



**Subject:** Mathematics

**Lead Teacher:** Mr A Heighway

**Year:** 11

**Curriculum organisation**  
 Students are taught for three lessons a week in three groups of 30. There is a set A and two parallel ability set Bs.

Overview of Topics & Key Information					How will your child be learning?
Term	Unit(s) of Work	Key Enquiry Questions	Key Content/ Terminology	Skills developed	
Autumn Term	<ul style="list-style-type: none"> <li>Exponential functions</li> <li>Graphs</li> <li>Trigonometric graphs and equations</li> <li>Non-linear simultaneous equations</li> <li>Functions</li> <li>Graph transformations</li> <li>Numerical methods</li> <li>Proof</li> <li>Interpreting graphs</li> <li>Basic number*</li> <li>Basic algebra*</li> <li>Basic geometry*</li> <li>Algebraic fractions*</li> <li>Manipulation and proof*</li> <li>Linear and quadratic equations*</li> <li>Introductory coordinate geometry*</li> </ul>	<ul style="list-style-type: none"> <li>What are similarities and differences between exponential growth and decay graphs?</li> <li>What are the key features of a cubic, exponential and reciprocal graphs?</li> <li>How many solutions does a trigonometric equation have?</li> <li>How are solutions to sine equations related?</li> <li>How do you find the inverse function?</li> <li>What is an inverse function?</li> <li>What is the new function given a transformation?</li> <li>How do you know what transformation it is referring to?</li> <li>What notation is used for even and odd numbers, consecutive numbers etc?</li> <li>How do you find the gradient of a curve?</li> <li>What is the difference between the instantaneous rate and average rate?</li> <li>What does the area under a speed time represent?</li> </ul>	<ul style="list-style-type: none"> <li>Exponential functions, growth, decay, exponential graphs</li> <li>Cubic graphs, reciprocal graphs</li> <li>Sine, cosine, tangent, period</li> <li>Non-linear equations, quadratic equations, simultaneous equations, approximate roots graphically</li> <li>Functions, inverse, composite</li> <li>Translation, reflection</li> <li>Approximate solutions, iteration, sign-change method,</li> <li>Algebraic proof, arguments</li> <li>Real world graphs, average rate, instantaneous rate, estimate gradients and area under graphs</li> <li>Calculus, differentiation, <math>\frac{dy}{dx}</math>, rates of change*</li> <li>Composite functions, inverse functions, domain and range*</li> </ul>	<ul style="list-style-type: none"> <li>Express exponential growth and decay as formula, solve growth and decay problems, plot, sketch and recognise exponential graphs</li> <li>Plot, sketch and recognise reciprocal and cubic graphs</li> <li>Solve trigonometric equations</li> <li>Recognise and sketch the graphs of <math>y = \sin x</math>, <math>y = \cos x</math> and <math>y = \tan x</math>.</li> <li>Solve simultaneous equations where one is a quadratic or it results in a quadratic; use graphs to approximate solutions</li> <li>Find inverse and composite functions</li> <li>Identify and sketch translations and reflections of graphs</li> <li>Approximate solutions to equations using iteration</li> <li>Use algebra to construct proofs and arguments</li> <li>Estimate gradients using tangents, estimate areas under graphs; calculate average and instantaneous rates of change; interpret in context such as velocity-time graphs and distance-time graphs</li> <li>Differentiate algebraic expressions with integer and fractional indices; use differentiation to find gradient of curves*</li> </ul>	<ul style="list-style-type: none"> <li>Whole class discussion</li> <li>Pair work</li> <li>Problem-solving tasks</li> <li>Independent work</li> <li>Group work</li> <li>Investigations</li> </ul>

	<ul style="list-style-type: none"> <li>• Introductory calculus*</li> <li>• Functions*</li> </ul> <p>*further mathematics only</p>	<ul style="list-style-type: none"> <li>• How can you find the gradient of a curve algebraically?*</li> <li>• What is differentiation?*</li> <li>• How do you find the range of a function?*</li> </ul>		<ul style="list-style-type: none"> <li>• Find inverse and composite functions; work out ranges of functions; express domains and ranges in different forms*</li> </ul>
Spring Term	<ul style="list-style-type: none"> <li>• Revision and exam practice</li> <li>• Sketching functions and inequalities*</li> <li>• Surds*</li> <li>• Index laws*</li> <li>• Equations of straight lines and circles*</li> <li>• Simultaneous equations*</li> <li>• Matrix multiplication*</li> <li>• Trigonometry and Pythagoras*</li> <li>• Calculus applications*</li> <li>• Sequences*</li> <li>• Factor theorem*</li> <li>• Matrix transformations*</li> <li>• Further trigonometry*</li> </ul> <p>*further mathematics only</p>	<ul style="list-style-type: none"> <li>• What information helps you sketch a graph?*</li> <li>• How do you rationalise a surd?*</li> <li>• When can you apply the rules of indices?*</li> <li>• Why does a power <math>\frac{1}{2}</math> mean square root?*</li> <li>• How does the equation of a circle change if you change the centre point?*</li> <li>• How would you determine if a line is a tangent to a circle?*</li> <li>• Can you apply the same methods of solving simultaneous equations two unknowns with three unknowns?*</li> <li>• What is a matrix?*</li> <li>• What does multiply matrices mean?*</li> <li>• Can all matrices be multiplied?*</li> <li>• How do you find the angle between two planes?*</li> <li>• What is an increasing or decreasing function?*</li> <li>• How can differentiation be used to solve problems in context?*</li> <li>• What happens to a sequence as <math>n</math> tends to infinity?*</li> </ul>	<ul style="list-style-type: none"> <li>• Sketching graphs, multiple domains, turning points, inequalities*</li> <li>• Rationalising denominators*</li> <li>• Fractional indices, negative indices*</li> <li>• Gradients, parallel, perpendicular, equations of circles, equations of tangents*</li> <li>• Solving simultaneous equations, elimination, substitution, equations with three unknowns*</li> <li>• Matrix, scalar, order, associative, commutative, identity matrices*</li> <li>• Angles between planes or lines, Pythagorean triples*</li> <li>• Stationary points, increasing and decreasing functions, equations of normal and tangents, maximum and minimum points*</li> <li>• Limiting values, quadratic and linear sequences*</li> <li>• Roots, polynomials, factors*</li> <li>• Unit square, matrix transformation*</li> <li>• Trigonometric identities, trigonometric equations*</li> </ul>	<ul style="list-style-type: none"> <li>• Sketch graphs with up to three domains; solve linear inequalities; solve quadratic inequalities*</li> <li>• Manipulate surds, rationalise the denominator*</li> <li>• Solve equations with expressions involving negative and fractional indices; simplify expressions with negative and fractional indices*</li> <li>• Work out gradients and equations of lines, find equations of circles with centre (a,b); find equations of tangents*</li> <li>• Solve three linear simultaneous equations*</li> <li>• Multiply 2x2 or 2x1 matrices*</li> <li>• Calculate angles between planes, apply trigonometry and Pythagoras in 3D*</li> <li>• Find stationary points of curves, determine the nature of stationary points; find equations of normal and tangents; apply calculus to problems in context*</li> <li>• Work out limiting values of sequences, find the <math>n</math>th term for quadratic sequences*</li> <li>• Find roots of polynomials, factorise polynomials, solve polynomial equations*</li> <li>• Apply matrix transformations and know the corresponding matrix representations*</li> <li>• Sketch and use trigonometric graphs, use trigonometric</li> </ul>

		<ul style="list-style-type: none"> <li>• How can you factorise cubic expressions?*</li> <li>• What is the matrix that represents a reflection on the x-axis?*</li> <li>• How are trigonometry and Pythagoras directly related?*</li> <li>• How many solutions should a trigonometric equation have?*</li> <li>• Why can trigonometric equations have more than one solution?</li> <li>• How do you find other solutions to trigonometric equations?*</li> </ul>		identities, solve trigonometric equations*	
Summer Term	<ul style="list-style-type: none"> <li>• Revision and exam practice</li> </ul>				

Equipment needed for lessons	How will learning and progress be assessed?
<ul style="list-style-type: none"> <li>• Standard school stationery (Pencil, Blue/Black Pen, Green Pen, Rubber, Sharpener, Ruler, Whiteboard pen)</li> <li>• Exercise book</li> <li>• Scientific Calculator</li> <li>• Pair of Compasses</li> <li>• Protractor</li> </ul>	<ul style="list-style-type: none"> <li>• End of half term tests</li> <li>• Formal assessment week</li> <li>• Peer and self-assessment</li> <li>• Homework tasks</li> <li>• Retrieval practice activities</li> </ul>

Extension & Enrichment opportunities	What can you do to support your child?
<ul style="list-style-type: none"> <li>• Intermediate mathematics challenge</li> <li>• Further mathematics Level 2 qualification</li> <li>• KS4 Puzzle and problem-solving lunchtime club</li> <li>• Puzzle of the week</li> <li>• House mathematics competition</li> </ul>	<ul style="list-style-type: none"> <li>• Several websites are very useful that include videos, questions and worked through examples, these are: <a href="http://mymaths.co.uk">mymaths.co.uk</a>, <a href="http://corbettmaths.com">corbettmaths.com</a>, <a href="http://mathsgenie.co.uk">mathsgenie.co.uk</a> and <a href="http://drfrostmaths.com">drfrostmaths.com</a></li> <li>• Encourage regular revision</li> </ul>

Inclusion	Inclusion within Y11 Maths
<ul style="list-style-type: none"> <li>• Teachers follow student passports to ensure that the needs of all students with SEND are met.</li> <li>• Work is enlarged to the necessary size for visually impaired students.</li> <li>• Teachers will ensure that classrooms are quiet learning environments where possible and will dim lights to support students with sensory needs.</li> <li>• Students have the use of laptop if they have a SEND need whereby use of a laptop supports them.</li> <li>• Hearing impaired students are supported through use a radio aid and teachers ensure that students can lip read at all times during lessons.</li> <li>• Dyslexic students are encouraged to use coloured overlays when they are required to read long passages.</li> <li>• Use of dyslexic friendly fonts and coloured backgrounds used in PowerPoints/resources.</li> <li>• Students with ADHD are given movement breaks, fidget toys and lessons are 'chunked' to aid concentration.</li> <li>• Students are seated according to their needs, students work with the SENDCo to decide upon this.</li> </ul>	<ul style="list-style-type: none"> <li>• Equipment is adapted wherever necessary to accommodate the needs of students with SEND</li> <li>• Where necessary, pupils are given frequent one to one tutorials to revisit previous topics and methods taught to support their understanding</li> <li>• Pupils are provided with online resources to help with learning outside of the classroom and homework, such as videos and worked examples</li> <li>• Students have access to spare mathematical equipment to help with organisation</li> </ul>

**If you have any questions about this Learning Overview, please contact the named Teacher above.**