MATHEMATICS FACULTY CURRICULUM MAP

INTENT	To develop pupils as competent mathematicians and promote an enthusiasm to study maths at a higher level and/or recognise the value of maths in everyday life.				
	Topics shown in BOLD are Higher Tier only in year 10 & 11.				
	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11
Number	PLACE VALUE: Understand place value of integers & decimals and use to put these in order and identify on a number line or scale. DIRECTED NUMBER: Understand negative numbers and use to put them in order and identify on a number line. Calculate with negative numbers. CALCULATION: Understand the properties of addition, subtraction, multiplication & division.tr Use mental and formal methods to calculate with integers and decimals. Solve problems involving the 4 operations. Know and use the correct order of operations. INDICES: Recognise square & cube numbers and the associated roots. Calculate powers and roots with and without a calculator. Recognise triangular numbers.	DIRECTED NUMBER: Calculate with negative numbers. Find powers and roots involving negative numbers. CALCULATION: Solve problems involving the 4 operations with integers and decimals, including money, time and the calendar. Know & use the correct order of operations. INDICES: Calculate higher powers & roots. Know & use the laws of indices.	PLACE VALUE: Manipulate calculations to find answers to further calculations. CALCULATION: Review in R&R starters INDICES: Simplify more complex expressions using the laws of indices, including negative powers. Find the reciprocal of a number. Evaluate negative powers.	CALCULATION: Solve problems involving the 4 operations/ Review in R&R starters INDICES: Simplify more complex expressions using the laws of indices, including negative and fractional powers. Evaluate negative & fractional powers. Change the base of an index number.	CALCULATION: Solve problems involving the 4 operations, focusing on GCSE questions. INDICES: Review evaluate & simplify indices. Simplify surds. Add, subtract, multiply & divide surds. Expand brackets with surds. Rationalise the denominator of a surd

STANDARD FORM: Write numbers in standard form.	STANDARD FORM: Convert between normal numbers & standard form. Order standard form numbers. Calculate with standard form numbers with & without a calculator.	STANDARD FORM: Solve problems involving standard form numbers.		STANDARD FORM: Review in revision. .
MULTIPLES, FACTORS & PRIMES: Find multiples & factors of numbers. Find the Highest Common Factor (HCF) and Lowest Common Multiple (LCM) of two or more numbers.	MULTIPLES, FACTORS & PRIMES: Write numbers as the product of their prime factors and use to calculate HCF and LCM.	MULTIPLES, FACTORS & PRIMES: Use prime factors to find the HCF or LCM of numbers or expressions. Solve contextual problems involving HCF & LCM.	MULTIPLES, FACTORS & PRIMES Use prime factors to find square & cube roots	MULTIPLES, FACTORS & PRIMES: Review in revision.
FRACTIONS, DECIMALS & %: Represent fractions, decimals and % on a number line. Identify equivalent fractions & cancel fractions to simplest form. Understand % as part of 100 and fractions as division. Convert between key fractions, decimals and %	FRACTIONS, DECIMALS & %: Convert fluently between fractions, decimals and % including fractions greater than 1.	FRACTIONS, DECIMALS & %: Convert between fractions and recurring decimals.		FRACTIONS, DECIMALS & %: Review in revision.
			FRACTIONS & % OF AMOUNTS: Solve problems involving fractions and % of amounts.	

	FRACTIONS & % OF AMOUNTS: Convert between fractions and mixed numbers. Find fractions and % of amounts with and without a calculator. **CALCULATE WITH FRACTIONS:** Add , subtract, multiply & divide fractions & mixed numbers. **ROUNDING & ESTIMATION:** Round numbers to powers of 10, decimals places & 1 significant figure.	**FRACTIONS & % OF AMOUNTS:** Calculate fractions and % of amounts, including fractions greater than 1 and % greater than 100%. Increase and decrease by a fraction or %, including use of decimal multipliers. Express one value as a fraction or % of another. Calculate % change. Find the original value before a % or fractional change. **CALCULATE WITH FRACTIONS:** Solve problems involving the 4 operations with fractions and mixed numbers. Add, subtract, multiply & divide simple algebraic fractions. **ROUNDING & ESTIMATION:** Round to a given number of significant figures. Estimate answers to calculations by rounding to 1 significant figure. Understand the limits of accuracy when rounding.	**FRACTIONS & % OF AMOUNTS:** Solve problems involving fractions and % Find the original amount given a fraction or % or after a fractional or % change. Solve problems involving simple & compound interest. Solve problems involving repeated % change in other contexts. **CALCULATE WITH FRACTIONS:** Solve problems involving the 4 operations with fractions and mixed numbers. Add, subtract, multiply & divide simple algebraic fractions. **ROUNDING & ESTIMATION:** Find the upper & lower bounds & error interval of a rounded value. Calculate with bounds.	**CALCULATE WITH FRACTIONS:** Solve problems involving the 4 operations with fractions and mixed numbers.	**FRACTIONS & % OF AMOUNTS:** Solve problems involving the fractions & %, focusing on GCSE questions. **CALCULATE WITH FRACTIONS:** Solve problems involving the fractions, focusing on GCSE questions. **ROUNDING & ESTIMATION:** Review in revision.

Ratio & Proportion	RATIO: Understand the meaning & representation of ratio.	RATIO: Find equivalent ratios and cancel ratios to their simplest form. Write ratio in the form 1:n. Solve problems where one part of a ratio is known. Share in a given ratio. Solve problems where the difference between parts of a ratio are known. Convert between ratio, fractions and %.	RATIO: Solve problems involving ratio. Combine ratios.	RATIO: Solve problems involving ratio. Combine ratios. **Change ratios.** **Relate ratio to fractions & linear functions.**	Review all ratio & proportion in revision.
		PROPORTION: Solve problems involving direct proportion (incl exchange rates, best buys, recipes, rates of change & unit conversion). Use conversion graphs.	PROPORTION: Solve problems involving direct proportional reasoning. Plot & use conversion graphs & direct proportion graphs.	PROPORTION: Solve problems involving direct & inverse proportion. Find missing values in proportion tables. Represent proportional relationships algebraically & graphically.	
		MAPS & SCALE DRAWINGS: Draw & interpret scale diagrams. Interpret maps using scale factors and ratios.	MAPS & SCALE DRAWINGS: Use ratio in maps & scale drawing to convert between measures on maps/drawings and actual lengths.		

Algebra	ALGEBRAIC NOTATION & SIMPLIFYING: Understand algebraic notation. Simplify algebraic expressions.	ALGEBRAIC NOTATION & SIMPLIFYING: Form algebraic expressions. Work with negative numbers in expressions.			
		BRACKETS & FACTORISING: Expand & simplify single brackets. Factorise expressions into a single bracket.	QUADRATICS: Expand & simplify double brackets. Factorise quadratic expressions into double brackets.	QUADRATICS & ALGEBRAIC FRACTIONS: Review expanding double brackets & factorising. Solve quadratic equations by factorising. **Expand triple brackets.** **Form & solve quadratic equations.** **Solve quadratic equations using the quadratic formula.** Simplify algebraic fractions. Add, subtract, multiply & divide algebraic fractions.	QUADRATICS & ALGEBRAIC FRACTIONS: Review expanding double brackets & factorising. Review solving quadratic equations by factorising. Solve quadratic equations graphically. **Solve quadratic equations using the quadratic formula.** **Complete the square on algebraic expressions and use to solve equations & find turning points.** Simplify algebraic fractions. Add, subtract, multiply & divide algebraic fractions.
	FLOWCHARTS, SUBSTITUTION & INVERSE OPERATIONS: Find the inputs & outputs of a given function machine. Given the input & output find a function. Substitute values, including negatives, into simple algebraic expressions.	FLOWCHARTS, SUBSTITUTION & INVERSE OPERATIONS: Substitute values, including negatives & decimals, into expressions & formulae.	FORMULAE: Substitute fractions into expressions & formulae including key scientific formulae Rearrange formulae.	FORMULAE: Review substitution into expressions & formulae. Review rearranging formulae.	FUNCTIONS: **Understand function notation and find inputs & outputs to functions.** **Find composite & inverse functions.**

	LINEAR EQUATIONS: Solve simple linear equations.	LINEAR EQUATIONS: Solve more complex linear equations. Form & solve linear equations. Solve simple equations involving squares, cubes & roots.	LINEAR EQUATIONS & INEQUALITIES: Review forming & solving linear equations. Understand inequality notation and represent inequalities on a number line.	EQUATIONS & INEQUALITIES: Solve linear inequalities & represent the solution on a number line. **Represent inequalities graphically & using set notation. Solve linear simultaneous equations.**	SIMULTANEOUS EQUATIONS & INEQUALITIES: Solve linear simultaneous equations. **Form & solve simultaneous equations. Solve non-linear simultaneous equations. Solve linear equations with two variables. Solve non-linear simultaneous equations. Use iterative methods to solve non-linear equations.**
	COORDINATES & LINEAR GRAPHS: Work with co-ordinates in 4 quadrants. Plot linear graphs from a table.	COORDINATES & LINEAR GRAPHS: Solve geometric problems involving coordinates. Plot linear graphs. Understand gradient and y-intercept. Find the midpoint of a line segment.	COORDINATES & GRAPHS: Understand the link between coordinates on a line and its equation. Given the equation of a line find its gradient and y-intercept. Find the equation of a line. Find the midpoint of a line segment. Solve simultaneous equations graphically. Plot quadratic graphs & find the turning point.	LINEAR & NON-LINEAR GRAPHS: Review plotting linear graphs. Review equation of a linear graph. Recognise equations of parallel lines. **Recognise equations of perpendicular lines. Work out the equation of parallel & perpendicular lines.** Plot quadratic graphs & use to solve quadratic equations.	LINEAR & NON-LINEAR GRAPHS: Review linear graphs. Plot & recognise quadratic, cubic & reciprocal graphs. **Plot & recognise exponential & circle graphs. Recognise the equation of a circle. Find the equation of a tangent to a circle. Understand how the transformation of a function affects its graphs and the coordinates on the graph.**
				SEQUENCES:	

				Find the next term in a quadratic sequence **Find the nth term of a quadratic sequence & use to find further terms**	
	SEQUENCES: Find the rule for a sequence and use it to find further terms. Understand the difference between linear & non-linear sequences.	SEQUENCES: Find missing terms in a sequence. Generate terms in a sequence given a rule or algebraic expression. Find the rule for the nth term of a linear sequence.	SEQUENCES: Recognise different types of sequence. Use the nth term to find further terms. Find the nth term of a linear sequence, including ascending, descending & fractional.		SEQUENCES: **Review quadratic sequences.** **Recognise & find further terms in geometric progressions where the ratio between terms is a surd**
					PROOF: **Prove a statement by counter-example.** **Prove a statement algebraically.**
Geometry & Measure	MEASURE: Convert metric units. Compare & order metric measures. Measure & draw line segments.	MEASURE: Solve problems involving conversion of metric units	MEASURE: Convert metric units of area & volume. Convert time between hrs & mins and decimals time. Calculate compound measures. Draw & interpret kinematics graphs.	MEASURE: Review kinematics graphs & draw & interpret other real-life graphs. **Calculate speed & acceleration from kinematics graphs.**	MEASURE: Calculate density, pressure & population density.
	PERIMETER, AREA & VOLUME: Calculate & solve problems with perimeter of shapes and area of rectangles & parallelograms & triangles.	PERIMETER, AREA & VOLUME: Calculate the area of a trapezium. Calculate the perimeter & area of compound shapes.	PERIMETER, AREA, VOLUME & SURFACE AREA: Identify the properties of 3D shapes. Draw & interpret 2D & 3D isometric drawings. Draw & recognise nets & elevations of 3D shapes.	PERIMETER, AREA, VOLUME & SURFACE AREA: Solve problems involving volume & surface area of cubes, cuboids & prisms, including cylinders. **Calculate arc length & sector area.**	PERIMETER, AREA & VOLUME: Review: Calculate the volume & surface area of prisms including cylinders Calculate the volume & surface area of cones, spheres & pyramids.

	PROPERTIES OF SHAPE: Recognise & know the properties of different types of triangle & quadrilateral. Recognise different polygons.	Name parts of a circle & calculate circumference & area of a circle. Calculate the volume & surface area of cubes & cuboids.	Calculate the volume & surface area of prisms including cylinders.		**Calculate the volume of a frustum.** **Calculate segment area.**
			PYTHAGORAS: Know & use Pythagoras theorem in 2D shapes.	PYTHAGORAS: Solve problems involving Pythagoras theorem.	PYTHAGORAS: Solve problems involving **Pythagoras theorem including in 3D shapes.**
			TRIGONOMETRY: Use trigonometry to find missing sides & angles in right-angled triangles. (sets 1 & 2 only)	TRIGONOMETRY: **Use trigonometry to find missing sides & angles in right-angled triangles.** **Solve problems involving trigonometry in 2D right-angled triangles.**	TRIGONOMETRY: Use trigonometry to find missing sides & angles in right-angled triangles. **Know & use exact trig values.** **Solve problems involving trigonometry in 3D shapes.** **Know & use the sine rule, cosine rule & trig area of a triangle.**
	ANGLES: Identify different types of angle. Draw & measure angles using a protractor. Identify parallel & perpendicular lines. Know & use angle rules, including vertically opposite angles, angles round a point, angles on a straight line & angles in triangles & quadrilaterals.	ANGLES: Calculate angles in parallel lines. Calculate angles in special quadrilaterals.	ANGLES: Solve angle problems involving a variety of angle rules. Calculate angles in polygons. Measure & draw bearings to locate a point.	ANGLES: Solve angle problems involving a variety of angle rules.	ANGLES: Solve angle problems involving a variety of angle rules & bearings with a focus on GCSE questions. CIRCLE THEOREM: **Know & use all circle theorem.** CONSTRUCTION & LOCI: Use constructions to solve loci problems

	CONSTRUCTION & LOCI: Construct triangles.	CONSTRUCTION & LOCI: Construct triangles, quadrilaterals & other polygons.	CONSTRUCTION & LOCI: Construct angle & perpendicular line bisectors.		SYMMETRY & TRANSFORMATIONS: Review in revision.
	SYMMETRY & TRANSFORMATIONS: Recognise & use line & rotational symmetry.	SYMMETRY & TRANSFORMATIONS: Reflect a shape over a given mirror line. Rotate a shape about a given point. Translate a shape by a given vector. Enlarge a shape by a positive or unit fraction scale factor.	SYMMETRY & TRANSFORMATIONS: Reflect a shape given the equation of the mirror line. Enlarge a shape from a given centre.	SYMMETRY & TRANSFORMATIONS: Review transformations from previous years. Describe transformations. Perform combined transformations. **Understand invariance of points.**	SIMILARITY& CONGRUENCE: Review in revision.
			SIMILARITY& CONGRUENCE: Identify similar & congruent shapes. Prove shapes are similar & find missing lengths & angles.	SIMILARITY& CONGRUENCE: Review similarity & congruence from previous years. Understand the relationship between linear, area & volume scale factors. **Prove triangles are congruent.**	VECTORS: Understand the difference between scalar & vector quantities. Understand vector notation & represent using line & column vectors. Add, subtract & multiply line & column vectors. **Solve vector geometry problems.**
				VECTORS: **Understand the difference between**	

				scalar & vector quantities. **Understand vector notation & represent using line & column vectors.** **Add, subtract & multiply line & column vectors.**	
Statistics	DATA COLLECTION & REPRESENTATION: Identify different types of data Draw & interpret frequency trees, bar charts, vertical line graphs& time series . Read & interpret ungrouped frequency tables.	DATA COLLECTION & REPRESENTATION: Design questionnaires. Read & interpret grouped frequency tables. Draw & interpret bar charts for grouped data, multiple & composite bar charts. Complete & interpret two-way tables. Draw & interpret scatter graphs.	DATA COLLECTION & REPRESENTATION: Draw & interpret pie charts. Choose the most appropriate graph for a set of data. Identify errors in graphs & where graphs are misleading. Draw & interpret boxplots (sets 1 & 2 only).	DATA COLLECTION & REPRESENTATION: Review data graphs from previous years. **Draw & interpret boxplots.** **Draw & interpret cumulative frequency graphs.** **Draw & interpret histograms.**	DATA COLLECTION & REPRESENTATION: Review in revision.
	AVERAGES & SPREAD: Find the mean, median, mode & range of a data set.	AVERAGES & SPREAD: Choose the most appropriate average & use to compare distributions.	AVERAGES & SPREAD: Find the mode, range & mean from an ungrouped & grouped frequency table and bar charts. Solve problems involving missing values & reverse mean.	AVERAGES & SPREAD: Review averages & spread from a table. Find the median from a table. **Find missing values in a table given information about the averages or range.**	AVERAGES & SPREAD: Review in revision.
Probability	Understand the probability scales and associated vocabulary. Calculate the theoretical probability for a single event. Understand that probabilities sum to 1 and calculate the probability an outcome does not occur.	Understand set notation. Calculate probabilities from a variety of charts	Use relative frequency as an estimate of probability. Use systematic methods to list outcomes of two or more events & calculate probabilities. Use the product rule to calculate the number of possible outcomes.	Review probabilities from Venn diagrams, two way tables, frequency trees & bar charts. **Use tree diagrams to show outcomes and calculate probabilities of two or more events.**	Use tree diagrams to show outcomes and calculate probabilities of two or more events. **Know & use the AND/OR rules.** **Solve problems involving probability resulting in equations to be solved.**

	Find missing probabilities in a table.				**Describe sets using set notation.**