



Subject: Mathematics

Lead Teacher: Mrs L Roberts

Year: 11

Curriculum organisation

Students are taught for three lessons a week in three groups of 30. There is a set A, a set B and two parallel set C's. Students' sets appear of their timetable, which is available to parents/guardians on Edulink.

Set A - Overview of Topics & Key Information

How will your child be learning?

Term	Unit(s) of Work	Key Enquiry Questions	Key Content/ Terminology	Skills developed	How will your child be learning?
Autumn Term	- Exponential functions - Graphs - Trigonometric graphs and equations - Non-linear simultaneous equations - Functions - Graph transformations - Numerical methods - Proof - Interpreting graphs - Algebraic fractions	- How many solutions does a trigonometric equation have? - How are solutions to sine equations related? - How do you find the inverse function? - What is an inverse function? - What is the new function given a transformation? - How do you know what transformation it is referring to? - What notation is used for even and odd numbers, consecutive numbers etc? - How do you find the gradient of a curve? - What is the difference between the instantaneous rate and average rate? - What does the area under a speed time represent? - What are similarities and differences between exponential growth and decay graphs? - What are the key features of a cubic, exponential and reciprocal graphs?	- Exponential functions, growth, decay, exponential graphs - Cubic graphs, reciprocal graphs - Sine, cosine, tangent, period - Non-linear equations, quadratic equations, simultaneous equations, approximate roots graphically - Functions, inverse, composite - Translation, reflection - Approximate solutions, iteration, sign-change method, - Algebraic proof, arguments - Real world graphs, average rate, instantaneous rate, estimate gradients and area under graphs	- Express exponential growth and decay as formula, solve growth and decay problems, plot, sketch and recognise exponential graphs - Plot, sketch and recognise reciprocal and cubic graphs - Solve trigonometric equations - Recognise and sketch the graphs of $y = \sin x$, $y = \cos x$ and $y = \tan x$. - Solve simultaneous equations where one is a quadratic or it results in a quadratic; use graphs to approximate solutions - Find inverse and composite functions - Identify and sketch translations and reflections of graphs - Approximate solutions to equations using iteration - Use algebra to construct proofs and arguments - 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	- Whole class discussion - Pair work - Problem-solving tasks - Independent work - Group work - Investigations

	- Sequences* - Factor theorem* - Introductory calculus, calculus applications* *further mathematics only	- What happens to a sequence as n tends to infinity?* - How can you factorise cubic expressions?* - How can you find the gradient of a curve algebraically?* - What is differentiation?* - What is an increasing or decreasing function?* - How can differentiation be used to solve problems in context?*	- Limiting values, quadratic and linear sequences* - Roots, polynomials, factors* - Calculus, differentiation, rates of change* - Sketching graphs, multiple domains, turning points, inequalities* - Stationary points, increasing and decreasing functions, equations of normal and tangents, maximum and minimum points*	- Work out limiting values of sequences, find the nth term for quadratic sequences* - Find roots of polynomials, factorise polynomials, solve polynomial equations* - Differentiate algebraic expressions with integer and fractional indices; use differentiation to find gradient of curves* - Find stationary points of curves, determine the nature of stationary points; find equations of normal and tangents; apply calculus to problems in context*	
Spring Term	- Revision and exam practice - Further trigonometry* - Trigonometry and Pythagoras* - Matrix multiplication* - Matrix transformations* *further mathematics only	- How do you find the angle between two planes?* - How are trigonometry and Pythagoras directly related?* - How many solutions should a trigonometric equation have?* - Why can trigonometric equations have more than one solution? - How do you find other solutions to trigonometric equations?* - What is a matrix?* - What does multiply matrices mean?* - Can all matrices be multiplied?*	- Angles between planes or lines, Pythagorean triples* - Trigonometric identities, trigonometric equations* - Matrix, scalar, order, associative, commutative, identity matrices* - Unit square, matrix transformation*	- Calculate angles between planes, apply trigonometry and Pythagoras in 3D* - Sketch and use trigonometric graphs, use trigonometric identities, solve trigonometric equations* - Multiply 2×2 or 2×1 matrices* - Apply matrix transformations and know the corresponding matrix representations*	

		What is the matrix that represents a reflection on the x-axis?*			
Summer Term	Revision and exam practice				

Set B - Overview of Topics & Key Information					How will your child be learning?
Term	Unit(s) of Work	Key Enquiry Questions	Key Content/ Terminology	Skills developed	- Whole class discussion - Pair work - Problem-solving tasks - Independent work - Group work - Investigations
Autumn Term	- Exponential functions - Graphs - Trigonometric graphs and equations - Non-linear simultaneous equations - Functions - Graph transformations - Numerical methods - Proof - Interpreting graphs - Algebraic fractions	- How many solutions does a trigonometric equation have? - How are solutions to sine equations related? - How do you find the inverse function? - What is an inverse function? - What is the new function given a transformation? - How do you know what transformation it is referring to? - What notation is used for even and odd numbers, consecutive numbers etc? - How do you find the gradient of a curve? - What is the difference between the instantaneous rate and average rate? - What does the area under a speed time represent? - What are similarities and differences between exponential growth and decay graphs? - What are the key features of a cubic, exponential and reciprocal graphs?	- Exponential functions, growth, decay, exponential graphs - Cubic graphs, reciprocal graphs - Sine, cosine, tangent, period - Non-linear equations, quadratic equations, simultaneous equations, approximate roots graphically - Functions, inverse, composite - Translation, reflection - Approximate solutions, iteration, sign-change method, - Algebraic proof, arguments - Real world graphs, average rate, instantaneous rate, estimate gradients and area under graphs	- Express exponential growth and decay as formula, solve growth and decay problems, plot, sketch and recognise exponential graphs - Plot, sketch and recognise reciprocal and cubic graphs - Solve trigonometric equations - Recognise and sketch the graphs of $y = \sin x$, $y = \cos x$ and $y = \tan x$. - Solve simultaneous equations where one is a quadratic or it results in a quadratic; use graphs to approximate solutions - Find inverse and composite functions - Identify and sketch translations and reflections of graphs - Approximate solutions to equations using iteration - Use algebra to construct proofs and arguments - 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	

Spring Term	• Revision and exam practice				
Summer Term	• Revision and exam practice				

Set C - Overview of Topics & Key Information					How will your child be learning?
Term	Unit(s) of Work	Key Enquiry Questions	Key Content/ Terminology	Skills developed	• Whole class discussion • Pair work • Problem-solving tasks • Independent work • Group work • Investigations
Autumn Term	• 3D shapes • Volume and Surface Area • Congruence • Similarity • Inequalities • Algebraic fractions	• Find the radius of a sphere given a known volume • How do you find the volume of a frustum? • What is congruence? • What information do you need to prove two triangles are congruent? • If a shape has volume 27 times larger, how much larger is its height? • How do you prove two triangles are similar? • Is solving inequalities the same as solving equations, if not what are the differences? • How do you represent an inequality with two variables graphically? • How many integer solutions are there to these three inequalities? • How do you add algebraic fractions? • What do algebraic fractions need for you to be able to simplify them?	• Volume, surface area, sphere, pyramid, cone, prism, cylinder, frustums • Congruent triangles properties, proof of congruence, • Similarity properties, length, area and volume scale factors, • Inequalities, regions, set notation • Fractions, common denominator, simplify fractions	• Calculate the volume and surface of prisms, cylinders, cones, spheres, pyramids and composite solids • Prove triangles are congruent • Prove triangles are similar, understand the relationship between length, area and volume of similar shapes • Solve linear inequalities in one and two variables, solve quadratic inequalities • Simplify and manipulate algebraic fractions	

Spring Term	• Exponential functions • Graphs • Trigonometric graphs and equations • Non-linear simultaneous equations • Functions • Graph transformations • Numerical methods • Proof • Interpreting graphs • Algebraic fractions	• How many solutions does a trigonometric equation have? • How are solutions to sine equations related? • How do you find the inverse function? • What is an inverse function? • What is the new function given a transformation? • How do you know what transformation it is referring to? • What notation is used for even and odd numbers, consecutive numbers etc? • How do you find the gradient of a curve? • What is the difference between the instantaneous rate and average rate? • What does the area under a speed time represent? • What are similarities and differences between exponential growth and decay graphs? • What are the key features of a cubic, exponential and reciprocal graphs?	• Exponential functions, growth, decay, exponential graphs • Cubic graphs, reciprocal graphs • Sine, cosine, tangent, period • Non-linear equations, quadratic equations, simultaneous equations, approximate roots graphically • Functions, inverse, composite • Translation, reflection • Approximate solutions, iteration, sign-change method, • Algebraic proof, arguments • Real world graphs, average rate, instantaneous rate, estimate gradients and area under graphs	• Express exponential growth and decay as formula, solve growth and decay problems, plot, sketch and recognise exponential graphs • Plot, sketch and recognise reciprocal and cubic graphs • Solve trigonometric equations • Recognise and sketch the graphs of $y = \sin x$, $y = \cos x$ and $y = \tan x$. • Solve simultaneous equations where one is a quadratic or it results in a quadratic; use graphs to approximate solutions • Find inverse and composite functions • Identify and sketch translations and reflections of graphs • Approximate solutions to equations using iteration • Use algebra to construct proofs and arguments • 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	
Summer Term	• Revision and exam practice				

Equipment needed for lessons

How will learning and progress be assessed?

• Standard school stationery (Pencil, Blue/Black Pen, Green Pen, Rubber, Sharpener, Ruler, Whiteboard pen) • Exercise book • Scientific Calculator • Pair of Compasses • Protractor	• End of half term tests • Formal assessment week • Peer and self-assessment • Homework tasks • Retrieval practice activities
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Extension & Enrichment opportunities	What can you do to support your child?
• Intermediate mathematics challenge • Further mathematics Level 2 qualification • Problem-solving lunchtime club	• Several websites are very useful that include videos, questions and worked through examples, these are: mymaths.co.uk, corbettmaths.com, mathsgenie.co.uk and drfrostmaths.com • Encourage regular revision
Inclusion	Inclusion within Y11 Maths
• Teachers follow student passports to ensure that the needs of all students with SEND are met. • Work is enlarged to the necessary size for visually impaired students. • Teachers will ensure that classrooms are quiet learning environments where possible and will dim lights to support students with sensory needs. • Students have the use of laptop if they have a SEND need whereby use of a laptop supports them. • Hearing impaired students are supported through use a radio aid and teachers ensure that students can lip read at all times during lessons. • Dyslexic students are encouraged to use coloured overlays when they are required to read long passages. • Use of dyslexic friendly fonts and coloured backgrounds used in PowerPoints/resources. • Students with ADHD are given movement breaks, fidget toys and lessons are 'chunked' to aid concentration. • Students are seated according to their needs, students work with the SENDCo to decide upon this.	• Equipment is adapted wherever necessary to accommodate the needs of students with SEND • Where necessary, pupils are given frequent one to one tutorials to revisit previous topics and methods taught to support their understanding • Pupils are provided with online resources to help with learning outside of the classroom and homework, such as videos and worked examples • Students have access to spare mathematical equipment to help with organisation

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