Maths Year 10 Higher

Topic Outline	Students should know and understand	Students should be able to
Autumn Term		
EQUATIONS AND INEQUALITIES	• How to work with and solve quadratic equations, simultaneous equations and inequalities.	• Find the roots of quadratic functions. • Rearrange and solve simple quadratic equations. • Solve more complex quadratic equations. • Use the quadratic formula to solve a quadratic equation. • Complete the square for a quadratic expression. • Solve quadratic equations by completing the square. • Solve simple simultaneous equations. • Solve simultaneous equations for real-life situations. • Use simultaneous equations to find the equation of a straight line. • Solve linear simultaneous equations where both equations are multiplied. • Interpret real-life situations involving two unknowns and solve them. • Solve simultaneous equations with one quadratic equation. • Use real-life situations to construct quadratic and linear equations and solve them. • Solve inequalities and show the solution on a number line and using set notation
PROBABILITY	• How to write and calculate with probabilities and draw and use Venn Diagrams.	• Use the product rule for finding the number of outcomes for two or more events. • List all the possible outcomes of two events in a sample space diagram. • Identify mutually exclusive outcomes and events.

		• Find the probabilities of mutually exclusive outcomes and events. • Find the probability of an event not happening. • Work out the expected results for experimental and theoretical probabilities. • Compare real results with theoretical expected values to see if a game is fair. • Draw and use frequency trees. • Calculate probabilities of repeated events. • Draw and use probability tree diagrams. • Decide if two events are independent. • Draw and use tree diagrams to calculate conditional probability. • Draw and use tree diagrams without replacement. • Use two-way tables to calculate conditional probability. • Use Venn diagrams to calculate conditional probability. • Use set notation.
Spring Term		
MULTIPLICATIVE REASONING	• How to use different percentage methods and work with compound measures.	• Find an amount after repeated percentage changes. • Solve growth and decay problems. • Calculate rates. • Convert between metric speed measures. • Use a formula to calculate speed and acceleration. • Solve problems involving compound measures • Use relationships involving ratio. • Use direct and indirect proportion.
SIMILARITY AND CONGRUENCE	• How to use similar and congruent shape ideas.	• Show that two triangles are congruent. • Know the conditions of congruence. • Prove shapes are congruent. • Solve problems involving congruence.

		• Use the ratio of corresponding sides to work out scale factors. • Find missing lengths on similar shapes. • Use similar triangles to work out lengths in real life. • Use the link between linear scale factor and area scale factor to solve problems. • Use the link between scale factors for length, area and volume to solve problems.
MORE TRIGONOMETRY	• How to draw, transform and use Trigonometric graphs and use the sine and cosine rules and area of a triangle.	• Understand and use upper and lower bounds in calculations involving trigonometry. • Understand how to find the sine of any angle. • Know the graph of the sine function and use it to solve equations. • Understand how to find the cosine of any angle. • Know the graph of the cosine function and use it to solve equations. • Understand how to find the tangent of any angle. • Know the graph of the tangent function and use it to solve equations. • Find the area of a triangle and a segment of a circle. • Use the sine rule to solve 2D problems. • Use the cosine rule to solve 2D problems. • Solve bearings problems using trigonometry. • Use Pythagoras' theorem in 3D. • Use trigonometry in 3D. • Recognise how changes in a function affect trigonometric graphs
FURTHER STATISTICS	• How to use different sampling methods and draw/interpret statistical diagrams	• Understand how to take a simple random sample. • Understand how to take a stratified sample. • Draw and interpret cumulative frequency tables and diagrams.

		• Work out the median, quartiles and interquartile range from a cumulative frequency diagram. • Find the quartiles and the interquartile range from stem-and-leaf diagrams. • Draw and interpret box plots. • Understand frequency density. • Draw histograms. • Interpret histograms. • Compare two sets of data.
Summer Term		
	• How to use simultaneous equations and inequalities graphically and sketch different graphs and solve them graphically and using iteration.	• Solve simultaneous equations graphically. • Represent inequalities on graphs. • Interpret graphs of inequalities. • Recognise and draw quadratic functions. • Find approximate solutions to quadratic equations graphically. • Solve quadratic equations using an iterative process. • Find the roots of cubic equations. • Sketch graphs of cubic functions. • Solve cubic equations using an iterative process.
CIRCLE THEOREMS	• How to recall and apply circle theorems and write reasoned arguments.	• Solve problems involving angles, triangles and circles. • Understand and use facts about chords and their distance from the centre of a circle. • Solve problems involving chords and radii. • Understand and use facts about tangents at a point and from a point. • Give reasons for angle and length calculations involving tangents. • Understand, prove and use facts about angles subtended at the centre and the circumference of circles.

		• Understand, prove and use facts about the angle in a semicircle being a right angle. • Find missing angles using these theorems and give reasons for answers. • Understand, prove and use facts about angles subtended at the circumference of a circle. • Understand, prove and use facts about cyclic quadrilaterals. • Prove the alternate segment theorem. • Solve angle problems using circle theorems. • Give reasons for angle sizes using mathematical language. • Find the equation of the tangent to a circle at a given point.
MORE ALGEBRA	• How to make a letter the subject, use algebraic fractions and functions ideas and extend surd ideas.	• Change the subject of a formula where the power of the subject appears. • Change the subject of a formula where the subject appears twice. • Add and subtract algebraic fractions. • Multiply and divide algebraic fractions. • Change the subject of a formula involving fractions where all the variables are in the denominators. • Simplify algebraic fractions. • Add and subtract more complex algebraic fractions. • Simplify expressions involving surds. • Expand expressions involving surds. • Rationalise the denominator of a fraction. • Solve equations that involve algebraic fractions • Use function notation. • Find composite functions. • Find inverse functions. • Prove a result using algebra.

Maths Year 11 Higher

Topic Outline	Students should know and understand	Students should be able to
Autumn Term		
VECTORS AND GEOMETRC PROOF	• How to describe and reason with vector ideas.	• Understand and use vector notation. • Work out the magnitude of a vector. • Calculate using vectors and represent the solutions graphically. • Calculate the resultant of two vectors. • Solve problems using vectors. • Use the resultant of two vectors to solve vector problems. • Express points as position vectors. • Prove lines are parallel. • Prove points are collinear. • Solve geometric problems in two dimensions using vector methods. • Apply vector methods for simple geometric proofs.
PROPORTION AND GRAPHS	• How to use direct and inverse proportion, transform graphs and sketch, draw and recognise non-linear graphs.	• Write and use equations to solve problems involving direct proportion. • Write and use equations to solve problems involving direct proportion. • Solve problems involving square and cubic proportionality. • Write and use equations to solve problems involving inverse proportion. • Use and recognise graphs showing inverse proportion. • Recognise graphs of exponential functions. • Sketch graphs of exponential functions. • Calculate the gradient of a tangent at a point.