state-wide awards ceremony. Find the probability of each event. Write as a fraction in simplest form.

7.  $P(\text{boy})$
8.  $P(\text{not } 6\text{th grader})$
9.  $P(\text{girl})$
10.  $P(8\text{th grader})$
11.  $P(\text{boy or girl})$
12.  $P(6\text{th or } 7\text{th grader})$
13.  $P(7\text{th grader})$
14.  $P(\text{not a } 9\text{th grader})$

Community Service	
girls	15
boys	25
6th graders	20
7th graders	8
8th graders	12

**MENU** A delicatessen serves different menu items, of which 2 are soups, 6 are sandwiches, and 4 are salads. How likely is it for each event to happen if you choose one item at random from the menu? Explain your reasoning.

15.  $P(\text{sandwich})$
16.  $P(\text{not a soup})$
17.  $P(\text{salad})$

18. **NUMBER CUBE** What is the probability of rolling an even number or a prime number on a number cube? Write as a fraction in simplest form.
19. **CLOSING TIME** At a convenience store there is a 25% chance a customer enters the store within one minute of closing time. Describe the complementary event and find its probability.



**9-2**

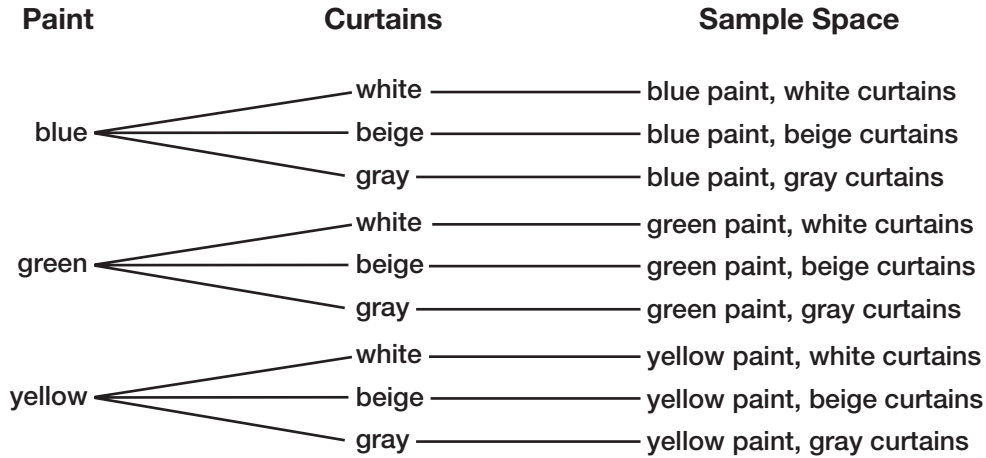
**Practice**

6SDAP3.1

**Sample Spaces**

For each situation, find the sample space using a table or tree diagram.

- choosing blue, green, or yellow wall paint with white, beige, or gray curtains



- choosing a lunch consisting of a soup, salad, and sandwich from the menu shown in the table.

Soup	Salad	Sandwich
Tortellini Lentil	Caesar Macaroni	Roast Beef Ham Turkey

- GAME** Kimiko and Miko are playing a game in which each girl rolls a number cube. If the sum of the numbers is a prime number, then Miko wins. Otherwise Kimiko wins. Find the sample space. Then determine whether the game is fair.

**9-3****Practice**

6SDAP3.1

***The Fundamental Counting Principle***

Use the Fundamental Counting Principle to find the total number of outcomes in each situation.

- choosing from 8 car models, 5 exterior paint colors, and 2 interior colors
- selecting a year in the last decade and a month of the year
- picking from 3 theme parks and 1-day, 2-day, 3-day, and 5-day passes

- choosing a meat and cheese sandwich from the list shown in the table

Cheese	Meat
Provolone	Salami
Swiss	Turkey
American	Tuna
Cheddar	Ham

- tossing a coin and rolling 2 number cubes

- selecting coffee in regular or decaf, with or without cream, and with or without sweeteners

- COINS** Find the number of possible outcomes if 2 quarters, 4 dimes, and 1 nickel are tossed.

- SOCIAL SECURITY** Find the number of possible 9-digit social security numbers if the digits may be repeated.

- AIRPORTS** Jolon will be staying with his grandparents for a week. There are four flights that leave the airport near Jolon's home that connect to an airport that has two different flights to his grandparents' hometown. Find the number of possible flights. Then find the probability of taking the earliest flight from each airport if the flight is selected at random.

- ANALYZE TABLES** The table shows the kinds of homes offered by a residential builder. If the builder offers a discount on one home at random, find the probability it will be a 4-bedroom home with an open porch. Explain your reasoning.

Number of Bedrooms	Style of Kitchen	Type of Porch
5-bedroom	Mediterranean	Open
4-bedroom	Contemporary	Screen
3-bedroom	Southwestern Colonial	

**9-4****Practice****6SDAP3.1*****Permutations*****Solve each problem.**

- 1. NUMBERS** How many different 2-digit numbers can be formed from the digits 4, 6, and 8? Assume no number can be used more than once.
- 2. LETTERS** How many permutations are possible of the letters in the word NUMBERS?
- 3. PASSENGERS** There are 5 passengers in a car. In how many ways can the passengers sit in the 5 passenger seats of the car?
- 4. PAINTINGS** Mr. Bernstein owns 14 paintings, but has only enough wall space in his home to display three of them at any one time: one in the hallway, one in the den, and one in the parlor. How many ways can Mr. Bernstein display three paintings in his home?
- 5. DOG SHOW** Mateo is one of the six dog owners in the terrier category. If the owners are selected in a random order to show their dogs, how many ways can the owners show their dogs?
- 6. TIME** Michel, Jonathan, and two of their friends each ride their bikes to school. If they have an equally-likely chance of arriving first, what is the probability that Jonathan will arrive first and Michel will arrive second?
- 7. BIRTHDAY** Glen received 6 birthday cards. If he is equally likely to read the cards in any order, what is the probability he reads the card from his parents and the card from his sister before the other cards?

**CODES** For Exercises 8–10, use the following information. A bank gives each new customer a 4-digit code number which allows the new customer to create their own password. The code number is assigned randomly from the digits 1, 3, 5, and 7, and no digit is repeated.

- 8.** What is the probability that the code number for a new customer will begin or end with a 7?
- 9.** What is the probability that the code number will *not* contain a 5?
- 10.** What is the probability that the code number will start with 371?

**Combinations****Solve each problem.**

- BASKETBALL** In how many ways can a coach select 5 players from a team of 10 players?
- BOOKS** In how many ways can 3 books be selected from a shelf of 25 books?
- CAFETERIA** In how many ways can you choose 2 side dishes from 15 items?
- CHORES** Of 8 household chores, in how many ways can you do three-fourths of them?
- ELDERLY** Latanya volunteers to bake and deliver pastries to elderly people in her neighborhood. In how many different ways can Latanya deliver to 2 of the 6 elderly people in her neighborhood?
- DELI** A deli makes potato, macaroni, three bean, Caesar, 7-layer, and Greek salads. The deli randomly makes only four salads each day. What is the probability that the four salads made one day are 7-layer, macaroni, Greek, and potato?
- AUTOGRAPHS** A sports memorabilia enthusiast collected autographed baseballs from the players in the table. The enthusiast is giving one autographed baseball to each of his three grandchildren. If the baseballs are selected at random, what is the probability that the Hank Aaron, Alex Rodriguez, and Mickey Mantle autographed baseballs are given to his grandchildren?

Player
Cal Ripkin
Hank Aaron
Barry Bonds
Alex Rodriguez
Mickey Mantle

**For Exercises 8–10, tell whether each problem represents a permutation or a combination. Then solve the problem.**

- LOCKS** In how many ways can three different numbers be selected from 10 numbers to open a keypad lock?
- MOVIES** How many ways can 10 DVDs be placed on a shelf?
- TRANSPORTATION** Eight people need transportation to the concert. How many different groups of 6 people can ride with Mrs. Johnson?

**9-6****Practice****6SDAP3.2, 6SDAP2.4****Problem-Solving Investigation: Act It Out****Mixed Problem Solving**

For Exercises 1 and 2, use the act it out strategy.

1. **POP QUIZ** Use the information in the table to determine whether tossing a nickel and a dime is a good way to answer a 5-question multiple-choice quiz if each question has answer choices A, B, C, and D. Justify your answer.

Nickel	Dime	Answer Choice
H	H	A
H	T	B
T	H	C
T	T	D

2. **BOWLING** Bill, Lucas, Carmen, and Dena go bowling every week. When ordered from highest to lowest, how many ways can their scores be arranged if Lucas is never first and Carmen always beats Bill?

Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.

**PROBLEM-SOLVING STRATEGIES**

- Use the four-step plan.
- Draw a diagram.
- Determine reasonable answers.
- Act it out.

3. **BOOKS** What is the probability of five books being placed in alphabetical order of their titles if randomly put on a book shelf?

4. **NUMBER THEORY** The sum of a 2-digit number and the 2-digit number when the digits are reversed is 77. If the difference of the same two numbers is 45, what are the two 2-digit numbers?

**Select the Operation**

For Exercises 5 and 6, select the appropriate operation(s) to solve the problems. Justify your solution(s) and solve the problem.

5. **BASEBALL** In one game, Rafael was up to bat 3 times and made 2 hits. In another game, he was up to bat 5 times with no hits. What percent of the times at bat did Rafael make a hit?

6. **RESTAURANT** A restaurant offers the possibility of 168 three-course dinners. Each dinner has an appetizer, an entrée, and a dessert. If the number of appetizers decreases from 7 to 5, find how many fewer possible three-course dinners the restaurant offers.

**9-7****Practice**

6SDAP3.2

***Theoretical and Experimental Probability***

**For Exercises 1–4, a number cube is rolled 24 times and lands on 2 four times and on 6 three times.**

1. Find the experimental probability of landing on a 2.
2. Find the experimental probability of *not* landing on a 6.
3. Compare the experimental probability you found in Exercise 1 to its theoretical probability.
4. Compare the experimental probability you found in Exercise 2 to its theoretical probability.

**ENTERTAINMENT For Exercises 5–7, use the results of the survey in the table shown.**

5. What is the probability that someone in the survey considered reading books or surfing the Internet as the best entertainment value? Write the probability as a fraction.
6. Out of 500 people surveyed, how many would you expect considered reading books or surfing the Internet as the best entertainment value?
7. Out of 300 people surveyed, is it reasonable to expect that 30 considered watching television as the best entertainment value? Why or why not?

Best Entertainment Value	
Type of Entertainment	Percent
Playing Interactive Games	48%
Reading Books	22%
Renting Movies	10%
Going to Movie Theaters	10%
Surfing the Internet	9%
Watching Television	1%

**For Exercises 8–10, a spinner marked with four sections blue, green, yellow, and red was spun 100 times. The results are shown in the table.**

8. Find the experimental probability of landing on green.
9. Find the experimental probability of landing on red.
10. If the spinner is spun 50 more times, how many of these times would you expect the pointer to land on blue?

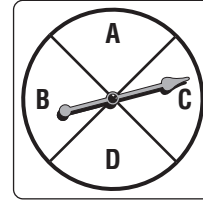
Section	Frequency
Blue	14
Green	10
Yellow	8
Red	68

**9-8****Practice**

6SDAP3.4, 6SDAP3.5

**Compound Events**

A number cube is rolled and a spinner like the one shown is spun. Find each probability.



1.  $P(6 \text{ and } D)$                       2.  $P(\text{multiple of } 2 \text{ and } B)$                       3.  $P(\text{not } 6 \text{ and not } A)$

A set of 7 cards is labeled 1–7. A second set of 12 cards contains the following colors: 3 green, 6 red, 2 blue, and 1 white. One card from each set is selected. Find each probability.

4.  $P(6 \text{ and green})$                       5.  $P(\text{prime and blue})$                       6.  $P(\text{odd and red})$
7.  $P(7 \text{ and white})$                       8.  $P(\text{multiple of } 3 \text{ and red})$                       9.  $P(\text{even and white})$

A coin is tossed, a number cube is rolled, and a letter is picked from the word *framer*.

10.  $P(\text{tails, } 5, m)$                       11.  $P(\text{heads, odd, } r)$                       12.  $P(\text{heads, } 6, \text{ vowel})$
13.  $P(\text{tails, prime, consonant})$  14.  $P(\text{not tails, multiple of } 3, a)$  15.  $P(\text{not heads, } 2, f)$

16. **TOLL ROAD** Mr. Espinoza randomly chooses one of five toll booths when entering a toll road when driving to work. What is the probability he will select the middle toll booth on Monday and Tuesday?

**MARBLES** For Exercises 17–20, use the information in the table shown to find each probability. After a marble is randomly picked from a bag containing marbles of four different colors, the color of the marble is observed and then it is returned to the bag.

Marbles	
Color	Number
White	6
Green	2
Red	1
Blue	3

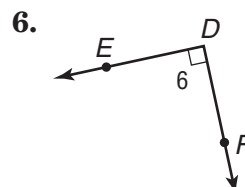
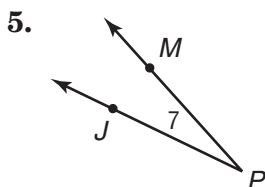
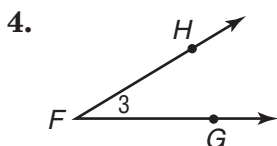
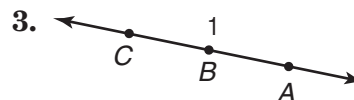
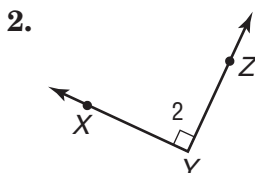
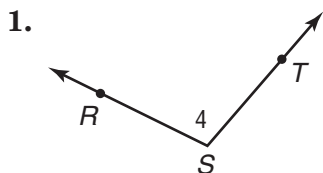
17.  $P(\text{red})$                       18.  $P(\text{green, blue})$
19.  $P(\text{red, white, blue})$                       20.  $P(\text{blue, blue, blue})$

# 10-1 Practice

6MG2.1

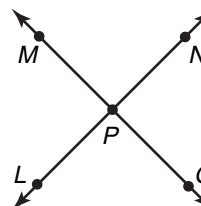
## Angle Relationships

Name each angle in four ways. Then classify the angle as *acute*, *right*, *obtuse*, or *straight*.



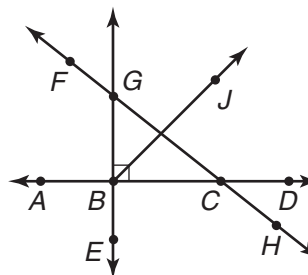
Use the figure at the right to answer Questions 7 and 8.

7. Name two angles that are vertical.
8. Name two angles that are adjacent.



Use the figure at the right to name the following.

9. two acute angles
10. two straight angles
11. two right angles
12. two obtuse angles



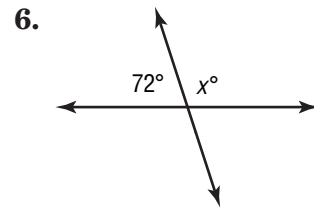
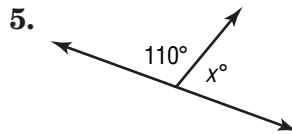
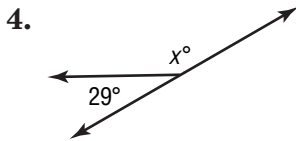
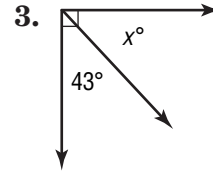
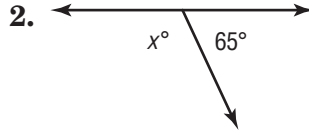
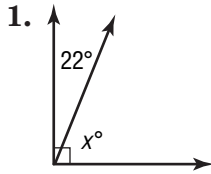


# 10-2 Practice

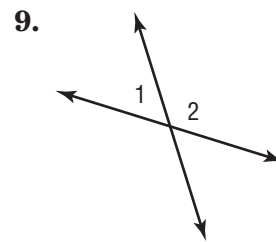
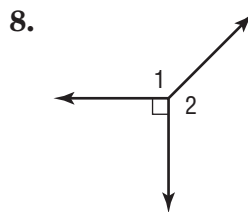
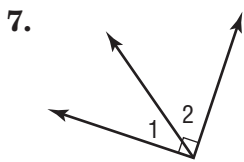
6MG2.1, 6MG2.2

## Complementary and Supplementary Angles

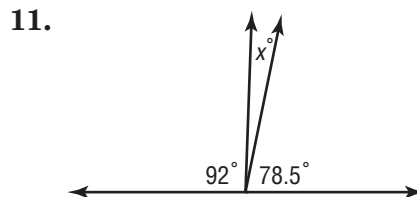
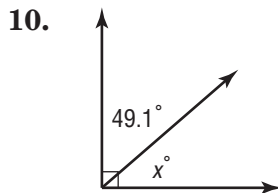
Find the value of  $x$  in each figure.



Classify each pair of angles as *complementary*, *supplementary*, or *neither*.



**ALGEBRA** Find the value of  $x$  in each figure.



**13. ALGEBRA** If  $\angle C$  and  $\angle D$  are supplementary, and the measure of  $\angle D$  is  $45^\circ$ , what is the measure of  $\angle C$ ?

# 10-3 Practice

5SDAP1.2

## Statistics: Display Data in a Circle Graph

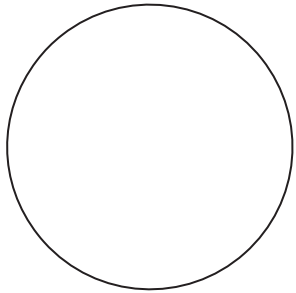
Display each set of data in a circle graph.

1.

Volume of World's Oceans	
Ocean	Percent
Pacific	49%
Atlantic	26%
Indian	21%
Arctic	4%

Source: peacecorps.gov

Volume of World's Oceans

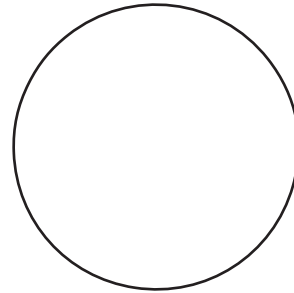


2.

America's Energy Sources	
Type	Percent
Petroleum	40%
Natural Gas	23%
Coal	22%
Nuclear	8%
Other	7%

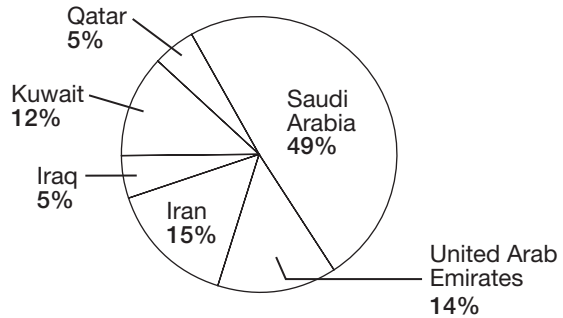
Source: conocophillips.com

America's Energy Sources



**EXPORTS** For Exercises 3 and 4, use the circle graph that shows the percent of Persian Gulf petroleum exports by country for the year 2003.

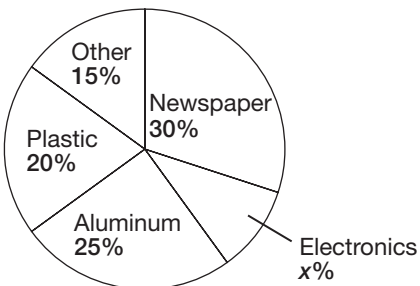
Persian Gulf Exports 2003



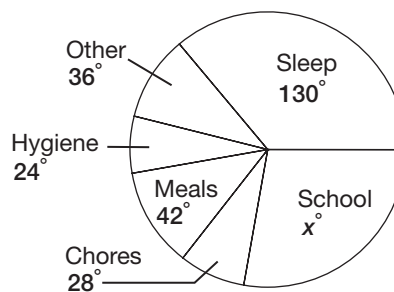
- Which country has the most petroleum exports?
- How many times more exports does Iran have than Qatar?

**DATA SENSE** For each graph, find the missing values.

5. Recycled Products



6. Time Management



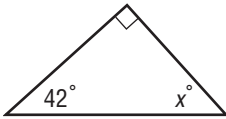
# 10-4 Practice

## Triangles

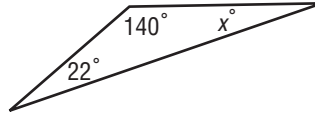
6MG2.2, 6MG2.3

Find the value of  $x$ .

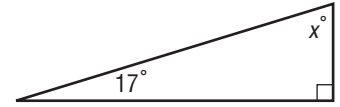
1.



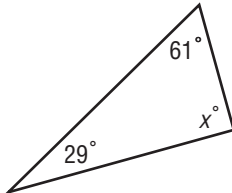
2.



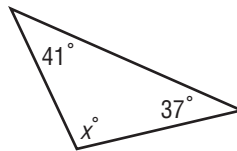
3.



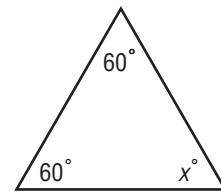
4.



5.



6.



Find the missing measure in each triangle with the given angle measures.

7.  $45^\circ, 35.8^\circ, x^\circ$

8.  $100^\circ, x^\circ, 40.7^\circ$

9.  $x^\circ, 90^\circ, 16.5^\circ$

10. Find the third angle of a right triangle if one of the angles measures  $24^\circ$ .

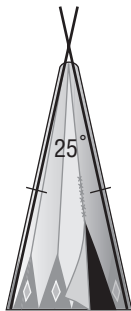
11. What is the third angle of a right triangle if one of the angles measures  $51.1^\circ$ ?

12. ALGEBRA Find  $m\angle A$  in  $\triangle ABC$  if  $m\angle B = 38^\circ$  and  $m\angle C = 38^\circ$ .

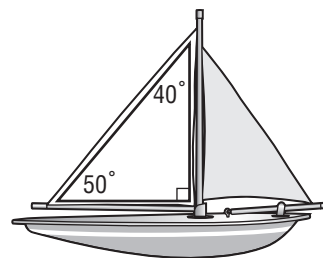
13. ALGEBRA In  $\triangle XYZ$ ,  $m\angle Z = 113^\circ$  and  $m\angle X = 28^\circ$ . What is  $m\angle Y$ ?

Classify the marked triangle in each object by its angles and by its sides.

14.



15.

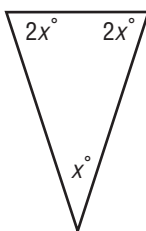


16.

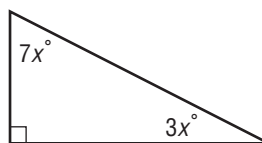


ALGEBRA Find the value of  $x$  in each triangle.

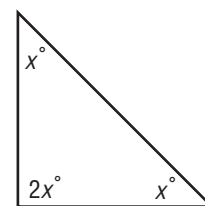
20.



21.



22.



**10-5 Practice****6MRI.2, 6MG2.3****Problem-Solving Investigation: Use Logical Reasoning****Mixed Problem Solving**

For Exercises 1 and 2, use logical reasoning to solve the problem.

- TOWNS** Tia, Bianca, and Hiroko live in the towns of Parkside, Westlake, and Summerville, but not necessarily in that order. Tia and her friend that lives in Westlake helped Bianca with her chores. Bianca does not live in Parkside. Where does Tia live? Did you use inductive or deductive reasoning?
- GEOMETRY** Draw a right triangle. Mark the midpoints of each side of the triangle and draw a smaller triangle by connecting the midpoints. Do this several more times. What can you conclude about the smaller triangle? Did you use inductive or deductive reasoning?

Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.

PROBLEM-SOLVING STRATEGIES
<ul style="list-style-type: none"> <li>Use the four-step plan.</li> <li>Look for a pattern.</li> <li>Use a graph.</li> <li>Use logical reasoning.</li> </ul>

- ANGLES** One angle of a triangle is  $33^\circ$  less than the other two angles. Find the measures of the angles of the triangle. Did you use inductive or deductive reasoning?

- METEORITES** An astronomer found three meteorites weighing 9.4 pounds, 5.7 pounds, and 24.5 pounds. If 1 kilogram weighs 2.2 pounds, find the average mass of the meteorites in kilograms.

**Select the Operation**

For Exercises 5 and 6, select the appropriate operation(s) to solve the problems. Justify your selections and solve the problem.

- PUBLIC TRANSPORTATION** A bus stopped at a bus stop and 12 people got on and 5 got off. At the next stop, 14 people got on and 3 got off. If the number of passengers has doubled, find the number of passengers on the bus.
- DISCOUNTS** The table shows the different discounts two stores offer for the same product. Which store offers the better price after the discount is applied and by how much?

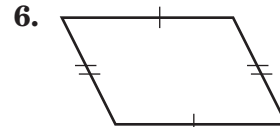
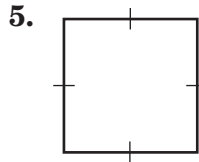
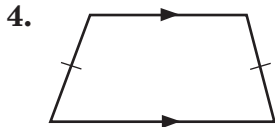
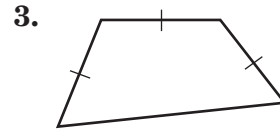
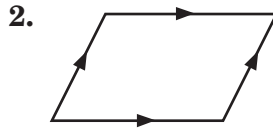
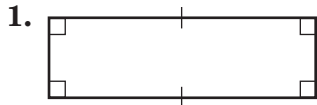
	Price	Discount
<b>Store A</b>	\$129.00	\$25
<b>Store B</b>	\$139.00	25%

# 10-6 Practice

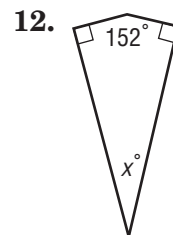
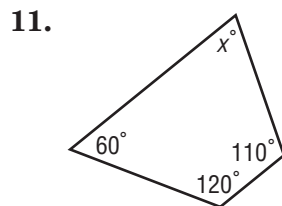
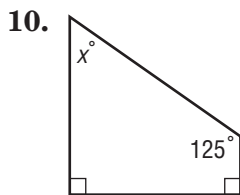
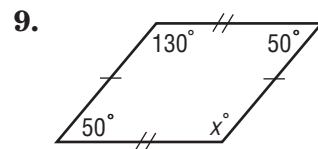
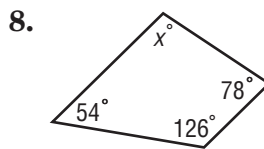
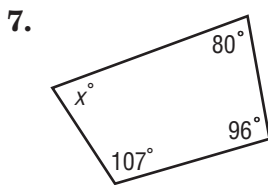
6MG2.3

## Quadrilaterals

Classify each quadrilateral using the name that best describes it.



**ALGEBRA** Find the missing angle measure in each quadrilateral.



Find the missing measure in each quadrilateral with the given angle measures.

13.  $63.2^\circ, 56^\circ, 111.7^\circ, x^\circ$

14.  $31.7^\circ, x^\circ, 161.3^\circ, 51.4^\circ$

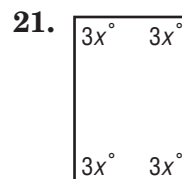
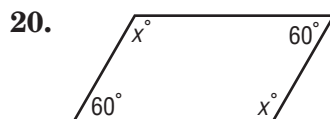
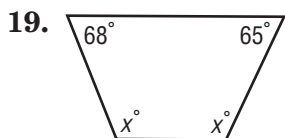
15.  $x^\circ, 122.4^\circ, 53.7^\circ, 90^\circ$

16.  $83.7^\circ, 137.2^\circ, x^\circ, 28.5^\circ$

17. **ALGEBRA** Find  $m\angle C$  in quadrilateral  $ABCD$  if  $m\angle A = 110^\circ, m\angle B = 88^\circ,$  and  $m\angle D = 55^\circ$ .

18. **ALGEBRA** What is  $m\angle Z$  in quadrilateral  $WXYZ$  if  $m\angle W = 86^\circ, m\angle X = 88^\circ,$  and  $m\angle Y = 92^\circ$ ?

**ALGEBRA** Find the value of  $x$  in each quadrilateral.

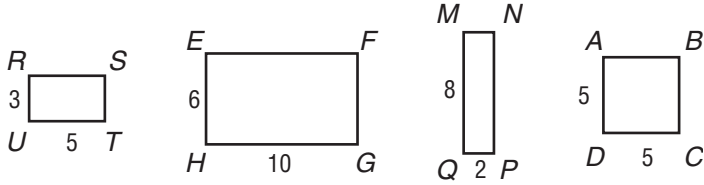


# 10-7 Practice

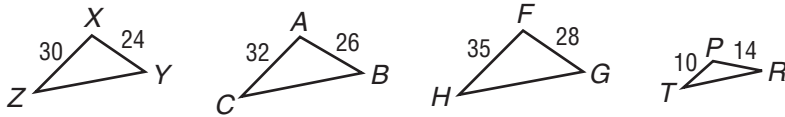
6NS1.3

## Similar Figures

1. Which rectangle is similar to rectangle  $RSTU$ ?

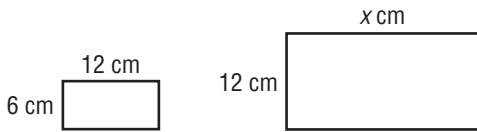


2. Which triangle is similar to triangle  $XYZ$ ?

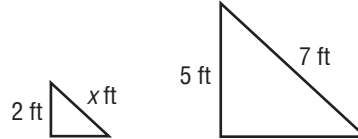


Find the value of  $x$  in each pair of similar figures.

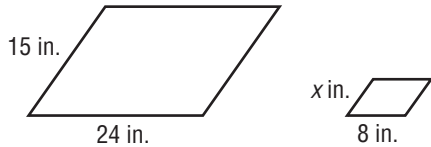
3.



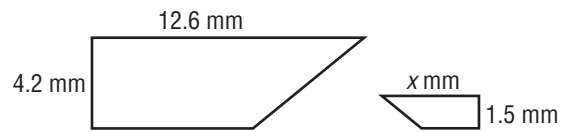
4.



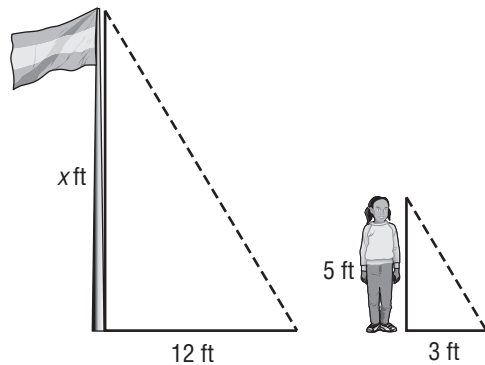
5.



6.



7. **FLAGPOLES** Tasha wants to find the height of the flagpole at school. One morning, she determines the flagpole casts a shadow of 12 feet. If Tasha is 5 feet tall and casts a shadow of 3 feet, what is the height of the flagpole?

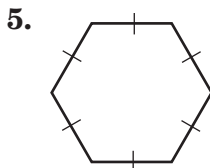
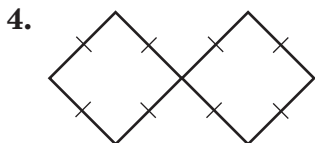
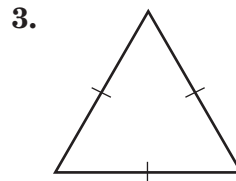
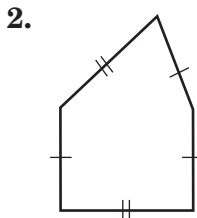
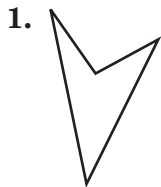


# 10-8 Practice

6MR2.2 , 6AF3.2

## Polygons and Tessellations

Determine whether each figure is a polygon. If it is, classify the polygon and state whether it is regular. If it is not a polygon, explain why.



Find the measure of an angle in each polygon if the polygon is regular. Round to the nearest tenth of a degree if necessary.

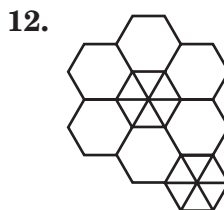
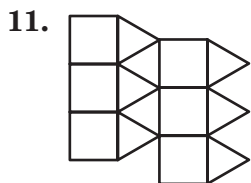
7. dodecagon  
(12-sided)

8. 14-gon

9. 18-gon

10. 36-gon

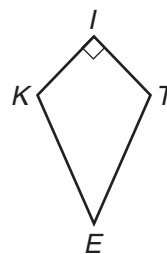
Classify the polygons that are used to create each tessellation.



13. What is the perimeter of a regular decagon with sides 6.2 meters long?

14. Find the perimeter of a regular hexagon having sides  $5\frac{2}{3}$  inches long.

**KITES** For Exercises 15–17, use the following information. A kite manufacturer makes kites in the shape of the figure shown.



15. Classify the shape of the kite.

16. If  $\angle K \cong \angle T$  and  $\angle E = 30^\circ$ , find  $m\angle K$  and  $m\angle T$ .

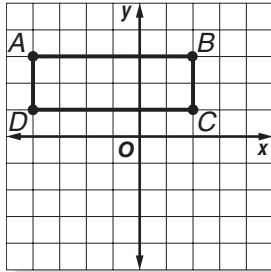
17. Can a tessellation be made by using the shape of the kite? Justify your answer.

# 10-9 Practice

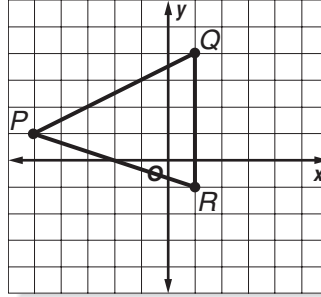
7MG3.2

## Translations

1. Translate rectangle  $ABCD$  3 units right and 4 units down. Graph rectangle  $A'B'C'D'$ .

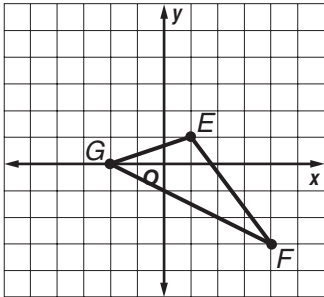


2. Triangle  $PQR$  is translated 3 units left and 3 units down. Then the translated figure is translated 6 units right. Graph the resulting triangle.

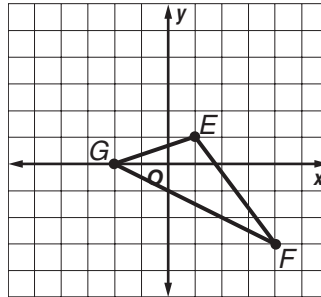


Triangle  $EFG$  has vertices  $E(1, 1)$ ,  $F(4, -3)$ , and  $G(-2, 0)$ . Find the vertices of  $E'F'G'$  after each translation. Then graph the figure and its translated image.

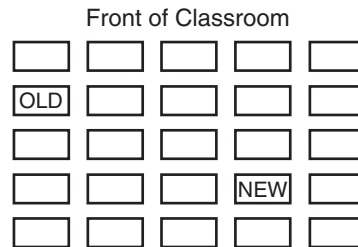
3. 3 units left, 2 units down



4. 4 units up



5. **SEATS** Jatin was given a new seating assignment in science class. The diagram shows his old seat and his new seat. Describe this translation in words and as an ordered pair.



**REASONING** The coordinates of a point and its image after a translation are given. Describe the translation in words and as an ordered pair.

6.  $A(1, -2) \rightarrow A'(3, 4)$       7.  $H(3, 3) \rightarrow H'(-4, 0)$       8.  $Z(-2, -4) \rightarrow Z'(1, -5)$



**10-10**

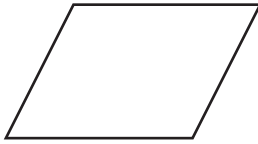
**Practice**

7MG3.2

**Reflections**

Determine whether each figure has line symmetry. If so, copy the figure and draw all lines of symmetry.

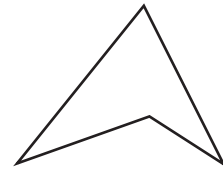
1.



2.



3.



4.



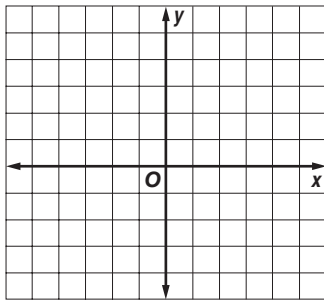
5.



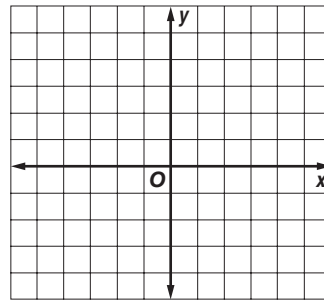
6.



7. Graph  $\triangle ABC$  with vertices  $A(2, 2)$ ,  $B(5, 4)$ , and  $C(5, 1)$  and its reflection over the  $x$ -axis. Then find the coordinates of the reflected image.



8. Graph square  $ABCD$  with vertices  $A(-1, 2)$ ,  $B(2, -1)$ ,  $C(5, 2)$ , and  $D(2, 5)$  and its reflection over the  $y$ -axis. Then find the coordinates of the reflected image.



The coordinates of a point and its image after a reflection are given. Describe the reflection as over the  $x$ -axis or  $y$ -axis.

9.  $B(1, -2) \rightarrow B'(1, 2)$

10.  $J(-3, 5) \rightarrow J'(-3, -5)$

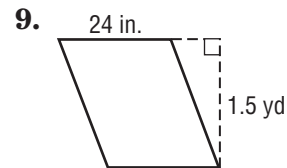
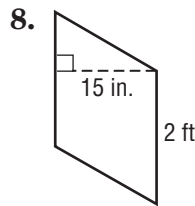
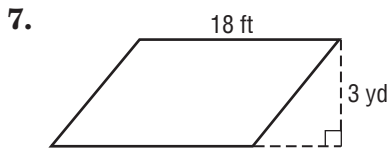
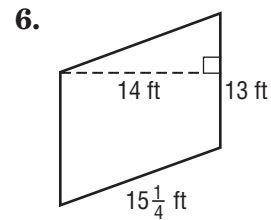
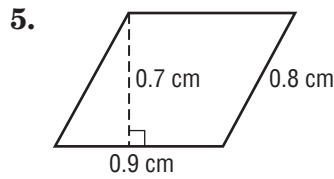
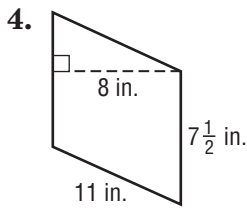
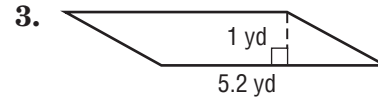
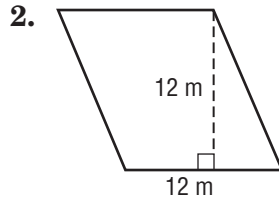
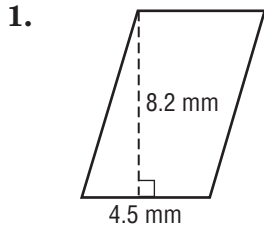
11.  $W(-7, -4) \rightarrow W'(7, -4)$

# 11-1 Practice

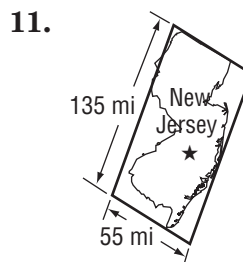
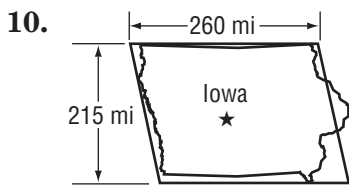
6AF3.1, 6AF3.2

## Area of Parallelograms

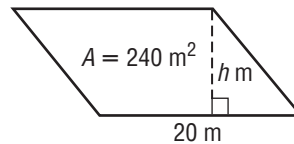
Find the area of each parallelogram. Round to the nearest tenth if necessary.



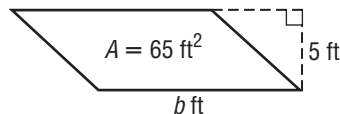
**GEOGRAPHY** Estimate the area of each state.



12. **ALGEBRA** A parallelogram has an area of 240 square meters. Find the height of the parallelogram if the base is 20 meters.



13. **ALGEBRA** What is the base of a parallelogram if the height is 5 feet and the area is 65 square feet?

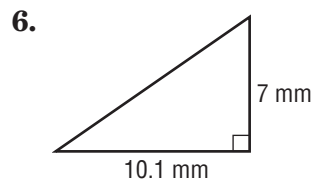
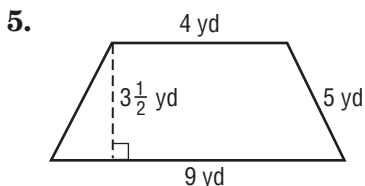
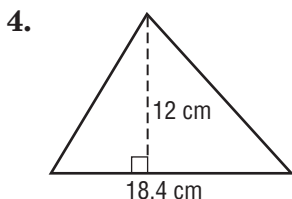
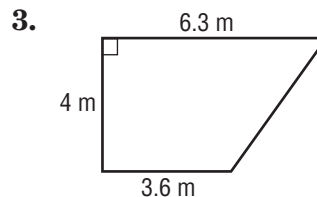
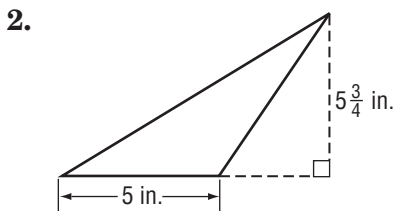
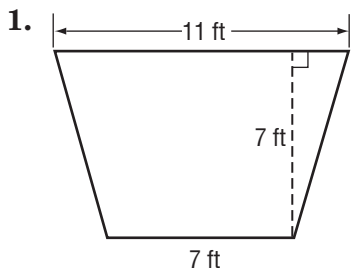


# 11-2 Practice

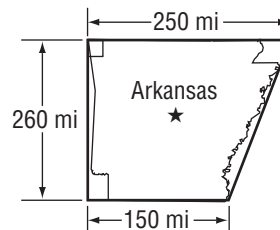
6AF3.1, 6AF3.2

## Area of Triangles and Trapezoids

Find the area of each figure. Round to the nearest tenth if necessary.

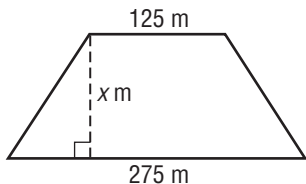


7. **GEOGRAPHY** The shape of Arkansas is roughly trapezoidal with bases of 150 miles and 250 miles and a height of 260 miles. What is the approximate area of Arkansas?

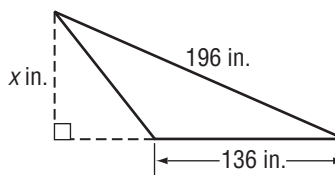


**ALGEBRA** Find the height of each figure.

8. Area =  $23,000 \text{ m}^2$



9. Area =  $6,460 \text{ in}^2$



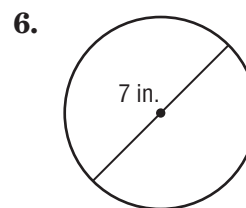
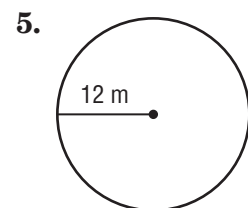
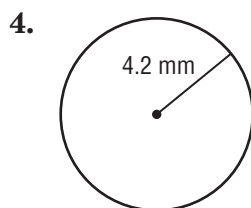
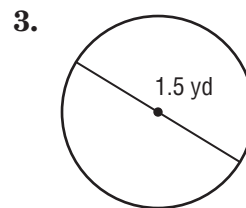
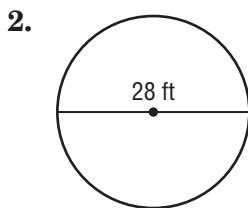
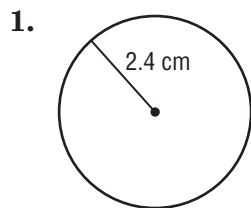
**Draw and label each figure. Then find the area.**

10. a trapezoid with a height less than 5 feet and an area greater than 50 square feet

11. a right triangle with a base greater than 10 meters and an area greater than 75 square meters

**11-3 Practice****6MGI.1, 6MGI.2****Circles and Circumference**

Find the circumference of each circle. Use 3.14 for  $\pi$ . Round to the nearest tenth if necessary.



7. radius =  $2\frac{1}{3}$  ft

8. radius = 11.9 m

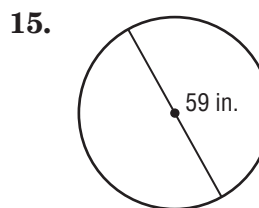
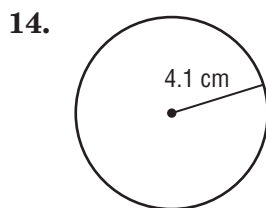
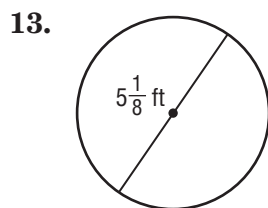
9. diameter =  $5\frac{5}{6}$  mi

10. radius =  $6\frac{1}{8}$  in.

11. diameter =  $17\frac{1}{2}$  ft

12. radius = 9.2 km

Estimate to find the approximate circumference of each circle. Explain which approximation of  $\pi$  you used.



**ALGEBRA** Find the diameter or radius of each circle. Use 3.14 for  $\pi$ . Round to the nearest tenth if necessary.

16.  $C = 32$  m, diameter = \_\_\_\_

17.  $C = 55$  mi, radius = \_\_\_\_

18. **HELICOPTERS** The landing circle for helicopters on the roof of a hospital has a radius of 20 yards. To the nearest yard, find its circumference.

19. **SPA** A circular spa has a diameter of 12 feet. The spa is decorated with 4-inch porcelain tiles around the rim. How many tiles surround the rim of the spa? Round to the nearest whole tile.

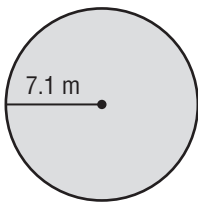
# 11-4 Practice

6MG1.1, 6MG1.2

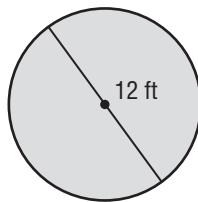
## Area of Circles

Find the area of each circle. Use 3.14 for  $\pi$ . Round to the nearest tenth if necessary.

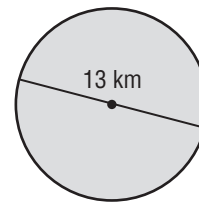
1.



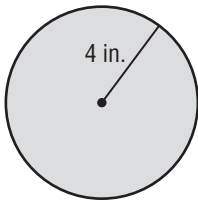
2.



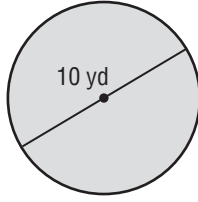
3.



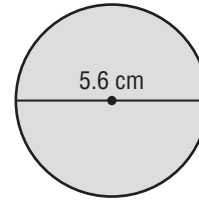
4.



5.



6.



7. diameter = 9.4 mm

8. diameter =  $3\frac{1}{2}$  ft

9. radius =  $6\frac{1}{4}$  in.

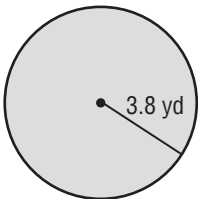
10. radius =  $4\frac{3}{4}$  yd

11. diameter =  $15\frac{1}{2}$  mi

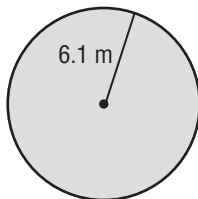
12. radius = 7.9 km

Estimate to find the approximate area of each circle.

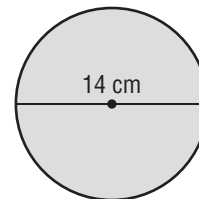
13.



14.

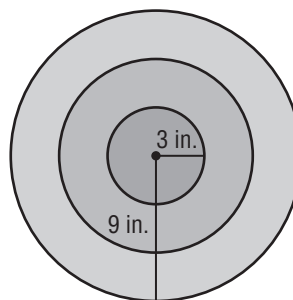


15.



16. **SPOTLIGHT** A spotlight can be adjusted to effectively light a circular area of up to 6 meters in diameter. To the nearest tenth, what is the maximum area that can be effectively lit by the spotlight?

17. **ARCHERY** The bull's eye on an archery target has a radius of 3 inches. The entire target has a radius of 9 inches. To the nearest tenth, find the area of the target outside of the bull's eye.



**11-5 Practice**

6MR1.3, 6MR2.2, 6NS2.1

**Problem-Solving Investigation: Solve a Simpler Problem****Mixed Problem Solving**

Solve Exercises 1 and 2. Use the solve a simpler problem strategy.

- STADIUM** The exits in a stadium are designed to allow 1,200 people to leave the stadium each minute. At this rate, how long would it take for 10,800 people to leave the stadium?
- PHARMACY** A city has three major pharmacy chains which have a total of 895,000 customers. Approximately how many customers do business at each major pharmacy?

Pharmacy	Percent
A	54.8%
B	32.4%
C	12.8%

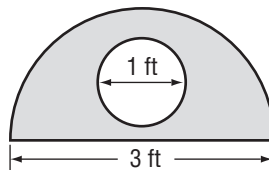
Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.

**PROBLEM-SOLVING STRATEGIES**

- Use the four-step plan.
- Eliminate possibilities.
- Draw a diagram.
- Solve a simpler problem.

- CARPENTRY** Mr. Fernandez uses 7 boards that are 4 feet long and 6 inches wide to make one bookshelf. If he buys lumber in lengths of 8 feet with a width of 12 inches, how many pieces of lumber does he need to purchase to make 5 bookshelves?

- AREA** Stacey is making a stained glass window above her front doorway in the shape as shown in the figure. To the nearest tenth, what is the area of the shaded portion of the window?

**Select the Operation**

For Exercises 5 and 6, select the appropriate operation(s) to solve the problems. Justify your selection(s) and solve the problem.

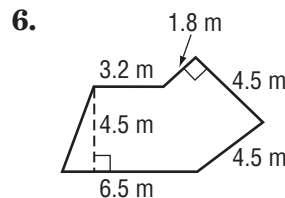
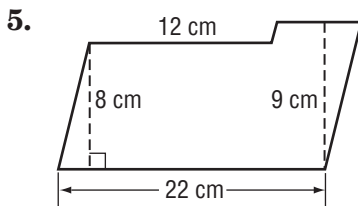
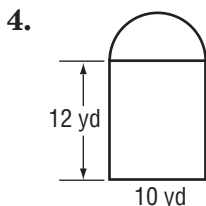
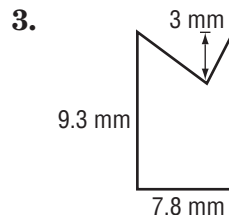
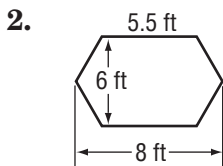
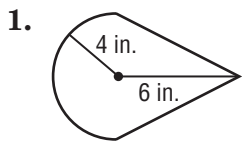
- QUALITY CONTROL** For every 250 televisions tested, 3 televisions are found to be defective. How many televisions were tested if 48 televisions were found defective?
- APPLIANCE REPAIR** An appliance repair company charged \$35 to make a house call. After arriving, the company charged \$10 for every 15 minutes of labor. How much was the repair bill if the new parts cost \$23 and the appliance took 45 minutes to repair?

# 11-6 Practice

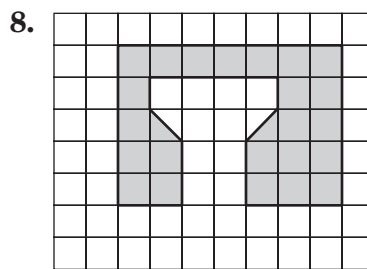
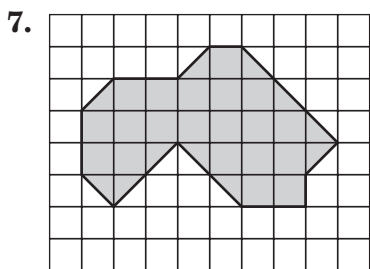
6AF3.1, 6AF3.2

## Area of Complex Figures

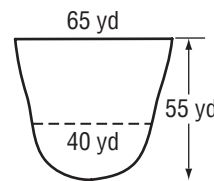
Find the area of each figure. Round to the nearest tenth if necessary.



In each diagram below, one square unit represents 5 square meters. Find the area of each figure.

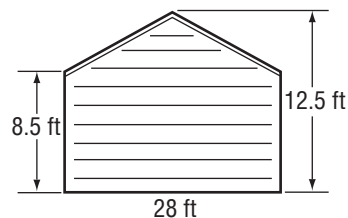


9. **AUDITORIUM** The diagram at the right gives the dimensions of an auditorium. If new carpet is needed for the auditorium, what will be the area of the carpet? Round to the nearest square yard.



**SIDING** For Exercises 10 and 11, use the diagram that shows one end of a cottage.

10. Each end of the cottage needs new siding. Find the total area that needs new siding.



11. The siding material costs \$75 for a bundle of siding that covers an area of 100 square feet. What will be the total cost to put siding on both ends of the cottage? Justify your answer.

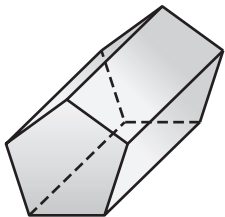
# 11-7 Practice

7MG3.6

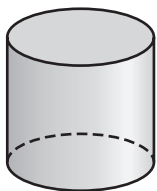
## Three-Dimensional Figures

For each figure, identify the shape of the base(s), if any. Then classify the figure.

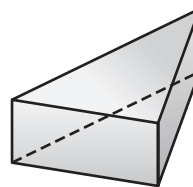
1.



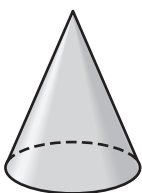
2.



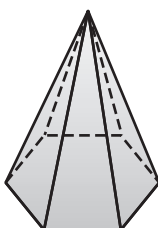
3.



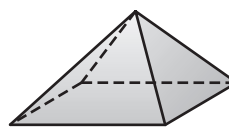
4.



5.



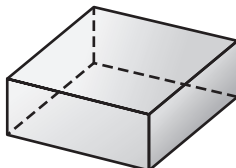
6.



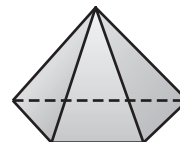
7.



8.



9.



10. **CANDLES** What three-dimensional figure describes the candle shown?



11. **FENCES** The basic shape of a fence post is made of two geometric figures. Classify these figures.





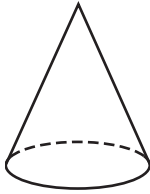
# 11-8 Practice

5MG2.3, 6MR2.4

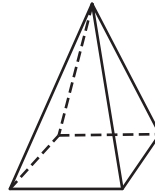
## Drawing Three-Dimensional Figures

Draw a top, a side, and a front view of each solid.

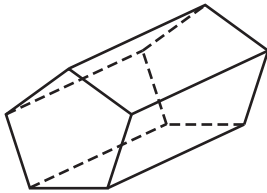
1.



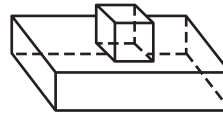
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3.

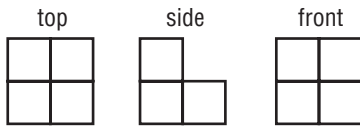


4.

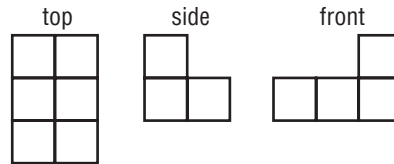


Draw each solid whose top, side, and front views are shown. Use isometric dot paper.

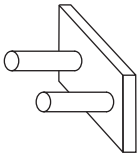
1.



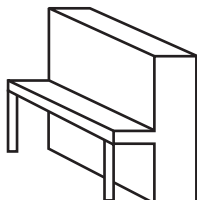
2.



7. **HAT RACK** Draw a top, a side, and a front view of the hat rack shown.



8. **MUSIC** Sketch views of the top, side, and front of the piano shown.

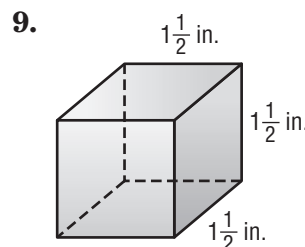
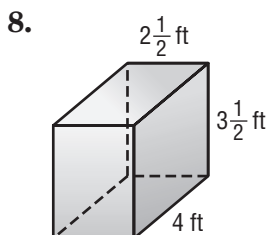
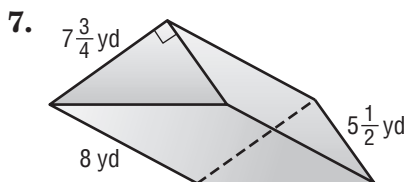
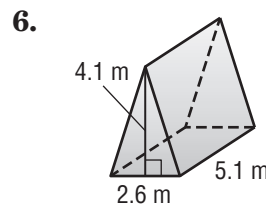
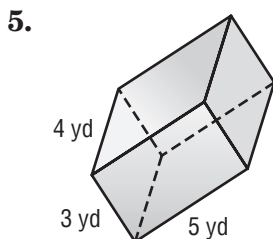
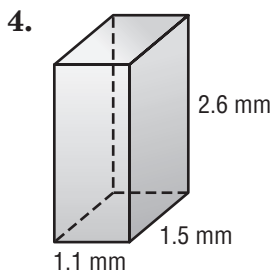
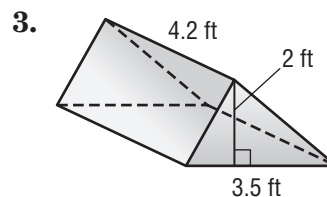
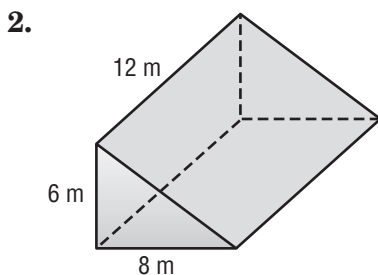
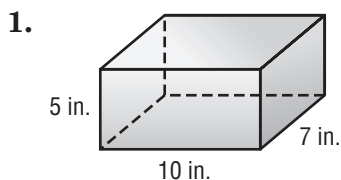


# 11-9 Practice

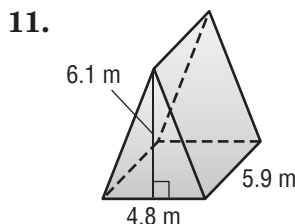
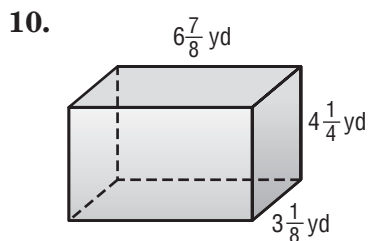
6MG1.3

## Volume of Prisms

Find the volume of each prism. Round to the nearest tenth if necessary.



**ESTIMATION** Estimate to find the approximate volume of each prism.



12. **ALGEBRA** The base of a rectangular prism has an area of 15.3 square inches and a volume of 185.13 cubic inches. Write an equation that can be used to find the height  $h$  of the prism. Then find the height of the prism.

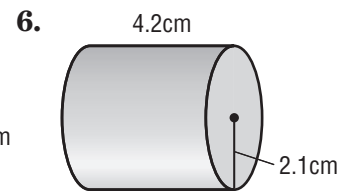
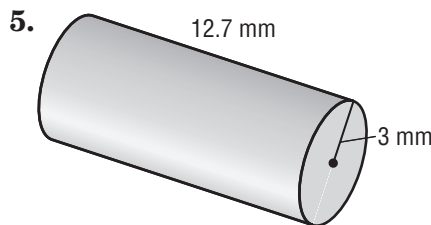
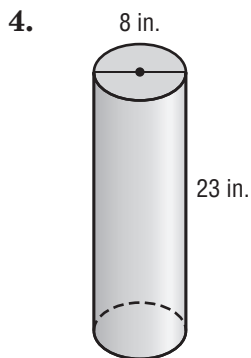
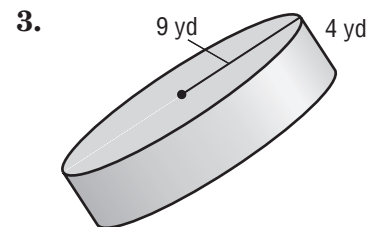
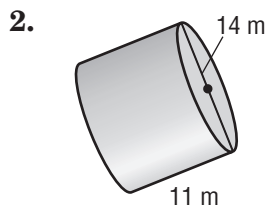
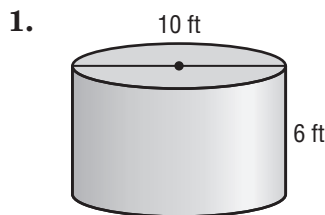
13. **MAIL** The United States Post Office has two different priority mail flat rate boxes. Which box has the greater volume? Justify your answer. Box 1:  $6\frac{1}{2}$  in.  $\times$   $8\frac{1}{2}$  in.  $\times$  11 in. Box 2:  $3\frac{3}{8}$  in.  $\times$   $11\frac{7}{8}$  in.  $\times$   $13\frac{5}{8}$  in.

# 11-10 Practice

6MG1.3

## Volume of Cylinders

Find the volume of each cylinder. Use 3.14 for  $\pi$ . Round to the nearest tenth.



7. radius = 3.7 cm  
height = 5.2 cm

8. diameter = 6 in.  
height =  $4\frac{1}{2}$  in

9. radius =  $5\frac{1}{4}$  yd  
height =  $6\frac{1}{2}$  yd

10. **CONTAINER** What is the volume of a barrel that has a diameter of  $1\frac{1}{2}$  feet and a height of 4 feet?

**ESTIMATION Match each cylinder with its approximate volume.**

11. diameter = 4 cm, height = 3.6 cm

a.  $108 \text{ ft}^3$

12. radius = 2.7 cm, height = 5 cm

b.  $135 \text{ ft}^3$

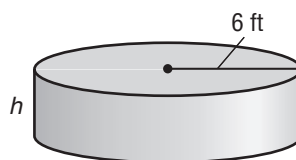
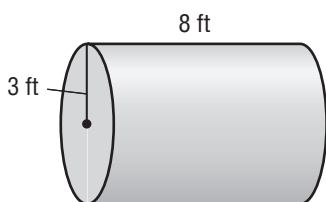
13. radius = 3 cm, height = 4.1 cm

c.  $96 \text{ ft}^3$

14. diameter = 8.2 cm, height = 2 cm

d.  $48 \text{ ft}^3$

15. **FUEL** Two fuel tanks with the dimensions shown have the same volume. What is the value of  $h$ ?



**12-1****Practice**

7NS2.4

**Estimating Square Roots****Estimate each square root to the nearest whole number.**

1.  $\sqrt{8}$

2.  $\sqrt{19}$

3.  $\sqrt{47}$

4.  $\sqrt{70}$

5.  $\sqrt{91}$

6.  $\sqrt{125}$

7.  $\sqrt{150}$

8.  $\sqrt{389}$

9.  $\sqrt{2,468}$

10.  $\sqrt{899}$

11.  $\sqrt{4,840}$

12.  $\sqrt{8,080}$

**Use a calculator to find each square root to the nearest tenth.**

13.  $\sqrt{6}$

14.  $\sqrt{21}$

15.  $\sqrt{53}$

16.  $\sqrt{79}$

17.  $\sqrt{190}$

18.  $\sqrt{624}$

19.  $\sqrt{427}$

20.  $\sqrt{3,178}$

21.  $\sqrt{0.36}$

22.  $\sqrt{0.81}$

23.  $\sqrt{1.44}$

24.  $\sqrt{2.25}$

25. **ALGEBRA** What whole number is closest to  $\sqrt{a + b}$  if  $a = 24$  and  $b = 38$ ?26. **ALGEBRA** Evaluate  $\sqrt{x - y}$  to the nearest tenth if  $x = 10$  and  $y = 4.5$ 27. **QUILTING** A queen-size quilt in the shape of a square has an area of 51 square feet. What is the approximate length of one side of the quilt to the nearest tenth?28. **PENDULUM** The formula below can be used to estimate the time it takes for a pendulum to swing back and forth once. Use the formula to find the time it takes for a pendulum with a length of 0.8 meter to swing back and forth once. Round to the nearest tenth.

$$T = 2 \times \sqrt{L}$$

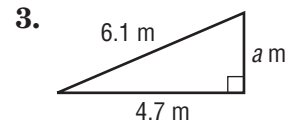
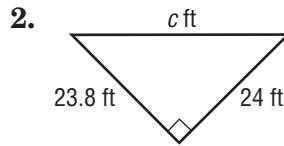
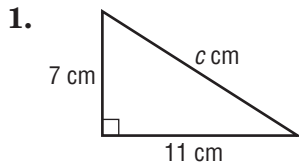
- $T$  = time (seconds)
- $L$  = length (meters)

# 12-2 Practice

7MG3.3

## The Pythagorean Theorem

Find the missing measure of each triangle. Round to the nearest tenth if necessary.



4.  $a = 3.3$  in.,  $b = 5.6$  in.

5.  $b = 2.9$  mm,  $c = 4.4$  mm

6.  $a = 21$  yd,  $c = 29$  yd

7.  $a = 2\frac{1}{5}$  ft,  $c = 4\frac{2}{5}$  ft

8.  $b = 7\frac{1}{4}$  in.,  $c = 7\frac{3}{4}$  in.

9.  $a = 6\frac{1}{2}$  yd,  $b = 10$  yd

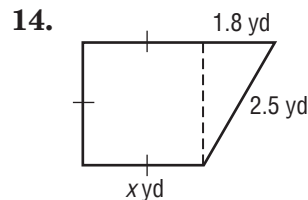
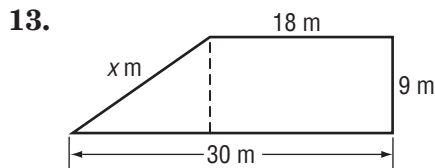
If a triangle has sides  $a$ ,  $b$ , and  $c$  so that  $a^2 + b^2 = c^2$ , then the triangle is a right triangle. Determine whether a triangle with the given side lengths is a right triangle. Write *yes* or *no*.

10. 9 cm, 12 cm, 18 cm

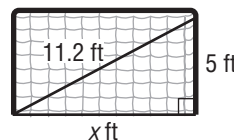
11. 7 ft, 24 ft, 25 ft

12. 5 in., 12 in., 13 in.

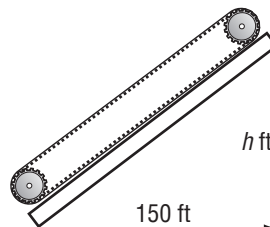
Find the missing measure in each figure. Round to the nearest tenth if necessary.



15. **SOCCER** Find the width of the soccer goal. Round to the nearest tenth.



16. **CONVEYOR BELT** The diagram shows the horizontal distance a conveyor belt moves a load of gravel. If the conveyor belt takes 54 seconds to move gravel from the bottom of the conveyor belt to the top at a rate of 3 feet per second, how high does the conveyor belt lift the gravel? Round to the nearest tenth.



**12-3 Practice**

6MR2.4, 6NS2.1

**Problem-Solving Investigation: Make a Model****Mixed Problem Solving**

For Exercises 1 and 2, make a model to solve the problem.

- 1. ARCHITECT** Mrs. Peron is designing a home for a client. The house is 45 feet by 76 feet. If she uses a scale of  $1 \text{ foot} = \frac{1}{2} \text{ inch}$ , what are the dimensions of the house on the blue prints?
- 2. SWIMMING POOL** Mr. Forrester has a swimming pool that measures  $3\frac{1}{3}$  yards by 8 yards. If the deck around the pool is  $2\frac{2}{3}$  yards wide, what is the outside perimeter of the deck?

Use any strategy to solve Exercises 3 and 4. Some strategies are shown below.

**PROBLEM-SOLVING STRATEGIES**

- Use the four-step plan.
- Draw a diagram.
- Use logical reasoning.
- Make a model.

- 3. BATTERIES** A manufacturing plant can make 350 batteries in 15 minutes. How long will it take the manufacturing plant to make 3,500 batteries?

- 4. SHOPPING** A grocery store has five cash registers. About 4 customers are checked out at each register every 20 minutes. How many customers are checked out at the store each hour?

**Select the Operation**

For Exercises 5 and 6, select an appropriate operation(s) to solve the problem. Justify your selection(s) and solve the problem.

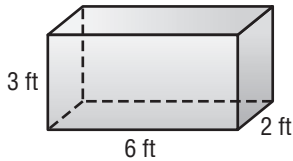
- 5. TESTS** Diego scored a 95 on his first test in science class. He then scored 100 on his next 5 tests. If he scored a 91 on his seventh test, what is his test average?

- 6. NEWSPAPERS** Candace wants to increase the number of newspapers she delivers. She currently delivers 58 newspapers. In fourteen weeks, she wants to be delivering 100 newspapers. How many newspaper deliveries must she increase each week to obtain her goal?

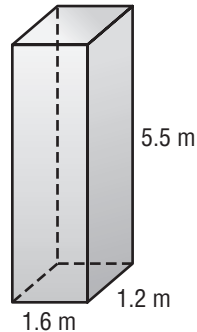
**12-4****Practice****7MG2.1****Surface Area of Rectangular Prisms**

Find the surface area of each rectangular prism. Round to the nearest tenth if necessary.

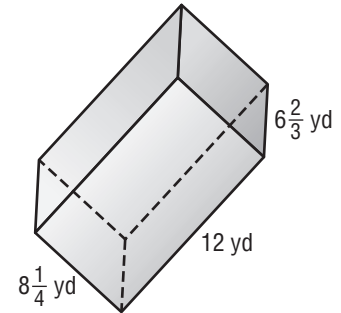
1.



2.



3.

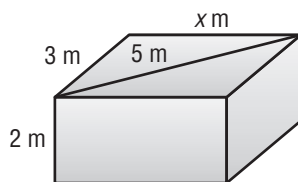


4. length = 20 cm  
width = 18 cm  
height = 25 cm

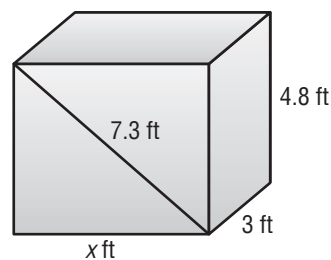
5. length = 31.5 in.  
width = 12.2 in.  
height = 24.8 in.

6. length = 5.3 mm  
width = 1.1 mm  
height = 3.4 mm

7.

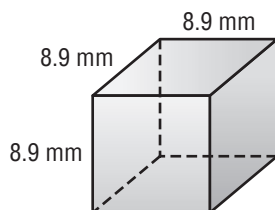


8.

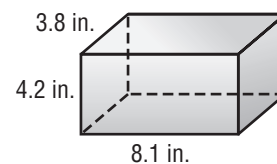


**ESTIMATION** Estimate the surface area of each prism.

9.



10.



11. **BIRTHDAY GIFT** When wrapping a birthday gift for his mother, Kenji adds an additional 2.5 square feet of gift wrap to allow for overlap. How many square feet of gift wrap will Kenji use to wrap a gift 3.5 feet long, 18 inches wide, and 2 feet high?

**For Exercises 12 and 13, use the following information.**

A company needs to package hazardous chemicals in special plastic containers that hold 80 cubic feet of chemicals.

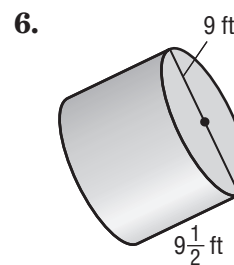
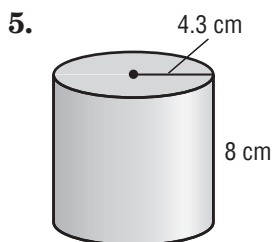
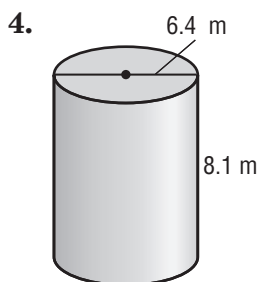
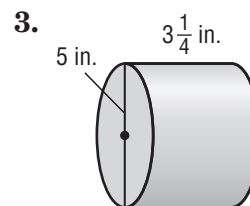
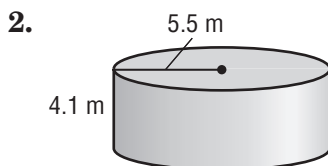
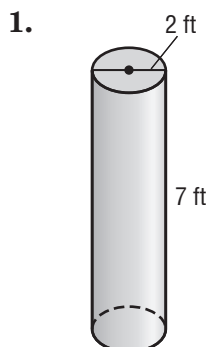
12. Find the whole number dimensions of the container that would use the least amount of plastic.
13. If the plastic costs \$0.10 per square foot, how much would it cost to make 24 containers?

**12-5 Practice**

7MG2.1

**Surface Area of Cylinders**

Find the surface area of each cylinder. Use 3.14 for  $\pi$ . Round to the nearest tenth.

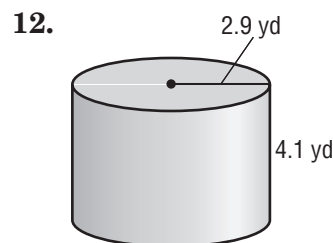
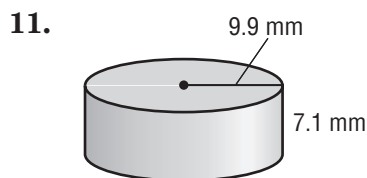
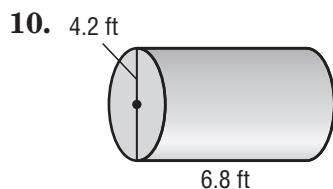


7. diameter = 15.2 mm  
height = 9.4 mm

8. diameter = 28.4 yd  
height = 15.1 yd

9. radius = 50 cm  
height = 70 cm

**ESTIMATION** Estimate the area of each cylinder.



13. **FUEL STORAGE** A fuel storage tank needs to be painted on the inside. If the height of the tank is 40 feet and the diameter is 120 feet, what is the surface that needs to be painted? Round to the nearest hundred square feet.

14. **PAPER TOWELS** Each of the three rolls of paper towels in a package are individually wrapped in plastic. The radius of each roll is 5.6 centimeters and the height is 27.9 centimeters. How much plastic is used to individually wrap the three rolls? Round to the nearest tenth.





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