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.

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**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°. See Section 13.4.1: Angles and Rotations.

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

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

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**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.

**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.

\[
\begin{align*}
4 + x &= 10 \\
4 + ? &= 10 \\
4 + &= 10 \\
\end{align*}
\]

\[
\begin{align*}
A &= l \times w \\
a + b &= b + a \\
a(b + c) &= ab + ac \\
\end{align*}
\]

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.

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.

-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.

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.
**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 × 0 = 0 through 9 × 9 = 81
90 division facts: 0 ÷ 1 = 0 through 81 ÷ 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:

\[ (a + b) + c = a + (b + c). \]

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.

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

**braces** See *grouping symbols*.

**brackets** See *grouping symbols*.

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

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**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.

**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° and boils at 100°. 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.

<table>
<thead>
<tr>
<th>Start</th>
<th>Change</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>(-5)</td>
<td>9</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>?</td>
</tr>
</tbody>
</table>

A comparison diagram for $12 = 9 + ?$
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°. Complementary angles do not need to be adjacent. Compare to supplementary angles.

\[ \angle 1 \text{ and } \angle 2; \ \angle A \text{ and } \angle B \]

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°. Same as nonconvex polygon. Compare to convex polygon. See Section 13.4.2: Polygons (\( n \)-gons).

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.

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.

A concave polygon

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

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.

concentric circles Circles that have the same center but radii of different lengths.
**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°. 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: Coordinate Grids.

**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 \(\{1, 2, 3, 4, \ldots\}\). 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](image)

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

![Cubes](image)

(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 cm³) A metric unit of volume or capacity equal to the volume of a cube with 1-cm edges. 1 cm³ = 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 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](image)

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 \( a \div b \). 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.

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 15.5.3: 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.

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:
- For any numbers \(a, b,\) and \(c:\)
  \[a \times (b + c) = (a \times b) + (a \times c)\]
  or \(a(b + c) = ab + ac\)

**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:
- For any numbers \(a, b,\) and \(c:\)
  \[a \times (b - c) = (a \times b) - (a \times c)\]
  or \(a(b - c) = ab - ac\)

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

\[
\begin{array}{ccc}
\text{dividend} & \text{divisor} & \text{quotient} \\
35 & 5 & 7 \\
\text{dividend} & \text{divisor} & \text{quotient} \\
40 & 8 & 5 \\
\text{quotient} & \text{divisor} & \text{dividend} \\
3 & 12 \frac{1}{3} & \end{array}
\]

**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, \(a \div b, \frac{a}{b}\), and \(a \over b\) 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, \(\frac{a}{b}\) is common on calculators, and \(\frac{a}{b}\) 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.
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.

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.

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.

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

equitateral 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. 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 $\text{VIII}$ 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.

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

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.

factor (1) Each of the two or more numbers in a product. For example, in 6 × 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 × 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 × 3 = 6. But 4 is not a factor of 6 because 4 × 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 × 2 × 1 = 6. Similarly, 4! = 4 × 3 × 2 × 1 = 24. For any number n, n! = n × (n − 1) × (n − 2) × . . . × 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.
**Glossary**

**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 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 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 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

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

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

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

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.

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.

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 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.

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

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

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

<table>
<thead>
<tr>
<th>in</th>
<th>out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>300</td>
<td>600</td>
</tr>
</tbody>
</table>

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.

**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.

A rectangular prism
A square pyramid
A cylinder
A cone
A sphere

**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.
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] and is done first. So (3 + 4) \times (8 + 2) \div 5 simplifies as follows:

\[
(3 + 4) \times [8 + 2] \div 5
\]

\[
7 \times 2
\]

14

See Section 10.1.2: Reading and Writing Number Sentences.

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.

Because of the 2-D property, heights and altitudes are always 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).

**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).

**hexa-**  A prefix meaning six.

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

**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.

**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.

**inequality**  A number sentence with a relation symbol other than \(=\), such as \(>\), \(<\), \(\geq\), \(\leq\), \(\neq\), or \(\approx\). 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.

integer
A number in the set {..., -4, -3, -2, -1, 0, 1, 2, 3, 4, ...}. 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.

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, $\pi = 3.141592653 \ldots$ continues forever without any known pattern. The number $1.10100100010000 \ldots$ 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.

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).

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).

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.

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).

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 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.](image)

**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.

<table>
<thead>
<tr>
<th>Number of Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>X</td>
</tr>
</tbody>
</table>

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 L = 1,000 mL = 1,000 cm³. 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.

**long-term memory** Memory in a calculator used by keys with an M on them, such as [M-] and [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.

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**Everyday Mathematics Teacher's Reference Manual**
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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 \(1,650,763.73\) wavelengths of orange-red light from the element krypton. Today, the meter is defined as the distance light travels in a vacuum in \(\text{\(\frac{1}{299,792,458}\)}\) 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 \(10 \times 67\) as 670 and add five of them to get \(50 \times 67\). Then add the remaining 3 \(67\)s 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 \(\ldots, -21, -14, -7, 0, 7, 14, 21, \ldots\)

**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.

<table>
<thead>
<tr>
<th>rows</th>
<th>chairs per row</th>
<th>total chairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>25</td>
<td>?</td>
</tr>
</tbody>
</table>

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*.

**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, $-24$, $-2.333\ldots$, 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*.

**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.

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<tr>
<td>20 $+$ 5</td>
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</table>

二十-5

veinticinco

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

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**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.

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</table>

**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.

**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 \( \frac{5}{5} + \frac{8}{8} = \frac{13}{13} \).

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.

\[ 5 + 5 = 10 \quad 16 \leq a \times b \]
\[ 2 - ? = 8 \quad a^2 + b^2 = c^2 \]

**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, \ldots 1, 4, 9, 16, 25, \ldots
1, 2, 1, 2, 1, \ldots 1, 3, 5, 7, 9, \ldots

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, $\text{VI} / \text{I}$, 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.

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

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

octa-  A prefix meaning eight.

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

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, $9 + _ = 15$, $? - 24 < 10$, 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: $\times, *, \cdot\,$
- Division: $\div, /\,$
- 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.

![Opposite Angle in a Triangle](image)

Angle $C$ is opposite side $AB$.

**Opposite Angles in a Quadrilateral**  Two angles in a quadrilateral that do not share a side.

![Opposite Angles in a Quadrilateral](image)

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**  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.
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.

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.

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).

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.
**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 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).

**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** (⊥) 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.

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

**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.

**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.

**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 (\( \pi \)).
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.

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).

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.

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, $\frac{4}{3}$, $\frac{1}{1000}$, 0.01, 8.125, and 5.111... 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 $a^n$ 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.

**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.

**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°. A full-circle protractor can be used to measure and draw angles up to 360°.

quad-  A prefix meaning four.

quadangle  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).

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.
**Glossary**

**quotitive division**  Same as measurement division.

**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 (π).

**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.

**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.

**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 \( \frac{3}{5} \), 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.
Definition (1) definition (2)

Glossary

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 \ldots 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.

Rational 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 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 \( \frac{1}{5} \), \( \frac{\sqrt{2}}{2} \), 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 pyramid
A pyramid with a rectangular base. See Section 13.5.2: Polyhedrons.

Rectilinear figure
1. In Everyday Mathematics, a closed 2-dimensional shape having line segments for sides and only 90° or 270° angles. 2. Any shape made up of line segments.

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° and 360°. 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 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.

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

remainder  An amount left over when one number is divided by another number. For example, in 16 ÷ 3 → 5 R1, 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... 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° *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.

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.

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

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

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.

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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.

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 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° turn around a center or axis of rotation. See Section 13.8.2: Other Symmetries.
row  A horizontal arrangement of objects or numbers in an array or table.

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 [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 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.

**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.
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).
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.
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 cm\(^2\) is read “1 square centimeter” or “1 centimeter squared.” See Section 14.4: Area.
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° angle. See Section 13.4.1: Angles and Rotations.

A straight angle

**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.

**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°. Supplementary angles do not need to be adjacent. Compare to complementary angles.

\[ \angle 1 \text{ and } \angle 2; \angle A \text{ and } \angle B \]  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.

**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. See Section 13.5.2: Polyhedrons.

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) 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.

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.

toggle A key on a calculator that changes back and forth between two displays each time it is pressed. For example, on some calculators 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).

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).

trapezoidal  A figure having trapezoids as faces. See Section 13.5.2: Polyhedrons.

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

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.

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.

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Glossary

**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.

**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.

**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.

**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.

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**Unit**

*days*

A unit box
vernial 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 cm³, cubic inches, or cubic feet. See Section 14.5: Volume (Capacity).

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.

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, . . .}. 

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.

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.

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 × 0 = 0. The product of a number and 0 is always 0.

zero point  Same as origin.