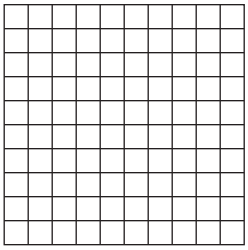
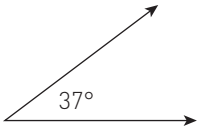
Glossary

100% block A block used to represent one whole or 100%.

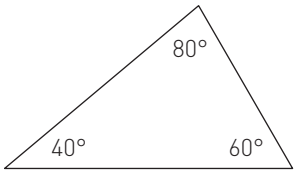


absolute value The absolute value of a number is the distance of the number from zero. Since the absolute value represents a distance, without regard to direction, absolute value is always non-negative. Thus, the absolute value of a negative number is its opposite, while the absolute value of a non-negative number is just the number itself. The absolute value of x is usually written "$|x|$." For example, $|-5| = 5$ and $|22| = 22$.

acute angle An angle with a measure greater than 0° and less than 90°. An example is shown.



acute triangle A triangle where all three angles measure less than 90°.



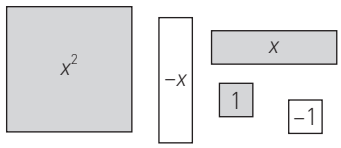
addition (+) An operation that tells how many objects there are when two sets are combined. The result is the number of objects in the two sets together which is called a sum. In arithmetic, the word "object" usually means "number."

additive inverse The number you need to add to a given number to get a sum of 0. For example, the additive inverse of –3 is 3. It is also called the opposite.

Additive Inverse Property The Additive Inverse Property states that for every number a there is a number $-a$ such that $a + (-a) = 0$. For example, the number 5 has an additive inverse of –5; $5 + (-5) = 0$. The additive inverse of a number is often called its opposite. For example, 5 and –5 are opposites.

algebra A branch of mathematics that uses variables to generalize the rules of numbers and numerical operations.

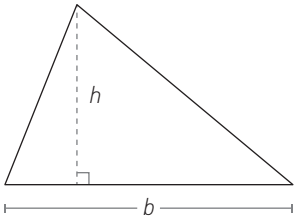
algebra tiles An algebra tile is a manipulative whose area represents a constant or variable quantity. The algebra tiles used in this course consist of large squares with dimensions x-by-x; rectangles with dimensions x-by-1; and small squares with dimensions 1-by-1. These tiles are named by their areas: x^2, x, and 1, respectively. The smallest squares are called "unit tiles." In this text, shaded tiles will represent positive quantities while unshaded tiles will represent negative quantities.



algebraic expression See *expression*.

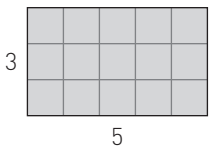
algorithm A fixed rule for carrying out a mathematical procedure. For example, to determine the average of a set of values, calculate the sum of the values and divide by the number of values.

altitude of a triangle The length of a segment that connects a vertex of the triangle to a line containing the opposite base (side) and is perpendicular to that line. See *height*.



angle Generally, an angle is formed by two rays that are joined at a common endpoint (such as the obtuse angle in the diagram). Angles in geometric figures are usually formed by two segments that have a common endpoint (such as the angle marked in the quadrilateral shown). See *acute angle*, *obtuse angle*, and *right angle*.

area For this course, area is the number of square units needed to fill up a region on a flat surface. In later courses, the idea will be extended to cones, spheres, and more complex surfaces. In the example shown, the area of the figure is 15 square units. See *surface area*.



area model An area model is a way to visually represent and solve problems that involve multiplication and division. It can also represent and calculate probabilities. The total area of the rectangle is equal to the sum of the areas of the parts. That is, the larger problem can be broken down into smaller problems.

The image shows how an area model can be used to multiply 46 · 67. You can rewrite 46 as 40 + 6, and 67 as 60 + 7. Use these numbers as the dimensions of a large rectangle, as shown. Determine the area of each of the smaller rectangles and then calculate the sum of the four smaller areas. This sum is the answer to the original problem.

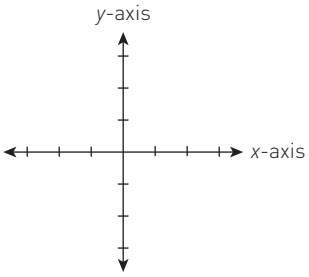
	60	+	7
40	2,400		280
+			
6	360		42

46 · 67 = (40 + 6)(60 + 7) = 2,400 + 280 + 360 + 42 = 3,082

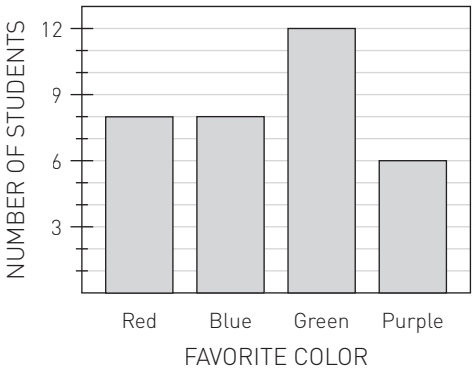
area of a triangle To calculate the area of a triangle, multiply the length of the base b by the height h and divide by 2: $A = \frac{1}{2}bh$. See *altitude of a triangle*.

average The sum of given values divided by the number of values used in computing the sum. For example, the average of 1, 4, and 10 is $\frac{1 + 4 + 10}{3}$. See *mean*.

axis (plural: axes) On a coordinate plane, two number lines that meet at right angles at the origin (0, 0). The *x*-axis runs horizontally and the *y*-axis runs vertically.



bar graph A bar graph is a set of rectangular bars that have height proportional to the number of data elements in each category. Each bar stands for all of the elements in a single distinguishable category (such as "red"). Bars are the same width and separated from each other. See *histogram*.



base of a geometric figure

(a) The base of a triangle: any side of a triangle to which a height is drawn. There are three possible bases in each triangle.

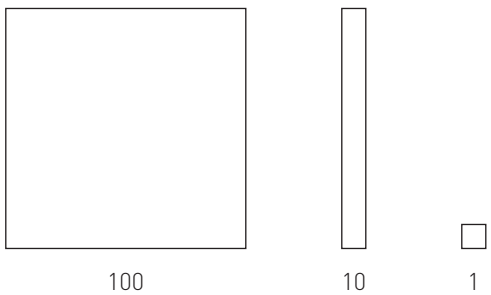
(b) The base of a trapezoid: either of the two parallel sides.

(c) The base of a parallelogram (including rectangle, rhombus, and square): any side to which a height is drawn. There are four possible bases.

(d) The base of a three-dimensional figure: see *prism* and *pyramid*.

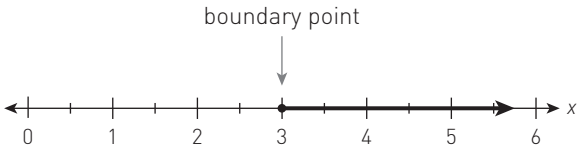
base of an exponent When working with an exponential expression in the form b^a, b is called the base. For example, 2 is the base in 2^5. (5 is the exponent, and 32 is the value.) See *exponent*.

base ten blocks Blocks used to represent numbers. The blocks used in this course are the 1-block, the 10-block, and the 100-block.

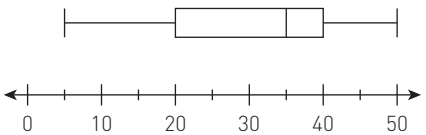


bin An interval on a histogram.

boundary point The endpoint or endpoints of a ray or segment on a number line where an inequality is true, marked with a solid dot. For strict inequalities (that is, inequalities involving < or >), the point is not part of the solution and is marked with an open dot. Boundary points may be found by solving the equality associated with the given inequality. For example, the solution to the equation $2x = 6$ is $x = 3$, so the inequality $2x \geq 6$ has a boundary point at 3. A boundary point is also sometimes called a "dividing point."



box plot A graphic way of showing a summary of data using the median, quartiles, and extremes of the data.



center (of a data distribution) Numbers that locate or approximate the center of a data set. Two of the ways to measure the center of a data set are the mean and the median. When dealing with measures of center, it is often useful to consider the distribution of the data. For symmetric distributions with no outliers, the mean can represent the middle, or "typical" value, of the data well. However, in the presence of outliers or non-symmetrical data distributions, the median may be a better measure. See *mean* and *median*.

coefficient (numerical) A number multiplying a variable or product of variables. For example, –7 is the coefficient of $-7xy^2$.

combining like terms Combining two or more like terms simplifies an expression by summing constants and summing those variable terms in which the same variables are raised to the same power. For example, combining like terms in the expression $3x + 7 + 5x – 3 + 2x^2 + 3y^2$ gives $8x + 4 + 2x^2 + 3y^2$. When working with algebra tiles, combining like terms involves putting together tiles with the same dimensions.

common Shared.

common factor A common factor is a factor that is the same for two or more terms. For example, x^2 is a common factor for $3x^2$ and $–5x^2y$.

common multiple A number that is a multiple of two or more numbers. For example, 24 and 48 are common multiples of 3 and 8.

comparison symbol See *inequality symbols*.

complex fraction A fraction with a fraction in the numerator and/or denominator.

composite number A number with more than two factors.

congruent Two shapes are congruent if they have exactly the same shape and size.

conjecture An educated guess that often results from noticing a pattern.

conservation of area The principle that the area of a shape does not change when it is cut apart and its pieces are put together in a different arrangement.

constant term A number that is not multiplied by a variable. In the expression $2x + 3(5 - 2x) + 8$, the number 8 is a constant term. The number 3 is not a constant term because it is multiplied by a variable inside the parentheses.

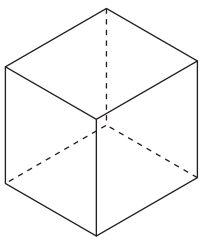
coordinate The number corresponding to a point on the number line or an ordered pair (x, y) that corresponds to a point in a two-dimensional coordinate system. In an ordered pair, the x-coordinate appears first and the y-coordinate appears second. For example, the point (3, 5) has an x-coordinate of 3. See *ordered pair*.

coordinate graph (system) A system of graphing ordered pairs of numbers on a coordinate plane. An ordered pair represents a point, with the first number giving the horizontal position relative to the x-axis and the second number giving the vertical position relative to the y-axis. See *ordered pair*.

counterexample An example showing that a statement has at least one exception; that is, a situation in which the statement is false. For example, the number 4 is a counterexample to the statement that all even numbers are greater than 7.

counting numbers See *natural numbers*.

cube A polyhedron of six faces, each of which is a square.



cubic unit A cube, each of whose edges measure 1 unit in length. Volume is measured in cubic units.

data display A visual way for organizing information. Some data displays used in this course are bar graphs, box plots, dot plots, histograms, scatter plots and Venn diagrams.

decimal point The dot separating the whole number from the decimal portion, that is, the ones and tenths places in a decimal number.

denominator The lower part of a fraction, which expresses into how many equal parts the whole is divided.

difference The result of subtraction.

digit One of the ten numerals: 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9.

dimensions The dimensions of a figure that is a flat region or space tell how far that the figure extends in each direction. For example, the dimensions of a rectangle might be 16 cm wide by 7 cm high.

Distributive Property For any a, b, and c, $a(b + c) = ab + ac$. For example, $10(7 + 2) = 10 \cdot 7 + 10 \cdot 2$.

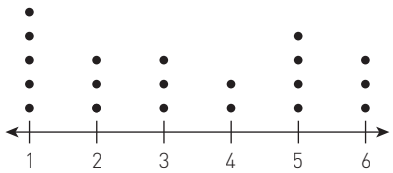
dividend A quantity to be divided. See *divisor*.

divisible A number is divisible by another if the remainder of the division is zero.

division (÷) The inverse operation to multiplication, or the operation that creates equal groups.

divisor The quantity by which another quantity is to be divided. Dividend ÷ divisor = quotient + remainder (if there is any).

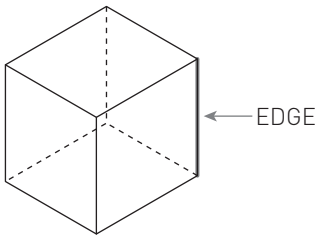
dot plot A way of displaying data that has an order and can be placed on a number line. Dot plots are generally used when the data is discrete (separate and distinct) and numerous pieces of data fall on most values.



NUMBER ROLLED ON A DICE

double-peaked See *shape (of a data display)*.

edge In three dimensions, a line segment formed by the intersection of two faces of a polyhedron.



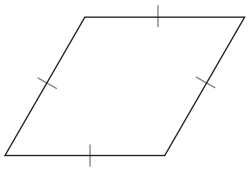
endpoint A point that marks the ends of a line segment or ray. See *line segment*.

enlarge To make larger.

equal (=) Two quantities are equal when they have the same value. For example, when $x = 4$, the expression $x + 8$ is equal to the expression $3x$ because the values of the expressions are the same.

equation A mathematical sentence that uses an equals sign (=) to show two expressions are the same. For example, the equation $7x + 4.2 = -8$ means that the value of $7x + 4.2$ equals -8. Equations can also represent rules that link two quantities, like $y = 4x - 3$, which calculates the area y of a tile pattern based on its figure number x.

equilateral A polygon is equilateral if all of its sides have equal length. The word "equilateral" comes from "equi" (meaning "equal") and "lateral" (meaning "side"). Equilateral triangles not only have sides of equal length, but also angles of equal measure. However, a polygon with more than three sides may be equilateral without having congruent angles. For example, see the rhombus shown.



equivalent expressions Two expressions are equivalent if they have the same value. For example, $2 + 3$ is equivalent to $1 + 4$.

equivalent fractions Two fractions are equivalent if they have the same numerical value. For example, $\frac{3}{6}$ and $\frac{5}{10}$ are equivalent fractions.

estimate To make a close guess to the actual value with some thought or calculation involved.

evaluate (an expression) To determine the numerical value of. To evaluate an expression, substitute the value(s) given for the variable(s) and perform the operations according to the Order of Operations. For example, evaluating $2x + y - 10$ when $x = 4$ and $y = 3$ gives the value 1. See *expression*.

even number An integer that is divisible by two with no remainder.

exponent In an expression of the form b^a, a is called the exponent. For example, in the expression 2^5, 5 is called the exponent (2 is the base, and 32 is the value). The exponent indicates how many times to use the base as a multiplier. For example, in 2^5, 2 is used 5 times: $2^5 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$. For exponents of zero, the rule is: for any number $x \neq 0$, $x^0 = 1$.

expression An expression is a combination of individual terms and operations (such as addition, subtraction, multiplication or division). Numerical expressions combine numbers and operation symbols; algebraic (variable) expressions include variables. For example, $4 + (5 - 3)$ is a numerical expression. In an algebraic expression, if each of the following terms, $6xy^2$, 24, and $\frac{y-3}{4+x}$, are combined, the result may be $6xy^2 + 24 - \frac{y-3}{4+x}$. An expression does not have an "equals" sign.

Expression Mat An organizing tool used to visually represent an expression with algebra tiles.

face One of the flat surfaces of a polyhedron, including the base(s).

factor

(a) In arithmetic: when two or more integers are multiplied, each of the integers is a factor of the product. For example, 4 is a factor of 24, because $4 \cdot 6 = 24$.

(b) In algebra: when two or more algebraic expressions are multiplied together, each of the expressions is a factor of the product. For example, x^2 is a factor of $-17x^2y^3$, because $(x^2)(-17y^3) = -17x^2y^3$.

first quartile (Q1) The median of the lower half of an ordered set of data is the lower quartile.

formula An equation that shows a mathematical relationship.

fraction The quotient of two quantities in the form $\frac{a}{b}$ where b is not equal to 0.

fraction greater than 1 A fraction in which the numerator is greater than the denominator.

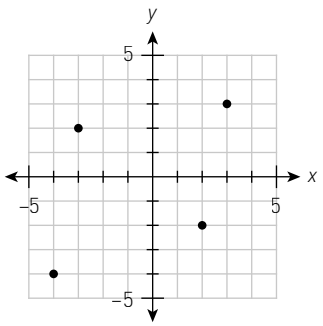
frequency The number of times that something occurs within an interval or data set.

Giant One A fraction that is equal to 1. Multiplying any fraction by a Giant One will create a new fraction equivalent to the original fraction. In the equation shown, $\frac{2}{2}$ is a Giant One.

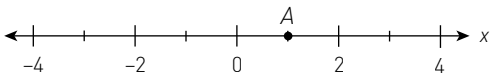
$$\frac{2}{3} \cdot \boxed{1} \; \frac{2}{2} = \frac{4}{6}$$

graph A graph represents numerical information in a visual form. The numbers may come from a table, situation (pattern), or rule (equation or inequality). Most of the graphs in this course show points, lines, and/or curves on a two-dimensional coordinate system or on a single axis called a number line.

TWO-DIMENSIONAL COORDINATE SYSTEM



NUMBER LINE



graphic organizer (GO) A visual representation of concepts or ideas you have learned. It helps with brainstorming and/or organizing information. It can make connections between ideas more clear. Examples are concept maps, charts, and Venn diagrams.

greater than One expression is greater than another if its value is larger. We indicate this relationship with the greater than symbol "$>$". For example, $4 + 5$ is greater than $1 + 1$. We write $4 + 5 > 1 + 1$.

greatest common factor (GCF) For integers, the greatest positive integer that is a common factor of two or more integers. For example, the greatest common factor of 28 and 42 is 14.

height

(a) Triangle: the length of a segment that connects a vertex of the triangle to a line containing the opposite base (side) and is perpendicular to that line.

(b) Trapezoid: the length of any segment that connects a point on one base of the trapezoid to the line containing the opposite base and is perpendicular to that line.

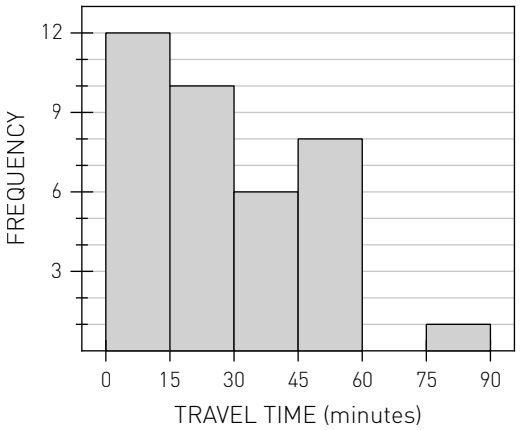
(c) Parallelogram (includes rectangle, rhombus, and square): the length of any segment that connects a point on one base of the parallelogram to the line containing the opposite base and is perpendicular to that line.

(d) Pyramid and cone: the length of the segment that connects the apex to a point in the plane containing the base of a figure and is perpendicular to that plane.

(e) Prism or cylinder: the length of a segment that connects one base of the figure to the plane containing the other base and is perpendicular to that plane. See *altitude of a triangle*.

hexagon A polygon with six sides.

histogram A way of displaying data that is much like a bar graph in that the height of the bars is proportional to the number of elements. The difference is that each bar of a histogram represents the number of data elements in a range of values, such as the time it takes to get to school from 0 minutes up to, but not including, 90 minutes. Each range of values should have the same width. See *bar graph*.



horizontal Parallel to the horizon. The x-axis of a coordinate graph is the horizontal axis.

Identity Property of Addition The Identity Property of Addition states that adding zero to any expression leaves the expression unchanged. That is, $a + 0 = a$. For example, $7 + 0 = 7$, and $-2y + 0 = -2y$.

Identity Property of Multiplication The Identity Property of Multiplication states that multiplying any expression by 1 leaves the expression unchanged. That is, $a(1) = a$. For example, $437x \cdot 1 = 437x$.

improper fraction See *fraction greater than 1.*

inequality An inequality consists of two expressions on either side of an inequality symbol. For example, the inequality $7x + 4.2 < -8$ states that the expression $7x + 4.2$ has a value less than -8.

inequality symbols The symbol $\leq$ read from left to right means "less than or equal to," the symbol $\geq$ read from left to right means "greater than or equal to," and the symbols $<$ and $>$ mean "less than" and "greater than," respectively. For example, "$7 < 13$" means that 7 is less than 13.

integers The set of numbers {..., –3, –2, –1, 0, 1, 2, 3, ...}.

interest An amount paid which is a percentage of an initial value.

interquartile range (IQR) A way to measure the spread of data. It is calculated by subtracting the first quartile from the third quartile.

interval A set of numbers between two given numbers.

inverse operation An operation that undoes another operation. For example, multiplication is the inverse operation for division.

isosceles triangle A triangle with two sides of equal length.

lateral face A (flat) side of a polyhedron. It is always a polygon.

least common multiple (LCM) The smallest common multiple of a set of two or more integers. For example, the least common multiple of 4, 6, and 8 is 24.

less than

(a) One expression is less than another if its value is not as large. This relationship is indicated with the less than symbol "<." For example, 1 + 1 is less than 4 + 5, so the comparison is written as $1 + 1 < 4 + 5$.

(b) Sometimes the comparison is made that one amount is a certain quantity less than another amount. For example, a student movie ticket might cost two dollars *less than* an adult ticket.

"let" statement A "let" statement is written at the beginning of our work to identify the variable that will represent a certain quantity. For example, in solving a problem about grilled cheese sandwiches, we might begin by writing "Let s = the number of sandwiches eaten." It is particularly important to use "let" statements when writing mathematical expressions, so that your readers will know what the variables in the expression represent.

like terms Two or more terms that contain the same variable(s), with corresponding variables raised to the same power. For example, $5x^2$ and $2x^2$ are like terms. See *combining like terms*.

line A line is an undefined term in geometry. A line is one-dimensional and continues without end in two directions. A line is made up of points and has no thickness. A line may be named with a letter (such as l), but also may be labeled using two points on the line, such as $\overleftrightarrow{AB}$.

line segment The portion of a line between two points. A line segment is named using its endpoints. For example, the line segment shown may be named either $\overline{AB}$ or $\overline{BA}$.

lowest common denominator (LCD) The smallest common multiple of the denominators of two or more fractions. For example, the LCD of $\frac{5}{12}$ and $\frac{3}{8}$ is 24.

lowest terms of a fraction A fraction for which the numerator and the denominator have no common factor greater than 1.

mean The mean, or average, of several numbers is one way of defining the "middle" of the numbers. To calculate the average of a group of numbers, add the numbers together then divide by the number of numbers in the set. For example, the average of the numbers 1, 5, and 6 is $(1 + 5 + 6) \div 3 = 4$. The mean is generally the best measure of central tendency when there are no outliers in the data set. See *average*.

mean absolute deviation A method for measuring the spread (variability) in a set of data by calculating the average distance each data point is from the mean. Since the calculation is based on the mean, it is best to use this measure of spread when the distribution is symmetric.

measure of central tendency Mean and median are measures of central tendency, reflecting special statistical information about a set of data. See *center (of a data distribution)*.

median The middle number of an ordered set of data. If there is no distinct middle, then the average of the two middle numbers is the median. The median is generally more accurate than the mean as a measure of central tendency when there are outliers in the data set.

mixed number (fraction) A number that consists of an integer and a fraction. For example, $3\frac{3}{8}$.

multiple The product of a whole number and any other (nonzero) whole number. For example, 15 is a multiple of 5.

multiple representations of a portion See *Portions Web*.

multiplication (·) An operation that reflects repeated addition. For example, $3 \cdot 4 = 4 + 4 + 4$.

Multiplicative Identity Property The Multiplicative Identity Property states that multiplying any expression by 1 leaves the expression unchanged. That is, $a(1) = a$. For example, $437x \cdot 1 = 437x$.

multiplicative inverse The multiplicative inverse for a non-zero number is the number we can multiply by to get the multiplicative identity, 1. For example, for the number 5, the multiplicative inverse is $\frac{1}{5}$; for the number $\frac{2}{3}$ the multiplicative inverse is $\frac{3}{2}$.

multiplier The number you can multiply by in order to increase or decrease an amount. When referring to figures or objects that have been enlarged the multiplier can be written as a ratio that compares the sizes of the parts of the corresponding parts of the figures or objects.

natural numbers The counting numbers beginning with 1. For example, 1, 2, 3....

negative number A negative number is a number less than zero. Negative numbers are graphed on the negative side of a number line, which is to the left of the origin.

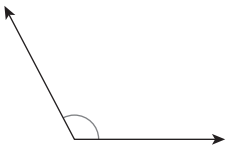
net A drawing of each of the faces of a prism or pyramid, as if it were cut along its edges and flattened out.

number line A diagram representing all real numbers as points on a line. All real numbers are assigned to points. The numbers are called the coordinates of the points and the point for which the number 0 is assigned is called the origin. See *boundary point*.

numeral A symbol that names a number. For example, each item of the following list is a numeral: 22.6, –19, 0.

numerator The number above the bar in a fraction that tells the numbers of parts in relationship to the number of parts in the whole.

obtuse angle Any angle that measures between (but not including) 90° and 180°.



obtuse triangle A triangle with one obtuse angle.

octagon A polygon with eight sides.

odd number An integer that cannot be evenly divided by two.

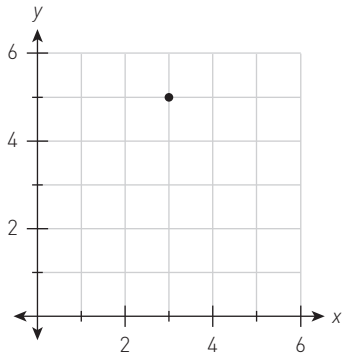
one-dimensional Something that does not have any width or depth. Lines and curves are one-dimensional.

operation A mathematical process such as addition, subtraction, multiplication, division, raising to a power, or taking a root.

opposite (of a number) The same number but with the opposite sign (+ or –). The additive inverse.

Order of Operations The specific order in which certain operations are to be carried out to evaluate or simplify expressions: parentheses (or other grouping symbols), exponents (powers or roots), multiplication and division (from left to right), and addition and subtraction (from left to right).

ordered pair Two numbers written in order as follows: (x, y). The primary use of ordered pairs in this course is to represent points in an xy-coordinate system. The first coordinate (x) represents the distance from the x-axis. The second coordinate (y) represents the distance from the y-axis. For example, the ordered pair (3, 5) can be represented by the point shown on the following graph.

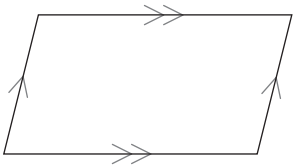


origin The point on a coordinate plane where the x-axis and y-axis intersect is called the origin. This point has coordinates (0, 0). The point assigned to zero on a number line is also called the origin. See *axis*.

outlier A number in a set of data that is much larger or much smaller than the other numbers in the set.

parallel Two or more straight lines on a flat surface that do not intersect (no matter how far they are extended) are parallel. Matching arrows on lines or line segments are used to indicate that those segments are parallel.

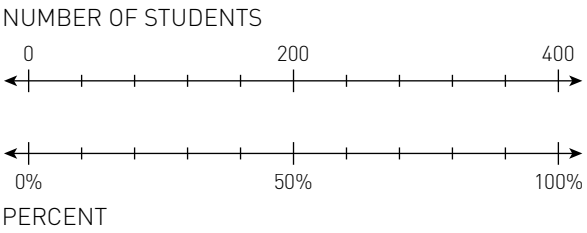
parallelogram A quadrilateral with two pairs of parallel sides.



pentagon A polygon with five sides.

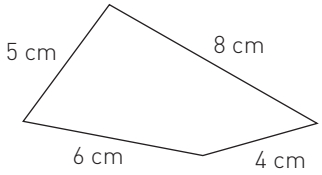
percent (%) A ratio that compares a number to 100. Percents are often written using the "%" symbol. For example, 0.75 is equal to $\frac{75}{100}$ or 75%.

percent ruler A diagram like the one shown. It is used to visually aid in determining an amount that is a percent of a whole.

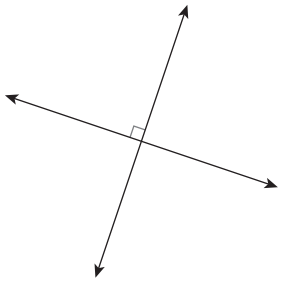


perfect number A positive integer that is equal to the sum of its proper positive divisors. For example, 6 is a perfect number because the proper divisors of 6 are 1, 2, and 3, and $1 + 2 + 3 = 6$.

perimeter The distance around a figure on a flat surface. In the example shown, the perimeter is 5 + 8 + 4 + 6 = 23 cm.



perpendicular Two rays, line segments, or lines that meet (intersect) to form a right angle (90°) are called perpendicular. A line and a flat surface may also be perpendicular if the line does not lie on the flat surface but intersects the surface and forms a right angle with every line on the flat surface passing through the point of intersection. A small square at the point of intersection of two lines or segments indicates that the lines form a right angle and are therefore perpendicular.

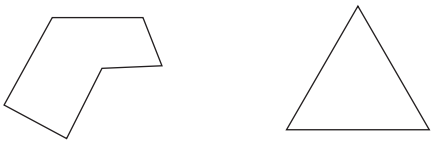


place value The number assigned to each place that a digit occupies.

plane A plane is a two-dimensional flat surface that extends without end. It is made up of points and has no thickness.

point An exact location in space. In two dimensions, an ordered pair specifies a point on a coordinate plane. See *ordered pair*.

polygon A two-dimensional closed figure of three or more line segments (sides) connected end to end. Each segment is a side and only intersects the endpoints of its two adjacent sides. Each point of intersection is a vertex. Shown are two examples of polygons.

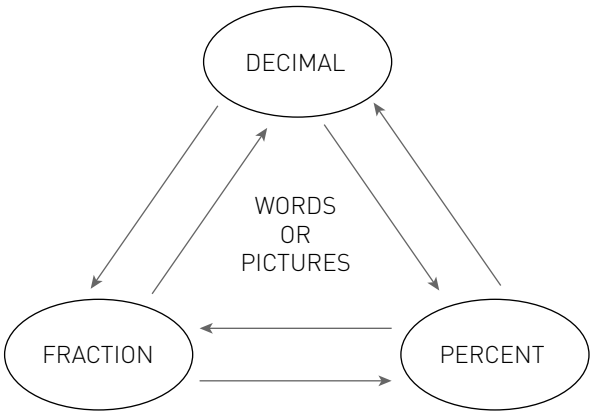


polyhedron A three-dimensional figure with no holes for which all faces are polygons.

population A collection of objects or group of people about whom information is gathered.

portion A part of something; a part of a whole.

Portions Web The web diagram shown illustrates that fractions, decimals, and percents are different ways to represent a portion of a number. Portions may also be represented in words, such as "four-fifths" or "seven-fourths," or as diagrams.



positive numbers Numbers that are greater than zero.

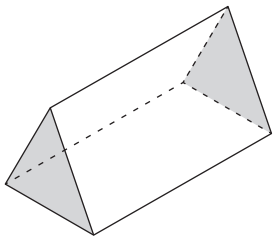
power A number or variable raised to an exponent in the form x^n. See *exponent*.

prime factor A factor that is a prime number.

prime factorization The expression of a number as the product of prime factors.

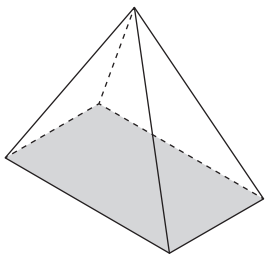
prime number A positive integer with exactly two factors. The only factors of a prime number are 1 and itself. For example, the numbers 2, 3, 17, and 31 are all prime.

prism A three-dimensional figure with two parallel, congruent polygonal bases. The lateral faces are parallelograms that connect the corresponding vertices of the bases.

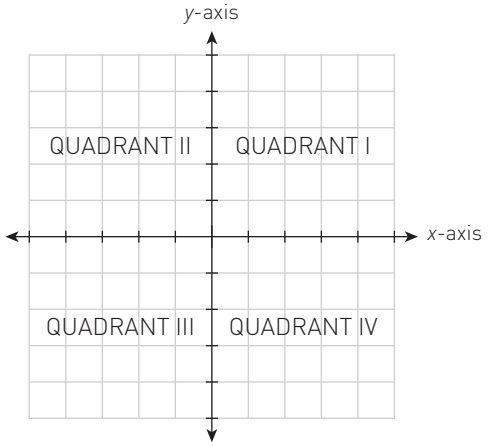


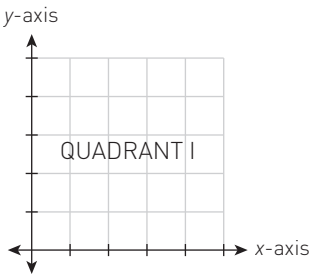
product The result of multiplying. For example, the product of 4 and 5 is 20.

pyramid A three-dimensional figure with a base that is a polygon. The lateral faces are formed by connecting each vertex of the base to a single point (the vertex of the pyramid) that is above or below the surface that contains the base.

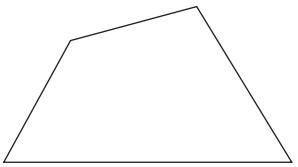


quadrants The coordinate plane is divided by its axes into four quadrants. The quadrants are numbered as shown in the first diagram. When graphing data that has no negative values, sometimes a graph that shows only the first quadrant is used.





quadrilateral A polygon with four sides. The following shape is a quadrilateral.



quartile Along with the median, the quartiles divide a set of data into four groups of the same size. See *box plot*.

quotient The result of a division problem.

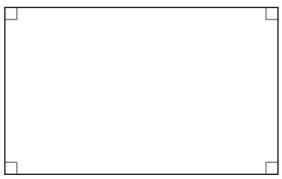
range The range of a set of data is the difference between the highest and lowest values.

rate A ratio comparing two quantities, often a comparison of time. For example, miles per hour.

ratio A ratio compares two quantities by division. A ratio may be written using a colon, but is more often written as a fraction. For example, the comparison may be made of the ratio of female students in a particular school to the total number of students in the school. This ratio could be written as 1,521:2,906 or as $\frac{\text{1,521 female students}}{\text{2,906 total students}}$.

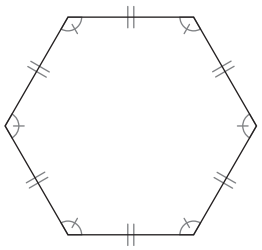
reciprocal The reciprocal of a nonzero number is its multiplicative inverse, that is, the reciprocal of x is $\frac{1}{x}$. For a number in the form $\frac{a}{b}$, where a and b are non-zero, the reciprocal is $\frac{b}{a}$. The product of a number and its reciprocal is 1. For example, the reciprocal of 12 is $\frac{1}{12}$, because $12 \cdot \frac{1}{12} = 1$.

rectangle A quadrilateral with four right angles.



reduce To make smaller.

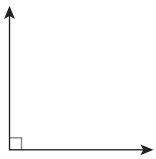
regular polygon A polygon is regular if the polygon is a convex polygon with congruent angles and congruent sides. For example, the following shape is a regular hexagon.



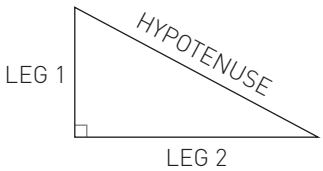
remainder The amount left over when the divisor does not divide the dividend exactly. For example 63 ÷ 5 is 12 with a remainder of 3.

rhombus A quadrilateral with four congruent sides. See *equilateral*.

right angle An angle that measures 90°. A small square is used to note a right angle, as shown in the example.



right triangle A triangle that has one right angle. The side of a right triangle opposite the right angle is called the "hypotenuse," and the two sides adjacent to the right angle are called "legs."



round (a number) To express an approximate value of a number that is exact to a given decimal place. For example, when 1,234.56 is rounded to the nearest whole number, the result is 1,235. When 1,234.56 is rounded to the nearest 100, the result is 1,200.

rule A rule is an equation or inequality that represents the relationship between two numerical quantities. A rule is often used to represent the relationship between quantities in a table, a pattern, a real-world situation, or a graph.

sample A subset (group) of a given population with the same characteristics as the whole population.

scale (scaling) The ratio between a length of the representation (such as a map, model, or diagram) and the corresponding length of the actual object. For example, the map of a city may use one inch to represent one mile.

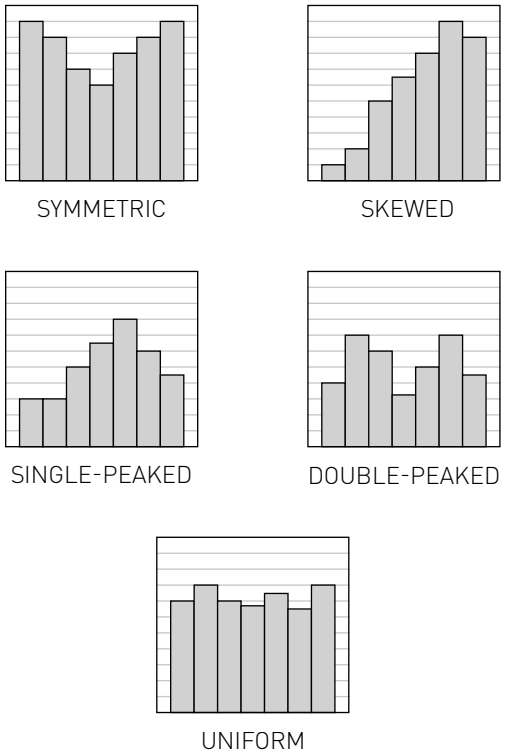
scale drawing A drawing that shows a real object with accurate sizes except they have all been reduced or enlarged by a certain amount.

scale on axes The scale on an axis tells you what number each successive tick mark on the axis represents. A complete graph has the scale marked with numbers on each axis. Each axis should be scaled so that each interval represents the same amount.

scalene triangle A triangle with no congruent sides.

set A collection of items.

shape (of a data display) Some of the words statisticians use to describe the overall shape of a data distribution include: symmetric, skewed, single-peaked, double-peaked, and uniform. Examples are shown.



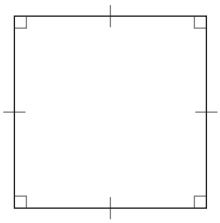
single-peaked See *shape (of a data display)*.

skewed (data display) See *shape (of a data display)*.

solution The number or numbers that, when substituted into an equation or inequality, make the equation or inequality true. For example, $x = 4$ is a solution to the equation $3x = 12$ because $3x$ equals 12 when $x = 4$.

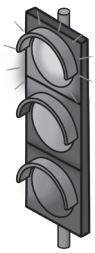
spread (data display) A measure of the amount of variability in a data set. Three ways to measure spread are the range, the mean absolute deviation, and the interquartile range.

square A quadrilateral with four right angles and four congruent sides.



square units The units used to describe the measure of an area in the form of 1 × 1 unit squares.

stoplight icon The icon shown will appear periodically throughout the text. Problems that display this icon contain errors of some type.



subproblems A problem-solving strategy that breaks a problem into smaller parts that must be solved in order to solve the original, more complex problem.

substitution Replacing one symbol with a number, a variable, or another algebraic expression of the same value. Substitution does not change the value of the overall expression. For example, suppose that the expression $13x - 6$ must be evaluated for $x = 4$. Since x has the value 4, 4 may be substituted into the expression wherever x appears, giving the equivalent expression $13(4) - 6$.

subtraction (–) An operation that gives the difference between two numbers.

sum The result of adding two or more numbers. For example, the sum of 4 and 5 is 9.

Super Giant One A Giant One in which either or both the numerator and denominator are fractions.

surface area The sum of all the area(s) of the surface(s) of a three-dimensional solid. For example, the surface area of a prism is the sum of the areas of its top and bottom bases, and its vertical surfaces (lateral faces).

symmetric See *shape (of a data display)*.

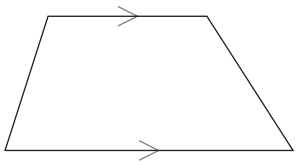
term A term is a single number, variable, or the product of numbers and variables, such as –45, $1.2x$, and $3xy^2$.

third quartile (Q3) The median of the upper half of an ordered set of data.

three-dimensional An object that has height, width, and depth.

tick mark A symbol that shows that a number line has been divided into intervals of equal length. See *number line*.

trapezoid A quadrilateral with at least one pair of parallel sides.



triangle A polygon with three sides.

two-dimensional An object having length and width.

uniform See *shape (of a data display)*.

unit of measure A standard quantity (such as a centimeter, second, square foot, or gallon) that is used to measure and describe an object. A single object may be measured using different units of measure. For example, a pencil may be 80 mm long, meaning that the pencil is 80 times as long as a unit of 1 mm. However, the same pencil is 8 cm long, so that the pencil is the same length as 8 cm laid end-to-end. This is because 1 cm is the same length as 10 mm.

unit rate A rate with a denominator of one when simplified.

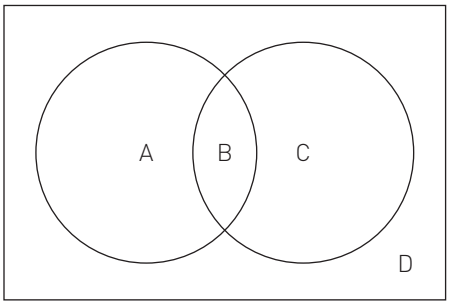
units digit The numeral in the ones place.

variability See *spread*.

variable A symbol used to represent one or more numbers. In this course, letters of the English alphabet are used as variables. For example, in the expression $3x - (8.6xy + z)$, the variables are x, y, and z.

variable expression See *expression*.

Venn diagram A type of diagram used to classify objects that is usually composed of two or more overlapping circles representing different conditions. An item is placed or represented in the Venn diagram in the appropriate position based on the conditions that the item meets. In the example of the Venn diagram shown, if an object meets one of two conditions, then the object is placed in region A or C but outside region B. If an object meets both conditions, then the object is placed in the intersection (B) of both circles. If an object does not meet either condition, then the object is placed outside of both circles (region D).



vertex (plural: vertices) For polygons, a vertex is the point at which two line segments meet to form a "corner."

vertical At right angles to the horizon. On a coordinate graph, the y-axis runs vertically.

volume A measurement of the size of the three-dimensional region enclosed within an object. Volume is expressed as the number of $1 \times 1 \times 1$ unit cubes (or parts of cubes) that fit inside a solid.

whole numbers The natural numbers and zero.

***x*-axis** The horizontal number line on a coordinate graph. See *axis*.

***x*-coordinate** In an ordered pair, (x, y), that represents a point in the coordinate plane, x is the value of the x-coordinate. That is, the distance from the y-axis that is needed to plot the point.

***y*-axis** The vertical number line on a coordinate graph. See *axis*.

***y*-coordinate** In an ordered pair, (x, y), that represents a point in the coordinate plane, y is the value of the y-coordinate. That is, the distance from the x-axis that is needed to plot the point.