

Y9 Long Term Curriculum Map

Dates taught / curriculum time	PRIOR KNOWLEDGE What should they already know / when was this last visited	CORE KNOWLEDGE What will they know at the end of this topic		MISCONCEPTIONS/ THRESHOLD CONCEPTS	AMBITION FOR ALL QUESTIONS	FORMAL ASSESSMENT
		Learn that...	Learn how to...			
HT1 Percentages and Proportion	- Represent percentages as fractions and decimals - Percentage multipliers - Percentage increase and decrease - Proportional reasoning	- Original x multiplier = new - Simple interest and compound interest are different - If $y = kx$, where k is a constant, then y is directly proportional to x - If $y = k/x$, where k is a constant, then y is inversely proportional to x	- Apply original x multiplier = new to percentage change problems (including original value problems) - Calculate simple and compound interest (including in financial contexts) - Solve problems step-by-step involving multipliers over a given interval (for example compound interest, depreciation) - Apply percentage knowledge to real financial problems including interest rates, credit cards, bank accounts and loans. - Calculate reverse percentages - Express exponential growth or decay as a formula - Interpret answers in growth and decay problems - Solve simple problems involving quantities in direct and inverse proportion including algebraic proportions. - Formulate equations and solve problems involving a quantity in direct proportion to a power or root of another quantity. - Solve simple word problems involving quantities in inverse proportion or simple algebraic proportions - Formulate equations and solve problems involving a quantity in inverse proportion to a power or root of another quantity - Solve currency conversion problems - Recognise and interpret graphs that illustrate direct and inverse proportion	- Forgetting that the multiplier when it is a percentage increase is 1._ - When it is a reduction they may forget to take away from 100% or 1 - Confusing inverse proportion with direct proportion	- What is a percentage? - How do you express a percentage as a fraction? - How do you express a percentage as a decimal? - What is a multiplier? - What is simple interest? - What is compound interest? - Increase (say number/value) by (say percentage) - Decrease (say/number/value) by (say percentage) - What is the equation used for direct proportion?	Formal assessment at the end of HT1 X:\Teaching Departments\Maths\Resources 2021-2022\Assessments\HT1 50 marks – mixture of AO1, AO2 and AO3

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HT1 Similarity	Area and volume of shapes	- Congruent shapes are the same size - Similar shapes are the same shape but can be different sizes	- Identify and prove that shapes are congruent - Prove that two triangles are congruent using the cases SSS, ASA, SAS and RHS - Identify and prove that shapes are similar - Use scale factors and how they affect dimensions - Understand the relationship between lengths, areas, and volumes of similar shapes	- Confusing congruency and similarity - Calculating the scale factor the wrong way e.g. saying 25 to 5 has a scale factor of 5 rather than 1/5	- What does it mean for two shapes to be congruent? - What does it mean for two shapes to be similar? - What is a scale factor? - What is a criteria needed for shapes to be congruent? - What is a criteria needed for shapes to be similar?	
HT2 Algebra specifics	Basic algebra - solving, substitution, re-arranging,	- Substitute means put in place of - Solving and re-arranging are the same skill - In SUVAT - a is constant acceleration - u is initial velocity - v is final velocity - s is displacement (from position when t = 0) - t is time taken	- Substitute values into simple expressions - Substitute values into complex formula - Substitute into the SUVAT equation $v = u + at$ $s = ut + \frac{1}{2}at^2$ $v^2 = u^2 + 2as$ - Re-arrange equations to make 'x' the subject - Function machines of basic input	- You always have to have x - The answer always has to be on the right hand side of the equals sign - When substitution into a variable such as 2f, the numbers go next to each other not multiplied by each other	- What does substitute mean? - Substitute x = ? into $2x \cdot x + 3$, - Why do we re-arrange an equation? - re-arrange to make y the subject $y + 3 = x$ - What purpose is there of using a function machine? - If the input is 3, use a function machine for 2x to find an output.	
HT2 Linear Graphs	- Understanding of Cartesian graphs and coordinates. - Knowledge of rearranging to solve equations	- The equation of a line is $y = mx + c$ where m is the gradient and c is the y intercept - The gradient relates to the steepness of a line - The y intercept is where the line crosses the y axis at the point (0,y) - Coordinates have the form (x , y) - Parallel lines have the same gradient - Perpendicular lines have the negative reciprocal gradients - Gradient = change in y / change in x	- Plotting coordinates - Calculate the midpoint of a line - Calculate where two lines intersect – link to simultaneous equations but do not teach - Generate coordinates given an equation of a line - Apply algebraic rules to rearrange formula into the form $y = mx + c$ - Derive the equation of line from a given line on a graph - To derive the equation of a line given the gradient and y intercept - Derive the equation of a line given a point and the gradient - Derive the equation of a line given two points - Calculate gradients from a line graph	- mx is the gradient not m - Getting the x and y axis the wrong way around (y , x) - Gradient = change in x/ change in y - Thinking the reciprocal of 3 is 3	- What is the equation of a straight line? - What does m stand for? - What does c stand for? - What is a gradient? - What is a y intercept? - What is the formula used to calculate the gradient? - What makes two lines parallel? - What makes two lines perpendicular? - What is a negative reciprocal? - What would the x coordinate be when a line crosses the y intercept?	Formal assessment at the end of HT2 50 marks – mixture of AO1, AO2 and AO3

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			- Calculate gradient from a set of coordinates - Calculate perpendicular gradients			
HT2 Vectors	- Substitute values into expressions	- Vectors can be added subtracted and scalar multiplied 2-dimensional vectors can be represented as column vectors	- Represent 2-dimensionsal vectors as column vectors - Draw column vectors on a square or coordinate grid - Add, subtract and scalar multiply vectors - Combining basic vectors - Use vectors in geometric arguments and proofs	- Vectors can go in either direction - Vector notation has a line like a fraction - Vector notation are coordinates	- What is a vector? - What is a column vector? - Describe how you would add vectors - Describe how you would subtract vectors - What is a scalar multiplication? - Describe how you would multiply a vector using scalar multiplication	
HT3 Transformations	Understanding of - Lines of symmetry - Rotational symmetry - Vectors	- Translations can be described using a column vector instruction - In column vector notation x is horizontal, y is vertical and negative values represent left and downwards movements. - A rotation is described using a centre point, a direction of rotation and an angle of turn. - That lines of symmetry (or lines to be used for reflection) can be identified by giving the equation of the line. - Enlargements are described using a centre and scale factor. - Fractional scale factors reduce the size of an object - Negative scale factors resize and rotate objects - Multiple transformations can often be described using one single transformation	- Translate objects on a grid by a given vector - Describe the translation of an object using a column vector - Rotate objects using a given set of instructions - Describe the rotation of an object giving its centre, angle and direction. - Reflect an object in a given or indicated line, both parallel to the axis and orthogonally. - Enlarge an object from a centre of enlargement by a given scale factor - Enlarge a shape with a negative scale factor - Describe an enlargement by giving the centre of enlargement and the scale factor - Describe multiple (two mostly) transformations as a single transformation.	- Transformation is a translation - Enlargements only make things bigger - You can only rotate around the origin	- What are the 4 main transformations? - How is a translation described? - How is a rotation described? - How is a reflection described? - How is an enlargement described? - What is the equation of the positive line going through the origin at 45°? - How do you find the centre of a rotation? - What effect does a fractional scale factor have on an enlargement? - What effect does a negative scale factor have on an enlargement?	Formal assessment at the end of HT3 50 marks – mixture of AO1, AO2 and AO3

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HT3 Probability	Understanding - The language of probability - Calculating simple probabilities - Basic probabilities - Flipping a coin will have a 50% chance of landing on heads - Understand key words used in probability e.g. event, outcome, certain etc.	- Possibility is described in words and probability is a numerical scale from 0 to 1. - The related probabilities of an event sum to 1 - A number line can represent this scale - Relative frequency is a probability value assigned to an event based on experimental data - A two-way table can be used to find all the possible outcomes of pairs of combined events - A Frequency tree can be used to calculate the probabilities of combined events, Sample space diagrams are used to show the outcome of two events	- Describe possibilities in words; impossible, certain, likely etc - Complete relative frequency tables based on experimental events - Place events on a probability scale - Use and complete two way tables - Use and complete frequency trees - Use tables and grids to list the outcomes of single events and simple combinations of events - Draw a sample space diagram to describe all of the possible outcomes - Use a sample space diagram to calculate the theoretical probability of a single outcome - Use a sample space diagram to calculate the theoretical probability of multiple outcomes - Evaluate the most appropriate probability diagram to use for a problem and solve complex probability problems - Use systematic listing strategies. - Use the product rule for counting numbers of outcomes of combined events.	- Probability can be greater than 1 - Probability can be given as a percentage - The number you are working the probability of is not the numerator out of the fraction (e.g. rolling a 3 on the dice does not have a probability of 3/6)	- What is the likelihood of “event x” - If the probability of A = x, what is the probability of not A - If A occurs x times in y trials, what is the relative frequency of A - What is the sum of all probabilities calculated from a two-way table - What are sample space diagrams used for? - How can a sample space be used to calculate probability? - What is the probability if an event is certain? - What is the probability if an event is impossible? - What scale is probability always between? - What is relative frequency? - How do you calculate relative frequency? - What should all frequencies add up to?	
HT4 Pythagoras and trigonometry	Substitution into formulae	Pythagoras’ Theorem can be used to find missing sides of a right angled triangle - The exact value of $\sin\theta$ and $\cos\theta$ for $\theta = 0, 30, 45, 60$ and 90 - The exact values of $\tan\theta$ for $\theta=0, 30, 45$ and 60 Trigonometric graphs are periodic and learn their general shapes	- Substitute into equations - Identify the hypotenuse of a triangle - Derive Pythagoras’ Theorem - Apply Pythagoras’ theorem $a^2 + b^2 = c^2$ to find the hypotenuse of a right angled triangle - Apply Pythagoras’ Theorem to find the shorter sides of a triangle - Solve problems using Pythagoras’ - Use Pythagoras Theorem in two dimensional figures - Apply Pythagoras in real life (e.g. ladder) - Apply Pythagoras to graphing - Apply Pythagoras’ Theorem to 3D shapes - Apply Pythagoras to real life (Pyramids) - Solve equations (with fractions)	- C is not the hypotenuse - The opposite and adjacent side length are interchangeable - Mistaking the inverse operation when changing the subject - Using Pythagoras for triangles that do not have a right angle - Not square rooting the answer	- What is Pythagoras theorem and what is it used for? - What is a hypotenuse? - How can $a^2 + b^2 = c^2$ be rearranged to find a side length that isn’t the hypotenuse? - Which type of triangles can SOHCAHTOA used and what does it calculate? - What is the value of $\sin 0^\circ$? - What is the value of $\sin 30^\circ$? - What is the value of $\sin 45^\circ$? - What is the value of $\sin 60^\circ$? - What is the value of $\sin 90^\circ$? - What is the value of $\cos 0^\circ$? - What is the value of $\cos 30^\circ$? - What is the value of $\cos 45^\circ$? - What is the value of $\cos 60^\circ$? - What is the value of $\cos 90^\circ$?	

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			- Re-arrange equations to have x as the subject (with fractions) - Identify the opposite side, adjacent side and hypotenuse of a triangle given an angle - Know the trigonometric ratios for sinθ, cosθ and tanθ - Apply the ratios for sinθ, cosθ and tanθ to find missing angles in right-angled triangles - Apply the ratios for sinθ, cosθ and tanθ to find missing sides in right angled triangles - Find exact trig angles Sketch trigonometric graphs, including labelling key points (turning points, intercepts, maximum and minimum points) - Apply Pythagoras' Theorem and trigonometric ratios to 2D figures to solve problems - Use method selection for Pythagoras vs Trigonometric ratios	SOHCAHTOA being used incorrectly - Not doing the inverse operation when finding an angle using SOHCAHTOA	- What is the value of tan0? - What is the value of tan30? - What is the value of tan45? - What is the value of tan60? - What is a turning point on trigonometric graphs? - What are maximum and minimum points on trigonometric graphs?	
HT5 Quadratic Equations	- Expanding double brackets - Expanding and factorising single brackets - Plotting linear graphs	Quadratic graphs take the shape of a parabola - The roots of a quadratic are where the graph intercepts the x axis - A quadratic without an 'x term' must be formed by a binomial with equal and opposite constants - The quadratic formula is given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	- Expand two binomials Expand more than two binomials - Find the highest common factor of algebraic terms Factorise linear expressions into a single bracket, including positive and negative terms - Factorise a quadratic into two pairs of brackets - Factorise expressions that are the difference of two squares Factorise quadratics with a>1 - Solve by factorising Write a quadratic equation in a completed square form Use the quadratic formula to solve quadratic equations - Use a table of values to plot graphs of linear functions. - Use a table of values to plot graphs of quadratic functions. - Find the roots of a quadratic equation through factorising.	- Incorrectly squaring a negative number (e.g. $-3^2 = 9$) - Mixing up TEAM letters and finding a pair that multiply to the middle and add to the end - Not noticing when a quadratic is in the form of difference of two squares - Thinking the constant terms in the double brackets are the intercepts of the graph	- What is the equation of a line? - What shape are quadratic graphs? - The roots of a quadratic graph are where the graph intercepts which axis? - What is the quadratic formula used for? - What is the quadratic formula? - What would you substitute a for in the quadratic formula? - What would you substitute b for in the quadratic formula? - What would you substitute c for in the quadratic formula? - What is a highest common factor? - What is an intercept of a graph? - What is completing the square used for? - How would you identify the turning points of a quadratic if you have completed the square?	Formal assessment at the end of HT5 50 marks – mixture of AO1, AO2 and AO3

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			- Find the turning points of a quadratic from a completed square form - Sketch a graph of a quadratic without plotting, indicating the intercepts, turning point, line of symmetry and showing the parabola as positive or negative. - Interleave topics - Pythagoras to lead to create a quadratic equation.			
HT5 Indices and Standard Form	Understanding of - Key square and cube numbers - Key square and cube roots - Writing in index form - Multiplying by 10, 100 and 1000 - Converting into and out of standard form	- To square a number, we multiply it by itself - To cube a number, we multiply it by itself and by itself again - The inverse of squaring is the square root, and the inverse of cubing is the cube root - Index laws can be used on terms that have the same base - The reciprocal of a term (or number) is one divided by that term (or number) $x^a \times x^b = x^{a+b}$ $\frac{x^a}{x^b} = x^{a-b}$ $(x^a)^b = x^{ab}$ $x^{-a} = \frac{1}{x^a}$ $x^{\frac{a}{b}} = \sqrt[b]{x^a}$ - Standard form is written as $A \times 10^n$, where $1 \leq A < 10$ and n cannot be a decimal/fraction	- Calculate squares and cubes of any numbers (including written methods for larger numbers, decimals, negatives etc.) - Estimate powers and roots (e.g. $\sqrt{51}$ to the nearest whole number) - Apply index rules to simplify basic expressions (multiplication, division, brackets rule) - Apply index rules for power of 0, negatives, fractional - Apply multiple index rules to simplify more complex expressions - Convert big numbers into standard form - Convert big numbers into ordinary form - Convert small numbers into standard form - Convert small numbers into ordinary form - Order standard form - Multiply and divide with standard form - Add and subtract with standard form	- To square a number, we multiply by 2, to cube we multiply by 3 etc. - Mixing up index laws (e.g. when we multiply terms, we multiply the powers) - Not putting a negative in the power for very small numbers in standard form	- What is the difference between squaring and cubing a number? - What is the difference between squaring and square-rooting a number? - Why are there two solutions for a square root? - What is the square/cube or square root/cube root of X? - Can you have the cube root of a negative number? - In 3^2 what number is the base and what is the index? - Explain why we cannot simplify terms with different bases? - What are the index laws for multiplication, division, and brackets? - Why is anything to the power 0 equal to 1? - What form does standard form take? - Can 'A' be 1? Can 'A' be 10? - What sort of numbers can 'n' be?	Formal assessment at end of HT6 assessing all content throughout year Mixture of AO1, AO2 and AO3
Ht6 Angle Recap	- Basic angle facts - Angles in parallel lines - Angles in polygons	- Angles in a right angle sum to 90 - Angles in a straight line sum to 180 - Angles around a point sum to 360 - Angles in a triangle sum to 180 - Angles in a quadrilateral sum to 360	- Apply the angle facts to questions - Apply multiple angle facts to work out the missing angle - Angles in parallel lines	Angles around a point have no relation to angles on a straight line	- What do angles in a X add to? - Can you tell me what you would need to do to work out a missing angle in X?	

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HT6 Constructions	Be comfortable with what angles are and the types of angles	- A bearing is always measure clockwise from north and is written as 3 digits - An angle bisector cuts the angle in half - A perpendicular bisector cuts a line in half and at right angles - The perpendicular distance from a point to a line is the shortest distance from a point to that line Loci/locus is a path made of points following a certain rule Equidistant means at equal distance	- Use a protractor accurately - Use a compass accurately - Measure and calculate bearings - Measure and calculate back bearings - Solve worded problems using bearings - Construct triangles using SAS, SSS and ASA methodology - Construct equilateral and isosceles using a compass and a ruler - Construct angle bisectors - Construct perpendicular bisectors - Construct a perpendicular line from a given point to a line - Construct a perpendicular line that goes through a given point on a line - Identify the loci of points - Use perpendicular bisectors and loci to shade specified regions - To apply loci and constructions to real life problems	- Using the wrong angle measurement on a protractor - A back bearing is measured anti-clockwise - Angles around a point are a circle - Mixing up angle rules - Only subtracting given angle in a rectilinear figure, not all given angles - Obtuse is the largest angle	- What is the definition of a bearing? - What is a back bearing? - How many digits are bearing always written as? - What direction is a bearing measured from? - What is north east direction as a bearing? - What is a south direction as a bearing? - What is a protractor used for? - What does perpendicular mean? - What is an angle bisector? - What is loci/locus? - What does equidistant mean? - What equipment can be used in constructions?	
HT6 Statistics	Understanding of - Calculating averages - Drawing and measuring angles - Angles around a point total 360	- Pie charts are a representation of the proportion of values in a data set - To calculate angle size of a sector of a pie chart, we do - Mean, median and mode are measures of central tendency - Range and IQR are measures of spread - To calculate mean we find the sum of the values and divide by how many observations there are - To calculate median, we find the central piece of data when the data are ordered - To calculate mode, we find the most common observation - To calculate range we subtract the largest value from the smallest value	- Drawing a pie chart given the angle - Calculate the angle for a sector of a pie chart - Use a protractor to accurately draw a pie chart - Compare and Interpret pie charts - Calculate the mean of a set of data - Calculate mean from ungrouped and grouped frequency table - Calculate the median of odd and even data sets - Calculate the median of ungrouped frequency tables - Calculate the mode of a set of data - Find the modal class from a grouped frequency table - Calculate the range of a set of data	- When comparing pie charts thinking that a bigger sector corresponds to more observations - When drawing pie charts always measuring the angle from the initial line - Using the wrong scale on a protractor - Missing key, labels et Mixing up mean, median, mode - Not realising there can be more than one mode or no mode at all	- How do you calculate the angle for a sector of a pie chart? - What does the angle in a pie chart represent? - Where do you start measuring from on a protractor? - How would you calculate mean? - How would you calculate median? - How would you calculate mode? - How would you calculate range? - What are the three averages? - What is grouped data? - How would you estimate the mean of a grouped frequency table?	

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