2024 / 2025	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
Year 7						
Learning	**Expressions, functions, and formulae** **Analysing and displaying data** **Number skills and relationships**	**Decimals and measures**	**Fractions** **Probability**	**Ratio and proportion**	**Sequences and graphs**	**Transformations**
Concepts	• **Statistics** • **Number** • **Algebra**	• **Number** • **Geometry**	• **Number** • **Ratio, proportion and rates of change.** • **Probability**	• **Ratio, proportion and rates of change.**	• **Algebra**	• **Geometry**
What is needed to master the learning?	**Expressions, functions, and formulae** Find outputs of simple functions written in words and using symbols. Describe simple functions in words. Simplify linear algebraic expressions by collecting like terms. Use letters to represent unknowns in algebraic expressions.	**Decimals and measures** Round decimals to make estimates and approximations of calculations. Compare measurements by converting them into the same units. Solve simple problems involving units of measurement in the context of length, mass and capacity.	**Fractions** Compare and order fractions. Change an improper fraction to a mixed number. Identify equivalent fractions. Simplify fractions by dividing numerator and denominator by common factors. Add and subtract simple fractions.	**Ratio and proportion** Solve simple problems involving direct proportion. Use the unitary method to solve simple word problems involving direct proportion. Reduce up to a three-part ratio to its simplest form by cancelling.	**Sequences and graphs** Generate terms of a sequence using a one-step term-to-term rule. Describe how a pattern sequence grows. Solve problems and spot patterns in coordinates. Find the midpoint of a line segment.	**Transformations** Identify congruent shapes. Enlarge shapes using given scale factors. Solve problems using line symmetry. Identify all the symmetries of 2D shapes. Identify reflection symmetry in 3D shapes.

	Use brackets with numbers and letters. Multiply and divide algebraic terms. Write expressions from word descriptions using addition, subtraction, multiplication and division. Write expressions to represent function machines. Substitute positive integers into simple formulae written in words and letters. Write simple formulae in words and letter symbols. **Analysing and displaying data** – Find the mode, median and mean of a set of data. Read and draw bar charts, bar-line charts, tally charts and frequency tables.	Convert between metric units of length, mass and capacity. Understand how different scales enable different levels of accuracy. Write decimal measures as two related units of measures. Check a result by considering whether it is of the right order of magnitude. Understand where to position the decimal point by considering equivalent calculations. Use all operations with decimals. Work out the perimeters of composite shapes and polygons. Solve problems involving area.	Calculate simple fractions of quantities. Work with equivalent fractions and decimals. Write one quantity as a fraction of another. Work with equivalent percentages, fractions and decimals. Use different strategies to calculate with percentages. **Probability** – Use the language of probability. Understand the probability scale from 0 to 1. Calculate probability based on equally likely outcomes.	Divide a quantity into two parts in a given ratio. Solve word problems involving ratio. Understand and use the relationship between fractions, ratio and proportion.	Use the term-to-term rule to work out more terms in a sequence. Recognise an arithmetic sequence and a geometric sequence. Recognise, name and plot straight line graphs parallel to the x- or y-axis. Recognise, name and plot the graphs of y = x and y = –x. Generate terms of a sequence using a position-to-term rule.	Reflect and describe a reflection of a shape on a coordinate grid. Describe and carry out rotations on a coordinate grid. Translate 2D shapes. Transform 2D shapes by combinations of rotations, reflections and translations. **Lines and angles** Use a protractor to measure and draw angles. Recognise acute, obtuse and reflex angles. Identify angle and side properties of triangles. Use a ruler and protractor to draw triangles accurately.

	Find the mode and range from a chart or table. Compare two sets of data using an average and the range. Read and draw a line graph. Read and draw a dual and compound bar chart. **Number skills** – Know and use the priority of operations, including brackets. Use estimation and inverse operations to check answers. Review all written methods of calculations. Solve problems involving money and time using a calculator. Understand what negative numbers are and how they behave: where they fit into the	Choose suitable units to estimate length and area.	Calculate the probability of an event not happening. Estimate probability based on experimental data. Understand why more trials lead to better estimate of probability.			Use the rules for angles on a straight line, angles around a point and vertically opposite angles. Solve problems involving angles. Use the rule for the sum of angles in a triangle and solve problems. Use the rule for the sum of angles in a quadrilateral and solve problems using quadrilateral properties.

	ordering of the number line and how they multiply. Identify common factors, the highest common factor and the lowest common multiple. Recognise prime and square numbers. Use index form for powers.					
Prior knowledge	**Analysing and displaying data** – basic number skills, basic drawing skills. **Number skills** - understand place value, add, subtract, multiply, and divide up to two-digit integers **Expressions, functions, and formulae** – number skills, recognition of using a letter for an unknown.	**Decimals and measures** – place value.	**Fractions** – understanding what a fraction represents, knowing the fraction line means to divide, percentage is out of 100, multiply and divide by powers of 10. **Probability** – ordering probability words onto a scale eg unlikely, certain, impossible.	**Ratio and proportion** – ratio notation, multiply and divide integers. Divide an amount into equal parts. Find the HCF of two numbers. Use a diagram to write a ratio. Write a ratio in its simplest form.	**Sequences and graphs** – order of operations, term-to-term pattern recognition.	**Transformations** – drawing ability, knowledge of coordinates and axes, multiplication, and division of small numbers. **Lines and angles** – identify basic shapes, ability to accurately draw lines and angles with a ruler, addition, and subtraction up to three-digit integers.
Common Misconceptions	Substituting a value into an expression without completing the	Not lining up with the decimal	Adding and subtracting numerators and	Not finding the value of one item first when	Use of equipment. Getting axes the wrong way round /	Confusion that enlargement must

	operation (is 3m = 37 instead of 3x7), misunderstanding of negative numbers. Not leaving gaps between the bars, different widths for each bar, inconsistent drawings, forgetting a key, mixing up axes. Aligning the correct value digits for addition and subtraction, mixing up multiples and factors, thinking that 1 is prime.	point/incorrect columns.	denominators, regardless of the denominator. Times tables not known, or no system to work them out. Confusion about scale and thinking that a probability can be greater than 1.	answering a question that requires the use of the unitary method. Writing a ratio in the wrong order. When dividing an amount in a ratio, e.g. £12 in the ratio 2 : 3, working out 12 ÷ 2 and 12 ÷ 3.	reading coordinates as y then x.	mean that the shape gets bigger. Not knowing clockwise/anti-clockwise directions, left and right confusion.

2024 / 2025	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
Year 8						
Learning	**Area and volume** **Number relationships**	**Expressions and equations** **Statistics, graphs, and charts**	**Real-life graphs** **Decimals and ratio**	**Lines and angles**	**Calculating with fractions**	**Percentages, decimals, and fractions** **Straight line graphs**
Concepts	• **Number** • **Geometry**	• **Algebra**	• **Statistics** • **Number**	• **Geometry**	• **Ratio, proportion & rates of change** • **Number**	• **Statistics**
What is needed to master the learning?	**Area and volume** Derive and use the formula for the area of a triangle. Calculate the area of compound shapes made from rectangles and triangles. Derive and use the formula for the area of a parallelogram. Use the formula for the area of a trapezium. Calculate the volume of cubes and cuboids.	**Expressions and equations** Write and use expressions involving powers. Expand brackets. Write and simplify algebraic expressions and formulae using brackets and division. Factorise expressions. Find the inverse of a simple function.	**Real-life graphs** Use and interpret conversion graphs. Interpret distance-time graphs. Plot line graphs from tables of data. Draw and interpret linear and non-linear graphs and identify trends. **Decimals and ratio** Round decimals to two or three decimal places and any number of significant figures.	**Lines and angles** Classify quadrilaterals by their geometric properties. Solve geometric problems using side and angle properties of special quadrilaterals. Identify alternate angles on a diagram Understand proofs of angle facts.	**Calculating with fractions** Order fractions. Add and subtract fractions with any size denominator. Use appropriate methods for multiplying fractions. Use strategies for dividing fractions. Find the reciprocal of a number.	**Percentages, decimals, and fractions** Recall equivalent fractions and decimals. Recognise recurring and terminating decimals. Recall equivalent fractions, decimals and percentages. Use the equivalence of fractions, decimals and percentages to compare two proportions.

	Solve volume problems. Sketch nets of 3D solids. Draw 3D solids on isometric paper. Draw plans and elevations of 3D solids. Calculate the surface area of cubes and cuboids. Solve problems in everyday contexts involving measures. Convert between different measures for area, volume and capacity. **Number** Understand, choose and use a range of strategies for mental calculations by developing an understanding of relationships between numbers.	Write and solve one-step equations using function machines. Solve two-step equations using function machines. Solve problems using equations. Solve equations using the balancing method. **Statistics, graphs, and charts** Calculate angles and draw/interpret pie charts. Use two-way tables. Calculate the mean from a frequency table. Use tables for grouped data, find modal class and estimate range. Draw and interpret stem and leaf diagrams with different stem values.	Order decimals of any size, including positive and negative decimals. Multiply decimals with up to and including two decimal places. Multiply and divide by decimals. Solve problems involving decimals and all four operations. Divide a quantity into three or more parts in a given ratio. Solve ratio and proportion problems involving decimals.	Identify corresponding angles. Solve problems using properties of angles in parallel and intersecting lines. Calculate the sum of the interior and exterior angles of a polygon. Work out the sizes of interior and exterior angles of a polygon. Solve geometrical problems showing reasoning. Solve problems involving angles by setting up equations. .	Use the four operations with mixed numbers	Express one number as a percentage of another when the units are different. Work out an amount increased or decreased by a percentage. Use mental strategies to solve percentage problems. Use a multiplier to calculate amounts increased or decreased by a percentage. Use the unitary method to solve percentage problems. **Straight line graphs** Recognise when values are in direct proportion with or without a graph. Plot graphs and read~~ing~~ values to solve problems.

	Estimate answers to calculations. Use a written method to divide decimal numbers by integers. Add, subtract, multiply and divide positive and negative numbers, including larger numbers and decimals. Calculate using squares, square roots, cubes and cube roots. Calculate combinations of squares, square roots, cubes, cube roots and brackets. Use index notation. Write a number as a product of its prime factors. Use prime factor decomposition to find the HCF and LCM.	Find mode, median and range from stem and leaf diagrams. Compare two sets of data using averages and range. Draw line graphs to compare two sets of data. Choose the most appropriate average to use. Draw scatter graphs. Describe types of correlation and draw a line of best fit. Interpret graphs and charts and explain why a graph or chart could be misleading.				Plot a straight-line graph and work out its gradient. Plot the graphs of linear functions. Write the equations of straight-line graphs in the form $y = mx + c$.

Prior knowledge	Pre-requisites... Y7 units 2, 3, 4 & 7 Round decimals to the nearest whole number, 10 and 100. Addition and subtraction using a written method. Estimate by rounding. Use negative numbers in the context of temperature. Repeated multiplication and BIDMAS. Use the correct priority of operations for more complex calculations.	Pre-requisites... Y7 units 1, 4, 5, 8 & 9. Number of degrees in circle Drawing a circle and radius Working out simple fractions and percentages of 360 Find the mean, median, mode and range Interpreting a simple frequency table Choose appropriate scales for axes. Identify what is misleading on a pictogram.	Pre-requisites... Y7 units 2, 4, 5, 9 Y8 unit 2 Recall of squares and cubes. Simplifying like terms. Index notation for a product. Priority of operations (BIDMAS). Construct expressions from written descriptions. Expanding brackets List factors of a number. Factorise individual terms. Find the HCF. Find the function given the input and output of a function machine.		Pre-requisites... Y7 units 5 Y8 unit 1 & 2 Addition and subtraction of fractions where the denominators are equal Writing fractions as mixed numbers Writing simple equivalent fractions Finding the lowest common multiple (LCM) of two numbers. Simple fractions of quantities Simplify fractions. Match equivalent fractions and decimals Multiplying fractions	Pre-requisites... Y7 units 5, 9. Y8 unit 2, 3, 4, 5, 6 & 8 Coordinate pairs from $y = 4x$ Multiplying with negative numbers Ordering time / distance graphs according to speed. Completing a table of values for $y = 2x + 2$ and using it to plot its graph (positive values of x). Finding the midpoint of vertical, horizontal and diagonal line segments. Round to 2 decimal places. Convert minutes to hours.

	Calculate powers of 10, 100 and 1000. Find the HCF of two numbers. Find the area and perimeter of a square and rectangle. Write an expression for the area and perimeter of a rectangle. Describe what 'perpendicular' means. Work out the area of a triangle by counting squares. Work out the perimeter and area of a compound shape made from rectangles only. Substitute numbers into expressions involving brackets. Working out cube numbers.		Check a calculation using the inverse operation. Solve a one-step equation. Find the output of a two-step function machine. Multiplicative reasoning using metric and imperial measures and currency. Copy and complete metric unit conversions. Converting a distance in one hour (speed) to a distance in different fractions of an hour. Working out missing numbers in sequences. Reading values from a conversion graph.		Division questions worded as 'How many … in …' Finding common factors	Know the equivalence of simple fractions and decimals. Use mental methods to find 10% and 15% of a quantity. Subtract percentages from 100% Increase and decrease an amount by a percentage. Write percentages as fractions.

	Recognise and name 3D shapes. Convert between metric units of measurement.		Finding the midpoint of two numbers. Interpreting straight line graphs.			
Misconceptions	0.16 ÷ 2 = 0.8 When estimating, students think they must round all of the numbers in a calculation, e.g. 24 ÷ 9.8 Students misuse rules such as "two negatives make a positive", e.g. −3 − 7 = 21 Students think that −2 always means subtract 2. Students confuse e.g. 2^3 with 2 × 3 Students think that -3^2 means the same as $(-3)^2$. Students may not completely decompose a number into its prime factors.	Multiplying indices instead of adding them. Students only multiply the first term when expanding brackets. Students only partially factorise an expression. For example, $12a + 16b = 2(6a + 8b)$ Students multiply/divide before adding/subtracting Students do not write each modified equation on a new line, leading to untrue equations, e.g. $2n + 1 = 9 - 1 = 8 \div 2 = 4$.	Insecure in bigger number names. Confusing ascending and descending. Students do not naturally estimate before answering. Failure to change both numbers in a decimal division. Not understanding that ratios can be simplified like fractions. Students fail to realise that alternate angles can be obtuse. Students do not use the properties of triangles to help solve a problem.	Students fail to realise that alternate angles can be obtuse. Students do not use the properties of triangles to help solve a problem. Students may assume that a polygon is regular. Students may draw exterior angles in two different directions. .	Accuracy in plotting graphs – uneven intervals or incorrectly marked scales. Not knowing which points to use to find the gradient. Thinking that lines parallel to x-axis will be $x = c$ rather than $y = c$. Dealing with negative values of x when substituting to complete a table of values. Working out a gradient when the scales are different on each axis. Students read hours and minutes	Not making the fractions have equal denominators before calculating. Adding numerators and denominators together. Confusing rules for multiplying and adding fractions. Not simplifying before / after multiplying fractions. Writing decimal equivalent of e.g. 5/6 as 5.6 Assuming that division always makes things smaller. Viewing the mixed number as two separate numbers

	Forgetting to use the ½ in the formula for the area of a triangle. Using the slant height instead of the perpendicular height. Adding the length width and height rather than multiplying them for volume. Finding volume instead of surface area.	Misreading the scale. When drawing a graph, not plotting points accurately enough. Using inappropriate scales when drawing their own graphs. Give highest frequency instead of mode/modal class; Not ordering the leaves in a stem & leaf. Not being able to decide which is the most appropriate average to use in an 'open' question. Joining the points with lines – emphasise that a scatter graph shows a scatter of points, not a line.	Students may assume that a polygon is regular. Students may draw exterior angles in two different directions.		as a decimal, e.g. 1 h 48 m = 1.48 h. Students may calculate a proportion as though it is a ratio, e.g. 2 out of 5 calculated as 2 ÷ 7. Students do not convert quantities to the same unit before comparing. Students do not know whether to multiply or divide by a multiplier.	

2024 / 2025	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
Year 9						
Learning	**Dealing with data – averages and range, grouped data, scatter diagrams, back-to-back stem & leaf diagrams.** **Indices and standard form.**	**Equations, expressions and formulae.** **Fractions, reciprocals and mixed numbers.**	**Constructions and loci.** **Probability - mutually exclusive events, experimental probability, two-way tables and sample space diagrams.**	**Sequences, inequalities, equations with fractions and indices, proportional relationships.** **Multiplicative Reasoning – Enlargement, percentage change, compound measures, inverse proportion.**	**Graphs – Draw and interpret straight line graphs, simultaneous equations, quadratic graphs, inverse proportion graphs and non-linear graphs.**	**Area and circumference of a circle, Pythagoras' theorem, surface area and volume.** **Comparing shapes – Similarity, congruency, trigonometry in right-angled triangles.**
Concepts	• **Statistics** • **Number**	• **Algebra** • **Number**	• **Geometry** • **Probability**	• **Algebra** • **Ratio, proportion & rates of change** • **Geometry**	• **Algebra**	• **Geometry** • **Number**
What is needed to master the learning?	**Dealing with Data** Identify sources of primary and secondary data. Choose a suitable sample size and what data to collect. Design and use data collection sheets and tables.	**Algebra** Write and solve equations with fractions. Write and solve equations with the unknown on both sides. Use the priority of operations when substituting into	**Constructions** Use scales on maps and diagrams. Draw diagrams to scale. Make accurate constructions using drawing equipment. Construct accurate triangles.	**Sequences** Find and use the nth term of an arithmetic sequence. Recognise and continue geometric and quadratic sequences. Represent inequalities on a number line.	**Graphs** Draw a graph from its equation, without working out points. Write the equation of a line parallel to another line. Draw graphs with equations like ax + by = c.	**Circles, Pythagoras and prisms** Calculate and solve problems involving the circumference of a circle. Calculate and solve problems involving the area of a circle.

	Find the median from a frequency table. Estimate the mean form a large set of grouped data. Construct and use a line of best fit to estimate missing values. Draw line graphs to represent grouped data. Draw and interpret back-to-back stem and leaf diagrams. **Number** Calculate combinations of indices, fractions and brackets. Use index laws to simplify expressions. Calculate combinations of powers, roots, fractions and brackets.	algebraic expressions. Substitute values into expressions involving powers and roots. Write and use formulae. Substitute into formulae and then solve equations to find unknown values. Change the subject of a formula. Use the rules for indices for multiplying and dividing. Simplify expressions involving brackets. Factorise an expression by taking out an algebraic common factor. Multiply out double brackets and collect like terms.	Construct accurate nets of solids involving triangles. Draw loci for the paths of points. Use scale diagrams to solve problems. **Probability** Identify mutually exclusive outcomes and events. Work out the probabilities of mutually exclusive outcomes and events. Calculate estimates of probability from experiments. List all the possible outcomes of one or two events in a sample space diagram. Decide if a game is fair Show all the possible outcomes of two events in a two-way table. Calculate	Find integer values that satisfy an inequality. Construct and solve equations including fractions or powers. Write formulae connecting variables in direct or inverse proportion. Use algebra to solve problems involving direct or inverse proportion. **Multiplicative reasoning** Enlarge 2D shapes using a positive whole number scale factors and centre of enlargement. Find the centre of enlargement by drawing lines on a grid. Understand that the scale factor is the ratio of corresponding lengths.	Rearrange equations of graphs into $y = mx + c$. Solve problems using simultaneous equations. Draw graphs with quadratic equations in the form $y = x^2$. Draw and interpret graphs showing inverse proportion. Draw and interpret non-linear graphs.	Find the length of an unknown side of a right-angled triangle. Solve problems involving right-angled triangles. Calculate the volume and surface area of a right prism. Calculate the volume and surface area of a cylinder. Convert between m^3, cm^3 and mm^3. Find the lower and upper bounds for a measurement. Calculate percentage error intervals. **Comparing shapes** Use congruent shapes to solve problems about triangles and other polygons. Work out whether shapes are similar, congruent or neither.

	Estimate answers to calculations. Understand negative and 0 indices. Write large and small numbers using standard form. Enter and read standard form numbers on your calculator. Order numbers written in standard form.	**Fractions (revision)** Add and subtract fractions with any size denominator. Use appropriate methods for multiplying fractions. Use strategies for dividing fractions. Find the reciprocal of a number. Write a mixed number as an improper fraction. Use the four operations with mixed numbers.	probabilities from two-way tables. Draw Venn diagrams. Calculate probabilities from Venn diagrams.	Enlarge 2D shapes using a negative whole number scale factors. Enlarge 2D shapes using a fractional scale factor. Find an original value using inverse operations. Calculate percentage change. Solve problems using compound measures. Solve problems using constant rates and related formulae. Solve best-buy problems. Solve problems involving inverse proportion.		Solve problems involving similar triangles. Use the tangent ratio to work out an unknown side of a right-angled triangle. Use the sine ratio to work out an unknown side of a right-angled triangle. Use the cosine ratio to work out an unknown side of a right-angled triangle. Use the trigonometric ratios to work out an unknown angle in a right-angled triangle.
Prior knowledge	**Averages and range** – midpoints, identifying mode, median, range, drawing stem and leaf diagrams, understand	**Algebra** – simplify simple expressions, multiply, and divide simple terms, use index notation, recognise equivalent	**Constructions,**– measure and draw lines, write a ratio in it's simplest from, know the 8 points of the compass, draw a net of a 3D	**Sequences** – simple arithmetic sequences, missing terms, term-to-term rules, substitution, solving simple equations.	**Graphs** - Coordinate pairs from $y = 4x$	**Right-angled triangles** – calculating squares and square roots, rounding, simplifying fractions, calculator

	inequality notation, read data from a frequency table, plot coordinates in the first quadrant, read values from a graph. Students should have experience of tally charts. Students will have used inequality notation. Students must be able to find the midpoint of two numbers. Students should be able to use the correct notation for time using 12- and 24-hour clocks. **Number** – list primes, factors, multiples, convert metric units, use simple powers of 10. Students will have an appreciation of place value and recognise even and odd numbers.	expressions, apply four operations. **Fractions**– find equivalent fractions, simplify fractions, divide larger numbers by smaller numbers, multiply a whole number by a fraction. Students should be able to use the four operations of number. Students have a basic understanding of fractions as being 'parts of a whole'. Students should know number complements to 10 and multiplication tables.	shapes, know clockwise and anticlockwise, identify congruent shapes. Students should be able to recall names of common 2D shapes. Students should be able to know the properties of special triangles and quadrilaterals. Students should understand the meaning of 'congruence' Students should be able to convert between metric measurements of length. **Probability** – add and multiply fractions and decimals, convert between FDP, understand the terms impossible, unlikely, even chance, likely, certain, calculate theoretical	**Multiplicative reasoning** – identify the value of a digit in a decimal, convert common fractions, write one number as a fraction or another. Students should know number complements to 10 and multiplication tables. Students should be able to define percentage as 'number of parts per hundred'.	Multiplying with negative numbers Ordering time / distance graphs according to speed. Completing a table of values for $y = 2x + 2$ and using it to plot its graph (positive values of x). Finding the midpoint of vertical, horizontal and diagonal line segments. Round to 2 decimal places. Convert minutes to hours. Know the equivalence of simple fractions and decimals. Use mental methods to find 10% and 15% of a quantity.	skills, identify the hypotenuse. Students should be able to rearrange simple formulae and equations, as preparation for rearranging trigonometric formulae. Students should recall basic angle facts. Students should understand when to leave an answer in surd form. Students can plot coordinates in all four quadrants and draw axes.

	Students will have knowledge of using the four operations with whole numbers. Students should have knowledge of integer complements to 10 and to 100. Students should have knowledge of strategies for multiplying and dividing whole numbers by 2, 4, 5, and 10. Students should be able to read and write decimals in figures and words.		probabilities for simple situations. Students should be able to add and subtract fractions. Students should be able to list outcomes. Students should be able to compare fractions.			
Misconceptions	Making the wrong link between what the data in a frequency table represents, so for example may state the 'frequency' rather than the interval when	The larger the denominator the larger the fraction. Not making the fractions have equal denominators before calculating.	Incorrect links between fractions and decimals, such as thinking that 15 = 0.15, 5% = 0.5, 4% = 0.4, etc.		Accuracy in plotting graphs – uneven intervals or incorrectly marked scales. Not knowing which points to use to find the gradient.	Misunderstanding of answers displayed on a calculator in surd form. Students forget to square root their final answer or

	asked for the modal group. Students may write statements such as 150 − 210 = 60. Significant figures and decimal place rounding are often confused. Some students may think 35 877 = 36 to two significant figures. The order of operations is not applied correctly when squaring negative numbers. 10^3 is interpreted as 10 × 3. 1 is a prime number. 'Product' being related to addition. Poor number skills involving negatives and times tables.	Adding numerators and denominators together. Confusing rules for multiplying and adding fractions. Not simplifying before / after multiplying fractions. Writing decimal equivalent of e.g. 5/6 as 5.6 Assuming that division always makes things smaller. Viewing the mixed number as two separate numbers.	It is not possible to have a percentage greater than 100%.		Thinking that lines parallel to x-axis will be $x = c$ rather than $y = c$. Dealing with negative values of x when substituting to complete a table of values. Working out a gradient when the scales are different on each axis. Students read hours and minutes as a decimal, e.g. 1 h 48 m = 1.48 h. Students may calculate a proportion as though it is a ratio, e.g. 2 out of 5 calculated as 2 ÷ 7. Students do not convert quantities to the same unit before comparing. Students do not know whether to multiply or divide by a multiplier.	round their answer prematurely. Labelling sides incorrectly. Confusion between use of Pythagoras and Trigonometry.

2024-2025	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
Year 10						
Learning	**Priority of operations, rounding, estimation, prime factor decomposition, HCF and LCM.** **Expressions, indices, expand brackets, factorise, formulae.**	**Fractions and percentages** **All transformations** **Averages and range**	**Geometric problems with properties of quadrilaterals, congruent shapes and angle reasoning.** **Probability – mutually exclusive events, sample space and two-way tables, venn diagrams, experimental results, tree diagrams and independent events.**	**Equations, inequalities, formulae and sequences.** **Graphs, tables and charts.**	**Perimeter, area and volume.** **Ratio and proportion problems.**	**Graphs –** **Draw and name straight line graphs, interpret gradient, use distance-time and other real-life graphs.**
Concepts	• **Number** • **Algebra**	• **Number** • **Geometry** • **Statistics**	• **Geometry** • **Probability**	• **Algebra** • **Statistics**	• **Number** • **Geometry** • **Ratio, proportion & rates of change**	• **Algebra** • **Ratio, proportion & rates of change**
What is needed to master the learning?	**Number** Use priority of operations with positive and negative numbers.	**Fractions and percentages** Compare, add and subtract fractions.	**Angles** Solve geometric problems using side and angle properties of quadrilaterals.	**Equations, inequalities, formulae and sequences** Solve simple linear equations.	**Perimeter, area, and volume** Calculate the perimeter and area of rectangles,	**Graphs** Find the midpoint of a line segment. Recognise, name and plot straight-

	Use inverse operations. Round to a given number of decimal place and significant figures. Multiply and divide decimal numbers. Estimate calculations. Find the HCF and LCM of two numbers by listing and prime factor decomposition. Find square roots and cube roots. Understand surd notation on a calculator. **Algebra** Write and simplify expressions. Use the index laws. Multiply and divide expressions. Substitute numbers into expressions.	Find a fraction of a quantity or measurement. Use fractions to solve problems. Multiply whole numbers, fractions and mixed numbers. Simplify calculations by cancelling. Divide a fraction by a whole number or a fraction. Convert between fractions, decimals and percentages. Use percentages to solve problems. Calculate simple interest. Use percentages in real-life situations. **Transformations** Translate a shape on a coordinate grid. Use a column vector to describe a translation.	Identify congruent shapes. Understand and use the angle properties of parallel lines. Find missing angles using corresponding and alternate angles. Solve angle problems in triangles. Understand angle proofs about triangles. Calculate the interior and exterior angles of regular polygons. Solve angle problems using equations. Solve geometrical problems showing reasoning. **Probability** Calculate simple probabilities from equally likely events.	Solve two-step equations. Solve linear equations with brackets. Solve equations with unknowns on both sides. Solve simple linear inequalities. Represent inequalities on a number line. Solve two-sided inequalities. Change the subject of a formula. Know the difference between an expression, an equation, a formula and an identity. Recognise and extend sequences. Find and use the nth term of an arithmetic sequence.	parallelograms and triangles. Calculate the area and perimeter of trapezia. Convert between area measures. Calculate the perimeter and area of shapes made from triangles and rectangles. Calculate the surface area of a cuboid and prism. Calculate the volume of a cuboid and prism. Solve problems involving surface area and volume. Convert between measures of volume. **Ratio and proportion** Divide a quantity into 2 or 3 parts in a given ratio.	line graphs parallel to the axes. Plot straight-line graphs from tables of values. Find the gradient of a line. Identify and interpret the gradient from an equation. Find the equations of straight-line graphs in the form $y = mx + c$. Draw and interpret graphs from real data. Use distance–time graphs to solve problems. Draw distance–time graphs. Interpret rate of change graphs. Draw and interpret a range of graphs. Understand when predictions are reliable.

	Substitute numbers into a simple formula. Expand brackets. Simplify expressions with brackets. Factorise algebraic expressions. Write expressions and simple formulae to solve problems. Use maths and science formulae.	Draw reflections on a coordinate grid. Describe reflections on a coordinate grid. Rotate a shape on a coordinate grid. Describe a rotation. Enlarge a shape by a scale factor. Enlarge a shape using a centre of enlargement. Describe an enlargement. Transform shapes using more than one transformation. Describe combined transformations of shapes on a grid. **Averages and range** Calculate the mean from a list and from a frequency table. Compare sets of data using the mean and range. Find the mode, median and range from a stem and leaf diagram. Identify outliers.	Understand mutually exclusive and exhaustive outcomes. Use two-way tables to record the outcomes from two events. Work out probabilities from sample space diagrams. Find and interpret probabilities based on experimental data. Use Venn diagrams to work out probabilities. Understand the language of sets and Venn diagrams. Use frequency trees and tree diagrams. Understand independent events. Solve probability problems involving	**Graphs, tables, and charts** Reading data from tables. Design and use two-way tables. Interpret and compare data shown in bar charts, line graphs and histograms. Construct and interpret stem and leaf and back-to-back stem and leaf diagrams. Draw and interpret pie charts. Plot and interpret scatter graphs. Use the line of best fit to predict values.	Solve word problems using ratios. Solve proportion problems in words. Work out which product is better value for money. Recognise and use direct proportion on a graph. Understand the link between the unit ratio and the gradient. Solve word problems involving direct and inverse proportion.	

		Estimate the range from a grouped frequency table. Recognise the advantages and disadvantages of each type of average. Find the modal class. Find the median from a frequency table. Estimate the mean of grouped data. Understand the need for sampling. Understand how to avoid bias.	events that are not independent.			
Prior knowledge	**Number** – rounding, multiplying, and dividing by powers of 10, understanding the meaning of prime, factors, multiples, converting between metric units, listing factors and multiples. Students will have an appreciation of place value and	**Fractions and percentages** – equivalence, simplifying, converting units of length, adding and subtracting fractions, mixed numbers, and improper fractions, multiply a whole number by a fraction, convert common fractions into decimals and percentages.	**Angles** – lines of symmetry, drawing angles, parallel, perpendicular, acute, obtuse, know properties of quadrilaterals and special triangles, use angle facts. Students should be able to use a ruler and protractor. Students should have an understanding of	**Equations, inequalities, and sequences** – inverse operations, solve simple one-step equations, function machines, expanding single brackets, recognise inequality symbols, simple arithmetic sequences, term-to-term rules, substitution.	**Perimeter, area, and volume** – perpendicular, converting between units of length, multiplying, and dividing by powers of 10, describe shapes using correct vocabulary. Students should be able to measure lines and recall the	**Graphs** – plot coordinates and read scales, substitute into a formula. Students should be able to halve a number. Students should be able to solve for an unknown. Students should be able to read scales.

	recognise even and odd numbers. Students will have knowledge of using the four operations with whole numbers. Students should have knowledge of integer complements to 10 and to 100. Students should have knowledge of strategies for multiplying and dividing whole numbers by 2, 4, 5, and 10. Students should be able to read and write decimals in figures and words. **Algebra** – basic expressions, calculating with positive and negative integers, HCF, simple substitutions.	Students should be able to use the four operations of number. Students should be able to find common factors. Students have a basic understanding of fractions as being 'parts of a whole'. Students should be able to define percentage as 'number of parts per hundred'. Students should know number complements to 10 and multiplication tables. **Transformations –** recall basic shapes, plot points in 4 quadrants, understand the concept of rotation, reflect in a mirror line, translate on a square grid, y=x, y=-x, clockwise and anticlockwise. Students should be able to list the four	angles as a measure of turning. Students should be able to name angles and distinguish between acute, obtuse, reflex and right angles. Students should recognise reflection symmetry, be able to identify and draw lines of symmetry, and complete diagrams with given number of lines of symmetry. Students should recognise rotation symmetry and be able to identify orders of rotational symmetry, and complete diagrams with given order of rotational symmetry. **Probability** – add and multiply fractions and decimals, convert between FDP, understand the terms impossible, unlikely, even	Students should be able to use inequality signs between numbers. Students should be able to use negative numbers with the four operations, recall and use the hierarchy of operations and understand inverse operations. Students should be able to deal with decimals and negatives on a calculator. Students should be able to use index laws numerically. Students should be able to draw a number line. **Graphs, tables, and charts** – tally charts, convert between 12- and 24-hour clock times, interpreting charts, ordering numbers, circle knowledge, plot	names of 2D shapes. Students should be able to use strategies for multiplying and dividing by powers of 10. Students should be able to find areas by counting squares and volumes by counting cubes. Students should be able to interpret scales on a range of measuring instruments. **Ratio and proportion** – know the four operations of number, have a basic understanding of fractions, find the scale factor of an enlargement, draw a line graph from a table of values. Students should be able to multiply and	Students should be able to use a function machine. Students should be able to understand that parallel lines will never meet. Students should be able to draw a line with a given gradient. Students should be able to interpret scales. Students should understand and use the relationship between distance, average speed and time.

		types of transformations. Students should be able to define the word perpendicular. Students should be able to find the scale factor from object to image. Students should be able to recognise properties of enlargements. Students should be able to simplify fractions. **Averages and range** – identify mode, median and range, reading data from a frequency table. Students should be able to calculate the midpoint of two numbers. Students will have drawn the statistical diagrams in “Graphs, Charts & Tables”. Students will have used inequality notation.	chance, likely, certain, calculate theoretical probabilities for simple situations. Students should be able to add and subtract fractions. Students should be able to list outcomes. Students should be able to compare fractions. Students should be able to list primes and multiples.	coordinates in the first quadrant, read values from a graph. Students should be able to read scales on graphs, draw circles, measure angles and plot coordinates in the first quadrant, and know that there are 360 degrees in a full turn and 180 degrees at a point on a straight line. Students should have experience of tally charts. Students will have used inequality notation. Students must be able to find the midpoint of two numbers. Students should be able to use the correct notation for time using 12- and 24-hour clocks.	divide whole numbers. Students should be able to find the HCF of a pair of numbers. Students should be able to use index notation. Students should be able to write a ratio in its simplest form. Students should be able to understand and use y=mx+	

Misconceptions	Students may write statements such as 150 − 210 = 60. Significant figures and decimal place rounding are often confused. Some students may think 35 877 = 36 to two significant figures. The order of operations is not applied correctly when squaring negative numbers. 10^3 is interpreted as 10 × 3. 1 is a prime number. 'Product' being related to addition. Poor number skills involving negatives and times tables. $3(x + 4) = 3x + 4$. Students may think that it is always	The larger the denominator the larger the fraction. Incorrect links between fractions and decimals, such as thinking that 15 = 0.15, 5% = 0.5, 4% = 0.4, etc. It is not possible to have a percentage greater than 100%. The concept of an unbiased sample is difficult for some students to understand. Often the $\sum(m \times f)$ is divided by the number of classes rather than $\sum f$ when estimating the mean. Lines of best fit are often forgotten. Interpreting scales of different measurements and confusion	Perpendicular lines have to be horizontal/vertical. All triangles have rotational symmetry of order 3. Some students will think that all trapezia are isosceles, or a square is only square if 'horizontal', or a 'non-horizontal' square is called a diamond. Some students may think that the equal angles in an isosceles triangle are the 'base angles'. Incorrectly identifying the 'base angles' (i.e. the equal angles) of an isosceles triangle when not drawn horizontally. All polygons are regular.	Rules of adding and subtracting negatives. Inverse operations can be misapplied. When solving inequalities, students often state their final answer as a number quantity and either exclude the inequality or change it to =. Making the wrong link between what the data in a frequency table represents, so for example may state the 'frequency' rather than the interval when asked for the modal group. For pie charts; Same size sectors for different sized data sets represent the same number rather than the same proportion.	Shapes involving missing lengths of sides often result in incorrect answers. Students often confuse perimeter and area. Volume often gets confused with surface area.	Accuracy in plotting graphs – uneven intervals or incorrectly marked scales. Not knowing which points to use to find the gradient. Thinking that lines parallel to x-axis will be $x = c$ rather than $y = c$. Dealing with negative values of x when substituting to complete a table of values. Working out a gradient when the scales are different on each axis.

	true that a = 1, b = 2, c = 3. If a = 2 sometimes students interpret 3a as 32. Making mistakes with negatives, including the squaring of negative numbers.	between x and y axes when plotting points.				

2024-2025	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
Year 11						
Learning	**All transformations on a co-ordinate grid and equations of straight lines.** **Pythagoras' theorem and trigonometry in right-angled triangles.** **Probability – mutually exclusive events, sample space and two-way tables, venn diagrams, experimental results, tree diagrams and independent events.**	**Multiplicative reasoning - compound measures,** **Constructions, loci and bearings**	**Quadratic equations and graphs.** **Perimeter, area and volume.**	**Fractions, indices and standard form (revision).** **Congruence, similarity and vectors.** **Cubic & reciprocal graphs, solve simultaneous equations, change the subject of a formula.**	**BESPOKE REVISION**	**EXAMS**
Concepts	• **Ratio, proportion & rates of change** • **Geometry** • **Probability**	• **Ratio, proportion & rates of change** • **Geometry**	• **Algebra** • **Geometry**	• **Number** • **Ratio, proportion & rates of change** • **Geometry** • **Algebra**		

What is needed to master the learning?	**Transformations** Translate a shape on a coordinate grid. Use a column vector to describe a translation. Draw and describe reflections on a coordinate grid. Rotate and describe the rotation of a shape on a coordinate grid. Enlarge a shape using a centre of enlargement. Describe an enlargement. Perform & describe combined transformations of shapes on a grid. Find the equations of straight-line graphs. Sketch graphs given the values of m and c.	**Multiplicative reasoning** Solve problems involving compound measures. Convert between metric speed measures. Calculate average speed, distance and time. Use formulae to calculate speed and acceleration. Use ratio and proportion in measures and conversions. Use inverse proportions. **Constructions, loci and bearings** Identify and sketch planes of symmetry of 3D shapes. Make accurate drawings of triangles using a ruler, protractor and compasses. Identify SSS, ASA, SAS and RHS triangles	**Quadratic equations and graphs** Multiply double brackets. Recognise quadratic expressions. Square single brackets. Plot graphs of quadratic functions. Solve quadratic equations $ax^2 + bx + c$=0 using a graph. Factorising quadratic expressions. Solving quadratic equations algebraically **Perimeter, area and volume** Solve problems involving the circumference of a circle. Solve problems involving the area of a circle.	**Fractions, indices and standard form** Multiply and divide mixed numbers and fractions (revision) To know and use the laws of indices (revision). Write large numbers in standard form. Write small numbers in standard form. Convert numbers from standard form with negative powers of ordinary numbers To add, subtract, multiply and divide numbers in standard form. **Congruence, similarity and vectors** Use similarity to solve angle problems.	**BESPOKE REVISION**	**EXAMS**

	Right-angled triangles Calculate the length of the hypotenuse in a right-angled triangle. Calculate the length of a shorter side in a right-angled triangle. Solve problems using Pythagoras' theorem. Use the sine, cosine & tangent ratio to calculate the length of a side or a missing angle in a right-angled triangle. Solve problems using an angle of elevation or depression. Know the exact values of the sine, cosine and tangent of some angles. **Probability** Calculate simple probabilities from	as unique from a given description. Identify congruent triangles Use scales on maps and diagrams to work out lengths and distances. Draw lengths and distances correctly on given scale drawings. Accurately draw angles and 2D shapes using a ruler, protractor and compasses. Recognise nets and make accurate drawings of nets of common 3D objects. Bisect angles and lines using rulers and compasses. Draw loci for the path of points that follow a given rule. Find and use three-figure bearings. Use angles at parallel lines to work out bearings.	Give answers in terms of π. Solve problems involving sectors of circles. Solve problems involving areas and perimeters of 2D shapes. Work out the volume and surface area of cylinders. Work out the surface area of a pyramid, cone & sphere. Work out the volume and surface area of composite solids.	Understand the similarity of regular polygons. Calculate perimeters of similar shapes. Recognise congruent shapes. Use congruence to work out unknown angles and sides. Add and subtract vectors. Find the resultant of two vectors. Find multiples of a vector. **More algebra** Draw and interpret graphs of cubic functions. Draw and interpret graphs of y = 1/x. Draw and interpret non-linear graphs to solve problems. Solve simultaneous equations by drawing a graph.		

	equally likely events. Understand mutually exclusive and exhaustive outcomes. Use two-way tables to record the outcomes from two events. Work out probabilities from sample space diagrams. Find and interpret probabilities based on experimental data. Use Venn diagrams to work out probabilities. Understand the language of sets and Venn diagrams. Use frequency trees and tree diagrams. Understand independent events.	Solve problems involving bearings and scale diagrams.		Write and solve simultaneous equations. Change the subject of a formula. Identify expressions, equations, formulae and identities. Prove results using algebra.		

	Solve probability problems involving events that are not independent.					
Strands	Ratio and proportion Geometry Number Statistics	Number Ratio and proportion Geometry	Number Algebra Geometry	Number Ratio and proportion Geometry Algebra		
Prior knowledge	**Transformations –** recall basic shapes, plot points in 4 quadrants, understand the concept of rotation, reflect in a mirror line, translate on a square grid, y=x, y=-x, clockwise and anticlockwise. Students should be able to list the four types of transformations. Students should be able to define the word perpendicular. Students should be able to find the scale factor from object to image.	**Multiplicative reasoning** – interpret scales on a range of measuring instruments, convert between metric units, understand ratio notation, find percent of an amount, rearrange equations, know the relationship between distance, average speed and time. Students should be able to work out percentage increase and decrease. Students should be able to write powers of numbers in index form.	**Quadratic equations and graphs** – square negative numbers, substitute into formulae, plot points on a coordinate gris, expand single brackets and collect like terms. Students should be able to work out area of a shape using algebraic terms. Students should be able to identify the equation of the mirror line. Students should be able to define	**Fractions, indices and standard form** – four operations of fractions, improper fractions and mixed numbers, powers of 10 in index form, index laws for multiplying and dividing positive integer powers. Students should be able to convert between fractions, mixed number and improper fractions. Students should be able to evaluate simple powers,		

	Students should be able to recognise properties of enlargements. Students should be able to simplify fractions. **Right-angled triangle** – rearrange simple formula and equations, recall basic angle facts, plot co-ordinates in all four quadrants, rounding to a specific degree of accuracy. Students should be able to calculate simple square and square roots. Students should be able to substitute into and evaluate expressions. Students should be able to simplify fractions.	Students should be able to substitute into and solve equations. Students should be able to calculate the area of a trapezium. Students should be able to write a ratio as a unit ratio. **Constructions, loci and bearings** – measure and draw lines, write a ratio in it's simplest from, know the 8 points of the compass, draw a net of a 3D shapes, know clockwise and anticlockwise, identify congruent shapes. Students should be able to recall names of common 2D shapes. Students should be able to know the properties of special triangles and quadrilaterals. Students should understand the	the origin and x-axis on a graph. Students should be able to work out factor pairs of negative numbers. **Perimeter, area and volume** – area of a rectangle, use a calculator, name common 3D shapes, define parts of a circle, substitute into formulae and solve for the unknown, work out the volume of cuboids and prisms. Students should be able to round accurately to a given number of significant figures or decimal places. Students should be able to solve equations. Students should be able to	Students should be able to use correct priority of operations. **Congruence, similarity and vectors** – recall and apply Pythagoras' theorem, recognise and enlarge shapes, know how to calculate area and volume, measure line and angles, know the properties of alternate, corresponding and vertically opposite angles, identify congruent and similar shapes. Students should be able to find equivalent fractions. Students should be able to understand squares and		

	Students should be able to use sin/cos/tan keys on the calculator. **Probability** – add and multiply fractions and decimals, convert between FDP, understand the terms impossible, unlikely, even chance, likely, certain, calculate theoretical probabilities for simple situations. Students should be able to add and subtract fractions. Students should be able to list outcomes. Students should be able to compare fractions. Students should be able to list primes and multiples.	meaning of 'congruence' Students should be able to convert between metric measurements of length. Students should be able to identify parallel and perpendicular lines.	evaluate squares and square roots. Students should be able to simplify fractions. Students should be able to work out the area of 2D shapes. Students should be able to work out the length of the hypotenuse using Pythagoras' theorem.	cubes of whole numbers and decimals. Students should know that the sum of the angles in a triangle must be 180. Students should be able to add and subtract with negative numbers. **More algebra** – draw linear graphs, plot co-ordinates, substitute into and solve equations, use formulae, recall and use the priority of operations and use of inequality symbols. Students should be able to recognise the shape of line and quadratic graphs. Students should be able to write		

				algebraic expressions. Students should be able to add and subtract positive and negative terms. Students should be able to identify inverse operations for algebraic terms.		
Misconceptions		Shapes involving missing lengths of sides often result in incorrect answers. Students often confuse perimeter and area. Volume often gets confused with surface area. Lines of best fit are often forgotten. Interpreting scales of different measurements and confusion between x and y axes when plotting points.	Misunderstanding of answers displayed on a calculator in surd form. Students forget to square root their final answer or round their answer prematurely. Labelling sides incorrectly. Confusion between use of Pythagoras and Trigonometry. Students find it difficult to	Diameter and radius are often confused and recollection which formula to use for area and circumference of circles is often poor. Misconceptions involving order of operations when substituting into formulae or order when re-arranging formulae. Incorrect formulae used for	Some pupils may use the wrong scale of a protractor. For example, they measure an obtuse angle as 60° rather than as 120°. Often 5 sides only are drawn for a cuboid.	

		Missing terms when expanding double brackets, lack of structure to method. X multiplied by x is 2x not x squared. Simplifying mistakes, particularly misunderstanding negative rules. Joining points on a quadratic graphs with straight lines. Mistakes when substituting negative values into a quadratic expression.	understand that two vectors can be parallel and equal as they can be in different locations in the plane.	compound measures. Units do not match for compound measures.		