

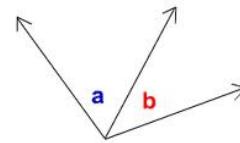
TEACHER MATH VOCABULARY

RESOURCE GUIDE

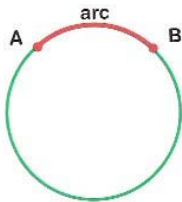
Absolute Value: The distance of a number from zero; the positive value of a number. A “|” is placed on either side to signify absolute value, so we can write: $|-14| = 14$ or $|29| = 29$.

Acute: An angle that is less than 90° or a **triangle** with all angles that are less than 90° .

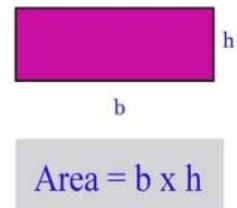
Adjacent: Two angles that are lying next to each other; they share a common side and vertex.



Arc: A portion of the **circumference** of a circle.



Area: The number of square units that cover a shape, such as the shaded portion of the rectangle to the right:



Average: Also known as **mean**, a value determined by adding all the numbers in the problem and dividing by the quantity of those numbers.

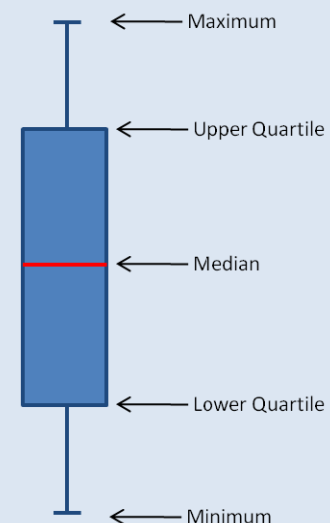
Binomial: A **polynomial** with two terms. Ex: $7x^2 + 5$. See **polynomial**.

Box Plot: A graphical representation of statistical measures reflecting the lower, **median**, and upper quartiles, as well as the minimum and maximum **data** values.

Chord: A straight line that connects two points on a circle's **circumference**. If the chord runs directly through the center, it is the **diameter**.

Circle: A two dimensional shape that curves 360° around a central point at an equal distance.

Fig. 1 – A Simplified Box Plot

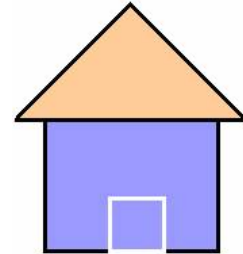


Circumference: The distance around a **circle** calculated by π times **diameter**.

Coefficient: A number used to multiply a **variable**.

Combination: A collection of numbers where order of the numbers does not matter. {1, 2, 3} can be written equivalently as {3, 1, 2}. Either collection of numbers is acceptable. If the order of numbers DOES matter, see **permutation**.

Composite Figure: A geometric figure that can be broken down into more than one of the basic figures. A square house with a **triangle** roof is a composite figure.



Coordinate: An ordered pair of numbers that specify a point on a coordinate plane, the first value representing the position on the 'x', or horizontal, axis and the second the 'y', or vertical, axis. Ex: (2, -5).

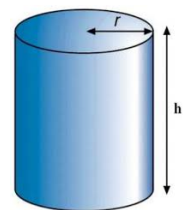
Counterexample: An example that disproves a mathematical statement. Ex: the area of a **triangle** can never be an even number. If a **triangle** has a base of 8 and a height of 10 the area would be 40, thus disproving the statement.



Cube: A three-dimensional object containing six square surfaces.

Cube Root: A number that when multiplied by itself three times will provide the cubed number. Ex: $\sqrt[3]{64}=4$ ($4 \times 4 \times 4 = 64$).

Cylinder: A three-dimensional shape that has two identical ends which are circular or elliptical.

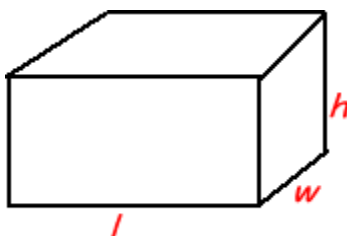


Data: A collection of numerical information.

Decimal: All the numbers in a base-10 number system (0-9). A number that uses a decimal point to show values less than one. Ex: $12.5 = 12$ plus .5, or $\frac{1}{2}$, and falls between 12 & 13.

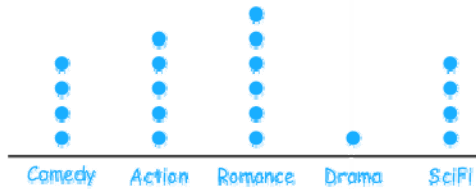
Diameter: A straight line that passes through the center of a **circle**.

Dimension: A measurement in a geometric figure, such as length, width or height.

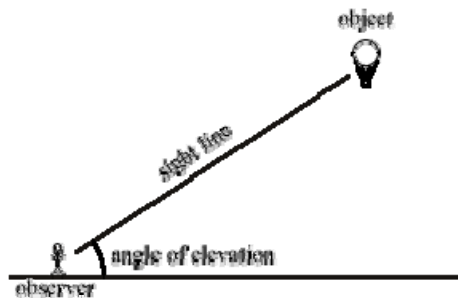


Distributive Property: The formula allowing multiplication of two products, where one or both contain multiple addends, by multiplying each addend separately and then adding the products. Ex: $a(b+c) = ab + ac$. The value of 'b+c' times 'a' is the same as 'a' times 'b' plus 'a' times 'c'.

Dot Plot: A **graph** that uses dots to represent **data**, such as below.



Elevation: The angle above horizontal that an observer must look to see an object that is higher than the observer.



Event: The outcome(s) of a mathematical experiment, usually seen in **probability**. They may be dependent or independent. When the outcome of the first experiment affects the outcome of the second, you have a dependent event.

Exponent: A number that signifies how many times you will multiply the base number by itself. It is shown as a small number that is raised to the right of the base number. Ex: in 4^2 (4×4) or 16^3 ($16 \times 16 \times 16$), the 2 or 3 is the **exponent**.

Expression: Numbers, operations or symbols that when grouped together show a value. Ex: $5\% \times 50 = 2.5$.

Factor: ¹The numbers in a multiplication problem. $2 \times 4 = 8$; 2 and 4 are the factors; ²numbers that divide into another number. Ex: 4 and 3 are factors of 12; ³the process of breaking down a **polynomial** expression to its lowest terms. Ex: $x^2 + 10x + 16$ can be factored to $(x + 8)(x + 2)$.

Formula: An equation with numbers or symbols used to solve a problem which shows the relationship between **variables**. Ex: The formula for **volume** of a **cylinder** is $V = \pi r^2 h$ where Pi is 3.14, the **radius** is 3 and the height is 7.

Fraction: A part of a whole. Ex: 5 months is part or $\frac{5}{12}$ of a year. The top number of a fraction is the numerator and the bottom number is the denominator. A fraction's value can be determined by dividing the numerator by the denominator.

Frequency: The number of times a value occurs in a set. Ex: if five students score 78 **percent** on a test, the score of 78 is said to have a frequency of five.

Function: A function describes the relationship between two sets: the domain and the range. It is written as $f(x)$, with x as the value assigned. If $f(x) = x/5$, then $f(10)=2$; $f(100)=20$, and so on.

Graph: A visual drawing that shows **data**, usually seen as a set of bars, lines, coordinate planes, **circles**, or more.

Greatest Common Factor: The highest number that divides exactly into two or more numbers evenly.

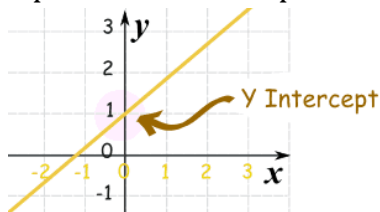
Histogram: A type of bar **graph** that shows **frequency** distribution for **ranges** or intervals.

Inequality: A symbol that shows that 2 values are not equal. The symbols could include: $<$, $>$, or \neq .

Input: The data entered to compute a mathematic operation. Almost all rules and algorithms start with an input and end with an **output**. For example, if a rule states to add three to a number, the input of 8 leads to the **output** of 11.

Integer: All positive and negative counting, or natural, numbers. Ex: -3, -2, -1, 0, 1, 2, 3

Intercept: The point at which a line crosses one of the axis of a coordinate plane. An "x intercept" represents where the line or curve crosses the 'x' axis. A 'y intercept' represents the point where the line or curve crosses the 'y' axis.



Interest: The amount paid for the use of borrowed money, usually shown as a **percent**.

Irrational number: A number that cannot be shown as a simple fraction. A number that, in **decimal** form, goes on forever. Ex: Pi is an irrational number 3.14159...(never-ending pattern).

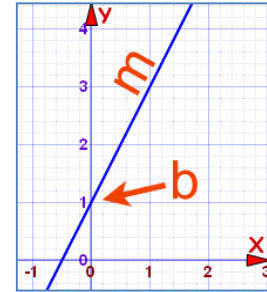
Isosceles: A triangle with two equal sides and equal angles.



Least Common Multiple: The number that is the smallest multiple of two or more numbers. The least common multiple of 4 and 7 is 28. 56 and 84 are multiples of 4 and 7, but they are not the smallest.

Like Term: Terms with the same variable. $2x$ and $9x$ are like terms because the attached variable, 'x', is the same.

Linear Expression/Equation: An algebraic equation, such as $y = 4x + 3$, in which the **variables** are of the first degree (that is, raised only to the first power). Any equation that, when graphed, makes a straight line, usually expressed by the "slope-intercept" formula in $y = mx + b$ format, where 'm' represents **slope**, and 'b' the point of **y-intercept** on a graph.



Manipulate: To reposition the elements of a mathematic operation without changing the values, such as an equation, in order to arrive at a solution. Ex: rearranging or regrouping an equation to isolate the **variable** you are attempting to calculate on one side, moved to the other side, etc.

Matrix: A table of numbers arranged in rows and columns. The individual items in a matrix are called the "elements" or "entries", such as below:

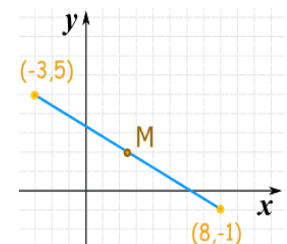
$$\begin{bmatrix} 1 & 9 & -13 \\ 20 & 5 & -6 \end{bmatrix}.$$

Mean: Also known as **average**. A value determined by adding all the numbers in the problem and dividing by the quantity of those numbers.

Median: The middle number of a set once the numbers are put in order from least to greatest. Ex: in the set 1, 4, 8, 7, 3, 5, 2 - which reordered is 1, 2, 3, 4, 5, 7, 8 - the median is the number 4. If the set contains an even amount of numbers and therefore no exact middle, then the two middle values are averaged together to determine the median. Ex: in the set 13, 17, 18, 25, 26, 30 - the median is calculated by averaging 18 & 25 ($18 + 25 = 43$; $43 \div 2 = 21.5$), resulting in a median of 21.5.

Midpoint: The point on a line segment that splits a segment into two equal halves.

Mode: The number that shows up the most frequently within a set of numbers. Ex: in the following data set - 1, 2, 2, 3, 3, 3, 3, 4, 4, 4 - the



mode is 3. A data set can contain multiple modes if they occur with equal frequency. Ex: in the set 76, 77, 78, 78, 79, 80, 80, the modes are 78 and 80.

Multiple: ¹A number that can be divided by another number with no remainder. Ex: 2, 4, and 8 are multiples of 16. ²The product of multiplying any whole number by another whole number.

Number Properties: Rules that govern mathematic operations. The four basic number properties are: **Distributive**, Associative, Commutative, and Identity. Ex: a commutative property of addition is that when two numbers are added together, their sum is the same regardless of the order in which the numbers are added [$3 + 5 = 8$ or $5 + 3 = 8$].

Obtuse: An angle that measures more than 90° .



Output: The **data** entered to compute a mathematic operation. Almost all rules and algorithms start with an **input** and end with an output. For example, if a rule states to add three to a number, the input of 8 leads to the output of 11.

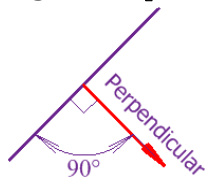
Percent: A **fraction** or **ratio** expressing part of 100, represented by the symbol %.

Perimeter: The distance around the boundaries of a two-dimensional object.

Periodicity: A **function** that repeats itself in a pattern at regular intervals.

Permutation: A collection of numbers where order of the numbers does matter. Ex: {1, 2, 3} can only be written as {1, 2, 3} and not {3, 1, 2}, etc. If the order of numbers does NOT matter, see **combination**.

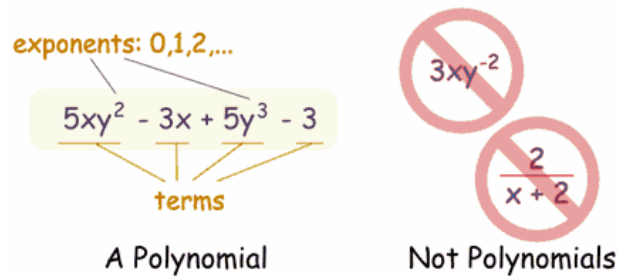
Perpendicular: The state of meeting together and forming a 90° angle, such as with lines, segments, **planes**, or sides of a shape.



Plane: A flat surface that has no edges but extends into infinity. Normally, planes are represented with edges, for visual reference, such as on a coordinate plane.

Polygon: A two-dimensional shape with three or more sides. **Triangles**, squares, and **rectangles** are all examples of polygons.

Polynomial: An **expression** that contains more than two algebraic terms, such as constants, **variables** and **exponents**. A polynomial cannot contain a negative exponent, an infinite number or terms, or division by a variable.



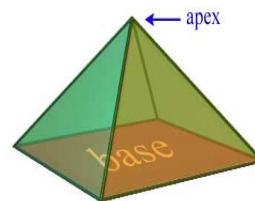
Prism: A three-dimensional object whose bases or ends have the same size and shape and are parallel to each other, with all surfaces flat and each side being a parallelogram. The shape formed at the ends give prisms their name, such as rectangular or triangular prisms.



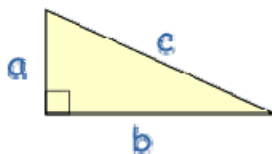
Probability: The number of successful **events** divided by the total number of **events**. Probability is usually shown as a **ratio** or a **percent**.

Proportion: Two **ratios**, shown in **fraction** form, that are equal.

Pyramid: A three dimensional shape with a **polygon** base whose sides form **triangles** that meet at the apex.



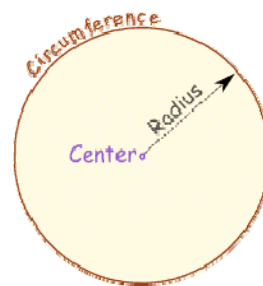
Pythagorean Theorem: The formula for determining the measurement of a side of a right triangle expressed as $a^2 + b^2 = c^2$, where 'a' and 'b' represent the sides of the right triangle, and 'c' the hypotenuse.



Quadratic Equation: A **function** in which the independent variable is squared. $y = x^2$ is the most basic quadratic function. All quadratic functions fit the form $y = ax^2 + bx + c$, where 'a', 'b', and 'c' can be any real number (although 'a' cannot be zero). Ex: $2x^2 - 7x - 49 = 0$. The graph of a quadratic function is called a parabola.

Random: A set of numbers or outcomes of a mathematic operation that are not predictable and/or occur without order. There may still be an overall structure, such as falling within a certain range of solutions. Ex: rolling two dice will provide random results each time, but always between 2 and 12.

Radius: A straight line measured from the center of a **circle** to any point on the **circumference**.



Range: The difference between the lowest and highest values in a set of numbers.

Rate of Change: A **ratio** expressing a change in quantity over a specific period of time.

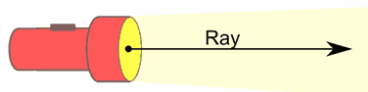
Ratio: Shows the relative comparison of two or more values. Ex: if there are 3 apples for every 4 oranges, that relationship can be shown as 3:4 or $\frac{3}{4}$.

Rational Number: Any number that can be made by dividing one **integer** into another and expressed as a simple **fraction**, i.e. a **ratio**.

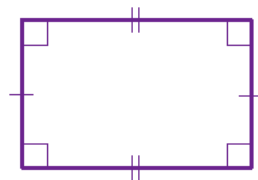
$$1.5 = \frac{3}{2} \begin{matrix} \text{Ratio} \\ \text{Rational} \end{matrix}$$

$$\pi = 3.14159... = \frac{?}{?} \begin{matrix} \text{(No Ratio)} \\ \text{Irrational} \end{matrix}$$

Ray: A line with a starting point but no end extending into infinity.



Rectangle: A flat, four-sided shape in which all interior angles measure 90° , whose opposite sides are parallel and equal in length.



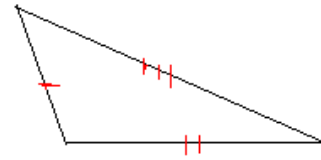
Right Angle: An angle equal to 90° .



Root: The root of a number x is another number, which when multiplied by itself a given number of times, equals x . Ex: the **square root** of 16 is 4 ($4 \times 4 = 16$); the **cube root** of 8 is 2 ($2 \times 2 \times 2 = 8$).

Scale: The length of a drawing compared to the real measurement. Ex: on a map, a 1-inch section could represent 10 miles, as shown in **ratio** form. Ex: 1:10.

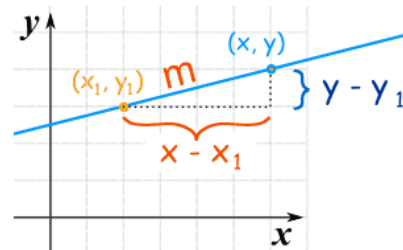
Scalene: A **triangle** whose three sides measure different lengths.



Scientific Notation: A method of displaying numbers – typically very large or very small numbers - in the form of a whole number with **decimal** between 1 and 10, multiplied by a power of 10. Ex: the scientific notation of 10,328 is 1.0328×10^4 , and .00003478 would be written as 3.478×10^{-5} .

Slope: The steepness of a line on a graph measured by using two points and determining the amount of vertical rise over horizontal run. In the standard **linear equation** $y=mx+b$, slope is represented by the **variable 'm'**.

$$\text{Slope } m = \frac{\text{change in } y}{\text{change in } x} = \frac{y - y_1}{x - x_1}$$

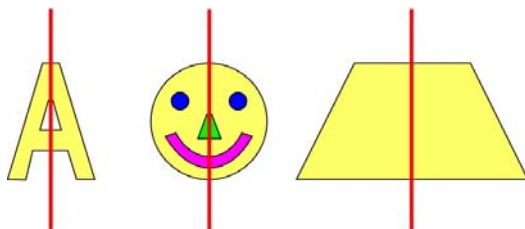


Square Root: A number that when multiplied by itself twice will provide the squared number. Ex: $\sqrt{25}=5$ ($5 \times 5=25$).

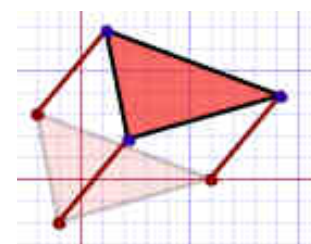
Standard Deviation: The degree to which numbers are spread out from the **average/mean** of a **data** set. The actual value of standard deviation is calculated as the **square root** of the variance, with variance being the average of the squared differences of numbers in the set from the **average**.

Surface Area: The combined area of all sides of a three-dimensional object.

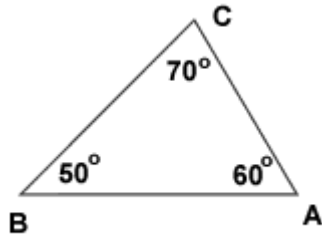
Symmetry: When a shape or image is identical to itself in appearance, proportion, and balance on both sides of an imaginary line drawn through the center of an object or around its axis.



Translation: A shift of a shape or object on a coordinate plane to a different location, but leaving the object identical in appearance and proportion.



Triangle: A three-sided **polygon** with three angles whose measurements total 180 degrees.



Unit Rate: The ratio of two measurements in which the second term equals 1. Ex: if one earns \$200 in 4 days, the unit rate of their salary is expressed as $200/4$, or \$50 per 1 day.

Unknown: The **variable** in a mathematic operation that remains to be solved, usually represented by a letter.

Variable: A symbol representing an unknown value, usually appearing as a letter. Ex: in the expression $2x + 3y = 16$, 'x' and 'y' are both variables.

Volume: The capacity of space occupied by a three-dimensional object.