Maths Curriculum Overview Years 10 & 11

	Year 10 Foundation	Year 10 Higher	Year 11 Foundation	Year 11 Higher
Autumn 1	**Percentages** ● Be able to recap finding a percentage of an amount, both on a calculator and using mental methods ● To be able to find the original cost of an amount increased by a percentages ● Be able to calculate reverse percentage problems ● Be able to find the percentage increase or decrease ● Be able to answer multi step problems involving percentages **Equations** ● To be able to expand and simplify expressions involving brackets. ● To be able to factorise expressions into brackets. ● To be able to expand double brackets ● To be able to solve two step linear equations ● Solve an equation with an unknown on both sides ● Solving equations with unknowns in the denominator ● Forming and solving equations ● To be able to factorise quadratics, including where a = 1 ● To be able to solve quadratics by factorising	**Percentages** ● Be able to recap finding a percentage of an amount, both on a calculator and using mental methods ● To be able to find the original cost of an amount increased by a percentages ● Be able to calculate reverse percentage problems ● Be able to find the percentage increase or decrease ● Be able to answer multi step problems involving percentages **Equations** ● To be able to expand and simplify multi step expressions involving brackets. ● To be able to factorise higher order expressions into brackets. ● To be able to expand double brackets ● To be able to expand triple brackets. ● Solve an equation with an unknown on both sides ● Solving equations with unknowns in the denominator ● Forming and solving equations ● To be able to factorise quadratics, including where a>1 ● To be able to solve quadratics by factorising ● Be able to factorise using the difference	**Factors, Multiples and Primes** ● Be able to find represent a number as a product of its prime factors ● Be able to find the highest common factor of two or more values by listing ● Be able to find the lowest common multiple of two or more values by listing ● Be able to find the highest common factor and lowest common multiple using prime factor decomposition **Calculating with Fractions** ● Be able to convert between mixed numbers and improper fractions ● Be able to add and subtract mixed fractions ● Be able to multiply mixed fractions ● Be able to divide mixed fractions ● Be able to apply fractions to other mathematical concepts such as area, perimeter and algebra ● Ordering fractions including mixed numbers **Equations and Expressions** ● Solving Simplify and manipulate algebraic expressions ● Simplify expressions using index laws ● Solve a two-step equation	**Surds** ● Be able to simplify surds ● Be able to multiply and divide surds ● Be able to add and subtract surds ● Be able to expand brackets involving surds ● Experience linking surds to other mathematical concepts, such as area, volume and Pythagoras ● Rationalise denominators containing a single term ● Rationalise denominators containing two terms **Equations** ● Be able to solve a quadratic equation by factorising, including when the coefficient of x is equal to or greater than one ● Be able to factorise using the difference of two squares ● Be able to solve quadratic equations using the quadratic formula ● Solve quadratic equations graphically ● Be able to solve equations by completing the square ● Find the turning point of a graph by completing the square ● Solve simultaneous equations where one or both is a quadratic ● Link solving quadratic equations to

Formula

- To be able to identify the current term within a formula
- To be able to change the subject of a multi-step equation
- To be able to change the subject of a multi-step equation, involving squares and roots
- Link changing the subject of an equation to areas of geometry, such as finding the radius
- Link changing the subject of an equation to SUVAT formulas

- of two squares
- Be able to recall the quadratic formula
- Understand why we would choose to apply the quadratic formula over factorising when solving an equation
- Be able to solve quadratic equations using the quadratic formula
- Be able to solve equations by completing the square

Formula

- To be able to identify the current term within a formula
- To be able to change the subject of a multi-step equation
- To be able to change the subject of a multi-step equation, involving squares and roots
- Link changing the subject of an equation to areas of geometry, such as finding the radius
- Link changing the subject of an equation to SUVAT formulas

- Solve an equation with an unknown on both sides
- Solving equations with unknowns in the denominator
- Forming and solving equations
- Factorising to solve quadratic equations where the coefficient of $x = 1$
- Solving quadratics, graphically
- Solving simultaneous equations using the elimination method

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higher level geometry and probability questions

Maths Curriculum Overview Years 10 & 11

Autumn 2	**Volume and Surface Area** ● Find the volume and surface area of a prism, including cylinders ● Find the volume of a cone ● Find the surface area of a cone ● Find the volume of a sphere and ● Find the surface area of a sphere and ● Find the volume and surface area of a 3D shape made up of prisms ● Find missing sides in 3d shapes when given the volume or surface area ● Answer problem solving questions involving volume and surface area **Trigonometry** ● To know how to find the hypotenuse when given the shorter sides on a right-angled triangle using Pythagoras' Theorem. ● To know how to find a shorter side on a right-angled triangle when given the hypotenuse and one other side. ● To know to use Pythagoras' Theorem in exam questions and different contexts ● To know how to identify which trigonometric ratio is required for a given problem. ● To know how to use the trigonometric ratio to find missing sides or angles in right-angled triangles. ● To be able to find, and recall the exact values of trigonometry	**Volume and Surface Area** ● Find the volume and surface area of a prism, including cylinders ● Find the volume of a cone ● Find the surface area of a cone ● Find the volume of a pyramid ● Find the surface area of a pyramid ● Find the volume of a frustum ● Find the surface area of a frustum ● Find the volume of a sphere and hemisphere ● Find the surface area of a sphere and hemisphere ● Find the volume and surface area of a 3D shape made up of prisms ● Find missing sides in 3d shapes when given the volume or surface area ● Answer problem solving questions involving volume and surface area **Trigonometry** ● To know how to find the hypotenuse when given the shorter sides on a right-angled triangle using Pythagoras' Theorem. ● To know how to find a shorter side on a right-angled triangle when given the hypotenuse and one other side. ● To know to use Pythagoras' Theorem in exam questions and different contexts ● To know how to apply Pythagoras' Theorem to find missing lengths on or inside cubes and cuboids. ● Be able to use 3D Pythagoras	**Angles** ● Recap of angle calculation and regular shapes. ● Calculation of angles in and on parallel lines. ● Calculation and use of bearings. ● Recap knowledge of parallel lines and their angles (corresponding, alternate, co-interior) ● Know the rules when dealing with bearings **Right Angled Triangles** ● Revision of Pythagoras with the emphasis on GCSE style questions. ● The use of trigonometric ratios to calculate missing angles. ● The use of trigonometric ratios to calculate missing sides. ● Identification exact values of sine and cosine 30, 60 and 90 degrees. **Surface Area and Volume** ● To find areas by counting squares and volumes by counting cubes. ● Interpret scales on a range of measuring instruments. ● Calculate and convert between metric units (ie cm to m) ● Know and use the formula for area and circumference of a circle ● Volume and surface area of prisms such as cubes, cuboids, triangular prisms and cylinders	**Algebraic Fractions** ● Be able to simplify algebraic fractions by factorising into one bracket ● Be able to simplify algebraic fractions by factorising into two brackets ● Understand that the 'rules' for calculating with algebraic fractions, are the same as the 'rules' for calculating with normal fractions ● Be able to add and subtract algebraic fractions ● Be able to multiply algebraic fractions ● Be able to divide algebraic fractions **Loci** ● Use a compass and ruler to construct: a triangle from given data, bisect an angle and line. Angles of 60, 90 and 30 degrees. Solve and define locus problems. ● Read the plan of a 3D Shape ● Revisit bearings. ● Bisect an angle and line ● Constructing a region **Trigonometry** ● Use Pythagoras and trig to solve more complex 2D problems. ● Using Pythagoras and trig ratios to solve 3D problems ● Calculate exact values of sin, cos and tan of common angles ● Using sine and cosine formulae for non-right angled triangles ● Using the formula for the area of any triangle

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		● To know how to identify which trigonometric ratio is required for a given problem. ● To know how to use the trigonometric ratio to find missing sides or angles in right-angled triangles. ● Multi-step questions involving Pythagoras and Trigonometry ● To be able to find, and recall the exact values of trigonometry		
Spring 3	**Linear and Non-Linear Graphs** ● Identify and draw lines in the form x = a and y = b ● Complete a table of coordinates and draw a line from this ● Find the gradient of a given line ● Find the equation of a linear graph ● Identify parallel lines and their equations ● Use conversion graphs ● Plot quadratic graphs using a table of coordinates ● Use a quadratic graph to solve a quadratic equation ● Recognise a cubic & quadratic graphs **Real Life Graphs** ● Interpret distance-time graphs ● Draw distance - time graphs and interpret their gradients ● Working with velocity time graphs to establish, acceleration and interpret the gradient	**Linear and Non-Linear Graphs** ● Identify and draw lines in the form x = a and y = b ● Complete a table of coordinates and draw a line from this ● Draw a line from a given equation ● Establish the gradient of a given line ● Find the equation of a linear graph ● Identifying and using other graphs (cubic etc) ● Sketch quadratic graphs from key information ● Find the turning point of a quadratic graph ● Establish gradients and equations of parallel and perpendicular lines **Real Life Graphs** ● Working with speed distance time graphs ● Velocity time graphs, gradients and area under the graph ● Real life graph construction, filing containers	**Statistical Diagrams** ● To use the correct notation for time using 12- and 24-hour clocks. ● Bable to draw and interpret pictograms, bar chart, and line graphs ● To extract information from tables and diagrams ● Work out the mode, median and mean ● The construction and interpretation of pie charts ● The construction and interpretation of scatter graphs' ● Working with grouped data and averages **Indices and Roots** ● Students should have knowledge of integer complements to 10 and to 100, multiplication facts to 10 × 10, strategies for multiplying and dividing by 10, 100 and 1000. ● Squares, square roots, cubes and cube roots and have knowledge of classifying integers ● Understand square root as an opposite to squaring (encountered in Pythagoras)	**Circle Theorems** ● To know what subtended means ● To be able to work with all seven circle theorems in order to find missing angles **Linear and Quadratic Inequalities** ● Understand the concept of inequality. ● Representing a solution to an inequality on a number line. ● Graphical inequalities and identifying regions. ● Solve a linear inequality ● Solve a quadratic inequality ● Identification of an inequality represented by two or more variables giving a region. ● Using trial and improvement to find a solution to an inequality. **Functions** ● Substituting into functions ● Substituting into composite functions ● Finding composite functions

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Area under a curve
Tangents to curves
Curve types
Transformation of graphs

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Recap of the notation of a power and the extension from square to any power
Calculate using powers (multiplication and division process including brackets)

<u>Standard Form</u>

Showing small and large numbers in standard form
Calculating with standard form

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Finding inverse functions

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Spring 4	**Probability** • Calculation of probabilities using fraction, decimal and percentage. • Use of bias in calculations • Predicted outcome from a number of trials, expected outcome. • Calculation of mutually exclusive outcomes (or) • Use of 1 as certain and zero as impossible • Combined events and the use of two way tables • Venn and tree diagrams • The further use of Venn diagrams and the full notation • "And" and "Or" calculations with tree diagrams. • Understanding mutually exclusive events and independent events • Use of tree diagrams to represent the options of a probability with	**Probability** • Probability calculation of different outcomes of combined events • Probability of two outcomes or events occurring at the same time. • The use of tree diagrams to work out the probability of combined events. • Probability of independent events • Conditional probability **Ratio and Proportion** • Calculating with ratios when only one part of the information is known • The use of crossover ratios (ie ratio houses to flats is 2:3 and flats to bungalows is 5:7) • Direct and inverse proportion expressed graphically. • Best buys. • Use of proportion with compound	**Ratio, Proportion and Compound Measures** • Simplify ratios. • Show ratios as fractions. • Share in a given ratio, including when a value needs converting • Work with ratios that have a crossover (ie ratio houses to flats is 1:2 and flats to terraced is 5 : 8) • Extension involving interest and compound measures. • Best buy questions • Recipe questions **Sequences and Linear Graphs** • Recap the nth term of linear sequences, all styles of questions should be explored, pupils should be fully conversant with the use of the nth term. • Finding and using the nth term of a quadratic sequence. • Completing a sequence using a table of coordinates	**Algebraic Proof** • Writing algebraic proof for different statements - such as consecutive numbers etc. **Iteration** • Using recurrence relations • Substituting into iterative formulae • Finding approximate solutions to equations using iteration **Vectors** • Add and subtract vectors algebraically and use column vectors. • Solve geometric problems and produce proofs. • Calculation of column vectors • Resultant vector calculation • Properties of parallel vectors and parallelograms

combined events. Ratio and Proportion ● Simplify ratios. ● Show ratios as fractions. ● Increase ratios. ● Work with ratios that have a crossover (ie ratio houses to flats is 1:2 and flats to terraced is 5 : 8) ● Working with speed, distance and time Simple and Compound Interest ● Write percentage change as a multiplier ● Understand what the term simple interest means ● Calculate simple interest ● Understand what compound interest is ● Complete compound interest calculations ● Find the missing term of a compound interest calculation ● Calculate with growth and decay ● Compare simple interest and compound interest, and be able to use mathematical reasoning to identify a 'best value' product	measures. ● The use of indirect/inverse proportion ● Calculation of direct and indirect proportion also using the constant Simple and Compound Interest ● Write percentage change as a multiplier ● Understand what the term simple interest means ● Calculate simple interest ● Understand what compound interest is ● Complete compound interest calculations ● Find the missing term of a compound interest calculation ● Calculate with growth and decay ● Compare simple interest and compound interest, and be able to use mathematical reasoning to identify a 'best value' product	● Plotting linear sequences on a graph Transformations ● Translation in all four quadrants using vector notation. ● 2D shape rotational and line symmetry. ● Reflections in all four quadrants ● Rotations in all four quadrants ● Enlargements in all four quadrants ● Students should be fully conversant with measuring lines and angles accurately. ● Translation in all four quadrants using vector notation.	
Summer 5	Sequences ● Students should be able to describe a pattern in words ● Students should be able to generate further values. ● Recognise and use the rules for a linear pattern to generate further values ● Express a pattern algebraically	Sequences ● Express a pattern algebraically ● Generate terms based on the nth term ● Recognise common sequences (Fibonacci) ● Use the nth term to generate missing values and confirm values are in the pattern	Percentages ● To confirm and recap prior knowledge and apply numerical skills to solve complex problems on a functional basis, using AO3 styled questions that will often involve more than one operation. ● Practice of GCSE questioning and the	Similarity, Congruence and Geometric Proof ● Finding the perimeter and area of similar shapes ● Finding the surface area and volume of similar shape ● Solving geometric problems using vectors ● Geometric proofs with vectors

• Generate terms based on the nth term • Recognise common sequences (Fibonacci) • Use the nth term to generate missing values and confirm values are in the pattern Proportion • Direct and inverse proportion • Unitary method • Best Buys • Ingredient Questions Fractions • Converting between FDP • Ordering fractions • Ordering FDP	• Identifying a quadratic pattern from the second difference • Production of the nth term for the quadratic pattern. • Use of the nth term to establish further values • Geometric and arithmetic sequences Proportion • Direct and inverse proportion • Unitary method • Best Buys • Ingredient Questions Fractions • Converting fractions to recurring decimals • Converting recurring decimals to fractions	complexity of questions that will involve a deeper understanding of the area, plus questions that involve more than one operation in their resolution. • The increased use of AO3 styled questioning, • The use of percentages for depreciation. • The move to reverse percentage. Probability • Calculation of probabilities of two or more events • Use and creation of two way tables to solve problems • Use and creation of Venn diagrams to solve problems • Use and creation of Tree diagrams to solve problems • The use of "and" & "or" questioning • Understand the use of the 0–1 scale to measure probability. • List all the outcomes for an experiment. • Know and apply the fact that the sum of probabilities for all outcomes is 1. • Drawing and using Venn Diagrams. • Combined events	• Geometric proofs with angle facts • Geometric proofs with congruence and similarity • Proving the circle theorem Proportion • Drawing histograms with equal class widths • Drawing histograms with unequal class widths • Interpreting histograms • Calculating averages from histograms
Summer 6	Transformations • Translation in all four quadrants using vector notation. • 2D shape rotational and line symmetry. • Reflections in all four quadrants • Rotations in all four quadrants • Enlargements in all four quadrants, also	Transformations • Translation in all four quadrants using vector notation. • 2D shape rotational and line symmetry. • Reflections in all four quadrants • Rotations in all four quadrants • Enlargements, negative and fractional	Revision	Revision

using point of enlargements other than the origin, the description of transformation.
- Multiple transformations.
- The use of y = x for the reflection.

Simultaneous Equations

- Students should be able to expand brackets and solve linear equations
- Solving linear simultaneous equations by elimination
- Solve linear simultaneous equations by substitution
- Solve simultaneous equations graphically

Statistical Diagram

- Recap of the range and the use of the range in accuracy
- Calculation of the mean, median and mode
- Reading and completing stem and leaf
- Use of grouped data and calculation of the averages.
- Calculation from charts such stem and leaf

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in all four quadrants, also using point of enlargements other than the origin, the description of transformation.
- Multiple transformations.
- The use of y = x for the reflection.

Simultaneous Equations

- Solving linear simultaneous equations by elimination
- Solve linear simultaneous equations by substitution
- Solve simultaneous equations graphically
- Solve simultaneous equations when at least one is a quadratic equation

Statistical Diagram

- Drawing cumulative frequency graphs
- Interpreting cumulative frequency graphs
- Drawing box plots
- Interpreting box plots
- Comparing populations using box plots and cumulative frequency graphs