TOPIC OVERVIEW DOCUMENT

YEAR 13

TOPIC OVERVIEW:

These topics build on Year 12 Maths by extending students' existing skills in In Y13 Mathematics, students develop advanced knowledge of algebra, functions, trigonometry and statistics. They learn to manipulate and model with algebra, explore functions and graphs, analyse sequences and series, apply binomial expansion, use radians in trigonometric contexts, and interpret data through regression, correlation and hypothesis testing. Together, these topics deepen students' understanding of mathematical relationships, patterns, modelling and statistical analysis, providing a strong foundation for further study and preparing them to apply their knowledge accurately in unfamiliar examination contexts.

Key Vocabulary (T2)	Vocab T3	Core knowledge	Disciplinary Skills
Analyse, interpret, justify, evaluate, compare, represent, manipulate, derive, predict, estimate, construct, transform, relationship, assumption, evidence, significant, model, generalise, verify, conclude.	Domain, range, composite function, inverse function, asymptote, series, arithmetic sequence, geometric sequence, recurrence relation, sigma notation, convergence, binomial theorem, coefficient, factorial, radian, arc length, sector area, trigonometric graph, regression, correlation, interpolation, extrapolation, hypothesis, null hypothesis, significance level, critical region, statistical significance,	Students develop a deeper understanding of algebra, functions, trigonometry and statistics. Through **Algebraic Methods**, they learn advanced techniques for manipulating expressions, solving equations and inequalities, and using algebraic models. In **Functions and Graphs**, they develop knowledge of different function types, transformations, inverses, composite functions and graphical behaviour. **Sequences and Series** introduces arithmetic and geometric sequences, recurrence relations, and methods for finding sums and patterns. Students also extend their algebraic understanding through **Binomial Expansion**, learning how to expand expressions and use coefficients in problem-solving. In **Radians**, they develop knowledge of radian measure, arc length, sector area and trigonometric graphs, strengthening links between geometry, algebra and trigonometry. Through **Regression, Correlation and Hypothesis Testing**, students learn how to analyse data,	You need to think and work like a mathematician by applying logical reasoning, problem-solving and critical thinking across a range of topics. You should be able to analyse unfamiliar problems, identify patterns and relationships, select appropriate mathematical methods, and justify your decisions clearly. Success requires perseverance when tackling complex, multi-step questions, as well as the ability to communicate mathematical arguments using precise notation and language. You will need to evaluate solutions, interpret results in context, and recognise the limitations of mathematical models and assumptions. Strong disciplinary skills also involve making connections between different areas of mathematics, working accurately and

	causation and regression model**.**	model relationships, make predictions, test statistical hypotheses and interpret the reliability of conclusions. Together, these topics build the core mathematical knowledge needed for advanced study by deepening students' understanding of mathematical relationships, patterns, modelling and statistical analysis.	systematically, and reflecting on your methods to improve efficiency and understanding. These skills enable you to approach challenging problems with confidence and prepare you for further study in mathematics and related disciplines.

Checkpoint: Vocab/ Knowledge/ Disciplinary skill(s)	**What does this assessment look like?**	**Which disciplinary skills do I need to be successful?**
Checkpoint 1: Algebraic methods	You will complete an end of unit assessment at the end of the topic	To be successful in Algebraic Methods, you need to apply algebraic techniques accurately, think logically, and solve problems systematically. You should be able to manipulate expressions, solve equations, recognise patterns, justify your reasoning, and select efficient methods when tackling unfamiliar problems. These skills develop the algebraic fluency and mathematical reasoning needed for success in Y13 Mathematics.
Checkpoint 2: Functions and graphs	You will complete an end of unit assessment at the end of the topic	To be successful in Functions and Graphs, you need to interpret and analyse mathematical relationships, understand how functions behave, and represent them graphically. You should be able to recognise patterns, connect algebraic and graphical representations, and use graphs to solve problems and justify conclusions. Success requires logical reasoning, accurate communication of mathematical ideas, and confidence in selecting appropriate methods when working with unfamiliar functions and graphical models.
Checkpoint 3: Sequences and series	You will complete an end of unit assessment at the end of the topic	To be successful in Sequences and Series, you need to recognise patterns, use mathematical rules to generate and analyse sequences, and apply appropriate methods to solve problems. You should be able to reason logically, work systematically, and make connections between algebraic, graphical and numerical representations. Success requires accuracy, mathematical fluency, and the ability to justify your findings when working with both familiar and unfamiliar problems. These skills help develop the analytical thinking and problem-solving needed for success in Y13 Mathematics.
Checkpoint 4: Binomial expansion	You will complete an end of unit assessment at the end of the topic	To be successful in Binomial Expansion, you need to apply algebraic methods accurately and work systematically to expand and simplify expressions. You should be able to recognise patterns, use mathematical notation correctly, and select efficient strategies when solving problems. Success requires logical reasoning, attention to detail, and the ability to justify your methods and check the validity of

		your answers. These skills develop the algebraic fluency and problem-solving confidence needed for success in Y13 Mathematics.
Checkpoint 5: Radians	You will complete an end of unit assessment at the end of the topic	To be successful in Radians**,** you need to apply mathematical reasoning to understand and use radian measure in place of degrees. You should be able to make connections between geometry, trigonometry and algebra, interpret mathematical relationships, and apply formulas accurately in a range of contexts. Success requires logical thinking, careful problem-solving, and the ability to communicate and justify your methods clearly. These skills develop the fluency and confidence needed to tackle advanced trigonometric concepts in Y13 Mathematics.
Checkpoint 6: Regression, correlation and hypothesis testing	You will complete an end of unit assessment at the end of the topic	To be successful in Regression, Correlation and Hypothesis Testing, you need to interpret data, identify relationships, and draw justified conclusions from statistical evidence. You should be able to analyse patterns, make predictions, evaluate the reliability of results, and communicate findings using clear statistical reasoning. These skills develop critical thinking, problem-solving and decision-making when working with data in Y13 Mathematics.

Milestone assessment: The average of the following unit tests: : Algebraic methods; Functions and graphs; Sequences and series; Binomial expansion; Radians; Regression, correlation and hypothesis testing		
Domain, range, composite function, inverse function, asymptote, series, arithmetic sequence, geometric sequence, recurrence relation, sigma notation, convergence, binomial theorem, coefficient, factorial, radian, arc length, sector area, trigonometric graph, regression, correlation, interpolation, extrapolation, hypothesis, null hypothesis, significance level, critical region, statistical significance, causation and regression model**.**	**Knowledge tasks:** Students develop advanced mathematical knowledge across algebra, functions, trigonometry and statistics. They learn to manipulate and model with algebra, explore the behaviour of functions and graphs, investigate sequences and series, and apply binomial expansion techniques. Students also deepen their understanding of trigonometry through radians, arc lengths and sectors, while developing statistical skills through regression, correlation and hypothesis testing. These topics strengthen problem-solving, mathematical reasoning and analytical thinking, providing a strong foundation for further study in mathematics and related disciplines.	**Disciplinary tasks:** Students develop the disciplinary skills needed to think and work like mathematicians. They learn to use logical reasoning, analyse patterns, solve complex problems and select appropriate mathematical methods with confidence. Students are encouraged to communicate their ideas clearly, justify their conclusions, and interpret results in context. They also develop resilience when tackling challenging problems, make connections between different areas of mathematics, and evaluate the effectiveness of their solutions. These skills support success in advanced mathematics and prepare students for further study and future careers that require analytical and critical thinking. .

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How can I achieve in this topic?

- Complete all exercises in the unit
- Engage 100% in lessons
- Use self-study periods to complete the mixed exercises
- Make good notes/examples in lessons and use them

Further research:

- Maths Genie • Learn A Level Maths for Free
- Calculator Suite - GeoGebra