

Grade 4 Curriculum Overview

Operations and Algebraic Thinking

- Solve equations using the four operations with a letter representing the unknown quantity.
- Find factors for given numbers (e.g. Circle all the factors of 12).
- Determine multiples (e.g. Is 20 a multiple of 4?).
- Determine whether a number is a prime number or a composite number.
- Determine the order of operations in a word problem.
- Determine which of the four operations to use in a number problem.
- Extend numbers patterns and state the rule.
- Multiply two-digit numbers by one-digit numbers using the distributive property.

Numbers and Operations in Base Ten

- Compare place value.
- Rewrite numbers using expanded form.
- Compare the place value of multi-digit whole numbers using symbols for greater than, less than or equal to.
- Round multi-digit whole numbers to any place.
- Use rectangular array to find the missing multiplicand and the multiplier.
- Multiply up to a five-digit number by up to a two-digit number.
- Multiply by 1 and 0 and divide by 1.
- Solve multiplication problems using models (e.g. $4 \times 3 = 3$ sets of 4).
- Multiply two-digit numbers by a one-digit number using the distributive property.
- Divide up to a three-digit number by up to a two-digit number.
- Add and subtract with five-digit numbers both horizontally and vertically.
- Find a reasonable solution.
- Convert written multiples of 10 to numerals (e.g. 10 thousands = 10,000).
- Use expanded notation (e.g. $5815 = 5000 + 800 + 10 + 5$).
- Complete fact families using the inverse relationships of: multiplication and division, addition and subtraction.
- Read numbers and identify place value up to the million's place.
- Place positive and negative numbers on a number line.
- Convert number words to numerals and numerals to number words.
- Show different equivalencies of numbers (e.g., $2 \times 3 \times 2 = 6 \times 2$).
- Solve word problems, including mental math problems, using all four operations.
- Estimate numbers using terms like *closer to* and *between*.
- Find the average of three numbers.
- Identify 10 more and 10 less than a given number.
- Determine the decimal and percent equivalence of $1/4$, $1/2$, $1/10$, $1/100$.
- Compare and order decimals to two decimal places.
- Compare decimals using symbols for greater than, less than or equal to.
- Round decimals to nearest tenth and whole.
- Add and subtract decimals to two places.
- Solve problems using percentages.
- Identify prime numbers.

Numbers and Operations – Fractions

- Decompose a fraction into a sum of fractions (e.g. $5/6 = 1/6 + 1/6 + 1/6 + 1/6 + 1/6$).
- Add and subtract mixed numbers with like denominators.
- Solve addition and subtraction word problems involving fractions.
- Multiply a fraction by a whole number (e.g. $3/2 = 1/2 \times 3$).
- Solve word problems using multiplication of a fraction by a whole number.
- Rewrite fractions into decimals; rewrite decimals into fractions.
- Identify fractions using circle graph models.
- Compare and order fractions (mixed and improper fractions) with and without a number line.

- Compare fractions with like and unlike denominators.
- Convert improper fractions to mixed numbers (e.g. $\frac{4}{3} = 1 \frac{1}{3}$).
- Determine equivalent fractions (e.g. $\frac{1}{2} = \frac{2}{4} = \frac{10}{20}$).
- Reduce fractions.
- Order both fractions and decimals on a number line.

Measurement and Data

- Convert within a system of measurement (e.g. 3 feet in a yard).
- Determine the appropriate unit of measurement to use (e.g. kilometers to measure distance).
- Solve problems involving time, volume, distance and money using simple fractions and decimals.
- Find the area and perimeter of a rectangle.
- Find the unknown factor of a rectangle given the area and length.
- Compare lengths of objects on a fraction number line involving fractions $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$.
- Given the measurement of an angle in a circle, determine the unknown angle.
- Identify right, acute and obtuse angles.
- Match angles to their corresponding fractions within a circle (e.g. 90 degree angle = $\frac{1}{4}$).
- Identify perpendicular, parallel and intersecting lines.
- Identify angles (right, acute, obtuse).
- Identify the radius and diameter of a circle.
- Identify trapezoid, pentagon, octagon, rhombus and triangular prism.
- Identify the corner, edge, and face of a three-dimensional object.
- Identify triangles by their angles (e.g. right triangle has one angle that equals 90 degrees).
- Identify the attributes of scalene, isosceles and equilateral triangles.
- Use ordered pairs to locate points on a grid.
- Identify congruent and similar shapes.
- Match the fraction with the degree of a turn (e.g. $\frac{1}{2}$ turn = 180 degrees).
- Compare two rectangles that have the same area but different perimeters, and vice versa.

Statistics, Data Analysis and Probability

- Interpret information on a graph (bar, circle and line).
- Interpret Venn diagrams.
- Make a tally chart using given information.
- Transfer information on a graph to a chart.
- Determine the likelihood of an event using 0 for impossible and 1 for certain.
- Determine probability given data (e.g. probability of picking a red marble in a bag of marbles).
- Determine events using terms: likely, more likely, equally likely, certain or impossible.
- Express outcomes of probability (e.g. 3 out of 8 or $\frac{3}{8}$).
- Find the median, mode, mean and range of a given set of numbers.

Mathematical Reasoning and Problem Solving

- Determine which piece of information is missing or irrelevant in solving a word problem.
- Determine the reasonableness of the solution to a problem.
- Determine whether an exact or an approximate solution is needed to solve a problem.
- Count the number of possible combinations using four different sets.

Extras: Fraction Cut-Outs, Fraction Puzzles, Hundred Chart, and Math Facts Sharpener Review Sheets

IMPORTANT!

Instructions for Parents

- To use Summer Math Skills Sharpener, simply tear off a page and have your child complete it. The book is designed to be used 3-4 days per week for 10 weeks.
- Our math books now support the Common Core Curriculum and the Standards of all 50 states. Therefore, some materials may not have been presented to your child. **Please allow your child to skip concepts not yet learned. Introduce new concepts only if your child shows readiness.**
- Check answers immediately for optimal feedback. Solution pages are provided at the back of the book. (**Solution pages represent only ONE method of solving each problem.**) A Lesson Tracker has been included for your convenience.
- “Help Pages” have been added at the front of the book to clarify certain concepts and represent only one way to solve problems.
- Allow your child to use a calculator only for those problems marked “Calculator Skill.”
- When solving division problems, students should use remainders when necessary.
- The problems labeled “Hundred Chart” are to be used with the chart at the back of the book. Your child may use beans, buttons, coins, etc. for markers.
- “Math Fact Sharpener” pages are located at the back of the book. Have your child complete one side of each of the five pages weekly.
- When solving fraction problems, students should reduce answers to the lowest possible terms.
- The problems labeled “Hands on Fraction” may be solved with the help of the “Fraction Cut-Outs” at the back of the book. Save them to use throughout the book. For example, with unlike denominators:
$$\frac{1}{4} + \frac{3}{8}$$
: Trade the $\frac{1}{4}$ piece for two $\frac{1}{8}$ pieces and add.
- Two “Fraction Fun Puzzle” pages are located at the back of the book and may be completed at any time.
- A “Glossary of Terms” and a “Table of Measurements” are at the back of the book.
- Adjust the program to vacations, etc. Presentation of mixed concepts on every page ensures that all skills are reinforced; therefore, pages may be completed in any order.
- If your child experiences difficulty with concepts that have been already taught, address the problem with his or her teacher in the fall; more consistent problems indicate that a tutor may be needed.

We appreciate your comments. Please send in the enclosed evaluation page before November 1st, after you child has returned to school in the fall and you are able to determine the success of the Summer Math Skills Sharpener.

MULTIPLES

To find the *multiples* of a number, multiply the number by other whole numbers. The list is infinite.

Example:

$3 \times 1 =$	<u>3</u>	} Multiples of 3.
$3 \times 2 =$	<u>6</u>	
$3 \times 3 =$	<u>9</u>	
$3 \times 4 =$	<u>12</u>	

and so on

Some numbers share some of the same multiples. Those multiples are known as *common multiples*.

Example:	Multiples of 2	Multiples of 3
	$2 \times 1 =$ <u>2</u>	$3 \times 1 =$ <u>3</u>
	$2 \times 2 =$ <u>4</u>	$3 \times 2 =$ <u>6</u>
	$2 \times 3 =$ <u>6</u>	$3 \times 3 =$ <u>9</u>

6 is a common multiple of 2 and 3

If we were to look for more *multiples* of 2 and 3, we could go on forever. Usually, we try to find the *least common multiple* (LCM) or the lowest number in value that is common to both.

Example: Find the LCM of 2 and 3.

Multiples of 2	Multiples of 3
$2 \times 1 =$ <u>2</u>	$3 \times 1 =$ <u>3</u>
$2 \times 2 =$ <u>4</u>	$3 \times 2 =$ <u>6</u>
$2 \times 3 =$ <u>6</u>	$3 \times 3 =$ <u>9</u>
$2 \times 4 =$ <u>8</u>	$3 \times 4 =$ <u>12</u>
$2 \times 5 =$ <u>10</u>	$3 \times 5 =$ <u>15</u>

The *least common multiple* (LCM) is 6 because it is the lowest number in value of all the multiples of 2 and 3.

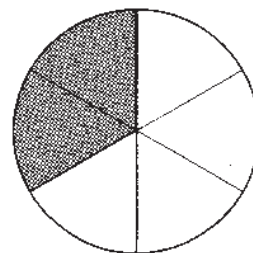
1. a.
$$\begin{array}{r} 827 \\ \times \quad 3 \\ \hline \end{array}$$

b. Find the quotient: $9 \overline{)546}$

2. $\frac{2}{6}$ of this circle is shaded.

a. What fraction is not shaded? _____

b. Is the shaded area equal to $\frac{1}{2}$? _____



3.  $\times 30 =$ _____

4. A soup recipe calls for 4 cups of water. Express what part of a gallon this is in decimal form. _____

5. Problem solving: We are two numbers. Our sum is 12. The difference between us is 8. What 2 numbers are we?

_____ + _____ = 12 _____ - _____ = 8

6. Hands on fraction: Fill in the missing sign: < or >

$$\frac{5}{8} - \frac{2}{8} \quad \square \quad \frac{3}{4} - \frac{1}{4}$$

7. Ella's backyard is 1,188 square feet. The length of her yard is 54 feet. What is its width? _____

8. Estimate the quotient by rounding to the nearest dollar:

a. $\$31.78 \div 4 =$ _____

b. $\$20.16 \div 5 =$ _____

9. Underline the composite numbers. Circle the prime numbers:

3 7 9 11 13 16 19 21

10. Order these decimals from least to greatest:

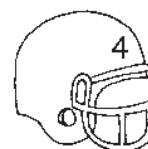
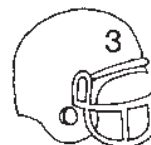
.50

.3

.03

.05

11. Four teams all want to play each other during the season. How many games in all will be played if they play each other only once? _____



12. a. $1\frac{3}{4}$
+ $\frac{3}{4}$

b. $1\frac{5}{8}$
+ $\frac{7}{8}$

13. Does a garden plot that measures 45 feet by 20 feet have the same perimeter as one that measures 15 feet by 55 feet?



1. a.
$$\begin{array}{r} 6,623 \\ - 3,596 \\ \hline \end{array}$$

b. $1,354 + 6,976 = \underline{\hspace{2cm}}$

2. Beverly bought 2 dozen cupcakes for her softball team. There are nine girls on the team. How many cupcakes will each girl receive? Will Beverly have any left over?

3. a.
$$\begin{array}{r} 916 \\ \times 10 \\ \hline \end{array}$$

b. $90 \overline{)540}$



4. This is how you would write the number 3,681 in expanded form:
 $(3 \times 1000) + (6 \times 100) + (8 \times 10) + (1 \times 1)$

Write 4,905 in expanded form:

 + + + = 4,687

5. Change these decimals to fractions. Example: $.5 = \frac{1}{2}$

a. $.25 = \underline{\hspace{2cm}}$

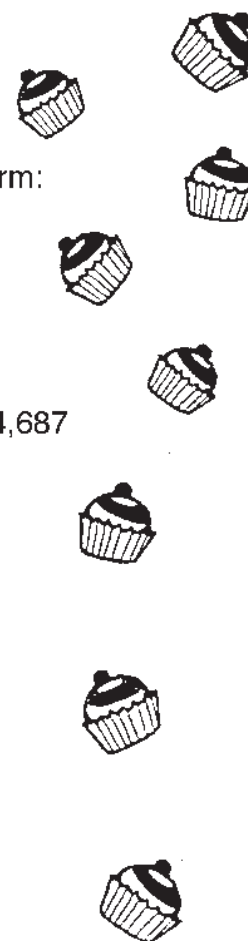
b. $.8 = \underline{\hspace{2cm}}$

6. The addition sign is missing. Where does it belong?

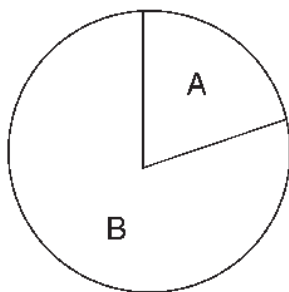
$2442 = 286 \underline{\hspace{2cm}}$

7. Look at this number: 6,657,381 and fill in the blank below:

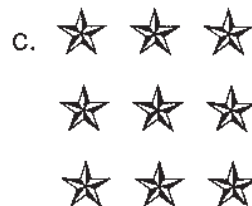
The "6" with the larger value is worth times
 more than the "6" with the smaller value.



8.

Angle B is 275° . What is angle A? _____

9. Which picture has an odd number of stars? _____



10. Circle which is larger:

14 quarts

3 gallons



11. In baseball all four bases are 90 feet apart. How far would you run if you hit a "double" (2 bases)? _____ How about a home run (4 bases)? _____

12. Which decimal equals the fraction $\frac{1}{2}$? .8 .5 .4 _____

13. Match the fraction on the left with an equivalent (equal) fraction on the right:

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

$$\frac{3}{9}$$

$$1\frac{1}{2}$$

$$\frac{14}{12}$$

$$\frac{1}{3}$$

$$\frac{6}{8}$$

$$\frac{7}{6}$$

$$\frac{3}{2}$$

Lesson #31

1. **2,567,943**

- a. What number is in the **hundred thousands** place? _____
- b. What number is in the **millions** place? _____
- c. What number is in the **ten thousands** place? _____

2. Put these decimals in order from **least** to **greatest**:

3.86	3.08	3.06	3.68
_____	_____	_____	_____

3. Match the number on the left to its equivalent **decimal**:

- | | | |
|----|---------------|------|
| a. | $\frac{1}{2}$ | 1.00 |
| b. | $\frac{1}{4}$ | .50 |
| c. | $\frac{3}{4}$ | .25 |
| d. | 1 | .75 |

4. Fill in these **improper fractions** on the number line below: $\frac{9}{3}$, $\frac{3}{2}$, $\frac{8}{4}$



5. Circle all of the **prime numbers**:

3 6 7 10 11

6. You have \$10.00. You buy 3 sodas for \$1.75 each. To find out how much money you will have left you would:

- a. Multiply first, then subtract b. Subtract first, then multiply

Lesson #31 continued

7. a. Which figure shows **perpendicular** lines? _____
 b. Which figure shows **parallel** lines? _____
 c. In which figure do the lines **intersect**? _____



Figure 1

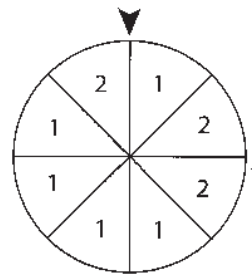


Figure 2

8. Would 40,000 be a **reasonable estimate** for $20,106 \times 2$? _____

9. If you spin this number wheel the **probability** that the arrow will point to a 2 is 3 out of 8 or $\frac{3}{8}$. What is the probability that the arrow will point to a 1?

_____ out of _____ or _____



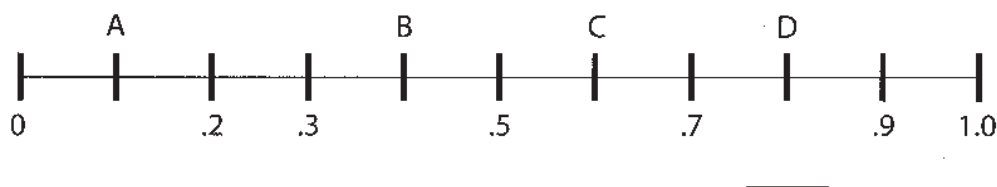
10. Which number represents 10 degrees below zero Farenheit?

10°F or **-10°F**

11. Decide whether you would need an **exact** or **estimated** measurement.

- a. The number of cookies for the school picnic _____
 b. The amount of medicine to take for an illness _____

12. Fill in these fractions on the number line below: $\frac{1}{10}$ $\frac{8}{10}$ $\frac{6}{10}$ $\frac{4}{10}$



HUNDRED CHART

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Math Facts Sharpener • Grades 3 and 4

$$\begin{array}{r} 2 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 1 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 9 \\ \hline \end{array}$$

WHOLE

$$\frac{1}{2}$$

$$\frac{1}{2}$$

$$\frac{1}{4}$$

$$\frac{1}{4}$$

$$\frac{1}{4}$$

$$\frac{1}{4}$$

$$\frac{1}{4}$$

$$\frac{1}{4}$$

$$\frac{1}{4}$$

$$\frac{1}{4}$$

FRACTION CUT-OUTS

$$\frac{1}{8}$$

$$\frac{1}{8}$$

$$\frac{1}{8}$$

$$\frac{1}{8}$$

$$\frac{1}{8}$$

$$\frac{1}{8}$$

$$\frac{1}{8}$$

$$\frac{1}{8}$$

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$$\frac{1}{8}$$

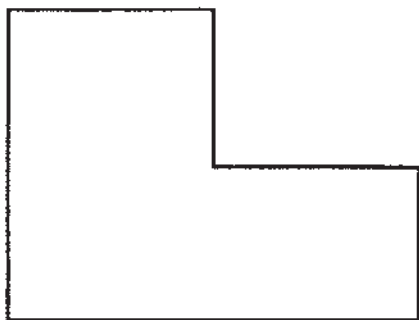
$$\frac{1}{8}$$

$$\frac{1}{8}$$

Fraction Fun Puzzles

Use your fraction cut-outs to help you solve these puzzles.
The answers are on the back of this page.

I. Cover this shape using only 2 pieces.

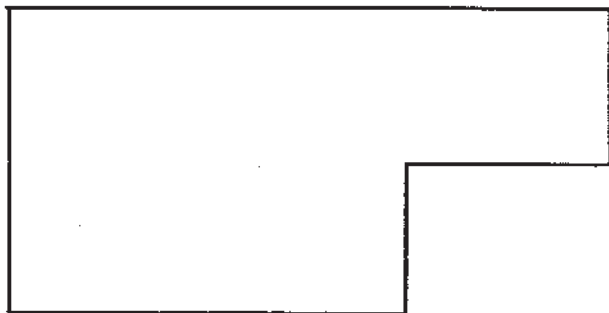


A. $\frac{\quad}{\quad} + \frac{\quad}{\quad}$

Now use 3 pieces

B. $\frac{\quad}{\quad} + \frac{\quad}{\quad} + \frac{\quad}{\quad}$

II. Cover this shape using only 2 pieces.



A. $\frac{\quad}{\quad} + \frac{\quad}{\quad}$

Now use only 3 pieces.

B. $\frac{\quad}{\quad} + \frac{\quad}{\quad} + \frac{\quad}{\quad}$

The Metric Units

Temperature - Celsius

0°C: the freezing point of water
37°C: the normal body temperature
100°C: the boiling point of water

Mass

1000 milligrams (mg) = 1 gram
1000 grams = 1 kilogram (kg)
1000 kilograms = 1 metric ton (t)

Capacity

1000 milliliters (mL) = 1 liter (L)
1000 liters = 1 kiloliter (kL)

Length

10 millimeters (mm) = 1 centimeter
10 centimeters (cm) = 1 decimeter
1000 millimeters (mm) = 1 meter (m)
100 centimeters = 1 meter (m)
10 decimeters (dm) = 1 meter
1000 meters (m) = 1 kilometer (km)

The Customary Units

Temperature - Fahrenheit

32°F: the freezing point of water
98.6°F: the normal body temperature
212°F: the boiling point of water

Weight

1 pound (lb) = 16 ounces (oz)
1 ton = 2,000 pounds

Time

1 minute (min) = 60 seconds (s)
1 hour = 60 minutes
1 day = 24 hours
1 week = 7 days
1 month (mo) = approx. 4 weeks
1 year (yr) = 365 days
52 weeks
12 months
1 decade = 10 years
1 century = 100 years

Capacity

1 cup (c) = 8 fluid ounces (fl oz)
1 pint (pt) = 16 fluid ounces
2 cups
1 quart (qt) = 32 fluid ounces
4 cups
2 pints
1 gallon (gal) = 128 fluid ounces
16 cups
8 pints
4 quarts

Length

1 foot (ft) = 12 inches (in)
1 yard (yd) = 36 inches
3 feet
1 mile (mi) = 5,280 feet
1,760 yards

GLOSSARY OF TERMS AND FORMULAS

a.m.: a way of expressing time between 12:00 midnight and 12:00 noon.

acute angle: an angle measuring less than 90 degrees.

addends: numbers to be added together in an addition problem.

algebraic expression: an expression that uses at least one letter to represent a number.

angle: the measured space between two lines that meet at one point.

area: the measure of a region in square units.

Formulas:

Quadrilateral: $A = \text{length} \times \text{width}$

Triangle: $A = \frac{1}{2} \times \text{base} \times \text{height}$

Circle: $A = \pi r^2$

$\pi \approx 3.14$

$r = \text{radius}$

average: a number obtained by adding a group of numbers together and dividing by the number of addends.

center: the point from which all points on a circle are equally distant.

circle: a closed, curved line. Each point on the circle is the same distance from the center of the circle.

circumference: the distance around a circle.

Formula: $c = 2 \pi r$ $r = \text{radius}$ $\pi \approx 3.14$

common denominator: a multiple of all denominators in a problem.

common factor: a number that is a factor of two other numbers is a common factor.

Example: 3 is a common factor of 9 and 12.

common multiple: a number that is a multiple of two other numbers.

Example: 24 is a common multiple of 6 and 4.

complementary angle: the number in degrees given to an angle that when added to another angle will give 90 degrees.

congruent: being the same.

coordinates: number pairs used in graphing. The horizontal axis is listed first and the vertical axis is listed second.

Example: 8, 10

customary measurement: units of measurement used in the United States.

Example: feet, pounds, miles, etc.

decade: a period of 10 years.

decimal point: a period put just before the decimal fraction such as the periods in .625 and .08

degree: a unit used to measure an angle or temperature.

