Glossaries

Instructional glossary

Mathematical 'doing' words

bisect To cut in half.

calculate To find the value of a numerical expression. See also **Evaluate**.

classify To sort into categories or types.

complete To fill in detail that makes a statement or diagram correct or whole.

construct To draw a geometrical figure accurately.

convert To change from one form to another. For example, convert a fraction to a decimal, or convert dollars to cents.

decrease To make smaller by subtracting or dividing.

estimate To make an educated guess about the value of an answer; to find roughly or approximately.

evaluate To find the value of an expression. For example, evaluate 3×8^2 , or evaluate 4x + 1 when x = 5.

give reasons When solving a problem, to show the mathematical rules or thinking used.

graph To display on a number line, number plane or statistical graph.

hence find/prove To find an answer or prove a result using previous answers or any information supplied.

increase To make larger by adding or multiplying.

measure To find the size of something using an instrument. For example, to find a length using a ruler.

prove/show that In questions where the answer is given, to use mathematical reasoning to prove that the answer is true.

reduce (a fraction) to its lowest terms See Simplify (a fraction).

round (a number) To find the nearest approximation for a number. For example, round 4.3 to the nearest whole number (4), \$12.9598 to the nearest cent (\$12.96), 0.166 66 to three decimal places (0.167).

show working To show the steps you used to find an answer.

simplify To give the answer in its simplest, shortest, neatest form.

simplify (a fraction) To reduce the numerator and denominator of a fraction by dividing by their greatest common divisor (GCD). When the numerator and denominator are as small as possible, the fraction has been simplified or reduced to its lowest terms.

simplify (a ratio or rate) To reduce the terms or units of a ratio or rate by dividing by a common factor, in a similar way to simplifying a fraction.

sketch To draw a rough diagram. Less accurate than to construct.

solve To find the value of the unknown variable in an equation.

substitute To replace a variable with a number and evaluate.

write correct to See Round (a number).

write/state To write an answer, formula or result without showing any working or explanation. (This usually means that the answer can be found mentally, or in one step.)

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Mathematical glossary

Some common symbols

+	plus
_	minus
×	multiplied by (times)
÷	divided by
%	per cent
()	parentheses, round brackets
[]	(square) brackets
{ }	braces
=	is equal to
\approx	is approximately equal to
\neq	is not equal to
<	is less than
>	is greater than
\leq	is less than or equal to
\geq	is greater than or equal to
·.	therefore

12-hour time Time of day written using a.m. or p.m. notation and the hours 1 to 12. For example, 6:20 p.m.

24-hour time Time of day written using four digits (instead of a.m. or p.m.) and the hours 0 to 23. For example, 1820 is the 24-hour time for 6:20 p.m.

A

acute angle A 'sharp' angle between 0° and 90°, for example, the marked angle in the diagram.



acute-angled triangle A triangle with three acute angles.

adjacent angles Angles next to each other that share a common arm, for example, angles x and y in the diagram.



-3	negative 3
	the square root of
∛	the cube root of
5)855	855 divided by 5, or 855 ÷ 5
0.Ġ	the recurring decimal 0.666 666
3 <i>x</i>	3 multiplied by <i>x</i> , $3 \times x$
$\frac{x}{2}$	<i>x</i> divided by 2, $x \div 2$
x^2	x squared, $x \times x$
x^3	<i>x</i> cubed, $x \times x \times x$
\overline{X}	the mean (average)
$\angle ABC$	angle ABC
$\triangle ABC$	triangle ABC
	is parallel to
\perp	is perpendicular to
P(E)	The probability of an event, E

algebraic expression A number written in algebraic form using variables, for example, 2xy + 4y - 5.

alternate angles A pair of angles between two lines crossed by a transversal, on opposite sides of the transversal, for example, the two angles marked in the diagram.

angle A description or measure of the size of a turn or rotation. The angle Cmarked in the diagram is named $\angle C$ or $\angle ACB$.



angle sum The total of the sizes of the angles in a shape. The angle sum of a triangle is 180°.

area The amount of surface enclosing a shape, measured in square units.

ascending order Going up, increasing, from smallest to largest (1-2-3). The opposite of **descending order**.

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associative law A law of arithmetic that says that when operating with more than two numbers, you can group them in any way. For example, the associative law of addition says that (a + b) + c = a + (b + c) for any three numbers *a*, *b* and *c*.

axis of symmetry See line symmetry.

B

base (in index notation) When a number is raised to a power, the number raised is the base. In the expression 3^5 , the 3 is called the base.

base (of a shape) The bottom side of a flat shape such as a triangle.



best buy When comparing different brands or sizes of items during shopping, the best buy is the item with the lowest unit cost and the best value for money.

bisect To cut in half.

braces See Grouping symbols. brackets See Grouping symbols.

breadth Another word for 'width'; how wide or broad something is.

С

capacity The amount of material (usually liquid) that a container can hold, measured in millilitres (mL), litres (L), kilolitres (kL) and megalitres (ML). See also **volume**.

cartesian plane Another name for **number plane**. Named after French mathematician and philosopher, René Descartes.

centi- A prefix meaning 'one-hundredth of'.

centre of symmetry See rotational symmetry.

certain Must happen; has a probability of 1 or 100%.

classify To group into categories or types.

cluster A group of data scores that are bunched or close together.

co-interior angles A pair of angles between two lines crossed by a transversal, on the same side of the transversal (co-interior means 'together inside'), for example, the two angles marked in the diagram.

collinear pointsPoints that lie in a line.common fractionSee Fraction.

commutative law A law of arithmetic that says that you can operate with 2 numbers in any order. For example, the commutative law of multiplication says that $a \times b = b \times a$ for any two numbers *a* and *b*.

compasses Geometrical instrument for constructing circles and equal lengths.

complementary angles Two angles whose sum is 90°. The angles 30° and 60° are complementary.



complementary event All the outcomes that are *not* the event; the 'opposite' event. For example, the complementary event to rolling 1 on a die is rolling a number that is not 1.

composite number A number with more than two factors. 12 is a composite number since it has six factors: 1, 2, 3, 4, 6 and 12. (See also **prime number**.)

composite shape A shape made up of two or more basic shapes.

consecutive numbers Any series of integers that follow each other in order, for example, 8, 9 and 10.

construct To draw a geometrical figure accurately.

coordinates An ordered pair of numbers used to locate a point or position, for example, *A*(2, 5) tells us that the point *A* is located 2 units to the right and 5 units up from the origin.

corresponding angles A pair of angles in matching positions when two lines are crossed by a transversal. They are on the same side of the transversal and the lines, for example, the two angles marked on the diagram.

cross-section A 'slice' of a solid cut across it rather than along it.



cube (of a number) The number raised to the power of 3.

For example, 7 cubed = $7^3 = 7 \times 7 \times 7 = 343$.

cube root (of a number) The value which, if cubed, gives the number.

For example, $\sqrt[3]{8} = 2$ because $2^3 = 2 \times 2 \times 2 = 8$.

cubic metre A metric unit of volume, the volume of a 1 m cube.

D

data Information, a collection of facts.

decimal places The places after the decimal point in a number. For example, 3.1416 has four decimal places.

degree (symbol °) A unit for measuring angle size. There are 360° in a complete revolution and 90° in a right angle.

denominator The number below the line in a fraction. The denominator of $\frac{2}{3}$ is 3.

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descending order Going down, decreasing, from largest to smallest (3-2-1). The opposite of **ascending order**.

diagonal An interval joining two non-adjacent vertices of a shape.



difference The result of a subtraction. The difference between 65 and 10 is 55.

digit A single figure; the whole numbers 0, 1, 2, 3, ..., 9.

For example, the number 129 has three digits: 1, 2 and 9.

distributive law A law of arithmetic that says that you can multiply by a number by splitting it into the sum or difference of two other numbers. For example, $27 \times 12 = 27 \times (10 + 2) = 27 \times 10 + 27 \times 2$. More generally, $a \times (b + c) = a \times b + a \times c$ for any three numbers *a*, *b* and *c*.

divided bar graph A rectangular graph which is divided into proportionately-sized sections to represent parts of a whole.



divisibility test A rule for testing whether a number is divisible by a specific value. For example, the divisibility test for 3 is to add the digits of the number and if the answer is a multiple of 3, then the number is divisible by 3.

divisor See factor.

dot plot A graph that uses dots above a number line to show frequencies of data scores.



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Ε

equation A mathematical statement that two quantities are equal. For example, 8 + 2 = 10 or 3b - 7 = 5.

equilateral triangle A triangle with three equal sides.



equivalent Having the same value. For example, 0.75 and $\frac{3}{4}$ are equivalent.

equivalent fraction An equal fraction created by multiplying or dividing the numerator and the denominator of a fraction by the same number.

equivalent ratio An equal ratio created by multiplying or dividing each term of a ratio by the same number.

even chance Equally likely to happen or not happen, '50-50 chance', having a probability of $\frac{1}{2}$.

event In probability, a result involving one or more outcomes. For example, when rolling a die, the event 'rolling an even number' contains the three outcomes {2, 4, 6}.

expected frequency The expected number of times an event will occur over repeated trials, found by multiplying the probability of the event by the number of trials.

experiment A situation involving chance that leads to outcomes, for example, rolling a die.

experimental probability (or relative

frequency) An estimate of theoretical probability; the relative frequency of an event in repeated trials of an experiment, found using the formula

 $P(E) = \frac{\text{number of times } E \text{ happened}}{\text{total number of trials}}$ $= \frac{\text{frequency of } E}{\text{total frequency}}$

expression A mathematical description of one or more operations. For example, $2 \times 4 + 5$ and

3b-7 are mathematical expressions (but 3b-7= 5 is an equation.) See also **Algebraic** expression.



F

factor (of a number) A value that divides evenly into a given number. For example, the factors of 15 are 1, 3, 5 and 15. Also called **divisor**.



formula (Plural: **formulas** or **formulae**). A rule written as an algebraic equation, using variables. The formula for the area of a triangle is $A = \frac{1}{2}bh$, where *A* is the area, *b* is the length of the base and *h* is the perpendicular height of the triangle.

fraction A number written in the form $\frac{a}{b}$, where *a* and *b* are integers and $b \neq 0$. More precisely called a **common fraction**, unlike other types of fractions such as decimals, percentages and ratios.

frequency The number of times an event occurs in repeated trials of a probability experiment, or the number of times a value appears in a set of data.

Glossaries

G

greatest common divisor (GCD) Also called the **highest common factor (HCF)**. The largest factor shared by two or more numbers. For example, the factors of 36 are 1, 2, 3, 4, 9, 12, 18 and 36, and the factors of 8 are 1, 2, 4 and 8, so the GCD of 36 and 8 is 4.

grouping symbols The collective name for parentheses (), square brackets [] and braces {}.

Η

hectare A large metric unit of area, equivalent to 10 000 m² or to the area of a square 100 m \times 100 m.

height How tall or high something is, the vertical distance between its top and its base.

highest common factor (HCF) See Greatest common divisor.

horizontal Going across, sideways, flat.

horizontal

Ι

image A transformed shape after it has been translated, reflected or rotated.

impossible Cannot happen, no chance, has a probability of 0.

improbable See Unlikely.

improper fraction A fraction whose numerator is greater than or equal to its denominator, such as $\frac{7}{4}$.

index (Plural: **indices**, pronounced 'in-dasees'). See **Power**.

index notation A way of writing repeated multiplication using indices (powers), in the form a^n . Index notation for $2 \times 2 \times 2 \times 2$ is 2^4 .

integer A number that is a positive or negative whole number or zero. The numbers $\{\ldots, -3, -2, -1, 0, 1, 2, 3, \ldots\}$ are integers.

intersect To cross.

interval A section of a line with a definite length, such as *AB* below.

B

isosceles triangle A triangle with two equal sides.

K

kilo- A prefix meaning one thousand (1000), represented by the symbol k. For example, one kilogram is 1000 grams.

kite A quadrilateral with two pairs of equal adjacent sides.

L

LHS The left-hand side (of an equation).

likely A high chance it will happen, probable.

line A straight edge that extends indefinitely in both directions.

line symmetry A plane shape has line symmetry if it can be folded so that one half fits exactly on top of the other half; that is, one half is the mirror-image of the other. The folding line is called the **axis of symmetry** (plural: **axes**). An equilateral triangle has three axes of symmetry. See also **rotational symmetry**.

line graph A graph made up of a line or several line intervals, often showing how a quantity is changing over time.



lowest common multiple (LCM) The smallest multiple that is shared by two or more numbers. For example, the multiples of 4 are 4,

x

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8, 12, 16, 20, . . . and the multiples of 10 are 10, 20, 30, 40, . . ., so the LCM of 4 and 10 is 20.

Μ

mean The average of a set of data, represented by \overline{x} , calculated by dividing the sum of the scores by the number of scores.

measure of location An average, middle or typical value of a set of data. The three measures of location are the mean, median and mode.

median The middle score when the scores are arranged in order. If the number of values is even, then the median is the average of the two middle values.

mega- A prefix meaning one million (1 000 000), represented by the symbol M. A megalitre is one million litres.

mental Using the mind.

micro- A prefix meaning one-millionth, represented by the Greek letter µ. One microsecond is one-millionth of a second.

milli- A prefix meaning one-thousandth $\left(\frac{1}{1000}\right)$, represented by the symbol m. One millimetre is one-thousandth of a metre.

mixed expression An expression with more than one arithmetic operation, such as $(17 - [3 + 1]) \times 2.$

mixed numeral A number written as a whole number and a fraction, for example $5\frac{3}{4}$.

mode The most common or frequent score(s) in a set of data.

multiple (of a number) The product of the number and a whole number. For example, the multiples of 6 are 6, 12, 18, 24, ...

Ν

negative number A number less than 0, written with a negative sign (-), for example, -3, -10 and -7. 9780170188777

number plane A

y coordinate grid system 2nd 1st based on two number quadrant quadrant lines that cross at right 3rd 0 angles: a horizontal line 4th quadrant quadrant called the *x*-axis and a vertical line called the yaxis. Also called Cartesian plane.

numerator The number above the line in a fraction. The numerator of $\frac{2}{3}$ is 2.

0

obtuse angle A 'wide' angle greater than 90° but less than 180°.

obtuse-angled triangle A triangle with one obtuse angle (between 90° and 180°).

order of operations The order in which a mixed expression such as $(17 - [3 + 1]) \times 2$ is evaluated. Work from left to right, first performing any operations in grouping symbols, then multiplication and division, and finally addition and subtraction.

order of rotational symmetry See rotational symmetry.

ordered pair A pair of numbers (x, y) that can be used as coordinates to plot a point on the number plane.

origin The point O(0, 0) at origin the centre of the number plane, where the *x*-axis and *y*-axis cross.

outcome In probability, a result of a situation or experiment. For example, when rolling a die, one possible outcome is rolling a 4.

outlier An extreme data value that is very different from the other values in a set.

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Р

positive number A number greater than 0, for example, 11, 6 and 4.

parallel lines Lines that point in the same direction and do not intersect.



 $AB \parallel CD$ means 'AB is parallel to CD'.

parallelogram A quadrilateral in which the opposite sides are parallel.



parentheses (Pronounced 'pa-ren-th-sees'.) See **Grouping symbols**.

percentage A fraction with a denominator of 100 that is written in a special way. For example, 7% means $\frac{7}{100}$.

perimeter The distance around the outside of a shape. The sum of the lengths of its sides.

perpendicular

perpendicular height

height The height of a shape, measured at right angles to the base.



perpendicular lines Lines that intersect to form a right angle. $AB \perp CD$ means AB is Aperpendicular to CD.



C

place value The way that the position of a digit in a number tells us its value. For example, the value of the 4 in 2417 is 400.

plane A flat surface that extends in all directions.

polygon Any flat shape that is made up of straight sides.



power/index The number of times a base is multiplied by itself. In 2^5 , the power is 5. Also called the *exponent*.

power of 10 The numbers 10, 100, 1000 and so on, formed by multiplying 10 by itself repeatedly.

prime number A number that has only two factors, 1 and itself. For example, 2 and 7 are prime numbers, but 15 is not. (See also **composite number**.)

prism A solid shape with identical cross-sections that have straight sides.



probability The chance of an event occurring, measured as a fraction, decimal or percentage between 0 and 1.

probable See Likely.

product The result of a multiplication. The product of 7 and 3 is 21.

pronumeral Another name for variable.

proper fraction A fraction whose numerator is less than its denominator, such as $\frac{3}{8}$.

protractor A geometrical instrument that measures the size of an angle in degrees.



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Q

quadrant (of a number plane) A quarter of the number plane created by the *x*-axis and *y*-axis crossing at right angles.



quadrilateral Any polygon with four sides, for example, rectangle, parallelogram, kite and trapezium.

quotient The result of a division. If 36 is divided by 3, the quotient is 12.

R

random In probability, describing a situation where every possible outcome has an equal chance, or is equally likely.

range In a set of data, the difference between the highest and lowest scores.

rate A relationship between two quantities measured in different units. For example, a speed of 107 km/h compares distance travelled (in kilometres) with time (in hours).

ratio A relationship between quantities measured in the same units. For example, the ratio of 3 teachers to 40 students is 3 : 40 (read '3 to 40').

reciprocal The reciprocal of any number is found by first writing the number as a fraction and then swapping the numerator with the denominator. The reciprocal of 5 is $\frac{1}{5}$ and the reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$. The product of any number and its reciprocal is 1.

rectangle A quadrilateral with four right angles.



recurring (or repeating) decimal A decimal with one or more digits that repeat endlessly. For example 0.1666 . . ., abbreviated as 0.16.

reflection The process of 'flipping' a shape across a line to give a mirror image that is back-to-front.



reflex angle A 'bentback' angle greater than 180° but less than 360°.

revolution An angle of 360°.



rhombus A quadrilateral with four equal sides.

RHS The right-hand side (of an equation).

right angle A 90° angle, a 'square corner', a quarter-turn.

rotation The process of 'spinning' or turning a shape about or around a fixed point at a certain angle and direction (clockwise or anti-clockwise).



90°

rotational symmetry A plane shape has rotational symmetry if it can be spun around its centre so that it fits onto itself again before making a complete revolution. The centre point is called the **centre of symmetry**. A regular pentagon (pictured) has rotational

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symmetry, and because it can fit onto itself five times during one complete revolution we say that it has rotational symmetry of order 5. See also line symmetry.



round To give an approximate answer. For example, rounding 3.14159 to three decimal places gives 3.142.

S

sample space In a probability situation, the set of all possible outcomes.

scale The amount represented by one unit or interval on a measuring instrument or on the axis of a graph.

scalene triangle A triangle with no equal sides.



sector graph Also called a pie chart, a circular graph representing parts of a whole by being divided into proportionately-sized sectors.

solution In algebra, the value(s) that make an equation true.

speed A rate that compares distance travelled with time taken. Usually measured in kilometres per hour (km/h) or metres per second (m/s).

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



square (of a number) The number multiplied by itself. For example, 7 squared = $7^2 = 7 \times 7 = 49.$

square root (of a number) The positive value which, if squared, gives the number. For example, $\sqrt{25} = 5$ because $5^2 = 5 \times 5$ = 25.

Stem | Leaf stem-and-leaf plot A 'number graph' that lists all the data scores, in groups. Each score is split into a 'stem' and a 'leaf'. This stem-and-leaf plot

shows 12 test scores, from 42 to 82.

Key: 5|8 stands for 58



substitute To replace a variable with a number, to evaluate an expression. For example, substituting t = 5 in the expression $t^2 + 6$ gives 31.

sum The result of an addition. The sum of 5 and 7 is 12.

supplementary angles Two angles whose sum is 180°. The angles 70° and 110° are $A = \frac{110^\circ}{A}$ supplementary.

symmetry See line symmetry and rotational symmetry.

Т

terminating decimal A decimal whose digits do not run endlessly, for example, 0.125.

terms of an expression The parts of an algebraic expression. For example, $b^2 + 6b - 9$ has three terms: b^2 , 6b and -9.

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terms of a ratio The numbers in a ratio, for example, in the ratio 14 : 9, the terms are 14 and 9.

transformation In geometry, the process of moving or changing a shape. See **Reflection**, **Rotation** and **Translation**.

translation The process of 'sliding' a shape a certain distance and direction.



transversal A straight line that crosses two or more lines at different points.

trapezium A quadrilateral with one pair of opposite sides parallel.

travel graph A line graph that describes a journey and shows the distance travelled over time.

trial One go or run of a repeated probability experiment, for example, one roll of a die.

triangle A polygon with three sides.



tonne A metric unit of mass for heavy objects, equal to 1000 kg.

U

unit cost The cost of one item or unit, found by dividing the cost of the item by the number of items or units.

unitary method A method for finding a quantity by finding the size of one part first.

unlikely A low chance it will happen, improbable, probably won't happen.

V

variable A symbol, usually a letter of the alphabet, that stands for a number. Also called a **pronumeral**.



vertical Going up and down, at a right angle to the **horizontal**.

vertically opposite angles A pair of opposite and equal ______ angles formed when two lines cross.

vinculum In a fraction, the horizontal line that separates the numerator from the denominator.

volume The amount of space occupied by a solid object, measured in cubic units.



*y***-axis** The vertical axis of a number plane (running up and down).