



Year 10 Higher Curriculum Overview

Subject: Mathematics

Year 10 Overview:	
In year 10 students apply the knowledge learnt in previous years and apply to worded and multi-concept problems. Algebra and Ratio & Proportion are common topics throughout.	
Autumn Term	
Outline of Key Learning	Unit Code
<p>Accuracy & Bounds</p> <ul style="list-style-type: none"> a. Calculate the upper and lower bounds of numbers given to varying degrees of accuracy b. Find the upper and lower bounds of calculations involving perimeters, areas and volumes of 2D and 3D shapes c. Use inequality notation to specify an error interval due to truncation or rounding 	7c
<p>Quadratic, cubic graphs</p> <ul style="list-style-type: none"> a. Recognise a linear, quadratic, cubic, reciprocal and circle graph from its shape b. Generate points and plot graphs of simple quadratic functions, then more general quadratic functions c. Draw graphs of simple cubic functions using tables of values d. Draw circles, centre the origin, equation $x^2 + y^2 = r^2$. 	6c
<p>Equations and Inequalities</p> <ul style="list-style-type: none"> a. Solve quadratic equations by factorisation and completing the square b. Solve quadratic equations by using the quadratic formula c. Find the exact solutions of two simultaneous equations in two unknowns d. Set up and solve a pair of linear simultaneous equations in two variables, including to represent a situation e. Solve two linear inequalities in x, find the solution sets and compare them to see which value of x satisfies both solve linear inequalities in two variables algebraically 	9a 9b



<p>Probability</p> <ul style="list-style-type: none">a. Work out probabilities from Venn diagrams to represent real-life situations and also 'abstract' sets of numbers/valuesb. Use union and intersection notationc. Find a missing probability from a list or two-way table, including algebraic termsd. Understand conditional probabilities and decide if two events are independente. Draw a probability tree diagram based on given information, and use this to find probability and expected number of outcomesf. Calculate the probability of independent and dependent combined eventsg. Compare experimental data and theoretical probabilities	<p>10</p>
<p>Representing Data</p> <ul style="list-style-type: none">a. Understand how different sample sizes may affect the reliability of conclusions drawnb. Construct and interpret cumulative frequency tablesc. Compare the mean and range of two distributions, or median and interquartile range, as appropriated. Interpret box plots to find median, quartiles, range and interquartile range and draw conclusionse. Construct and interpret histograms from class intervals with unequal widthf. Estimate the mean from a histogramg. Estimate the median from a histogram with unequal class widths or any other information from a histogram, such as the number of people in a given interval	<p>14a 14b</p>



Spring Term	
Outline of Key Learning	Unit Code
<p>Circle Theorems and Geometry</p> <ul style="list-style-type: none"> a. Understand and apply giving reasons for, all the circle theorems b. 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), finding the gradient of the tangent perpendicular to it and using the given point c. Recognise and construct the graph of a circle using $x^2 + y^2 = r^2$ for radius r centred at the origin of coordinates 	<p>16a 16b</p>
<p>Multiplicative reasoning</p> <ul style="list-style-type: none"> a. Solve proportion problems using the unitary method b. Work out which product offers best value and consider rates of pay c. Express a multiplicative relationship between two quantities as a ratio or a fraction, e.g. when $A:B$ are in the ratio 3:5, A is $\frac{3}{5}B$. When $4a = 7b$, then $a = \frac{7b}{4}$ or $a:b$ is 7:4 d. Use kinematics formulae from the formulae sheet to calculate speed, acceleration 	<p>11</p>
<p>Direct & Inverse proportion</p> <ul style="list-style-type: none"> a. Set up and use equations to solve word and other problems involving direct proportion b. Use $y = kx$ to solve direct proportion problems, including questions where students find k, and then use k to find another value c. Solve problems involving inverse proportionality d. Set up and use equations to solve word and other problems involving direct proportion or inverse proportion. 	<p>19b</p>

<p>Similarity and Congruence</p> <ul style="list-style-type: none"> a. Understand and use SSS, SAS, ASA and RHS conditions to prove the congruence of triangles using formal arguments, and to verify standard ruler and pair of compasses constructions b. Solve angle problems by first proving congruence c. Understand similarity of triangles and of other plane shapes, and use this to make geometric inferences d. 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 e. 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 f. Find missing lengths, areas and volumes in similar 3D solids g. Solve problems involving frustums of cones where you have to find missing lengths first using similar triangles 	<p>12</p>
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Summer Term	
Outline of Key Learning	Unit Code
<p>Transformations</p> <ul style="list-style-type: none"> a. Rotate 2D shapes using the origin or any other point (not necessarily on a coordinate grid) b. Reflect 2D shapes using specified mirror lines including lines parallel and not parallel to the axes and also $y = x$ and $y = -x$ c. Recognise and describe single translations using column vectors on a coordinate grid d. Translate a given shape by a vector e. Describe and transform 2D shapes using enlargements by a positive integer, positive fractional, and negative scale factor f. Use congruence to show that translations, rotations and reflections preserve length and angle, so that any figure is congruent to its image under any of these transformations g. Describe and transform 2D shapes using combined rotations, reflections, translations, or enlargements h. Describe the changes and invariance achieved by combinations of rotations, reflections and translations 	<p>8a</p>



<p>Trigonometry & Pythagoras</p> <ul style="list-style-type: none">a. Understand, recall and use Pythagoras' Theorem in 2Db. Understand, use and recall the trigonometric ratios sine, cosine and tan, and apply them to find angles and lengths in general triangles in 2D figuresc. Use the trigonometric ratios to solve 2D problems finding angles of elevation and depressiond. 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°	5b
<p>Algebraic Fractions</p> <ul style="list-style-type: none">a. Rationalise the denominator involving surdsb. Simplify algebraic fractions, multiply and divide algebraic fractionsc. Solve quadratic equations arising from algebraic fraction equationsd. Change the subject of a formula, including cases where the subject occurs on both sides of the formula, or as a denominatore. Find $f(x) + g(x)$ and $f(x) - g(x)$, $2f(x)$, $f(3x)$ etc algebraically;f. Find the inverse of a linear functiong. For two functions $f(x)$ and $g(x)$, find $gf(x)$	17
<p>Further Trigonometry</p> <ul style="list-style-type: none">a. 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 sizeb. Apply to the graph of $y = f(x)$ the transformations $y = -f(x)$, $y = f(-x)$ for sine, cosine and tan functions $f(x)$c. Apply to the graph of $y = f(x)$ the transformations $y = f(x) + a$, $y = f(x + a)$ for sine, cosine and tan functions $f(x)$d. Know and apply $\text{Area} = \frac{1}{2}ab \sin C$ to calculate the area, sides or angles of any trianglee. Know the sine and cosine rules, and use to solve 2D problems (including involving bearings) and 3D problemsf. Understand, recall and use trigonometric relationships and Pythagoras' Theorem in right-angled triangles, and use these to solve problems in 3D configurations	13a 13b