Revision 'Must Know' Checklist: Y9 Maths Higher Tier (Lower)

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

Glenthorne High School
Achievement for all

Number	Algebra	Geometry and Measures	Ratio and Proportion	Statistics and Probability
• Add, subtract, multiply and divide decimals and whole numbers using BIDMAS • Find the prime factor decomposition of positive integers – write as a product using index notation • Round integers and decimal numbers to a given number of significant figures • Solve estimation problems to one and two-step calculations • Evaluate positive numerical indices (not algebraic) • Evaluate fractional indices • Evaluate negative indices • Use product rule for counting and finding potential combinations • Find the HCF of 2 numbers using either lists of common factors or a Venn diagram • Convert large numbers into and out of standard form • Add and subtract numbers in standard form • Identify Surds and simplify • Find equivalent fractions	• Know the difference between a term, expression, equation, formula and an identity. • Recognise simple sequences including at the most basic level odd, even, triangular, square and cube numbers and Fibonacci-type sequences, include those involving numbers in standard form or index form. • Substitute positive and negative numbers into expressions without a calculator • Expand single brackets (Recap) and double brackets and simplify expressions • Solve linear equations, with integer coefficients, in which the unknown appears on either side or on both sides of the equation • Change the subject of a formula (one and two-step) • Factorise quadratic expressions in the form ax2 +bx +c where a=1 • Solve quadratic equations by factorising in the form ax2 +bx +c=0 where a=1 • Draw linear graphs such as x=4, y=-0 • Draw linear graphs in the form y=mx+c from a table of values	• Classify quadrilaterals by their geometric properties and distinguish between scalene, isosceles and equilateral triangles. Use properties to find missing angles • Understand and use the angle properties of parallel lines and find missing angles using the properties of corresponding and alternate angles giving reasons, include geometric shapes and their properties • Understand, recall and use Pythagoras' Theorem in 2D. Given three sides of a triangle, justify if it is right-angled or not • Calculate and use the sums of the interior angles of polygons, find missing angles including irregular polygons • FInd the interior angle of a polygon • Calculate the angles of regular polygons and use these to solve geometric problems • Find the exterior angle of a polygon • Find the number of sides of a polygon give the interior or exterior angle	• Solve proportion problems using the unitary method • Scale up recipes and solve problems • Solve problems involving Speed, Distance, Time. miles per hour as well as metric measures, include changes of units. • Solve problems involving Density, Mass, Volume, include changes of units • Calculate an unknown quantity from quantities that vary in direct or inverse proportion • Recognise when values are in direct proportion by reference to the graph form, and use a graph to find the value of k in y = kx • Recognise when values are in inverse proportion by reference to the graph form • Identify the scale factor of an enlargement of a similar shape as the ratio of the lengths of two corresponding sides, using integer or fraction scale factors. • Share within a given 2-part ratio • Solve recipe problems • Solve worded ratio problems by upscaling and downscaling	• Sort, classify and tabulate data and discrete or continuous quantitative data • Find averages and measures of spread from lists of numbers • Produce and interpret composite bar charts. • Produce and interpret pie charts. • Calculate the mean, mode, median and range from a frequency table (discrete data) • Find the mean from a grouped frequency table • Construct and interpret an ordered stem and leaf diagram • Construct a back-to-back stem and leaf diagram and interpret it • Find the mode, median, range, as well as the greatest and least values from stem and leaf diagrams, and compare two distributions from stem and leaf diagrams • Construct a frequency polygon • Draw and interpret scatter graphs • Complete a table knowing the sum of the probabilities of all outcomes is 1. Use 1 – p as the

• Simplify fractions • Order Fractions, Decimals and Percentages • Add and subtract proper, improper fractions and mixed numbers • Multiply and divide proper, improper fractions and mixed numbers • Find a percentage of an amount using non-calculator and calculator amounts • Find percentage increases & decreases • Solve reverse/backward percentage problems • Solve simple interest problems • Solve compound interest problems inc. Depreciation • Write ratios in their simplest form, including three-part ratios. • Divide into a given ratio with two or more parts	• Identify the gradient and y-intercept from a graph • Find the equation of a positive straight line given two points • Find the equation of a positive straight line and given the gradient and a point • Find the equation of a negative straight line given two points • Find the equation of a negative straight line and given the gradient and a point • Use straight line graphs to solve currency conversion graphs • Draw and interpret straight-line graphs for real-life situations, including ready reckoner graphs, conversion graphs, fuel bills, fixed charge and cost per item (gradient) • Draw a distance–time graph and use to calculate various measures (of individual sections), including average speed, distance, time • Find the solutions of two simultaneous equations, linear / linear, including where both need multiplying by elimination • Write down whole number values that satisfy an inequality. • Show inequalities on number lines	• Solve exam style questions on angle problems • Find the perimeter of a rectangle, trapezium and parallelogram using a variety of metric measures. • Recall the definition of a circle and name and draw parts of a circle, including sector, tangent, chord, segment • Recall and use formulae for the circumference of a circle and the area enclosed by a circle (using circumference = $2\pi r = \pi d$ and area of a circle = $\pi r2$) using a variety of metric measures • Find radius or diameter, given area or circumference of circles in a variety of metric measures • Recall and use the formula for the volume of a cuboid or prism made from composite 3D solids using a variety of metric measures, include cylinders • Find the surface area of prisms including cubes, cuboids, and triangular prisms • Find the volume of prisms including cubes, cuboids, and triangular prisms • Convert between metric units • Reflect a 2D shape in a line such as x=4 or y=-1 and be able to describe the transformation	• Problem solve different style ratio problems with differing given information (i.e., using a given ratio share to apply to another ratio share)	probability of an event not occurring • Estimate the number of times an event will occur, given the probability and the number of trials • List all outcomes for single events, and combined events, systematically. Use product rule for counting • Draw sample space diagrams and use them for adding simple probabilities • Find a missing probability from a list or two-way table, including algebraic terms, include conditional probability • Draw and find probabilities from a probability tree diagram based on given information with replacement. Find the probability of successive events, such as several throws of a single dice • Work out probabilities from Venn diagrams to represent real-life situations and 'abstract' sets of numbers/values, such as sets of prime and even number • Find probabilities using Frequency Trees • Solve conditional probability problems using probability trees • Shade areas of a Venn diagram and use correct notation

	• Solve simple linear inequalities in one variable, and represent the solution set on a number line, include unknowns on both sides • Identify a set of integers that satisfy an inequality and express this on a number line • Change the subject of a formula (multi-step) • Solve simultaneous equations graphically • Solve double inequalities and represent on a number line. • Find the solution sets and compare them to see which value of x satisfies both solve linear inequalities in two variables algebraically • Factorise quadratic expressions in the form ax2 + bx + c. • Solve quadratic equations by factorising, including ones that need rearranging • Solve simultaneous equations graphically, formed from two linear functions, include real-life situation and represent the solution in context of the problem • Solve simultaneous equations graphically, formed from one linear function and one quadratic function • Solve simultaneous equations graphically, formed from two	• Translate a 2D shape using a vector • Describe a translation of a 2D shape using a vector • Rotate a 2D shape on a set of axis • Describe a rotation of a 2D shape on a set of axis • Enlarge a 2D shape on a set of axis using a positive scale factor using vectors • Describe a transformation is a rotation, translation, enlargement or reflection as exam style questions • Understand and draw front and side elevations and plans of shapes made from simple solids • Read and construct scale drawings, drawing lines and shapes to scale • Understand, draw and measure bearings • Find the length of the longest side (hypotenuse) of a right angled triangle • Find any length side of a right angled triangle • To solve worded Pythagoras problems • Understand what Sine, Cosine and Tangent Ratios are		• Fill in a Venn diagram correctly given two sets of data • Plot a scatter graph and draw accurately a line of best fit • Use a line of best fit to solve scatter graph problems • Draw a pie chart • Compare and interpret pie chart questions • Understand what is meant by a sample and a population, include census. Understand how different sample sizes may affect the reliability of conclusions drawn • Draw a cumulative frequency diagram • Find averages and measures of spread from a cumulative frequency graph i.e Median and IQR • Compare distributions using cumulative frequency diagrams • Draw a boxplot/ Box and Whisker diagram from a discrete set of numbers • Draw a boxplot from a cumulative frequency diagram • Compare boxplots and make written conclusions about data sets

	linear functions, include real-life situation and represent the solution in context of the problem • Expand the product of more than two linear expressions, triple brackets. • Solve quadratic equations by factorising in the form ax2 +bx +c=0 where a>2 • Solve quadratic equations by using the quadratic formula • Write a quadratic in completing the square form. • Use to solve quadratic equations and sketch Quadratic graphs	• Find a missing angle in a right angled triangle • Find a missing side on a right angled triangle • Answer exam style questions involving Pythagoras and trigonometry and know when to use which method • Understand and use vector notation, including column notation, and understand and interpret vectors as displacement in the plane with an associated direction • Understand that 2a is parallel to a and twice its length, and that a is parallel to –a in the opposite direction • Represent vectors, combinations of vectors and scalar multiples in the plane pictorially • Calculate the sum of two vectors, the difference of two vectors and a scalar multiple of a vector using column vectors • Calculate the resultant of two vectors, including algebraic terms		• Answer exam style questions on comparing data using boxplots and cumulative frequency