

# Year 11 Maths Medium Term Plan

Unit	Duration (lessons)	Learning Objectives/Outcomes
Similarity	8	<ul style="list-style-type: none"><li>• Understand the effect of enlargement for perimeter, area and volume of shapes and solids</li><li>• Understand that enlargement does not have the same effect on area and volume</li><li>• Use simple examples of the relationship between enlargement and areas and volumes of simple shapes and solids</li><li>• Use the effect of enlargement on areas and volumes of shapes and solids</li><li>• Know the relationships between linear, area and volume scale factors of mathematically similar shapes and solids</li></ul>
Congruence & Similarity	4	<ul style="list-style-type: none"><li>• Recognise that all corresponding angles in similar figures are equal in size when the lengths of sides are not</li><li>• Understand and use SSS, SAS, ASA and RHS conditions to prove the congruence of triangles using formal arguments, and to verify standard ruler and a pair of compasses constructions</li><li>• Understand similarity of triangles and of other plane figures, and use this to make geometric inferences</li><li>• Complete a formal geometric proof of similarity of two given triangles</li></ul>
Vectors & Vector Geometry	8	<ul style="list-style-type: none"><li>• Understand and use vector notation</li><li>• Calculate, and represent graphically, the sum of two vectors, the difference of two vectors and a scalar multiple of a vector</li><li>• Calculate the resultant of two vectors</li><li>• Solve geometrical problems in 2-D using vector methods</li><li>• Apply vector methods for simple geometrical proofs</li></ul>

Plotting Complex Functions Transforming $y = f(x)$ Incl. Exponential Growth & Decay	8	<ul style="list-style-type: none"> <li>• Plot graphs of simple cubic functions, the reciprocal function <math>y = 1/x</math> with <math>x \neq 0</math>, the exponential function <math>y = kx</math> for integer values of <math>x</math> and simple positive values of <math>k</math>, the circular functions <math>y = \sin x</math> and <math>y = \cos x</math>, within the range <math>-360^\circ</math> to <math>+360^\circ</math></li> <li>• Recognise the characteristic shapes of all these functions</li> <li>• Draw and plot a range of mathematical functions</li> <li>• Interpret and analyse a range of mathematical functions and be able to draw them, recognising that they were of the correct shape</li> <li>• Apply to the graph of <math>y = f(x)</math> the transformations <math>y = f(x) + a</math>, <math>y = f(ax)</math>, <math>y = f(x + a)</math>, <math>y = af(x)</math> for linear, quadratic, sine and cosine functions <math>f(x)</math></li> <li>• Select and apply the transformations of reflection, rotation, enlargement and translation of functions expressed algebraically</li> <li>• Interpret and analyse transformations of functions and write the functions</li> <li>• Algebraically</li> <li>• Recognise the characteristics of an exponential curve</li> <li>• Know and understand the principles of compound interest</li> <li>• Understand that powers are the variable in an exponential formula</li> <li>• Be able to draw a graph of <math>y = abx</math></li> <li>• Be able to use co-ordinates on a graph to determine a formula and hence solve further problems</li> </ul>
Completing the square to sketch curves	4	<ul style="list-style-type: none"> <li>• Know that all equations in this form are transformations of the curve <math>y = x^2</math></li> <li>• Identify minimum/maximum from an equation by comp the sq.</li> <li>• Determine an equation from a sketch (work backwards)</li> </ul>
Tangents to a curve at a given point	4	<ul style="list-style-type: none"> <li>• Use a trial and error method to find the gradient (eqn) of a tangent to a point on a given curve</li> <li>• Determine the gradient of a tangent to the curve <math>y = x^2</math> using Newton's method of choosing a point very close to the given point</li> <li>• Investigate the process and look into differentiation</li> </ul>

Iteration	4	<ul style="list-style-type: none"> <li>• Use a flow diagram to generate a sequence of numbers where <math>U_2</math> is found by using <math>U_1</math> and so on...</li> <li>• Know when a sequence converges or diverges</li> <li>• Generate a sequence from a given iteration formula</li> </ul>
Set Theory	4	<ul style="list-style-type: none"> <li>• Understand sets defined in algebraic terms</li> <li>• Understand and use subsets</li> <li>• Understand and use the complement of a set</li> <li>• Use Venn diagrams to represent sets and the number of elements in sets</li> <li>• Use the notation <math>n(A)</math> for the number of elements in set A</li> <li>• Use sets in practical situations</li> </ul>
Applied Handling Data	4	<ul style="list-style-type: none"> <li>• Data Representation</li> <li>• Contextualised work - Recap and application of work</li> </ul>
Applied Number	4	<ul style="list-style-type: none"> <li>• Number Topics</li> <li>• Contextualised work - Recap and application of work</li> </ul>
Applied Shape & Space	4	<ul style="list-style-type: none"> <li>• Shape &amp; Space Topics</li> <li>• Contextualised work - Recap and application of work</li> </ul>
Applied Algebra	4	<ul style="list-style-type: none"> <li>• Algebra Topics</li> <li>• Contextualised work - Recap and application of work</li> </ul>
Exam Preparation	4	<ul style="list-style-type: none"> <li>• Personalised exam preparation</li> </ul>
Knowledge & Understanding Enhancement	44	<ul style="list-style-type: none"> <li>• Revision</li> </ul>