

Revision 'Must Know' Checklist: Y10 Maths Higher Tier (Upper)

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"> Use the product rule for counting. Add and subtract numbers in standard form. Multiply and divide numbers in standard form. Interpret a calculator display using standard form and know how to enter numbers in standard form Find the LCM and HCF of two numbers by listing and using prime factors. Use index laws to simplify and calculate the value of numerical expressions and solve problems using index laws. Understand surd notation and simplify surd expressions involving squares. Expanding and simplifying single and double brackets involving surds. Rationalise the denominator of harder questions involving surds. Multiply and divide fractions, including mixed numbers and whole numbers. Add and subtract fractions, including mixed numbers. 	<ul style="list-style-type: none"> Use index laws to simplify and calculate the value of algebraic expressions and solve problems using index laws. Factorise quadratic expressions of the form $ax^2 + bx + c$, including difference of two squares. Expand the product of more than two linear expressions, triple brackets. Use and substitute formulae from mathematics and other subjects, including the kinematics formulae. Change the subject of a formula, including cases where the subject is on both sides of the original formula, or involving fractions and small powers of the subject. Continue a quadratic sequence and use the nth term to generate terms. Find the nth term of quadratic sequences. Distinguish between arithmetic and geometric sequences. Recognise and use simple geometric progressions. Continue geometric progression and find term to term rule, including negative, fraction and decimal terms. 	<ul style="list-style-type: none"> For a non-linear velocity–time graph, estimate the acceleration at one point in time, from the tangent, and the average acceleration over several seconds by finding the gradient of the chord. Understand and use the fact that the tangent at any point on a circle is perpendicular to the radius at that point. Find and give reasons for missing angles on diagrams using angle between a tangent and radius is 90° Find and give reasons for missing angles on diagrams using the fact that tangents from an external point are equal in length. Understand, complete and learn proof for the following: Angle subtended by an arc at the centre of a circle is twice the angle subtended at any point on the circumference. Angle in a semicircle is a right angle. Perpendicular from the centre of a circle to a chord bisects the chord. Angles in the same segment are equal. Alternate segment theorem. 	<ul style="list-style-type: none"> Convert between currencies. Can also use ratios to convert. Represent repeated proportional change using a multiplier raised to a power, use this to solve problems involving compound interest and depreciation. Find the original amount given the final amount after a percentage increase or decrease (reverse percentages). Use calculators for reverse percentage calculations by doing an appropriate division. Work out the multiplier for repeated proportional change as a single decimal number. Solve problems involving direct proportion or inverse proportion with squares, cubes or other powers/roots of another quantity. 	<ul style="list-style-type: none"> Calculate the mean, mode, median and range from a discrete frequency table. Construct and interpret grouped frequency tables for continuous data. Estimate the mean with grouped data. Find the interval which contains the median and the modal class. Construct and interpret time–series graphs. Produce box plots from raw data and when given quartiles, median and identify any outliers. Compare the median and interquartile range. Compare and interpret box plots to find median, quartiles, range and interquartile range and draw conclusions. Construct cumulative frequency tables and construct diagrams from tables. Interpret cumulative frequency diagrams. Find the median and quartile values and interquartile range, link to a drawn boxplot underneath the x-axis. Estimate frequency greater/less than a given value.

<ul style="list-style-type: none"> Convert a recurring decimal to a fraction. 	<ul style="list-style-type: none"> Identify and interpret gradient from an equation $ax + by = c$. Find the equation of a straight line in this form and use to plot and draw straight lines. Use when $y = mx + c$ is the equation of a straight line; the perpendicular gradient is $-1/m$. Generate equations of perpendicular lines from equations of lines. Draw graphs of simple cubic functions using tables of values. Interpret graphs of simple cubic functions, including finding solutions to cubic equations Draw graphs of the reciprocal function $1/x$ with $x \neq 0$ using tables of values. Recognise and be able to sketch. Draw circles, centre the origin, equation $x^2 + y^2 = r^2$. Recognise a linear, quadratic, cubic, reciprocal and circle graph from its shape. Find the equation of a tangent to a circle at a given point, by using the given point. Find the equation of a tangent to a circle at a given point, by finding the gradient of the radius that meets the circle at that point (circles all centre the origin). Find the equation of a tangent to a circle at a given point, by finding the gradient of the tangent perpendicular to it. 	<p>Opposite angles of a cyclic quadrilateral sum to 180°</p> <ul style="list-style-type: none"> Find the surface area of a cylinder. Calculate arc lengths, angles and areas of sectors of circles, include in terms of π. Convert between metric area and volume measures. Convert between metric measures of volume and capacity. Recall and use the formula for volume of pyramid. Find the surface area of a pyramid. Recall and use the formula for volume of pyramid. Find the surface area of a pyramid. Find the surface area and volumes of compound solids. Form equations involving more complex shapes and solve these equations. Solve problems involving more complex shapes and solids. Solve upper and lower bounds calculations and problems to an appropriate degree of accuracy. Use the sum of the exterior angles of any polygon is 360°, and the sum of the interior angle and the exterior angle is 180° to find missing angles. 	<ul style="list-style-type: none"> Draw and use an algebraic tree diagram to calculate conditional probabilities - without replacement. Draw and find probabilities from Venn diagrams using union, intersection, complement notation and combined set notation, include conditional probability - 'given' worded questions.
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	<ul style="list-style-type: none"> Factorise quadratic expressions in the form $ax^2 + bx + c$. Solve quadratic equations by factorising, including ones that need rearranging. Find the solutions of two simultaneous equations, linear and quadratic by substitution. Find the solutions of two simultaneous equations, linear and a circle by substitution. Write a quadratic in completing the square form, include coefficient of x^2 bigger than 1. Use to solve quadratic equations. Solve quadratic inequalities in one variable, by factorising and sketching the graph to find critical values. Represent the solution set for inequalities using set notation. Calculations with algebraic fractions. Solve quadratic equations arising from algebraic fraction equations. Solve 'Show that' and proof questions using consecutive integers, squares, even numbers and odd numbers. For two functions $f(x)$ and $g(x)$, find composite functions. Find the inverse of a linear function. Interpret and analyse transformations of graphs of 	<ul style="list-style-type: none"> Calculate the length of a line segment AB given pairs of points using Pythagoras. Use Pythagoras' Theorem to solve problems in 3D configurations. Understand the language of planes. Calculate the length of a diagonal of a cuboid. Find the angle between a line and a plane. Use the trigonometric ratios to solve 2D problems using SOHCAHTOA. Find missing sides and angles - Including angles of elevation and depression. Know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90°; know the exact value of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60°. Find areas after enlargement and compare with before enlargement, to deduce multiplicative relationship (area scale factor); given the areas of two shapes, one an enlargement of the other, find the scale factor of the enlargement (whole number values only). Use constructions to solve loci problems including with bearings. 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. 		
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	<p>functions and write the functions algebraically.</p> <ul style="list-style-type: none"> Recognise, sketch and interpret graphs of the trigonometric functions (in degrees). Apply the transformations. Apply the graph of combined transformations for sine, cosine and tan functions $f(x)$. 	<ul style="list-style-type: none"> Solve problems involving frustums of cones where you must find missing lengths first using similar triangles. Use the sine, sine area and cosine rules to solve 3D problems. Apply to the graph of $y = f(x)$ the transformations. 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. Solve geometric problems in 2D where vectors are divided in a given ratio. Produce geometrical proofs to prove points are collinear and vectors/lines are parallel. 		
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