



VASHON ISLAND SCHOOL DISTRICT

MATHEMATICS GUIDE

OSPI GLOSSARY

Revised June 2006

## OSPI Mathematics Glossary

**Absolute value:** The numerical value of a number without regard to its sign; the distance from 0 to a point on the number line. ( $| |$  means absolute value)

Example:

$|3| = 3$  and  $|-3| = 3$ ;  $|9| = 9$  and  $|-9| = 9$ ;  $|0| = 0$ .

**Acute angle:** An angle which measures less than 90 degrees and greater than 0 degrees.

**Acute triangle:** A triangle with three acute angles.

**Addend:** Any number that is added; addend + addend = sum.

Example:

In  $3 + 4 = 7$ , 3 and 4 are addends.

**Addition:** An operation joining two or more sets where the result is the whole.

**Adjacent angles:** Angles in the same plane that have a common side and a common vertex, but whose interiors do not intersect.

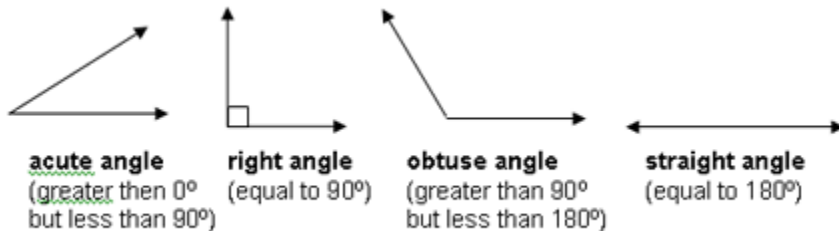


**Algorithm:** A step-by-step method for computing. For example, the addition algorithm describes how to find the sum when regrouping, or the long division algorithm.

**Analysis:** Breaking down material into its component parts so that it may be more easily understood.

**Analyze:** To breakdown material into component parts so that it may be more easily understood.

**Angle:** Two rays that share an endpoint; classified according to the number of degrees of its measure.



**Approximate:** To obtain a number close to an exact amount.

**Approximation:** The result of obtaining a number close to an exact amount.

**Area:** The area of a flat, or plane, figure is the number of unit squares that can be contained within it. The unit square is usually some standard unit, like a square meter, a square foot, or a square inch.

**Argument:** A reason or reasons offered for or against something; suggests the use of logic and facts to support or refute a statement or idea.

**Arithmetic sequence:** A list of numbers, called terms, in which the difference between any two adjacent numbers is the same. The first number in the list is called the initial value.

Example:

The list 1, 3, 5, 7 ... is an arithmetic sequence because the difference between any two adjacent numbers is 2. That difference is called the common difference.

**Associative property of addition:** The sum stays the same when the grouping of addends is changed.

Example:

$$(a + b) + c = a + (b + c)$$
$$(30 + 4) + 20 = 30 + (4 + 20)$$

**Associative property of multiplication:** The product stays the same when the grouping of factors is changed.

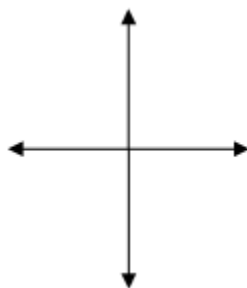
Example:

$$(a \times b) \times c = a \times (b \times c)$$
$$(2 \times 3) \times 4 = 2 \times (3 \times 4)$$

**Attributes:** A characteristic or distinctive feature.

**Average:** A measure of central tendency; generally, average will imply arithmetic average, which could be the mean, median, or mode.

**Axes:** Perpendicular lines used as reference lines in a coordinate system or graph; traditionally, the horizontal axis represents the independent variable and the vertical axis the dependent variable.

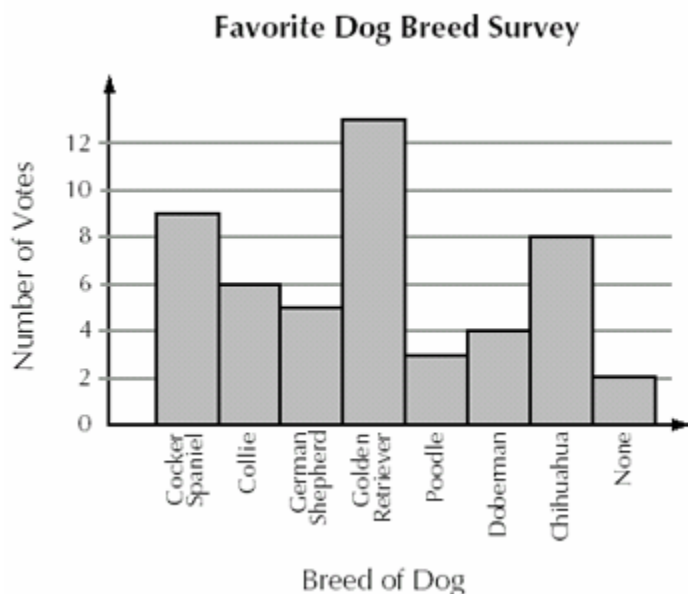


**Axiom:** A self-evident and generally accepted statement.

Example:

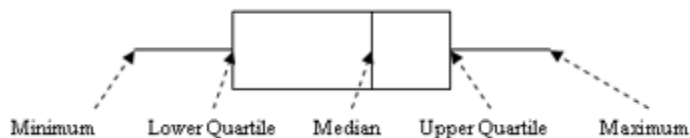
Two points determine exactly one straight line.

**Bar graph:** A graph that uses the length of solid bars to represent numbers and compare data.



**Bivariate data:** Data involving two variables, such as height and weight, or amount of smoking and a measure of health; often graphed in a scatter plot.

**Box-and-whisker plot:** A graph which displays the following five points from a data set: the minimum value, the lower quartile (25th percentile), the median, the upper quartile (75th percentile), and the maximum value.



**Capacity:** Volume and capacity are both terms for the measures of the “size” of three-dimensional regions. Standard units of volume are expressed in terms of length units, such as, cubic centimeters. Capacity units are generally applied to liquids or the containers that hold liquids. Standard capacity units include quarts and gallons, liters and milliliters.

**Cardinal number:** Number that designates how many objects, or the number of units in the set; answers the question, “How many...?”.

Example:

There are 28 students in the room. The cardinality or cardinal number is 28.

**Central tendency:** A single number that describes all the numbers in a set. Three measures of central tendency are mean, median, and mode.

Example:

For the set of numbers 95, 86, and 83, the mean is 88.

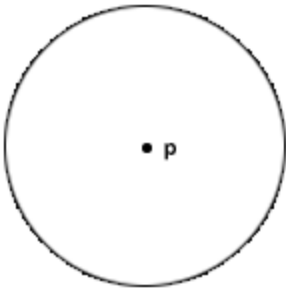
**Characteristics:** A set of distinguishing elements.

**Chart:** A method of displaying information in the form of a graph or table.

**Circle:** A set of points in a plane that are all the same distance from the center point.

Example:

Circle P is drawn below.

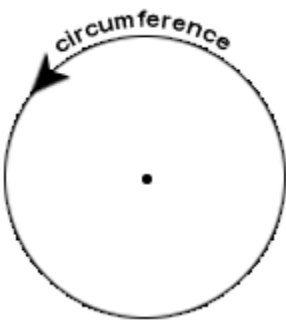


**Circle graph:** Sometimes called a pie chart, a way of representing data that shows the fractional part or percentage of an overall set as a corresponding part of a circle. Example:



**Circumference:** The boundary line, or perimeter, of a circle; also, the length of the perimeter of a circle.

Example:



**Closure property:** A set of numbers is said to be closed under an operation if the result of performing the operation on any two numbers in the set produces a number in the set.

**Cluster:** In terms of statistics, a relatively large number of data closely grouped around a particular value.

**Coefficient:** A number multiplied by a variable.

Example:

A number like 6 in the term  $6x^2$  is a coefficient.

**Collinear points:** Points on the same line.

**Combination:** A collection of objects in no particular order.

Example:

The collection 1, 2, 3 is the same combination as 3, 1, 2.

**Common denominator:** A number divisible by all of the denominators of two or more fractions.

Example:

12 is the common denominator of  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ .

**Common multiple:** A number that is a multiple of each of two or more numbers; used to find a common denominator when operating with fractions having unlike denominators.

Example:

12 is a common multiple of 2, 3, and 4. See Multiple.

**Commutative property of addition:** The order in which two numbers are added does not affect the results. (The commutative property does not apply to subtraction.)

Example:

$$a + b = b + a$$

$$4 + 50 = 50 + 4$$

**Commutative property of multiplication:** It makes no difference in which order two numbers are multiplied. (The commutative property does not apply to division.)

Example:

$$a \times b = b \times a$$

$$3 \times 5 = 5 \times 3$$

**Compare:** Look for similarities and differences.

**Compatible numbers:** Numbers in a problem that are adjusted to make mental math easier.

Example:

$16 + 11 + 24 + 35$  is adjusted so that  $11 + 24 = 35$  and  $35 + 35 = 70$  and  $70 + 16 = 86$ . So, 86 is the final answer.

**Complementary angles:** Two angles whose measures sum to 90.

**Complementary events:** Two events whose probabilities of occurring sum to 1. In other words, these events are mutually exclusive and the only two things that can occur.

Example:

Getting a head and getting a tail are complementary events, when flipping a coin.

**Composing numbers:** Building larger units from smaller units.

Example:

Ten units build one ten in base ten.

**Composite numbers:** An integer greater than 1 which has whole number factors other than itself and 1.

Example:

10 is a composite number because it has the factors 1, 2, 5 and 10.

**Compound events:** An event that consists of two or more simple events.

Example:

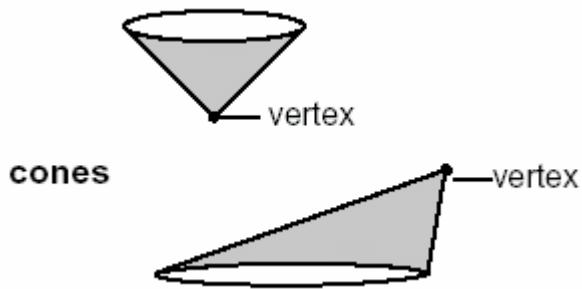
Consider the event of rolling a cube and flipping a coin and getting a "6" and "tails".

**Conclude:** To make a judgment or decision after investigating or reasoning; to infer.

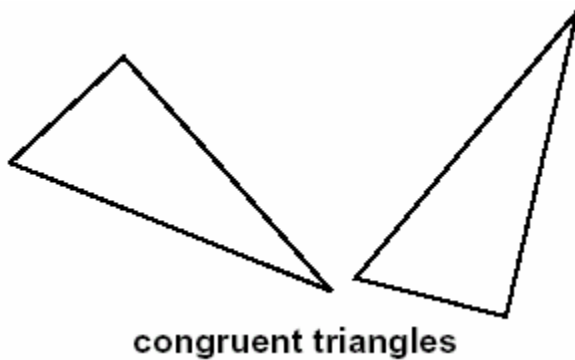
**Conclusion:** A statement that follows logically from other facts.

**Conditional probability:** The probability that an event will occur given that another event has already occurred.

**Cone:** A three-dimensional figure with one circular or elliptical base and a curved surface that joins the base to the vertex.



**Congruent figures:** Figures that have the same shape and size.



**Conjectures:** Inference or judgment based on inconclusive or incomplete evidence; guesswork.

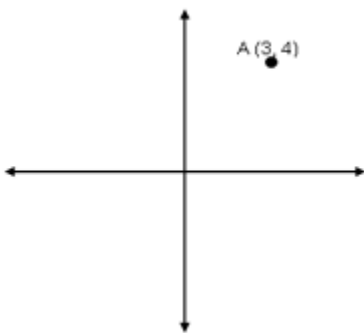
**Consecutive vertices:** Two vertices of a polygon that are endpoints of one side of the polygon.

**Contrast:** To emphasize differences.

**Coordinates:** Ordered pairs of numbers that identify points on a coordinate plane.

Example:

(3, 4) is the coordinate of point A.



**Coplanar points:** Points that are on the same plane.

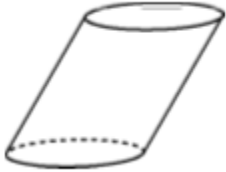
**Cube:** A rectangular prism having six congruent square faces.

**Cube root:** One of three (and only three) equal factors of a given number.

Example:

3 is the cube root of 27 because  $3 \cdot 3 \cdot 3 = 27$ .

**Cylinder:** A solid figure with two circular or elliptical bases that are congruent and parallel to each other.



**Data:** Collected pieces of information.

**Decimal number:** A number expressed in base 10, such as 39.456.

**Decomposing numbers:** Breaking larger units into smaller units in a base.

Example:

One ten breaks into ten units in base ten.

**Deductive reasoning:** Using logic, definitions, and other statements known to be true in order to prove another statement is true.

**Denominators:** The number below the fraction bar; indicates the number of equivalent pieces or sets into which something is divided.

**Dependent event:** An event whose probability is affected by the outcome of another event.

**Derived unit of measurement:** A measurement determined by finding the ratio of other measurements.

Example:

Density is determined by dividing the mass of quantity by its volume; speed by dividing distance covered by time elapsed.

**Diagonal:** A segment joining 2 non-consecutive vertices of a polygon.

**Diagram:** A drawing that represents a mathematical situation.

**Diameter:** A line segment (or the length of a segment) passing through the center of the circle with endpoints on the circle.

**Difference:** The number found when subtracting one number from another; the result of a subtraction operation; the amount by which a quantity is more or less than another number.

**Dimensions:** The length, width, or height of an object.

**Direct measurement:** A measurement determined by use of a tool (not a calculation). See Measurement.

**Direct proportion:** Proportionality indicates that two quantities or variables are related in a linear manner. If one quantity doubles in size, so does the other; if one of the variables diminishes to 1/10 of its former value, so does the other.

**Discrete:** Composed of distinct parts or discontinuous elements; a set of numbers or points that has no limit points.

Example:

Discrete – taking coins out of your pocket one at a time.

Non-discrete (or continuous) – pouring water from one container to another container.

**Distributive property:** The product of a number and a sum is equal to the sum of the products of the number with each of the addends in the sum. That is, for all real numbers  $a$ ,  $b$ , and  $c$  in a given set,  $a(b + c) = ab + ac$ .

**Distributive property of multiplication over addition:** A property of real numbers that states  $a \times (b + c) = (a \times b) + (a \times c)$  where  $a$ ,  $b$ , and  $c$  stand for any real numbers.

Example:

$$3 \times (40 + 5) = (3 \times 40) + (3 \times 5)$$

**Dividend:** A number which is to be divided by another number. Dividend  $\div$  divisor = quotient

Example:

In  $15 \div 3 = 5$ , 15 is the dividend.

$$\begin{array}{r} \text{quotient} \\ \text{divisor} \overline{) \text{dividend}} \end{array} \quad 3 \overline{) 15} \begin{array}{r} 5 \\ \hline \end{array}$$

**Divisible:** One integer is divisible by another non-zero integer if the quotient is an integer with remainder of zero.

Example:

12 is divisible by 3 because  $12 \div 3$  is an integer, namely 4.

**Division:** An operation on two numbers to determine the number of sets or the size of the sets. Problems where the number of sets is unknown may be called measurement or repeated subtraction problems. Problems where the size of sets is unknown may be called fair sharing or partition problems.

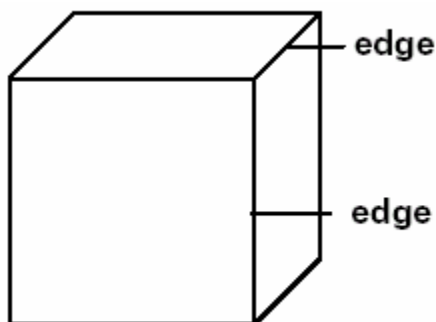
**Divisor:** The number by which the dividend is to be divided; also a factor quotient.

Example:  $15 \div 3 = 5$ , 3 is the divisor.

$$\begin{array}{r} \text{quotient} \\ \text{divisor} \overline{) \text{dividend}} \end{array} \quad 3 \overline{) 15} \begin{array}{r} 5 \\ \hline \end{array}$$

**Domain:** Set of all values of the independent variable of a given function, usually the  $x$ -values on a coordinate plane.

**Edge:** The line segment formed by the intersection of two faces of a three-dimensional figure; a cube has 12 edges.



**Empirical frequency:** The number of times in an experiment that a particular event occurs.

**Empirical results:** The results of an experiment or simulation.

**Equality:** Two or more sets of values are equal.

**Equally likely:** Two outcomes are equally likely if they have the same probability of occurring.

**Equation:** A number sentence or algebraic sentence which shows equality between two sets of values.

Example:

$$4 + 8 = 6 + 6$$

$$4 + 8 = 24 \div 2$$

$$4 + X = 12$$

**Equilateral:** Having equal sides.

**Equivalent fractions:** Fractions that name the same number.

Example:

$\frac{3}{4}$  and  $\frac{6}{8}$  and  $\frac{9}{12}$  are equivalent fractions.

**Estimate:** To find an approximate value or measurement of something without exact calculation.

**Estimation:** The process of finding an approximate value or measurement of something without exact calculation. Measurement estimation – an approximate measurement found without taking an exact measurement. Quantity estimation – an approximate number of items in a collection. Computational estimation – a number that is an approximation of a computation that we cannot (or do not wish to) determine exactly.

**Even number:** A whole number divisible by two.

Example:

0, 4, 6, 8 are even numbers.

**Event:** Any subset of the sample space. In rolling a number cube, the event of rolling a “3” is a singleton event because it contains only one outcome. The event of rolling an “even number” contains three outcomes.

**Expanded form:** A number written in component parts showing the cumulative place values of each digit in the number.

Example:

$$546 = 500 + 40 + 6.$$

**Experimental probability:** The ratio of the number of times an event occurs to the number of trials.

**Exponent:** A numeral written above and to the right of another numeral to indicate how many times the original number is used as a factor.

Example:

The exponent “3” in  $4^3$  means 4 is a factor 3 times;  $4^3 = 4 \times 4 \times 4$ .

**Exponential (relationship):** Any data set or information that can be reasonably modeled by an equation of the form  $y = a^x$ .

**Expression:** A combination of variables, numbers, and symbols that represent a mathematical relationship.

**Extrapolate:** To estimate or approximate a value beyond a given set of data.

**Face:** A flat surface, or side, of a solid (3-D) figure.



**Factor:** One of two or more numbers that are multiplied together to obtain a product.

Example:

In  $4 \times 3 = 12$ , 4 and 3 are factors.

**Factorial:** The product of all whole numbers from  $x$  down through 1, symbolized by  $x!$ .

Example:

$4! = (4)(3)(2)(1) = 24$

**Figure:** A geometric figure is a set of points and/or lines in 2 or 3 dimensions.

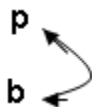
**Flip:** Movement of a figure (or object) that reverses the figure (object).

Examples:

Flipping a pancake from one side to the other.

Reversing a “b” to a “d”.

Tipping a “p” to a “b” or a “b” to a “p” as shown below:



**Fluency:** Understanding of mathematical procedures and the skill to use them with efficiency, accuracy, and flexibility.

**Fraction:** A way of representing part of a whole set.

Example:

$$\text{Example: } \frac{\text{numerator}}{\text{denominator}} = \frac{\text{dividend}}{\text{divisor}} =$$

$$\frac{\# \text{ of parts under consideration}}{\# \text{ of parts in a set}}$$

**Fraction families:** Sets of fractions having denominators that are multiples of a single number.

Example:

Halves, fourths, eighths, and sixteenths are a family. Thirds, sixths, and ninths are a family.

**Function machine:** Applies a function rule to a set of numbers which determines a corresponding set of numbers.

Example:

9 --> Input --> Rule  $\times 7$  --> Output --> 63

If you apply the function rule "multiply by 7" to the values 5, 7, and 9, the corresponding values would be:

5 --> 35

7 --> 49

9 --> 63

**Fundamental counting principle:** If one event has  $m$  possible outcomes and a second independent event has  $n$  possible outcomes, then there are  $m \times n$  total possible outcomes for the two events together.

**Generalization:** A conclusion reached through inductive reasoning.

**Geometric sequence:** A list of numbers, called terms, in which each successive term is determined by multiplying the previous term by a common factor.

Example:

1, 2, 4, 8, 16... is a geometric sequence with a first term of 1 and a common factor of 2.

**Graph:** A "picture" showing how certain facts are related to each other or how they compare to one another.

**Greatest common factor (divisor):** The largest factor of two or more numbers; often abbreviated as GCF. The GCF is also called the greatest common divisor.

Example:

To find the GCF of 24 and 36:

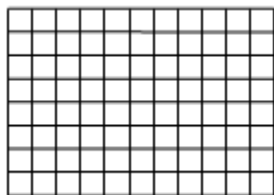
1) Factors of 24 = {1, 2, 3, 4, 6, 8, 12, 24}.

2) Factors of 36 = {1, 2, 3, 4, 6, 9, 12, 18, 36}.

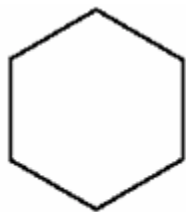
3) Common factors of 24 and 36 are {1, 2, 3, 4, 6, 12}, the largest being 12.

4) 12 is the GCF of 24 and 36.

**Grid:** A pattern of regularly spaced horizontal and vertical lines on a plane that can be used to locate points.



**Hexagon:** A six-sided polygon.

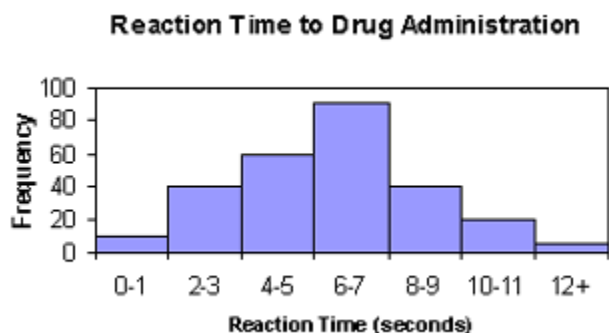


**regular hexagon**



**nonregular hexagons**

**Histogram:** A graph that shows the frequency distribution for a set of data. The graph is noted for the labels of the bars being given in intervals and for no spaces between successive bars.



**Horizontal:** Extending side to side, parallel to the horizon.

**Hypotenuse:** The longest side of a right triangle (opposite the right angle).

**Identity property of addition:** Adding zero to a number gives a sum identical to the given number.

**Identity property of multiplication:** Multiplying a number by 1 gives a product identical to the given number.

**Impossible events:** An event that cannot happen or an event with a probability of 0.

**Improper fraction:** A fraction in which the numerator is equal to or greater than the denominator.

Examples:

15/15 and 5/3

**Independent events:** Two events whose outcomes have no effect on one another.

Example:

The second flip of a coin is independent of the first flip of a coin.

**Indirect measurement:** A measurement determined without the direct application of measurement tools.

Examples:

- 1) Determine the likelihood a desk will pass through a doorway.
- 2) Which is longer the distance around your wrist or an eraser?
- 3) Find a measure by the use of the Pythagorean Theorem, by similarity, or through ratios or scale factors.

**Inductive reasoning:** A method of reasoning in which a general statement or conjecture is made based on particular facts and/or observations.

Example:

Deriving a general rule to describe a set of numbers from an observed pattern.

**Inequality:** Two or more sets of values are not equal.

**Infer:** To draw a conclusion from facts or evidence.

**Inference:** A conjecture based on inductive reasoning.

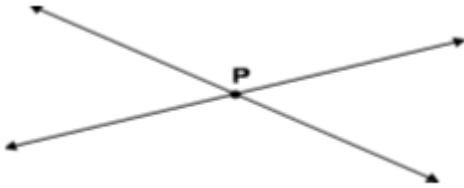
**Integer:** The counting numbers (1, 2, 3, ...), their opposites (-1, -2, -3, ...), and zero.

**Integral:** Refers to being an integer.

**Interpolate:** To estimate or approximate a value between two given values.

**Interpret:** To explain the meaning of information, facts, and/or observation.

**Intersecting lines:** Lines that meet at a point.



**Interval:** Spacing of (or space between) two numbers on a number line.

**Inverse property of multiplication:** Each non-zero real number  $x$  has a multiplicative inverse, denoted by  $1/x$ , such that their product is 1.

Example:

The number 3 has a multiplicative inverse of  $1/3$ .

**Inverse proportion:** Indicates that two quantities or variables are related in a reciprocal manner. If one quantity doubles in size the other is halved. If one quantity is multiplied by ten the other is divided by ten.

Example:

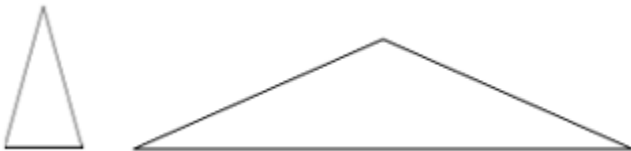
If the time spent traveling a certain distance is doubled, the speed of travel halved.

**Investigate:** To research using careful observation and examination of the facts; to inquire.

**Irrational number:** A number that cannot be written in a fraction form.

**Irregular polygon:** A polygon whose interior angles are not equal and/or its sides are not equal in length.

**Isosceles triangle:** A triangle with two congruent sides; an alternate definition is a triangle with at least two congruent sides (there is no common agreement on a definition of an isosceles triangle).



**Justify:** To prove or show to be true or valid using logic and/or evidence.

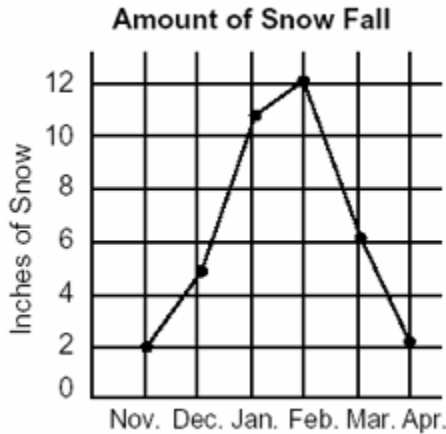
**Least common multiple:** The smallest positive multiple of two or more integers.

Example:

12 is the LCM of 3, 2, and 4, because it is the smallest number that is a multiple of all three numbers. 12 is also the LCM of 2, -3, 4.

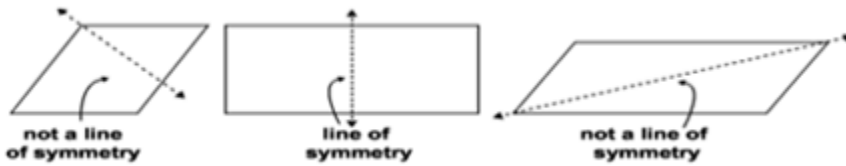
**Line:** See Undefined Terms.

**Line graph:** A graph that uses lines (segments) to show that something is increasing, decreasing, or staying the same over time.



**Line of best fit:** A line drawn on a scatter plot to estimate the relationship between two sets of data.

**Line of symmetry:** A line on which a figure can be folded into two parts that are congruent mirror images of each other.



**Line plots:** A line plot, sometimes called a dot plot, starts with a line that represents one variable. The values of the variable are labels on the line. Each observation is marked as a point above the line.

**Example of a line plot:**



**Linear equation:** An equation whose graph on a coordinate grid is a line. The equation can be written in the form  $y = mx + b$ .

**Linear inequality:** An inequality whose graph on a coordinate grid is bounded by a line. The inequality can be written in the form  $y (=, <, >, \text{ or } \neq) mx + b$ .

**Linear model:** An equation that may be expressed as  $y = mx + b$  (or  $ax + by + c = 0$ ) to exactly or nearly represent a data set.

**Linear or linear relationships:** Any data set or information that could be reasonably modeled with a line.

**Lower quartile:** The median of the lower half of an ordered set of data.

**Mean:** A measure of central tendency found by summing the members of a set of data and dividing the sum by the number of members of the set (also called the arithmetic mean.).

Example:

If A = 20 children, B = 29 children, and C = 26 children, the mean number of children is found by summing the three numbers  $20 + 29 + 26 = 75$  and then dividing the sum, 75, by the number 3. So, 25 is the mean of 20, 29, and 26.

**Measurement:** The numerical amount associated with dimensions, quantity, length, or capacity.

Example:

The length of a line segment and the volume of a cube are measurements.

**Measures of central tendency:** Numbers that give some indication of the distribution of data. Three measures of central tendency are mean, median, and mode.

**Median:** The number in the middle of a set of data arranged in order from least to greatest or from greatest to least; or the average of the two middle terms if there is an even number of terms.

Example:

1) For the data: 6, 14, 23, 46, 69, 72, 94 --> the median is 46 (the middle number). 2) For the data: 6, 14, 23, 69, 72, 94 --> the median is also 46 (the average of the two middle numbers in the list).

**Method:** A systematic way of accomplishing a task.

**Mixed number:** A number expressed as the sum of an integer and a proper fraction; having a whole part and a fractional part.

Example:

$6\frac{2}{3}$

**Mode:** The item that occurs most frequently in a set of data. There may be one, more than one, or no mode.

Example:

The mode in {1, 3, 4, 5, 5, 7, 9} is 5.

**Multiple:** A multiple of a number is the product of that number and an integer.

Example:

Multiples of 2 = {2, 4, 6, 8, 10, 12,....}.

Multiples of 3 = {3, 6, 9, 12,....}.

Multiples of 4 = {4, 8, 12,....}.

**Multiple transformations:** A combination of transformations applied sequentially to a figure.

Example:

Reflection of one figure over one line followed by reflection over a second line or, translation of one figure on a graph followed by a reflection over an axis.

**Multiplication:** An operation on two numbers that tells how many in all. The first number is the number of sets and the second number tells how many in each set. Problem formats can be expressed as repeated addition, an array approach or a Cartesian product approach.

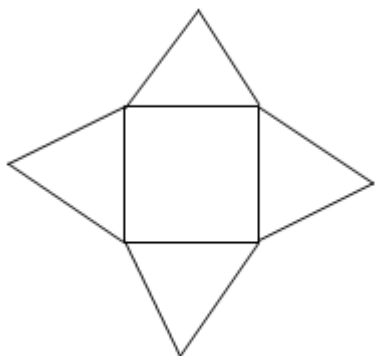
**Mutually exclusive:** Two events are mutually exclusive if it is not possible for both of them to occur.

Example:

If a die is rolled, the event "getting a 1" and the event "getting a 2" are mutually exclusive since it is not possible for the die to be both a one and a two on the same roll.

**Natural numbers:** A number from the set of numbers {1, 2, 3, 4...}. The natural numbers are also called the counting numbers or positive integers.

**Net:** A representation of three-dimensional figure that is “unfolded”.



**Non-linear:** A data set or function that, when plotted, does not have the characteristics of a line.

**Non-repeating decimal:** A decimal number in which there are no digits that endlessly repeat a pattern.

**Non-standard units of measurement:** Measurement units that are not commonly accepted as standard but are applied uniformly when measuring.

Example:

Paperclips, pencils, cubes

**Noncoplaner points:** A set of points in space that cannot be contained in the same plane.

**Number line:** A line that shows numbers ordered by magnitude from left to right or bottom to top; an arrowhead at each end indicates that the line continues endlessly in both directions; equal intervals are marked and labeled.

**Number sentence:** An expression of a relationship between quantities as an equation or an inequality.

Examples:

$$7 + 7 = 8 + 6$$

$$14 < 92$$

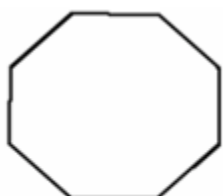
$$56 + 4 > 59$$

**Numerator:** The number above the line in a fraction; indicates the number of equivalent parts being considered.

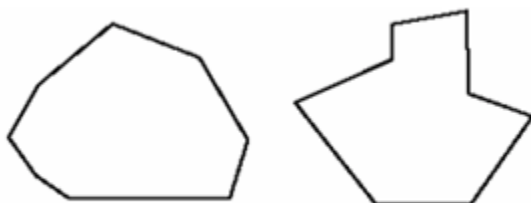
**Obtuse angle:** An angle with measure greater than 90 degrees and less than 180 degrees.

**Obtuse triangle:** A triangle with one obtuse angle.

**Octagon:** An eight-sided polygon.



**regular  
octagon**



**nonregular  
octagons**

**Odd number:** A whole number that is not divisible by two.

Examples:

53 and 701 are odd numbers.

**Odds:** A ratio of probabilities in favor of, or against the occurrence of an event. The odds in favor =  $P(\text{an event can occur}) / P(\text{an event cannot occur})$  The odds against =  $P(\text{an event cannot occur}) / P(\text{an event can occur})$

**One-dimensional:** A shape (geometric figure) having only length; no width or height (a figure that can lie on a line).

**Open-ended problem:** A problem with different possible solution paths and which may have different solutions depending on the route taken.

**Operation:** A mathematical process that combines numbers; basic operations of arithmetic include addition, subtraction, multiplication, and division.

**Order of operations:** In simplifying an expression involving a number of indicated operations, perform the operations in the following order:

1. Complete all operations inside parentheses first;
2. Calculate powers and roots and in the order they occur from left to right;
3. Calculate all multiplications and divisions – left to right;
4. Calculate all additions and subtractions – left to right.

Examples:

$$7 + 3 \times 8 = 31$$

[multiply  $3 \times 8$  before adding 7]

$$(7 + 3) \times 8 = 80 \text{ [add 7 and 3 before multiplying by 8]}$$

$$7 + 3^2 \times 8 = 79 \text{ [square 3, multiply by 8, and then add 7]}$$

**Ordered pairs:** Two numbers (elements), for which order is important. When used to locate points on a coordinate graph the first element indicates distance along the x-axis (horizontal) and the second indicates distance along the y-axis (vertical). See illustration for Coordinates.

**Ordinal number:** A number that designates the position of an object in order; first, second, and third are examples of ordinal numbers.

Example:

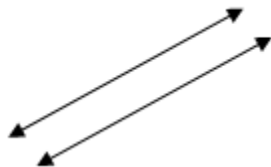
Eraser is the second element in the set {pencil, eraser, desk, chalkboard, book, file, paper}; Z is the twenty-sixth element in the set {a, b, c, d, ...z}.

**Origin:** Zero on a number-line or the point (0, 0) on a coordinate plane.

**Outcome:** One of the possible results in a probability situation or activity.

**Outlier:** A number in a set of data that is much larger or smaller than most of the other numbers in the set.

**Parallel lines:** Lines that lie in the same plane and never intersect.



**Parallelogram:** A quadrilateral with opposite sides parallel.

**Pattern:** The arrangement of numbers, pictures, etc., in an organized and predictable way.

Example:

3, 6, 9 12 .... □ ○ □ ○ □ ○

**Pentagon:** A five-sided polygon.



**Regular Pentagon**



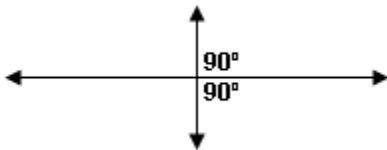
**Non-regular Pentagon**

**Percent:** A ratio of a number to 100. Percent means per hundred and is represented by the symbol %.

Example: "35 to 100" means 35%.

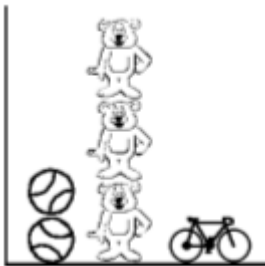
**Perimeter of polygon:** The sum of the lengths of the sides of the polygon.

**Perpendicular lines:** Lines that lie on the same plane that intersect to form right angles (90 degrees).



**Pi ( $\pi$ ):** The ratio of the circumference to the diameter of the same circle. The value of pi is approximately 3.14159 and pi is represented by the symbol ( $\pi$ ).

**Pictograph:** Graph that uses pictures or symbols to represent similar data.



**Place value:** The value of a digit as determined by its place in a number.

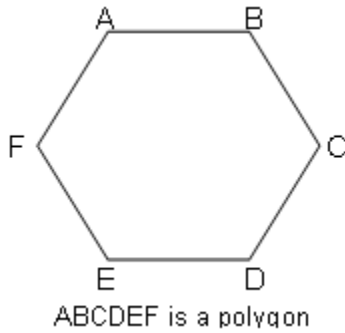
Example:

In the number 135, the 3 means  $3 \cdot 10$  or 30. In the number 356, the 3 means  $3 \cdot 100$  or 300.

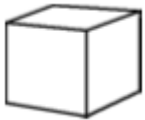
**Plane:** See Undefined terms.

**Point:** See Undefined terms.

**Polygons:** A closed plane figure having three or more straight sides.



**Polyhedron:** A solid (3-D) figure, the faces of which are polygons.



**Population:** A group of people, objects, or events that fit a particular description.

**Power:** A number (exponent) representing repeated multiplication.

Example:

In  $3^4$ , 4 is a power of 3 that represents repeated multiplication so that  $3^4 = 3 \times 3 \times 3 \times 3 = 81$

**Precision:** An indication of how finely a measurement is made; related to the unit of measurement and the calibration of the tool.

Example:

Was the measurement made using a ruler marked in increments of  $\frac{1}{4}$  of an inch or in increments of  $\frac{1}{16}$  of an inch?

**Predict:** To tell about or make known in advance, especially on the basis of special knowledge or inference.

**Prediction:** A prediction is a description of what will happen before it happens. It is a foretelling that is based on a scientific law or mathematical model.

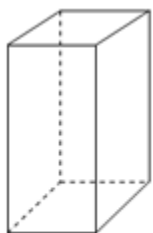
**Prime numbers:** A whole number greater than 1 having exactly two whole number factors, itself and 1.

Examples:

7 is prime since its only whole number factors are 1 and 7.

1 is not a prime number.

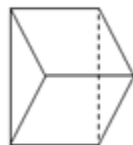
**Prism:** A 3-dimensional figure that has 2 congruent and parallel faces (bases) that are polygons and the remaining (lateral) faces are parallelograms.



Rectangular  
Prism



Triangular  
Prism



Triangular  
Prism



Trapezoidal  
Prism

**Probability:** The numerical measure of the chance that a particular event will occur, depending on the possible events. The probability of an event,  $P(E)$ , is always between 0 and 1, with 0 meaning that there is no chance of occurrence and 1 meaning a certainty of occurrence.

**Product:** The result of a multiplication expression; factor  $\times$  factor = product.

Example:

$3 \times 4 = 12$ , 12 is the product.

**Proof:** A logical argument that a specified statement is true based on assumed statements and previously determined true statements.

**Proportion:** An equation showing that two ratios are equivalent.

Example:

$\frac{2}{3} = \frac{6}{9}$

**Proportional:** Constituting a proportion; having the same, or a constant, ratio; as, proportional quantities.

**Pyramid:** A solid (3-D) figure whose base is a polygon and whose other faces are triangles that meet at a common point (vertex).



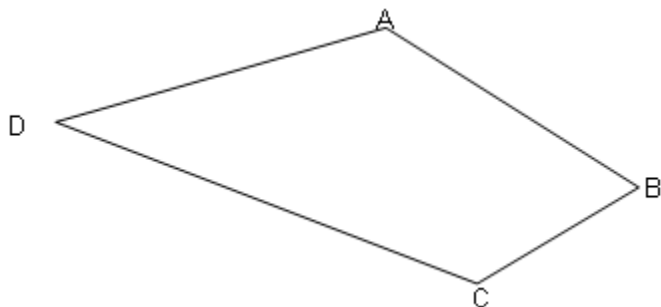
**Pythagorean theorem:** In any right triangle having a hypotenuse of length  $c$  and two legs of lengths  $a$  and  $b$ ,  $a^2 + b^2 = c^2$ .

**Quadratic equation:** An equation of the form  $ax^2 + bx + c = 0$ , where  $a \neq 0$ .

**Quadrilateral:** A four-sided polygon.

Example:

ABCD is a quadrilateral.



**Questionnaire:** A set of questions for a survey.

**Quotient:** The result of dividing one number by another number. Dividend  $\div$  divisor = quotient.

Example:

In  $15 \div 3 = 5$ , 5 is the quotient.

$$\begin{array}{r} \text{quotient} \\ \text{divisor} \overline{) \text{dividend}} \end{array} \qquad 3 \overline{) 15}$$

**Radius:** The distance from the center to the edge of a circle; or, the distance from the center of a circle to a point on the circle.

**Random sample:** A sample in which every person, object, or event in the population has the same chance of being selected for the sample.

**Range (functional):** The set of all values of the dependent variable of a given function, usually the y-value on a coordinate plane.

**Range (statistical):** The absolute value of the difference between the largest and smallest values in a set of data.

Example:

The range of {2, 4, 6, 7, 9, 13} is  $|2 - 13|$  or  $13 - 2$  or 11.

**Rate:** A ratio comparing two quantities measured in different units where one is measured in time.

Examples:

Miles per hour and heartbeats per minute are rates.

**Ratio:** A comparison of two numbers using a variety of written forms.

Example:

The ratio of two and five may be written "2 to 5" or 2:5 or  $2/5$ .

**Rational number:** Any number that can be expressed as a ratio of two integers, with the denominator non-zero.

Examples:

34 can be written  $34/1$ , 4.32 can be written as  $342/100$ ,  $3 \frac{1}{2}$  can be written as  $7/2$ .

**Ray:** A part of a line that has one end point and extends indefinitely in one direction.

**Real numbers:** Any number that can be expressed as a decimal that terminates, endlessly repeats, or continues endlessly without pattern.

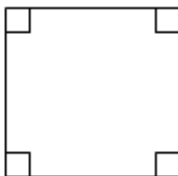
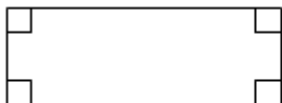
**Reasonable:** Within likely bounds; sensible.

**Reciprocal:** The multiplicative inverse of a non-zero number.

Example:

The reciprocal of  $x$  is given by  $1/x$ .

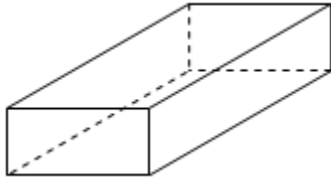
**Rectangle:** A quadrilateral with four right angles. A square is a rectangle.



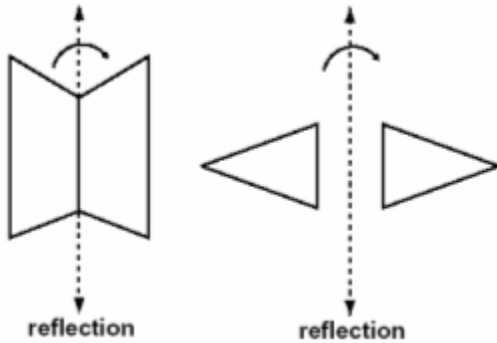
**Rectangular prism:** A prism with 2 rectangular bases.

Example:

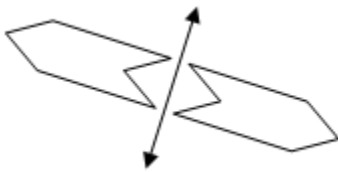
The figure shown is a rectangular prism.



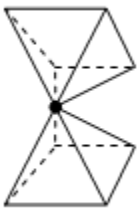
**Reflection:** A transformation of a figure by flipping the figure over a line, creating a mirror image.



**Reflection on a line:** A transformation of a figure by reflecting the figure over a line, creating a mirror image of the original figure.



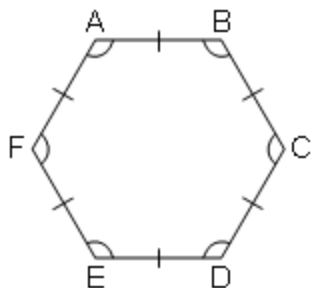
**Reflection on a point:** A transformation of a figure by reflecting each of its points through a fixed point, called the center of the reflection, creating an image of the original figure across the center.



**Regular polygon:** A polygon with all sides having the same length and all angles having the same measure.

Example:

ABCDEF is a regular polygon called a hexagon.



**Repeating decimal:** A decimal number whose expression contains a repeating pattern of decimals from some point in the expression forward.

Example:

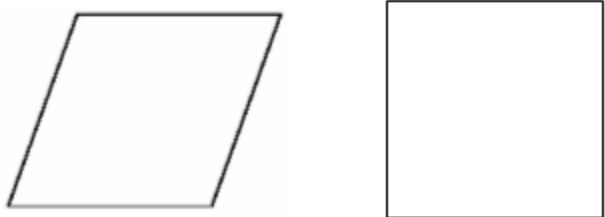
2.121212... is a repeating decimal with the pattern of the digits "12".

This decimal can be written as  $2.\overline{12}$ .

**Represents:** To present clearly; describe; show.

**Revise:** To change or modify based on reflection and evaluation.

**Rhombus:** A quadrilateral with all four sides equal in length.



**Right angle:** An angle whose measure is 90 degrees. See Angle and Triangle.

**Right circular cylinder:** A cylinder whose bases are circles and the centers of whose sections form a line perpendicular to the bases.



**Right cylinder:** A cylinder with centers of whose sections form a line perpendicular to the bases.

**Right prism:** A prism with rectangular lateral faces (sides).

**Right triangle:** A triangle having one right angle. See Angle and Triangle.

**Rotation:** A transformation of a figure (or points) in a plane resulting from turning a figure around a center point O either clockwise or counterclockwise. See Turn.

**Rule:** A procedure; a prescribed method; a way of describing the relationship between two sets of numbers.

Example:

In the following data, the rule is to add 3.

Input	Output
3	6
5	8
9	12

**Sample:** A portion of a population or set used in statistics.

Example:

All boys under the age of ten constitute a sample of the population of all male children.

**Sample space:** A set of all possible outcomes to a specified experiment.

**Scale:** Sequenced collinear marks, usually at regular intervals or else representing equal steps, that are used as a reference in making measurements.

**Scale factor:** A ratio that compares two sets of measurements such as the size of a model to the actual size of the object being modeled.

**Scalene polygon:** A polygon with no two sides equal.

**Scatter plot:** A graph of points (x, y), one for each item being measured, on a coordinate plane. The two coordinates of a point represent their observed, paired values.

Example:

The ordered pairs may relate temperature to time of day (time, temp).

**Scientific notation:** A number expressed in the form of  $a \times 10^n$  where  $1 = a < 10$  and n is an integer.

Examples:

342.15 can be written in scientific notation as  $3.4215 \times 10^2$ .

425 can be written in scientific notation as  $4.25 \times 10^2$ .

**Sequence:** A set of numbers arranged in a special order or pattern.

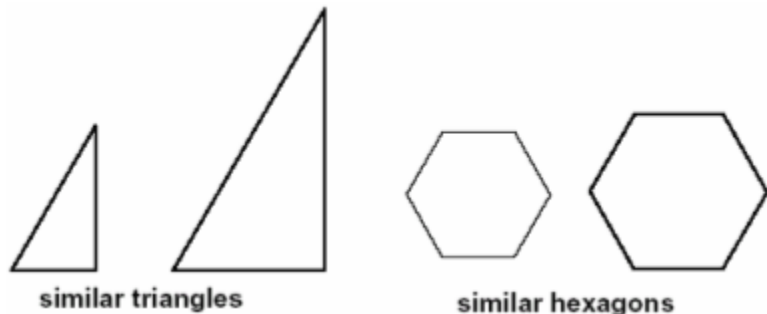
**Series:** The indicated sum or difference of a sequence of numbers.

Example:

The series  $1 + 3 + 5 + \dots + 19$  is the series of the first ten odd whole numbers.

**Side:** A line segment connected to other segments to form the boundary of a polygon.

**Similar figures:** Having the same shape but not necessarily the same size (congruent corresponding angles and proportional corresponding sides).



**Similarity:** Characteristic of similar figures.

**Simulation (probability):** An experiment to model a real-life situation.

Example:

Toss a coin to model true-false; heads=true, tails=false.

**Single variable equation:** An equation with one variable. (must have an "=" sign)

Example:

$$3x + 2 = 8$$

**Single variable expression:** An expression with one variable (must not have "=" or inequality sign).

Example:

$$3x + 2$$

**Skip count:** Counting by groups as in skip count by 2s, 3s, 4s, ... 12s. Can be thought of as a precursor to multiplication.

**Slide:** Movement of a figure that scoots the figure. See Translation.

Example:

Scooting a book on a table.

**Slope:** The ratio of the change in y-units (vertical) to the change in x-units (horizontal) between two points on a line.

Example:

The slope of a line through (3,4) and (9,5) is  $\frac{5-4}{9-3}$  or  $\frac{1}{6}$

**Solid:** A geometric figure with three dimensions.

**Solution of an equation:** A number that, when substituted for the variable in an equation, results in a true statement.

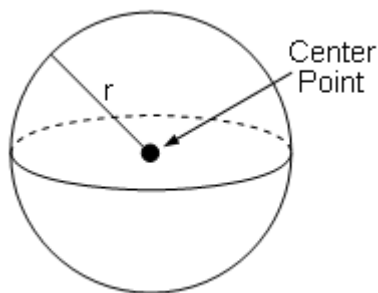
**Solve:** To find the solution to an equation or problem.

**Spatial:** Of, pertaining to, involving, or having the nature of space or 3-Dimensions.

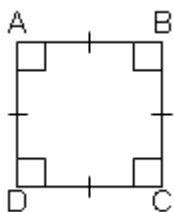
**Sphere:** A closed surface consisting of all points in space that are the same distance from a given point (the center).

Example:

A basketball.



**Square:** A rectangle with congruent sides. See Rectangle.



**Square numbers:** An integer that is a perfect square of another integer.

Example:

49 is a square number because 49 is the perfect square of 7. (i.e.  $49=7 \times 7$ ).

**Square roots:** One of two (and only two) equal non-negative factors of a given number.

Example:

7 is the square root of 49 because  $7 \cdot 7 = 49$ .

**Standard form of a number:** A number written with one digit for each place value.

Example: The standard form for five hundred forty-six is 546. The standard form for three thousand six is 3,006.

**Standard units of measurement:** Units of measure commonly used, generally classified in the U.S. customary system or metric system.

Example:

feet, meters, acres, gallons, liters

**Stem-and-leaf plot:** A method of organizing a list of numbers into stems and leaves where leaves represent units and stems represent the other digits. Stems are listed in increasing or decreasing order. Leaves are associated with their stem but need not be sequential.

Examples:

Ages of Adults in the Park

Data set			Stem	Leaves		
23	25	29	29	2	3	5 9 9
36	38	39	39	3	6	8 9 9
52	54	55	55	5	2	4 5 5

Key: 2 | 3 5 9 9 represents 23, 25, 29, 29 years

Number of Customers for Dinner

Data Set			Stem	Leaves		
120	126	124	12	0	6	4
135	133		13	5	3	
142	140	143	14	2	0	3

Key: 12 | 0 6 4 represents 120, 126, 124

**Strategy:** A plan used in problem solving; such as looking for a pattern, drawing a diagram, working backward, etc.

**Subtraction:** An operation that is removal of sets from an initial set; or finds the difference between two amounts when comparing two quantities.

**Successive events:** Events that follow one another in a compound probability setting.

**Sum:** The result of addition. Addend + Addend = Sum

**Summary:** A series of statements containing evidence, facts, and/or procedures that support a result.

**Surface area:** The sum of the areas of all of the faces (or surfaces) of a 3-D object. Also the area of a net of a 3-D object. Calculations of surface area are in square units ( $\text{in}^2$ ,  $\text{m}^2$ , or  $\text{cm}^2$ ).

**Survey:** To get an overview by gathering data.

**Symbol:** A letter or sign used to represent a number, function, variable, operation, quantity, or relationship.

Examples:

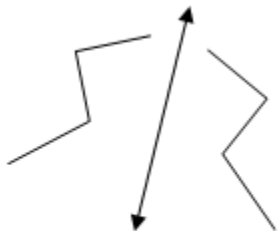
a, =, +, ...

**Symmetrical:** Having a line, plane, or point of symmetry such that for each point on the figure, there is a corresponding point that is the reflection of that point. See Line of symmetry).

**Symmetry (line):** The geometric property of being balanced about a line.

Example:

A figure is symmetric with respect to a line, called the axis of symmetry, if it can be folded on the line and the two halves of the figure are congruent and match.



**Symmetry (point):** A figure is symmetric about a point if there is a rotation of the figure of less than 360 degrees about the point that allows the figure to correspond with itself.

**System of equations:** Two or more equations in terms of the same variables. The solution of a system is a set of values for the unknowns (variables) that satisfy all the equations simultaneously.

Example:

Given the system of two equations  $X + Y = 3$  and  $2X - Y = 0$ ;  $(X, Y) = (1, 2)$  is the solution for the system because  $(1, 2)$  is a solution for both  $X + Y = 3$  and  $2X - Y = 0$

**T-chart:** A table of two sets of values; an input-output table.

Example:

Input	Output
1	4
2	5
3	6

**Table:** A method of displaying data in rows and columns.

**Terminating decimal:** A terminating decimal is a fraction whose decimal representation contains a finite number of digits.

Example:

$$\frac{1}{4} = .25$$

**Tessellate:** To form or arrange congruent figures (sometimes polygons) in a pattern on a plane with no gaps and no overlaps.

**Theoretical probability:** Measure of the likelihood that an event will occur; the ratio of favorable outcomes to the number of possible outcomes.

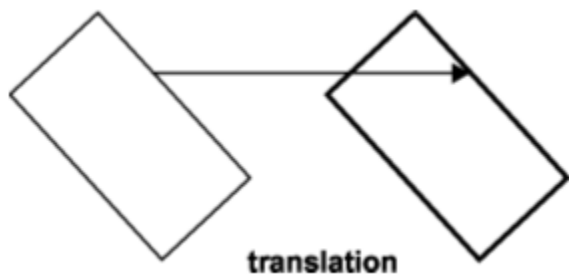
Example:

Knowing that there are six possible outcomes for rolling a fair number cube one can assign the probability of  $\frac{1}{6}$  to each of the possible outcomes.

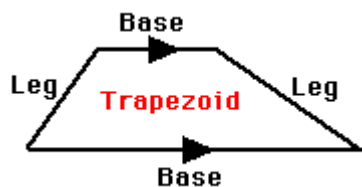
**Three-dimensional figures:** A shape (geometric figure) having length, width, and height.

**Transformation (geometric):** A change in position/location of a figure. Types of transformations include translation (slide), reflection (flip), rotation (turn), (or combinations of these).

**Translation:** A transformation of a figure by sliding without turning or flipping in any direction.



**Trapezoid:** A quadrilateral that has exactly two parallel sides; an alternate definition is a quadrilateral with at least two parallel sides (There is no common agreement on a definition of a trapezoid).



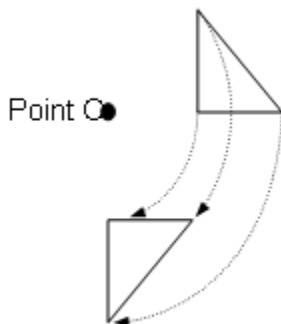
**Trend:** The general direction or tendency of a set of data.

**Triangle:** The figure formed by joining three non-collinear points with straight segments.

**Turn:** To move a point or figure in a circular path around a center point. Motion may be either clockwise or counterclockwise. See Rotation.

Example:

The hands of a clock turn around the center of a clock in a clockwise direction.



**Two-dimensional figures:** A shape (geometric figure) having length and width. (A flat figure)

**Undefined terms:** A term whose meaning is not defined in terms of other mathematical words, but instead is accepted with an intuitive understanding of what the term represents. The words "point," "line," and "plane" are undefined terms from geometry.

**Unique:** Means there is one and only one object or result.

Example:

The product of two integers is unique.

**Univariate data:** Data involving one variable.

Example:

A list of test scores.

**Unknown:** In algebra, the quantity represented by a variable.

**Valid statement:** A statement taken as being true in a reasoning situation.

**Validate:** To determine, substantiate, verify, or confirm whether a given statement or argument passes specific standards.

**Variability of data:** Range, average deviation, standard deviation, and spread are all ways to describing of the variability of data.

**Variable:** A symbol used to represent a quantity that changes or can have different values.

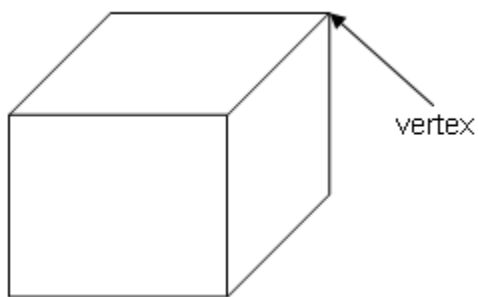
Example: In  $5n$ , the  $n$  is a variable.

**Variation (direct):** A relationship between two variables than can be expressed in the form  $y = kx$  where  $k \neq 0$ ;  $y = kx$  can be read as “ $y$  varies directly with respect to  $x$ ”.

**Variation (inverse):** A relationship between two variables that can be expressed in the  $y = k/x$  where  $k \neq 0$ ;  $y = k/x$  can be read as “ $y$  varies inversely with respect to  $x$ ”.

**Verify:** To establish as true by presentation of evidence.

**Vertex:** A point at which two lines meet to form an angle, where edges of a polygon or polyhedron intersect, or the point opposite the base in a pyramid or cone.



**Vertical:** Extending straight up and down; perpendicular to the horizon.

Examples:

1) A power pole is vertical to the ground. 2) Lines drawn on paper from top to bottom that are parallel to the sides of the paper represent vertical lines.

**Vertices:** Plural of vertex.

**Volume:** A measure in cubic units of the space contained in the interior of a solid figure.

Example:

The number of cubit units contained in the interior of a rectangular solid.

**Whole number:** A number from the set of numbers  $\{0, 1, 2, 3, 4 \dots\}$ .

**Word forms:** The expression of numbers and/or symbols in words.

Examples:

546 is “five hundred forty-six”.

The “<” symbol means “is less than”.

The “>” symbol means “is greater than”.

The “=” symbol means “equals” or “is equal to.” The “≠” symbol means “equals” or “is equal to”.

**X-axis:** One of two intersecting straight (number) lines that determine a coordinate system in a plane; typically the horizontal axis.

**Y-axis:** One of two intersecting straight (number) lines that determine a coordinate system in a plane; typically the vertical axis.

**Zero property of addition:** Adding zero to a number gives a sum identical to the original number. Zero is the identity element of addition. See Identity property.

Examples:

$$4 + 0 = 4 \text{ and } 56.89 + 0 = 56.89$$

**Zero property of multiplication:** The product of any number and zero is zero.

Examples:

$$4 \times 0 = 0 \text{ and } 0 \times 456.7 = 0$$