Vocabulary for Mathematics

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Sum means addition.
The sum of x and $y = x + y = 15$.
The sum of 6 and 9 is 6 **plus** 9 = 15.

More than or greater than sometimes means addition.
x is 3 more than y means $x = y + 3$.
But x is more than y means $x > y$.

Increased by means addition
x increased by 3 means $x + 3$

Difference means **subtraction** (Note: one "s") the larger number minus the smaller number
The difference of x and y is 3 means $x - y = 3$
The difference of 6 and 9 is $9 - 6 = 3$.

Decreased by means subtraction
x decreased by 3 means $x - 3$.

Less than or fewer than sometimes means subtraction.
x is 3 less than y means $x = y - 3$.
But "x is less than y" means $x < y$.

Product means multiplication.
The product of x and y is 12 means $x \times y = 12$.
The product of 6 and 9 is 6 **multiplied by** 9 = 54.

Quotient means division.
The quotient of x and $y = 6$ means $x \div y = 6$.
The quotient of 6 and 9 is 6 **divided by** 9 = ⅔.
14 divided by 3 equals 4 with **remainder** 2

Average – the sum of the numbers divided by the number of numbers.
Example the average of x, y & z is $\frac{x+y+z}{3}$

Natural numbers, $\mathbb{N}$ 0, 1, 2, 3, ...

Integers, $\mathbb{Z}$: ...-3, -2, -1, 0, 1, 2, 3, ...

The **multiples** of 7 are 7, 14, 21, 28, ...

Consecutive means one after the other.
3, 4, 5 or x, $x + 1$, $x + 2$ $x \in \mathbb{Z}$ are consecutive integers.

Even: 2, 4, 6, 8, 10, ... Even means divisible by 2. If n is an integer, $2n$ is even.

Odd: 1, 3, 5, 7, 9, ... Odd means not divisible by 2. If n is an integer, $2n + 1$, $n \in \mathbb{Z}$ is odd.

Prime: 2, 3, 5, 7, 11, 13, … The **prime factors** of 24 are 2 & 3.

Negative: less than zero

Positive: greater than zero

Zero is neither positive nor negative.

Digits The digits of 519 are 5, 1 and 9

x^2 is pronounced "x **squared**."

x^3 is pronounced "x **cubed**."

x^8 is pronounced "x to the 8th **power**."

b^a – b is the **base** and a is the **exponent** or **index** or **power**

$\sqrt{x}$ is pronounced "the **square root** of x" or "**root** x" or "**radical** x."

$\sqrt[3]{x}$ is pronounced "the **cube root** of x."

$\sqrt[8]{x}$ is pronounced "the 8th **root** of x."

In the fraction $\frac{a}{b}$, a is the **numerator**, b is the **denominator**.

Evaluate - find the numerical value of, i.e. carry out the math

Solve – find the unknown, usually x

Expand - open the brackets or FOIL out

Simplify - expand, combine like terms, cancel common factors from numerator & denominator

Variable – an unknown value that is represented by a letter or symbol. $y = 3x + 7$ has variables x & y.

Expression – an algebraic form consisting of numbers, variables and operation signs. Expressions **cannot** be solved.
Example $3x + 7$

Equation – an algebraic form which contains an "=" sign. Equations **can** be solved.
Example $0 = 3x + 7$

Function – a relation between x and y with exactly one value of y for each allowed value of x

Linear equation – an equation with only an x term and a constant term
Example $0 = 3x + 7$

Linear function – a function with only an x term and a constant term. Linear functions are of the form $y = mx + b$ or $Ax + By = C$

Quadratic equation an equation with an x^2 term example $0 = x^2 - 5x + 6$

Quadratic function a function with an x^2 term
Quadratic functions are of the form
$y = ax^2 + bx + c$

Terms – algebraic forms which are separated by + or – signs
Example $3x^3 - 2x^2 + x - 7$ has four terms.

Constant term – a term which does not contain a variable
Example -7 is the constant term above.

Like terms – terms with exactly the same variable form.
Example $4x$ and $3x$ are like terms, $4x$ and $3x^2$ are not like terms

Coefficient – the numeric factor of an algebraic term.
Example In the expression $4x^2 + 2x - 3$, 4 is the coefficient of the x^2 term; 2 is the coefficient of x term.

For a rectangle the **width** is the distance end to end of the shorter side; the **length** is the distance end to end of the longer side.

Height – the vertical measure of an object

Perimeter – the distance around a two-dimensional figure.

Area – The space measured in square units that any 2-D object such as a triangle or circle occupies.

Volume - The amount of cubic units that a 3-D object occupies.

π, pi – It rhymes with "high", not with "he"

$$\pi = \frac{\text{circumference of the circle}}{\text{diameter of the circle}}$$

Vertex – A point on a polygon (triangle, rectangle, hexagon, etc.) or solid (cube, pyramid, etc.) where two or more straight lines meet, i.e. a corner. plural: **vertices.** Also a vertex is the maximum or minimum point of a parabola.

Types of Polygons

Polygon: a closed 2-dimensional shape made of straight lines (not curved lines) Closed means the lines are connected.
Triangle: 3-sided polygon
Quadrilateral: 4-sided polygon
Pentagon: 5-sided polygon
Hexagon: 6-sided polygon
Octagon: 8-sided polygon
Regular: all angles and sides are of equal measure
Convex polygon: a polygon with no internal angle greater than 180°. Regular polygons are convex.
Concave polygon: a polygon with at least one internal angle greater than 180°

Types of Triangles

Acute: all angles are acute i.e. less than 90°
Obtuse: one angle is obtuse, i.e. greater than 90°
Scalene: no sides are equal
Isosceles: exactly 2 sides are equal, exactly 2 angles equal
Equilateral: all 3 sides are equal, all angles = 60°
Right: one angle = 90°
Oblique: no right angles

Triangles are **congruent** if they are exactly the same except for a rotation or reflection.
Triangles are **similar** if the **corresponding** angles are equal.

Types of Quadrilaterals

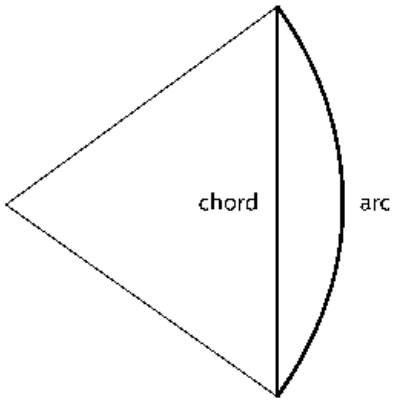
Trapezium (or **trapezoid)**: two opposite sides are parallel and the other two sides are not parallel.
Isosceles trapezoid: a trapezium with the nonparallel sides equal in length (Corresponding angles are equal.)
Parallelogram: both pairs of opposite sides are parallel. (Both pairs of opposite sides are equal in length. Both pairs of opposite angles are equal.)
Rhombus: a parallelogram with all sides equal in length.
Rectangle: all vertices are right angles. (Both pairs of opposite sides are equal in length and parallel.)
Square: a rectangle with all sides of equal length.
Sphere the three-dimensional analogue of a circle.

Types of Angles

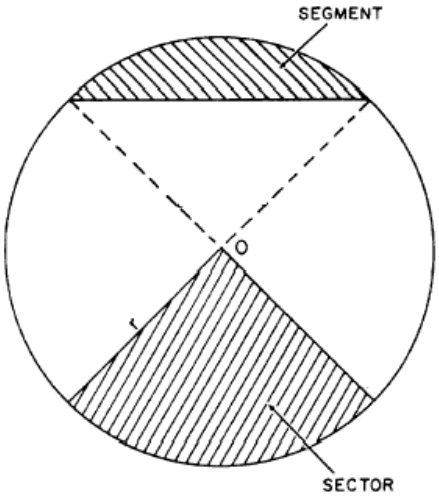
Acute: $0° < \theta < 90°$
Obtuse: $90° < \theta < 180°$
Right: $\theta = 90°$
Reflex: $180° < \theta < 360°$
Complementary: $\theta + \varphi = 90°$
Supplementary: $\theta + \varphi = 180°$

Circle terms

Circumference of a circle: its perimeter.
Radius: a line segment joining the centre of the circle to any point on the circle; or the length of such a segment.
Diameter: a line segment whose endpoints lie on the circle and which passes through the centre; or the length of such a segment.
Tangent: a straight line that touches the circle at a single point.
Arc: part of the circle's circumference.
Chord: a line segment joining two points on the circle.



Sector: the region bounded by two radii and the arc lying between the radii.
Segment: a region bounded by a chord and the arc lying between the chord's endpoints.



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