Number – Negatives and Rounding

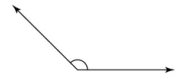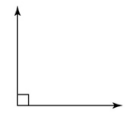| 1	Ordering negative numbers	When using negative numbers, the further away you get from 0, the smaller the number is. eg. -300 is smaller than -2.
2	Adding and subtracting negatives	+ – is the same as – (eg. 3 + - 5 = -2) - - is the same as + (eg. 6 - - 4 = 10)
3	Multiplying and dividing negatives	+ x – = – + ÷ – = – – x + = – – ÷ + = – – x – = + – ÷ – = +
4	Decimal Places	Rounding to decimal places gives instructions on how many numbers need to be left after the decimal. eg. rounding to 2 decimal places means there must be 2 numbers after the decimal.
5	Estimation	To estimate, round each number in the calculation to 1 significant figure. eg. 2.1 x 6.8, round to 2 x 7 = 14.

Algebra – Expanding and Simplifying Expressions

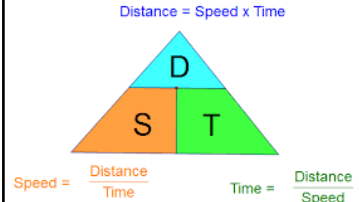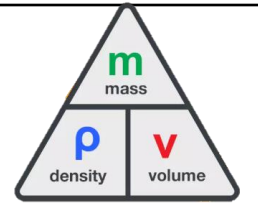| 1	Like terms	Terms with the same variable. eg. $4x$ and $5x$ are like terms. $6a$ and $3b$ are not.
2	Expand single brackets	To expand a bracket, **multiply** each term **in the bracket** by the expression **outside** the bracket. $$3(x + 7) = 3x + 21$$
3	Expand double brackets	Multiply each term in the second bracket by each term in the first. $(x + 7)(x + 2) = x^2 + 9x + 14$
4	Factorise linear expressions	The **reverse** of **expanding**. Factorising is writing an expression as a product of terms by '**taking out**' a common **factor**. $6x - 15 = 3(2x - 5)$, where 3 is the common factor.

Key Vocabulary

1	Negative	A number that is less than zero.
2	Significant Figure	The number of digits that are meaningful. eg. 5.623 has 4 significant figures. 0.615 has 3, because it starts with a zero.
3	Estimation	A value that is close enough to the right answer.
4	Symmetry	Where 2 or more parts of a shape area identical when reflected.
5	Congruent	Shapes that are the same size and have the same angles.
6	Expand	To **multiply** terms inside a bracket by the terms (or bracket) outside.
7	Factorise	The reverse of expanding. Use common factors to put brackets back into an expression.

Geometry and Measure – Draw Lines and Angles

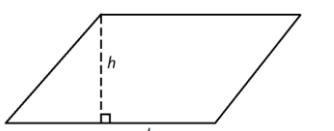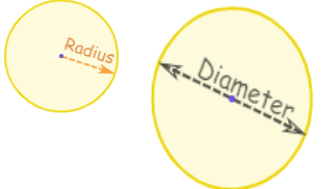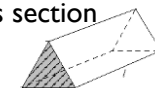| 1	Acute Angle	An angle less than 90°.
2	Obtuse Angle	An angle greater than 90° and less than 180°.
3	Right Angle	An angle of 90°.

Ratio, Proportion and Rates of Change - Scales

1	Speed	Distance = Speed x Time
2	Density	

Speed = $\frac{Distance}{Time}$ Time = $\frac{Distance}{Speed}$

Algebra – Equations

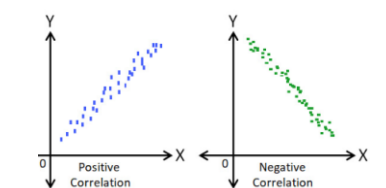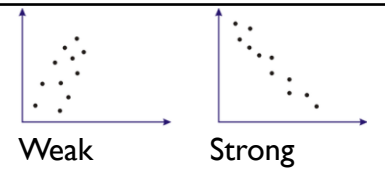| 1	Solving one-step and two-step equations	Using **inverse (opposite) operations** to find out a missing number. Example 1: $x + 6 = 11$ (subtract 6) $x = 5$ Example 2; $3x - 2 = 10$ (add 2) $3x = 12$ (divide by 3) $x = 4$

Geometry and Measure – Area, Perimeter and Volume

1	Triangle base x height ÷ 2	
2	Parallelogram base x perpendicular height	
3	Circle (Area) $A = \pi r^2$	
4	Circumference $C = \pi$ x diameter	
5	Volume of any regular Prism	Area of the cross section (shaded) x length

Geometry and Measure – Pythagoras

1	Finding the hypotenuse (longest side) $a^2 + b^2 = c^2$	$a^2 + b^2 = c^2$ $3^2 + 4^2 = 25$ $\sqrt{25} = 5$
2	Finding a shorter side	$a^2 = c^2 - b^2$

Statistics – Scatter Graphs

1	Positive and Negative Correlation	
2	Strong and Weak Correlation	
3	No correlation	

Key Vocabulary

1	Area	The space inside a shape.
2	Surface area	The total area of the surface of a 3-dimensional (3D) shape.
3	Volume	The amount of 3D space a shape takes up.
4	Diameter and Radius	The diameter is 2 times the radius.
5	Correlation	The relationship between different sets of data.
6	Line of best fit	Shows the general direction a group of points seems to follow.
7	Hypotenuse	The longest side of a right-angled triangle.

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Number – BIDMAS and Decimals

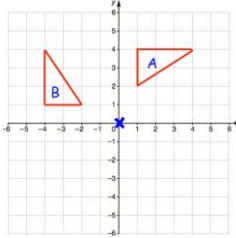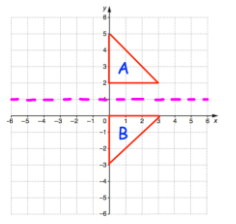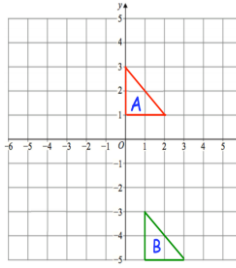| 1	B I D M A S	Brackets Indices Division Multiplication Addition Subtraction	Example: $(21 + 5) - 3 \times 8$ $26 - 3 \times 8$ $26 - 24 = 2$

Algebra – Sequences

1	Term-to-term rule	How you get from one term to the next. Example: 2, 6, 10, 14, … The sequence goes up by 4 each time so the term-to-term rule is +4.
2	Finding the nth term	Example: 1, 3, 5, 7, 9, … The sequence goes up by 2 each time so we start with *2n*. We then take the term-to-term rule (in this case 2) away from the first term. 1 – 2 = *-1*. This is the second part of our nth term. So our final answer is: *2n – 1*

Statistics – Averages

1	Mean	Add all the numbers up, and divide by how many numbers there are.
2	Median	The middle of a sorted list of numbers.
3	Mode	The number that appears most often in a set of numbers.
4	Range	The difference between the lowest and highest values.

Geometry and Measure – Transformations

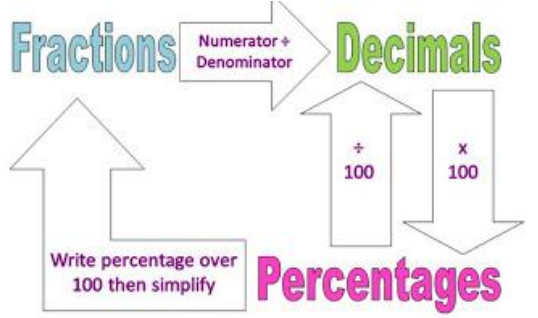| 1	Rotation: need the degrees turned, direction (clockwise or anti-clockwise) and the **centre of rotation**.	
2	Reflection: need the line that the shape has been reflected in. This shape has been reflected in $y = 1$.	
3	Translation: need the direction and how far the shape has travelled. Can be given as a column vector. Example: $\begin{pmatrix} 1 \\ -6 \end{pmatrix}$ This means 1 right and 6 down.	

Statistics – Data Types

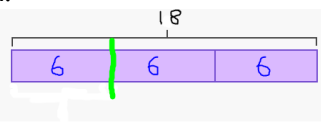| 1	Quantitative	Data that can be counted (discrete) or measured (continuous).
2	Qualitative	Data that describes something. Eg. people's favourite colour.
3	Discrete	Data that can only take certain values. Eg. the number of students in a class.
4	Continuous	Data that can take any value within a range. Eg. people's height.

Key Vocabulary

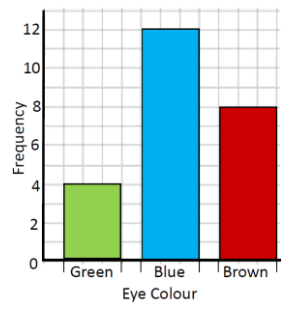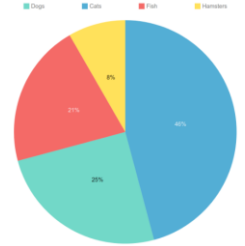| 1	Generate	Work out a term (or terms) of a sequence.
2	nth term	Representing a sequence algebraically in terms of *n*.
3	Arithmetic sequence	A sequence that changes by the same amount every time.
4	Geometric sequence	A sequence made my multiplying/dividing by the same value each time.
5	Rotational symmetry	A shape that still looks the same after some rotation. Eg. a square has a rotational symmetry of order 4.
6	Modal Class	The class (or group) with the highest frequency.
7	Bias	A systematic (built-in) error that makes all values wrong by a certain amount.

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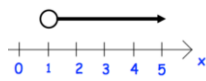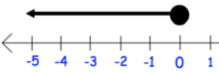## Number – Fractions

| 1 | FDP | |

Ratio, Proportion and Rates of Change – Ratio

| 1 | Simplifying | To simplify, you need to divide each part of the ratio by the same factor. Example:
15 : 50 *becomes*
3 : 10 because you can divide both parts by 5. |
| 2 | Sharing | Using bar models to share a quantity in a given ratio. Example:
Share £18 in the ratio 1:2.
1 + 2 = 3 parts total.
18
6 6 6
£18 shared between 3 boxes:
18 ÷ 3 = £6
Shared in the ratio 1:2 gives the answer of £6 : £12. |

Statistics – Data Representation

1	**Tally Chart** • Information you are collecting listed. • Column for tallies. • Column for frequency.	Chocolate | Tally | Frequency Milk | 𝅖𝅖𝅖𝅖 II | 22 Dark | 𝅖 | 5 White | 𝅖𝅖 III | 13 Total 40
2	**Bar Chart** • Frequency on y-axis. • Information you are collecting on the x-axis. • Bars same width. • Equal gaps between bars. • Title explaining what the chart shows.	Eye colours in a Year 8 Class
3	**Pie Chart** • Divided into sectors which shows the relative size of the data. • Needs a key or labels to clearly show what each sector represents. • Sectors calculated using parts of 360°.	

Algebra – Inequalities

| 1 | Greater than (>)
Less than (<) | Greater than or equal to (≥)
Less than or equal to (≤) |
| 2 | Representing inequalities on a number line | $x > 1$
$x \le 0$ |

Number – Percentages

| 1 | Percentage Change | $\dfrac{Changed\ by}{Original\ amount} \times 100$ |

Key Vocabulary

	Convert	To change a value or expression from one form to another.
1	Simplify	To make as simple as possible.
3	Frequency	How often something happens.
4	Simultaneous Equations	Two or more equations with shared variables.
5	Recurring decimal	A decimal number that has digits that repeat forever.

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Algebra - Sequences

1	Substitution • Replace the letters with the numbers. • Multiply them as 2y is actually 2 times y.	If $x = 2$ and $y = 3$, what is the value of $4x + 2y$? $4 \times 2 = 8$ **and** $3 \times 2 = 6$ $8 + 6 = 14$ 14
2	Finding the Nth Term • Find the difference • Take it away from 1st term	8 12 16 20 24 -4 +4 +4 +4 +4 0th 4 8 12 16 20 24 n^{th} term = steps x n + 0th term n^{th} term = $4n + 4$
3	Finding the Quadratic Nth Term	Find the nth term of the following sequence 5 15 29 47 69 +10 +14 +18 +22 +4 +4 +4 Divided by 2 Sequence: 5 15 29 47 69 $2n^2$: 2 8 18 32 25 Difference: 3 7 11 15 19 nth term is $2n^2 + 4n - 1$

Algebra – Straight Line Graphs

1	Plotting a Linear Graph	$y = 2x + 1$ 1) Complete a Table of Values. 	x	-3	-2	-1	0	1	2	3	 	y	-5	-3	-1	1	3	5	7	
2	Equation of a line	$y = $ m$x + $ c m is gradient and c is the y intercept

3	Finding the Gradient • $\frac{Change\ in\ y}{Change\ in\ x}$ • $\frac{4}{2} = 2$	
4	Finding the equation of a line • Gradient is 3 • Y intercept is 1 • Equation of the line: **y = 3x + 1**	
5	Plotting Quadratic Graphs	 	x	y	 	-2	4	 	-1	1	 	0	0	 	1	1	 	2	4	
6	Solving Simultaneous Equations Graphically • Look for where they meet • Meets at **(1, 5)** • So **x = 1 and y = 5**	y=x+4 y=6−x

Probability

1	Calculating Probability	$\frac{number\ of\ successful\ outcomes}{number\ of\ possible\ outcomes}$
2	Relative Frequency • $\frac{Frequency}{Total}$	Color	Frequency	Relative Frequency Purple	7	7/20= 35% Blue	3	3/20= 15% Pink	5	5/20=25% Orange	5	5/20=25% Total	20	20/20 = 100%

3	Using a Venn Diagram	The experiment is done 20 times: • P(only A) = 0.4 x 20 = 8 • P(only B) = 0.2 x 20 = 4 • P(both A&B) = 0.3 x 20 = 6 • P(neither AB) = 0.1 x 20 = 2

Geometry – Properties and Surface area

1	Surface area of a rectangular prism (cuboid)	$2(length\ x\ width)$ $+ 2(length\ x\ depth)$ $+ 2(width\ x\ depth)$
2	Surface area of a triangular prism	$(h\ x\ b)\ x\ (s1\ x\ l)$ $+ (s2\ x\ l) + (s3 + l)$
3	Surface area of a cylinder	$2\pi r^2 + 2\pi r l$

Key Vocabulary

1	Prism	A 3D shape with two parallel bases joined by quadrilaterals.
2	Quadratic	Involving a squared but no higher power.
3	Simultaneous Equations	Equations involving two or more unknowns that are to have the same values in each question.
4	Probability	The extent to how likely something is to occur.

Geometry – Area and Perimeter

1	Completing a Cumulative Frequency Table	
2	Plotting a Cumulative Frequency Graph • Join with a smooth curve	
3	Finding the; • Upper Quartile (75% of the way) • Median (50% of the way) • Lower Quartile (25% of the way)	
4	Box Plots	

Transformations - Enlargements

1	Enlarging by a Scale Factor • Example SF 2	
2	Enlarging a shape using a Centre of Enlargement • **SF of 2** & **COE (0, 0)**	
3	Congruent Triangles • Side Angle Side • Angle Side Angle • Right Ang, Hypot, Side • Side, Side, Side	

Constructions – Loci

1	Bisect a line • Place compasses at either end and go over half way making a curve.	
2	Bisect an Angle • Using a compass, draw a curve to meet the two lines **(A and B)** • Use these points to find another meeting point, **C**. Draw a line through.	

Algebra – Rearranging Formulae

1	Rearranging One Step Equations (Add and Subtract)	$a + 5 = b \longrightarrow a = b - 5$ -5 -5 $c - 3 = d \longrightarrow c = d + 3$ +3 +3
2	Rearranging One Step Equations (Multiplication and Division)	$6a = b \longrightarrow a = \dfrac{b}{6}$ ÷6 ÷6 $\dfrac{c}{5} = d \longrightarrow c = 5d$ ×5 ×5
3	Rearrange Two Step equations • Make a the subject	$b = 5a + 21$ -21 -21 $b - 21 = 5a$ ÷5 ÷5 $\dfrac{b - 21}{5} = a$
4	Rearrange using Powers	$x^2 = y \longrightarrow x = \sqrt{y}$ √ √ $\sqrt{c} = d \longrightarrow c = d^2$ 2 2

Key Vocabulary

1	Inverse	The reverse of something else.
2	Quartiles	Data divided into 4 equal segments. (25, 50, 75, 100)
3	Enlarging	Changing the size of a shape (smaller or larger).
4	Congruent	Identical in form