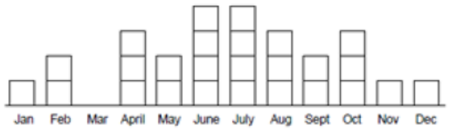
Elston Hall Learning Trust

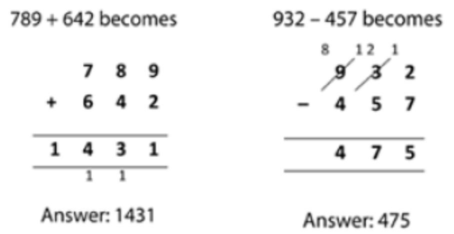
Mathematics glossary

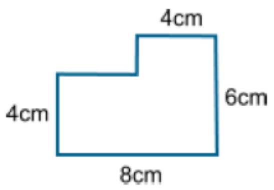
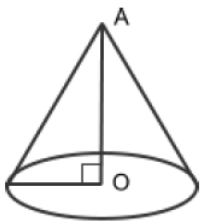
Word	Meaning
acute angle(KS2)	An angle between 0° and 90°
addend (KS1)	A number to be added to another. See also dividend, subtrahend and multiplicand.
addition (KS1)	The binary operation of addition on the set of all real numbers that adds one number of the set to another in the set to form a third number which is also in the set. The result of the addition is called the sum or total. The operation is denoted by the + sign. When we write 5 + 3 we mean 'add 3 to 5'; we can also read this as '5 plus 3'. In practice the order of addition does not matter: The answer to 5 + 3 is the same as 3 + 5 and in both cases the sum is 8. This holds for all pairs of numbers and therefore the operation of addition is said to be commutative. To add three numbers together, first two of the numbers must be added and then the third is added to this intermediate sum. For example, (5 + 3) + 4 means 'add 3 to 5 and then add 4 to the result' to give an overall total of 12. Note that 5 + (3 + 4) means 'add the result of adding 4 to 3 to 5' and that the total is again 12. The brackets indicate a priority of sub-calculation, and it is always true that (a + b) + c gives the same result as a + (b + c) for any three numbers a, b and c. This is the associative property of addition. Addition is the inverse operation to subtraction, and vice versa. There are two models for addition: Augmentation is when one quantity or measure is increased by another quantity. i.e. "I had £3.50 and I was given £1, then I had £4.50". Aggregation is the combining of two quantities or measures to find the total. E.g. "I had £3.50 and my friend had £1, we had £4.50 altogether.
algebra (KS1)	The part of mathematics that deals with generalised arithmetic. Letters are used to denote variables and unknown numbers and to state general properties. Example: a(x + y) = ax + ay exemplifies a relationship that is true for any numbers a, x and y. Adjective: algebraic. See also equation, inequality, formula, identity and expression.
analogue clock (KS1)	A clock usually with 12 equal divisions labelled 'clockwise' from the top 12, 1, 2, 3 and so on up to 11 to represent hours. Commonly, each of the twelve divisions is further subdivided into five equal parts providing sixty minor divisions to represent minutes. The clock has two hands that rotate about the centre. The minute hand completes one revolution in one hour, whilst the hour hand completes one revolution in 12 hours. Sometimes the Roman numerals XII, I, II, III, IV, V1, VII, VIII, IX, X, XI are used instead of the standard numerals used today.
angle (KS1)	An angle is a measure of rotation and is often shown as the amount of rotation required to to turn one line segment onto another where the two line segments meet at a point (insert diagram). See right angle, acute angle, obtuse angle, reflex angle

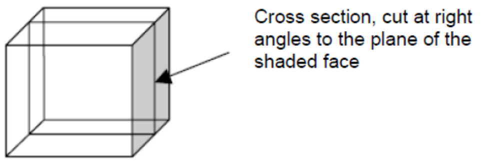
angle at a point (KS2)	The complete angle all the way around a point is 360°.
anticlockwise (KS1)	In the opposite direction from the normal direction of travel of the hands of an analogue clock.
approximation (KS2)	A number or result that is not exact. In a practical situation an approximation is sufficiently close to the actual number for it to be useful. Verb: approximate. Adverb: approximately. When two values are approximately equal, the sign ≈ is used.
area (KS2)	A measure of the size of any plane surface. Area is usually measured in square units e.g. square centimetres (cm2), square metres (m2).
array (KS1)	An ordered collection of counters, numbers etc. in rows and columns.
associative (KS1)	A binary operation ∗ on a set S is associative if a ∗ (b ∗ c) = (a ∗ b) ∗ c for all a, b and c in the set S. Addition of real numbers is associative which means a + (b + c) = (a + b) + c for all real numbers a, b, c. It follows that, for example, 1 + (2 + 3) = (1 + 2) + 3. Similarly multiplication is associative. Subtraction and division are not associative because: 1 – (2 – 3) = 1 – (−1) = 2, whereas (1 – 2) – 3 = (−1) – 3 = −4 and 1 ÷ (2 ÷ 3) = 1 ÷ 2/3 = 3/2, whereas (1 ÷ 2) ÷ 3 = (1/2) ÷ 3 = 1/6.
average (KS2)	Loosely an ordinary or typical value, however, a more precise mathematical definition is a measure of central tendency which represents and or summarises in some way a set of data. The term is often used synonymously with ‘arithmetic mean', even though there are other measures of average. See median and mode
axis (KS2)	A fixed, reference line along which or from which distances or angles are taken.
axis of symmetry (KS1)	A line about which a geometrical figure, or shape, is symmetrical or about which a geometrical shape or figure is reflected in order to produce a symmetrical shape or picture. Reflective symmetry exists when for every point on one side of the line there is another point (its image) on the other side of the line which is the same perpendicular distance from the line as the initial point. Example: a regular hexagon has six lines of symmetry; an equilateral triangle has three lines of symmetry. See reflection symmetry
bar chart (KS1)	A format for representing statistical information. Bars, of equal width, represent frequencies and the lengths of the bars are proportional to the frequencies (and often equal to the frequencies). Sometimes called bar graph. The bars may be vertical or horizontal depending on the orientation of the chart.

<table>
<tr><td>binary operation (KS1)</td><td>A rule for combining two numbers in the set to produce a third also in the set. Addition, subtraction, multiplication and division of real numbers are all binary operations.</td></tr>
<tr><td>block graph (KS1)</td><td>A simple format for representing statistical information. One block represents one observation. Example: A birthday graph where each child places one block, or colours one square, to represent himself / herself in the month in which he or she was born.

</td></tr>
<tr><td>brackets (KS2)</td><td>Symbols used to group numbers in arithmetic or letters and numbers in algebra and indicating certain operations as having priority.
Example: 2 x (3 + 4) = 2 x 7 = 14 whereas 2 x 3 + 4 = 6 + 4 = 10.
Example: 3(x + 4) denotes the result of adding 4 to a number and then multiplying by 3; (x + 1)2 denotes the result of adding 1 to a number and then squaring the result</td></tr>
<tr><td>cancel (a fraction) (KS2/3)</td><td>One way to simplify a fraction down to its lowest terms. The numerator and denominator are divided by the same number e.g. 4/8 = 2/4. Also to 'reduce' a fraction.
Note: when the numerator and denominator are both divided by their highest common factor the fraction is said to have been cancelled down to give the equivalent fraction in its lowest terms. e.g.18/30 = 3/5 (dividing numerator and denominator by 6)</td></tr>
<tr><td>capacity (KS1)</td><td>Capacity – the volume of a material (typically liquid or air) held in a vessel or container.
Note: the term ’volume’ is used as a general measure of 3-dimensional space and cannot always be used as synonymously with capacity. e.g. the volume of a cup is the space taken up by the actual material of the cup (a metal cup melted down would have the same volume); whereas the capacity of the cup is the volume of the liquid or other substance that the cup can contain. A solid cube has a volume but no capacity.
Units include litres, decilitres, millilitres; cubic centimetres (cm3) and cubic metres (m3). A litre is equivalent to 1000 cm3.</td></tr>
<tr><td>cardinal number (KS1)</td><td>A cardinal number denotes quantity, as opposed to an ordinal number which denotes position within a series.
1, 2, 5, 23 are examples of cardinal numbers
First (1st), second (2nd), third (3rd) etc denote position in a series, and are ordinals.</td></tr>
<tr><td>Carroll diagram (KS1)</td><td>A sorting diagram named after Lewis Carroll, author and mathematician, in which numbers (or objects) are classified as having a certain property or not having that property
Example: Use the diagram below to classify all the integers from 1 to 33
<table>
<tr><td></td><td>Even</td><td>Not even</td></tr>
<tr><td>Multiple of three</td><td>6, 12, 18, 24, 30</td><td>3, 9, 15, 21, 27, 33</td></tr>
<tr><td>Not multiple of three</td><td>2, 4, 8, 10, 14, 16, 20, 22, 24, 26, 28, 32</td><td>1, 5, 7, 11, 13, 17, 19, 23, 25, 29, 31</td></tr>
</table></td></tr>
</table>

cartesian coordinate system (KS2)	A system used to define the position of a point in two- or three-dimensional space: 1. Two axes at right angles to each other are used to define the position of a point in a plane. The usual conventions are to label the horizontal axis as the x-axis and the vertical axis as the y-axis with the origin at the intersection of the axes. The ordered pair of numbers (x, y) that defines the position of a point is the coordinate pair. The origin is the point (0,0); positive values of x are to the right of the origin and negative values to the left, positive values of y are above the origin and negative values below the origin. Each of the numbers is a coordinate. The numbers are also known as Cartesian coordinates, after the French mathematician, René Descartes (1596 – 1650). 2. Three mutually perpendicular axes, conventionally labelled *x, y* and *z*, and coordinates (*x, y, z*) can be used to define the position of a point in space.
categorical data (KS1)	Data arising from situations where categories (unordered discrete) are used. Examples: pets, pupils' favourite colours; states of matter – solids, liquids, gases, gels etc; nutrient groups in foods – carbohydrates, proteins, fats etc; settlement types – hamlet, village, town, city etc; and types of land use – offices, industry, shops, open space, residential etc.
centi– (KS1)	Prefix meaning one-hundredth (of)
Centilitre	Symbol: cl. A unit of capacity or volume equivalent to one-hundredth of a litre.
Centimetre	Symbol: cm. A unit of linear measure equivalent to one hundredth of a metre.
centre (KS2)	The middle point for example of a line or a circle
chart (KS1)	Another word for a table or graph
Chronological (KS1)	Relating to events that occur in a time ordered sequence.
circle (KS1)	The set of all points in a plane which are at a fixed distance (the radius) from a fixed point (the centre) also in the plane Alternatively, the path traced by a single point travelling in a plane at a fixed distance (the radius) from a fixed point (the centre) in the same plane. One half of a circle cut off by a diameter is a semi-circle. The area enclosed by a circle of radius r is ⍰r2.
circular (KS1)	1. In the form of a circle. 2. Related to the circle, as in circular function.
circumference (KS2)	The distance around a circle (its perimeter). If the radius of a circle is r units, and the diameter d units, then the circumference is 2⍰r, or ⍰d units.
clockwise (KS1)	In the direction in which the hands of an analogue clock travel. Anti-clockwise or counter-clockwise are terms used for the opposite direction.
column (KS2)	A vertical arrangement for example, in a table the cells arranged vertically.
column graph (KS1)	A bar graph where the bars are presented vertically.

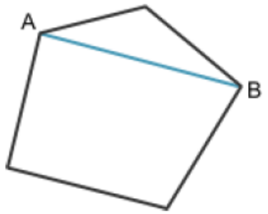
columnar addition or subtraction (KS2)	A formal method of setting out an addition or a subtraction in ordered columns with each column representing a decimal place value and ordered from right to left in increasing powers of 10. With addition, more than two numbers can be added together using column addition, but this extension does not work for subtraction.  (Examples taken from Appendix 1 of the Primary National Curriculum for Mathematics)
common factor (KS2)	A number which is a factor of two or more other numbers, for example 3 is a common factor of the numbers 9 and 30 This can be generalised for algebraic expressions: for example (x – 1) is a common factor of (x – 1)2 and (x – 1)(x + 3).
common fraction (KS1)	A fraction where the numerator and denominator are both integers. Also known as simple or vulgar fraction. Contrast with a compound or complex fraction where the numerator or denominator or both contain fractions.
common multiple (KS2)	An integer which is a multiple of a given set of integers, e.g. 24 is a common multiple of 2, 3, 4, 6, 8 and 12.
commutative (KS1/2)	A binary operation $*$ on a set S is commutative if $a * b = b * a$ for all a and b $\in$ S. Addition and multiplication of real numbers are commutative where $a + b = b + a$ and $a \times b = b \times a$ for all real numbers a and b. It follows that, for example, 2 + 3 = 3 + 2 and 2 x 3 = 3 x 2. Subtraction and division are not commutative since, as counter examples, $2 – 3 \neq 3 – 2$ and $2 \div 3 \neq 3 \div 2$.
Compare (KS1/2)	In mathematics when two entities (objects, shapes, curves, equations etc.) are compared one is looking for points of similarity and points of difference as far as mathematical properties are concerned. Example: compare y = x with y = x2. Each equation represents a curve, with the first a straight line and the second a quadratic curve. Each passes through the origin, but on the straight line the values of y always increase from a negative to positive values as x increases, but on the quadratic curve the y-axis is an axis of symmetry and $y \geq 0$ for all values of x. The quadratic has a lowest point at the origin; the straight line has no lowest point

compasses (pair of) (KS2)	An instrument for constructing circles and circular arcs and for marking points at a given distance from a fixed point.
compensation (in calculation) (KS1/2)	A mental or written calculation strategy where one number is rounded to make the calculation easier. The calculation is then adjusted by an appropriate compensatory addition or subtraction. Examples: • 56 + 38 is treated as 56 + 40 and then 2 is subtracted to compensate. • 27 × 19 is treated as 27 × 20 and then 27 (i.e. 27 × 1) is subtracted to compensate. • 67 − 39 is treated as 67 − 40 and then 1 is added to compensate.
complement (in addition) (KS2)	In addition, a number and its complement have a given total. Example: When considering complements in 100, 67 has the complement 33, since 67 + 33 = 100
composite shape (KS1)	A shape formed by combining two or more shapes. 
concrete objects (KS1)	Objects that can be handled and manipulated to support understanding of the structure of a mathematical concept. Materials such as Dienes (Base 10 materials), Cuisenaire, Numicon, pattern blocks are all examples of concrete objects.
cone (KS1)	A cone is a 3-dimensionsl shape consisting of a circular base, a vertex in a different plane, and line segments joining all the points on the circle to the vertex. If the vertex A lies directly above the centre O of the base, then the axis of the cone AO is perpendicular to the base and the shape is a right circular cone. 

conjecture (KS1)	An educated guess (or otherwise!) of a particular result, which is as yet unverified.
consecutive (KS1)	Following in order. Consecutive numbers are adjacent in a count. Examples: 5, 6, 7 are consecutive numbers. 25, 30, 35 are consecutive multiples of 5 multiples of 5. In a polygon, consecutive sides share a common vertex and consecutive angles share a common side.
continuous data (KS1)	Data arising from measurements taken on a continuous variable (examples: lengths of caterpillars; weight of crisp packets). Continuous data may be grouped into touching but non-overlapping categories. (Example height of pupils [x cm] can be grouped into $130 \le x < 140$; $140 \le x < 150$ etc.) Compare with discrete data.
convert (KS2)	Changing from one quantity or measurement to another. E.g. from litres to gallons or from centimetres to millimetres etc.
coordinate (KS2)	In geometry, a coordinate system is a system which uses one or more numbers, or coordinates, to uniquely determine the position of a point in space. See cartesian coordinate system.
corner (KS1)	In elementary geometry, a point where two or more lines or line segments meet. More correctly called vertex, vertices (plural). Examples: a rectangle has four corners or vertices; and a cube has eight corners or vertices.
correspondence problems (KS2)	Correspondence problems are those in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).
count (verb) (KS1)	The act of assigning one number name to each of a set of objects (or sounds or movements) in order to determine how many objects there are. In order to count reliably children need to be able to: • Understand that the number words come in a fixed order • Say the numbers in the correct sequence; • Organise their counting (e.g. say one number for each object and keep track of which things they have counted); • Understand that the final word in the count gives the total • Understand that the last number of the count remains unchanged irrespective of the order (conservation of number)
counter example (KS1)	Where a hypothesis or general statement is offered, an example that clearly disproves it.
cross-section (KS2)	In geometry, a section in which the plane that cuts a figure is at right angles to an axis of the figure. Example: In a cube, a square revealed when a plane cuts at right angles to a face. 

cube (KS1/2)	In geometry, a three-dimensional figure with six identical, square faces. Adjoining edges and faces are at right angles. In number and algebra, the result of multiplying to power of three, n3 is read as ‘n cubed’ or ‘n to the power of three’ Example: Written 23, the cube of 2 is (2 x 2 x 2) = 8.
cube number (KS2)	A number that can be expressed as the product of three equal integers. Example: 27 = 3 × 3 × 3. Consequently, 27 is a cube number; it . It is the cube of 3 or 3 cubed. This is written compactly as 27 = 33, using index, or power, notation.
cubic centimetre (KS2)	Symbol: cm3. A unit of volume. The three-dimensional space equivalent to a cube with edge length 1cm.
cubic (KS3)	A mathematical expression of degree three; the highest total power that appears in this expression is power 3.. Examples: a cubic polynomial is one of the type ax3 + bx2 + cx + d; x2y is an expression of degree 3.
cubic curve (KS3)	A curve with an algebraic equation of degree three.
cubic metre (KS2)	Symbol: m3. A unit of volume. A three-dimensional space equivalent to a cube of edge length 1m.
cuboid (KS1)	A three-dimensional figure with six rectangular faces.
curved surface (KS2)	The curved boundary of a 3-D solid, for example; the curved surface of a cylinder between the two circular ends, or the curved surface of a cone between its circular base and its vertex, or the surface of a sphere.
cylinder (KS1)	A three-dimensional object whose uniform cross-section is a circle. A right cylinder can be defined as having circular bases with a curved surface joining them, this surface formed by line segments joining corresponding points on the circles. The centre of one base lies over the centre of the second.
2-D; 3-D (KS1)	Short for 2-dimensional and 3-dimensional. A figure is two-dimensional if it lies in a plane. A solid is three-dimensional and occupies space (in more than one plane). A plane is specified by ordered pairs of numbers called coordinates, typically (x,y). Points in 3-dimensional space are specified by an ordered triple of numbers, typically (x, y, z).
data (KS1)	Information of a quantitative nature consisting of counts or measurements. Initially data are nearly always counts or things like percentages derived from counts. When they refer to measurements that are separate and can be counted, the data are discrete. When they refer to quantities such as length or capacity that are measured, the data are continuous. Singular: datum.
database	A means of storing sets of data.

decimal (KS2)	Relating to the base ten. Most commonly used synonymously with decimal fractions where the number of tenths, hundredth, thousandths, etc. are represented as digits following a decimal point. The decimal point is placed at the right of the ones column. Each column after the decimal point is a decimal place. Example: The decimal fraction 0.275 is said to have three decimal places. The system of recording with a decimal point is decimal notation. Where a number is rounded to a required number of decimal places, to 2 decimal places for example, this may be recorded as 2 d.p.
decimal fraction (KS2)	Tenths, hundredths, thousandths etc represented by digits following a decimal point. Example 0.125 is equivalent to 1/10 + 2/100 + 5/1000 or 1/8 The decimal fraction representing 1/8 is a terminating decimal fraction since it has a finite number of decimal places. Other fractions such as 1/3 produce recurring decimal fractions. These have a digit or group of digits that is repeated indefinitely. In recording such decimal fractions a dot is written over the single digit, or the first and last digits of the group, that is repeated.
decimal system (KS2)	The common system of numbering based upon powers of ten; Example: 152.34 is another way of writing 1 × 102 + 5 × 101 + 2 × 100 + 3 × 10−1 + 4 × 10−2.
decomposition (KS2)	See subtraction by decomposition.
deductive reasoning (KS2)	Deduction is typical mathematical reasoning where the conclusion follows necessarily from a set of premises (as far as the curriculum goes these are the rules of arithmetic and their generalisation in algebra, and the rules relating to lines, angles, triangles, circles etc. in geometry); if the premises are true then following deductive rules the conclusion must also be true.
degree (KS2)	The most common unit of measurement for angle. One whole turn is equal to 360 degrees, written 360o See angle
degree of accuracy (KS2)	A measure of the precision of a calculation, or the representation of a quantity. A number may be recorded as accurate to a given number of decimal places, or rounded to the nearest integer, or to so many significant figures.
denomination (currency) (KS1)	The face value of coins. In the smallest denomination of UK currency (known as Sterling) is 1p and the largest denomination of currency is a £50 note.
denominator (KS2)	In the notation of common fractions, the number written below the line i.e. the divisor. Example: In the fraction ⅔ the denominator is 3.
density (KS3)	A measure of mass per unit volume, which is calculated as total mass ÷ total volume. If mass is measured in kilograms and volume is measured in cubic metres then density is measured in the compound units of kg m−3 or kg/m3

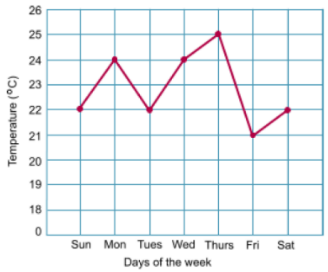
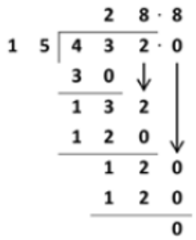
describe (KS1)	When the curriculum asks pupils to 'describe' a mathematical object, transformation or the features of a graph, or anything else of a mathematical nature, it is asking pupils to refine their skills to hone in on the essential mathematical features and to describe these as accurately and as succinctly as possible. By KS3 pupils are expected to develop this skill to a good degree. **In mathematics (as distinct from its everyday meaning), difference means the numerical.**
diagonal (of a polygon) (KS2)	A line segment joining any two non-adjacent vertices of a polygon.  The line AB is one diagonal of this polygon.
diagram (KS1)	A picture, a geometric figure or a representation.
diameter (KS2)	Any of the chords of a circle or sphere that pass through the centre.
Difference (KS1)	In mathematics (as distinct from its everyday meaning), difference means the numerical difference between two numbers or sets of objects and is found by comparing the quantity of one set of objects with another. e.g. the difference between 12 and 5 is 7; 12 is 5 more than 7 or 7 is 5 fewer than 12. Difference is one way of thinking about subtraction and can, in some circumstances, be a more helpful image for subtraction than 'take-away' – e.g. 102 - 98
digit (KS1)	One of the symbols of a number system most commonly the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. Examples: the number 29 is a 2-digit number; there are three digits in 2.95. The position or place of a digit in a number conveys its value.
digital clock (KS1)	A clock that displays the time as hours and minutes passed, usually since midnight. Example: four thirty in the afternoon is displayed as 16:30.
directed number (KS1)	A number having a direction as well as a size e.g. -7, +10, etc. Such numbers can be usefully represented on a number line extending in both directions from zero.
direction (KS1)	The orientation of a line in space. e.g. north, south, east, west; up, down, right, left are directions.
Dissection (KS2)	To cut into parts.

distance between (KS2)	A measure of the separation of two points. Example: A is 5 miles from B
distributive (KS2)	One binary operation ∗ on a set S is distributive over another binary operation • on that set if a ∗ (b • c) = (a ∗ b) • (a ∗ c) for all a, b and c ∈ S. For the set of real numbers, multiplication is distributive over addition and subtraction since a(b + c) = ab + ac for all a, b and c real numbers. (Addition, subtraction and division are not distributive over other number operations)
divide (KS1)	To carry out the operation of division.
dividend (KS1)	In division, the number that is divided. E.g. in 15 ÷ 3, 15 is the dividend See also Addend, subtrahend and multiplicand.
divisibility (KS2)	The property of being divisible by a given number. Example: A test of divisibility by 9 checks if a number can be divided by 9 with no remainder.
divisible (by) (KS2)	A whole number is divisible by another if there is no remainder after division and the result is a whole number. Example: 63 is divisible by 7 because 63 ÷ 7 = 9 remainder 0. However, 63 is not divisible by 8 because 63 ÷ 8 = 7.875 or 7 remainder 7.
division (KS1)	1. An operation on numbers interpreted in a number of ways. Division can be sharing – the number to be divided is shared equally into the stated number of parts; or grouping – the number of groups of a given size is found. Division is the inverse operation to multiplication. 2. On a scale, one part. Example: Each division on a ruler might represent a millimetre.
divisor (KS2)	The number by which another is divided. Example: In the calculation 30 ÷ 6 = 5, the divisor is 6. In this example, 30 is the dividend and 5 is the quotient.
dodecahedron (KS2)	A polyhedron with twelve faces. The faces of a regular dodecahedron are regular pentagons. A dodecahedron has 20 vertices and 30 edges.
double (KS1)	1. To multiply by 2. Example: Double 13 is (13 × 2) = 26. 2. The number or quantity that is twice another. Example: 26 is double 13. In this context, a ‘near double’ is one away from a double. Example: 27 is a near double of 13 and of 14. (N.B. spotting near doubles can be a useful mental calculation strategy e.g. seeing 25 + 27 as 2 more than double 25.
edge (KS1)	A line segment, joining two vertices of a figure. A line segment formed by the intersection of two plane surfaces. Examples: a square has four edges; and a cuboid has twelve edges.
efficient methods (KS2)	A means of calculation (which can be mental or written) that achieves a correct answer with as few steps as possible. In written calculations this often involves setting out calculations in a columnar layout. If a calculator is used the most efficient method uses as few key entries as possible.
equal (KS1)	Symbol: =, read as ‘is equal to’ or ‘equals’. and meaning ‘having the same value as’. Example: 7 – 2 = 4 + 1 since both expressions, 7 – 2 and 4 + 1 have the same value, 5.

equilateral (KS2)	Of equal length - e.g. an equilateral triangle is a triangle with all 3 sides of equal length.
estimate (KS2)	1. Verb: To arrive at a rough or approximate answer by calculating with suitable approximations for terms or, in measurement, by using previous experience. 2. Noun: A rough or approximate answer.
evaluate (KS2)	Find the value of a numerical or an algebraic expression. Examples: Evaluate 28 ÷ 4 by calculating, 28 ÷ 4 = 7 Evaluate x2 – 3 when x = 2 by substituting this value for x and calculating,22 – 3 = (2 × 2) – 3 = 4 – 3 = 1
exchange (KS2)	Change a number or expression for another of equal value. The process of exchange is used in some standard compact methods of calculation. Examples: 'carrying figures' in addition, multiplication or division; and 'decomposition' in subtraction.
expression (KS2)	A mathematical form expressed symbolically. Examples: 7 + 3; a2 + b2.
face (KS1)	One of the flat surfaces of a solid shape. Example: a cube has six faces; each face being a square
factor (KS2)	When a number, or polynomial in algebra, can be expressed as the product of two numbers or polynomials, these are factors of the first. Examples: 1, 2, 3, 4, 6 and 12 are all factors of 12 because 12 = 1 × 12 = 2 × 6 = 3 × 4: (x – 1) and (x + 4) are factors of (x2 + 3x − 4) because (x – 1)(x + 4) = (x2 + 3x – 4)
factorise (KS2)	To express a number or a polynomial as the product of its factors. Examples: Factorising 12: 12 = 1 × 12 = 2 × 6 = 3 × 4 The factors of 12 are 1, 2, 3, 4, 6 and 12. 12 may be expressed as a product of its prime factors: 12 = 2 × 2 × 3 Factorising x2 – 4x – 21: x2 – 4x – 21 = (x + 3) (x – 7) The factors of x2 – 4x – 21 are (x + 3) and (x – 7)
facts (KS1)	i.e. Multiplication / division/ addition/ subtraction facts. The word 'fact' is related to the four operations and the instant recall of knowledge about the composition of a number. i.e. an addition fact for 20 could be 10+10; a subtraction fact for 20 could be 20-9=11. A multiplication fact for 20 could be 4 x 5 and a division fact for 20 could be 20÷5 = 4.
fluency (KS1)	To be mathematically fluent one must have a mix of conceptual understanding, procedural fluency and knowledge of facts to enable you to tackle problems appropriate to your stage of development confidently, accurately and efficiently.
foot (KS2)	Symbol: ft. An imperial measure of length. 1 foot = 12 inches. 3 feet = 1 yard. 1 foot is approximately 30 cm.

formal written methods (KS2)	Setting out working in columnar form. In multiplication, the formal methods are called short or long multiplication depending on the size of the numbers involved. Similarly, in division the formal processes are called short or long division. See Mathematics Appendix 1 in the 2013 National Curriculum.
formula (KS2)	An equation linking sets of physical variables. e.g. A=πr2 is the formula for the area of a circle. Plural: formulae.
(the) four operations	Common shorthand for the four arithmetic operations of addition, subtraction, multiplication and division.
fraction (KS1)	The result of dividing one integer by a second integer, which must be non- zero. The dividend is the numerator and the non-zero divisor is the denominator. See also common fraction, decimal fraction, equivalent fraction, improper fraction, proper fraction, simple fraction, unit fraction and vulgar fraction.
Frequency (KS1)	The number of times an event occurs; or the number of individuals (people, animals etc.) with some specific property.
gallon (KS2)	Symbol: gal. An imperial measure of volume or capacity, equal to the volume occupied by ten pounds of distilled water. In the imperial system, 1 gallon = 4 quarts = 8 pints. One gallon is just over 4.5 litres.
general statement (KS1)	A statement that applies correctly to all relevant cases. e.g. the sum of two odd numbers is an even number.
generalise (KS1)	To formulate a general statement or rule.
geometrical (KS1)	Relating to geometry, the aspect of mathematics concerned with the properties of space and figures or shapes in space.
gram (KS1)	Symbol: g. The unit of mass equal to one thousandth of a kilogram.
graph (KS2)	A diagram showing a relationship between variables. Adjective: graphical.
grid (KS2)	A lattice created with two sets of parallel lines. Lines in each set are usually equally spaced. If the sets of lines are at right angles and lines in both sets are equally spaced, a square grid is created.
heptagon (KS2)	A polygon with seven sides and seven edges.
hexagon (KS2)	A polygon with six sides and six edges. Adjective: hexagonal, having the form of a hexagon
horizontal (KS2)	Parallel to the horizon.
hour (KS1)	A unit of time. One twenty-fourth of a day. 1 hour = 60 minutes = 3600 (60 x 60) seconds.
hundred square (KS1)	A 10 by 10 square grid numbered 1 to 100. A similar grid could be numbered as a 0 – 99 grid.
icosahedron (KS2)	A polyhedron with 20 faces. In a regular Icosahedron all faces are equilateral triangles.

imperial unit (KS2)	A unit of measurement historically used in the United Kingdom and other English speaking countries. Units include inch, foot, yard, mile, acre, ounce, pound, stone, hundredweight, ton, pint, quart and gallon. Now largely replaced by metric units.
improper fraction (KS2)	An improper fraction has a numerator that is greater than its denominator. Example: 9/4 is improper and could be expressed as the mixed number 2¼
inch (KS2)	Symbol: in. An imperial unit of length. 12 inches = 1 foot. 36 inches = 1 yard. Unit of area is square inch, in2. Unit of volume is cubic inch, in3. 1 inch is approximately 2.54 cm.
index notation (KS2)	The notation in which a product such as a × a × a × a is recorded as a4. In this example the number 4 is called the index (plural indices) and the number represented by a is called the base. See also standard index form
Inequality (KS1)	When one number, or quantity, is not equal to another. Statements such as a ≠ b, a<b, a ≤, b, a > b or a≥b are inequalities. The inequality signs in use are: ≠ means ‘not equal to’; A ≠ B means ‘A is not equal to B” < means ‘less than’; A < B means ‘A is less than B’ > means ‘greater than’; A > B means ‘A is greater than B’ ≤ means ‘less than or equal to’; A ≤ B means ‘A is less than or equal to B’ ≥ means ‘greater than or equal to’; A ≥ B means ‘A is greater than or equal to B’
infinite (KS1)	Of a number, always bigger than any (finite) number that can be thought of. Of a sequence or set, going on forever. The set of integers is an infinite set.
interpret (KS2)	Draw out the key mathematical features of a graph, or a chain of reasoning, or a mathematical model, or the solutions of an equation, etc.
interval [0,1] (KS2)	All possible points in the closed continuous interval between 0 and 1 on the real number line, including the end points zero and 1.
inverse operations (KS1)	Operations that, when they are combined, leave the entity on which they operate unchanged. Examples: addition and subtraction are inverse operations e.g. 5 + 6 – 6 = 5. Multiplication and division are inverse operations e.g. 6 × 10 ÷ 10 = 6. Squaring and taking the square root are inverse to each other: √x2 = (√x)2 = x; similarly with cube and cube root, and any integer power n and nth root. Some operations, such as reflection in the x-axis, or ‘subtract from 10’ are self-inverse i.e. they are inverses of themselves
kilo- (KS2)	Prefix denoting one thousand
kilogram (KS2)	Symbol: kg. The base unit of mass in the SI (Système International d’Unités). 1kg. = 1000g.
kilometre (KS2)	Symbol: km. A unit of length in the SI (Système International d’Unités). The base unit of length in the system is the metre. 1km. = 1000m.

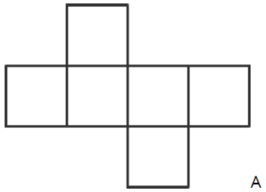
kite (KS1)	A quadrilateral with two pairs of equal, adjacent sides whose diagonals consequently intersect at right angles.
length (KS1)	The extent of a line segment between two points. Length is independent of the orientation of the line segment
level of accuracy (KS2)	Often in reference to the number of significant figures with which a numerical quantity is recorded, and made more precise by stating the range of possible error. The degree of precision in the measurement of a quantity.
Line (KS1)	A set of adjacent points that has length but no width. A straight line is completely determined by two of its points, say A and B. The part of the line between any two of its points is a line segment.
Line graph	A graph in which adjacent points are joined by straight-line segments. Such a graph is better seen as giving a quick pictorial visualisation of variation between points rather than an accurate mathematical description of the variation between points. 
Litre (KS1)	Symbol: l. A metric unit used for measuring volume or capacity. A litre is equivalent to 1000 cm3.
long division (KS2)	A columnar algorithm for division by more than a single digit, most easily described with an example: 432 ÷ 15 becomes  Answer: 28·8 Why should one do division this way, when it can be done much more easily using a calculator? There are two reasons: (a) it helps to understand the process and can easily be generalised to algebraic division; (b) calculators may go wrong, or may not be available, so the result has to be calculated 'by hand'.

long multiplication (KS2)	A columnar algorithm for performing multiplication by more than a single digit, again best illustrated by an example:
	(Example taken from Appendix 1 of the Primary National Curriculum for Mathematics)
	
	124 × 26 becomes
	  1 2
	  1 2 4
	× 2 6
	  7 4 4
	2 4 8 0
	3 2 2 4
	1 1
	Answer: 3224
	
	Why should one do multiplication this way, when it can be done much more easily using a calculator? There are two reasons:
	(a) it helps to understand the process and can easily be generalised to algebraic multiplication;
	(b) calculators may go wrong, or may not be available, so the result has to be calculated 'by hand'.

mass (KS1)	A characteristic of a body, relating to the amount of matter within it. Mass differs from weight, the force with which a body is attracted towards the earth's centre. Whereas, under certain conditions, a body can become weightless, mass is constant. In a constant gravitational field weight is proportional to mass.
maximum value (in a non-calculus sense) (KS1)	The greatest value. Example: The maximum temperature in London yesterday was 18oC.
mean (KS2)	Often used synonymously with average. The mean (sometimes referred to as the arithmetic mean) of a set of discrete data is the sum of quantities divided by the number of quantities. Example: The arithmetic mean of 5, 6, 14, 15 and 45 is (5 + 6 + 14 + 15 + 45) ÷ 5 i.e. 17. More correctly called the arithmetic mean, as there are also other means in mathematics. See mode and median.
measure (KS1)	1. The size in terms of an agreed unit. See also compound measure. 2. Measure is also used as a verb, to find the size.
measuring tools (KS1)	These record numerical quantities of continuous variables, often by comparison with scaled calibrations on the device that is used, or using digital technology. For example, a ruler measures length, a protractor measures angles, a thermometer measures temperature; weighing scales measure mass, a stop watch measures time duration, measuring vessels to measure capacity, and so on.
mensuration (KS2)	In the context of geometric figures, the process of measuring or calculating angles, lengths, areas and volumes.
mental calculation (KS1)	Referring to calculations that are largely carried out mentally but may be supported with a few simple written jottings.
metre (KS2)	Symbol: m. The base unit of length in SI (Système International d'Unités).

metric unit (KS2)	Unit of measurement in the metric system. Metric units include metre, centimetre, millimetre, kilometre, gram, kilogram, litre and millilitre.
milli– (KS2)	Prefix. One-thousandth.
millilitre (KS2)	Symbol: ml. One thousandth of a litre.
millimetre (KS2)	Symbol: mm. One thousandth of a metre.
minimum value (in a non-calculus sense) (KS1)	The least value. Example: The expected minimum temperature overnight is 6oC.
minus (KS1)	A name for the symbol −, representing the operation of subtraction.
minute (KS1)	Unit of time. One-sixtieth of an hour. 1 minute = 60 seconds
missing number problems (KS1)	A problem of the type 7 = ☐ − 9 often used as an introduction to algebra.
mixed fraction (KS2)	A whole number and a fractional part expressed as a common fraction. Example: 1⅓ is a mixed fraction. Also known as a mixed number.
mixed number (KS2)	A whole number and a fractional part expressed as a common fraction. Example: 2 ¼ is a mixed number. Also known as a mixed fraction.
multiple (KS1)	For any integers a and b, a is a multiple of b if a third integer c exists so that a = bc Example: 14, 49 and 70 are all multiples of 7 because 14 = 7 x 2, 49 = 7 x 7 and 70 = 7 x 10.. -21 is also a multiple of 7 since -21 = 7 ×-3.
multiplicand (KS1)	A number to be multiplied by another. e.g. in 5 × 3, 5 is the multiplicand as it is the number to be multiplied by 3. See also Addend, subtrahend and dividend.
multiplication (KS1)	Multiplication (often denoted by the symbol "×") is the mathematical operation of scaling one number by another. It is one of the four binary operations in arithmetic (the others being addition, subtraction and division). Because the result of scaling by whole numbers can be thought of as consisting of some number of copies of the original, whole-number products greater than 1 can be computed by repeated addition; for example, 3 multiplied by 4 (often said as "3 times 4") can be calculated by adding 4 copies of 3 together: 3 x 4 = 3 + 3 + 3 + 3 = 12 Here 3 and 4 are the "factors" and 12 is the "product". Multiplication is the inverse operation of division, and it follows that 7 ÷ 5 × 5 = 7 Multiplication is commutative, associative and distributive over addition or subtraction.

<table>
<tr><td>multiple (KS1)</td><td>For any integers a and b, a is a multiple of b if a third integer c exists so that a = bc
Example: 14, 49 and 70 are all multiples of 7 because 14 = 7 x 2, 49 = 7 x 7 and 70 = 7 x 10.. -21 is also a multiple of 7 since -21 = 7 ×-3.</td></tr>
<tr><td>multiplication table (KS1)</td><td>An array setting out sets of numbers that multiply together to form the entries in the array, for example
<table>
<tr><td>Multipliers</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>1</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>2</td><td>2</td><td>4</td><td>6</td></tr>
<tr><td>3</td><td>3</td><td>6</td><td>9</td></tr>
<tr><td>4</td><td>4</td><td>8</td><td>12</td></tr>
<tr><td>5</td><td>5</td><td>10</td><td>15</td></tr>
<tr><td>6</td><td>6</td><td>12</td><td>18</td></tr>
<tr><td>7</td><td>7</td><td>14</td><td>21</td></tr>
</table></td></tr>
<tr><td>multiplicative reasoning (KS2)</td><td>Multiplicative thinking is indicated by a capacity to work flexibly with the concepts, strategies and representations of multiplication (and division) as they occur in a wide range of contexts.
For example, from this: 3 bags of sweets, 8 sweets in each bag. How many sweets?
To this and beyond:
Julie bought a dress in a sale for £49.95 after it was reduced by 30%. How much would she have paid before the sale?</td></tr>
<tr><td>multiply (KS1)</td><td>Carry out the process of multiplication.</td></tr>
<tr><td>natural number (KS2)</td><td>The counting numbers 1, 2, 3, … etc. The positive integers. The set of natural numbers is usually denoted by N.</td></tr>
<tr><td>near double (KS2)</td><td>See double.</td></tr>
<tr><td>negative integer (KS2)</td><td>An integer less than 0. Examples: -1, -2, -3 etc.</td></tr>
<tr><td>negative number (KS2)</td><td>1. A number less than zero. Example: − 0.25. Where a point on a line is labelled 0 negative numbers are all those to the left of the zero on a horizontal numberline.
2. Commonly read aloud as ‘minus or negative one, minus or negative two’ etc. the use of the word ‘negative’ often used in preference to ‘minus’ to distinguish the numbers from operations upon them.
3. See also directed number and positive number.</td></tr>
</table>

net (KS2)	1. A plane figure composed of polygons which by folding and joining can form a polyhedron.  A net of a cube 2. Remaining after deductions. Examples: The net profit is the profit after deducting all operating costs. The net weight is the weight after deducting the weight of all packaging.
notation (KS1)	A convention for recording mathematical ideas. Examples: Money is recorded using decimal notation e.g. £2.50 Other examples of mathematical notation include a + a = 2a, y = f(x) and n × n × n = n3 ,
number bond (KS1)	A pair of numbers with a particular total e.g. number bonds for ten are all pairs of whole numbers with the total 10.
number line (KS1)	A line where numbers are represented by points upon it.
number sentence (KS1)	A mathematical sentence involving numbers. Examples: 3 + 6 = 9 and 9 > 3
number square (KS1)	A square grid in which cells are numbered in order.
number track (KS1)	A numbered track along which counters might be moved. The number in a region represents the number of single moves from the start.
numeral (KS1)	A symbol used to denote a number. The Roman numerals I, V, X, L, C, D and M represent the numbers one, five, ten, fifty, one hundred, five hundred and one thousand. The Arabic numerals 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are used in the Hindu-Arabic system giving numbers in the form that is widely used today.
numerator (KS2)	In the notation of common fractions, the number written on the top – the dividend (the part that is divided). In the fraction ⅔, the numerator is 2.
oblong (KS1)	Sometimes used to describe a non-square rectangle – i.e. a rectangle where one dimension is greater than the other
octagon (KS1)	A polygon with eight sides. Adjective: octagonal, having the form of an octagon.
octahedron (KS2)	A polyhedron with eight faces. A regular octahedron has faces that are equilateral triangles.

odd number (KS2)	An integer that has a remainder of 1 when divided by 2.
operation (KS1)	See binary operation
operator (KS2)	A mathematical action: In the lower key stages ‘half of’, ‘quarter of’, ‘fraction of’, ‘percentage of ‘ are considered as operations. In more advanced mathematics there are very many operators that can be defined, for example a ‘linear transformation’ or a ‘differential operator’.
order of operation (KS2)	This refers to the order in which different mathematical operations are applied in a calculation. Without an agreed order an expression such as 2 + 3 × 4 could have two possible values: 5 × 4 = 20 (if the operation of addition is applied first) 2 + 12 = 14 (if the operation of multiplication is applied first) The agreed order of operations is that: • Powers or indices take precedent over multiplication or division – 2 × 32 = 18 not 25; • Multiplication or division takes precedent over addition and subtraction – 2 + 3 × 4 = 14 not 20 • If brackets are present, the operation contained therein always takes precedent over all others – (2 + 3) × 4 = 20 This convention is often encapsulated in the mnemonic BODMAS or BIDMAS: Brackets Orders / Indices (powers) Division & Multiplication Addition & Subtraction
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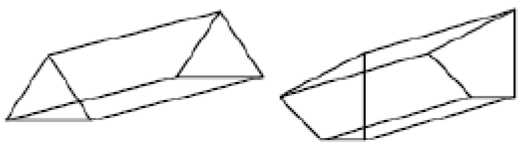
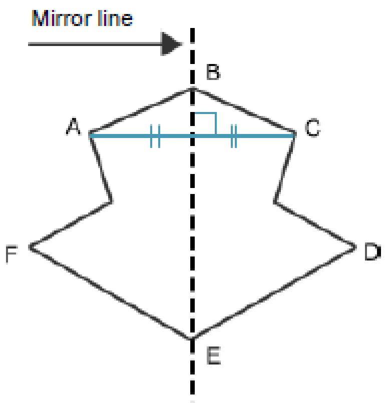
ordinal number (KS1)	A term that describes a position within an ordered set. Example: first, second, third, fourth … twentieth etc
origin (KS2)	A fixed point from which measurements are taken. See also Cartesian coordinate system.
ounce (KS2)	Symbol: oz. An imperial unit of mass. In the imperial system, 16 ounces = 1 pound. 1 ounce is just over 28 grams.
parallel (KS2)	In Euclidean geometry, always equidistant. Parallel lines, curves and planes never meet however far they are produced or extended.
Parallelogram (KS2)	A quadrilateral whose opposite sides are parallel and consequently equal in length.
partition (KS1)	1. To separate a set into subsets. 2. To split a number into component parts. Example: the two-digit number 38 can be partitioned into 30 + 8 or 19 + 19. 3. A model of division. Example: 21 ÷ 7 is treated as ‘how many sevens in 21?’
pattern (KS1)	A systematic arrangement of numbers, shapes or other elements according to a rule.
pentagon (KS1)	A polygon with five sides and five interior angles. Adjective: pentagonal, having the form of a pentagon.
percentage (KS2)	1. A fraction expressed as the number of parts per hundred and recorded using the notation %. Example: One half can be expressed as 50%; the whole can be expressed as 100% 2. Percentage can also be interpreted as the operator ‘a number of hundredths of’. Example: 15% of Y means 15/100 × Y Frequently, it is necessary to calculate a percentage increase, or a percentage decrease. Sometimes, given the result of an increase or decrease the original whole has to calculated.

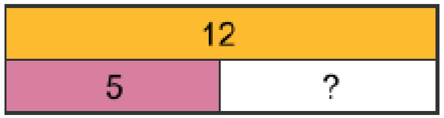
percentage continued (KS2)	Example 1: A salary of £24000 is increased by 5%; find the new salary. Calculation is £2400 × (1.05) = £25200 (note: 1.05 = 1 + 5/100) Example 2: The city population of 5 500 000 decreased by 13% over the last five years so that the present population is 5500000 × (0.87) = 4 785 000 (note: 1 – 13/100 = 0.87) Example 3: A sale item is on sale at £560 after a reduction of 20%, what was its original price? The calculation is: original price × 0.8 = £560. So, original price = £560/0.8 (since division is inverse to multiplication) = £700.
perimeter (KS2)	The length of the boundary of a closed figure.
pictogram (KS1)	A format for representing statistical information. Suitable pictures, symbols or icons are used to represent objects. For large numbers one symbol may represent a number of objects and a part symbol then represents a rough proportion of the number.
pictorial representations (KS1)	Pictorial representations enable learners to use pictures and images to represent the structure of a mathematical concept. The pictorial representation may build on the familiarity with concrete objects. E.g. a square to represent a Dienes ‘flat’ (representation of the number 100). Pupils may interpret pictorial representations provided to them or create a pictorial representation themselves to help solve a mathematical problem.
pie-chart (KS2)	Also known as pie graph. A form of presentation of statistical information. Within a circle, sectors like ‘slices of a pie’ represent the quantities involved. The frequency or amount of each quantity is proportional to the angle at the centre of the circle.
pint (KS2)	An imperial measure of volume applied to liquids or capacity. In the imperial system, 8 pints = 4 quarts = 1 gallon. 1 pint is just over 0.5 litres.
place holder (KS2)	In decimal notation, the zero numeral is used as a place holder to denote the absence of a particular power of 10. Example: The number 105.07 is a shorthand for 1 × 102 + 0 × 101 + 5 × 100 + 0 × 10−1 + 7 × 10−2 .
place value (KS1)	The value of a digit that relates to its position or place in a number. Example: in 1482 the digits represent 1 thousand, 4 hundreds, 8 tens and 2 ones respectively; in 12.34 the digits represent 1 ten, 2 ones, 3 tenths and 4 hundredths respectively.
plot (KS2)	The process of marking points. Points are usually defined by coordinates and plotted with reference to a given coordinate system.
plus (KS1)	A name for the symbol +, representing the operation of addition.
point (KS2)	An element, in geometry, that has position but no magnitude.
polygon (KS1)	A closed plane figure bounded by straight lines. The name derives from many angles. If all interior angles are less than 180° the polygon is convex. If any interior angle is greater than 180°, the polygon is concave. If the sides are all of equal length and the angles are all of equal size, then the polygon is regular; otherwise, it is irregular. Adjective: polygonal.

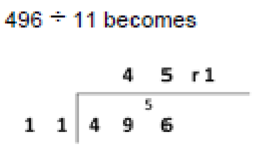
positive number (KS2)	A number greater than zero. Where a point on a line is labelled 0 positive numbers are all those to the left of the zero and are read 'positive one, positive two, positive three' etc. See also directed number and negative number.
position (KS1)	Location as specified by a set of coordinates in a plane or in full 3-dimensional space. On the large scale, location on the earth is specified by latitude and longitude coordinates.
pound (mass) (KS2)	Symbol: lb. An imperial unit of mass. In the imperial system, 14 lb = 1 stone. 1 lb is approximately 455 grams. 1 kilogram is approximately 2.2 lb.
pound sterling (money) (KS1)	Symbol £. A unit of money. £1.00 = 100 pence. £1 is commonly called a pound.
power (of ten) (KS2)	1. 100 (i.e. 102 or 10 x 10) is the second power of 10, 1000 (i.e.103 or 10 x 10 x 10) is the third power of 10 etc. Powers of other numbers are defined in the same way. Example: 2 (21), 4 (22), 8 (23), 16 (24) etc are powers of 2. 2. A fractional power represents a root. Example: x½ = √x 3. A negative power represents the reciprocal. Example: x−1 = 1/x 4. By convention any number or variable to the power 0 equals 1. i.e. x0 = 1
prime factor (KS2)	The factors of a number that are prime. Example: 2 and 3 are the prime factors of 12 (12 = 2 x 2 x 3). See also factor.
prime number (KS2)	A whole number greater than 1 that has exactly two factors, itself and 1. Examples: 2 (factors 2, 1), 3 (factors 3, 1). 51 is not prime (factors 51, 17, 3, 1).
priority of operations (KS2)	Generally, multiplication and division are done before addition and subtraction, but this can be ambiguous, so brackets are used to indicate calculations that must be done before the remainder of the operations are carried out. See order of operation
prism (KS1)	A solid bounded by two congruent polygons that are parallel (the bases) and parallelograms (lateral faces) formed by joining the corresponding vertices of the polygons. Prisms are named according to the base e.g. triangular prism, quadrangular prism, pentagonal prism etc. Examples:  If the lateral faces are rectangular and perpendicular to the bases, the prism is a right prism.
product (KS1)	The result of multiplying one number by another. Example: The product of 2 and 3 is 6 since 2 × 3 = 6.

proof (KS2/3)	Using mathematical reasoning in a series of logical steps to show that if one mathematical statement is true then another that follows from it must be true. There are many forms of proof in mathematics, and some proofs are extremely complicated. Mathematics develops by using proof to develop evermore results that are true if certain basic axioms are accepted. Proof is fundamental to mathematics; it is important to be able to say that a result is true beyond any shadow of doubt. This power is unique to mathematics; no other discipline can do this. Example: Proof that the square of every even number is divisible by 4 Any even number by definition is divisible by 2, which means that every even number can be written as a multiple of 2. In symbols, this means that any even number has the form 2n, where n is some integer. Thus the square of this number is (2n) × (2n) and using the fact that multiplication is commutative this can be written as 2 × 2 × n × n = 4 × n2 = 4n2 This is a multiple of 4 and so is divisible by 4.
proper fraction (KS2)	A proper fraction has a numerator that is less than its denominator So ¾ is a proper fraction, whereas 4/3 is an improper fraction (i.e. not proper).
property (KS1)	Any attribute. Example: One property of a square is that all its sides are equal.
proportion (KS2/3)	1. A part to whole comparison. Example: Where £20 is shared between two people in the ratio 3 : 5, the first receives £7.50 which is 3/8 of the whole £20. This is his proportion of the whole. 2. If two variables x and y are related by an equation of the form y = kx, then y is directly proportional to x; it may also be said that y varies directly as x. When y is plotted against x this produces a straight line graph through the origin. 3. If two variables x and y are related by an equation of the form xy = k, or equivalently y = k/x, where k is a constant and x ≠ 0, y ≠ 0 they vary in inverse proportion to each other
proportional reasoning (KS2)	Using the mathematics and vocabulary of ratio, proportion and hence fractions and percentages to solve problems.
Protractor (KS2)	An instrument for measuring angles.
Prove (KS2/3)	To formulate a chain of reasoning that establishes in conclusion the truth of a proposition. See proof.
pyramid (KS1)	A solid with a polygon as the base and one other vertex, the apex, in another plane. Each vertex of the base is joined to the apex by an edge. Other faces are triangles that meet at the apex. Pyramids are named according to the base: a triangular pyramid (which is also called a tetrahedron, having four faces), a square pyramid, a pentagonal pyramid etc.
quadrant (KS2)	One of the four regions into which a plane is divided by the x and y axes in the Cartesian coordinate system.
quadrilateral (KS1)	A polygon with four sides.
quantity (KS1)	Something that has a numerical value, for example: 5 bananas.
quarter turn (KS1)	A rotation through 90º, usually anticlockwise unless stated otherwise.

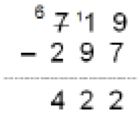
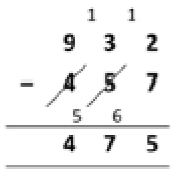
quotient (KS2)	The result of a division. Example: 46 ÷ 3 = 15⅓ and 15⅓ is the quotient of 46 by 3. Where the operation of division is applied to the set of integers, and the result expressed in integers, for example 46 ÷ 3 = 15 remainder 1 then 15 is the quotient of 46 by 3 and 1 is the remainder.
radius (KS2)	In relation to a circle, the distance from the centre to any point on the circle. Similarly, in relation to a sphere, the distance from the centre to any point on the sphere.
rate (KS2)	A measure of how quickly one quantity changes in comparison to another quantity. For example, speed is a measure of how distance travelled changes with time; the average speed of a moving object is the total distance travelled/ time taken to travel that distance. Acceleration is a measure of the rate at which the speed of a moving object changes as time passes. The rate of inflation is a measure of the change in the buying power of money over a given time period.
ratio (KS2)	A part to part comparison. The ratio of a to b is usually written a : b. Example: In a recipe for pastry fat and flour are mixed in the ratio 1 : 2 which means that the fat used has half the mass of the flour, that is amount of fat/amount of flour = ½. Thus ratios are equivalent to particular fractional parts.
ratio notation (KS2)	a : b can be changed into the unitary ratio 1 : b/a , or the unitary ratio a/b : 1. Any ratio is also unchanged if any common factors can be divided out.
rational number (KS2)	A number that is an integer or that can be expressed as a fraction whose numerator and denominator are integers, and whose denominator is not zero. Examples: − 1, ⅓, 3/5, 9, 235. Rational numbers, when expressed as decimals, are recurring decimals or finite (terminating) decimals. Numbers that are not rational are irrational. Irrational numbers include √5 and π which produce infinite, non-recurring decimals.
real numbers	A number that is rational or irrational. Real numbers are those generally used in everyday contexts, but in mathematics, or the physical sciences, or in engineering, or in electronics the number system is extended to include what are known as complex numbers. In school mathematics to key stage 4 all the mathematics deals with real numbers. Integers form a subset of the real numbers.
reciprocal (KS2)	The multiplicative inverse of any non-zero number. Any non-zero number multiplied by its reciprocal is equal to 1. In symbols $x \times 1/x = 1$, for all $x \neq 0$. Multiplying by 1/x is the same as dividing by x, and since division by zero is not defined zero has to be excluded from all other numbers that all have a reciprocal.
rectangle (KS1)	A parallelogram with an interior angle of 90°. Opposite sides are equal. If adjacent sides are also equal the rectangle is a square. If adjacent sides are not equal, the rectangle is sometimes referred to as an oblong. A square is a (special type) of rectangle but a rectangle is not a square. The use of the word 'oblong' (favoured by some) resolves this issue. An oblong is a rectangle which is not square.
rectilinear (KS2)	Bounded by straight lines. A closed rectilinear shape is also a polygon. A rectilinear shape can be divided into rectangles and triangles for the purpose of calculating its area.
recurring decimal (KS2)	A decimal fraction with an infinitely repeating digit or group of digits. Example: The fraction ⅓ is the decimal 0.33333 …, referred to as nought point three recurring and may be written as 0.3 (with a dot over the three). Where a block of numbers is repeated indefinitely, a dot is written over the first and last digit in the block e.g. 1/7 = $0.\dot{1}4285\dot{7}$

reflection (KS2)	In 2-D, a transformation of the whole plane involving a mirror line or axis of symmetry in the plane, such that the line segment joining a point to its image is perpendicular to the axis and has its midpoint on the axis. A 2-D reflection is specified by its mirror line.
Reflective symmetry (KS2)	A 2-D shape has reflection symmetry about a line if an identical-looking object in the same position is produced by reflection in that line. Example:  In the shape ABCDEF, the mirror line runs through B and E. The part shape BCDE is a reflection of BAFE. Point A reflects onto C and F onto D. The mirror line is the perpendicular bisector of AC and of FD.
regular (KS2)	1. Describing a polygon, having all sides equal and all internal angles equal. 2. Describing a tessellation, using only one kind of regular polygon. Examples: squares, equilateral triangles and regular hexagons all produce regular tessellations.
relation, relationship (KS1)	A common property of two or more items. An association between two or more items.
remainder (KS2)	In the context of division requiring a whole number answer (quotient), the amount remaining after the operation. Example: 29 divided by 7 = 4 remainder 1.
repeated addition (KS1)	The process of repeatedly adding the same number or amount. One model for multiplication. Example 5 + 5 + 5 + 5 = 5 x 4.
repeated subtraction (KS1)	The process of repeatedly subtracting the same number or amount. One model for division. Example 35 -5 - 5 - 5 - 5 - 5 - 5 - 5 = 0 so 35 ÷ 5 = 7 remainder 0.

representation (KS2)	The word 'representation' is used in the curriculum to refer to a particular form in which the mathematics is presented, so for example a quadratic function could be expressed algebraically or presented as a graph; a quadratic expression could be shown as two linear factors multiplied together or the multiplication could be expanded out; a probability distribution could be presented in a table or represented as a histogram, and so on. Very often, the use of an alternative representation can shed new light on a problem. An array is a useful representation for multiplication and division which helps to see the inverse relationship between the two. The Singapore Bar Model is a useful representation of for many numerical problems. e.g. Tom has 12 sweets and Dini has 5. How many more sweets does Tom have than Dini? 
rhombus (KS2)	A parallelogram with all sides equal.
right (KS2)	Used as an adjective, right-angled or erect. Example: In a right cylinder the centre of one circular base lies directly over the centre of the other.
right angle (KS2)	One quarter of a complete turn. An angle of 90 degrees. An acute angle is less than one right angle. An obtuse angle is greater than one right angle but less than two. A reflex angle is greater than two right angles.
Roman numerals (KS2)	The Romans used the following capital letters to denote cardinal numbers: I for 1; V for 5; X for 10; L for 50; C for 100; D for 500; M for 1000. Multiples of one thousand are indicated by a bar over a letter, so for example V with a bar over it means 5000. Other numbers are constructed by forming the shortest sequence with this total, with the proviso that when a higher denomination follows a lower denomination the latter is subtracted from the former. Examples: III =3; IV = 4; XVII =17; XC = 90; CX =110; CD = 400; MCMLXXII = 1972. A particular feature of the Roman numeral system is its lack of a symbol for zero and, consequently, no place value structure. As such it is very cumbersome to perform calculations in this number system.
rotation (KS1)	In 2-D, a transformation of the whole plane which turns about a fixed point, the centre of rotation. A is specified by a centre and an (anticlockwise) angle.
rotation symmetry (KS2)	A 2-D shape has rotation symmetry about a point if an identical-looking shape in the same position is produced by a rotation through some angle greater than 0° and less than 360° about that point. A 2-D shape with rotation symmetry has rotation symmetry of order n when n is the largest positive integer for which a rotation of 360°/n produces an identical-looking shape in the same position. A rotation of 360°, about any centre whatever, produces an identical-looking shape in the same position for all 2-D shapes including those without rotation symmetry. For this reason it is true, though not very informative, to say that the order of rotation symmetry is 1 for shapes that do not have rotation symmetry.

round (verb) (KS2)	In the context of a number, express to a required degree of accuracy. Example: 543 rounded to the nearest 10 is 540.
row	A horizontal arrangement.
rule (KS1)	Generally a procedure for carrying out a process. In the context of patterns and sequences a rule, expressed in words or algebraically, summarises the pattern or sequence and can be used to generate or extend it.
sample (KS2)	A subset of a population. In handling data, a sample of observations may be made from which to draw inferences about a larger population.
scale (noun)	A measuring device usually consisting of points on a line with equal intervals.
scale (verb) (KS2)	To enlarge or reduce a number, quantity or measurement by a given amount (called a scale factor). e.g. to have 3 times the number of people in a room than before; to find a quarter of a length of ribbon; to find 75% of a sum of money.
scale factor (KS2)	For two similar geometric figures, the ratio of corresponding edge lengths.
score (KS1)	1. To earn points or goals in a competition. The running total of points or goals. 2. The number twenty.
second (KS1)	1. A unit of time. One-sixtieth of a minute. 2. Ordinal number as in 'first, second, third, fourth …'.
sequence (KS1)	A succession of terms formed according to a rule. There is a definite relation between one term and the next and between each term and its position in the sequence. Example: 1, 4, 9, 16, 25 etc.
set (KS1)	A well-defined collection of objects (called members or elements).
sequence (KS1)	A succession of terms formed according to a rule. There is a definite relation between one term and the next and between each term and its position in the sequence. Example: 1, 4, 9, 16, 25 etc.
set square (KS2)	A drawing instrument for constructing parallel lines, perpendicular lines and certain angles. A set square may have angles 90o, 60o, 30o or 90o, 45o, 45o.
share (equally) (KS1)	Sections of this page that are currently empty will be filled over the coming weeks. One model for the process of division.
short division (KS2)	A compact written method of division. Example: 496 ÷ 11 becomes  Answer : 45 1/11 (Example taken from Appendix 1 of the Primary National Curriculum for Mathematics)

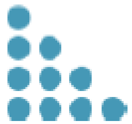
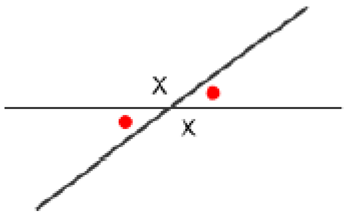
short multiplication (KS2)	Essentially, simple multiplication by a one digit number, with the working set out in columns. 342 x 7 becomes 342 x 7 becomes 3 4 2 × 7 2 3 9 4 2 1 Answer: 2394 (Example taken from Appendix 1 of the Primary National Curriculum for Mathematics)
side (KS1)	A line segment that forms part of the boundary of a figure. Also edge.
sign (KS1)	A symbol used to denote an operation. Examples: addition sign +, subtraction sign −, multiplication sign ×, division sign ÷, equals sign = etc. In the case of directed numbers, the positive + or negative − sign indicates the direction in which the number is located from the origin along the number line.
simple fraction (KS1)	A fraction where the numerator and denominator are both integers. Also known as common fraction or vulgar fraction.
simplify (a fraction) (KS2)	Reduce a fraction to its simplest form. See cancel (a fraction) and reduce (a fraction).
sort (KS1)	To classify a set of entities into specified categories.
sphere (KS2)	A closed surface, in three-dimensional space, consisting of all the points that are a given distance from a fixed point, the centre. A hemi-sphere is a half-sphere. Adjective: spherical
square (KS1)	1. A quadrilateral with four equal sides and four right angles. 2. The square of a number is the product of the number and itself. Example: the square of 5 is 25. This is written 52 = 25 and read as five squared is equal to twenty-five. See also square number and square root.
square centimetre (KS2)	Symbol: cm2. A unit of area, a square measuring 1 cm by 1 cm. 10000 cm2 = 1 m2
square metre (KS2)	Symbol: m2. A unit of area, a square measuring 1m by 1 m.
square millimetre (KS2)	Symbol: mm2. A unit of area, a square measuring 1 mm by 1 mm. One-hundredth part of a square centimetre and one-millionth part of a square metre.
square number (KS2)	A number that can be expressed as the product of two equal numbers. Example 36 = 6 x 6 and so 36 is a square number or “6 squared”. A square number can be represented by dots in a square array.

standard unit (KS1)	Uniform units that are agreed throughout a community. Example: the metre is a standard unit of length. Units such as the handspan are not standard as they vary from person to person.
subtract (KS1)	Carry out the process of subtraction
subtraction (KS1)	The inverse operation to addition. Finding the difference when comparing magnitude. Take away.
subtraction by decomposition (KS2)	A method of calculation used in subtraction and particularly linked with one of the main columnar methods for subtraction. In this method the number to be subtracted from (the minuend) is re-partitioned, if necessary, in order that each digit of the number to be subtracted (the subtrahend) is smaller than its corresponding digit in the minuend. e.g. in 739 – 297, only the digits in the hundreds and the ones columns are bigger in the minuend than the subtrahend. By re-partitioning 739 into 6 hundreds, 13 tens and 9 ones each separate subtraction can be performed simply, i.e.: 9 – 7 13 (tens) – 9 (tens) and 6 (hundreds) – 2 (hundreds). 
subtraction by equal addition	A method of calculation used in subtraction and particularly linked with one of the main columnar methods for subtraction. This method relies on the understanding that adding the same quantity to both the minuend and the subtrahend retains the same difference. This is a useful technique when a digit in the subtrahend is larger than its corresponding digit in the minuend. E.g. in the example below, 7 > 2, therefore 10 has been added to the 2 (in the ones place) of the minuend to make 12 (ones) and also added to the 5 (tens) of the subtrahend to make 60 (or 6 tens) before the first step of the calculation can be completed. Similarly 100 has been added to the 3 (tens) of the minuend to make 13 (tens) and also added to the 4 (hundreds) of the subtrahend to make 5 (hundred). 932-457 becomes  Answer: 475 Example taken from Appendix 1 of the Primary National Curriculum for Mathematics.
subtrahend (KS1)	A number to be subtracted from another. See also Addend, dividend and multiplicand.
sum (KS1)	The result of one or more additions.
surface (KS1)	A set of points defining a space in two or three dimensions.

<table>
<tr><td>symbol (KS1)</td><td>A letter, numeral or other mark that represents a number, an operation or another mathematical idea. Example: L (Roman symbol for fifty), > (is greater than).</td></tr>
<tr><td>symmetry (KS1)</td><td>A plane figure has symmetry if it is invariant under a reflection or rotation i.e. if the effect of the reflection or rotation is to produce an identical-looking figure in the same position. See also reflection symmetry, rotation symmetry. Adjective: symmetrical.</td></tr>
<tr><td>table (KS1)</td><td>1. An orderly arrangement of information, numbers or letters usually in rows and columns.
2. See multiplication table</td></tr>
<tr><td>take away (KS1)</td><td>1. Subtraction as reduction
2. Remove a number of items from a set.</td></tr>
<tr><td>tally (KS1)</td><td>Make marks to represent objects counted; usually by drawing vertical lines and crossing the fifth count with a horizontal or diagonal strike through.

A Tally chart is a table representing a count using a Tally

<table>
<tr><th colspan="3">Favourite Pets</th></tr>
<tr><th>Pet</th><th>Tally Marks</th><th>Number</th></tr>
<tr><td>Cat</td><td>𝍸 𝍸</td><td>10</td></tr>
<tr><td>Dog</td><td>||||</td><td>4</td></tr>
<tr><td>Rabbit</td><td>𝍸 |</td><td>6</td></tr>
</table>
</td></tr>
<tr><td>temperature (KS1)</td><td>A measure of the hotness of a body, measured by a thermometer or other form of heat sensor.
Two common scales of temperature are the Fahrenheit scale (°F) and the Celsius (or centigrade scale) which measures in °C. These scales have reference points for the freezing point of water (0°C or 32°F) and the boiling point of water (100°C or 212°F).
The relation between °F and °C is °F = 9/5(°C) + 32.</td></tr>
<tr><td>terminating decimal (KS2)</td><td>A decimal fraction that has a finite number of digits. Example: 0.125 is a terminating decimal. In contrast ⅓ is a recurring decimal fraction. All terminating decimals can be expressed as fractions in which the denominator is a multiple of 2 or 5.</td></tr>
<tr><td>tetrahedron (KS2)</td><td>A solid with four triangular faces. A regular tetrahedron has faces that are equilateral triangles. Plural: tetrahedra</td></tr>
<tr><td>time (KS1)</td><td>1. Progress from past, to present and to future
2. Time of day, in hours, minutes and seconds; clocks and associated vocabulary
3. Duration and associated vocabulary
4. Calendar time in days, weeks, months, years
5. Associated vocabulary such as later, earlier, sooner, when, interval of time, clock today, yesterday, tomorrow, days of the week, the 12 months of a year, morning, a.m., afternoon, p.m., noon, etc.</td></tr>
</table>

total (KS1)	1. The aggregate. Example: the total population - all in the population. 2. The sum found by adding.
translation (KS2)	A transformation in which every point of a body moves the same distance in the same direction. A transformation specified by a distance and direction (vector).
trapezium (KS2)	A quadrilateral with at least one pair of sides parallel.
triangle (KS1)	A polygon with three sides. Adjective: triangular, having the form of a triangle.
triangular number (KS1)	1. A number that can be represented by a triangular array of dots with the number of dots in each row from the base decreasing by one. Example:  The triangular number 10 represented as a triangular array of dots. 2. A number in the sequence 1, 1 + 2, 1 + 2 + 3, 1 + 2 + 3 + 4 etc. 55 is a triangular number since it can be expressed as, 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10.
turn (KS1)	A rotation about a point: a quarter turn is a rotation of 90°. A half turn is a rotation of 180°, a whole turn is a rotation of 360°.
unit (KS1)	A standard used in measuring e.g. the metre is a unit of length; the degree is a unit of turn/angle, etc.
unit fraction (KS1)	A fraction that has 1 as the numerator and whose denominator is a non-zero integer. Example: ½, ⅓
vertex (KS1)	The point at which two or more lines intersect. Plural: vertices.
vertical (KS1)	At right angles to the horizontal plane. The up-down direction on a graph or map.
vertically opposite angles (KS2)	 The pair of equal angles between two intersecting straight lines. There are two such pairs of vertically opposite angles

volume (KS1)	A measure of three-dimensional space. Usually measured in cubic units; for example, cubic centimetres (cm3) and cubic metres (m3).
vulgar fraction (KS2)	A fraction in which the numerator and denominator are both integers. Also known as common fraction or simple fraction.
weight (KS1)	In everyday English weight is often confused with mass. In mathematics, and physics, the weight of a body is the force exerted on the body by the gravity of the earth, or any other gravitational body.
yard (KS2)	Symbol: yd. An imperial measure of length. In relation to other imperial units of length, 1 yard = 3 feet = 36 inches. 1760yd. = 1 mile One yard is approximately 0.9 metres.
zero (KS1)	1. Nought or nothing; zero is the only number that is neither positive nor negative. 2. Zero is needed to complete the number system. In our system of numbers : $a - a = 0$ for any number a. $a + (-a) = 0$ for any number a; $a + 0 = 0 + a = a$ for any number a; $a - 0 = a$ for any number a; $a \times 0 = 0 \times a = 0$ for any number a; division by zero is not defined as it leads to inconsistency. 3. In a place value system, a place-holder. Example: 105. 4. The cardinal number of an empty set.