

Revision 'Must Know' Checklist: Y11 Maths Higher 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
<ul style="list-style-type: none"> ○ Write error intervals. ○ Calculate the upper and lower bound of a calculation. ○ Simplify surds and expand single brackets with surds. ○ Rationalise the denominator. ○ Use the product rule for counting. ○ Multiply and divide fractions, including mixed numbers. ○ Add and subtract fractions, including mixed numbers. ○ Find a percentage of a quantity. ○ Calculate the value of profit or loss. ○ Calculate Percentage change and percentage profit or loss. ○ Compound and simple interest. ○ Find the number of compounds given the investment and the final amount. ○ Calculate original cost after a percentage increase or decrease (reverse percentage calculations). ○ Linear sequences. ○ Quadratic sequences. ○ Find the common ratio r in geometric sequences. 	<ul style="list-style-type: none"> ○ Understand and use the laws of indices. ○ Evaluate & simplify expressions with negative indices with numerical bases. ○ Evaluate & simplify expressions with fractional indices with numerical bases. ○ Expand the product of more than two linear expressions, triple brackets. ○ Factorise quadratic expressions of the form ax^2+bx+c, ○ Factorise the special case of the difference of two squares. ○ Change the subject of an equation where the subject appears once. ○ To be able to change the subject when the subject appears on both sides of the equation by factorising. ○ Recognise common factors in algebraic fractions and simplify algebraic fractions. ○ Apply skills in factorising quadratics to simplify algebraic fractions. ○ Multiply and divide algebraic fractions. 	<ul style="list-style-type: none"> ○ Perform speed, distance, time, and calculations ○ Complete compound measures calculations (Density, Mass & Volume, Pressure, Force & Area). ○ For a non-linear distance–time graph, estimate the speed at one point in time, from the tangent, and the average speed over several seconds by finding the gradient of the chord. ○ Draw a linear velocity–time graph (of individual sections) and find speed, time, acceleration, distance using enclosed areas by counting squares or using areas of trapezia, rectangles, and triangles. ○ 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. ○ Calculate and use the sums of the interior angles of polygons, find missing angles including irregular polygons ○ Use the sum of the exterior angles of any polygon is 	<ul style="list-style-type: none"> ○ 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 ○ Solve problems involving direct proportion or inverse proportion with squares, cubes, or other powers/roots of another quantity, include using k to find another value. ○ Relate algebraic solutions to graphical representation of the equations ○ Perform calculations with ratio & fractions 	<ul style="list-style-type: none"> ○ Construct and interpret grouped frequency tables. ○ To construct frequency polygons. ○ Estimate the mean with grouped data. Understand why it is an estimate. ○ Find the interval which contains the median and the modal class. ○ To create scatter graphs, describe correlation draw lines of best fit, and estimate. ○ To explain why some predictions may be unreliable ○ Produce line graphs. ○ Construct and interpret time–series graphs, comment on trends ○ Understand what is meant by a sample, a population, and a census. ○ Understand how different sample sizes may affect the reliability of conclusions drawn. ○ Construct and interpret cumulative frequency tables. Construct and interpret the graphs/diagrams from tables ○ Produce box plots from raw data and when given

<ul style="list-style-type: none"> ○ Convert between standard form and ordinary form ○ Perform reverse mean calculations. 	<ul style="list-style-type: none"> ○ Add and subtract algebraic fractions with different denominators. ○ Plot and draw graphs of straight lines of the form $y=mx + c$ with and with a table of values. ○ Recognise that equations in the form $y=mx + c$ correspond to straight-line graphs. ○ Find approximate solutions to a linear equation from a graph and understand why it is an approximate. ○ Calculate the length of a line segment given the coordinates of the end points using Pythagoras' theorem. ○ Use two coordinates to find the equation of a line in the form $y=mx+c$ ○ Find the equation of parallel lines. ○ Find the equation of a perpendicular line given a point. ○ Solve two linear simultaneous equations by elimination. ○ Set up and solve a pair of linear simultaneous equations in two variables, including to represent a situation. 	<p>360°, and the sum of the interior angle and the exterior angle is 180° to find missing angles.</p> <ul style="list-style-type: none"> ○ Use the trigonometric ratios to solve missing lengths and angle problems with right-angled triangles. ○ Find angles of elevation and depression ○ Use Pythagoras' Theorem to solve problems in 3D configurations. ○ Calculate the length of a diagonal of a cuboid. Find the angle between a line and a plane. ○ Understand similarity of triangles and of other shapes. ○ Prove that two shapes are similar by showing that all corresponding angles are equal in size and/or lengths of sides are in the same ratio/one is an enlargement of the other, giving the scale factor. ○ Know the relationships between linear, area and volume scale factors of mathematically similar shapes and solids. ○ Find missing lengths, areas and volumes in similar 3D solids using scale factors 		<ul style="list-style-type: none"> ○ quartiles, median and identify any outliers. ○ Compare data sets using the median and interquartile range. ○ Construct a histogram by calculating frequency density. ○ Interpret histograms and make estimates from them. ○ Complete a table knowing the sum of the probabilities of all outcomes is 1. Use $1 - p$ as the probability of an event not occurring. ○ Estimate the number of times an event will occur, given the probability and the number of trials ○ Find the probability of successive events, such as several throws of a single dice. ○ Draw and find probabilities from a probability tree diagram based on given information with replacement. ○ Draw and use a tree diagram to calculate conditional probabilities - without replacement. ○ Work out probabilities from Venn diagrams to represent real-life situations and 'abstract' sets of
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	<ul style="list-style-type: none"> ○ Interpret the solution in the context of the problem. ○ Generate points and plot graphs of simple quadratic functions, then more general quadratic functions. ○ Solve quadratic equations by factorising. ○ Solve quadratic equations by using the quadratic formula. ○ Write a quadratic in completing the square form. ○ Use completing the square to solve quadratic equations and to identify the coordinates of a turning point. ○ Draw graphs of simple cubic functions using tables of values, including finding solutions to cubic equations. ○ Draw circles, centre the origin, equation $x^2 + y^2 = r^2$. ○ Understand how to define a function. ○ Use function notation and find outputs given inputs. ○ For two functions $f(x)$ and $g(x)$, find composite functions such as $gf(x)$. ○ Know that $f^{-1}(x)$ refers to the inverse function. 	<ul style="list-style-type: none"> ○ Know and use the sine rule ○ Know and use the cosine rule to find missing sides and angles. ○ Know and apply $\text{Area} = \frac{1}{2}ab\sin C$ to calculate the area, sides, or angles of any triangle. ○ Recognise, sketch, and interpret graphs of the trigonometric functions (in degrees) $y = \sin x$, $y = \cos x$ and $y = \tan x$ for angles of any size. ○ Calculate arc lengths, angles, and areas of sectors of circles, include in terms of π. ○ Find the surface area of prisms including cubes, cuboids, and triangular prisms. ○ Find the surface area of a cylinder ○ Calculate the volume of prisms including a cylinder. ○ Use the formulae for volume and surface area of spheres and cones, use to solve problems, include in terms of π. ○ Know and use the angle at the centre is twice the angle at the circumference subtended from the same arc 		<p>numbers/values, such as sets of prime and even number.</p>
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	<ul style="list-style-type: none"> ○ Find the inverse of a linear function. ○ By writing the denominator in terms of its prime factors, decide whether fractions can be converted to recurring or terminating decimals. Convert a fraction to a recurring decimal. ○ Solve 'Show that' and proof questions using consecutive integers (n, $n + 1$), squares a^2, b^2, even numbers $2n$, and odd numbers $2n+1$. ○ Understand iteration is a process used to approximate the solutions to equations, and to show that a root exists between two given values. ○ Use a recurrence relation given in the question to approximate a root. ○ Construct and solve linear equations and inequalities. ○ Solve quadratic inequalities in one variable, by factorising and sketching the graph to find critical values. 	<ul style="list-style-type: none"> ○ Know and use "The angle subtended by the diameter is 90°" ○ Know and use "The angles in a cyclic quadrilateral sum to 180°" ○ Know and use "Angles in the same segment are equal" ○ Know and use that "The tangent meets a radius at 90°" and "Lengths of the tangents from a point to the circle are equal." ○ Know and use "The alternate segment theorem" ○ Select and apply the appropriate circle theorems to find missing angles. ○ Perform transformations of shapes, including translation, rotation, and reflection. ○ Enlarge a shape using a negative or fractional scale factor. ○ Describe a transformation using a single transformation. ○ Create loci and constructions. ○ Represent vectors, combinations of vectors and scalar multiples in the plane pictorially. 		
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