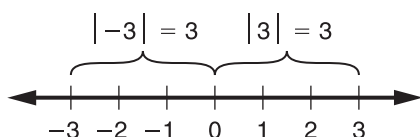


# Glossary

This glossary contains words and phrases from *First* through *Third Grade Everyday Mathematics*. To place the definitions in broader mathematical contexts, most entries also refer to sections in this *Teacher's Reference Manual*. In a definition, terms in *italics* are defined elsewhere in the glossary.

## A

**absolute value** The distance between a number and 0 on a *number line*. The absolute value of a positive number is the number itself, and the absolute value of a negative number is the *opposite* of the number. The absolute value of 0 is 0. The symbol for the absolute value of  $n$  is  $|n|$ .



**accurate** As correct as possible according to an accepted standard. For example, an accurate measure or count is one with little or no error. See *precise* and Section 16.2: Approximation and Rounding.

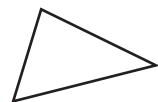
**acre** A U.S. customary unit of *area* equal to 43,560 square feet. An acre is roughly the size of a football field. A square mile is 640 acres. See the Tables of Measures and Section 14.4: Area.

**acute angle** An *angle* with a measure less than  $90^\circ$ . See Section 13.4.1: Angles and Rotations.



Acute angles

**acute triangle** A *triangle* with three acute angles. See Section 13.4.2: Polygons ( $n$ -gons).



An acute triangle

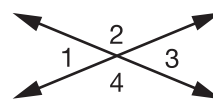
**addend** Any one of a set of numbers that are added. For example, in  $5 + 3 + 1$ , the addends are 5, 3, and 1.

**addition fact** Two 1-digit numbers and their sum, such as  $9 + 7 = 16$ . See *arithmetic facts* and Section 16.3.3: Fact Practice.

**addition/subtraction use class** In *Everyday Mathematics*, situations in which addition or subtraction is used. These include *parts-and-total*, *change*, and *comparison* situations. See Section 10.2.1: Addition and Subtraction Use Classes.

**additive inverses** Two numbers whose sum is 0. Each number is called the additive inverse, or *opposite*, of the other. For example, 3 and  $-3$  are additive inverses because  $3 + (-3) = 0$ .

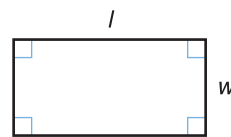
**adjacent angles** Two *angles* with a common *side* and *vertex* that do not otherwise overlap.



Angles 1 and 2, 2 and 3, 3 and 4, and 4 and 1 are pairs of adjacent angles.

**adjacent sides** Same as *consecutive sides*.

**algebra** (1) The use of letters of the alphabet to represent numbers in *equations*, *formulas*, and rules. (2) A set of rules and properties for a number system. (3) A school subject, usually first studied in eighth or ninth grade. See Section 17.2: Algebra and Uses of Variables.



$$\text{Area} = \text{length} \times \text{width}$$

$$A = l \times w$$

$$4 + x = 10$$

$$4 + ? = 10$$

$$4 + \underline{\quad} = 10$$

$$4 + \square = 10$$

$$a + b = b + a$$

$$a(b + c) = ab + ac$$

Formulas, equations, and properties using algebra

**algebraic expression** An *expression* that contains a *variable*. For example, if Maria is 2 inches taller than Joe and if the variable  $M$  represents Maria's height, then the algebraic expression  $M - 2$  represents Joe's height. See *algebra* and Section 17.2: Algebra and Uses of Variables.

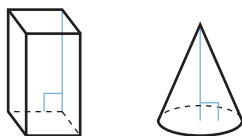
**algebraic order of operations** Same as *order of operations*.

**algorithm** A set of step-by-step instructions for doing something, such as carrying out a computation or solving a problem. The most common algorithms are those for basic arithmetic computation, but there are many others. Some mathematicians and many computer scientists spend a great deal of time trying to find more efficient algorithms for solving problems. See Chapter 11: Algorithms.

**altitude** (1) In *Everyday Mathematics*, same as *height* of a figure. (2) Distance above sea level. Same as *elevation*.



Altitudes of 2-D figures are shown in blue.



Altitudes of 3-D figures are shown in blue.

**A.M.** The abbreviation for *ante meridiem*, meaning “before the middle of the day” in Latin. From midnight to noon.

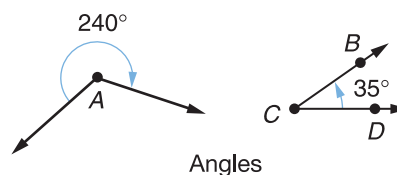
**analog clock** (1) A clock that shows the time by the positions of the hour and minute hands. (2) Any device that shows time passing in a continuous manner, such as a sundial. Compare to *digital clock*. See Section 15.2.1: Clocks.



An analog clock

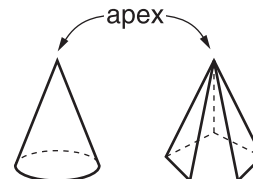
**-angle** A suffix meaning *angle*, or corner.

**angle** A figure formed by two *rays* or two *line segments* with a common *endpoint* called the *vertex* of the angle. The rays or segments are called the *sides* of the angle. An angle is measured in degrees between 0 and 360. One side of an angle is the *rotation* image of the other side through a number of degrees. Angles are named after their vertex point alone as in  $\angle A$  below; or by three points, one on each side and the vertex in the middle as in  $\angle BCD$  below. See *acute angle*, *obtuse angle*, *reflex angle*, *right angle*, *straight angle*, and Section 13.4.1: Angles and Rotations.



Angles

**apex** In a *pyramid* or *cone*, the *vertex* opposite the *base*. In a pyramid, all the nonbase faces meet at the apex. See Section 13.5.2: Polyhedrons and Section 13.5.3: Solids with Curved Surfaces.



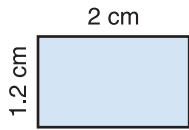
**approximately equal to ( $\approx$ )** A symbol indicating an *estimate* or approximation to an exact value. For example,  $\pi \approx 3.14$ . See Section 16.2: Approximation and Rounding.

**arc of a circle** A part of a *circle* between and including two *endpoints* on the circle. For example, the endpoints of the *diameter* of a circle define an arc called a *semicircle*. An arc is named by its endpoints.



Arcs

**area** The amount of *surface* inside a *2-dimensional figure*. The figure might be a triangle or rectangle in a plane, the curved surface of a cylinder, or a state or country on Earth's surface. Commonly, area is measured in *square units* such as square miles, square inches, or square centimeters. See Section 14.4: Area.



A rectangle with area  $1.2 \text{ cm} \times 2 \text{ cm} = 2.4 \text{ cm}^2$

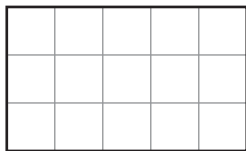


A triangle with area 21 square units



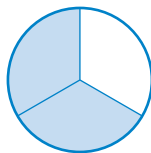
The area of the United States is about 3,800,000 square miles.

**area model** (1) A model for multiplication in which the *length* and *width* of a *rectangle* represent the *factors*, and the *area* of the rectangle represents the *product*. See Section 10.2.2: Multiplication and Division Use Classes.



Area model for  $3 \times 5 = 15$

(2) A model showing fractions as parts of a whole. The *whole* is a region, such as a circle or a rectangle, representing the *ONE*, or *unit whole*. See Section 9.3.2: Uses of Fractions.



Area model for  $\frac{2}{3}$

**arithmetic facts** The addition facts (whole-number *addends* 9 or less); their inverse subtraction facts; multiplication facts (whole-number *factors* 9 or less); and their inverse division facts, except there is no division by zero. There are

100 addition facts:  $0 + 0 = 0$  through  $9 + 9 = 18$

100 subtraction facts:  $0 - 0 = 0$  through  $18 - 9 = 9$

100 multiplication facts:  $0 \times 0 = 0$  through  $9 \times 9 = 81$

90 division facts:  $0 \div 1 = 0$  through  $81 \div 9 = 9$

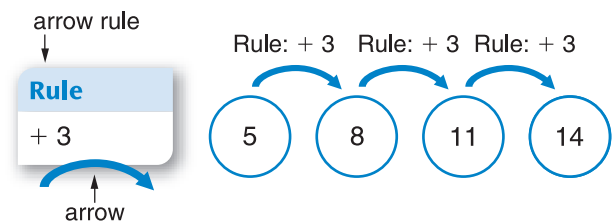
See *extended facts*, *fact extensions*, *fact power*, and Section 16.3.2: Basic Facts and Fact Power.

**arm span** Same as *fathom*.

**array** (1) An arrangement of objects in a regular *pattern*, usually rows and columns. (2) A *rectangular array*. In *Everyday Mathematics*, an array is a rectangular array unless specified otherwise. See Section 10.2.2: Multiplication and Division Use Classes and Section 14.4: Area.

**arrow rule** In *Everyday Mathematics*, an operation that determines the number that goes into the next frame in a *Frames-and-Arrows* diagram. There may be more than one arrow rule per diagram. See Section 17.1.4: Functions.

**arrows** In *Everyday Mathematics*, the links representing the *arrow rule(s)* in a *Frames-and-Arrows* diagram. See Section 17.1.4: Functions.



**Associative Property of Addition** A property of addition that three numbers can be added in any order without changing the sum. For example,  $(4 + 3) + 7 = 4 + (3 + 7)$  because  $7 + 7 = 4 + 10$ .

In symbols:

For any numbers  $a$ ,  $b$ , and  $c$ ,

$$(a + b) + c = a + (b + c).$$

Subtraction is not associative. For example,  $(4 - 3) + 7 \neq 4 - (3 + 7)$  because  $8 \neq -6$ .

**Associative Property of Multiplication** A property of multiplication that three numbers can be multiplied in any order without changing the product. For example,  $(4 \times 3) \times 7 = 4 \times (3 \times 7)$  because  $12 \times 7 = 4 \times 21$ .

In symbols:

For any numbers  $a$ ,  $b$ , and  $c$ ,  
 $(a \times b) \times c = a \times (b \times c)$ .

Division is not associative. For example,  $(8 \div 2) \div 4 \neq 8 \div (2 \div 4)$  because  $1 \neq 16$ .

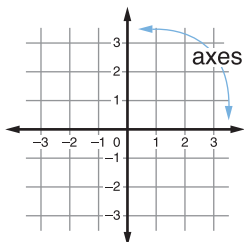
**attribute** A feature of an object or common feature of a set of objects. Examples of attributes include size, shape, color, and number of sides. Same as *property*.

**attribute blocks** A set of blocks in which each block has one each of four *attributes* including color, size, thickness, and shape. The blocks are used for attribute identification and sorting activities. Compare to *pattern blocks*.

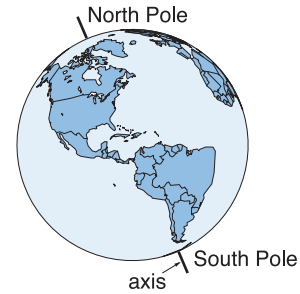
**autumnal equinox** The first day of autumn, when the sun crosses the plane of Earth's equator and day and night are about 12 hours each. "Equinox" is from the Latin *aequi-* meaning "equal" and *nox* meaning "night." Compare to *vernal equinox*.

**average** A typical value for a set of numbers. In everyday life, average usually refers to the *mean* of the set, found by adding all the numbers and dividing the sum by the number of numbers. In statistics, several different averages, or *landmarks*, are defined, including *mean*, *median*, and *mode*. See Section 12.2.4: Data Analysis.

**axis of a coordinate grid** Either of the two *number lines* used to form a *coordinate grid*. Plural is axes. See Section 15.3: Coordinate Systems.



**axis of rotation** A line about which a solid figure rotates.

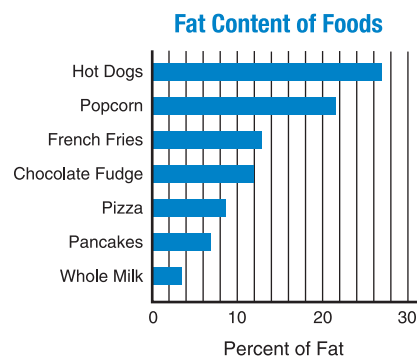
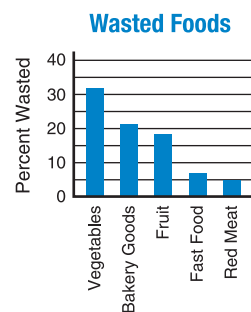


## B

**ballpark estimate** A rough *estimate*; "in the ballpark." A ballpark estimate can serve as a check of the reasonableness of an answer obtained through some other procedure, or it can be made when an exact value is unnecessary or impossible to obtain. See Section 16.1: Estimation.

**bank draft** A written order for the exchange of money. For example, \$1,000 bills are no longer printed so \$1,000 bank drafts are issued. People can exchange \$1,000 bank drafts for smaller bills, perhaps ten \$100 bills.

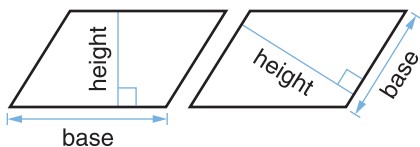
**bar graph** A graph with horizontal or vertical bars that represent data. See Section 12.2.3: Organizing and Displaying Data.



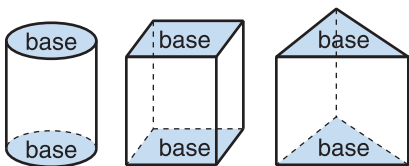
**base (in exponential notation)** A number that is raised to a *power*. For example, the base in  $5^3$  is 5. See *exponential notation* and Section 10.1.1: Arithmetic Symbols.

**base of a number system** The foundation number for a *numeration* system. For example, our usual way of writing numbers uses a *base-10 place-value* system. In programming computers or other digital devices, bases of 2, 8, 16, or other powers of 2 are more common than base 10. See Section 9.2.1: Numeration and Place Value.

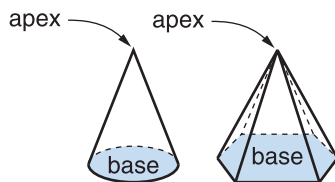
**base of a parallelogram** (1) The side of a *parallelogram* to which an *altitude* is drawn. (2) The length of this side. The area of a parallelogram is the base times the *altitude* or height perpendicular to it. See *height of a parallelogram* and Section 13.4.2: Polygons (*n*-gons).



**base of a prism or cylinder** Either of the two parallel and congruent *faces* that define the shape of a *prism* or *cylinder*. In a cylinder, the base is a circle. See *height of a prism or cylinder*, Section 13.5.2: Polyhedrons, and Section 13.5.3: Solids with Curved Surfaces.

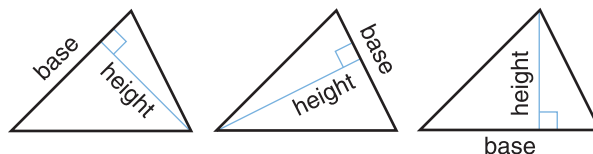


**base of a pyramid or cone** The *face* of a pyramid or cone that is opposite its *apex*. The base of a cone is a circle. See *height of a pyramid or cone*, Section 13.5.2: Polyhedrons, and Section 13.5.3: Solids with Curved Surfaces.



**base of a rectangle** (1) One of the sides of a *rectangle*. (2) The length of this side. The area of a rectangle is the base times the *altitude* or height. See *height of a rectangle* and Section 13.4.2: Polygons (*n*-gons).



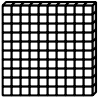
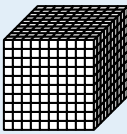
**base of a triangle** (1) Any side of a *triangle* to which an *altitude* is drawn. (2) The length of this side. The area of a triangle is half the base times the altitude or height. See *height of a triangle* and Section 13.4.2: Polygons (*n*-gons).



**base ten** Our system for writing numbers that uses only the 10 symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9, called *digits*. You can write any number using one or more of these 10 digits, and each digit has a value that depends on its place in the number (its *place value*). In the base-ten system, each place has a value 10 times that of the place to its right, and 1 tenth the value of the place to its left. See Section 9.2.1: Numeration and Place Value.

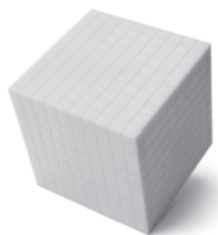
**base-10 blocks** A set of blocks to represent ones, tens, hundreds, and thousands in the *base-10 place-value* system. In *Everyday Mathematics*, the unit block, or *cube*, has 1-cm edges; the ten block, or *long*, is 10 unit blocks in length; the hundred block, or *flat*, is 10 longs in width; and the thousand block, or *big cube*, is 10 flats high. See *long*, *flat*, and *big cube* for photos of the blocks. See *base-10 shorthand* and Section 9.7.1: Base-10 Blocks.

**base-10 shorthand** In *Everyday Mathematics*, a written notation for *base-10 blocks*. See Section 9.7.1: Base-10 Blocks.

Base-10-Block Shorthand		
Name	Block	Shorthand
cube		■
long		
flat		□
big cube		◻◻

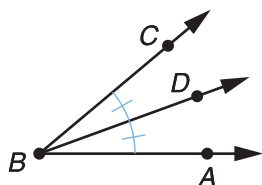
**benchmark** A count or measure that can be used to evaluate the reasonableness of other counts, measures, or estimates. A benchmark for land area is that a football field is about one acre. A benchmark for length is that the width of an adult's thumb is about one inch. See Section 14.1: Personal Measures.

**big cube** In *Everyday Mathematics*, a *base-10 block* cube that measures 10-cm by 10-cm by 10-cm. A big cube consists of one thousand 1-cm cubes. See Section 9.7.1: Base-10 Blocks.



A big cube

**bisect** To divide a segment, angle, or figure into two parts of equal measure. See *bisector*.



Ray  $BD$  bisects angle  $ABC$ .

**bisector** A *line*, *segment*, or *ray* that divides a segment, an angle, or a figure into two parts of equal measure. See *bisect*.

**braces** See *grouping symbols*.

**brackets** See *grouping symbols*.

**broken-line graph** Same as *line graph*.

## C

**calendar** (1) A *reference frame* to keep track of the passage of time. Many different calendars exist, including the Gregorian calendar currently used by most of the Western world, the Hebrew calendar, and the Islamic calendar. See Section 15.2.2: Calendars. (2) A practical model of the reference frame, such as the large, reusable Class Calendar in *First through Third Grade Everyday Mathematics*. See Section 5.2: Class Calendar. (3) A schedule or listing of events.

August 2007

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 Dr.'s appt. 3:00	2	3	4
5	6	7	8	9	10	11
12	13 Mom's b-day	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

**calibrate** (1) To divide or mark a measuring tool with gradations such as the degree marks on a *thermometer*. (2) To test and adjust the accuracy of a measuring tool.

**capacity** (1) The amount of space occupied by a *3-dimensional figure*. Same as *volume*. (2) Less formally, the amount a container can hold. Capacity is often measured in units such as quarts, gallons, cups, or liters. See Section 14.5: Volume (Capacity). (3) The maximum weight a scale can measure. See Section 14.10.3: Scales and Balances.

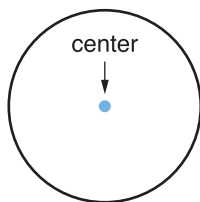
**Celsius** A *temperature scale* on which pure water at sea level freezes at  $0^\circ$  and boils at  $100^\circ$ . The Celsius scale is used in the metric system. A less common name for this scale is centigrade because there are 100 units between the freezing and boiling points of water. Compare to *Fahrenheit*. See Section 15.1.1: Temperature Scales.

**census** An official count of population and the recording of other demographic data such as age, gender, income, and education.

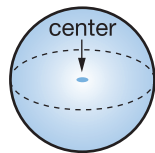
**cent** A penny;  $\frac{1}{100}$  of a dollar. From the Latin word *centesimus*, which means “a hundredth part.” See Section 14.9: Money.

**cent-** A prefix meaning 100, as in *century* or *centennial*.

**center of a circle** The point in the plane of a *circle* equally distant from all points on the circle. See Section 13.4.3: Circles and Pi ( $\pi$ ).

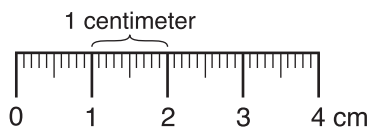


**center of a sphere** The point equally distant from all points on a *sphere*. See Section 13.5.3: Solids with Curved Surfaces.



**centi-** A prefix meaning 1 hundredth.

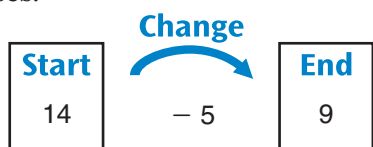
**centimeter (cm)** A metric unit of *length* equivalent to 10 millimeters,  $\frac{1}{10}$  of a decimeter, and  $\frac{1}{100}$  of a meter. See the Tables of Measures and Section 14.2.2: Metric System.



**century** One hundred years.

**chance** The possibility that an *outcome* will occur in an uncertain *event*. For example, in flipping a coin there is an equal chance of getting HEADS or TAILS. See Section 12.1.2: The Language of Chance.

**change diagram** A diagram used in *Everyday Mathematics* to model situations in which quantities are either increased or decreased by addition or subtraction. The diagram includes a starting quantity, an ending quantity, and an amount of change. See *situation diagram* and Section 10.2.1: Addition and Subtraction Use Classes.

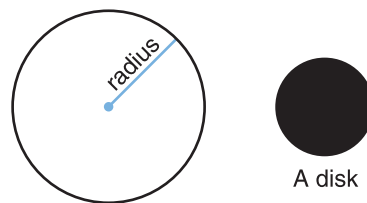


A change diagram for  $14 - 5 = 9$

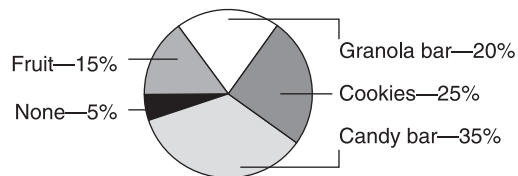
**change-to-less story** A *number story* about a change situation in which the ending quantity is less than the starting quantity. For example, a story about spending money is a change-to-less story. Compare to *change-to-more story*. See Section 10.2.1: Addition and Subtraction Use Classes.

**change-to-more story** A *number story* about a change situation in which the ending quantity is more than the starting quantity. For example, a story about earning money is a change-to-more story. Compare to *change-to-less story*. See Section 10.2.1: Addition and Subtraction Use Classes.

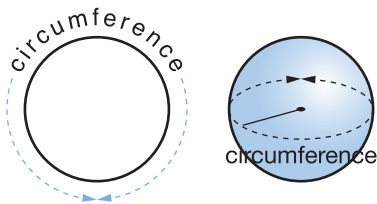
**circle** The set of all points in a *plane* that are equally distant from a fixed point in the plane called the *center* of the circle. The distance from the center to the circle is the *radius* of the circle. The *diameter* of a circle is twice its radius. Points inside a circle are not part of the circle. A circle together with its interior is called a *disk* or a *circular region*. See Section 13.4.3: Circles and Pi ( $\pi$ ).



**circle graph** A graph in which a *circle* and its interior are divided into *sectors* corresponding to parts of a set of data. The whole circle represents the whole set of data. Same as *pie graph* and sometimes called a *pie chart*. See Section 12.2.3: Organizing and Displaying Data.



**circumference** The distance around a circle; its *perimeter*. The circumference of a sphere is the circumference of a circle on the sphere with the same center as the sphere. See Section 13.4.3: Circles and Pi ( $\pi$ ) and Section 13.5.3: Solids with Curved Surfaces.



**Class Data Pad** In *Everyday Mathematics*, a large pad of paper used to store and recall data collected throughout the year. The data can be used for analysis, graphing, and generating number stories. See Section 5.3: Class Data Pad.

**clockwise rotation** The direction in which the hands move on a typical *analog clock*; a turn to the right.

**column** A vertical arrangement of objects or numbers in an *array* or a table.



**column addition** An addition *algorithm* in which the addends' digits are first added in each place-value column separately, and then 10-for-1 trades are made until each column has only one digit. Lines may be drawn to separate the place-value columns. See Section 11.2.1: Addition Algorithms.

**common denominator** A nonzero number that is a multiple of the *denominators* of two or more fractions. For example, the fractions  $\frac{1}{2}$  and  $\frac{2}{3}$  have common denominators 6, 12, 18, and other multiples of 6. Fractions with the same denominator already have a common denominator.

**common factor** A *factor* of each of two or more counting numbers. For example, 4 is a common factor of 8 and 12. See *factor of a counting number*.

**Commutative Property of Addition** A property of addition that two numbers can be added in either order without changing the sum. For example,  $5 + 10 = 10 + 5$ . In *Everyday Mathematics*, this is called a *turn-around fact*, and the two Commutative Properties are called *turn-around rules*.

In symbols:

For any numbers  $a$  and  $b$ ,  $a + b = b + a$ .

Subtraction is not commutative. For example,  $8 - 5 \neq 5 - 8$  because  $3 \neq -3$ . See Section 16.3.3: Fact Practice.

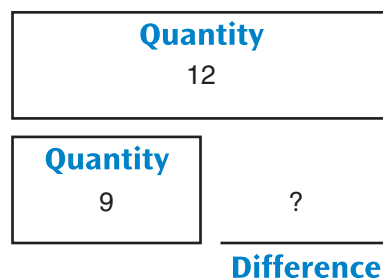
**Commutative Property of Multiplication** A property of multiplication that two numbers can be multiplied in either order without changing the product. For example,  $5 \times 10 = 10 \times 5$ . In *Everyday Mathematics*, this is called a *turn-around fact*, and the two Commutative Properties are called *turn-around rules*.

In symbols:

For any numbers  $a$  and  $b$ ,  $a \times b = b \times a$ .

Division is not commutative. For example,  $10 \div 5 \neq 5 \div 10$  because  $2 \neq \frac{1}{2}$ . See Section 16.3.3: Fact Practice.

**comparison diagram** A diagram used in *Everyday Mathematics* to model situations in which two quantities are compared by addition or subtraction. The diagram contains two quantities and their difference. See *situation diagram* and Section 10.2.1: Addition and Subtraction Use Classes.



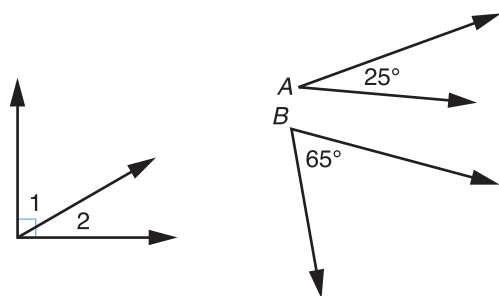
A comparison diagram for  $12 = 9 + ?$

**comparison story** A *number story* about the difference between two quantities. Comparison situations can lead to either addition or subtraction depending on whether one of the compared quantities or the difference between them is unknown. See Section 10.2.1: Addition and Subtraction Use Classes.



**complement of a number  $n$**  (1) In *Everyday Mathematics*, the difference between  $n$  and the next higher multiple of 10. For example, the complement of 4 is  $10 - 4 = 6$  and the complement of 73 is  $80 - 73 = 7$ . (2) The difference between  $n$  and the next higher power of 10. In this definition, the complement of 73 is  $100 - 73 = 27$ .

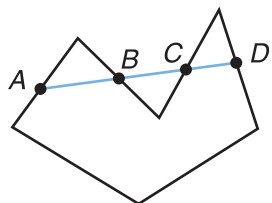
**complementary angles** Two *angles* whose measures add to  $90^\circ$ . Complementary angles do not need to be *adjacent*. Compare to *supplementary angles*.



$\angle 1$  and  $\angle 2$ ;  $\angle A$  and  $\angle B$  are pairs of complementary angles.

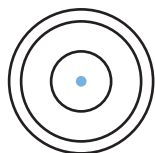
**composite number** A *counting number* greater than 1 that has more than two *factors*. For example, 10 is a composite number because it has four factors: 1, 2, 5, and 10. A composite number is divisible by at least three whole numbers. Compare to *prime number*.

**concave polygon** A *polygon* on which there are at least two points that can be connected with a *line segment* that passes outside the polygon. For example, segment  $AD$  is outside the hexagon between  $B$  and  $C$ . Informally, at least one vertex appears to be “pushed inward.” At least one interior angle has measure greater than  $180^\circ$ . Same as *nonconvex polygon*. Compare to *convex polygon*. See Section 13.4.2: Polygons ( $n$ -gons).



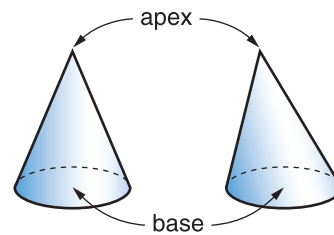
A concave polygon

**concentric circles** *Circles* that have the same center but radii of different lengths.



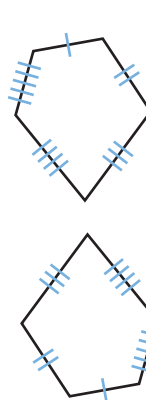
Concentric circles

**cone** A *geometric solid* with a circular *base*, a vertex (*apex*) not in the *plane* of the base, and all of the line segments with one endpoint at the apex and the other endpoint on the circumference of the base. See Section 13.5.3: Solids with Curved Surfaces.

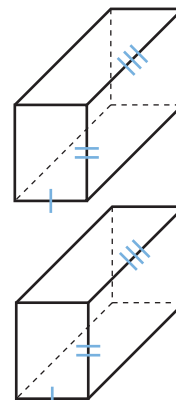


Cones

**congruent figures ( $\cong$ )** Figures having the same size and shape. Two figures are congruent if they match exactly when one is placed on top of the other after a combination of slides, flips, and/or turns. In diagrams of congruent figures, the corresponding congruent sides may be marked with the same number of hash marks. The symbol  $\cong$  means “is congruent to.” See Section 13.6.2: Congruence and Similarity.



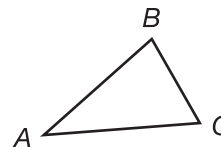
Congruent pentagons



Congruent prisms

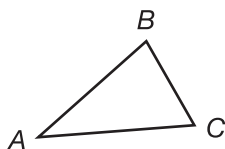
**consecutive** Following one after another in an uninterrupted order. For example, A, B, C, and D are four consecutive letters of the alphabet; 6, 7, 8, 9, and 10 are five consecutive whole numbers.

**consecutive angles** Two *angles* in a *polygon* with a common side.



Angles A and B, B and C, and C and A are pairs of consecutive angles.

**consecutive sides** (1) Two *sides* of a *polygon* with a common *vertex*. (2) Two sides of a *polyhedron* with a common *edge*. Same as *adjacent sides*.

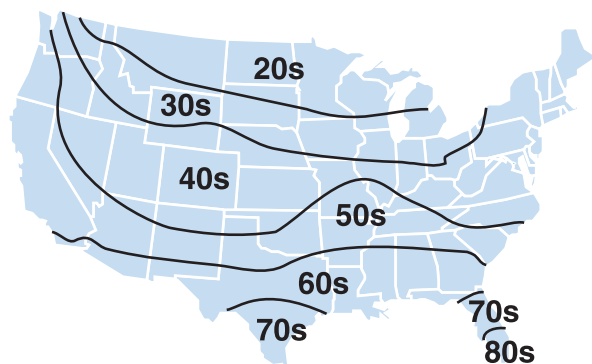


Sides  $AB$  and  $BC$ ,  $BC$  and  $CA$ , and  $CA$  and  $AB$  are pairs of consecutive sides.

**consecutive vertices** The vertices of *consecutive angles* in a polygon.

**constant** A quantity that does not change. For example, the ratio of the circumference of a circle to its diameter is the famous constant  $\pi$ . In  $x + 3 = y$ , 3 is a constant.

**contour line** A curve on a map through places where a measurement such as temperature, elevation, air pressure, or growing season is the same. Contour lines often separate regions that have been differently colored to show a range of conditions. See *contour map*.

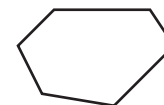


A temperature contour map

**contour map** A map that uses *contour lines* to indicate areas having a particular feature, such as elevation or temperature.

**conversion fact** A fixed relationship such as 1 yard = 3 feet or 1 inch = 2.54 centimeters that can be used to convert measurements within or between systems of measurement. See Section 14.2.3: Converting between Measures.

**convex polygon** A *polygon* on which no two points can be connected with a line segment that passes outside the polygon. Informally, all vertices appear to be “pushed outward.” Each angle in the polygon measures less than  $180^\circ$ .



A convex polygon

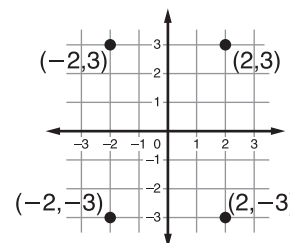
Compare to *concave polygon*.  
See Section 13.4.2: Polygons (*n*-gons).

**coordinate** (1) A number used to locate a point on a *number line*; a point’s distance from an *origin*. (2) One of the numbers in an *ordered pair* or triple that locates a point on a *coordinate grid* or in coordinate space, respectively. See Section 9.7.2: Number Grids, Scrolls, and Lines and Section 15.3: Coordinate Systems.

**coordinate grid (rectangular coordinate grid)**

A *reference frame* for locating points in a plane by means of *ordered pairs* of numbers.

A rectangular coordinate grid is formed by two number lines that intersect at *right angles* at their *zero points*. See Section 15.3.2:



A coordinate grid

Coordinate Grids.

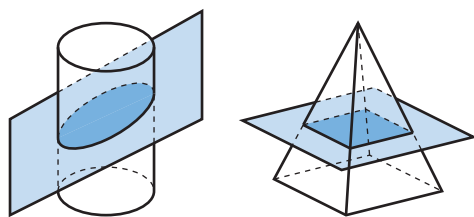
**corner** Same as *vertex*.

**counterclockwise rotation** Opposite the direction in which the hands move on a typical *analog clock*; a turn to the left.

**counting numbers** The numbers used to count things. The set of counting numbers is  $\{1, 2, 3, 4, \dots\}$ . Sometimes 0 is included, but not in *Everyday Mathematics*. Counting numbers are in the sets of *whole numbers*, *integers*, *rational numbers*, and *real numbers*, but each of these sets include numbers that are not counting numbers. See Section 9.2.2: Plain and Fancy Counting.

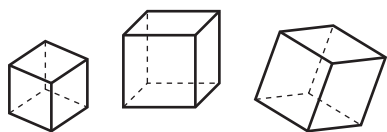
**counting-up subtraction** A subtraction *algorithm* in which a difference is found by counting or otherwise adding up from the smaller number to the larger number. For example, to calculate  $87 - 49$ , start at 49, add 30 to reach 79, and then add 8 more to reach 87. The difference is  $30 + 8 = 38$ . See Section 11.2.2: Subtraction Algorithms.

**cross section** A shape formed by the intersection of a *plane* and a *geometric solid*.



Cross sections of a cylinder and a pyramid

**cube** (1) A *regular polyhedron* with 6 square faces. A cube has 8 *vertices* and 12 *edges*. See Section 13.5.2: Polyhedrons.



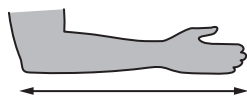
Cubes

(2) In *Everyday Mathematics*, the smaller cube of the *base-10 blocks*, measuring 1 cm on each edge. See Section 9.7.1: Base-10 Blocks.

**cubic centimeter (cc or cm<sup>3</sup>)** A metric unit of *volume* or *capacity* equal to the volume of a cube with 1-cm edges. 1 cm<sup>3</sup> = 1 milliliter (mL). See the Tables of Measures and Section 14.5: Volume (Capacity).

**cubic unit** A unit such as cubic centimeters, cubic inches, cubic feet, and cubic meters used to measure *volume* or *capacity*. See Section 14.5: Volume (Capacity).

**cubit** An ancient unit of *length*, measured from the point of the elbow to the end of the middle finger. The cubit has been



Cubit

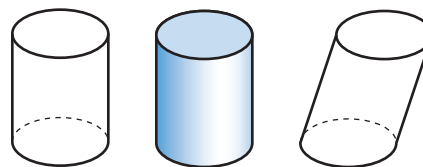
standardized at various times between 18 and 22 inches. The Latin word *cubitum* means “elbow.” See Section 14.1: Personal Measures.

**cup (c)** A U.S. customary unit of *volume* or *capacity* equal to 8 fluid ounces or  $\frac{1}{2}$  pint. See the Tables of Measures and Section 14.5: Volume (Capacity).

**curved surface** A 2-dimensional surface that does not lie in a plane. *Spheres*, *cylinders*, and *cones* each have one curved surface. See Section 13.5.3: Solids with Curved Surfaces.

**customary system of measurement** In *Everyday Mathematics*, same as U.S. customary system of measurement.

**cylinder** A *geometric solid* with two congruent, parallel circular regions for *bases* and a curved *face* formed by all the segments with an endpoint on each circle that are parallel to a segment with endpoints at the centers of the circles. Also called a circular cylinder. See Section 13.5.3: Solids with Curved Surfaces.



Cylinders

## D

**data** Information that is gathered by counting, measuring, questioning, or observing. Strictly, data is the plural of *datum*, but data is often used as a singular word. See Section 12.2: Data Collection, Organization, and Analysis.

**data bank** (1) In *Third Grade Everyday Mathematics*, a collection of data sets presented in posters, tables, graphs, and maps. (2) In general, any established data set or database.

**deca-** A prefix meaning ten.

**decade** Ten years.

**decagon** A 10-sided polygon. See Section 13.4.2: Polygons (*n*-gons).

**deci-** A prefix meaning 1 tenth.

**decimal** (1) In *Everyday Mathematics*, a number written in standard *base-10* notation containing a decimal point, such as 2.54. (2) Any number written in standard base-10 notation. See *repeating decimal*, *terminating decimal*, and Section 9.3.1: Fraction and Decimal Notation.

**decimal notation** In *Everyday Mathematics*, same as *standard notation*.

**decimal point** A mark used to separate the ones and tenths places in *decimals*. A decimal point separates dollars from cents in *dollars-and-cents notation*. The mark is a dot in the U.S. customary system and a comma in Europe and some other countries.

**decimeter (dm)** A metric unit of *length* equivalent to  $\frac{1}{10}$  meter, or 10 centimeters.

**degree (°)** (1) A unit of measure for *angles* based on dividing a *circle* into 360 equal parts. Lines of latitude and longitude are measured in degrees, and these degrees are based on angle measures. See Section 13.4.1: Angles and Rotations.

(2) A unit for measuring *temperature*. See *degree Celsius*, *degree Fahrenheit*, and Section 15.1.1: Temperature Scales.

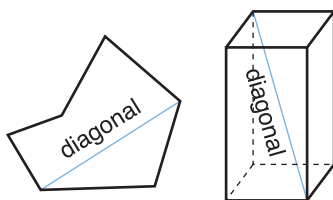
The symbol ° means degrees of any type.

**degree Celsius (°C)** The *unit interval* on *Celsius* thermometers and a metric unit for measuring *temperatures*. Pure water at sea level freezes at 0°C and boils at 100°C. See Section 15.1.1: Temperature Scales.

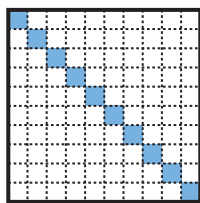
**degree Fahrenheit (°F)** The *unit interval* on *Fahrenheit* thermometers and a U.S. customary unit for measuring *temperatures*. Pure water at sea level freezes at 32°F and boils at 212°F. A saturated salt solution freezes at 0°F. See Section 15.1.1: Temperature Scales.

**denominator** The nonzero divisor  $b$  in a fraction  $\frac{a}{b}$  and  $a/b$ . In a *part-whole fraction*, the denominator is the number of equal parts into which the *whole*, or *ONE*, has been divided. Compare to *numerator*. See Section 9.3.1: Fraction and Decimal Notation.

**diagonal** (1) A *line segment* joining two nonconsecutive vertices of a *polygon*. See Section 13.4.2: Polygons ( $n$ -gons). (2) A segment joining two nonconsecutive vertices on different faces of a polyhedron.

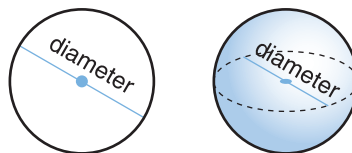


(3) A line of objects or numbers from upper left to lower right or from lower left to upper right, in an *array* or a table.



A diagonal of an array

**diameter** (1) A *line segment* that passes through the center of a *circle* or *sphere* and has endpoints on the circle or sphere. (2) The length of such a segment. The diameter of a circle or sphere is twice the *radius*. See Section 13.4.3: Circles and Pi ( $\pi$ ) and Section 13.5.3: Solids with Curved Surfaces.



**difference** The result of subtracting one number from another. For example, the difference of 12 and 5 is  $12 - 5 = 7$ .

**digit** (1) Any one of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 in the *base-10* numeration system. For example, the numeral 145 is made up of the digits 1, 4, and 5. (2) Any one of the symbols in any number system. For example, A, B, C, D, E, and F are digits along with 0 through 9 in the base-16 notation used in some computer programming.

**digital clock** A clock that shows the time with numbers of hours and minutes, usually separated by a colon. This display is discrete, not continuous, meaning that the display jumps to a new time after a minute delay. Compare to *analog clock*. See Section 15.2.1: Clocks.



A digital clock

**dimension** (1) A measure along one direction of an object, typically length, width, or height. For example, the dimensions of a box might be 24-cm by 20-cm by 10-cm. (2) The number of *coordinates* necessary to locate a point in a geometric space. For example, a line has one dimension because one coordinate uniquely locates any point on the line. A plane has two dimensions because an *ordered pair* of two coordinates uniquely locates any point in the plane. See Section 13.1: Dimension.

### Distributive Property of Multiplication over Addition

A property relating multiplication to a sum of numbers by distributing a *factor* over the terms in the sum. For example,  
 $2 \times (5 + 3) = (2 \times 5) + (2 \times 3) = 10 + 6 = 16$ .

In symbols:

$$\begin{aligned} &\text{For any numbers } a, b, \text{ and } c: \\ &a \times (b + c) = (a \times b) + (a \times c) \\ &\text{or } a(b + c) = ab + ac \end{aligned}$$

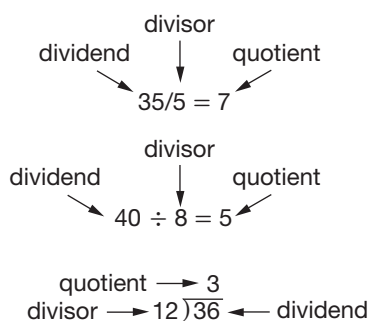
### Distributive Property of Multiplication over Subtraction

A property relating multiplication to a difference of numbers by distributing a *factor* over the terms in the difference. For example,  
 $2 \times (5 - 3) = (2 \times 5) - (2 \times 3) = 10 - 6 = 4$ .

In symbols:

$$\begin{aligned} &\text{For any numbers } a, b, \text{ and } c: \\ &a \times (b - c) = (a \times b) - (a \times c) \\ &\text{or } a(b - c) = ab - ac \end{aligned}$$

**dividend** The number in division that is being divided. For example, in  $35 \div 5 = 7$ , the dividend is 35.



**divisibility rule** A shortcut for determining whether a counting number is *divisible by* another counting number without actually doing the division. For example, a number is divisible by 5 if the *digit* in the ones place is 0 or 5. A number is divisible by 3 if the sum of its digits is divisible by 3.

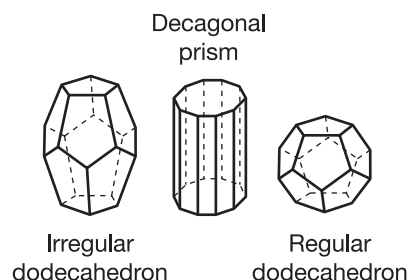
**divisibility test** A test to see if a *divisibility rule* applies to a particular number.

**divisible by** If the larger of two *counting numbers* can be divided by the smaller with no remainder, then the larger is divisible by the smaller. For example, 28 is divisible by 7, because  $28 \div 7 = 4$  with no remainder. If a number  $n$  is divisible by a number  $d$ , then  $d$  is a *factor* of  $n$ . Every counting number is divisible by itself.

**division symbols** The number  $a$  divided by the number  $b$  is written in a variety of ways. In *Everyday Mathematics*,  $a \div b$ ,  $a/b$ , and  $\frac{a}{b}$  are the most common notations, while  $b \overline{)a}$  is used to set up the traditional long-division algorithm.  $a:b$  is sometimes used in Europe,  $\boxed{\div}$  is common on calculators, and  $\boxed{/}$  is common on computer keyboards. See Section 10.1.1: Arithmetic Symbols.

**divisor** In division, the number that divides another number, the *dividend*. For example, in  $35 \div 7 = 5$ , the divisor is 7. See the diagram under the definition of *dividend*.

**dodecahedron** A *polyhedron* with 12 faces. If each face is a regular pentagon, it is one of the five *regular polyhedrons*. See Section 13.5.2: Polyhedrons.



**dollar** The basic unit in the U.S. monetary system, equal to 100 *cents*.

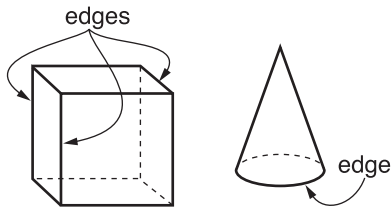
**dollars-and-cents notation** The U.S. customary notation for writing amounts of money as a number of dollars and hundredths of dollars (*cents*). The decimal is preceded by the \$ symbol, as in \$8.98, meaning “eight dollars and 98 cents.” See Section 14.9: Money.

**double** Two times an amount; an amount added to itself.

**doubles fact** The sum (or product) of a 1-digit number added to (or multiplied by) itself, such as  $4 + 4 = 8$  or  $3 \times 3 = 9$ . A doubles fact does not have a *turn-around fact* partner.

# E

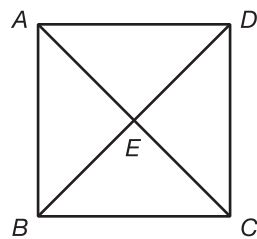
**edge** (1) Any *side* of a polyhedron's *faces*.  
 (2) A line segment or curve where two surfaces of a geometric solid meet. See Section 13.5.2: Polyhedrons and Section 13.5.3: Solids with Curved Surfaces.



**elapsed time** The difference in two times. For example, between 12:45 P.M. and 1:30 P.M., 45 minutes have elapsed.

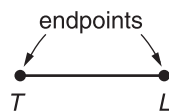
**elevation** A height above sea level. Same as *altitude* (2).

**embedded figure** A figure entirely enclosed within another figure.



Triangle *ADE* is embedded in square *ADCB*.

**endpoint** A point at the end of a *line segment*, *ray*, or *arc*. These shapes are usually named using their endpoints. For example, the segment shown is “segment *TL*” or “segment *LT*.”



**enlarge** To increase the size of an object or a figure without changing its shape. Same as *stretch*. See *scale factor* and Section 13.7.2: Stretches and Shrinks.

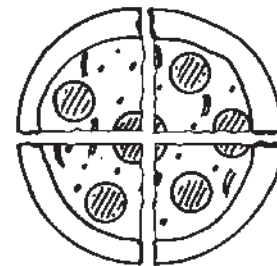
**equal** Same as *equivalent*.

**equal-grouping story** A *number story* in which a quantity is divided into equal groups. The total and size of each group are known. For example, *How many tables seating 4 people each are needed to seat 52 people?* is an equal-grouping story. Often division can be used to solve equal-grouping stories. Compare to *measurement division* and *equal-sharing story* and see Section 10.2.2: Multiplication and Division Use Classes.

**equal groups** Sets with the same number of elements, such as cars with 5 passengers each, rows with 6 chairs each, and boxes containing 100 paper clips each. See Section 10.2.2: Multiplication and Division Use Classes.

**equal-groups notation** In *Everyday Mathematics*, a way to denote a number of equal-size groups. The size of each group is shown inside square brackets and the number of groups is written in front of the brackets. For example, 3 [6s] means 3 groups with 6 in each group. In general,  $n$  [bs] means  $n$  groups with  $b$  in each group.

**equal parts** Equivalent parts of a *whole*. For example, dividing a pizza into 4 equal parts means each part is  $\frac{1}{4}$  of the pizza and is equal in size to the other 3 parts. See Section 9.3.2: Uses of Fractions.



4 equal parts, each  $\frac{1}{4}$  of a pizza

**equal-sharing story** A *number story* in which a quantity is shared equally. The total quantity and the number of groups are known. For example, *There are 10 toys to share equally among 4 children; how many toys will each child get?* is an equal-sharing story. Often division can be used to solve equal-sharing stories. Compare to *partitive division* and *equal-grouping story*. See Section 10.2.2: Multiplication and Division Use Classes.

**equally likely outcomes** *Outcomes* of a chance experiment or situation that have the same *probability* of happening. If all the possible outcomes are equally likely, then the probability of an *event* is equal to:

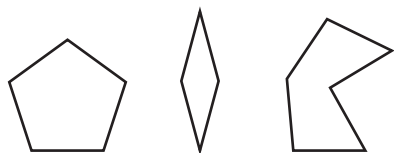
$$\frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

See *random experiment* and Section 12.1.2: The Language of Chance.

**equation** A *number sentence* that contains an equal sign. For example,  $5 + 10 = 15$  and  $P = 2l + 2w$  are equations. See Section 10.1.2: Reading and Writing Number Sentences and Section 17.2.2: Reading and Writing Open Sentences.

**equator** An imaginary circle around Earth halfway between the North Pole and the South Pole.

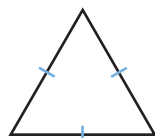
**equilateral polygon** A polygon in which all sides are the same length. See Section 13.4.2: Polygons ( $n$ -gons).



Equilateral polygons

**equilateral triangle**

A *triangle* with all three sides equal in length. Each angle of an equilateral triangle measures  $60^\circ$ , so it is also called an equiangular triangle.



An equilateral triangle

See Section 13.4.2: Polygons ( $n$ -gons).

**equivalent** Equal in value but possibly in a different form. For example,  $\frac{1}{2}$ , 0.5, and 50% are all equivalent. See Section 9.6.1: Equality.

**equivalent equations** *Equations* with the same *solution*. For example,  $2 + x = 4$  and  $6 + x = 8$  are equivalent equations with the common solution 2. See Section 17.2.3: Solving Open Sentences.

**equivalent fractions** *Fractions* with different *denominators* that name the same number. See Section 9.3.3: Rates and Ratios.

**equivalent names** Different ways of naming the same number. For example,  $2 + 6$ ,  $4 + 4$ ,  $12 - 4$ ,  $18 - 10$ ,  $100 - 92$ ,  $5 + 1 + 2$ , eight, VIII, and  $\#\#\#\#$  are all equivalent names for 8. See *name-collection box*.

**estimate** (1) An answer close to, or approximating, an exact answer. (2) To make an estimate. See Section 16.1: Estimation.

**European subtraction** A subtraction *algorithm* in which the subtrahend is increased when regrouping is necessary. The algorithm is commonly used in Europe and in certain parts of the United States. See Section 11.2.2: Subtraction Algorithms.

**even number** (1) A *counting number* that is *divisible by 2*. (2) An *integer* that is divisible by 2. Compare to *odd number* and see Section 17.1.2: Odd and Even Number Patterns.

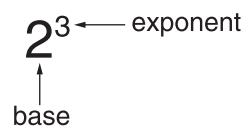
**event** A set of possible *outcomes* to an experiment. For example, in an experiment flipping two coins, getting 2 HEADS is an event, as is getting 1 HEAD and 1 TAIL. The *probability* of an event is the chance that the event will happen. For example, the probability that a fair coin will land HEADS up is  $\frac{1}{2}$ . If the probability of an event is 0, the event is *impossible*. If the probability is 1, the event is *certain*. See Section 12.1: Probability.

**expanded notation** A way of writing a number as the sum of the values of each *digit*. For example, 356 is  $300 + 50 + 6$  in expanded notation. Compare to *standard notation*, *scientific notation*, and *number-and-word notation*.

**Explorations** In *First through Third Grade Everyday Mathematics*, independent or small-group activities that focus on one or more of the following: concept development, manipulatives, data collection, problem solving, games, and skill reviews. See Section 1.2.1: Explorations.

**exponent** A small raised number used in *exponential notation* to tell how many times the *base* is used as a *factor*. For example, in  $5^3$ , the base is 5, the exponent is 3, and  $5^3 = 5 \times 5 \times 5 = 125$ . Same as *power*. See Section 10.1.1: Arithmetic Symbols.

**exponential notation** A way of representing repeated multiplication by the same factor. For example,  $2^3$  is exponential notation for  $2 \times 2 \times 2$ . The *exponent* 3 tells how many times the *base* 2 is used as a factor. See Section 10.1.1: Arithmetic Symbols.



**expression** (1) A mathematical phrase made up of numbers, *variables*, *operation symbols*, and/or *grouping symbols*. An expression does not contain *relation symbols* such as =, >, and ≤. (2) Either side of an

*equation* or *inequality*. See Section 10.1.2: Reading and Writing Number Sentences and Section 17.2.2: Reading and Writing Open Sentences.

$$2 + 3$$

$$\sqrt{2ab}$$

$$\pi r^2$$

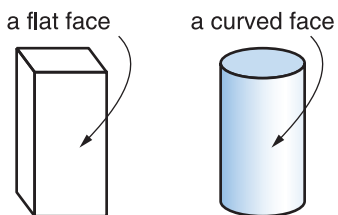
$$9x - 2$$

Expressions

**extended facts** Variations of basic *arithmetic facts* involving multiples of 10, 100, and so on. For example,  $30 + 70 = 100$ ,  $40 \times 5 = 200$ , and  $560 \div 7 = 80$  are extended facts. See *fact extensions* and Section 16.3: Mental Arithmetic.

## F

**face** (1) In *Everyday Mathematics*, a flat surface on a 3-dimensional figure. Some special faces are called *bases*. (2) More generally, any 2-dimensional surface on a 3-dimensional figure. See Section 13.5: Space and 3-D Figures.



**fact extensions** Calculations with larger numbers using knowledge of basic *arithmetic facts*. For example, knowing the addition fact  $5 + 8 = 13$  makes it easier to solve problems such as  $50 + 80 = ?$  and  $65 + ? = 73$ . Fact extensions apply to all four basic arithmetic operations. See *extended facts* and Section 16.3.3: Fact Practice.

**fact family** A set of related *arithmetic facts* linking two inverse operations. For example,

$$5 + 6 = 11 \quad 6 + 5 = 11$$

$$11 - 5 = 6 \quad 11 - 6 = 5$$

are an addition/subtraction fact family. Similarly,

$$5 \times 7 = 35 \quad 7 \times 5 = 35$$

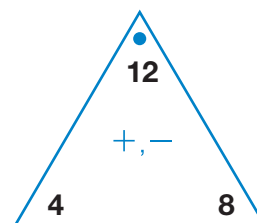
$$35 \div 7 = 5 \quad 35 \div 5 = 7$$

are a multiplication/division fact family. Same as *number family*. See Section 16.3.3: Fact Practice.

**fact habits** Same as *fact power*.

**fact power** In *Everyday Mathematics*, the ability to automatically recall basic *arithmetic facts*. Automatically knowing the facts is as important to arithmetic as knowing words by sight is to reading. Same as *fact habits*. See Section 16.3.2: Basic Facts and Fact Power.

**Fact Triangle** In *Everyday Mathematics*, a triangular flash card labeled with the numbers of a *fact family* that students can use to practice addition/subtraction and multiplication/division facts. The two 1-digit numbers and their sum or product (marked with a dot) appear in the corners of each triangle. See Section 1.3.1: Fact Families/Fact Triangles.



**factor** (1) Each of the two or more numbers in a *product*. For example, in  $6 \times 0.5$ , 6 and 0.5 are factors. Compare to *factor of a counting number n*. (2) To represent a number as a product of factors. For example, factor 21 by rewriting as  $7 \times 3$ .

**factor of a counting number n** A *counting number* whose product with some other counting number equals  $n$ . For example, 2 and 3 are factors of 6 because  $2 \times 3 = 6$ . But 4 is not a factor of 6 because  $4 \times 1.5 = 6$ , and 1.5 is not a counting number.

**factor pair** Two *factors of a counting number n* whose product is  $n$ . A number may have more than one factor pair. For example, the factor pairs for 18 are 1 and 18, 2 and 9, and 3 and 6.

**factorial (!)** A *product* of a whole number and all smaller whole numbers except 0. The symbol ! means “factorial.” For example, 3! is read “three factorial” and  $3! = 3 \times 2 \times 1 = 6$ . Similarly,  $4! = 4 \times 3 \times 2 \times 1 = 24$ . For any number  $n$ ,

$$n! = n \times (n - 1) \times (n - 2) \times \dots \times 1.$$

By convention,  $0! = 1$ .

**facts table** A chart showing *arithmetic facts*. An addition/subtraction facts table shows addition and subtraction facts. A multiplication/division facts table shows multiplication and division facts.



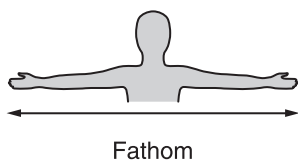
**Fahrenheit** A *temperature scale* on which pure water at sea level freezes at 32° and boils at 212°. The Fahrenheit scale is widely used in the United States but in few other places. Compare to *Celsius*. See *degree Fahrenheit* and Section 15.1.1: Temperature Scales.

**fair** Free from bias. Each side of a fair die or coin will land up about equally often. Each region of a fair spinner will be landed on in proportion to its area.

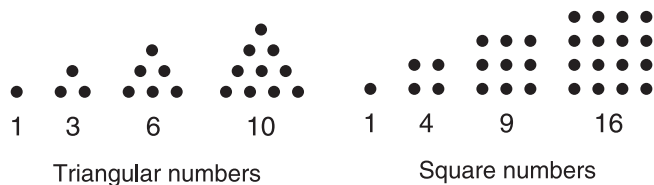
**fair game** A game in which every player has the same chance of winning. See Section 12.1.2: The Language of Chance.

**false number sentence** A *number sentence* that is not true. For example,  $8 = 5 + 5$  is a false number sentence. Compare to *true number sentence*. See Section 10.1.2: Reading and Writing Number Sentences.

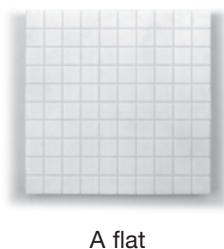
**fathom** A unit of *length* equal to 6 feet, or 2 yards. It is used mainly by people who work with boats and ships to measure depths underwater and lengths of cables. Same as *arm span*. See Section 14.1: Personal Measures.



**figurate numbers** Numbers that can be illustrated by specific *geometric patterns*. *Square numbers* and *triangular numbers* are figurate numbers. See Section 17.1.3: Sequences.



**flat** In *Everyday Mathematics*, the *base-10 block* consisting of one hundred 1-cm cubes. See Section 9.7.1: Base-10 Blocks.



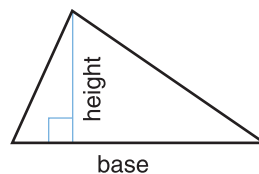
**flat surface** A *surface* contained entirely in one *plane*. See Section 13.4: Planes and Plane Figures and Section 13.5: Space and 3-D Figures.

**flip** An informal name for a *reflection* transformation. See Section 13.7.1: Flips, Turns, and Slides.

**fluid ounce (fl oz)** A U.S. customary unit of *volume* or *capacity* equal to  $\frac{1}{16}$  of a pint, or about 29.573730 milliliters. Compare to *ounce*. See the Tables of Measures and Section 14.5: Volume (Capacity).

**foot (ft)** A U.S. customary unit of *length* equivalent to 12 inches, or  $\frac{1}{3}$  of a yard. See the Tables of Measures and Section 14.3: Length.

**formula** A general rule for finding the value of something. A formula is usually an *equation* with quantities represented by letter *variables*. For example, a formula for distance traveled  $d$  at a rate  $r$  over a time  $t$  is  $d = r \times t$ . The area of a triangle  $A$  with base length  $b$  and height  $h$  is given below. See Section 17.2.1: Uses of Variables.



$$A = \frac{1}{2} \times b \times h$$

**fraction (primary definition)** A number in the form  $\frac{a}{b}$  or  $a/b$ , where  $a$  and  $b$  are *whole numbers* and  $b$  is not 0. A fraction may be used to name part of an object or part of a collection of objects, to compare two quantities, or to represent division. For example,  $\frac{12}{6}$  might mean 12 eggs divided into 6 groups of 2 eggs each, a ratio of 12 to 6, or 12 divided by 6. See Section 9.3: Fractions, Decimals, Percents, and Rational Numbers.

**fraction (other definitions)** (1) A fraction that satisfies the previous definition and includes a *unit* in both the *numerator* and *denominator*. For example, the *rates*

$$\frac{50 \text{ miles}}{1 \text{ gallon}} \quad \text{and} \quad \frac{40 \text{ pages}}{10 \text{ minutes}}$$

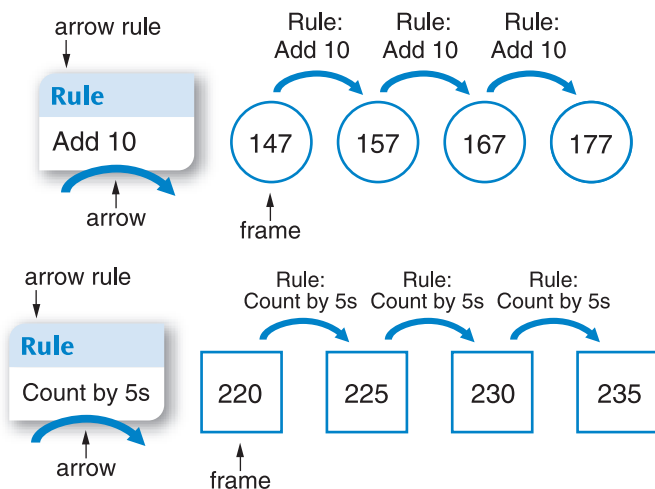
are fractions. (2) A number written using a fraction bar, where the fraction bar is used to indicate division. For example,

$$\frac{2.3}{6.5}, \quad \frac{1\frac{4}{5}}{12}, \quad \text{and} \quad \frac{\frac{3}{4}}{\frac{5}{8}}$$

**fractional part** Part of a *whole*. *Fractions* represent fractional parts of numbers, sets, or objects. See Section 9.3.2: Uses of Fractions.

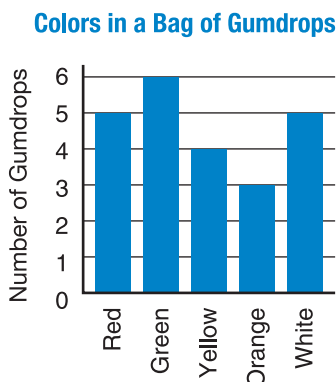
**frames** In *Everyday Mathematics*, the empty shapes in which numbers are written in a *Frames-and-Arrows* diagram. See Section 17.1.4: Functions.

**Frames and Arrows** In *Everyday Mathematics*, diagrams consisting of frames connected by arrows used to represent number *sequences*. Each frame contains a number, and each arrow represents a rule that determines which number goes in the next frame. There may be more than one rule, represented by different-color arrows. *Frames-and-Arrows* diagrams are also called “chains.” See Section 17.1.3: Sequences.



**frequency** (1) The number of times a value occurs in a set of data. See Section 12.2.3: Organizing and Displaying Data. (2) A number of repetitions per unit of time. For example, the vibrations per second in a sound wave.

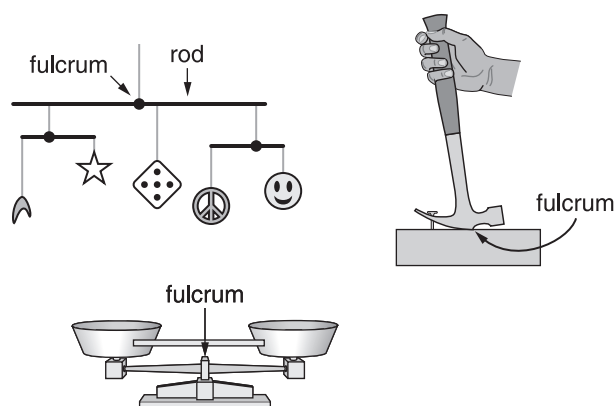
**frequency graph** A graph showing how often each value occurs in a data set. See Section 12.2.3: Organizing and Displaying Data.



**frequency table** A table in which data are *tallied* and organized, often as a first step toward making a *frequency graph*. See Section 12.2.3: Organizing and Displaying Data.

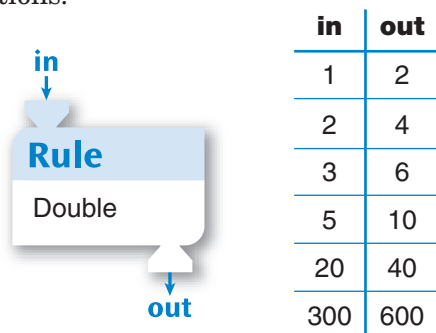
Color	Number of Gumdrops
red	###
green	###/
yellow	////
orange	///
white	###

**fulcrum** (1) The point on a mobile at which a rod is suspended. (2) The point or place around which a lever pivots. (3) The center support of a *pan balance*.



**function** A set of *ordered pairs*  $(x,y)$  in which each value of  $x$  is paired with exactly one value of  $y$ . A function is typically represented in a table, by points on a coordinate graph, or by a rule such as an *equation*. For example, for a function with the rule “Double,” 1 is paired with 2, 2 is paired with 4, 3 is paired with 6, and so on. In symbols,  $y = 2 \times x$  or  $y = 2x$ . See Section 17.1.4: Functions.

**function machine** In *Everyday Mathematics*, an imaginary device that receives *inputs* and pairs them with *outputs*. For example, the function machine below pairs an input number with its double. See *function* and Section 17.1.4: Functions.



A function machine and function table

**furlong** A unit of *length* equal to 1 eighth of a mile. Furlongs are commonly used in horse racing.

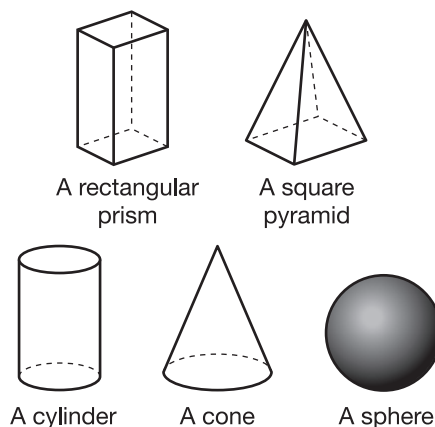
## G

**gallon (gal)** A U.S. customary unit of *volume* or *capacity* equal to 4 quarts. See the Tables of Measures and Section 14.5: Volume (Capacity).

**generate a random number** To produce a *random number* by such methods as drawing a card without looking from a shuffled deck, rolling a fair die, and flicking a fair spinner. In *Everyday Mathematics*, random numbers are commonly generated in games. See Section 12.4.1: Random-Number Generators.

**geoboard** A manipulative *2-dimensional coordinate system* made with nails or other posts at equally-spaced intervals relative to both axes. Children loop rubber bands around the posts to make polygons and other shapes.

**geometric solid** The *surface* or surfaces that make up a *3-dimensional figure* such as a prism, pyramid, cylinder, cone, or sphere. Despite its name, a geometric solid is hollow; that is, it does not include the points in its interior. Informally, and in some dictionaries, a solid is defined as both the surface and its interior. See Section 13.5.1: “Solid” Figures.



Geometric solids

**girth** The distance around a 3-dimensional object.

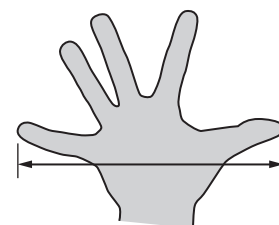
**-gon** A suffix meaning *angle*. For example, a *hexagon* is a plane figure with six angles.

**gram (g)** A metric unit of *mass* equal to  $\frac{1}{1,000}$  of a kilogram. See the Tables of Measures and Section 14.6: Weight and Mass.

**graph key** An annotated list of the symbols used in a graph explaining how to read the graph. Compare to *map legend*.

**greatest common factor (GCF)** The largest *factor* that two or more *counting numbers* have in common. For example, the common factors of 24 and 36 are 1, 2, 3, 4, 6, and 12, and their greatest common factor is 12.

**great span** The distance from the tip of the thumb to the tip of the little finger (pinkie), when the hand is stretched as far as possible. The great span averages about 9 inches for adults. Same as *hand span*. Compare to *normal span* and see Section 14.1: Personal Measures.



Great span

**grouping symbols** Parentheses ( ), brackets [ ], braces { }, and similar symbols that define the order in which operations in an *expression* are to be done. *Nested* grouping symbols are groupings within groupings, and the innermost grouping is done first. For example, in  $(3 + 4) \times [(8 + 2) \div 5]$ , the group  $(8 + 2)$  is nested within  $[(8 + 2) \div 5]$  and is done first. So  $(3 + 4) \times [(8 + 2) \div 5]$  simplifies as follows:

$$\begin{aligned} &(3 + 4) \times [(8 + 2) \div 5] \\ &(3 + 4) \times [10 \div 5] \\ &7 \times 2 \\ &14 \end{aligned}$$

See Section 10.1.2: Reading and Writing Number Sentences.

## H

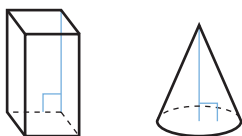
**half** One of two *equal parts*.

**hand span** Same as *great span*.

**height** (1) A perpendicular segment from one *side* of a geometric figure to a parallel side or from a *vertex* to the *opposite side*. (2) The length of this segment. In *Everyday Mathematics*, same as *altitude*. See *height of a parallelogram*, *height of a rectangle*, *height of a prism or cylinder*, *height of a pyramid or cone*, *height of a triangle*, Section 13.4.2: Polygons (*n*-gons), Section 13.5.2: Polyhedrons, and Section 13.5.3: Solids with Curved Surfaces.

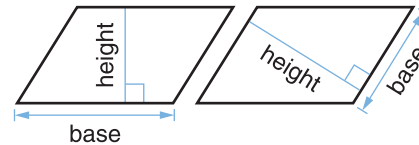


Heights/altitudes of 2-D figures are shown in blue.

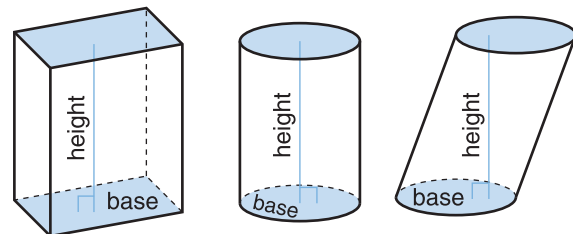


Heights/altitudes of 3-D figures are shown in blue.

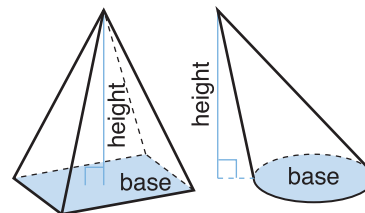
**height of a parallelogram** (1) The *length* of the shortest line segment between a *base of a parallelogram* and the line containing the *opposite side*. The height is perpendicular to the base. (2) The line segment itself. See *altitude*, *base of a parallelogram*, and Section 13.4.2: Polygons (*n*-gons).



**height of a prism or cylinder** The *length* of the shortest line segment from a *base of a prism or cylinder* to the plane containing the opposite base. The height is perpendicular to the bases. (2) The line segment itself. See *altitude*, *base of a prism or cylinder*, and Section 13.5.2: Polyhedrons.

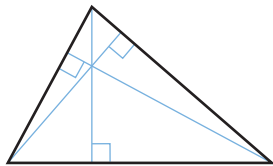


**height of a pyramid or cone** The *length* of the shortest line segment from the *apex* of a pyramid or cone to the plane containing the *base*. The height is perpendicular to the base. (2) The line segment itself. See *altitude*, *base of a pyramid or cone*, and Section 13.5.2: Polyhedrons.



**height of a rectangle** The *length* of a side perpendicular to a *base of a rectangle*. Same as *altitude* of a rectangle. See Section 13.4.2: Polygons (*n*-gons).

**height of a triangle** The *length* of the shortest segment from a *vertex* of a triangle to the line containing the opposite *side*. The height is perpendicular to the base. (2) The line segment itself. See *altitude*, *base of a triangle*, and Section 13.4.2: Polygons (*n*-gons).

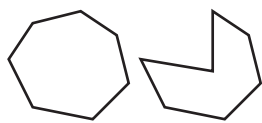


The heights of the triangle are shown in blue.

**hemisphere** (1) Half of Earth's surface. (2) Half of a *sphere*.

**hepta-** A prefix meaning seven.

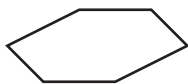
**heptagon** A 7-sided *polygon*. See Section 13.4.2: Polygons (*n*-gons).



Heptagons

**hexa-** A prefix meaning six.

**hexagon** A 6-sided *polygon*. See Section 13.4.2: Polygons (*n*-gons).



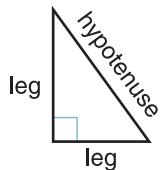
A hexagon

**Home Link** In *First* through *Third Grade Everyday Mathematics*, a suggested follow-up or enrichment activity to be done at home. See Section 1.2.3: Home Links.

**horizon** Where the earth and sky appear to meet, if nothing is in the way. The horizon looks like a line when you look out to sea.

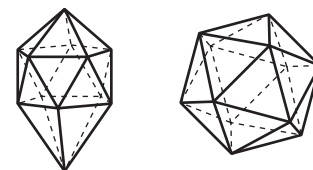
**horizontal** In a left-to-right orientation. Parallel to the *horizon*.

**hypotenuse** In a *right triangle*, the *side* opposite the *right angle*. See Section 13.4.2: Polygons (*n*-gons).



**icon** A small picture or diagram sometimes used to represent quantities. For example, an icon of a stadium might be used to represent 100,000 people on a *pictograph*. Icons are also used to represent functions or objects in computer operating systems and applications.

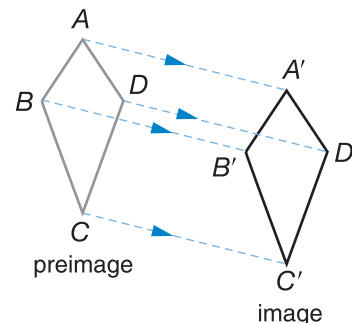
**icosahedron** A *polyhedron* with 20 faces. An icosahedron with equilateral triangle faces is one of the five *regular polyhedrons*. See Section 13.5.2: Polyhedrons.



An irregular icosahedron

A regular icosahedron

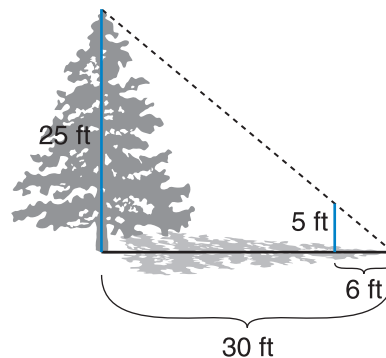
**image** A figure that is produced by a *transformation* of another figure called the *preimage*. See Section 13.7: Transformations.



**improper fraction** A *fraction* with a *numerator* that is greater than or equal to its *denominator*. For example,  $\frac{4}{3}$ ,  $\frac{5}{2}$ ,  $\frac{4}{4}$ , and  $\frac{24}{12}$  are improper fractions. In *Everyday Mathematics*, improper fractions are sometimes called “top-heavy” fractions.

**inch (in.)** A U.S. customary unit of *length* equal to  $\frac{1}{12}$  of a foot and 2.54 centimeters. See the Tables of Measures and Section 14.3: Length.

**indirect measurement** The determination of heights, distances, and other quantities that cannot be measured directly.



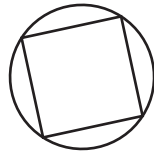
Indirect measurement lets you calculate the height of the tree from the other measures.

**inequality** A *number sentence* with a *relation symbol* other than =, such as >, <, ≥, ≤, ≠, or ≈. See Section 9.6: Numeric Relations.

**input** (1) A number inserted into an imaginary *function machine*, which applies a rule to pair the input with an *output*. (2) The values for *x* in a *function* consisting of *ordered pairs* (*x*, *y*). See Section 17.1.4: Functions. (3) Numbers or other information entered into a calculator or computer.

### inscribed polygon

A *polygon* whose vertices are all on the same *circle*.

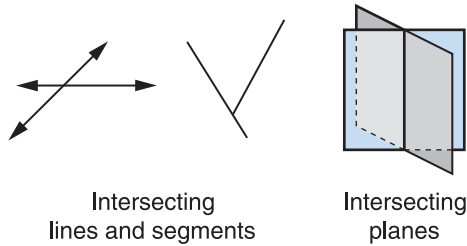


An inscribed square

**integer** A number in the set  $\{\dots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots\}$ . A *whole number* or its *opposite*, where 0 is its own opposite. Compare to *rational number*, *irrational number*, and *real number*. See Section 9.4: Positive and Negative Numbers.

**interior of a figure** (1) The set of all points in a *plane* bounded by a closed *2-dimensional figure* such as a *polygon* or *circle*. (2) The set of all points in space bounded by a closed *3-dimensional figure* such as a *polyhedron* or *sphere*. The interior is usually not considered to be part of the figure. See Section 13.4: Planes and Plane Figures and Section 13.5: Space and 3-D Figures.

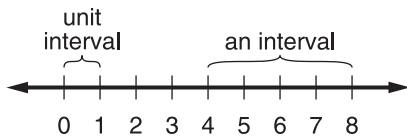
**intersect** To share a common point or points.



Intersecting lines and segments

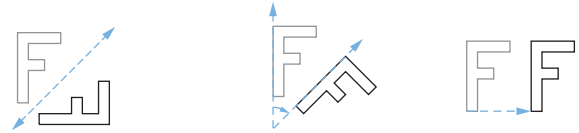
Intersecting planes

**interval** (1) The set of all numbers between two numbers  $a$  and  $b$ , which may include one or both of  $a$  and  $b$ . (2) The points and their coordinates on a segment of a number line. The interval between 0 and 1 on a number line is the *unit interval*.



**irrational numbers** Numbers that cannot be written as *fractions* where both the *numerator* and *denominator* are *integers* and the denominator is not zero. For example,  $\sqrt{2}$  and  $\pi$  are irrational numbers. An irrational number can be written as a nonterminating, nonrepeating decimal. For example,  $\pi = 3.141592653 \dots$  continues forever without any known pattern. The number 1.10100100010000  $\dots$  is irrational because its pattern does not repeat. See Section 9.5: Irrational and Real Numbers.

**isometry transformation** A *transformation* in which the *preimage* and *image* are *congruent*. *Reflections* (flips), *rotations* (turns), and *translations* (slides) are isometry transformations, while a *size-change* (stretch or shrink) is not. Although the size and shape of the figures in an isometry transformation are the same, their orientations may be different. From the Greek *isometros* meaning “of equal measure.” See Section 13.7.1: Flips, Turns, and Slides.

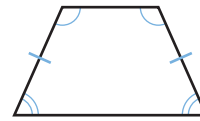


A reflection (flip)

A rotation (turn)

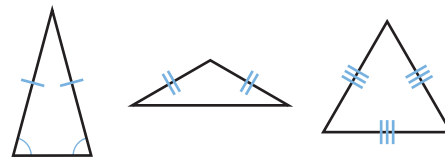
A translation (slide)

**isosceles trapezoid** A *trapezoid* whose nonparallel sides are the same length. Pairs of base angles have the same measure. See Section 13.4.2: Polygons ( $n$ -gons).



An isosceles trapezoid

**isosceles triangle** A *triangle* with at least two sides equal in length. Angles opposite the congruent sides are congruent to each other. See Section 13.4.2: Polygons ( $n$ -gons).



Isosceles triangles

## J

**juxtapose** To represent multiplication in an *expression* by placing *factors* side by side without a multiplication symbol. At least one factor is a *variable*. For example,  $5n$  means  $5 \times n$ , and  $ab$  means  $a \times b$ . See Section 10.1.1: Arithmetic Symbols.

## K

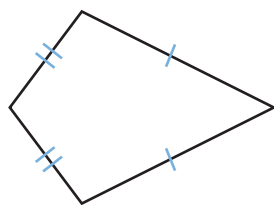
**key sequence** The order in which calculator keys are pressed to perform a calculation. See Section 3.1.1: Calculators.

**kilo-** A prefix meaning 1 thousand.

**kilogram** A metric unit of *mass* equal to 1,000 grams. The international standard kilogram is a 39 mm diameter, 39 mm high *cylinder* of platinum and iridium kept in the International Bureau of Weights and Measures in Sèvres, France. A kilogram is about 2.2 pounds. See the Tables of Measures and Section 14.6: Weight and Mass.

**kilometer** A metric unit of *length* equal to 1,000 meters. A kilometer is about 0.62 mile. See the Tables of Measures and Section 14.3: Length.

**kite** A *quadrilateral* with two distinct pairs of adjacent sides of equal length. In *Everyday Mathematics*, the four sides cannot all have equal length; that is, a *rhombus* is not a kite. The diagonals of a kite are *perpendicular*. See Section 13.4.2: Polygons (*n*-gons).



A kite

## L

**label** A descriptive word or phrase used to put a number or numbers in context. Labels encourage children to associate numbers with real objects. Flags, snowballs, and scary monsters are examples of labels. See Section 10.2: Use Classes and Situation Diagrams.

**landmark** In *Everyday Mathematics*, a notable feature of a *data set*. Landmarks include the *median*, *mode*, *mean*, *maximum*, *minimum*, and *range*. See Section 12.2.4: Data Analysis.

**lattice multiplication** A very old *algorithm* for multiplying multidigit numbers that requires only basic multiplication facts and addition of 1-digit numbers in a lattice diagram. See Section 11.2.3: Multiplication Algorithms.

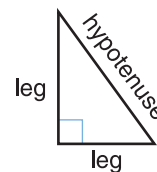
**least common denominator (LCD)** The *least common multiple* of the denominators of every fraction in a given collection. For example, the least common denominator of  $\frac{1}{2}$ ,  $\frac{4}{5}$ , and  $\frac{3}{8}$  is 40.

**least common multiple (LCM)** The smallest number that is a *multiple* of two or more given numbers.

For example, common multiples of 6 and 8 include 24, 48, and 72. The least common multiple of 6 and 8 is 24.

**left-to-right subtraction** A subtraction *algorithm* that works from the left decimal place to the right in several steps. For example, to solve  $94 - 57$ , first calculate  $94 - 50$  to obtain 44 and then calculate  $44 - 7$  to obtain 37. The method is especially suited to mental arithmetic. See Section 11.2.2: Subtraction Algorithms.

**leg of a right triangle** Either *side* of the *right angle* in a *right triangle*; a side that is not the *hypotenuse*. See Section 13.4.2: Polygons (*n*-gons).



**length** The distance between two points on a *1-dimensional figure*. For example, the figure might be a line segment, arc, or a curve on a map modeling a hiking path. Length is measured in units such as inches, kilometers, and miles. See Section 14.3: Length.

**length of a rectangle** Typically, but not necessarily, the longer dimension of a *rectangle*.

**like fractions** *Fractions* with equal *denominators*.

**line** In *Everyday Mathematics*, a 1-dimensional straight path that extends forever in opposite directions. A line is named using two points on it or with a single, italicized lower-case letter such as *l*. In formal Euclidean geometry, line is an undefined geometric term. See Section 13.3: Lines, Segments, and Rays.

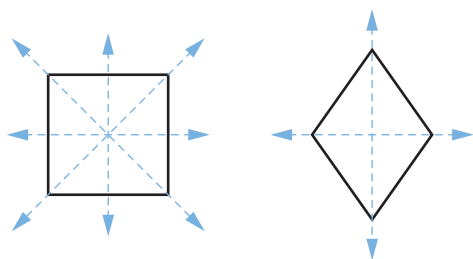


Line  $PR$  or  $\overleftrightarrow{PR}$

**line graph** A graph in which *data points* are connected by *line segments*. Same as *broken-line graph*. See Section 12.2.3: Organizing and Displaying Data.

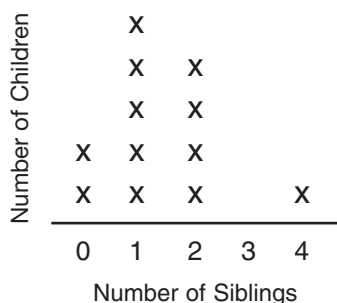
**line of reflection (mirror line)** (1) In *Everyday Mathematics*, a line halfway between a figure and its *reflection* image in a plane. (2) The *perpendicular bisector* of the line segments connecting points on a figure with their corresponding points on its reflection image. Compare to *line of symmetry*. See Section 13.7.1: Flips, Turns, and Slides.

**line of symmetry** A line that divides a figure into two parts that are *reflection* images of each other. A figure may have zero, one, or more lines of symmetry. For example, the numeral 2 has no lines of symmetry, a square has four lines of symmetry, and a circle has infinitely many lines of symmetry. Also called a symmetry line. See Section 13.8.1: Line Symmetry.



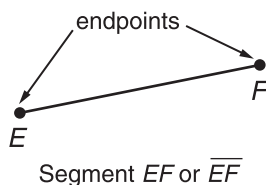
Lines of symmetry are shown in blue.

**line plot** A sketch of data in which check marks, Xs, or other symbols above a labeled line show the frequency of each value. See Section 12.2.3: Organizing and Displaying Data.

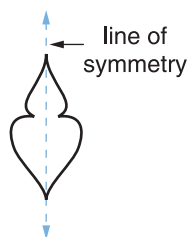


A line plot

**line segment** A part of a *line* between and including two points called *endpoints* of the segment. Same as *segment*. A line segment is often named by its endpoints. See Section 13.3: Lines, Segments, and Rays.

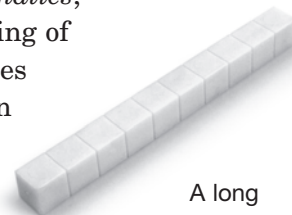


**line symmetry** A figure has line symmetry if a line can be drawn that divides it into two parts that are *reflection* images of each other. See *line of symmetry* and Section 13.7.1: Flips, Turns, and Slides.



**liter (L)** A metric unit of *volume* or *capacity* equal to the volume of a cube with 10-cm-long edges.  $1 \text{ L} = 1,000 \text{ mL} = 1,000 \text{ cm}^3$ . A liter is a little larger than a quart. See the Tables of Measures and Section 14.5: Volume (Capacity).

**long** In *Everyday Mathematics*, the *base-10 block* consisting of ten 1-cm cubes. Sometimes called a “rod.” See Section 9.7.1: Base-10 Blocks.



A long

**long-term memory** *Memory* in a calculator used by keys with an M on them, such as  $\boxed{M-}$  and  $\boxed{M+}$ . Numbers in long-term memory are not affected by calculations with keys without an M, which use *short-term memory*. See Section 3.1.1: Calculators.

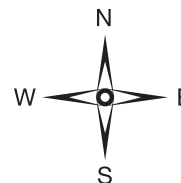
**lowest terms of a fraction** Same as *simplest form of a fraction*.



**magnitude estimate** A rough *estimate* of whether a number is in the tens, hundreds, thousands, or other powers of 10. For example, the U.S. national debt per person is in the tens of thousands of dollars. In *Everyday Mathematics*, children give magnitude estimates for problems such as *How many dimes are in \$200?* or *How many halves are in 30?* Same as *order-of-magnitude estimate*. See Section 16.1.3: Estimates in Calculations.

**map direction symbol**

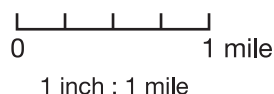
A symbol on a map that identifies north, south, east, and west. Sometimes only north is indicated. See Section 15.4: Maps.



**map legend (map key)** A diagram that explains the symbols, markings, and colors on a map.



**map scale** The *ratio* of a distance on a map, globe, or drawing to an actual distance. For example, 1 inch on a map might correspond to 1 real-world mile. A map scale may be shown on a segment of a number line, given as a ratio of distances such as  $\frac{1}{63,360}$  or 1:63,360 when an inch represents a mile, or by an informal use of the = symbol such as “1 inch = 1 mile.” See Section 15.4.2: Map and Model Scales.



**mass** A measure of the amount of matter in an object. Mass is not affected by gravity, so it is the same on Earth, the moon, or anywhere else in space. Mass is usually measured in grams, kilograms, and other metric units. Compare to *weight*. See Section 14.6: Weight and Mass.

**Math Boxes** In *Everyday Mathematics*, a collection of problems to practice skills. Math Boxes for each lesson are in the *Math Journal*. See Section 1.2.4: Math Boxes.

**Math Journal** In *Everyday Mathematics*, a place for students to record their mathematical discoveries and experiences. Journal pages give models for conceptual understanding, problems to solve, and directions for individual and small-group activities.

**Math Master** In *Everyday Mathematics*, a page ready for duplicating. Most masters support children in carrying out suggested activities. Some masters are used more than once during the school year.

**Math Message** In *Everyday Mathematics*, an introductory activity to the day’s lesson that children complete before the lesson starts. Messages may include problems to solve, directions to follow, sentences to complete or correct, review exercises, or reading assignments. See Section 1.2.5: Math Messages.

**maximum** The largest amount; the greatest number in a set of data. Compare to *minimum*. See Section 12.2.4: Data Analysis.

**mean** For a set of numbers, their sum divided by the number of numbers. Often called the *average* value of the set. Compare to other data *landmarks median* and *mode*. See Section 12.2.4: Data Analysis.

**measurement division** A term for the type of division used to solve an *equal-grouping story* such as *How many tables seating 4 people each are needed for 52 people?* Same as *quotitive division*. Compare to *partitive division*. See Section 10.2.2: Multiplication and Division Use Classes.

**measurement unit** The reference unit used when measuring. Examples of basic units include inches for *length*, grams for *mass* or *weight*, cubic inches for *volume* or *capacity*, seconds for *elapsed time*, and degrees Celsius for change of temperature. Compound units include square centimeters for area and miles per hour for speed. See Section 14.2: Measurement Systems.

**median** The middle value in a set of data when the data are listed in order from smallest to largest or vice versa. If there is an even number of data points, the median is the *mean* of the two middle values. Compare to other data *landmarks mean* and *mode*. See Section 12.2.4: Data Analysis.

**memory in a calculator** Where numbers are stored in a calculator for use in later calculations. Most calculators have both a *short-term memory* and a *long-term memory*. See Section 3.1.1: Calculators.

**mental arithmetic** Computation done by people “in their heads,” either in whole or in part. In *Everyday Mathematics*, students learn a variety of mental-calculation strategies to develop automatic recall of basic facts and *fact power*. See Section 16.3: Mental Arithmetic.

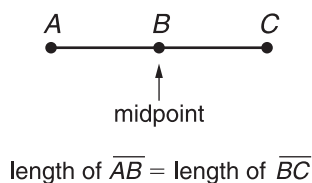
**Mental Math and Reflexes** In *Everyday Mathematics*, exercises at three levels of difficulty at the beginning of lessons for students to get ready to think about math, warm-up skills they need for the lesson, continually build mental-arithmetic skills, and help you assess individual strengths and weaknesses. See Section 1.2.6: Mental Math and Reflexes.

**meter (m)** The basic metric unit of *length* from which other metric units of length are derived. Originally, the meter was defined as  $\frac{1}{10,000,000}$  of the distance from the North Pole to the equator along a meridian passing through Paris. From 1960 to 1983, the meter was redefined as 1,630,763.73 wavelengths of orange-red light from the element krypton. Today, the meter is defined as the distance light travels in a vacuum in  $\frac{1}{299,792,458}$  second. One meter is equal to 10 decimeters, 100 centimeters, or 1,000 millimeters. See Section 14.3: Length.

**metric system** A measurement system based on the *base-ten* (decimal) numeration system and used in most countries and by virtually all scientists around the world. Units for *length* include millimeter, centimeter, meter, and kilometer; units for *mass* and *weight* include gram and kilogram; units for *volume* and *capacity* include milliliter and liter; and the unit for *temperature* change is degrees Celsius. See the Tables of Measures and Section 14.2.2: Metric System.

**middle value** Same as *median*.

**midpoint** A point halfway between two other points. The midpoint of a line segment is the point halfway between the endpoints.



**mile (mi)** A U.S. customary unit of *length* equal to 5,280 feet, or 1,760 yards. A mile is about 1,609 meters.

**milli-** A prefix meaning thousandth.

**milliliter (mL)** A metric unit of *volume* or *capacity* equal to  $\frac{1}{1,000}$  of a liter, or 1 cubic centimeter. See Section 14.5: Volume (Capacity).

**millimeter (mm)** A metric unit of *length* equal to  $\frac{1}{10}$  of a centimeter, or  $\frac{1}{1,000}$  of a meter. See Section 14.3: Length.

**millisecond (ms or msec)** A unit of time equal to  $\frac{1}{1,000}$  of a second.

**minimum** The smallest amount; the smallest number in a set of data. Compare to *maximum*. See Section 12.2.4: Data Analysis.

**minuend** In subtraction, the number from which another number is subtracted. For example, in  $19 - 5 = 14$ , the minuend is 19. Compare to *subtrahend*.

**mirror image** Same as *reflection* image.

**mixed number** A number that is written using both a *whole number* and a *fraction*. For example,  $2\frac{1}{4}$  is a mixed number equal to  $2 + \frac{1}{4}$ .

**modal** Of or relating to the *mode*.

**mode** The value or values that occur most often in a set of data. Compare to other *landmarks* *median* and *mean*. See Section 12.2.4: Data Analysis.

**modified repeated addition** A multiplication *algorithm* based on adding  $a$  to itself  $b$  times to find  $a \times b$ . One of the factors is separated into parts and the partial products of the other factor and those parts are then added. For example, to compute  $67 \times 53$ , think of 10 [67s] as 670 and add five of them to get  $50 \times 67$ . Then add the remaining 3 [67s] to the result. See Section 11.2.3: Multiplication Algorithms.

**modified U.S. traditional multiplication** A multiplication *algorithm* in which the traditional algorithm is enhanced by introducing 0s into the blanks to maintain the logic of the process and to help avoid sloppy alignment of partial products. See Section 11.2.3: Multiplication Algorithms.

**multiple of a number  $n$**  (1) A product of  $n$  and a *counting number*. For example, the multiples of 7 are 7, 14, 21, 28, . . . (2) A product of  $n$  and an *integer*. For example, the multiples of 7 are . . . , -21, -14, -7, 0, 7, 14, 21, . . .

**multiples of equal groups** A *multiple* of a rate in an *equal-grouping* situation. For example, *How many balloons are there altogether in 6 packages with 20 balloons per package?* is a multiple-of-equal-groups problem. See Section 10.2.2: Multiplication and Division Use Classes.

**multiplication/division use class** In *Everyday Mathematics*, a situation in which multiplication or division is used. These include *equal grouping/sharing*, *arrays and area*, *rates and ratio*, *scaling*, and *Cartesian product* situations. See Section 10.2.2: Multiplication and Division Use Classes.

**multiplication/division diagram** A diagram used in *Everyday Mathematics* to model situations in which a total number is made up of equal-size groups. The diagram contains a number of groups, a number in each group, and a total number. Also called a multiplication diagram for short. See *situation diagram* and Section 10.2.2: Multiplication and Division Use Classes.

rows	chairs per row	total chairs
15	25	?

A multiplication/division diagram

**multiplication fact** The product of two 1-digit numbers, such as  $6 \times 7 = 42$ . See *arithmetic facts* and Section 16.3.2: Basic Facts and Fact Power.

**multiplication symbols** The number  $a$  multiplied by the number  $b$  is written in a variety of ways. Many mathematics textbooks and *Second* and *Third Grade Everyday Mathematics* use  $\times$  as in  $a \times b$ . Beginning in fourth grade, *Everyday Mathematics* uses  $*$  as in  $a * b$ . Other common symbols are a dot as in  $a \cdot b$  and by *juxtaposition* as in  $ab$ , which is common in formulas and in algebra courses. See Section 10.1.1: Arithmetic Symbols.

**multiplicative inverses** Same as *reciprocals*.

## N

**name-collection box** In *Everyday Mathematics*, a diagram that is used for collecting *equivalent names* for a number. See Section 1.3.3: Name-Collection Boxes.

25
$37 - 12$
$20 + 5$
###-###-###-###-###
twenty-five
veinticinco

**natural numbers** In *Everyday Mathematics*, same as *counting numbers*.

**negative numbers** Numbers less than 0; the opposites of the *positive numbers*, commonly written as a positive number preceded by a  $-$ . Negative numbers are plotted left of 0 on a horizontal number line or below 0 on a vertical number line. See Section 9.4: Positive and Negative Numbers.

**negative rational numbers** *Rational numbers* less than 0; the opposites of the *positive rational numbers*. For example,  $-24$ ,  $-2.333 \dots$ , and  $-\frac{5}{8}$  are negative rational numbers. See Section 9.4: Positive and Negative Numbers.

**nested parentheses** Parentheses within parentheses in an *expression*. Expressions are evaluated from within the innermost parentheses outward. See *grouping symbols* for an example and Section 10.1.2: Reading and Writing Number Sentences.

**net score** The final score of a turn or game after all calculations have been completed.

**net weight** The *weight* of the contents of a container, excluding the weight of the container.

**$n$ -gon** Same as *polygon*, where  $n$  is the number of sides. Polygons that do not have special names like squares and pentagons are usually named using  $n$ -gon notation, such as 13-gon or 100-gon.

**nona-** A prefix meaning nine.

**nonagon** A 9-sided *polygon*.

**nonconvex polygon** Same as *concave polygon*.

**normal span** The distance from the end of the thumb to the end of the index (first) finger of an outstretched hand. For estimating lengths, many people can adjust this distance to approximately 6 inches or 15 centimeters. Same as *span*. Compare to *great span*. See Section 14.1: Personal Measures.

**$n$ -to-1 ratio** A ratio of a number  $n$  to 1. Every ratio  $a:b$  can be converted to an  $n$ -to-1 ratio by dividing  $a$  by  $b$ . For example, a ratio of 3 to 2 is a ratio of  $3 \div 2 = 1.5$  or a 1.5-to-1 ratio.

**number-and-word notation** A notation consisting of the *significant digits* of a number and words for the place value. For example, 27 billion is number-and-word notation for 27,000,000,000.

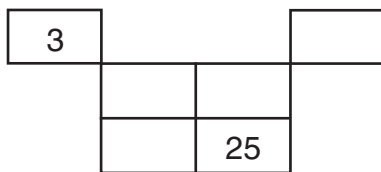
**number family** Same as *fact family*.

**number grid** In *Everyday Mathematics*, a table in which *consecutive* numbers are arranged in *rows*, usually 10 *columns* per row. A move from one number to the next within a *row* is a change of 1; a move from one number to the next within a *column* is a change of 10. See Section 9.7.2: Number Grids, Scrolls, and Lines.

-9	-8	-7	-6	-5	-4	-3	-2	-1	0
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
101	102	103	104	105	106	107	108	109	110

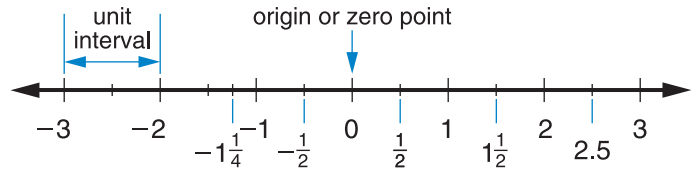
A number grid

**number-grid puzzle** In *Everyday Mathematics*, a piece of a *number grid* in which some, but not all, of the numbers are missing. Students use number-grid puzzles to practice place-value concepts.



A number-grid puzzle

**number line** A line on which points are indicated by *tick marks* that are usually at regularly spaced intervals from a starting point called the *origin*, the *zero point*, or simply 0. Numbers are associated with the tick marks on a *scale* defined by the *unit interval* from 0 to 1. See Section 9.7.2: Number Grids, Scrolls, and Lines.



A number line

**number model** A *number sentence*, *expression*, or other representation that models a *number story* or situation. For example, the story *Sally had \$5, and then she earned \$8* can be modeled as the number sentence  $5 + 8 = 13$ , as the expression  $5 + 8$ , or by

$$\begin{array}{r} 5 \\ + 8 \\ \hline 13 \end{array}$$

See Section 10.1: Number Sentences and Number Models and Section 18.3: Mathematical Modeling.

**number scroll** In *Everyday Mathematics*, a series of *number grids* taped together. See Section 9.7.2: Number Grids, Scrolls, and Lines.



A number scroll

**number sentence** Two *expressions* with a *relation symbol*. See Section 10.1: Number Sentences and Number Models.

$$\begin{array}{ll} 5 + 5 = 10 & 16 \leq a \times b \\ 2 - ? = 8 & a^2 + b^2 = c^2 \end{array}$$

Number sentences

**number sequence** A list of numbers, often generated by a rule. In *Everyday Mathematics*, students explore number sequences using *Frames-and-Arrows* diagrams. See Section 17.1.3: Sequences.

1, 2, 3, 4, 5, . . .      1, 4, 9, 16, 25, . . .  
 1, 2, 1, 2, 1, . . .      1, 3, 5, 7, 9, . . .

Number sequences

**number story** A story that involves numbers and one or more explicit or implicit questions. For example, *I have 7 crayons in my desk. Carrie gave me 8 more crayons. Now I have 15 crayons in all* is a number story. See Section 18.4.1: Number Stories.

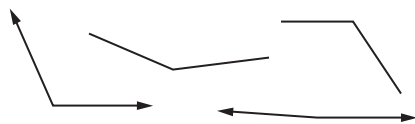
**numeral** A word, symbol, or figure that represents a number. For example, six, VI, ~~###~~, and 6 are all numerals that represent the same number.

**numeration** A method of numbering or of reading and writing numbers. In *Everyday Mathematics*, numeration activities include counting, writing numbers, identifying equivalent names for numbers in *name-collection boxes*, exchanging coins such as 5 pennies for 1 nickel, and renaming numbers in computation. See Section 9.2.1: Numeration and Place Value.

**numerator** The dividend  $a$  in a fraction  $\frac{a}{b}$  or  $a/b$ . In a part-whole *fraction*, in which the *whole* (the *ONE* or *unit whole*) is divided into a number of equal parts, the numerator is the number of equal parts being considered. Compare to *denominator*. See Section 9.3.1: Fraction and Decimal Notation.

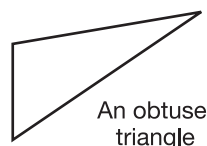
## O

**obtuse angle** An *angle* with measure between  $90^\circ$  and  $180^\circ$ . See Section 13.4.1: Angles and Rotations.



Obtuse angles

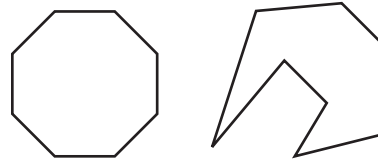
**obtuse triangle** A *triangle* with an angle measuring more than  $90^\circ$ . See Section 13.4.2: Polygons ( $n$ -gons).



An obtuse triangle

**octa-** A prefix meaning eight.

**octagon** An 8-sided *polygon*. See Section 13.4.2: Polygons ( $n$ -gons).



Octagons

**octahedron** A *polyhedron* with 8 faces. An octahedron with 8 *equilateral triangle* faces is one of the five *regular polyhedrons*. See Section 13.5.2: Polyhedrons.

**odd number** A *counting number* that is not *divisible by 2*. Compare to *even number*. See Section 17.1.2: Odd and Even Number Patterns.

**ONE** In *Everyday Mathematics*, same as *whole* or *unit whole*.

**1-dimensional (1-D) coordinate system** A *reference frame* in which any point on a *1-dimensional figure* can be located with one *coordinate* relative to the origin of a number line. Compare to *2-dimensional* and *3-dimensional coordinate systems*. See Section 15.3.1: Number Grids, Scrolls, and Lines.

**1-dimensional (1-D) figure** A figure such as a line segment, arc, or part of a curve that has length but no width or depth. Compare to *2- and 3-dimensional figures*. See Section 13.1: Dimension.

**open sentence** A *number sentence* with one or more *variables*. An open sentence is neither true nor false. For example,  $9 + \underline{\quad} = 15$ ,  $? - 24 < 10$ , and  $7 = x + y$  are open sentences. See Section 17.2.2: Reading and Writing Open Sentences.

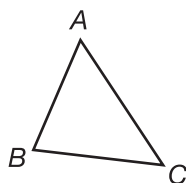
**operation** A rule performed on one or more mathematical objects such as numbers, *variables*, or *expressions* to produce another mathematical object. Addition, subtraction, multiplication, and division are the four basic arithmetic operations. Taking a square root, squaring a number, and multiplying both sides of an *equation* by the same number are also operations. In *Everyday Mathematics*, students learn about many operations along with several procedures, or *algorithms*, for carrying them out. See Chapter 10: Operations and Number Models.

**operation symbol** A symbol used in *expressions* and *number sentences* to stand for a particular mathematical operation. Symbols for common arithmetic operations are:

addition	+
subtraction	−
multiplication	×, *, •
division	÷, /
powering	^

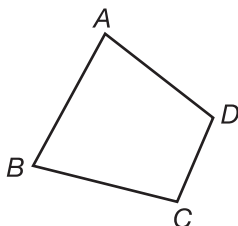
See Section 10.1: Number Sentences and Number Models.

**opposite angle in a triangle** The *angle* opposite a *side* of a *triangle* that is not one of the sides of the angle.



Angle C is opposite side AB.

**opposite angles in a quadrilateral** Two *angles* in a *quadrilateral* that do not share a side.



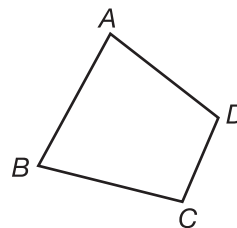
Angles A and C; angles B and D are pairs of opposite angles.

**opposite-change rule for addition** An addition *algorithm* in which a number is added to one *addend* and subtracted from the other addend. Compare to *same-change rule for subtraction*. See Section 11.2.1: Addition Algorithms.

**opposite of a number  $n$**  A number that is the same distance from 0 on a number line as  $n$ , but on the opposite side of 0. In symbols, the opposite of a number  $n$  is  $-n$  and, in *Everyday Mathematics*,  $OPP(n)$ . If  $n$  is a negative number,  $-n$  is a positive number. For example, the opposite of  $-5$  is 5. The sum of a number  $n$  and its opposite is zero;  $n + -n = 0$ . Same as *additive inverse*.

**opposite side in a triangle** The *side* opposite an *angle* of a *triangle* that is not a side of the angle.

**opposite sides in a quadrilateral** Two *sides* in a *quadrilateral* that do not share a *vertex*.



Sides AB and DC; sides BC and AD are pairs of opposite sides.

**order-of-magnitude estimate** Same as *magnitude estimate*.

**order-of-magnitude increase** A 10-times change in a value. Sometimes simply called a magnitude increase. See Section 16.1.2: Extreme Numbers.

**order of operations** Rules that tell the order in which operations in an *expression* should be carried out. The conventional order of operations is:

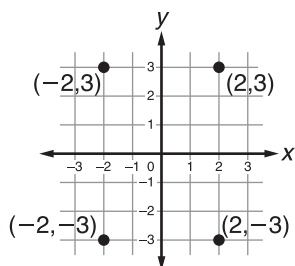
1. Do operations inside *grouping symbols*. Work from the innermost set of grouping symbols outward. Inside grouping symbols, follow Rules 2–4.
2. Calculate all expressions with *exponents*.
3. *Multiply* and *divide* in order from left to right.
4. *Add* and *subtract* in order from left to right.

For example:

$$\begin{aligned}
 5^2 + (3 \times 4 - 2) \div 5 &= 5^2 + (12 - 2) \div 5 \\
 &= 5^2 + 10 \div 5 \\
 &= 25 + 10 \div 5 \\
 &= 25 + 2 \\
 &= 27
 \end{aligned}$$

Same as *algebraic order of operations*. See Section 10.1.2: Reading and Writing Number Sentences.

**ordered pair** (1) Two numbers, or *coordinates*, used to locate a point on a *rectangular coordinate grid*. The first coordinate  $x$  gives the position along the horizontal axis of the grid, and the second coordinate  $y$  gives the position along the vertical axis. The pair is written  $(x,y)$ . See Section 15.3: Coordinate Systems. (2) Any pair of objects or numbers in a particular order.

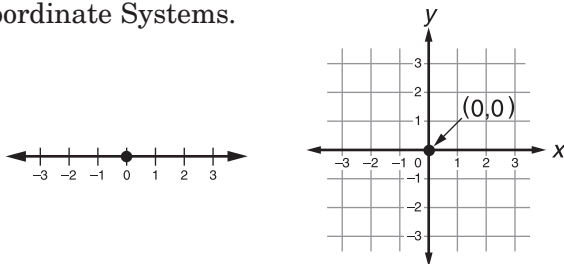


Ordered pairs

**orders of magnitude** Positive powers of 10 including 10, 100, 1,000, and so on. See *order-of-magnitude increase* and Section 16.1.2: Extreme Numbers.

**ordinal number** The position or order of something in a *sequence*, such as first, third, or tenth. Ordinal numbers are commonly used in dates, as in “May fifth” instead of “May five.” See Section 9.2.3: Ordinal Numbers.

**origin** The zero point in a *coordinate system*. On a number line, the origin is the point at 0. On a coordinate grid, the origin is the point  $(0,0)$  where the two axes intersect. See Section 15.3: Coordinate Systems.



The points at 0 and  $(0,0)$  are origins.

**ounce (oz)** A U.S. customary unit of *weight* equal to  $\frac{1}{16}$  of a pound or about 28.35 grams. Compare to *fluid ounce*. See the Tables of Measures and Section 14.6: Weight and Mass.

**outcome** A possible result of a chance experiment or situation. For example, HEADS and TAILS are the two possible outcomes of flipping a coin. See *event*, *equally likely outcomes*, and Section 12.1.2: The Language of Chance.

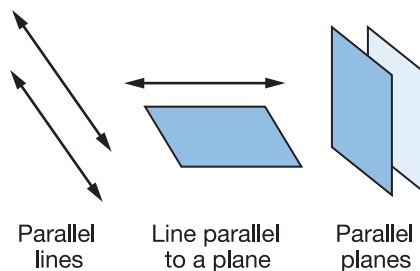
**output** (1) A number paired to an *input* by an imaginary *function machine* applying a rule. (2) The values for  $y$  in a *function* consisting of ordered pairs  $(x,y)$ . See Section 17.1.4: Functions. (3) Numbers or other information displayed by calculator or computer.

**P**

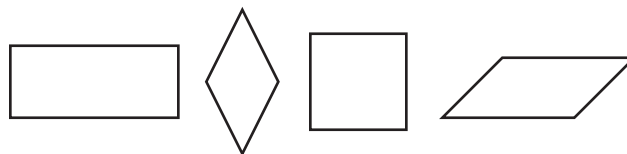
**pan balance** A device used to weigh objects or compare their *weights*. See Section 14.10.3: Scales and Balances.

**parallel lines** *Lines* in a *plane* that never meet. Two parallel lines are always the same distance apart. *Line segments* or *rays* on parallel lines are parallel to each other. See Section 13.6.1: Perpendicular and Parallel.

**parallel planes** *Planes* in space that never meet. Two parallel planes are always the same distance apart. A figure in one plane is parallel to the other plane. Polygons in one plane are said to be parallel to polygons in the other plane. However, 1-dimensional shapes such as lines, segments, and rays in one plane are not necessarily parallel to 1-dimensional shapes in a parallel plane. See Section 13.6.1: Perpendicular and Parallel.



**parallelogram** A *quadrilateral* with two pairs of parallel sides. *Opposite sides* of a parallelogram have the same length and *opposite angles* have the same measure. All rectangles are parallelograms, but not all parallelograms are rectangles because parallelograms do not necessarily have right angles. See Section 13.4.2: Polygons ( $n$ -gons).



Parallelograms

**parentheses** See *grouping symbols*.

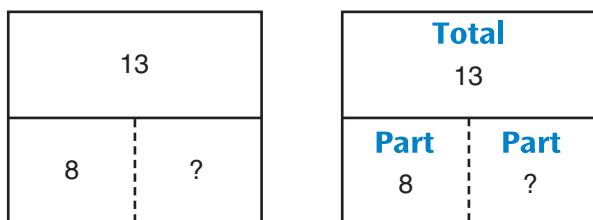
**partial-differences subtraction** A subtraction *algorithm* in which separate differences are computed for each place value of the numbers and then added to get a final difference. See Section 11.2.2: Subtraction Algorithms.

**partial-products multiplication** A multiplication *algorithm* in which partial products are computed by multiplying the value of each digit in one factor by the value of each digit in the other factor. The final product is the sum of the partial products. See Section 11.2.3: Multiplication Algorithms.

**partial-sums addition** An addition *algorithm* in which separate sums are computed for each place value of the numbers and then added to get a final sum. See Section 11.2.1: Addition Algorithms.

**partitive division** A term for the type of division used to solve an *equal-sharing story* such as *If \$10 is shared by 4 people, how much does each person get?* Compare to *measurement division*. See Section 10.2.2: Multiplication and Division Use Classes.

**parts-and-total diagram** In *Everyday Mathematics*, a diagram used to model problems in which two or more quantities (parts) are combined to get a total quantity. See *situation diagram* and Section 10.2.1: Addition and Subtraction Use Classes.



Parts-and-total diagrams for  $13 = 8 + ?$

**parts-and-total story** A *number story* in which a whole is made up of distinct parts. For example, *There are 15 girls and 12 boys in Mrs. Dorn's class. How many students are there in all?* is a parts-and-total story. In other stories, the total and one or more parts may be known and the last part unknown. See Section 10.2.1: Addition and Subtraction Use Classes.

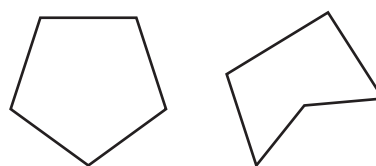
**pattern** A repetitive order or arrangement. In *Everyday Mathematics*, students mainly explore visual and number patterns in which elements are arranged so that what comes next can be predicted. See Section 17.1: Patterns, Sequences, and Functions.

**Pattern-Block Template** In *First through Third Grade Everyday Mathematics*, a sheet of plastic with geometric shapes cut out, used to draw patterns and designs. See Section 13.10.1: Pattern-Block Template.

**pattern blocks** A set of *polygon*-shaped blocks of varying sizes in which smaller blocks can be placed on larger blocks to show fractional parts. The blocks are used for geometric-shape identification and fraction activities. Compare to *attribute blocks*.

**penta-** A prefix meaning five.

**pentagon** A 5-sided *polygon*. See Section 13.4.2: Polygons (*n*-gons).



Pentagons

**per** For each, as in *ten chairs per row* or *six tickets per family*.

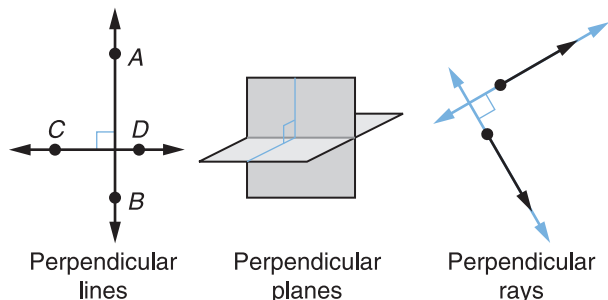
**per capita** For each person. Often used to describe an *average* of a data set, as in *The per-capita debt for U.S. citizens in July 2005 was \$26,451.95*.

**percent (%)** Per hundred, for each hundred, or out of a hundred.  $1\% = \frac{1}{100} = 0.01$ . For example, *48% of the students in the school are boys* means that, on average, 48 of every 100 children in the school are boys. See Section 9.3.4: Percents.

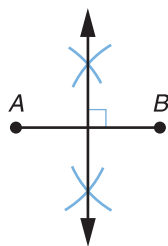
**perimeter** The distance around the boundary of a *2-dimensional figure*. The perimeter of a *circle* is called its *circumference*. A formula for the perimeter  $P$  of a *rectangle* with length  $l$  and width  $w$  is  $P = 2 \times (l + w)$ . Perimeter comes from the Greek words for “around measure.” See Section 14.3: Length.



**perpendicular ( $\perp$ )** Two *lines* or two *planes* that intersect at *right angles*. *Line segments* or *rays* that lie on perpendicular lines are perpendicular to each other. The symbol  $\perp$  means “is perpendicular to.” See Section 13.6.1: Perpendicular and Parallel.



**perpendicular bisector** A *line*, *ray*, or *segment* that *bisects* a line segment at a *right angle*.



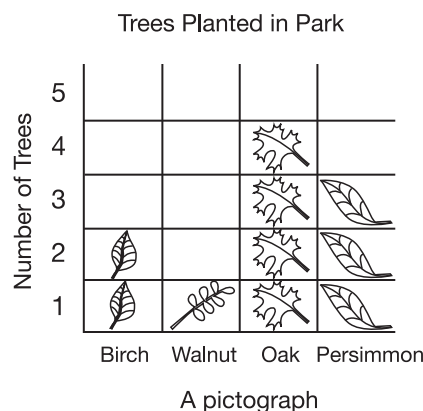
Construction of a perpendicular bisector of  $\overline{AB}$

**personal-measurement reference** A convenient approximation for a standard unit of measurement. For example, many people have thumbs that are approximately one inch wide. See Section 14.1: Personal Measures.

**perspective drawing** A drawing that realistically represents a 3-dimensional object on a 2-dimensional surface. See Section 13.5.4: Connecting 2-D and 3-D.

**pi ( $\pi$ )** The ratio of the *circumference* of a circle to its *diameter*. Pi is also the ratio of the area of a circle to the square of its radius. Pi is the same for every circle and is an *irrational number* that is approximately equal to 3.14. The symbol  $\pi$  is the sixteenth letter of the Greek alphabet. See page 67 for the first 1,832 digits of  $\pi$ , and Section 13.4.3: Circles and Pi ( $\pi$ ).

**pictograph** A graph constructed with pictures or symbols. See Section 12.2.3: Organizing and Displaying Data.



**pie graph** Same as *circle graph*.

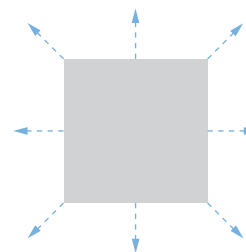
**pint (pt)** A U.S. customary unit of *volume* or *capacity* equal to 2 cups, or 16 fluid ounces. A handy saying to remember is *A pint’s a pound the world around*, meaning that a pint of water weighs about 1 pound. See the Tables of Measures and Section 14.5: Volume (Capacity).

**place value** A system that gives a *digit* a value according to its position, or place, in a number. In our standard, *base-ten* (decimal) system for writing numbers, each place has a value 10 times that of the place to its right and 1 tenth the value of the place to its left. See Section 9.2.1: Numeration and Place Value.

thousands	hundreds	tens	ones	.	tenths	hundredths

A place-value chart

**plane** In *Everyday Mathematics*, a *2-dimensional* flat surface that extends forever in all directions. In formal Euclidean geometry, plane is an undefined geometric term. See Section 13.4: Planes and Plane Figures.

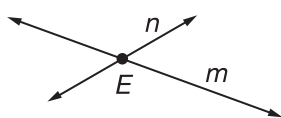


A plane

**plane figure** A *2-dimensional figure* that is entirely contained in a single *plane*. For example, triangles, squares, pentagons, circles, and parabolas are plane figures; lines, rays, cones, cubes, and prisms are not. See Section 13.4: Planes and Plane Figures.

**P.M.** The abbreviation for *post meridiem*, meaning “after the middle of the day” in Latin. From noon to midnight.

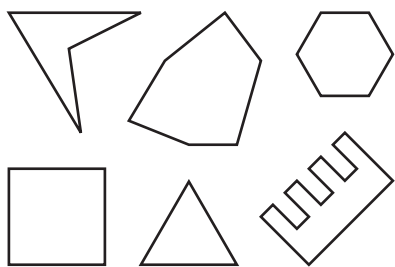
**point** In *Everyday Mathematics*, an exact location in space. Points are usually labeled with capital letters. In formal Euclidean geometry, point is an undefined geometric term. See Section 13.2: Points.



Lines *m* and *n* intersect at point *E*.

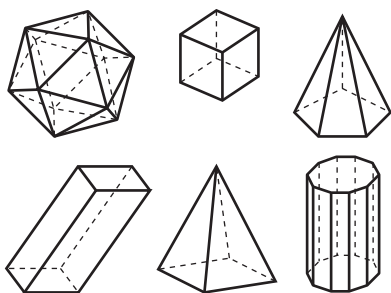
**poly-** A prefix meaning many.

**polygon** A *2-dimensional figure* formed by three or more line segments (*sides*) that meet only at their endpoints (*vertices*) to make a closed path. The sides may not cross one another. See Section 13.4.2: Polygons (*n*-gons).



Polygons

**polyhedron** A *3-dimensional figure* formed by *polygons* with their interiors (*faces*) and having no holes. Plural is polyhedrons or polyhedra. See Section 13.5.2: Polyhedrons.



Polyhedrons

**population** (1) The total number of people living within a defined geographic region. (2) In data collection, the group of people or objects that is the focus of study. Large populations are often studied by picking a representative *random sample* from the population. See Section 12.2.2: Collecting and Recording Data.

**population density** The number of people living in a defined geographic region, usually given as a *rate*, such as *876 people per square mile*.

**positive numbers** Numbers greater than 0; the opposites of the *negative numbers*. Positive numbers are plotted to the right of 0 on a horizontal number line or above 0 on a vertical number line. See Section 9.4: Positive and Negative Numbers.

**positive rational numbers** *Rational numbers* greater than 0; the opposites of the *negative rational numbers*. For example,  $7$ ,  $\frac{4}{3}$ ,  $\frac{1}{1,000}$ ,  $0.01$ ,  $8.125$ , and  $5.111 \dots$  are positive rational numbers. See Section 9.4: Positive and Negative Numbers.

**poster** In *Everyday Mathematics*, a page displaying a collection of illustrated numerical data. A poster may be used as a source of data for developing *number stories*.

**pound (lb)** A U.S. customary unit of *weight* equal to 16 ounces and defined as 0.45359237 kilograms. See the Tables of Measures and Section 14.6: Weight and Mass.

**power** Same as *exponent*.

**power of a number** A *product of factors* that are all the same; the result of  $a^b$  for any numbers  $a$  and  $b$ . For example,  $5^3 = 5 \times 5 \times 5 = 125$  is read “5 to the third power” or “the third power of 5” because 5 is a factor 3 times. See *exponential notation* and Section 10.1.1: Arithmetic Symbols.

**precipitation** Condensed atmospheric moisture that falls to the ground, including rain, snow, and hail. In the United States, rainfall is typically measured in inches. Snow and hail are first melted and then measured like rain.

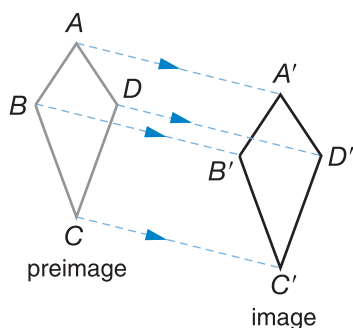
**precise** Exact or accurate.

**precise calculations** The more accurate measures or other data are, the more *precise* any calculations using those numbers can be. See *significant digits* and Section 16.2: Approximation and Rounding.

**precise measures** The smaller the *scale* of a measuring tool, the more *precise* a measurement can be. For example, a measurement to the nearest inch is more precise than a measurement to the nearest foot. A ruler with  $\frac{1}{16}$ -inch markings can be more precise than a ruler with only  $\frac{1}{4}$ -inch markings, depending on the skill of the person doing the measuring.

**predict** In mathematics, to say what will happen in the future based on experimental data or theoretical calculation.

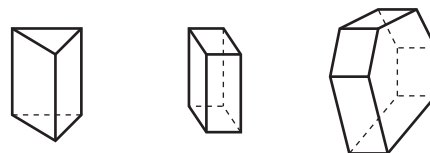
**preimage** The original figure in a *transformation*. Compare to *image*. See Section 13.7: Transformations.



**prime factorization** A *counting number* written as a product of *prime-number* factors. Every counting number greater than 1 has a unique prime factorization. For example, the prime factorization of 24 is  $2 \times 2 \times 2 \times 3$ .

**prime number** A *counting number* greater than 1 that has exactly two whole-number factors, 1 and itself. For example, 7 is a prime number because its only factors are 1 and 7. The first five prime numbers are 2, 3, 5, 7, and 11. Also simply called *primes*. Compare to *composite number*.

**prism** A *polyhedron* with two parallel and congruent polygonal regions for *bases* and lateral *faces* formed by all the line segments with endpoints on corresponding edges of the bases. The lateral faces are all parallelograms. Lateral faces intersect at lateral *edges*. In a *right prism*, the lateral faces are rectangular. Prisms get their names from the shape of their bases. See Section 13.5.2: Polyhedrons.



A triangular prism

A rectangular prism

A hexagonal prism

**probability** A number from 0 through 1 giving the likelihood that an *event* will happen. The closer a probability is to 1, the more likely the event is to happen. The closer a probability is to 0, the less likely the event is to happen. For example, the probability that a fair coin will show HEADS is  $\frac{1}{2}$ . See Section 12.1: Probability.

**product** The result of multiplying two numbers, called *factors*. For example, in  $4 \times 3 = 12$ , the product is 12.

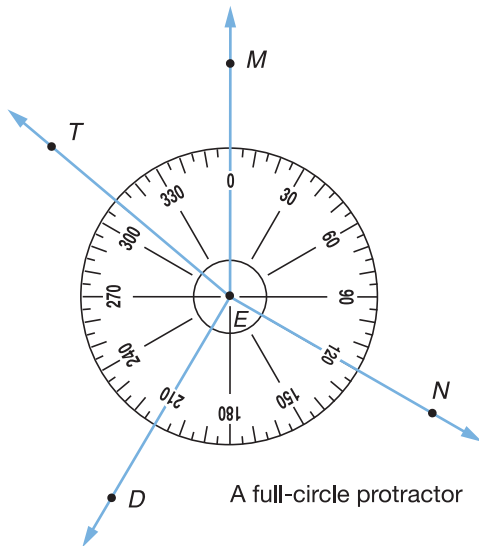
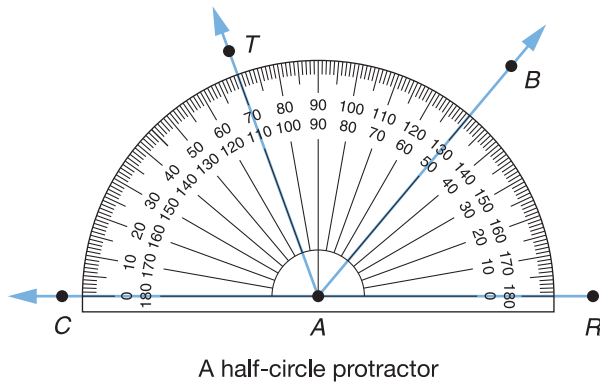
**Project** In *Everyday Mathematics*, a thematic activity to be completed in one or more days by small groups or by a whole class. Projects often involve collecting and analyzing data and are usually cross-curricular in nature. See Section 1.2.9: Projects.

**proper factor** Any *factor of a counting number* except the number itself. For example, the factors of 10 are 1, 2, 5, and 10, and the proper factors of 10 are 1, 2, and 5.

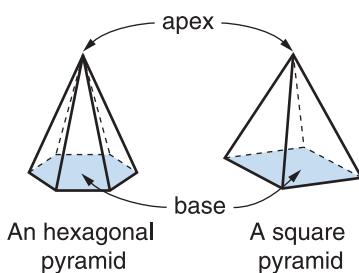
**proper fraction** A *fraction* in which the numerator is less than the denominator. A proper fraction is between  $-1$  and  $1$ . For example,  $\frac{3}{4}$ ,  $-\frac{2}{5}$ , and  $\frac{12}{24}$  are proper fractions. Compare to *improper fraction*. *Everyday Mathematics* does not emphasize these distinctions.

**property** (1) A generalized statement about a mathematical relationship such as the *Distributive Property of Multiplication over Addition*. (2) Same as *attribute*.

**protractor** A tool used for measuring or drawing *angles*. A half-circle protractor can be used to measure and draw angles up to  $180^\circ$ . A full-circle protractor can be used to measure and draw angles up to  $360^\circ$ .



**pyramid** A *polyhedron* made up of any polygonal region for a *base*, a vertex (*apex*) not in the plane of the base, and all of the line segments with one endpoint at the apex and the other on an edge of the base. All faces except perhaps the base are triangular. Pyramids get their name from the shape of their base. See Section 13.5.2: Polyhedrons.

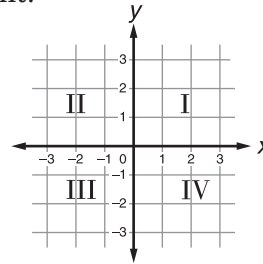


## Q

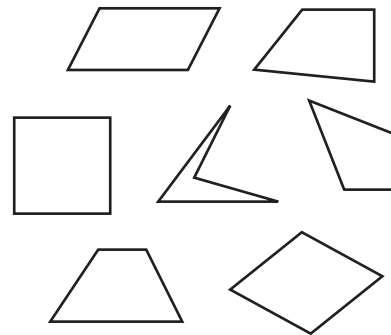
**quad-** A prefix meaning four.

**quadrangle** Same as *quadrilateral*.

**quadrant** One of the four sections into which a *rectangular coordinate grid* is divided by the two axes. The quadrants are typically numbered I, II, III, and IV counterclockwise beginning at the upper right.



**quadrilateral** A 4-sided *polygon*. See *square*, *rectangle*, *parallelogram*, *rhombus*, *kite*, *trapezoid*, and Section 13.4.2: Polygons (*n*-gons).

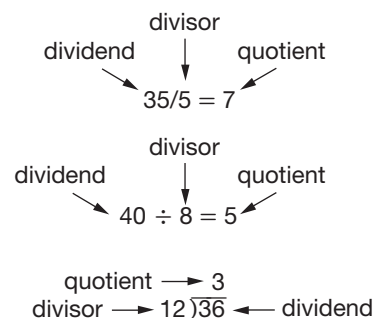


Quadrilaterals

**quadruple** Four times an amount.

**quart** A U.S. customary unit of *volume* or *capacity* equal to 32 fluid ounces, 2 pints, or 4 cups. See the Tables of Measures and Section 14.5: Volume (Capacity).

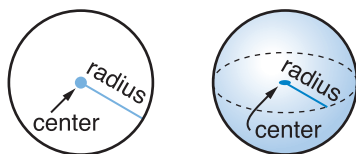
**quotient** The result of dividing one number by another number. For example, in  $10 \div 5 = 2$ , the quotient is 2.



**quotitive division** Same as *measurement division*.

## R

**radius** (1) A *line segment* from the center of a circle (or sphere) to any point on the *circle* (or *sphere*). (2) The length of this line segment. The length of a radius is half the length of a *diameter*. Plural is radiuses or radii. See Section 13.4.3: Circles and Pi ( $\pi$ ).



**random draw** Taking an object from a set of objects in which each object has an *equally likely* chance of being chosen. For example, drawing a card from a deck and drawing a domino from a bag of dominos are random draws. See Section 12.1.2: The Language of Chance.

**random experiment** An experiment in which all *outcomes* are *equally likely*. No one outcome is more predictable than any other. See Section 12.1.2: The Language of Chance.

**random number** A number produced by a *random experiment*, such as rolling a die or spinning a spinner. For example, rolling a fair die produces random numbers because each of the six possible numbers 1, 2, 3, 4, 5, and 6 has the same chance of coming up. See Section 12.1.2: The Language of Chance.

**random sample** A *sample* that gives all members of the *population* the same chance of being selected. See Section 12.2.2: Collecting and Recording Data.

**range** The *difference* between the *maximum* and the *minimum* in a set of data. Used as a measure of the spread of the data. See Section 12.2.4: Data Analysis.

**rate** A comparison by division of two quantities with different *units*. For example, traveling 100 miles in 2 hours is an average rate of  $\frac{100 \text{ mi}}{2 \text{ hr}}$ , or 50 miles per hour. Compare to *ratio*. See Section 9.3.3: Rates and Ratios and Section 10.2.2: Multiplication and Division Use Classes.

**rate diagram** A diagram used in *Everyday Mathematics* to model *rate* situations. The diagram includes two quantities and the rate comparing them. See *situation diagram* and Section 10.2.2: Multiplication and Division Use Classes.

rows	chairs per row	chairs
6	4	?

A rate diagram

**rate-multiplication story** A *number story* in which one quantity is a *rate* times another quantity. A typical rate is *speed*, which multiplied by a time traveled gives distance traveled. There are many other rates such as price per pound or hours per person. For example, *8 people work a total of 20 hours. What is the average number of work hours per person?* is a rate-multiplication story. See Section 10.2.2: Multiplication and Division Use Classes.

**rate table** A display of *rate* information. In a rate table, the fractions formed by the two numbers in each column are *equivalent fractions*. For example,  $\frac{35}{1} = \frac{70}{2}$  in the table below. See Section 10.2.2: Multiplication and Division Use Classes.

miles	35	70	105	140	175	210
gallons	1	2	3	4	5	6

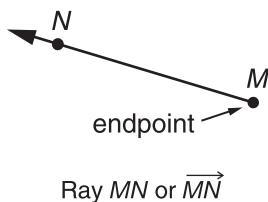
**rate unit** A compound *unit* for a *rate*. For example, *miles per hour*, *dollars per pound*, and *words per minute* are rate units. See Section 9.3.3: Rates and Ratios.

**ratio** A comparison by division of two quantities with the same *units*. Ratios can be fractions, decimals, percents, or stated in words. Ratios can also be written with a colon between the two numbers being compared. For example, if a team wins 3 games out of 5 games played, the ratio of wins to total games is  $\frac{3}{5}$ ,  $3/5$ , 0.6, 60%, 3 to 5, or 3:5 (read “three to five”). Compare to *rate*. See Section 9.3.3: Rates and Ratios.

**rational counting** Counting using one-to-one matching. For example, counting a number of chairs, people, or crackers. See Section 9.2.2: Plain and Fancy Counting.

**rational numbers** Numbers that can be written in the form  $\frac{a}{b}$ , where  $a$  and nonzero  $b$  are *integers*. The decimal form of a rational number either terminates or repeats. For example,  $\frac{2}{3}$ ,  $-\frac{2}{3}$ , 0.5, 20.5, and 0.333 . . . are rational numbers. See Section 9.3: Fractions, Decimals, Percents, and Rational Numbers.

**ray** A part of a *line* starting at the ray's *endpoint* and continuing forever in one direction. A ray is often named by its endpoint and another point on it. See Section 13.3: Lines, Segments, and Rays.



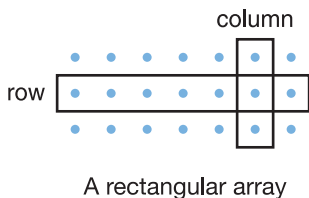
**r-by-c array** A rectangular arrangement of elements with  $r$  rows and  $c$  elements per row. Among other things, an  $r$ -by- $c$  array models  $r$  sets with  $c$  objects per set. Although listing rows before columns is arbitrary, it is in keeping with the order used in matrix notation, which students will study later.

**real numbers** All *rational* and *irrational numbers*; all numbers that can be written as decimals. For every real number there is a corresponding point on a number line, and for every point on the number line there is a real number. See Section 9.5: Irrational and Real Numbers.

**reciprocals** Two numbers whose product is 1. For example, 5 and  $\frac{1}{5}$ ,  $\frac{3}{5}$  and  $\frac{5}{3}$ , and 0.2 and 5 are pairs of reciprocals. Same as *multiplicative inverses*.

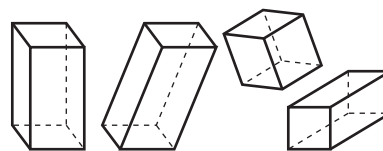
**rectangle** A *parallelogram* with all *right angles*. See Section 13.4.2: Polygons ( $n$ -gons).

**rectangular array** An arrangement of objects in *rows* and *columns* that form a *rectangle*. All rows have the same number of objects, and all columns have the same number of objects. See *r-by-c array* and Section 10.2.2: Multiplication and Division Use Classes.



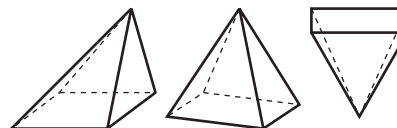
**rectangular coordinate grid** (1) In *Everyday Mathematics*, same as *coordinate grid*. (2) A coordinate grid with perpendicular *axes*. See Section 15.3: Coordinate Systems.

**rectangular prism** A *prism* with rectangular *bases*. The four faces that are not bases are either *rectangles* or *parallelograms*. For example, a shoe box models a rectangular prism in which all sides are rectangles. See Section 13.5.2: Polyhedrons.



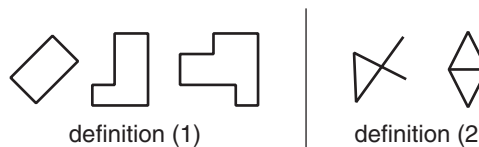
Rectangular prisms

**rectangular pyramid** A *pyramid* with a rectangular *base*. See Section 13.5.2: Polyhedrons.



Rectangular pyramids

**rectilinear figure** (1) In *Everyday Mathematics*, a closed *2-dimensional* shape having *line segments* for *sides* and only  $90^\circ$  or  $270^\circ$  *angles*. (2) Any shape made up of *line segments*.



definition (1)

definition (2)

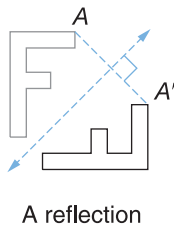
Rectilinear figures

**reduce** To decrease the size of an object or figure without changing its shape. Same as *shrink*. See *scale factor* and Section 13.7.2: Stretches and Shrinks.

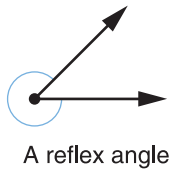
**reduce a fraction** To rewrite a fraction in a *simpler form*. See *simplest form of a fraction*.

**reference frame** A system for locating numbers within a given context, usually with reference to an *origin* or *zero point*. For example, number lines, clocks, calendars, temperature scales, and maps are reference frames. See Chapter 15: Reference Frames.

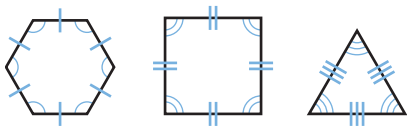
**reflection** A transformation in which the *image* of a figure is a mirror image of the figure over a *line of reflection*. Each point  $A$  on the figure and its corresponding point  $A'$  on the image are the same distance from the line of reflection on a line perpendicular to it. Informally called a *flip*. See Section 13.7.1: Flips, Turns, and Slides.



**reflex angle** An *angle* with a measure between  $180^\circ$  and  $360^\circ$ . See Section 13.4.1: Angles and Rotations.

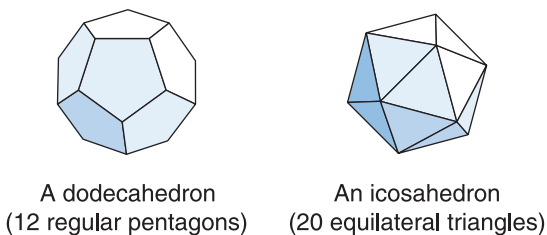
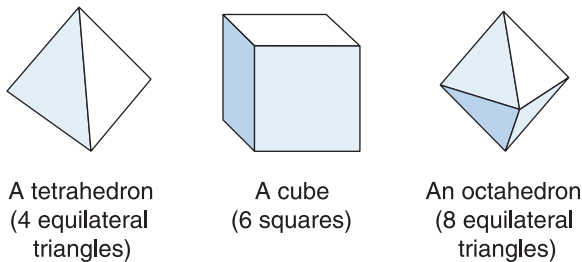


**regular polygon** A *polygon* in which all *sides* are the same length and all *angles* have the same measure. See Section 13.4.2: Polygons ( $n$ -gons).

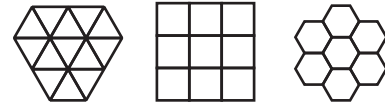


Regular polygons

**regular polyhedron** A *polyhedron* whose faces are all *congruent regular polygons* and in which the same number of faces meet at each *vertex*. The five regular polyhedrons, known as the Platonic solids, are shown below.



**regular tessellation** A *tessellation* of one *regular polygon*. The only three regular tessellations are shown below.



Samples of the three regular tessellations

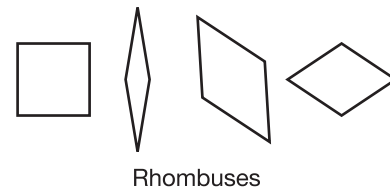
**relation symbol** A symbol used to express a relationship between two quantities. See Section 10.1.2: Reading and Writing Number Sentences.

Relation	Meaning
=	is equal to
≠	is not equal to
<	is less than
>	is greater than
≤	is less than or equal to
≥	is greater than or equal to
≈	is approximately equal to

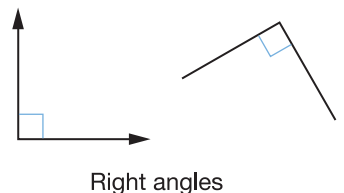
**remainder** An amount left over when one number is divided by another number. For example, in  $16 \div 3 \rightarrow 5 \text{ R}1$ , the *quotient* is 5 and the remainder R is 1. See Section 10.1.1: Arithmetic Symbols.

**repeating decimal** A *decimal* in which one *digit* or a group of digits is repeated without end. For example,  $0.3333\dots$  and  $0.147$  are repeating decimals. Compare to *terminating decimal*. See Section 9.3.1: Fraction and Decimal Notation.

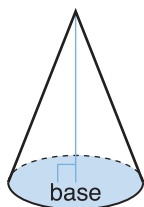
**rhombus** A *parallelogram* with all sides the same length. All rhombuses are parallelograms. Every square is a rhombus, but not all rhombuses are squares. Also called a diamond. Plural is rhombuses or rhombi. See Section 13.4.2: Polygons ( $n$ -gons).



**right angle** A  $90^\circ$  *angle*. See Section 13.4.1: Angles and Rotations.

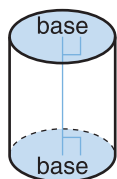


**right cone** A cone whose base is perpendicular to the line segment joining the apex and the center of the base. See Section 13.5.3: Solids with Curved Surfaces.



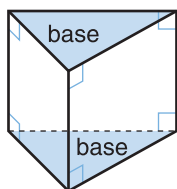
A right circular cone

**right cylinder** A cylinder whose bases are perpendicular to the line segment joining the centers of the bases. See Section 13.5.3: Solids with Curved Surfaces.



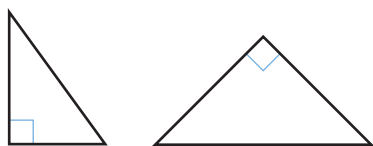
A right circular cylinder

**right prism** A prism whose bases are perpendicular to all of the edges that connect the two bases. See Section 13.5.2: Polyhedrons.



A right triangular prism

**right triangle** A triangle with a right angle. See Section 13.4.2: Polygons ( $n$ -gons).



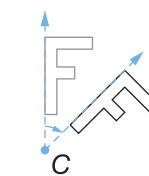
Right triangles

**Roman numerals** Letters that are used alone and in combination to represent numbers in an ancient Roman system of numeration. Roman numerals are found on clocks, building cornerstones, preliminary pages in books, movie copyright dates, and other places.

#### Roman Numerals

I = 1	X = 10	C = 100
II = 2	XX = 20 (2 tens)	CC = 200
III = 3	XXX = 30 (3 tens)	CCC = 300
IV = 4	XL = 40 (50 less 10)	CD = 400
V = 5	L = 50	D = 500
VI = 6	LX = 60 (50 plus 10)	CM = 900
VII = 7	LXX = 70 (50 plus 20)	M = 1,000
VIII = 8	LXXX = 80 (50 plus 30)	$\bar{X}$ = 10,000
IX = 9	XC = 90 (100 less 10)	$\bar{C}$ = 100,000
		$\infty$ = 100,000,000 or infinity

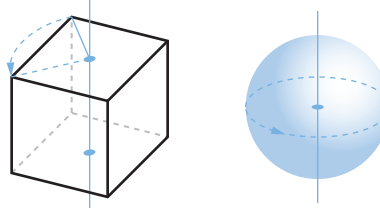
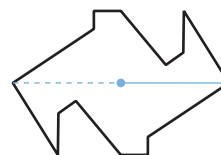
**rotation** (1) A point  $P'$  is a rotation image of a point  $P$  around a center of rotation  $C$  if  $P'$  is on the circle with center  $C$  and radius  $CP$ . If all the points in one figure are



A rotation

rotation images of all the points in another figure around the same center of rotation and with the same angle of rotation, the figures are rotation images. The center can be inside or outside of the original image. Informally called a *turn*. See Section 13.7.1: Flips, Turns, and Slides. (2) If all points on the image of a 3-dimensional figure are rotation images around a point on a line called the axis of rotation, then the image is a rotation image of the original figure.

**rotation symmetry** A figure has rotation symmetry if it is the rotation image of itself after less than a  $360^\circ$  turn around a center or axis of rotation. See Section 13.8.2: Other Symmetries.



Shapes with rotation symmetry

**rote counting** Reciting a string of number words by rote, without understanding their significance. See *skip counting* and Section 9.2.2: Plain and Fancy Counting.

**round** (1) To approximate a number to make it easier to work with, or to make it better reflect the precision of the data. "Rounding up" means to approximate larger than the actual value. "Rounding down" means to approximate smaller than the actual value. See *round to the nearest* and Section 16.2: Approximation and Rounding. (2) Circular in shape.

**round to the nearest** To round a number up or down in a particular decimal place, depending on which approximation is closer to the actual value. See Section 16.2: Approximation and Rounding.



**row** A horizontal arrangement of objects or numbers in an *array* or table.

## S

**same-change rule for subtraction** A subtraction *algorithm* in which the same number is added to or subtracted from both numbers. See Section 11.2.2: Subtraction Algorithms.

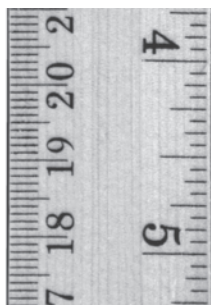
**sample** A part of a *population* intended to represent the whole population. See *random sample* and Section 12.2.2: Collecting and Recording Data.

**scale** (1) The relative size of something. (2) Same as *scale factor*. (3) A tool for measuring *weight*. See Section 14.6: Weight and Mass.

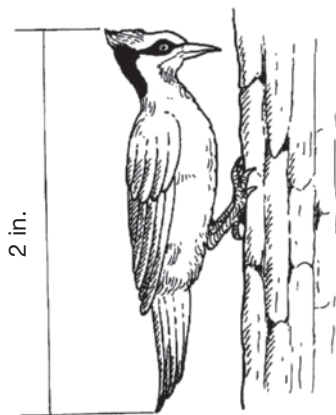
**scale of a map** Same as *map scale*.

### scale of a number line

The *unit interval* on a number line or measuring device. The scales on this ruler are 1 millimeter on the left side and  $\frac{1}{16}$  inch on the right side. See Section 9.7.2: Number Grids, Scrolls, and Lines.



**scale drawing** A drawing of an object in which all parts are drawn to the same *scale* to the object. For example, architects and builders use scale drawings traditionally called blueprints. A map is a scale drawing of a geographical region. See *scale factor* and Section 15.4.2: Map and Model Scales.



A woodpecker (8 in.)  
to  $\frac{1}{4}$  scale

**scale factor** (1) The *ratio* of lengths on an *image* and corresponding lengths on a *preimage* in a *size change*. Same as *size-change factor*. See Section 13.7.2: Stretches and Shrinks. (2) The ratio of lengths in a *scale drawing* or *scale model* to the corresponding lengths in the object being drawn or modeled. See Section 15.4.2: Map and Model Scales.

**scale model** A model of an object in which all parts are made to the same *scale* to the object. For example, many model trains or airplanes are scale models of actual vehicles. See *scale factor* and Section 15.4.2: Map and Model Scales.

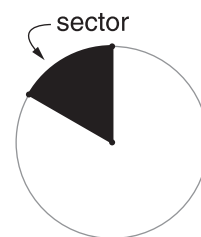
**scalene triangle** A *triangle* with sides of three different lengths. The three angles of a scalene triangle have different measures. See Section 13.4.2: Polygons (*n*-gons).

**scientific calculator** A calculator that can display numbers using *scientific notation*. Scientific calculators follow the *algebraic order of operations* and can calculate a *power of a number*, a *square root*, and several other functions beyond simple 4-function calculators. Some scientific calculators let you enter and do arithmetic with *fractions*. See Section 3.1.1: Calculators.

**scientific notation** A way of writing a number as the product of a *power of 10* and a number that is at least 1 and less than 10. Scientific notation allows you to write large and small numbers with only a few symbols. For example, in scientific notation, 4,300,000 is  $4.3 \times 10^6$ , and 0.00001 is  $1 \times 10^{-5}$ . *Scientific calculators* display numbers in scientific notation. Compare to *standard notation* and *expanded notation*.

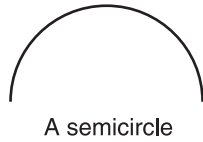
**second (s or sec)** (1) A unit of time defined as  $\frac{1}{31,556,925.9747}$  of the tropical year at midnight Eastern Time on New Year's Day, 1900. There are 60 seconds in a minute. (2) An *ordinal number* in the sequence *first, second, third, . . .*

**sector** A region bounded by and including an *arc* and two *radii* of a circle. A sector resembles a slice of pizza. *Circle graphs* are made with sectors corresponding to parts of a data set. Also called a wedge.



**segment** Same as *line segment*.

**semicircle** (1) Half of a *circle*. (2) Half of a circle and the *diameter* between the endpoints of the arc. Sometimes the interior of this closed figure is also included. See *circle* and Section 13.4.3: Circles and Pi ( $\pi$ ).



**sequence** A list of numbers, often with an underlying rule that may be used to generate subsequent numbers in the list. *Frames-and-Arrows* diagrams are used to represent sequences. See Section 17.1.3: Sequences.

**set** A collection or group of objects, numbers, or other items.

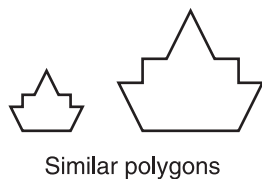
**short-term memory** *Memory in a calculator* used to store values for immediate calculation. Short-term memory is usually cleared with a (C), (AC), (Clear), or similar key. Compare to *long-term memory*. See Section 3.1.1: Calculators.

**shrink** Same as *reduce*.

**side** (1) One of the *line segments* that make up a *polygon*. (2) One of the *rays* or *segments* that form an *angle*. (3) One of the *faces* of a *polyhedron*.

**significant digits** The *digits* in a number that convey useful and reliable information. A number with more significant digits is more *precise* than a number with fewer significant digits. In general, calculations should not produce results with more significant digits than the original numbers. See *scientific notation* and Section 16.2: Approximation and Rounding.

**similar figures** Figures that have the same shape, but not necessarily the same size. Compare to *congruent*. See Section 13.6.2: Congruence and Similarity.



**simpler form of a fraction** A *fraction* renamed as an *equivalent fraction* with a smaller numerator and smaller denominator. To put a fraction in simpler form, divide both the numerator and the denominator by a common factor greater than 1. For example, divide the numerator and the denominator of  $\frac{18}{24}$  by 2 to get the simpler form  $\frac{9}{12}$ .

**simplest form of a fraction** A *fraction* that cannot be renamed in *simpler form*. Same as *lowest terms of a fraction*. A *mixed number* is in simplest form if its fractional part is in simplest form.

**simplify a fraction** To write a fraction in *simplest form*.

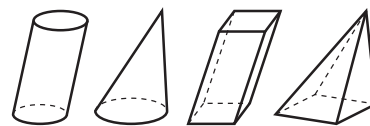
**situation diagram** A diagram used to organize information in a problem situation in one of the *addition/subtraction* or *multiplication/division use classes*. See Section 10.2: Use Classes and Situation Diagrams.

**size change** A *transformation* in which the *image* of a figure is a an enlargement (*stretch*) or reduction (*shrink*) of the original figure by a given *scale factor*. See Section 13.7.2: Stretches and Shrinks.

**size-change factor** Same as *scale factor*.

**skip counting** *Rote counting* by intervals, such as by twos, fives or tens. See Section 9.2.2: Plain and Fancy Counting.

**slanted (oblique) cylinder, cone, prism, or pyramid** A *cylinder*, *cone*, *prism*, or *pyramid* that is not a *right cylinder*, *right cone*, *right prism*, or *right pyramid*.



A slanted (oblique) cylinder, cone, prism, and pyramid

**slate** A lap-size (about 8-inch by 11-inch) chalkboard or whiteboard that children use in *Everyday Mathematics* for recording responses during group exercises and informal group assessments. See Section 1.2.10: Slates.

**slide** An informal name for a *translation*. See Section 13.7.1: Flips, Turns, and Slides.

**solution of an open sentence** A value or values for the *variable(s)* in an *open sentence* that make the sentence true. For example, 7 is a solution of  $5 + n = 12$ . Although equations are not necessarily open sentences, the solution of an open sentence is commonly referred to as a solution of an equation. See Section 17.2.3: Solving Open Sentences.

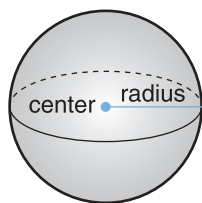
**solution of a problem** (1) The method by which an answer to a problem is obtained. (2) The answer to a problem. See Chapter 18: Problem Solving.

**solution set** The set of all *solutions of an open sentence*. For example, the solution set of  $x^2 = 25$  is  $\{5, -5\}$  because substituting either 5 or  $-5$  for  $x$  makes the sentence true.

**span** Same as *normal span*.

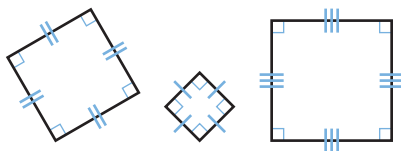
**speed** A *rate* that compares distance traveled with the time taken to travel that distance. For example, if a car travels 100 miles in 2 hours, then its average speed is  $\frac{100 \text{ mi}}{2 \text{ hr}}$ , or 50 miles per hour. See Section 9.3.3: Rates and Ratios.

**sphere** The set of all points in space that are an equal distance from a fixed point called the *center of the sphere*. The distance from the center to the sphere is the *radius* of the sphere. The *diameter* of a sphere is twice its radius. Points inside a sphere are not part of the sphere. See Section 13.5.3: Solids with Curved Surfaces.



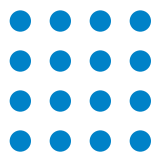
A sphere

**square** A *rectangle* with all sides of equal length. All angles in a square are *right angles*. See Section 13.4.2: Polygons ( $n$ -gons).



Squares

**square array** A rectangular *array* with the same number of *rows* as *columns*. For example, 16 objects will form a square array with 4 objects in each row and 4 objects in each column. See Section 10.2.2: Multiplication and Division Use Classes.



A square array

**square corner** Same as a *right angle*.

**square numbers** *Figurate numbers* that are the product of a *counting number* and itself. For example, 25 is a square number because  $25 = 5 \times 5$ . A square number can be represented

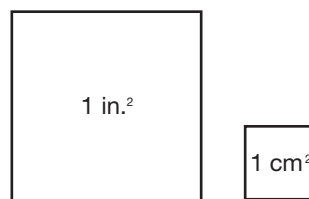
by a *square array* and as a number squared, such as  $25 = 5^2$ . See Section 10.1.1: Arithmetic Symbols and Section 17.1.3: Sequences.

**square of a number  $n$**  The product of  $n$  and itself, commonly written  $n^2$ . For example,  $81 = 9 \times 9 = 9^2$  and  $3.5^2 = 3.5 \times 3.5 = 12.25$ . See Section 10.1.1: Arithmetic Symbols.

**square pyramid** A *pyramid* with a square *base*. See Section 13.5.2: Polyhedrons.

**square root of a number  $n$**  A number that multiplied by itself is  $n$ , commonly written  $\sqrt{n}$ . For example, 4 is a square root of 16, because  $4 \times 4 = 16$ . Normally, square root refers to the positive square root, but the *opposite* of a positive square root is also a square root. For example,  $-4$  is also a square root of 16 because  $-4 \times -4 = 16$ .

**square unit** A unit to measure *area*. A model of a square unit is a square with each side a related unit of *length*. For example, a square inch is the area of a square with 1-inch sides. Square units are often labeled as the length unit squared. For example,  $1 \text{ cm}^2$  is read "1 square centimeter" or "1 centimeter squared." See Section 14.4: Area.



Square units

**standard notation** Our most common way of representing *whole numbers*, *integers*, and *decimals*. Standard notation is *base-ten place-value* numeration. For example, standard notation for three hundred fifty-six is 356. Same as *decimal notation*. See Section 9.2.1: Numeration and Place Value and Section 9.3.1: Fraction and Decimal Notation.

**standard unit** A unit of measure that has been defined by a recognized authority, such as a government or a standards organization. For example, *inches*, *meters*, *miles*, *seconds*, *pounds*, *grams*, and *acres* are all standard units. See Section 14.2: Measurement Systems.

**straight angle** A  $180^\circ$  angle. See Section 13.4.1: Angles and Rotations.



**straightedge** A tool used to draw *line segments*. Strictly speaking, a straightedge does not have a measuring *scale* on it, so ignore the marks if you use a ruler as a straightedge.

**stretch** Same as *enlarge*.

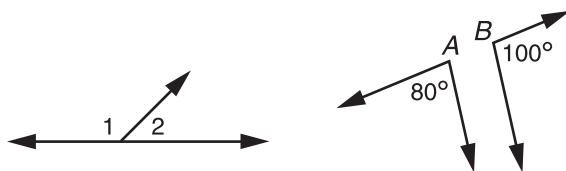
**substitute** (1) To replace one thing with another. (2) To replace *variables* with numbers in an *expression* or *formula*. For example, substituting  $b = 4.5$  and  $h = 8.5$  in the formula  $A = b \times h$  gives  $A = 4.5 \times 8.5 = 38.25$ . See Section 17.2.1: Uses of Variables.

**subtrahend** The number being taken away in a subtraction problem. For example, in  $15 - 5 = 10$ , the subtrahend is 5.

**sum** The result of adding two or more numbers. For example, in  $5 + 3 = 8$ , the sum is 8. Same as *total*.

**summer solstice** The longest day of the year, when the sun is farthest north of Earth's equator. The number of hours of daylight depends on the latitude of a location. In Colorado, the summer solstice averages a little less than 16 hours of daylight. Compare to *winter solstice*.

**supplementary angles** Two angles whose measures add to  $180^\circ$ . Supplementary angles do not need to be *adjacent*. Compare to *complementary angles*.



$\angle 1$  and  $\angle 2$ ;  $\angle A$  and  $\angle B$   
are two pairs of supplementary angles.

**surface** (1) The boundary of a 3-dimensional object. The part of an object that is next to the air. Common surfaces include the top of a body of water, the outermost part of a ball, and the topmost layer of ground that covers Earth. See Section 13.5: Space and 3-D Figures. (2) Any 2-dimensional layer, such as a *plane* or a face of a *polyhedron*.

**surface area** The *area* of the *surface* of a 3-dimensional figure. The surface area of a polyhedron is the sum of the areas of its faces.

**survey** A study that collects *data*. Surveys are commonly used to study “demographics” such as people’s characteristics, behaviors, interests, and opinions. See Section 12.2.2: Collecting and Recording Data.

**symmetric figure** A figure that exactly matches with its *image* under a *reflection* or *rotation*. See *line symmetry*, *rotation symmetry*, and Section 13.8: Symmetry.

**symmetry** The balanced distribution of points over a line or around a point in a *symmetric figure*. See *line symmetry*, *rotation symmetry*, and Section 13.8: Symmetry.



A figure with  
line symmetry



A figure with  
rotation symmetry

## T

**tally** (1) To keep a record of a count, commonly by making a mark for each item as it is counted. (2) The mark used in a count. Also called “tally mark” and “tick mark.” See Section 12.2.2: Collecting and Recording Data.

**tally chart** A table to keep track of a *tally*, typically showing how many times each value appears in a set of data.

**temperature** How hot or cold something is relative to another object or as measured on a standardized *scale* such as *degrees Celsius* or *degrees Fahrenheit*. See Section 15.1: Temperature.

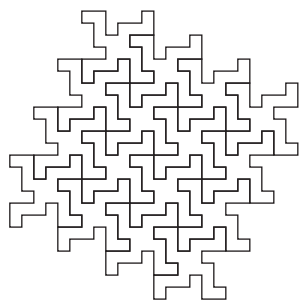
**template** In *Everyday Mathematics*, a sheet of plastic with geometric shapes cut out of it, used to draw patterns and designs. See Section 13.10.1: Pattern-Block Template.

**term** (1) In an *algebraic expression*, a number or a product of a number and one or more *variables*. For example, in the equation  $5y + 3k = 8$ , the terms are  $5y$ ,  $3k$ , and  $8$ . The  $8$  is a *constant* term, or simply a *constant*, because it has no variable part. See Section 17.2.2: Reading and Writing Open Sentences. (2) An element in a *sequence*. In the sequence of square numbers, the terms are  $1$ ,  $4$ ,  $9$ ,  $16$ , and so on.

**terminating decimal** A *decimal* that ends. For example,  $0.5$  and  $0.125$  are terminating decimals. See Section 9.3.1: Fraction and Decimal Notation.

**tessellate** To make a *tessellation*; to tile a surface.

**tessellation** A pattern of shapes that covers a surface completely without overlaps or gaps. Same as a *tiling*.



A tessellation

**tetrahedron** A *polyhedron* with 4 faces. A tetrahedron is a *triangular pyramid*. See Section 13.5.2: Polyhedrons.

**theorem** A mathematical statement that can be proved to be true. For example, the Pythagorean theorem states that if the *legs* of a *right triangle* have lengths  $a$  and  $b$  and the *hypotenuse* has length  $c$ , then  $a^2 + b^2 = c^2$ . The Pythagorean theorem has been proven in hundreds of ways over the past 2,500 years.

**thermometer** A tool used to measure *temperature* in *degrees* according to a fixed scale. The most common scales are *Celsius* and *Fahrenheit*. See Section 15.1.2: Thermometers.

**3-dimensional (3-D) coordinate system** A *reference frame* in which any point on a *3-dimensional figure* can be located with three *coordinates* relative to the *origin* of three axes intersecting perpendicularly at their origins in space. Compare to *1-* and *2-dimensional coordinate systems*. See Section 15.3: Coordinate Systems.

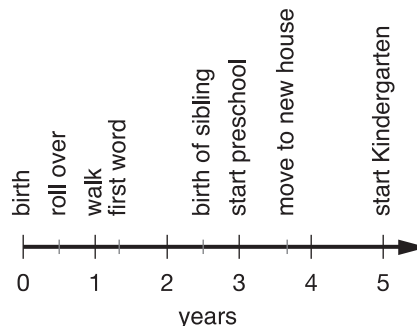
**3-dimensional (3-D) figure** A figure whose points are not all in a single *plane*. Examples include *prisms*, *pyramids*, and *spheres*, all of which have length, width, and height. See Section 13.1: Dimension.

**tick marks** (1) Marks showing the *scale* of a number line or ruler. (2) Same as *tally* (2).

**tile** A shape used in a *tessellation*. A tessellation of only one tile is called a “same-tile tessellation.”

**tiling** Same as *tessellation*.

**timeline** A *number line* showing when events took place. In some timelines the *origin* is based on the context of the events being graphed, such as the birth date of the child’s life graphed below. The origin can also come from another reference system, such as the year A.D. in which case the scale below might cover the years 2000 through 2005. See Section 15.2.3: Timelines.



A timeline of a child’s milestones

**toggle** A key on a calculator that changes back and forth between two displays each time it is pressed. For example, on some calculators  $\boxed{+/-}$  toggles between a number and its *opposite*. See Section 3.1.1: Calculators.

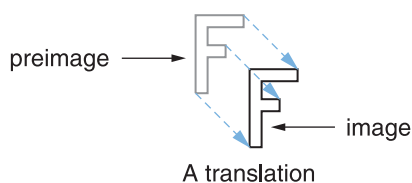
**tool kit** In *First through Third Grade Everyday Mathematics*, a bag or a box containing a calculator, measuring tools, and manipulatives often used by children in the program.

**top-heavy fraction** Same as *improper fraction*.

**total** Same as *sum*.

**trade-first subtraction** A subtraction *algorithm* in which all necessary trades between places in the numbers are done before any subtractions are carried out. Some people favor this algorithm because they can concentrate on one thing at a time. See Section 11.2.2: Subtraction Algorithms.

**transformation** An operation on a geometric figure (the *preimage*) that produces a new figure (the *image*). The study of transformations is called transformation geometry. Transformations are often based on rules for how points behave, as in the translation below. Although the preimage does not actually move under a transformation, it is convenient to think and talk about transformations as moving a figure from one place to another and sometimes changing its size or shape. So *Everyday Mathematics* encourages using informal terms such as *flip*, *turn*, and *slide*. See *isometry transformation*, *reflection*, *rotation*, *translation*, *size change* and Section 13.7: Transformations.



**translation** A transformation in which every point in the *image* of a figure is at the same distance in the same direction from its corresponding point in the figure. Informally called a *slide*. See *transformation* for an example and Section 13.7.1: Flips, Turns, and Slides.

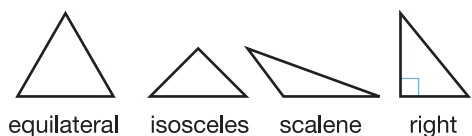
**trapezoid** A quadrilateral that has exactly one pair of *parallel* sides. In *Everyday Mathematics*, both pairs of sides cannot be parallel; that is, a parallelogram is not a trapezoid. See Section 13.4.2: Polygons (*n*-gons).



Trapezoids

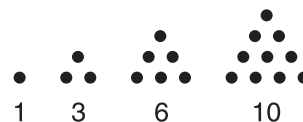
**tri-** A prefix meaning three, as in tricycle.

**triangle** A 3-sided polygon. See *equilateral triangle*, *isosceles triangle*, *scalene triangle*, *acute triangle*, *right triangle*, *obtuse triangle*, and Section 13.4.2: Polygons (*n*-gons).



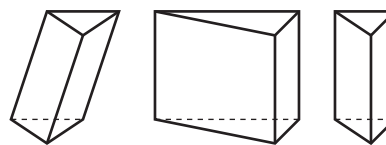
equilateral isosceles scalene right  
Triangles

**triangular numbers** *Figurate numbers* that can be shown by triangular arrangements of dots. The triangular numbers are {1, 3, 6, 10, 15, 21, 28, 36, 45, . . .}. See Section 17.1.3: Sequences.



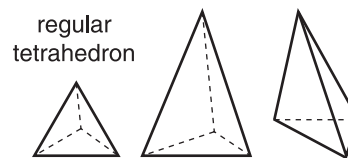
Triangular numbers

**triangular prism** A *prism* whose bases are triangles. See Section 13.5.2: Polyhedrons.



Triangular prisms

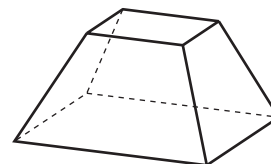
**triangular pyramid** A *pyramid* in which all *faces* are *triangles*, any one of which is the *base*. A regular tetrahedron has four *equilateral triangles* for faces and is one of the five *regular polyhedrons*. See Section 13.5.2: Polyhedrons.



regular tetrahedron  
Triangular pyramids

**true number sentence** A *number sentence* stating a correct fact. For example,  $75 = 25 + 50$  is a true number sentence. See Section 10.1.2: Reading and Writing Number Sentences.

**truncate** (1) In a *decimal*, to cut off all *digits* after the decimal point or after a particular place to the right of the decimal point. For example, 12.345 can be truncated to 12.34, 12.3, or 12. *Integers* cannot be truncated. Same as rounding down in places to the right of the decimal point. See *round* and Section 16.2: Approximation and Rounding. (2) Informally, to cut off a part of a solid figure.



A truncated pyramid

**turn** An informal name for a *rotation*.

**turn-around facts** A pair of multiplication (or addition) facts in which the order of the factors (or addends) is reversed. For example,  $3 \times 9 = 27$  and  $9 \times 3 = 27$  are turn-around multiplication facts, and  $4 + 5 = 9$  and  $5 + 4 = 9$  are turn-around addition facts. There are no turn-around facts for subtraction or division. Turn-around facts are instances of the *Commutative Properties of Addition and Multiplication*. See Section 16.3.2: Basic Facts and Fact Power.

**turn-around rule** A rule for solving addition and multiplication problems based on the *Commutative Properties of Addition and Multiplication*. For example, if you know that  $6 \times 8 = 48$ , then, by the turn-around rule, you also know that  $8 \times 6 = 48$ .

**2-dimensional (2-D) coordinate system** A reference frame in which any point on a *2-dimensional figure* can be located with an *ordered pair* of coordinates relative to the *origin* of two intersecting perpendicular axes in space. Compare to *1-* and *3-dimensional coordinate systems*. See Section 15.3: Coordinate Systems.

**2-dimensional (2-D) figure** A figure whose points are all in one *plane* but not all on one *line*. Examples include polygons and circles, all of which have length and width but no height. See Section 13.1: Dimension.

## U

**unfair game** A game in which every player does not have the same chance of winning. See Section 12.1.2: The Language of Chance.

**unit** A label used to put a number in context. In measuring *length*, for example, inches and centimeters are units. In a problem about 5 apples, apple is the unit. In *Everyday Mathematics*, students keep track of units in *unit boxes*. See Section 10.2.1: Addition and Subtraction Use Classes.

**unit box** In *Everyday Mathematics*, a box displaying the *unit* for the numbers in the problems at hand. See Section 1.3.6: Unit Boxes.

Unit

days

A unit box

**unit fraction** A *fraction* whose *numerator* is 1. For example,  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{12}$ ,  $\frac{1}{8}$ , and  $\frac{1}{20}$  are unit fractions. Unit fractions are especially useful in converting among units within measurement systems. For example, because 1 foot = 12 inches you can multiply a number of inches by  $\frac{1}{12}$  to convert to feet. See Section 14.2.3: Converting between Measures.

**unit interval** The *interval* between 0 and 1 on a *number line*.

**unit price** The price for one item or *per unit* of measure. For example, the unit price of a 5-ounce package of onion powder selling for \$2.50 is \$0.50 per ounce. In recent years, grocery stores have begun posting unit prices to help consumers compare prices of different brands of a similar product or different size containers of the same product. See Section 14.2.3: Converting between Measures.

**unit ratio** Same as *n-to-1 ratio*.

**unit whole** Same as *whole* or *ONE*.

**U.S. customary system** The measuring system used most often in the United States. Units for *length* include inch, foot, yard, and mile; units for *weight* include ounce and pound; units for *volume* or *capacity* include cup, pint, quart, gallon, and cubic units; and the main unit for *temperature* change is degrees Fahrenheit. See Section 14.2.1: U.S. Customary System.

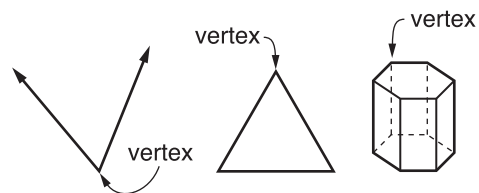
**use class** In *Everyday Mathematics*, a problem situation that one of the basic arithmetic operations can be used to solve. Students use *situation diagrams* to help model problems from the different use classes. See *addition/subtraction use classes*, *multiplication/division use classes*, and Section 10.2: Use Classes and Situation Diagrams.

## V

**variable** A letter or other symbol that represents a number. A variable can represent a single number, as in  $5 + n = 9$ , because only  $n = 4$  makes the sentence true. A variable can also stand for many different numbers, as in  $x + 2 < 10$ , because any number  $x$  less than 8 makes the sentence true. In *formulas* and *properties*, variables stand for all numbers. For example,  $a + 3 = 3 + a$  for all numbers  $a$ . See Section 17.2.1: Uses of Variables.

**vernal equinox** The first day of spring, when the sun crosses the plane of Earth’s equator and day and night are about 12 hours each. “Equinox” is from the Latin *aequi-* meaning “equal” and *nox* meaning “night.” Compare to *autumnal equinox*.

**vertex** The point at which the *rays* of an angle, the *sides* of a polygon, or the *edges* of a polyhedron meet. Plural is *vertexes* or *vertices*. In *Everyday Mathematics*, same as *corner*. See Section 13.4: Planes and Plane Figures and Section 13.5: Space and 3-D Figures.



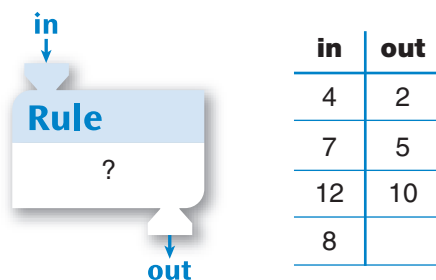
**vertical** Upright; perpendicular to the *horizon*. Compare to *horizontal*.

**volume** (1) The amount of space occupied by a *3-dimensional figure*. Same as *capacity*. (2) Less formally, the amount a container can hold. Volume is often measured in cubic units, such as  $\text{cm}^3$ , cubic inches, or cubic feet. See Section 14.5: Volume (Capacity).

## W

**weight** A measure of how heavy something is; the force of gravity on an object. An object’s *mass* is constant, but it weighs less in weak gravity than in strong gravity. For example, a person who weighs 150 pounds in San Diego weighs about 23 pounds on the moon. See Section 14.6: Weight and Mass.

**“What’s My Rule?” problem** In *Everyday Mathematics*, a problem in which two of the three parts of a *function* (*input*, *output*, and *rule*) are known, and the third is to be found out. See Section 17.1.4: Functions.



A “What’s My Rule?” problem

**whole** An entire object, collection of objects, or quantity being considered in a problem situation; 100%. Same as *ONE* and *unit whole*. See Section 9.3.2: Uses of Fractions.

**whole numbers** The *counting numbers* and 0. The set of whole numbers is  $\{0, 1, 2, 3, \dots\}$ .

**width of a rectangle** The *length* of one side of a *rectangle* or rectangular object, typically the shorter side.

**winter solstice** The shortest day of the year, when the sun is farthest south of Earth’s equator. The number of hours of daylight depends on the latitude of a location. In Colorado, the winter solstice averages a little more than 9 hours of daylight. Compare to *summer solstice*.

## Y

**yard (yd)** A U.S. customary unit of *length* equal to 3 feet, or 36 inches. To Henry I of England, a yard was the distance from the tip of the nose to the tip of the middle finger. In *Everyday Mathematics*, it is from the center of the chest to the tip of the middle finger. See the Tables of Measures and Section 14.1: Personal Measures.

## Z

**zero fact** In *Everyday Mathematics*: (1) The *sum* of two 1-digit numbers when one of the *addends* is 0, as in  $0 + 5 = 5$ . If 0 is added to any number, there is no change in the number. Same as the additive identity. (2) The *product* of two 1-digit numbers when one of the factors is 0, as in  $4 \times 0 = 0$ . The product of a number and 0 is always 0.

**zero point** Same as *origin*.