

Instructional Words

C

calculate: Figure out the number that answers a question. Compute.

clarify: Make a statement easier to understand. Provide an example.

classify: Put things into groups according to a rule and label the groups. Organize into categories.

compare: Look at two or more objects or numbers and identify how they are the same and how they are different (e.g., compare the numbers 6.5 and 5.6; compare the size of the students' feet; compare two shapes).

conclude: Judge or decide after reflection or after considering data.

construct: Make or build a model. Draw an accurate geometric shape (e.g., use a ruler and a protractor to construct an angle).

create: Make your own example.

D

describe: Tell, draw, or write about what something is or what something looks like. Tell about a process in a step-by-step way.

determine: Decide with certainty as a result of calculation, experiment, or exploration.

draw: 1. Show something in picture form (e.g., draw a diagram).
2. Pull or select an object (e.g., draw a card from the deck; draw a tile from the bag).

E

estimate: Use your knowledge to make a sensible decision about an amount. Make a reasonable guess (e.g., estimate how long it takes to cycle from your home to school; estimate how many leaves are on a tree; what is your estimate of $3210 + 789$?).

evaluate: 1. Determine if something makes sense. Judge.
2. Calculate the value as a number.

explain: Tell what you did. Show your mathematical thinking at every stage. Show how you know.

explore: Investigate a problem by questioning, brainstorming, and trying new ideas.

extend: 1. In patterning, continue the pattern.
2. In problem solving, create a new problem that takes the idea of the original problem further.

J

justify: Give convincing reasons for a prediction, an estimate, or a solution. Tell why you think your answer is correct.

M

measure: Use a tool to describe an object or determine an amount (e.g., use a ruler to measure the height or distance around something; use a protractor to measure an angle; use balance scales to measure mass; use a measuring cup to measure capacity; use a stopwatch to measure the time in seconds or minutes).

model: Show or demonstrate an idea using objects and/or pictures (e.g., model addition of integers using red and blue counters).

P

predict: Use what you know to work out what is going to happen (e.g., predict the next number in the pattern 1, 2, 4, 7, ...).

R

reason: Develop ideas and relate them to the purpose of the task and to each other. Analyze relevant information to show understanding.

relate: Describe how two or more objects, drawings, ideas, or numbers are similar.

represent: Show information or an idea in a different way that makes it easier to understand (e.g., draw a graph; make a model).

S

show (your work): Record all calculations, drawings, numbers, words, or symbols that make up the solution.

sketch: Make a rough drawing (e.g., sketch a picture of the field with dimensions).

solve: Develop and carry out a process for finding a solution to a problem.

sort: Separate a set of objects, drawings, ideas, or numbers according to an attribute (e.g., sort 2-D shapes by the number of sides).

V

validate: Check an idea by showing that it works.

verify: Work out an answer or solution again, usually in another way. Show evidence.

visualize: Form a picture in your head of what something is like. Imagine.

Mathematical Words

A

absolute value: Written as $|x|$; describes the distance of x from 0; equals x when $x \geq 0$ or $-x$ when $x < 0$. For example, $|3| = 3$ and $|-3| = -(-3) = 3$.

algebraic expression: A collection of symbols, including one or more variables and possibly numbers and operation symbols. For example, $3x + 6$, x , $5x$, and $21 - 2w$ are all algebraic expressions.

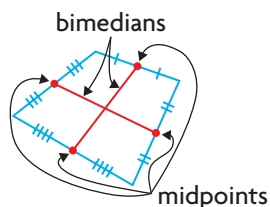
algebraic term: Part of an algebraic expression; often separated from the rest of the expression by an addition or subtraction symbol. For example, the expression $2x^2 + 3x + 4$ has three terms: $2x^2$, $3x$, and 4.

B

- base:**
1. The face that determines the name and the number of edges of a prism or pyramid
 2. In a 2-D shape, the line segment that is perpendicular to the height
 3. The number that is used as a factor in a power. For example, in the power 5^3 , 5 is the base.

BEDMAS: A made-up word used to recall the order of operations, standing for **B**rackets, **E**xponents, **D**ivision, **M**ultiplication, **A**ddition, **S**ubtraction

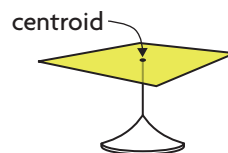
bimedian: The line joining the midpoints of two opposite sides in a quadrilateral



C

binomial: An algebraic expression containing two terms (e.g., $3x + 2$)

centroid: The centre of an object's mass; the point at which it balances; also known as the centre of gravity



circle: The set of all the points in a plane that are the same distance, called the radius (r), from a fixed point called the centre. The formula for the area of a circle is $A = \pi r^2$.

circumference: The boundary of a circle; the length of this boundary. The formula to calculate the length is $C = 2\pi r$, where r is the radius, or $C = \pi d$, where d is the diameter.

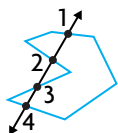
coefficient: The factor by which a variable is multiplied. For example, in the term $5x$, the coefficient is 5.



collinear: Three or more points are collinear if they lie on the same line.

composite shape: A shape that can be divided into more than one of the basic shapes

concave polygon: A polygon with at least one interior angle greater than 180° . A straight line through it may cross more than two sides.



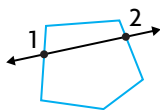
cone: A solid figure with a flat base and a curved side that meets at a point

conjecture: A guess or prediction based on limited evidence

constant: A value in a mathematical expression or formula that does not change. For example, in the expression $3x + 2$, 2 is a constant.

continuous: A set of data that can be broken down into smaller and smaller parts and still have meaning

convex polygon: A polygon with every interior angle less than 180° . Any straight line through it crosses at most two sides.



counterexample: An example that proves that a hypothesis or conjecture is false

cylinder: A 3-D figure with two congruent, parallel, circular faces and one curved surface

D

data point: An item of factual information derived from measurement or research. On a graph created on a Cartesian plane, each data point is represented as a dot at the location denoted by coordinates of an ordered pair where (x, y) = (value of the independent variable, value of the dependent variable).

degree: For a power with one variable, the degree is the variable's exponent. When there is more than one variable, the degree is the sum of the exponents of the powers of the variables. For example, x^4 , x^3y , and x^2y^2 all have degree 4.

denominator: The number in a fraction that represents the number of parts in the whole set, or the number of parts the whole set has been divided into. For example, in $\frac{4}{5}$, the fractional unit is fifths.

dependent variable: In a relation, the variable whose values you calculate; usually placed in the left column in a table of values and on the vertical axis in a graph

diagonal: In a polygon, a line segment joining two vertices that are not next to each other (i.e., not joined by one side)

diameter: A line segment that joins two points on a circle and passes through the centre; the length of this line segment

direct variation: A relation in which one variable is a multiple of the other

discrete: A set of data that cannot be broken into smaller parts

displacement: How far out of place an object is; the object's overall change in position in reference to its starting point (origin)

distributive property or law: The property that states that when a sum is multiplied by a number, each value in the sum is multiplied by the number separately, and the products are then added. For example, $4 \times (7 + 8) = (4 \times 7) + (4 \times 8)$.

dividend: A number being divided. For example, in $18 \div 3 = 6$, 18 is the dividend, 3 is the divisor, and 6 is the quotient.

divisor: A number by which another is divided. For example, in $18 \div 3 = 6$, 3 is the divisor, 18 is the dividend, and 6 is the quotient.

E

equation: A mathematical statement in which the value on the left side of the equal sign is the same as the value on the right side of the equal sign. For example, the equation $5n + 4 = 39$ means that 4 more than the product of 5 and a number equals 39.

equation of a line: An equation of degree 1 that gives a straight line when graphed on the Cartesian plane. The equation can be expressed in several forms:

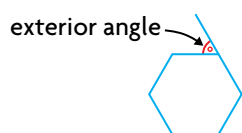
$Ax + By = C$, $Ax + By + C = 0$, or $y = mx + b$ are the most common. For example, the equations $4x + 2y = 8$, $4x + 2y - 8 = 0$, and $y = -2x + 4$ all represent the same straight line when graphed.

equilateral: In a triangle, having all sides equal in length

equivalent equations: Equations that have the same solution

exponent: The number that tells how many equal factors are in a power

exterior angle: The angle formed by extending a side of a convex polygon; the angle between any extended side and its adjacent side



extrapolate: To predict a value by following a pattern beyond known values

F

first difference: The difference between two consecutive y -values in a table in which the difference between the x -values is constant

G

geometric pattern: Any pattern created with straight lines. These patterns are created primarily with right angles, triangles, squares, and other geometric shapes.

H

hypotenuse: The longest side of a right triangle; the side that is opposite the right angle

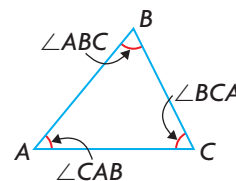
I

improper fraction: A fraction in which the numerator is greater than the denominator (e.g., $\frac{5}{4}$)

independent variable: In a relation, the variable whose values you choose; usually placed in the right column in a table of values and on the horizontal axis in a graph

integers (I): All positive and negative whole numbers, including zero: ... -3 , -2 , -1 , 0 , 1 , 2 , 3 , ...

interior angle: The angle formed inside each vertex of a polygon. For example, $\triangle ABC$ has three interior angles: $\angle ABC$, $\angle BCA$, and $\angle CAB$.



interpolate: To estimate a value between two known values

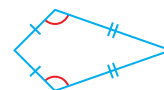
inverse operations: Operations that undo, or reverse, each other. For example, addition is the inverse of subtraction; multiplication is the inverse of division.

isolating a term or a variable: Performing math operations (e.g., addition, subtraction, multiplication, division) to get a term or a variable by itself on one side of an equation

isosceles: In a triangle, having two sides equal in length

K

kite: A quadrilateral that has two pairs of equal sides with no sides parallel



L

least common multiple (LCM): The least whole number that has all given numbers as factors. For example, 12 is the least common multiple of 4 and 6.

like terms: Algebraic terms that have the same variables and exponents apart from their numerical coefficients (e.g., $2x^2$ and $-3x$)

linear equation: An equation in the form $ax + b = 0$, or an equation that can be rewritten in this form. The algebraic expression involved is a polynomial of degree 1 (e.g., $2x + 3 = 6$ or $y = 3x - 5$).

linear relation: A relation in which the graph forms a straight line

line of best fit: A line that best describes the relationship between two variables in a scatter plot

lowest common denominator (LCD): The smallest common multiple of the denominators of two or more fractions. For example, the LCD of $\frac{3}{4}$ and $\frac{1}{6}$ is 12.

M

magnitude: The size of a quantity, measured in units of that quantity. For example, the magnitude of each angle of a regular hexagon is 120° .

median: 1. The middle value in a set of ordered data. For example, when there is an odd number of numbers, the median is the middle number; when there is an even number of numbers, the median is the mean of the two middle numbers.

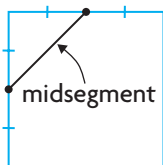
2. The line drawn from a vertex of a triangle to the midpoint of the opposite side



3. The middle number in a set, such that half the numbers in the set are less and half are greater when the numbers are arranged in order

midpoint: The point that divides a line segment into two equal parts

midsegment: A line segment connecting the midpoints of two adjacent sides of a polygon



mixed number: A number made up of a whole number and a fraction (e.g., $5\frac{1}{7}$)

monomial: An algebraic expression with one term (e.g., $5x^2$, $4xy$)

N

natural number (N): One of the counting numbers (e.g., 1, 2, 3, 4). A natural number is used as a cardinal number when it describes how many things there are in a set (e.g., ten runners in a race), and as an ordinal number when it marks the position of something in a sequence (e.g., the runner in place number ten).

negative reciprocals: Numbers that multiply to produce -1 are negative reciprocals of each other (e.g., $\frac{3}{4}$ and $-\frac{4}{3}$, $-\frac{1}{2}$ and 2).

net: A 2-D pattern you can fold to create a 3-D shape

nonlinear relation: A relation whose graph is not a straight line

numerator: The number in a fraction that shows the number of parts of a given size the fraction represents

O

opposites: Two numbers with opposite signs that are the same distance from zero. For example, $+6$ and -6 are opposites.

optimum: The most desirable of a number of possible choices

order of operations: Rules describing what sequence to use when evaluating an expression:

1. Evaluate within brackets.
2. Calculate exponents and square roots.
3. Divide or multiply from left to right.
4. Add or subtract from left to right.

outlier: A data point that is separated from the rest of the points on a graph

P

parallelogram: A quadrilateral with equal and parallel opposite sides. For example, a rhombus, rectangle, and square are all types of parallelograms.

partial variation: A relation in which one variable is a multiple of the other plus a constant amount

pattern rule: A description of how a pattern starts and how it continues

point of intersection: The point in common between two lines

polynomial: An expression that comprises a sum and/or difference of monomials

power: A numerical expression that shows repeated multiplication. For example, the power 5^3 is a shorter way of writing $5 \times 5 \times 5$. A power has a base and an exponent: the exponent tells the number of equal factors there are in a power.

principle: A basic truth or rule about the way something works

prism: A 3-D figure with two parallel, congruent polygonal bases. A prism is named by the shape of its bases (e.g., rectangular prism, triangular prism).

pyramid: A 3-D shape with a polygon for a base. The other faces are triangles that meet at a single vertex.

Q

quotient: The result of dividing one number by another. For example, if 12 is divided by 5, the quotient is 2.4.

R

radius (plural **radii**): A line segment that goes from the centre of a circle to its circumference; the length of this line segment

rate of change: The change in one variable relative to the change in another

rational numbers (Q): Numbers that can be expressed as the quotient of two integers where the divisor is not 0

rectangle: A parallelogram with four square corners

relation: A description of how two variables are connected

repeating decimal: A decimal in which a block of one or more digits eventually repeats in a pattern

(e.g., $\frac{25}{99} = 0.252\ 525\ 252\ \dots$;

$\frac{1}{7} = 0.142\ 857\ 142\ 857\ \dots$)

rhombus: A parallelogram with four equal sides

right pyramid: A pyramid whose base is a regular polygon and whose top vertex is directly above the centre of the base

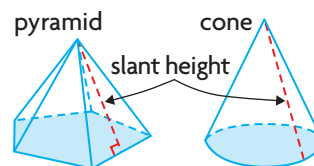
rise: The vertical distance between two points

run: The horizontal distance between two points

S

scatter plot: A graph that attempts to show a relationship between two variables by means of points plotted on a coordinate grid. It is also called a scatter diagram.

slant height: The distance from the top to the base, at a right angle, along a slanted side of a pyramid or cone. It is measured to the midpoint of the base side for a pyramid.



slope: A measure, often represented by m , of the steepness of a line; the ratio comparing the vertical and horizontal distances (called the rise and run) between

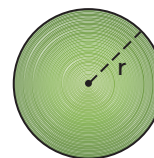
two points; $m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$

solution to an equation: The value of a variable that makes the equation true. For example, in the equation $5n + 4 = 39$, the value of n is 7 because $5(7) + 4 = 39$.

solution to a system of linear equations: A point that satisfies both relations in a system of linear equations. The point of intersection represents an ordered pair that solves a system of linear equations.

solve for a variable in terms of other variables: The process of using inverse operations to express one variable in terms of the other variable(s)

sphere: The set of points in three dimensions in which the points are all the same distance, r , from a fixed point, called the centre; r is the radius of the sphere.



surface area: The total area of all the faces of any 3-D shape

system of linear equations: A set of equations (at least two) that represent linear relations between the same two variables

T

table of values: An orderly arrangement of facts set out for easy reference (e.g., an arrangement of numerical values in vertical and horizontal columns)

trapezoid: A quadrilateral with one pair of parallel sides

trend: A relationship between two variables for which the independent variable is time

trinomial: An algebraic expression containing three terms (e.g., $2x^2 - 6xy + 7$)

V

variable: A symbol used to represent an unspecified number. For example, x and y are variables in the expression $x + 2y$.

velocity: The rate of change of displacement or the rate of displacement. It includes an object's speed in a specified direction. $v = \frac{\Delta d}{\Delta t}$ where v is velocity, d is displacement, and t is time.

volume: The amount of space occupied by an object

W

whole numbers (W): The counting numbers that begin at 0 and continue forever: 0, 1, 2, 3, ...

X

x -intercept: The value at which a graph meets the x -axis. The value of y is 0 for all x -intercepts.

Y

y -intercept: The value at which a graph meets the y -axis. The value of x is 0 for all y -intercepts.

Z

zero principle: Two opposite integers that, when added, give a sum of zero. For example, $(-1) + (+1) = 0$.