Revision ‘Must Know’ Checklist: Y9 Maths Foundation Tier (Lower)

Below is a checklist of everything you must know to be successful by the end of this year.

Number	Algebra	Geometry and Measures	Ratio and Proportion	Statistics and Probability
• Use and order positive and negative integers and decimals. Understand < > ≠. Identify the value of digits in numbers including decimals. • Round numbers to a given number of decimal places. Round numbers to 1 significant figure. Round numbers to the nearest integer and powers of 10. • Recall integer squares, cubes and roots and use index notation up to 10x10. List all three-digit numbers that can be made from three given integers - Smallest, largest etc. • Recognise multiples, factors, and prime numbers (up to two-digit) from a list. • List factors and multiples systematically. • Find the LCM and HCF of two numbers - Include solving simple problems. • Find the prime factor decomposition of positive integers and write as a product using index notation. • Multiply and divide numbers by powers of 10. • Convert large numbers into standard form and vice versa.	• Use algebraic notation and symbols correctly, write an expression. • Multiply together two simple algebraic expressions, e.g. 2a×3b. • Simplify expressions by cancelling, e.g. 4x/2=2x. • Manipulate and simplify algebraic expressions by collecting 'like' terms. • Expand a single bracket. • Simplify expressions involving brackets. To multiply/expand two sets of single brackets, e.g. 3(x+4)+2(x-2). • Factorise algebraic expressions by taking out common factors of a single bracket. • Substitute numbers into expressions including those involving brackets and powers - Positive and negative. • Substitute numbers into an algebraic formula. • Use function machines to find outputs and inputs. • Solve one step and two step linear equations. • Solve linear equations involving brackets.	• Estimate the size of angles and measure and draw angles using a protractor. • Use letters to identify points, lines and angles (Two-letter notation for a line and three-letter notation for an angle). • To know that there are 360° in a full turn, 180° in a half turn and 90° in a quarter turn. • Identify a perpendicular to a given line and mark perpendicular lines on a diagram. • Identify parallel lines and mark parallel lines on a diagram. • Find missing angles at a point, on a straight line, right angles, and vertically opposite angles. • Sketch, name and list the properties of each special type of quadrilateral and classify quadrilaterals by their geometric properties. • Find missing angles in quadrilaterals - Including the use of special types of shapes. • Distinguish between scalene, equilateral, isosceles and right-angled triangles.	• Express the splitting of a quantity into a ratio. Write a ratio as a fraction. • Write ratios in their simplest form. Write ratios in form 1:m or m:1. • Share a quantity in a given two-part or three-part ratio - Include problems involving mixing, e.g. paint colours, cement and drawn conclusions. • Use a ratio to compare a scale model to a real-life object. • Understand and use proportion as equality of ratios, e.g. Recognise that two paints mixed red to yellow 5 : 4 and 20 : 16 are the same colour. Solve proportion problems using the unitary method. • Scale up recipes and decide if there is enough of each ingredient. • Work out which product is the better buy. • Solve problems involving Speed, Distance, Time. miles per hour as well as metric measures, include simple changes of units.	• Use correct notation for time, 12 and 24-hour clock. • Interpret timetables and work out time taken for a journey. • Produce and interpret a pictogram - Find the total population and mode. To produce and interpret a stem and leaf diagram. • Produce and interpret dual/comparative bar chart - Find the total population, least/greatest values, mode and recognise patterns. • Understand that pie charts represent proportions rather than frequencies and use this to interpret simple pie charts using simple fractions and percentages, 1/2, 1/4 and multiples of 10% sections. • Construct pie charts for categorical data and discrete/continuous numerical data (Must be accurate to 2 degrees). • Produce and interpret a line graph and recognise patterns. • Draw a scatter graph and to understand/draw a line of best fit. • Recognise types of data, e.g. Primary, secondary, discrete, continuous, qualitative, quantitative.

• Convert small numbers into standard form and vice versa. • Add, subtract, multiply and divide decimals - Including money problems. • Use the order of operations with and without calculators for all calculations: positive and negative numbers, brackets, powers and roots, four operations. • Add and subtract positive and negative integers. • Multiply and divide positive and negative integers. • Write fractions to describe shaded parts of diagrams. Write a fraction in its simplest form and find equivalent fractions. Use diagrams to find equivalent fractions or compare/order fractions. • Express a given number as a fraction of another. • Convert between mixed numbers and improper fractions. • Add and subtract fractions with different denominators and mixed number fractions. • Multiply and divide fractions by fractions and mixed number fractions.	• Write down integer values that satisfy an inequality. • Show inequalities on number lines and write an inequality using a number line - Use the correct notation to show inclusive and exclusive inequalities. • Solve simple linear inequalities in one variable, and represent the solution set on a number line. • Recognise sequences of odd and even numbers, and other sequences including Fibonacci sequences. • Distinguish between arithmetic and geometric sequences. • Write the term-to-term definition of a sequence in words. • Find the next term in a sequence. • Find and plot coordinates in all four quadrants and be able to complete geometrical shapes. • Recognise straight-line graphs parallel to the axes. Plot and draw graphs of y = a, x = a, y = x and y = –x. • Recognise that equations of the form y = mx + c correspond to straight-line graphs in the coordinate	• Find missing angles in triangles - Including the use of isosceles and equilateral triangles. • Recognise and name pentagons, hexagons, heptagons, octagons and decagons. • Understand ‘regular’ and ‘irregular’ as applied to polygons. • Calculate and use the sums of the interior angles to find missing angles of regular polygons. • Use the sum of the exterior angles of any polygon is 360° to find missing angles and to work out the number of sides a shape has. • Indicate given values on a scale, including decimal value. Make sensible estimates of a range of measures in everyday settings. • Convert metric units to other metric units. • Find the perimeter and area of rectangles and triangles, involving some compound shapes with rectangles and triangles.		• To understand how sources of data may be biased. • Calculate the mean, mode, median and range for discrete data. • Find the mean, median, mode and range from a discrete frequency table (non-grouped data). • Organise raw data into a grouped frequency table and to calculate the median and modal class. • Complete a two-way table and calculate probabilities from it. • Complete, use and draw a frequency tree. • Distinguish between events which are impossible, unlikely, even chance, likely, and certain to occur. Understand probabilities can be written in words or fractions, decimals and percentages. Mark events and/or probabilities on a probability scale of 0 to 1. • Find the probability of an event happening using theoretical probability, e.g. 3 or 4 on a dice, or coloured counters in a bag. • Estimate the number of times an event will occur, given the probability and the number of trials. • Record outcomes of probability experiments in tables. Work out probabilities from frequency

• Attempt to simplify calculations before when multiplying. • Convert between fractions and decimals. • Convert to make a calculation easier, e.g. 0.25 × 8 = 1/4 × 8, or 3/8 × 10 = 0.375 × 10. • Convert between simple fractions, decimals and percentages. • Understand that a percentage is a fraction in hundredths. Find a percentage of a quantity/measurement without a calculator: 50%, 25% and multiples of 10% and 5% - Include real-life VAT, simple interest, tax… • Express a given number as a percentage of another number. The use of multipliers for calculating the percentage of a quantity. • Calculate a percentage increase/decrease of a quantity/measurement.	plane. Use function machines to find coordinates (i.e. given the input x, find the output y). • Plot and draw graphs of straight lines of the form y = mx + c using a table of values. • Find the coordinates of the midpoint of a line segment (reading off visually from a graph). • Draw, label and scale axes. Draw straight line graphs for real-life situations, including ready reckoner graphs, conversion graphs, fuel bills graphs, fixed charge and cost per unit. Read values from straight-line graphs for real-life situations. • Draw and interpret simple distance–time graphs. Calculate the speed of individual sections, total distance and total time. • Understand and use the concepts and vocabulary of expressions, equations, formulae, identities, inequalities, terms and factors. • Define a 'quadratic' expression. Multiply double brackets/Quadratics. • Recognise a quadratic graph from its shape. Generate points and plot graphs of quadratic functions.	• Find the perimeter and area of parallelograms and trapeziums. • Identify and name common solids: cube, cuboid, cylinder, prism, pyramids, sphere and cone. Know the terms face, edge and vertex. Sketch nets of cuboids and prisms. Draw sketches of 3D solids. • Find the surface area of a cube and a cuboid. • Find the volume of cubes and cuboid. • Find the volume of triangular prisms Including triangles, trapeziums, parallelograms, compound shapes made from rectangles. • Understand congruency and similarity referring to lengths and angles. • Identify simple congruent and similar shapes by eye/counting squares. • Understand that translations are specified by a distance and direction using a vector. Use column vectors to describe translations and to translate shapes.		tables, include deciding if a coin, spinner or game is fair. • Identify different mutually exclusive outcomes and know that the sum of the probabilities of all outcomes is 1. Use 1 – p to find the probability of an event not occurring. • Find a missing probability from a list or table using mutually exclusive outcomes. • List all outcomes for combined events systematically, e.g. dice, spinners, coins, choices on a menu. Use to find simple probabilities. Use and draw sample space diagrams Link to listing outcomes of combined events.

	• Factorise quadratic expressions of the form x2 + bx + c and with negative values. • Identify and interpret the gradient from an equation ax + by = c. Rearranging the equations into the form of y = mx +c. • Solve simultaneous equations (linear/linear) graphically. • Solve simultaneous equations (linear/linear) algebraically, recognising whether to add/subtract the equations when solving by elimination (no multiplying).	• Understand that reflections are specified by a mirror line. Describe reflections on a coordinate grid using the equation of the line of symmetry using vertical, horizontal and diagonal mirror lines. • Understand that rotations are specified by a centre, an angle and a direction of rotation. Draw a shape after rotation about the origin or any other point on a coordinate grid. Find the centre of rotation, angle and direction of rotation to describe rotations. • Enlarge a shape on a grid without a centre specified - Include fractional scale factors. Enlarge a given shape using the origin and not as the centre of enlargement, include fractional scale factors. • Understand and recall Pythagoras' Theorem in 2D. Calculate the length of the hypotenuse and of shorted sides in a right-angled triangle, including decimal lengths and a range of units. Given 3 sides of a triangle, use Pythagoras' Theorem to justify if it is right-angled or not.		

		• Answer basic worded and problem-solving based Pythagoras questions. • Identify, name and draw parts of a circle including tangent, chord and segment. • Recall and use the formulae to find the circumference of an enclosed circle $2\pi r = \pi d$. • Recall and use the formulae to find the area of an enclosed circle. • Understand and recall the trigonometric ratios sine, cosine and tan by labelling right-angled triangles. Find missing side lengths of right-angled triangles, including real-life 2D problem solving scenarios. • Estimate lengths using a scale diagram. Use and interpret maps and scale drawings. • Understand and draw front and side elevations and plans of shapes made from more complex solids with diagonal lengths. • Use a straight edge, protractor and a pair of compasses to construct SSS, SAS, ASA and RHS triangles. Understand they		

		are unique, but SSA triangles are not. • Use three-figure bearings to specify direction. • Recognise and identify when shapes are congruent and similar. • Understand and use the basic congruence criteria for triangles (SSS, SAS, ASA and RHS). • Identify the scale factor of an enlargement of a shape as the ratio or multiple of the lengths of two corresponding sides. • Solve simple problems to find missing lengths in similar shapes where the shapes are drawn separately. Use knowledge of angles on parallel lines to identify similar triangles. • Understand and use column notation in relation to vectors. Represent information graphically given column vectors.		