MOOR PARK HIGH SCHOOL: CURRICULUM

Key Stage 4 Long Term Planning Year 10 Faculty Area: Mathematics

Autumn 1 – Similarity		
Knowledge	***Congruence, Similarity and Enlargement (3 weeks)***	***Trigonometry (3 weeks)***
Rationale	Building on their experience of enlargement and similarity in previous years, this unit extends students' experiences and looks more formally at dealing with topics such as similar triangles. It would be useful to use ICT to demonstrate what changes and what stays the same when manipulating similar shapes. Parallel line angle rules are revisited to support establishment of similarity. Congruency is introduced through considering what information is needed to produce a unique triangle. Higher level content extends enlargement to explore negative scale factors and looks at establishing that a pair of triangles are congruent through formal proof.	Trigonometry is introduced as a special case of similarity within right-angled triangles. Emphasis is placed throughout the steps on linking the trig functions to ratios, rather than just functions. This key topic is introduced early in Year 10 to allow regular revisiting e.g. when looking at bearings. For the Higher tier, calculation with trigonometry is covered now and graphical representation is covered in Year 11.
KS4 National Curriculum Content Covered (Bold type Indicates Higher NC Content)	• extend and formalise their knowledge of ratio and proportion in working with measures and geometry • compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity • interpret and use fractional **and negative** scale factors for enlargements • apply the concepts of congruence and similarity, including the relationships between lengths, **areas and volumes** in similar figures • use mathematical language and properties precisely • make and test conjectures about the generalisations that underlie patterns and relationships; look for proofs or counterexamples • develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems	• extend and formalise their knowledge of ratio and proportion, including trigonometric ratios • apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right angled triangles **and, where possible, general triangles** in two- and three-dimensional figures • know the exact values of $\sin\theta$, $\cos\theta$, $\tan\theta$ for required angles • **know and apply the sine rule and cosine rule to find unknown lengths and angles** • **know and apply to calculate the area, sides or angles of any triangle** • develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi step problems • make and use connections between different parts of mathematics to solve problems • model situations mathematically and express the results using a range of formal mathematical representations, reflecting on how their solutions may have been affected by any modelling assumptions • select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem
Connections to Previous National Curriculum Content in KS3 (Statutory)	• change freely between related standard units [for example time, length, area, volume/capacity, mass] • use scale factors, scale diagrams and maps • understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction • solve problems involving direct and inverse proportion, including graphical and algebraic representations • draw and measure line segments and angles in geometric figures, including interpreting scale drawings • derive and use the standard ruler and compass constructions (perpendicular bisector of a line segment, constructing a perpendicular to a given line from/at a given point, bisecting a given angle); recognise and use the perpendicular distance from a point to a line as the shortest distance to the line • describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric • identify properties of, and describe the results of, translations, rotations and reflections applied to given figures • use the standard conventions for labelling the sides and angles of triangle ABC • identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids • know and use the criteria for congruence of triangles • derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies • apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs • interpret mathematical relationships both algebraically and geometrically	• use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles
Assessment	White Rose Maths skills checks at the end of each unit (2 during this period)	
Homework	Sparx Maths online homework	
Literacy	Mathematical key terms/vocabulary for each unit. Correct terminology used when answering questions. Read and understand written questions.	
CIAG	Why Study Maths ? https://www.youtube.com/watch?v=4ApLzQvMSxc&feature=emb_logo	

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Autumn 2 – Developing Algebra		
Knowledge	***Representing Solutions of Equations and Inequalities (3 weeks)***	***Simultaneous Equations (3 weeks)***
Rationale	Students will have covered both equations and inequalities at key stage 3, and this unit offers the opportunity to revisit and reinforce standard techniques and deepen their understanding. Looking at the difference between equations and inequalities, students will establish the difference between a solution and a solution set; they will also explore how number lines and graphs can be used to represent the solutions to inequalities. As well as solving equations, emphasis needs to be placed on forming equations from given information. This provides an excellent opportunity to revisit other topics in the curriculum such as angles on a straight line/in shapes/parallel lines, probability, area and perimeter etc. Factorising quadratics to solve equations is covered in the Higher strand here and is revisited in the Core strand in Year 11	Students now move on to the solution of simultaneous equations by both algebraic and graphical methods. The method of substitution will be dealt with before elimination, considering the substitution of a known value and then an expression. With elimination, all types of equations will be considered, covering simple addition and subtraction up to complex pairs where both equations need adjustment. Links will be made to graphs and forming the equations will be explored as well as solving them. The Higher strand will include the solution of a pair of simultaneous equations where one is a quadratic, again dealing with factorisation only at this stage.
KS4 National Curriculum Content Covered (Bold type Indicates Higher NC Content)	• consolidate their algebraic capability from key stage 3 and extend their understanding of algebraic simplification and manipulation to include quadratic expressions • translate simple situations or procedures into algebraic expressions or formulae; derive an equation, solve the equation and interpret the solution • select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem. • recognise, sketch and interpret graphs of linear functions • factorising quadratic expressions of the form $x2+$ bx + c (Higher only at this stage) • solve quadratic equations algebraically by factorising (Higher only at this stage) • solve linear inequalities in one **or two** variable**s, and quadratic inequalities in one variable;** represent the solution set on a number line, **using set notation and on a graph**	• consolidate their algebraic capability from key stage 3 and extend their understanding of algebraic simplification and manipulation to include quadratic expressions • model situations mathematically and express the results using a range of formal mathematical representations, reflecting on how their solutions may have been affected by any modelling assumptions • translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution • select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems; interpret their solution in the context of the given problem • solve two simultaneous equations in two variables (linear/linear **or linear/quadratic**) algebraically • recognise, sketch and interpret graphs of linear functions and quadratic functions
Connections to Previous National Curriculum Content in KS3 (Statutory)	• simplify and manipulate algebraic expressions to maintain equivalence by: multiplying a single term over a bracket; taking out common factors; expanding products of two or more binomials • understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors • use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) • model situations or procedures by translating them into algebraic expressions or formulae and by using graphs • work with coordinates in all four quadrants • recognise, sketch and produce graphs of linear functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane • interpret mathematical relationships both algebraically and graphically • reduce a given linear equation in two variables to the standard form ***y*** = ***mx*** + c • calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically • use linear graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations • find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear	• simplify and manipulate algebraic expressions to maintain equivalence by: multiplying a single term over a bracket; taking out common factors; expanding products of two or more binomials • understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors • use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) • model situations or procedures by translating them into algebraic expressions or formulae and by using graphs • work with coordinates in all four quadrants • recognise, sketch and produce graphs of linear functions of one variable with appropriate scaling, using equations in x and y and the Cartesian plane • interpret mathematical relationships both algebraically and graphically • reduce a given linear equation in two variables to the standard form ***y*** = ***mx*** + c • calculate and interpret gradients and intercepts of graphs of such linear equations numerically, graphically and algebraically • use linear graphs to estimate values of y for given values of x and vice versa and to find approximate solutions of simultaneous linear equations • find approximate solutions to contextual problems from given graphs of a variety of functions, including piece-wise linear, exponential and reciprocal graphs
Assessment	White Rose Maths skills checks at the end of each unit (2 during this period)	
Homework	Sparx Maths online homework	
Literacy	Mathematical key terms/vocabulary for each unit. Correct terminology used when answering questions. Read and understand written questions.	
CIAG	Business Owner - https://www.youtube.com/watch?v=C7tQW5ieGHg	

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Spring 1 – Geometry			
Knowledge	***Angles and Bearings (2 weeks)***	***Working with Circles (2 weeks)***	***Vectors (2 weeks)***
Rationale	As well as the formal introduction of bearings, this block provides a great opportunity to revisit other materials and make links across the mathematics curriculum. Accurate drawing and use of scales will be vital, as is the use of parallel line angles rules; all of these have been covered at Key Stage 3. Students will also reinforce their understanding of trigonometry and Pythagoras from earlier this year, applying their skills in another context as well as using mathematics to model real-life situations.	This block also introduces new content whilst making use of and extending prior learning. The formulae for arc length and sector area are built up from students' understanding of fractions They are also introduced to the formulae for surface area and volume of spheres and cones; here higher students can enhance their knowledge and skills of working with area and volume ratios. Higher tier students are also introduced to four of the circle theorems; the remaining theorems will be introduced in Year 11 when these four will be revisited.	Students will have met vectors to describe translations during Key Stage 3 This will be revisited and used as the basis for looking more formally at vectors, discovering the meaning of $-\boldsymbol{a}$ compared to $\boldsymbol{a}$ to make sense of operations such as addition, subtraction and multiplication of vectors. This will connect to exploring 'journeys' within shapes linking the notation $\overrightarrow{AB}$ with $\boldsymbol{b}-\boldsymbol{a}$ etc. Higher tier students will then use this understanding as the basis for developing geometric proof, making links to their knowledge of properties of shape and parallel lines.
KS4 National Curriculum Content Covered (Bold type Indicates Higher NC Content)	• interpret and use bearings • compare lengths…using scale factors • apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles **and, where possible, general triangles** in two dimensional figures • **know and apply the sine rule and cosine rule to find unknown lengths and angles** • use mathematical language and properties precisely • reason deductively in geometry, number and algebra, including using geometrical constructions • make and use connections between different parts of mathematics to solve problems	• identify and apply circle definitions and properties, including centre, radius, chord, diameter, circumference, tangent, arc, sector and segment • calculate arc lengths, angles and areas of sectors of circles • calculate surface areas and volumes of spheres, pyramids, cones and composite solids • **apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results**	• describe translations as 2D vectors • apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; **use vectors to construct geometric arguments and proofs**
Connections to Previous National Curriculum Content in KS3 (Statutory)	• apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles • understand and use the relationship between parallel lines and alternate and corresponding angles • derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons • use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right- angled triangles	• change freely between related standard units [for example time, length, area, volume/capacity, mass] • use scale factors, scale diagrams and maps • understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction • solve problems involving direct and inverse proportion, including graphical and algebraic representations • derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders) • calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes • derive and illustrate properties of triangles, quadrilaterals, circles, and other plane figures [for example, equal lengths and angles] using appropriate language and technologies • use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D	• apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs • interpret mathematical relationships both algebraically and geometrically
Assessment	White Rose Maths skills checks at the end of each unit (3 during this period)		
Homework	Sparx Maths online homework		
Literacy	Mathematical key terms/vocabulary for each unit. Correct terminology used when answering questions. Read and understand written questions.		
CIAG	digital tech engineer - https://youtu.be/TWGgqmQAfvM		

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Spring 2 –	***Proportions and Proportional Change***		
Knowledge	***Ratios and Fractions (2 weeks)***	***Percentages and Interest (2 weeks)***	***Probability (2 weeks)***
Rationale	This block builds on KS3 work on ratio and fractions, highlighting similarities and differences and links to other areas of mathematics including both algebra and geometry. The focus is on reasoning and understanding notation to support the solution of increasingly complex problems that include information presented in a variety of forms. The bar model is a key tool used to support representing and solving these problems.	Although percentages are not specifically mentioned in the KS4 national curriculum, they feature heavily in GCSE papers and this block builds on the understanding gained in KS3. Calculator methods are encouraged throughout and are essential for repeated percentage change/growth and decay problems. Use of financial contexts is central to this block, helping students to maintain familiarity with the vocabulary they are unlikely to use outside school.	This block also builds on KS3 and provides a good context in which to revisit fraction arithmetic and conversion between fractions, decimals and percentages. Tables and Venn diagrams are revisited and understanding and use of tree diagrams is developed at both tiers, with conditional probability being a key focus for Higher tier students.
KS4 National Curriculum Content Covered (Bold type Indicates Higher NC Content)	• Consolidating subject content from key stage 3: ➢ Use ratio notation, including reduction to simplest form. ➢ Divide a given quantity into two parts in a given $part{:}part$ or $part{:}whole$ ratio; express the division of a quantity into two parts as a ratio. ➢ Relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions. ➢ Use compound units such as speed, unit pricing and density to solve problems. • Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity. •Apply the concepts of congruence and similarity, including the relationships between lengths, **areas and volumes** in similar figures.	• Consolidating subject content from key stage 3: ➢ Interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%. ➢ Solve problems involving percentage change, including percentage increase, decrease and original value problems and simple interest in financial mathematics. • Set up, solve and interpret the answers in growth and decay problems, including compound interest **and work with general iterative processes.**	• Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one. • Use a probability model to predict the outcomes of future experiments; understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size. • Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions. • **Calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams.**
Connections to Previous National Curriculum Content in KS3 (Statutory)	• change freely between related standard units [for example time, length, area, volume/capacity, mass] • use scale factors, scale diagrams and maps • understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction • solve problems involving direct and inverse proportion, including graphical and algebraic representations • work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 and 3/8) • interpret fractions and percentages as operators • express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1 • use ratio notation, including reduction to simplest form • divide a given quantity into two parts in a given part : part or part : whole ratio; express the division of a quantity into two parts as a ratio • relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions • use compound units such as speed, unit pricing and density to solve problems	• work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 and 3/8) • interpret fractions and percentages as operators • express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1 • Define percentage as 'number of parts per hundred', interpret percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100% • interpret fractions and percentages as operators • solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics	• record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale • understand that the probabilities of all possible outcomes sum to 1 • enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams • generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities
Assessment	White Rose Maths skills checks at the end of each unit (3 during this period)		
Homework	Sparx Maths online homework		
Literacy	Mathematical key terms/vocabulary for each unit.	Correct terminology used when answering questions.	Read and understand written questions.
CIAG			

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Summer 1 –	***Delving into Data/Using Number***	
Knowledge	***Collecting, Representing and Interpreting Data (4 weeks)***	***Non-Calculator Methods (2 weeks)***
Rationale	This block builds on KS3 work on the collection, representation and use of summary statistics to describe data. Much of the content is familiar, both from previous study within and beyond mathematics (including Geography and Science) and from everyday life. The steps have been chosen to balance consolidation of existing knowledge with extending and deepening, particularly in terms of interpretation of results and evaluating and criticising statistical methods and diagrams. For students following Higher tier, there is additional content relating to continuous data including histograms, cumulative frequency diagrams, box plots and associated measures such as quartiles and the interquartile range. Again, the emphasis with these topics should be on interpretation (particularly in making comparisons) and not just construction. A possible approach to teaching this unit would be project-based, where students collect primary data (or select samples from secondary data) from which they make and test hypotheses, thus giving a purpose to the creation and analysis of the diagrams and measures involved.	This block revises and builds on KS3 content for calculation. Mental methods and using number sense are to be encouraged alongside the formal methods for all four operations with integers, decimals and fractions. Where possible this should be covered through problems, particularly multi-step problems in preparation for GSCE. The limits of accuracy of truncation are explored and compared to rounding, and Higher tier students will look at all aspects of irrational numbers including surds.
KS4 National Curriculum Content Covered (Bold type Indicates Higher NC Content)	• Consolidating subject content from key stage 3: ➢ use describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data ➢ construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data ➢ describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) • infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling • interpret and construct tables and line graphs for time series data • **construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use** • interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data, **including box plots** • apply statistics to describe a population • interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (including modal class) and spread **including quartiles and inter-quartile range**	• Consolidate their numerical and mathematical capability from key stage 3 • Calculate exactly with fractions, **surds** and multiples of π; **simplify surd expressions involving squares and rationalise denominators** • **Change recurring decimals into their corresponding fractions and vice versa** • Apply and interpret limits of accuracy when rounding or truncating, **including upper and lower bounds** • Develop their use of formal mathematical knowledge to interpret and solve problems, including in financial contexts • Make and use connections between different parts of mathematics to solve problems
Connections to Previous National Curriculum Content in KS3 (Statutory)	• describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data • construct and interpret appropriate tables, charts, and diagrams, including frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line (or bar) charts for ungrouped and grouped numerical data • describe, interpret and compare observed distributions of a single variable through: appropriate graphical representation involving discrete, continuous and grouped data; and appropriate measures of central tendency (mean, mode, median) and spread (range, consideration of outliers) • describe simple mathematical relationships between two variables (bivariate data) in observational and experimental contexts and illustrate using scatter graphs	• understand and use place value for decimals, measures and integers of any size • order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥ • use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common ultiple, prime factorisation, including using product notation and the unique factorisation property • interpret and compare numbers in standard form A x 10^n, $1 \leq n < 10$ where n is a positive or negative integer or zero • round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures] • appreciate the infinite nature of the sets of integers, real and rational numbers. • use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative • use conventional notation for the priority of operations, including brackets, powers, roots • use standard units of time • recognise and use relationships between operations including inverse operations • use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations • use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation $a < x \leq b$ • use a calculator and other technologies to calculate results accurately and then interpret them appropriately • Define percentage as 'number of parts per hundred', interpret percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%

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		• interpret fractions and percentages as operators • solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics	
Assessment	White Rose Maths skills checks at the end of each unit (2 during this period)		
Homework	Sparx Maths online homework		
Literacy	Mathematical key terms/vocabulary for each unit. Correct terminology used when answering questions. Read and understand written questions.		
CIAG	Aspiring Astronaut - https://www.youtube.com/watch?v=Boi-FMB4-vs		

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Summer 2 – Using Number/Expressions

Knowledge	***Types of Numbers and Sequences (2 weeks)***	***Indices and Roots (2 weeks)***	***Manipulating Expressions (2 Weeks)***
Rationale	This block again mainly revises KS3 content, reviewing prime factorisation and associated number content such as HCF and LCM. Sequences is extended for Higher Tier to include surds and finding the formula for a quadratic sequence.	This block consolidates the previous two blocks focusing on understanding powers generally and, in particular, in standard form. Negative and fractional indices are explored in detail. Again, much of this content will be familiar from KS3, particularly for Higher tier students, so this consolidation material may be covered in less than two weeks allowing more time for general non-calculator and problem-solving practice. To consolidate the index laws, these can be revisited in the next block when simplifying algebraic expressions.	This final block of year 10 builds on the Autumn term learning of equations and inequalities, providing revision and reinforcement for Foundation tier students and an introduction to algebraic fractions for those following the Higher tier. This also allows all students to revise fraction arithmetic to keep their skills sharp. Algebraic argument and proof are considered, starting with identities and moving on to consider generalised number.
KS4 National Curriculum Content Covered (Bold type Indicates Higher NC Content)	• consolidating subject content from key stage 3: ➢ factors, multiples, primes, HCF and LCM ➢ describe and continue sequences • recognise and use sequences of triangular, simple arithmetic progressions, Fibonacci type sequences, quadratic sequences, and simple geometric progressions ($rn$where $n$is an integer, and $r$is a positive rational number **or a surd**) **and other sequences** • deduce expressions to calculate the nth term of linear **and quadratic** sequence	• recognise and use sequences of square and cube numbers • **estimate powers and roots of any given positive number** • calculate with roots, and with integer **and fractional** indices • calculate with numbers in standard form A x 10^n, where $1 \leq n < 10$ and n is an integer • simplifying expressions involving sums, products and powers, including the laws of indices	• simplify and manipulate algebraic expressions (including those involving surds **and algebraic fractions** by factorising quadratic expressions of the form $x^2 + bx + c$ • know the difference between an equation and an identity • argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments **and proofs**
Connections to Previous National Curriculum Content in KS3 (Statutory)	• understand and use place value for decimals, measures and integers of any size • order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥ • use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property • interpret and compare numbers in standard form A x 10^n, $1 \leq n < 10$ where n is a positive or negative integer or zero • round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures] • appreciate the infinite nature of the sets of integers, real and rational numbers. • generate terms of a sequence from either a term-to-term or a position-to-term rule • recognise arithmetic sequences and find the nth term • recognise geometric sequences and appreciate other sequences that arise	• understand and use place value for decimals, measures and integers of any size • order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥ • use the concepts and vocabulary of prime numbers, factors (or divisors), multiples, common factors, common multiples, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation property • interpret and compare numbers in standard form A x 10^n, $1 \leq n < 10$ where n is a positive or negative integer or zero • round numbers and measures to an appropriate degree of accuracy [for example, to a number of decimal places or significant figures] • appreciate the infinite nature of the sets of integers, real and rational numbers. • use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative • use conventional notation for the priority of operations, including brackets, powers, roots • use standard units of time • recognise and use relationships between operations including inverse operations • use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations • use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation $a < x \leq b$ • use a calculator and other technologies to calculate results accurately and then interpret them appropriately • use and interpret algebraic notation, including: ab in place of $a \times b$; 3y in place of $y + y + y$ and $3 \times y$; a^2 in place of $a \times a$; ah in place of $a \times h$; a/b in place of a÷b; coefficients written as fractions rather than decimals; brackets • substitute values into formulae expressions, rearrange and simplify expressions • understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors	• understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors • simplify and manipulate algebraic expressions to maintain equivalence by collecting like terms • understand and use standard mathematical formulae; rearrange formulae to change the subject • use algebraic methods to solve linear equations in one variable (including all forms that require rearrangement) • simplify and manipulate algebraic expressions to maintain equivalence by: collecting like terms; multiplying a single term over a bracket; taking out common factors; expanding products of two or more binomials • use approximation through rounding to estimate answers and calculate possible resulting errors expressed using inequality notation $a < x \leq b$ • use a calculator and other technologies to calculate results accurately and then interpret them appropriately • use and interpret algebraic notation, including: ab in place of $a \times b$; 3y in place of $y + y + y$ and $3 \times y$; a^2 in place of $a \times a$; ah in place of $a \times h$; a/b in place of a÷b; coefficients written as fractions rather than decimals; brackets • substitute values into formulae expressions, rearrange and simplify expressions • use the symbols =, ≠, <, >, ≤, ≥ • use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative • use conventional notation for the priority of operations, including brackets, powers, roots • recognise and use relationships between operations including inverse operations

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		• simplify and manipulate algebraic expressions to maintain equivalence by: multiplying a single term over a bracket; taking out common factors; expanding products of two or more binomials	
Assessment	White Rose Maths skills checks at the end of each unit (3 during this period)		
Homework	Sparx Maths online homework		
Literacy	Mathematical key terms/vocabulary for each unit.	Correct terminology used when answering questions.	Read and understand written questions.
CIAG			