# HIGHFIELDS SCHOOL
## CURRICULUM OVERVIEW 2023-2024

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**SUBJECT:** A LEVEL MATHEMATICS          **EXAMINATION BOARD:** OCR

| AUTUMN TERM - YEAR 12 | SPRING TERM – YEAR 12 | SUMMER TERM - YEAR 12 |
|---|---|---|
| **A Level Mathematics A (H240)**<br>**Notation and Proof** - Including proof by exhaustion, disproof by counter example<br>**Algebra and Functions** - Surds, indices, simultaneous equations, quadratic functions<br>**Binomial Expansion** - Using the formula for the binomial expansion<br>**Coordinate Geometry** – Be ble to find the equation of a straight line, the gradient of a line, distance between two points. Be able to find the equation of a circle<br>**Polynomials and Graphs** - Be able to identify key points and shapes of a graph to be able to sketch the graphs<br>**Data Handling** - Be able to interpret tables and diagrams for single-variable data. Work with a large data set (LDS).<br>**Sampling** - Be able to make inferences about populations, able to use simple sampling techniques.<br>**Kinematics -** Be able to use SUVAT equations and interpret distance time graphs.<br>**Probability** - Using diagrams to help calculations for probability. Working with binomial probability distributions.<br>**Polynomials** - Be able to solve equations of varying order, using the factor theorem and the remainder theorem.<br>**Inequalities** - Be able to solve linear and quadratic inequalities | **Forces** - Understand that forces are vectors and be able to use force diagrams. Able to use Newton's Third Law.<br>**Equilibrium** - Able to find normal reaction forces, frictional forces and investigate particles in equilibrium.<br>**Data Presentation -** Working with histograms, scatter diagrams, lines of regression<br>**Averages, Spread and Outliers** - Calculations of central tendency, mean, standard deviation and using calculator statistical functions.<br>**Trigonometry** - Understand and be able to use the three main trig functions, the sine rule and the cosine rule. Be able to solve equations with trigonometric functions.<br>**Vectors** - Be able to use vectors in 2 dimensions<br>**Differentiation** - Understanding the concept of differentiation and being able to apply it to a variety of functions.<br>**Integrals** - Be able to evaluate definite and indefinite integrals. Use integrals to find areas. Understand the link between integration and differentiation.<br>**Hypothesis Testing** - Be able to use the language of hypothesis testing.<br>**Variable Acceleration** - Derive and use the formula for constant acceleration using differentiation and integration | **Functions**<br>Be able to define a function, domain and range and use set notation to describe them. Use inverse functions and composite functions.<br>**Functions**<br>The modulus function.<br>**Algebra**<br>Partial fractions and binomial expansion.<br>**Exponentials and Logs**<br>Know how to use exponential and logarithmic functions, and the log laws to manipulate appropriate functions. |
| **ASSESSMENT**<br>Progress review 1 - Assessment based upon a mixture of topics.<br>Progress review 2 - Assessment based upon a mixture of full examination papers. | **ASSESSMENT**<br>Continual assessment using past papers for retrieval practise. | |

| AUTUMN TERM - YEAR 13 | SPRING TERM – YEAR 13 | SUMMER TERM - YEAR 13 |
|---|---|---|
| **Radians** - Understand the use of radians as an angle measure and be able to use them in appropriate geometric and trigonometric cases. <br> **Binomial expansion** - Extend knowledge of the binomial expansion to cases other than integer powers and know the constraints put upon this. <br> **Arithmetic and Geometric progressions** - Be able two different kinds of sequence and series to solve problems <br> **Numerical methods -** Use iterative processes to help solve equations. Be able to use the Newton-Rhapson method to help solve equations. <br> **Moments about a point** - Understand and be able to use the units for moments and calculate the forces about an axis. <br> **Parametric forms** - Understand and be able to use parametric equations of curves and be able to convert between them. <br> **Trigonometric Identities** - Compound angle formula, $r\sin(\theta + \phi)$ form. <br> **Further calculus** - Differentials of exponentials, natural logs, trig functions and implicit differentiation. Integration by substitution and integration by parts. <br> **Parametric Equations** - Using parametric equations and differentiating parametric equations. <br> **Differential Equations** - Forming and solving differential equations <br> **Statistical Hypothesis Testing** - Carry out hypothesis tests using the Normal distribution. Identifying correlation coefficients. | **Conditional Probability** - Understand conditional probability and be able to use in conjunction with appropriate diagrams <br> **Normal distributions** - Be able to use the normal distribution as a model and be able to find probabilities using the distribution. <br> **Differential Equations** - Be able to construct and solve simple differential equations in context. <br> **Proof** - Proof by deduction, exhaustion and contradiction. Disproof by counterexample. <br> **Differentiation** - Product and quotient rule. <br> **Projectiles** - Modelling the path of a projectile with constant acceleration equations. <br> **A model for friction** - Know how and when to use the coefficient for friction. <br> **Forces and motion** - Using Newtons Laws in two dimensions. <br> **Revision-** Topics identified from Year 13 School Examinations | **Exam preparation** <br> General revision <br> Topic specific revision <br> Past papers |
| **ASSESSMENT** <br> Progress review 1 - Assessment based upon a mixture of topics. <br> Progress review 2 - Assessment based upon a mixture of full examination papers. | **ASSESSMENT** <br> Continual assessment using past papers for retrieval practice. | |