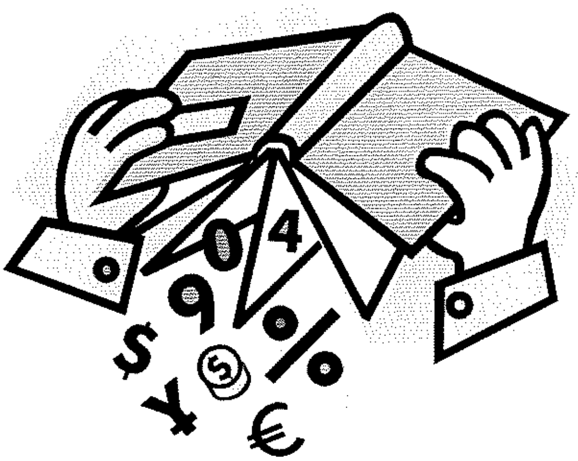
Bryant Middle School

7th grade



Summer Packet

MATH

NAME ______________________ DATE __________ PERIOD _____

4-1 Study Guide and Intervention

Writing Expressions and Equations

The table below shows phrases written as mathematical expressions.

Phrases	Expression	Phrases	Expression
9 more than a number the sum of 9 and a number a number plus 9 a number increased by 9 the total of *x* and 9	$x + 9$	4 subtracted from a number a number minus 4 4 less than a number a number decreased by 4 the difference of *h* and 4	$h - 4$
Phrases	**Expression**	**Phrases**	**Expression**
6 multiplied by *g* 6 times a number the product of *g* and 6	$6g$	a number divided by 5 the quotient of *t* and 5 divide a number by 5	$\frac{t}{5}$

The table below shows sentences written as an equation.

Sentences	Equation
Sixty less than three times the amount is $59. Three times the amount less 60 is equal to 59. 59 is equal to 60 subtracted from three times a number. A number times three minus 60 equals 59.	$3n - 60 = 59$

Lesson 4–1

EXERCISES

Write each phrase as an algebraic expression.

1. 7 less than *m*
2. the quotient of 3 and *y*
3. the total of 5 and *c*
4. the difference of 6 and *r*
5. *n* divided by 2
6. the product of *k* and 9

Write each sentence as an algebraic equation.

7. A number increased by 7 is 11.
8. The price decreased by $4 is $29.
9. Twice as many points as Bob would be 18 points.
10. After dividing the money 5 ways, each person got $67.
11. Three more than 8 times as many trees is 75 trees.
12. Seven less than a number is 15.

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4-2 Study Guide and Intervention

Solving Addition and Subtraction Equations

Remember, equations must always remain balanced. If you subtract the same number from each side of an equation, the two sides remain equal. Also, if you add the same number to each side of an equation, the two sides remain equal.

EXAMPLE 1 **Solve $x + 5 = 11$. Check your solution.**

$x + 5 = 11$	Write the equation.
$- 5 = -5$	Subtract 5 from each side.
$x = 6$	Simplify.

Check

$x + 5 = 11$	Write the equation.
$6 + 5 \stackrel{?}{=} 11$	Replace *x* with 6.
$11 = 11$ ✓	This sentence is true.

The solution is 6.

EXAMPLE 2 **Solve $15 = t - 12$. Check your solution.**

$15 = t - 12$	Write the equation.
$+12 = +12$	Add 12 to each side.
$27 = t$	Simplify.

Check

$15 = t - 12$	Write the equation.
$15 \stackrel{?}{=} 27 - 12$	Replace *t* with 27.
$15 = 15$ ✓	This sentence is true.

The solution is 27.

EXERCISES

Solve each equation. Check your solution.

1. $h + 3 = 14$
2. $m + 8 = 22$
3. $p + 5 = 15$
4. $17 = y + 8$
5. $w + 4 = -1$
6. $k + 5 = -3$
7. $25 = 14 + r$
8. $57 + z = 97$
9. $b - 3 = 6$
10. $7 = c - 5$
11. $j - 12 = 18$
12. $v - 4 = 18$
13. $-9 = w - 12$
14. $y - 8 = -12$
15. $14 = f - 2$
16. $23 = n - 12$

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4-3 Study Guide and Intervention

Solving Multiplication Equations

If each side of an equation is divided by the same non-zero number, the resulting equation is equivalent to the given one. You can use this property to solve equations involving multiplication and division.

EXAMPLE 1 **Solve $45 = 5x$. Check your solution.**

$45 = 5x$ Write the equation.

$\frac{45}{5} = \frac{5x}{5}$ Divide each side of the equation by 5.

$9 = x$ $45 \div 5 = 9$

Check $45 = 5x$ Write the original equation.

$45 \stackrel{?}{=} 5(9)$ Replace x with 9. Is this sentence true?

$45 = 45$ ✓

The solution is 9.

EXAMPLE 2 **Solve $-21 = -3y$. Check your solution.**

$-21 = -3y$ Write the equation.

$\frac{-21}{-3} = \frac{-3y}{-3}$ Divide each side by -3.

$7 = y$ $-21 \div (-3) = 7$

Check $-21 = -3y$ Write the original equation.

$-21 \stackrel{?}{=} -3(7)$ Replace y with 7. Is this sentence true?

$-21 = -21$ ✓

The solution is 7.

EXERCISES

Solve each equation. Then check your solution.

1. $8q = 56$ **2.** $4p = 32$ **3.** $42 = 6m$ **4.** $104 = 13h$

5. $-6n = 30$ **6.** $-18x = 36$ **7.** $48 = -8y$ **8.** $72 = -3b$

9. $-9a = -45$ **10.** $-12m = -120$ **11.** $-66 = -11t$ **12.** $-144 = -9r$

13. $3a = 4.5$ **14.** $2h = 3.8$ **15.** $4.9 = 0.7k$ **16.** $9.75 = 2.5z$

Lesson 4–3

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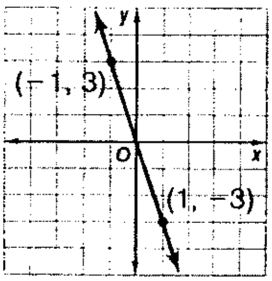
4-7 Study Guide and Intervention

Lines and Slope

Slope is a number that tells how steep the line is.

$\text{slope} = \dfrac{\text{change in } y}{\text{change in } x}$ ← vertical change / ← horizontal change

EXAMPLE 1 **Find the slope of the line.**



$\text{slope} = \dfrac{\text{change in } y}{\text{change in } x}$

$= \dfrac{-6}{2}$ or -3

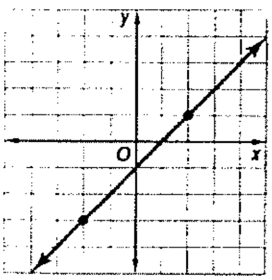
The slope of the line is −3.

EXERCISES

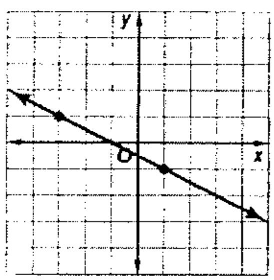
Lesson 4–7

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

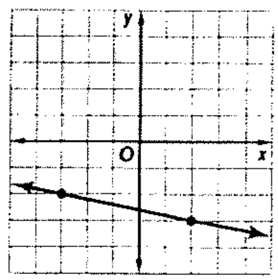
1.



2.



3.



4. (5, 3), (3, 1)

5. (5, 3), (6, 5)

6. (3, 4), (−1, −4)

7. (2, −6), (3, −3)

8. (4, 6), (5, 2)

9. (4, 4), (5, 2)

10. (0, 3), (1, −4)

11. (−3, 2), (−1, −4)

12. (2, 0), (6, 1)

13. (11, 4), (7, 1)

14. (2, 7), (−3, 4)

15. (−1, −3), (7, 3)

16. (7, −4), (1, 0)

17. (5, −2), (7, −3)

18. (0, 0), (6, −1)

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3-4 Study Guide and Intervention

Adding Integers

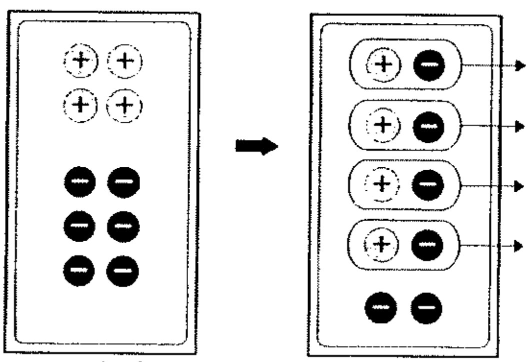
For integers with the same sign:
- the sum of two positive integers is positive.
- the sum of two negative integers is negative.

For integers with different signs, subtract their absolute values. The sum is:
- positive if the positive integer has the greater absolute value.
- negative if the negative integer has the greater absolute value.

To add integers, it is helpful to use counters or a number line.

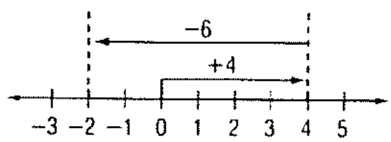
EXAMPLE 1 **Find 4 + (−6).**

Method 1 Use counters.
Combine a set of 4 positive counters and a set of 6 negative counters on a mat.



4 + (−6)   4 + (−6) = −2

Method 2 Use a number line.
- Start at 0.
- Move 4 units right.
- Then move 6 units left.



4 + (−6) = −2

EXERCISES

Add.

1. −5 + (−2)   **2.** 8 + 1   **3.** −7 + 10

4. 16 + (−11)   **5.** 22 + (−7)   **6.** −50 + 50

7. −10 + (−10)   **8.** 100 + (−25)   **9.** −35 + −20

Evaluate each expression if $a = 8$, $b = -8$, and $c = 4$.

10. $a + 15$ **11.** $b + (-9)$ **12.** $a + b$

13. $b + c$ **14.** $-10 + c$ **15.** $12 + b$

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3-5 Study Guide and Intervention

Subtracting Integers

Lesson 3–5

To subtract an integer, add its opposite.

EXAMPLE 1 **Find 6 − 9.**

$6 - 9 = 6 + (-9)$ To subtract 9, add −9.
$= -3$ Simplify.

EXAMPLE 2 **Find −10 − (−12).**

$-10 - (-12) = -10 + 12$ To subtract −12, add 12.
$= 2$ Simplify.

EXAMPLE 3 **Evaluate $a - b$ if $a = -3$ and $b = 7$.**

$a - b = -3 - 7$ Replace *a* with −3 and *b* with 7.
$= -3 + (-7)$ To subtract 7, add −7.
$= -10$ Simplify.

EXERCISES

Subtract.

1. $7 - 9$

2. $20 - (-6)$

3. $-10 - 4$

4. $0 - 12$

5. $-7 - 8$

6. $13 - 18$

7. $-20 - (-5)$

8. $-8 - (-6)$

9. $25 - (-14)$

10. $-75 - 50$

11. $15 - 65$

12. $19 - (-10)$

Evaluate each expression if $m = -2$, $n = 10$, and $p = 5$.

13. $m - 6$

14. $9 - n$

15. $p - (-8)$

16. $p - m$

17. $m - n$

18. $-25 - p$

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3-6 Study Guide and Intervention

Multiplying Integers

The product of two integers with **different** signs is **negative**.

The product of two integers with the **same** sign is **positive**.

EXAMPLE 1 **Multiply 5(−2).**

$5(-2) = -10$ The integers have different signs. The product is negative.

EXAMPLE 2 **Multiply −3(7).**

$-3(7) = -21$ The integers have different signs. The product is negative.

EXAMPLE 3 **Multiply −6(−9).**

$-6(-9) = 54$ The integers have the same sign. The product is positive.

EXAMPLE 4 **Multiply $(-7)^2$.**

$(-7)^2 = (-7)(-7)$ There are 2 factors of −7.
$= 49$ The product is positive.

EXAMPLE 5 **Simplify −2(6*c*).**

$-2(6c) = (-2 \cdot 6)c$ Associative Property of Multiplication.
$= -12c$ Simplify.

EXAMPLE 6 **Simplify 2(5*x*).**

$2(5x) = (2 \cdot 5)x$ Associative Propery of Multiplication.
$= 10x$ Simplify.

EXERCISES

Multiply.

1. $-5(8)$
2. $-3(-7)$
3. $10(-8)$
4. $-8(3)$
5. $-12(-12)$
6. $(-8)^2$

ALGEBRA **Simplify each expression.**

7. $-5(7a)$
8. $3(-2x)$
9. $4(6f)$
10. $7(6b)$
11. $-6(-3y)$
12. $7(-8g)$

ALGEBRA **Evaluate each expression if $a = -3$, $b = -4$, and $c = 5$.**

13. $-2a$
14. $9b$
15. ab
16. $-3ac$
17. $-2c^2$
18. abc

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3-7 Study Guide and Intervention

Dividing Integers

The quotient of two integers with different signs is negative.

The quotient of two integers with the same sign is positive.

EXAMPLE 1 **Divide $30 \div (-5)$.**

$30 \div (-5)$ The integers have different signs.

$30 \div (-5) = -6$ The quotient is negative.

EXAMPLE 2 **Divide $-100 \div (-5)$.**

$-100 \div (-5)$ The integers have the same sign.

$-100 \div (-5) = 20$ The quotient is positive.

EXERCISES

Divide.

1. $-12 \div 4$
2. $-14 \div (-7)$
3. $\frac{18}{-2}$
4. $-6 \div (-3)$
5. $-10 \div 10$
6. $\frac{-80}{-20}$
7. $350 \div (-25)$
8. $-420 \div (-3)$
9. $\frac{540}{45}$
10. $\frac{-256}{16}$

ALGEBRA **Evaluate each expression if $d = -24$, $e = -4$, and $f = 8$.**

11. $12 \div e$
12. $40 \div f$
13. $d \div 6$
14. $d \div e$
15. $f \div e$
16. $e^2 \div f$
17. $\frac{-d}{e}$
18. $ef \div 2$
19. $\frac{f^2}{e^2}$
20. $\frac{de}{f}$

Lesson 3–7

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5-4 Study Guide and Intervention

Fractions and Decimals

To write a decimal as a fraction, divide the numerator of the fraction by the denominator. Use a power of ten to change a decimal to a fraction.

EXAMPLE 1 **Write $\frac{5}{9}$ as a decimal.**

Method 1 Use pencil and paper.

```
   0.555...
 9)5.000
   4 5
     50  <--  The remainder after
     45       each step is 5.
      50
      45
       5
```

Method 2 Use a calculator.

5 [÷] 9 [=] 0.55555556

You can use bar notation $0.\overline{5}$ to indicate that 5 repeats forever. So, $\frac{5}{9} = 0.\overline{5}$.

EXAMPLE 2 **Write 0.32 as a fraction in simplest form.**

$0.32 = \frac{32}{100}$ The 2 is in the hundredths place.

$= \frac{8}{25}$ Simplify.

EXERCISES

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

1. $\frac{8}{10}$

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

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

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

5. $\frac{13}{15}$

6. $3\frac{47}{99}$

Write each decimal as a fraction in simplest form.

7. 0.14

8. 0.3

9. 0.94

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5-5 Study Guide and Intervention

Fractions and Percents

A **ratio** is a comparison of two numbers by division. When a ratio compares a number to 100, it can be written as a **percent**. To write a ratio or fraction as a percent, find an equivalent fraction with a denominator of 100. You can also use the meaning of percent to change percents to fractions.

EXAMPLE 1 **Write $\frac{19}{20}$ as a percent.**

$$\frac{19}{20} \xrightarrow{\times 5} \frac{95}{100} = 95\%$$

Since 100 ÷ 20 = 5, multiply the numerator and denominator by 5.

EXAMPLE 2 **Write 92% as a fraction in simplest form.**

$92\% = \frac{92}{100}$ Definition of percent

$= \frac{23}{25}$ Simplify.

EXERCISES

Write each ratio as a percent.

1. $\frac{14}{100}$
2. $\frac{27}{100}$
3. 34.5 per 100
4. 18 per 100
5. 21:100
6. 96:100

Write each fraction as a percent.

7. $\frac{3}{100}$
8. $\frac{14}{100}$
9. $\frac{2}{5}$
10. $\frac{1}{20}$
11. $\frac{13}{25}$
12. $\frac{4}{10}$

Write each percent as a fraction in simplest form.

13. 35%
14. 18%
15. 75%
16. 80%
17. 16%
18. 15%

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5-6 Study Guide and Intervention

Percents and Decimals

To write a percent as a decimal, divide the percent by 100 and remove the percent symbol. To write a decimal as a percent, multiply the decimal by 100 and add the percent symbol.

EXAMPLE 1 **Write 42.5% as a decimal.**

$42.5\% = \frac{42.5}{100}$	Write the percent as a fraction.
$= \frac{42.5 \times 10}{100 \times 10}$	Multiply by 10 to remove the decimal in the numerator.
$= \frac{425}{1{,}000}$	Simplify.
$= 0.425$	Write the fraction as a decimal.

EXAMPLE 2 **Write 0.625 as a percent.**

$0.625 = 062.5$	Multiply by 100.
$= 62.5\%$	Add the % symbol.

EXERCISES

Write each percent as a decimal.

1. 6%
2. 28%
3. 81%
4. 84%
5. 35.5%
6. 12.5%
7. 14.2%
8. 11.1%

Write each decimal as a percent.

9. 0.47
10. 0.03
11. 0.075
12. 0.914

6-2 Study Guide and Intervention

Adding and Subtracting Fractions

Like fractions are fractions that have the same denominator. To add or subtract like fractions, add or subtract the numerators and write the result over the denominator.

Simplify if necessary.

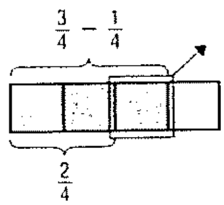
To add or subtract *unlike fractions*, rename the fractions with a least common denominator. Then add or subtract as with like fractions.

EXAMPLE 1 **Subtract $\frac{3}{4} - \frac{1}{4}$. Write in simplest form.**

$\frac{3}{4} - \frac{1}{4} = \frac{3-1}{4}$ Subtract the numerators.

$= \frac{2}{4}$ Write the difference over the denominator.

$= \frac{1}{2}$ Simplify.



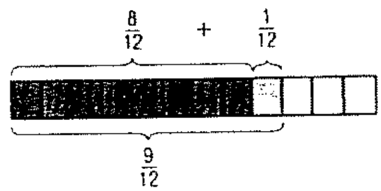
EXAMPLE 2 **Add $\frac{2}{3} + \frac{1}{12}$. Write in simplest form.**

The least common denominator of 3 and 12 is 12.

$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$ Rename $\frac{2}{3}$ using the LCD.

$$\begin{array}{rcr} \frac{2}{3} & \rightarrow & \frac{8}{12} \\ +\frac{1}{12} & \rightarrow & +\frac{1}{12} \\ \hline & & \frac{9}{12} \text{ or } \frac{3}{4} \end{array}$$

Add the numerators and simplify.



EXERCISES

Add or subtract. Write in simplest form.

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

2. $\frac{7}{9} - \frac{2}{9}$

3. $\frac{1}{2} + \frac{3}{4}$

4. $\frac{7}{8} - \frac{5}{6}$

5. $\frac{5}{9} + \frac{5}{6}$

6. $\frac{3}{8} - \frac{1}{12}$

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

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

9. $\frac{7}{15} + \frac{5}{6}$

10. $\frac{7}{9} - \frac{1}{2}$

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6-3 Study Guide and Intervention

Adding and Subtracting Mixed Numbers

To add or subtract mixed numbers:

1. Add or subtract the fractions. Rename using the LCD if necessary.
2. Add or subtract the whole numbers.
3. Simplify if necessary.

EXAMPLE 1 **Find $14\frac{1}{2} + 18\frac{2}{3}$.**

$14\frac{1}{2}$	→	$14\frac{3}{6}$	Rename the fractions.
$+18\frac{2}{3}$	→	$+18\frac{4}{6}$	Add the whole numbers and add the fractions.
		$32\frac{7}{6}$ or $33\frac{1}{6}$	Simplify.

EXAMPLE 2 **Find $21 - 12\frac{5}{8}$.**

21	→	$20\frac{8}{8}$	Rename 21 as $20\frac{8}{8}$.
$-12\frac{5}{8}$	→	$-12\frac{5}{8}$	First subtract the whole numbers and then the fractions.
		$8\frac{3}{8}$	

EXERCISES

Add or subtract. Write in simplest form.

1. $7\frac{3}{4} + 2\frac{3}{4}$

2. $14\frac{2}{9} - 6\frac{1}{9}$

3. $9\frac{1}{5} - 4\frac{3}{4}$

4. $7\frac{1}{8} + 5\frac{3}{8}$

5. $7\frac{3}{4} + 2\frac{2}{3}$

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

7. $5\frac{1}{2} - 3\frac{1}{4}$

8. $6\frac{1}{3} + 2\frac{1}{6}$

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

10. $2\frac{2}{3} + 7\frac{1}{2}$

11. $6\frac{1}{2} - 6\frac{1}{3}$

12. $18\frac{1}{2} + 5\frac{5}{8}$

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6-5 Study Guide and Intervention

Algebra: Solving Equations

Lesson 6–5

Multiplicative inverses, or **reciprocals**, are two numbers whose product is 1. To solve an equation in which the coefficient is a fraction, multiply each side of the equation by the reciprocal of the coefficient.

EXAMPLE 1 **Find the multiplicative inverse of $3\frac{1}{4}$.**

$3\frac{1}{4} = \frac{13}{4}$	Rename the mixed number as an improper fraction.
$\frac{13}{4} \cdot \frac{4}{13} = 1$	Multiply $\frac{13}{4}$ by $\frac{4}{13}$ to get the product 1.

The multiplicative inverse of $3\frac{1}{4}$ is $\frac{4}{13}$.

EXAMPLE 2 **Solve $\frac{4}{5}x = 8$. Check your solution.**

$\frac{4}{5}x = 8$	Write the equation.
$\left(\frac{5}{4}\right)\frac{4}{5}x = \left(\frac{5}{4}\right)8$	Multiply each side by the reciprocal of $\frac{4}{5}$, $\frac{5}{4}$.
$x = 10$	Simplify.

The solution is 10.

EXERCISES

Find the multiplicative inverse of each number.

1. $\frac{4}{9}$

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

3. $-\frac{15}{4}$

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

Solve each equation. Check your solution.

5. $\frac{3}{5}x = 12$

6. $16 = \frac{10}{3}a$

7. $\frac{c}{2} = 7$

8. $\frac{15}{7}y = 3$

9. $\frac{m}{6} = -4$

10. $14 = -\frac{7}{9}b$

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6-7

Study Guide and Intervention

Measurement: Changing Customary Units

Customary Units		
Length	Weight	Capacity
1 foot (ft) = 12 inches (in.)	1 pound (lb) = 16 ounces (oz)	1 cup (c) = 8 fluid ounces (fl oz)
1 yard (yd) = 3 feet	1 ton (T) = 2,000 pounds	1 pint (pt) = 2 cups
1 mile (mi) = 5,280 feet		1 quart (qt) = 2 pints
		1 gallon (gal) = 4 quarts

EXAMPLE 1 $5\frac{1}{2}$ **lb =** ___?___ **oz**

To change from larger units to smaller units, multiply.

$5\frac{1}{2} \times 16 = 88$ Since 1 pound is 16 ounces, multiply by 16.

$5\frac{1}{2}$ pounds = 88 ounces

EXAMPLE 2 **28 fl oz =** ___?___ **c**

To change from smaller units to larger units, divide.

$28 \div 8 = 3\frac{1}{2}$ Since 8 fluid ounces are in 1 cup, divide by 8.

28 fluid ounces = $3\frac{1}{2}$ cups

EXERCISES

Complete.

1. 5 lb = ______ oz
2. 48 in. = ______ ft
3. 6 yd = ______ ft

4. 7 qt = ______ pt
5. 8,000 lb = ______ T
6. $3\frac{1}{4}$ mi = ______ ft

7. 4 c = ______ fl oz
8. 6 c = ______ pt
9. $\frac{1}{2}$ gal = ______ qt

10. 3 ft = ______ in.
11. 9 qt = ______ gal
12. 30 fl oz = ______ c

13. 6,864 ft = ______ mi
14. 40 oz = ______ lb
15. 9 pt = ______ c

16. 18 ft = ______ yd
17. 11 pt = ______ qt
18. $2\frac{3}{4}$ T = ______ lb

6-8 Study Guide and Intervention

Geometry: Perimeter and Area

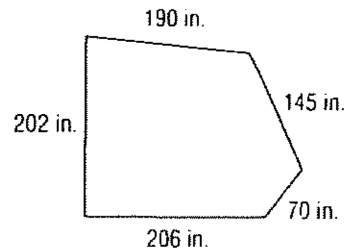
The distance around a geometric figure is called the **perimeter**.

To find the perimeter of any geometric figure, add the measures of its sides.

The perimeter of a rectangle is twice the length ℓ plus twice the width w.

$$P = 2\ell + 2w$$

EXAMPLE 1 **Find the perimeter of the figure at the right.**



$P = 145 + 70 + 206 + 202 + 190$
$= 813$

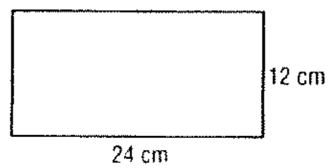
The perimeter is 813 inches.

The measure of the surface enclosed by a geometric figure is called the **area**.

The area of a rectangle is the product of the length ℓ and width w.

$$A = \ell \cdot w$$

EXAMPLE 2 **Find the area of the rectangle.**

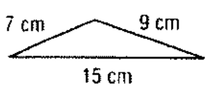


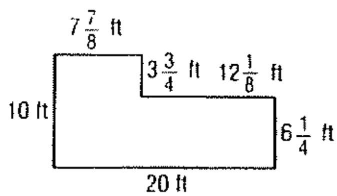
$A = \ell \cdot w$
$= 24 \cdot 12$
$= 288$

The area is 288 square centimeters.

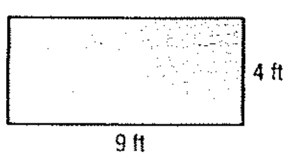
EXERCISES

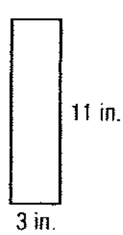
Find the perimeter of each figure.

1. 

2. 

Find the perimeter and area of each rectangle.

3. 

4. 

5. $\ell = 8$ ft, $w = 5$ ft

6. $\ell = 3.5$ m, $w = 2$ m

7. $\ell = 8$ yd, $w = 4\frac{1}{3}$ yd

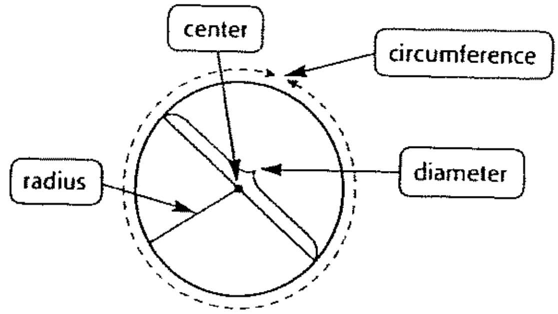
8. $\ell = 29$ cm, $w = 7.3$ cm

NAME ______________________ DATE ____________ PERIOD _____

6-9 Study Guide and Intervention

Geometry: Circles and Circumference

A **circle** is the set of all points in a plane that are the same distance from a given point, called the **center**. The **diameter** *d* is the distance across the circle through its center. The **radius** *r* is the distance from the center to any point on the circle. The **circumference** *C* is the distance around the circle. The circumference *C* of a circle is equal to its diameter *d* times π, or 2 times its radius *r* times π.



EXAMPLE 1 **Find the circumference of a circle with a diameter of 7.5 centimeters.**

$C = \pi d$

$C \approx 3.14 \times 7.5$ Use 3.14 for π.

$C \approx 23.55$ The circumference of the circle is about 23.55 centimeters.

EXAMPLE 2 **If the radius of a circle is 14 inches, what is its circumference?**

$C = 2\pi r$

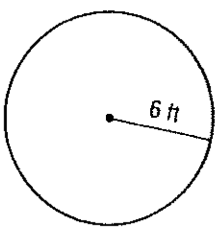
$C \approx 2 \times \frac{22}{7} \times 14$ Use $\frac{22}{7}$ for π.

$C \approx 88$ The circumference of the circle is about 88 inches.

EXERCISES

Find the circumference of each circle. Use 3.14 or $\frac{22}{7}$ for π. Round to the nearest tenth if necessary.

1.



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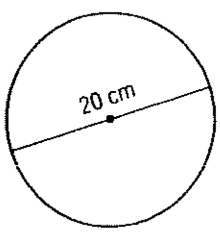

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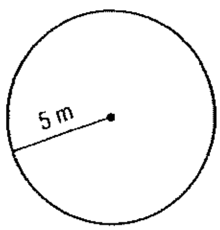

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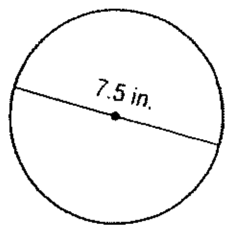


5. diameter = 15 km

6. radius = 21 mi

7. radius = 50 m

8. diameter = 600 ft

9. radius = 62 mm

10. diameter = 7 km

11. radius = 95 in.

12. diameter = 6.3 m

13. diameter = $5\frac{1}{4}$ cm

Lesson 6–9

NAME ______________ DATE ________ PERIOD ______

7-1 Study Guide and Intervention

Ratios

Any ratio can be written as a fraction. To write a ratio comparing measurements, such as units of length or units of time, both quantities must have the same unit of measure. Two ratios that have the same value are **equivalent ratios**.

EXAMPLE 1 **Write the ratio 15 to 9 as a fraction in simplest form.**

$15 \text{ to } 9 = \frac{15}{9}$ Write the ratio as a fraction

$= \frac{5}{3}$ Simplify.

Written as a fraction in simplest form, the ratio 15 to 9 is $\frac{5}{3}$.

EXAMPLE 2 **Write 40 centimeters to 2 meters as a fraction in simplest form.**

$\frac{40 \text{ centimeters}}{2 \text{ meters}} = \frac{40 \text{ centimeters}}{200 \text{ centimeters}}$ Convert 2 meters to centimeters.

$= \frac{\overset{1}{40} \text{ centimeters}}{\underset{5}{200} \text{ centimeters}}$ Divide by the GCF, 40 centimeters.

$= \frac{1}{5}$ Simplify.

EXERCISES

Write each ratio as a fraction in simplest form.

1. 30 to 12
2. 5:20
3. 49:42
4. 15 to 13
5. 28 feet:35 feet
6. 24 minutes to 18 minutes
7. 75 seconds:2 minutes
8. 12 feet:10 yards

Determine whether the ratios are equivalent. Explain.

9. $\frac{3}{4}$ and $\frac{12}{16}$
10. 12:17 and 10:15
11. $\frac{25}{35}$ and $\frac{10}{14}$
12. 2 lb:36 oz and 3 lb:44 oz
13. 3 ft:12 in. and 2 yd:2 ft

Lesson 7–1

7-2 Study Guide and Intervention

Rates

A ratio that compares two quantities with different kinds of units is called a **rate**. When a rate is simplified so that it has a denominator of 1 unit, it is called a **unit rate**.

EXAMPLE 1 DRIVING **Alita drove her car 78 miles and used 3 gallons of gas. What is the car's gas mileage in miles per gallon?**

Write the rate as a fraction. Then find an equivalent rate with a denominator of 1.

78 miles using 3 gallons $= \frac{78 \text{ mi}}{3 \text{ gal}}$ — Write the rate as a fraction.

$= \frac{78 \text{ mi} \div 3}{3 \text{ gal} \div 3}$ — Divide the numerator and the denominator by 3.

$= \frac{26 \text{ mi}}{1 \text{ gal}}$ — Simplify.

The car's gas mileage, or unit rate, is 26 miles per gallon.

EXAMPLE 2 SHOPPING **Joe has two different sizes of boxes of cereal from which to choose. The 12-ounce box costs $2.54, and the 18-ounce box costs $3.50. Which box costs less per ounce?**

Find the unit price, or the cost per ounce, of each box. Divide the price by the number of ounces.

12-ounce box	$2.54 ÷ 12 ounces ≈ $0.21 per ounce
18-ounce box	$3.50 ÷ 18 ounces ≈ $0.19 per ounce

The 18-ounce box costs less per ounce.

EXERCISES

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

1. 18 people in 3 vans

2. $156 for 3 books

3. 115 miles in 2 hours

4. 8 hits in 22 games

5. 65 miles in 2.7 gallons

6. 2,500 Calories in 24 hours

Choose the best unit price.

7. $12.95 for 3 pounds of nuts or $21.45 for 5 pounds of nuts

8. A 32-ounce bottle of apple juice for $2.50 or a 48-ounce bottle for $3.84.

NAME ______________________ DATE ____________ PERIOD _____

7-5 Study Guide and Intervention

Fractions, Decimals, and Percents

EXAMPLE 1 **Write $4\frac{3}{8}\%$ as a fraction in simplest form.**

$4\frac{3}{8}\% = \frac{4\frac{3}{8}}{100}$	Write a fraction.
$= 4\frac{3}{8} \div 100$	Divide.
$= \frac{35}{8} \div 100$	Write $4\frac{3}{8}$ as an improper fraction.
$= \frac{35}{8} \times \frac{1}{100}$	Multiply by the reciprocal of 100, which is $\frac{1}{100}$.
$= \frac{35}{800}$ or $\frac{7}{160}$	Simplify.

EXAMPLE 2 **Write $\frac{5}{16}$ as a percent.**

$\frac{5}{16} = \frac{n}{100}$	Write a proportion using $\frac{n}{100}$.
$500 = 16n$	Find the cross products.
$\frac{500}{16} = \frac{16n}{16}$	Divide each side by 16.
$31\frac{1}{4} = n$	Simplify.

So, $\frac{5}{16} = 31\frac{1}{4}\%$ or 31.25%.

EXERCISES

Write each percent as a fraction in simplest form.

1. 60%

2. $68\frac{3}{4}\%$

3. $27\frac{1}{2}\%$

4. 37.5%

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

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

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

7. $\frac{9}{16}$

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

NAME ______________ DATE ______ PERIOD ____

8-5 Study Guide and Intervention

Sales Tax and Discount

Lesson 8–5

Sales tax is a percent of the purchase price and is an amount paid in addition to the purchase price. **Discount** is the amount by which the regular price of an item is reduced.

EXAMPLE 1 SOCCER **Find the total price of a $17.75 soccer ball if the sales tax is 6%.**

Method 1

First, find the sales tax.

6% of $\$17.75 = 0.06 \cdot 17.75$

≈ 1.07

The sales tax is $1.07.

Next, add the sales tax to the regular price.

$1.07 + 17.75 = 18.82$

The total cost of the soccer ball is $18.82.

Method 2

$100\% + 6\% = 106\%$ Add the percent of tax to 100%.

The total cost is 106% of the regular price.

106% of $\$17.75 = 1.06 \cdot 17.75$

≈ 18.82

EXAMPLE 2 TENNIS **Find the price of a $69.50 tennis racket that is on sale for 20% off.**

First, find the amount of the discount d.

part = percent · base

$d = 0.2 \cdot 69.50$ Use the percent equation.

$d = 13.90$ The discount is $13.90.

So, the sale price of the tennis racket is $69.50 − $13.90 or $55.60.

EXERCISES

Find the total cost or sale price to the nearest cent.

1. $22.95 shirt; 7% sales tax

2. $39.00 jeans; 25% discount

3. $35 belt; 40% discount

4. $115.48 watch; 6% sales tax

5. $16.99 book; 5% off

6. $349 television; 6.5% sales tax

NAME ______________________ DATE __________ PERIOD ____

10-4 Study Guide and Intervention

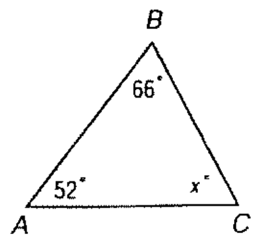
Triangles

A **triangle** is a figure with three sides and three angles. The sum of the measures of the angles of a triangle is 180°. You can use this to find a missing angle measure in a triangle.

EXAMPLE 1 **Find the value of x in $\triangle ABC$.**

$x + 66 + 52 = 180$	The sum of the measures is 180.
$x + 118 = 180$	Simplify.
$-118 \quad -118$	Subtract 118 from each side.
$x = 62$	

The missing angle is 62°.

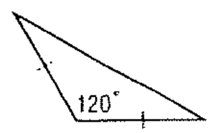


Triangles can be classified by the measures of their angles. An **acute triangle** has three acute angles. An **obtuse triangle** has one obtuse angle. A **right triangle** has one right angle.

Triangles can also be classified by the lengths of their sides. Sides that are the same length are **congruent segments** and are often marked by tick marks. In a **scalene triangle**, all sides have different lengths. An **isosceles** triangle has at least two congruent sides. An **equilateral triangle** has all three sides congruent.

EXAMPLE 2 **Classify the triangle by its angles and by its sides.**

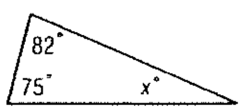
The triangle has one obtuse angle and two sides the same length. So, it is an obtuse, isosceles triangle.



EXERCISES

Find the missing measure in each triangle. Then classify the triangle as *acute*, *right*, or *obtuse*.

1.



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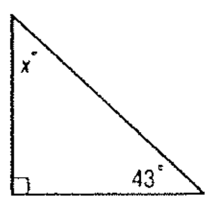

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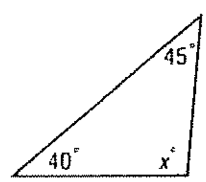
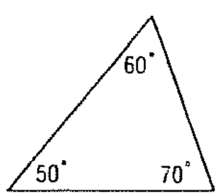
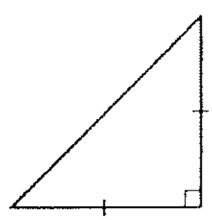


Classify each triangle by its angles and by its sides.

4.



5.



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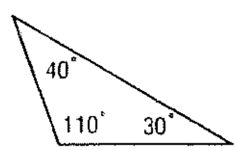
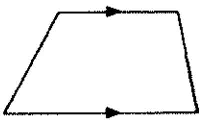
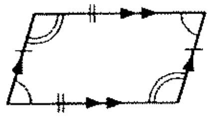
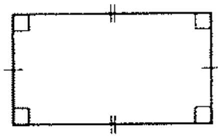
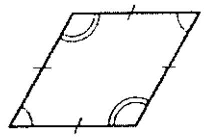
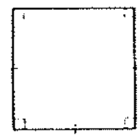


NAME ______________________ DATE ____________ PERIOD ____

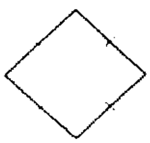
10-5 Study Guide and Intervention

Quadrilaterals

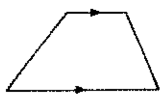
Quadrilaterals can be classified using their angles and sides. The best description of a quadrilateral is the one that is the most specific.

				
Trapezoid	**Parallelogram**	**Rectangle**	**Rhombus**	**Square**
quadrilateral with one pair of parallel sides	quadrilateral with opposite sides parallel and opposite sides congruent	parallelogram with 4 right angles	parallelogram with 4 congruent sides	parallelogram with 4 right angles and 4 congruent sides

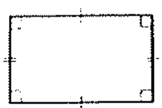
EXAMPLES **Classify the quadrilateral using the name that *best* describes it.**

1 

The quadrilateral is a parallelogram with 4 congruent sides. It is a rhombus.

2 

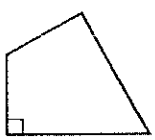
The quadrilateral has one pair of parallel sides. It is a trapezoid.

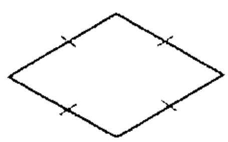
3 

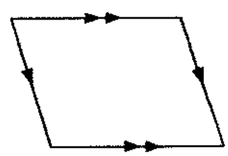
The quadrilateral is a parallelogram with 4 right angles. It is a rectangle.

EXERCISES

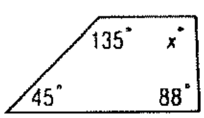
Classify the quadrilateral using the name that *best* describes it.

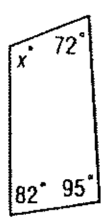
1. 

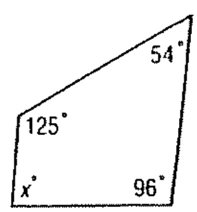
2. 

3. 

Find the missing measure in each quadrilateral.

4. 

5. 

6. 

Math Words

acute angle uh KYOOT ANG gul *(n)* An angle that measures less than 90 degrees.

addend AD end *(n)* Any of the numbers to be added in an addition problem.

addition uh DIHSH un *(n)* The operation of combining two or more addends to get the total number, or sum.

angle ANG gul *(n)* A figure formed by the meeting of two rays at an endpoint.

arc ahrk *(n)* A part of a circle.

area AIR ee uh *(n)* The number of square units within a plane figure.

associative property uh SOH shee ay tihv PRAHP ur tee *(n)* A rule stating that when the grouping of three or more addends or factors changes, the sum or the product remains the same.

average AV ur ij *(n)* The quotient found when the sum of a set of numbers is divided by the number of addends.

axis AK sihs *(n)* One of the perpendicular lines on a graph. The horizontal line is the *x* axis. The vertical line is the *y* axis.

calculator KAL kyuh lay tur *(n)* A device that performs mathematical computations.

Celsius scale SEL see uhs skayl *(n)* The metric temperature scale in which 0°C is the freezing point of water and 100°C is the boiling point.

centimeter SEN tuh mee tur *(n)* A metric unit of length equal to one hundredth of a meter.

chord kord *(n)* A straight line segment that connects two points on a circle.

circle SUR kul *(n)* A plane figure of which every point on the outside edge is the same distance from a center point.

circumference sur KUHM fur uns *(n)* The distance around the outside edge of a circle.

common divisor KAHM un dih VYE zur *(n)* A number that is a divisor of all the numbers in a given set.

common factor KAHM un FAK tur *(n)* A number that is a factor of all the numbers in a given set.

common multiple KAHM un MUHL tuh pul *(n)* A number that is a multiple of all the numbers in a given set.

commutative property KAHM yuh tay tihv PRAHP ur tee *(n)* A rule stating that when the order of two addends or factors changes, the sum or product remains the same.

compass KUHM pus *(n)* An instrument used to make circles or arcs.

composite number kum PAHZ iht NUHM bur *(n)* Any number that can be divided exactly by at least one number other than itself or 1.

cone kohn *(n)* A space figure that has a circular base and is pointed at the other end.

equivalent fractions ih KWIHV uh lunt FRAK shunz *(n)* Fractions that are the same amount.

estimate ES tuh mayt *(v)* To find an answer that is close to the exact answer.

even number EE vun NUHM bur *(n)* Any whole number that has 0, 2, 4, 6, or 8 in the ones place.

expanded form ihk SPAND ud form *(n)* A way to write numbers that shows the place value of each digit.

exponent ek SPOH nunt *(n)* A number or symbol written above and to the right of another number or symbol, telling how many times it is to be used as a factor.

face fays *(n)* The surface of one of the plane figures that make up a space figure.

factor FAK tur *(n)* One of two or more numbers that when multiplied together gives a product.

factor tree FAK tur tree *(n)* A picture to show the prime numbers of a composite number.

Fahrenheit scale FAR un hyt skayl *(n)* The customary temperature scale in which 32°F is the freezing point of water and 212°F is the boiling point.

foot fut *(n)* A customary unit of length equal to 12 inches.

fraction FRAK shun *(n)* A number that expresses a part of a whole.

gallon GAL lun *(n)* A customary unit of liquid measure equal to four quarts.

gram gram *(n)* The basic unit of weight in the metric system.

graph graf *(n)* A picture or chart that shows relationships between things.

greater than GRAY tur than *(n)* The relationship of one number being larger than another number.

greatest common factor (GCF) GRAY tihst KAHM un FAK tur *(n)* The greatest number that evenly divides into a given set of numbers.

hexagon HEK suh gahn *(n)* A polygon with six sides.

improper fraction ihm PRAHP ur FRAK shun *(n)* A fraction whose numerator is greater than or equal to the denominator.

inch ihnch *(n)* A customary unit of length equal to $\frac{1}{12}$ of a foot.

integer IHN tih jur *(n)* Any of the whole numbers or negative numbers, and zero.

interest IHN tur ihst *(n)* Payment for the use of borrowed money.

intersect ihn tur SEKT *(v)* To come together or cross.

isosceles triangle eye SAHS uh leez TRY ang gul *(n)* A triangle with at least two sides the same length and at least two angles the same measure.

multiplication muhl tuh plih KAY shun *(n)* The operation that is a short way of adding a number to itself a certain number of times.

multiplier MUHL tuh plye ur *(n)* A number by which another number is multiplied.

negative number NEG uh tihv NUHM bur *(n)* A number that is less than zero.

number line NUHM bur lyn *(n)* A line that shows numbers in order.

numeral NOO mur ul *(n)* A symbol representing a number.

numerator NOO muh ray tur *(n)* The number above the line in a fraction.

obtuse angle ahb TOOS ANG gul *(n)* An angle that measures more than 90 degrees but less than 180 degrees.

octagon AHK tuh gahn *(n)* A polygon with eight sides.

odd number ahd NUHM bur *(n)* Any whole number that has 1, 3, 5, 7, or 9 in the ones place.

ordinal number OR dn ul NUHM bur *(n)* A number that indicates order or position in a series.

origin OR uh jihn *(n)* The point at which two axes meet on a graph.

ounce ouns *(n)* A customary unit of weight equal to $\frac{1}{16}$ of a pound.

parallel lines PAR uh lel lynz *(n)* Two lines that lie in the same plane but do not intersect.

parallelogram par uh LEL uh gram *(n)* A quadrilateral with two pairs of parallel sides.

pentagon PEN tuh gahn *(n)* A polygon with five sides.

percent pur SENT *(n)* Out of each hundred.

perimeter puh RIHM ih tur *(n)* The distance around a figure.

perpendicular lines per pun DIHK yuh lur lynz *(n)* Two lines that intersect at right angles.

pint pynt *(n)* A customary unit of liquid measure equal to two cups.

place value plays VAL yoo *(n)* The value given to the place a digit occupies in a number.

plane figure playn FIHG yur *(n)* A figure that lies on a flat surface.

polygon PAHL ee gahn *(n)* A closed plane figure formed by line segments.

pound pound *(n)* A customary unit of weight equal to 16 ounces.

prime factorization prym fak tur ih ZAY shun *(n)* Writing a composite number as the product of prime numbers.

prime number prym NUHM bur *(n)* A whole number that cannot be divided without a remainder by any number other than itself and 1.

principal PRIHN suh pul *(n)* An amount of money on which interest is paid.

space figure spays FIHG yur *(n)* A figure that has volume.

sphere sfihr *(n)* A space figure in which all the points on the surface are the same distance from a center point.

square skwair *(n)* A quadrilateral with four right angles and all sides the same length.

square measure skwair MEZH ur *(n)* A unit used to measure area.

subtraction sub TRAK shun *(n)* The operation of finding how many are left when one number is taken away from another number.

subtrahend SUHB truh hend *(n)* The number to be subtracted from another number.

sum suhm *(n)* The number obtained by adding two or more numbers together.

symmetry SIHM ih tree *(n)* An exact matching in size, shape, and position of parts that are on opposite sides of a dividing line or center.

ton tuhn *(n)* A customary unit of weight equal to 2,000 pounds.

trapezoid TRAP ih zoid *(n)* A quadrilateral having one pair of parallel sides.

triangle TRY ang gul *(n)* A polygon with three sides.

unit YOO niht *(n)* An amount or quantity used as a standard of measurement.

vertex VUR teks *(n)* The point at which the rays of an angle intersect.

volume VAHL yoom *(n)* The measure of units of space occupied by a space figure.

whole number hohl NUHM bur *(n)* A number that tells how many complete units there are, such as the numbers 0, 1, 2, 3, 4, and so on.

yard yahrd *(n)* A customary unit of length equal to three feet.

ADDITIONAL WORDS