

Learning Programme – A-Level Mathematics – Lower Sixth

Topic/Teacher	Content/Objectives/Skills	Homework	Assessment	Success Criteria (A-Level grades)	Stretch & Challenge (Thirst for Learning)
	<b>Lent First Half Term</b>				
<p><b>Trigonometry (A)</b></p>	<p>Draw graphs of <math>y=asinbx</math>, <math>y=acosbx</math> and <math>y=atanbx</math>, where <math>a</math> &amp; <math>b</math> are constants and be able to use their symmetries and periodicities. Derive the exact values of <math>\sin</math>, <math>\cos</math> &amp; <math>\tan</math> of <math>0^\circ</math>, <math>30^\circ</math>, <math>45^\circ</math>, <math>60^\circ</math> &amp; <math>90^\circ</math> and equivalent larger/negative angles. Derive and use the trigonometric identities; <math>\tan\theta=\sin\theta/\cos\theta</math> and <math>\sin^2\theta+\cos^2\theta=1</math>. Be able to solve trigonometric equations in a given interval, including quadratics equations in <math>\sin</math>, <math>\cos</math>, and <math>\tan</math>, and equations involving multiples of the unknown angle. Be able to use the graphs of <math>y=\sin x</math>, <math>y=\cos x</math>, <math>y=\tan x</math> to find all possible solutions.</p>	<p>Assessment Homework – Trigonometry</p>	<p>Half Term Test (week after Christmas break)</p>	<p>Mainly determined from Half-Term test, however, class work &amp; homework may also be used.</p> <p>A-Level Grade boundaries dependent on difficulty of test.</p>	<p>Students will be challenged using extension questions on the topics they are studying, designed to develop their ability to solve multi-staged problems.</p>
<p><b>Sine and cosine rules (A)</b></p>	<p>Use the sine rule and cosine rule to find the lengths of unknown sides or the sizes of unknown angles in triangles. Be able to solve problems using the sine and cosine rules, including bearings and the ambiguous case of the sine rule. Find the area of a triangle using <math>\frac{1}{2}absinC</math>.</p>				

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<b>Exponentials &amp; Logarithms (B)</b>	<p>Understand exponential functions of the form <math>a^x</math> (where <math>a</math> is positive, including <math>e</math>) and draw their graphs.</p> <p>Know that the gradient of <math>e^{kx}</math> is equal to <math>ke^{kx}</math> and hence understand why the exponential model is suitable in many applications.</p> <p>Know and use the definition of <math>\log_a x</math> as the inverse of <math>a^x</math> (where <math>a</math> is positive, including <math>e - i.e. \ln x</math>).</p> <p>Understand logarithms and convert between the exponential and logarithmic forms of a function. i.e. <math>a=b^c</math> is equivalent to <math>c=\log_b a</math>.</p> <p>Understand and use the laws of logs; i.e. <math>\log_a(xy)=\log_a x+\log_a y</math>, <math>\log_a(x/y)=\log_a x-\log_a y</math>, <math>\log_a x^n=n\log_a x</math>, <math>\log_a a=1</math> &amp; <math>\log_a 1=0</math>.</p> <p>Solve logarithmic and exponential equations.</p> <p>Use logarithmic graphs to estimate parameters in relationships of the form <math>y = ax^n</math> and <math>y = kb^x</math>, given data for <math>x</math> and <math>y</math>. (Plot <math>\log y</math> against <math>\log x</math> and obtain a straight line where the intercept is <math>\log a</math> and the gradient is <math>n</math> Plot <math>\log y</math> against <math>x</math> and obtain a straight line where the intercept is <math>\log k</math> and the gradient is <math>\log b</math>.)</p>		Half Term Test (week after Christmas break)	<p>Mainly determined from Half-Term test, however, class work &amp; homework may also be used.</p> <p>A-Level Grade boundaries dependent on difficulty of test.</p>	Students will be challenged using extension questions on the topics they are studying, designed to develop their ability to solve multi-staged problems.
<b>Exponential Growth &amp; Decay (B)</b>	<p>Understand and use exponential growth and decay; use in modelling (examples may include the use of <math>e</math> in continuous compound interest, radioactive decay, drug concentration decay, exponential growth as a model for population growth); consideration of limitations and refinements of exponential models.</p> <p>Draw and transform exponential growth and exponential decay graphs.</p>	Assessment Homework – Exponentials & Logs			