Subject :		Maths		**Year Group:**
Scheme title	**Half term 1 - June**	**Half term 2 - September**	**Half term 3 - October**	**Half term 4 - January**
Purpose of scheme	To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion	To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion	To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion	To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion
Skills	Teacher 1: Algebra and Functions •Proof by Contradiction - (including proof of the irrationality of √2 and the infinity of primes, and application to unfamiliar proofs). •Simplifying Expressions - Simplify rational expressions including by factorising and cancelling, and algebraic division (by linear expressions only). • •Mapping and Functions - Use of functions in modelling, including consideration of limitations and refinements of the models. •Composite/Inverse Functions - Understand and use composite functions; inverse functions and their graphs. •Modulus - the modulus of a linear function •Transformation of Graphs •Partial Fractions - Decompose rational functions into partial fractions (denominators not more complicated than squared linear terms and with no more than three terms, numerators constant or linear). Teacher 2: Trigonometry 2 Part 1 •Arcs and Sectors - Work with radian measure, including use for arc length and area of sector. •Know and use exact values of sin, tan and cos for and multiples thereof. •Small Angle Approximations - Understand and use the standard small angle approximations of sine, cosine and tangent •Inverse Trig Functions - Understand and use the definitions of secant, cosecant and cotangent and of arcsin, arccos and arctan; their relationships to sine, cosine and tangent; understanding of their graphs; their ranges and domains. •Cosec, Sec and Cot •Identities involving Cosec, Sec and Cot – understand and use Construct proofs involving trigonometric functions and identities.	Teacher 1: Parametric Equations Parametric Equations of Curves - Understand and use the parametric equations of curves and conversion between Cartesian and parametric forms. Parametric and Cartesian Equations - Use parametric equations in modelling in a variety of contexts. Differentiation 2 Part 1 Points of inflection - connection to convex and concave sections of curves and points of inflection. Chain Rule, Product Rule, Quotient Rule - Differentiate using the product rule, the quotient rule and the chain rule, including problems involving connected rates of change and inverse functions. Differentiation of e, ln x and a^x - and related sums, differences and constant multiples. Understand and use the derivative of ln x. Differentiating Trig Functions - differentiation from first principles for small positive integer powers of x and for and sinx and cosx Teacher 2: Trigonometry 2 Part 2 The additional Formulas - Understand and use double angle formulae; use of formulae for and The Double Angle Formulas The R Addition Formulas - Understand and use expressions for in the equivalent forms of or Modelling with Trig Functions - Use trigonometric functions to solve problems in context, including problems involving vectors, kinematics and forces. Correlation and Regression Regression The Product Moment Correlation Coefficient Rank Correlations LARGE DATA SET LESSON – Correlation Probability 2 Conditional Probability - Understand and use conditional probability, including the use of tree diagrams, Venn diagrams, two-way tables. Understand and use the conditional probability formula Modelling with Probability - including critiquing assumptions made and the likely effect of more realistic assumptions.	Teacher 1: Differentiation 2 Part 2 Connected Rates of Change - Construct simple differential equations in pure mathematics and in context, (contexts may include kinematics, population growth and modelling the relationship between price and demand). Differentiation with Parametric Equations and implicit differentiation - Differentiate simple functions and relations defined implicitly or parametrically, for first derivative only. Vectors Vectors in Three Dimensions Calculating with Vectors - Use vectors to solve problems in pure mathematics and in context, including forces and kinematics. Kinematics 2 Projectiles - Understand, use and derive the formulae for constant acceleration for motion in a straight line; extend to two dimensions using vectors. Use calculus in kinematics for motion in a straight line: extend to two dimensions using vectors. Non-Uniform Acceleration in 2 dimensions - Model motion under gravity in a vertical plane using vectors; projectiles. Teacher 2: The Normal Distribution The Normal Distribution - Understand and use the Normal distribution as a model; find probabilities using the Normal distribution. Link to histograms, mean, standard deviation, points of inflection and the binomial distribution. Normal Approximation Choosing Probability Distributions - Select an appropriate probability distribution for a context, with appropriate reasoning, including recognising when the binomial or Normal model may not be appropriate. Hypothesis Tests - Understand and apply the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, p-value; extend to correlation coefficients as measures of how close data points lie to a straight line and be able to interpret a given correlation coefficient using a given p-value or critical value (calculation of correlation coefficients is excluded). Conduct a statistical hypothesis test for the mean of a Normal distribution with known, given or assumed variance and interpret the results in context. LARGE DATA SET LESSON – Hypothesis Testing Integration 2 – Part 1 Integration of 〖(ax+b)〗^n Integration e^x and 1/x, sinkx, coskx and related sums, differences and constant multiples. Integration of Trigonometric Functions Integration of (f'(x))/(f(x)) Integrating du/dx f'(u) Using Trig Identities in Integration Finding Area – including the area between two curves. Parametric Integration	Teacher 1: Dynamics •Resolving Forces - Understand and use addition of forces; resultant forces; dynamics for motion in a plane. •Friction - Understand and use the model for friction; coefficient of friction; motion of a body on a rough surface; limiting friction and statics. •Newton's Law of Motion - Understand and use Newton's second law for motion in a straight line (re-stricted to forces in two perpendicular directions or simple cases of forces given as 2D vectors); extend to situations where forces need to be resolved (restricted to 2 dimensions). Understand and use New-ton's third law; equilibrium of forces on a particle and motion in a straight line (restricted to forces in two perpendicular directions or simple cases of forces given as 2D vectors); application to problems in-volving smooth pulleys and connected particles; resolving forces in two dimensions; equilibrium of a particle under coplanar forces. Moments •Moments - Understand and use moments in simple static contexts. •Reaction Forces and Friction in Moments Teacher 2: Integration 2 – Part 2 •Integration by Substitution - Carry out simple cases of integration by substitution and integration by parts; understand these methods as the inverse processes of the chain and product rules respectively. •(Integration by substitution includes finding a suitable substitution and is limited to cases where one substitution will lead to a function which can be integrated; integration by parts includes more than one application of the method but excludes reduction formulae.) •Integration by Parts •Integration Using Partial Fractions - Integrate using partial fractions that are linear in the denominator. •Differential Equations - Evaluate the analytical solution of simple first order differential equations with separable variables, including finding particular solutions. (Separation of variables may require factori-sation involving a common factor.) •Understand and use integration as the limit of a sum - Interpret the solution of a differential equation in the context of solving a problem, including identifying limitations of the solution; includes links to kinematics
Key Words	Proof by contradiction Simplify Expressions Factorise Mappings Domain Range Functions Inverse Linear Modulus Partial fractions Denominators Radian Arc Sector Trigonometric Relationships Inverse trigonometry	Parametric Cartesian Product Quotient Chain rule Trigonometrically Partial fraction Limitation Sum Kinematics Analytical Particular solutions Interpret Method Context Regression Correlation Rank Conditional Assumptions Critiquing	Coefficients Projectile Dimension Model Gravity Kinematics Resolving Friction Motion Equilibrium Coplanar Forces Vectors Moment Friction Reaction forces Normal distribution Null hypothesis Alternate hypothesis Standard deviation Variance Linear Sequences Arithmetic Geometric Integration Integral Parametric Partial Fractions Limitation Sum	Modelling Resolving Friction Motion Equilibrium Coplanar Forces Vectors Moment Friction Reaction forces Integration Integral Parametric Partial Fractions Limitation Sum
End Point	Students are able to understand and apply the skills identified above.	Students are able to understand and apply the skills identified above.	Students are able to understand and apply the skills identified above.	Students are able to understand and apply the skills identified above.
Assessment method	After each topic in bold (listed opposite), students complete a mini assessment. This may be done as part of home learning and sometimes done in class in test conditions. This is then teacher marked and recorded on the central tracking spreadsheet to inform progress and intervention. Students complete full A level assessments in line with the AQA specification at progress points in the year in line with the school calendar. Assessments are cumulative and grade boundaries reflect actual A Level Maths grade boundaries.	After each topic in bold (listed opposite), students complete a mini assessment. This may be done as part of home learning and sometimes done in class in test conditions. This is then teacher marked and recorded on the central tracking spreadsheet to inform progress and intervention. Students complete full A level assessments in line with the AQA specification at progress points in the year in line with the school calendar. Assessments are cumulative and grade boundaries reflect actual A Level Maths grade boundaries.	After each topic in bold (listed opposite), students complete a mini assessment. This may be done as part of home learning and sometimes done in class in test conditions. This is then teacher marked and recorded on the central tracking spreadsheet to inform progress and intervention. Students complete full A level assessments in line with the AQA specification at progress points in the year in line with the school calendar. Assessments are cumulative and grade boundaries reflect actual A Level Maths grade boundaries.	After each topic in bold (listed opposite), students complete a mini assessment. This may be done as part of home learning and sometimes done in class in test conditions. This is then teacher marked and recorded on the central tracking spreadsheet to inform progress and intervention. Students complete full A level assessments in line with the AQA specification at progress points in the year in line with the school calendar. Assessments are cumulative and grade boundaries reflect actual A Level Maths grade boundaries.

Half term 5 - February	Half term 6 - April
To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion	To develop fluency, problem solving and reasoning skills across the 6 key areas of number, algebra, geometry and measures, statistics, probability and ratio and proportion
Teacher 1: Sequences and Series •Sequences - Work with sequences including those given by a formula for the nth term and those generated by a simple relation of the form xn+1= f(xn); increasing sequences; decreasing sequences; periodic sequences. •Arithmetic Sequences and series - Understand and work with arithmetic sequences and series, including the formulae for nth term and the sum to n terms. •Geometric Sequences and Series - Understand and work with geometric sequences and series including the formulae for the nth term and the sum of a finite geometric series; the sum to infinity of a convergent geometric series, including the use of |r | < 1; modulus notation. •Modelling Problems - Use sequences and series in modelling. The Binomial Expansion 2 •The Binomial Expansion - Extend to any rational n, including its use for approximation; be aware that the expansion is valid for (Proof not required.) •Binomial Expansion by Approximations •Binomial Expansion and Partial Fractions Teacher 2: Numerical Methods •Location of Roots - Locate roots of f(x)=0 by considering changes of sign f(x) of in an interval of x on which f(x) is sufficiently well-behaved. •Understand how change of sign methods can fail. •Iterative Methods - Solve equations approximately using simple iterative methods; be able to draw associated cobweb and staircase diagrams. The Newton-Raphson Method - Solve equations using the Newton-Raphson method and other recurrence relations of the form Understand how such methods can fail. •The Trapezium Rule - Understand and use numerical integration of functions, including the use of the trapezium rule and estimating the approximate area under a curve and limits that it must lie between. Use numerical methods to solve problems in context.	Teacher 1 and Teacher 2 Complete any content not finished from HT5 then revision of content from A Level Maths and A Level Further Maths including resources such as: •Alpha Books 1-6 •Integral Revision and Summary Sheets: https://integralmaths.org/ This has a wealth of resources for both maths and further maths including student access to videos. Please see our website list for the latest login details. •Practice Exam Papers from AQA and CGP •Materials from the Resource Bank on T drive: T:\bec\Curriculum.Enrichment.Inclusion\Curriculum\Maths and Computer Science\Maths\Curriculum and SOW NEW\Sixth Form\RESOURCE BANK •This contains a wealth of resources, please keep adding to this. •Websites such as Maths and Physics Tutor, Mr Barton and Integral Maths •Make use of the CGP A Level Maths Revision Guide available from SFO •Use of knowledge organisers
Linear Sequences Arithmetic Geometric Roots Interval Approximate Newton-Raphson Trapezium Binomial Approximation Partial fraction Equivalent Kinematics Forces Vectors Forces Proof Range Domain	Key Vocabulary Key Vocabulary is outlined throughout the SOW.
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