HIGHFIELDS SCHOOL

OVERVIEW - SCHEME OF WORK 2021-2022

www.hswv.co.uk

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

AUTUMN TERM - YEAR 12	SPRING TERM – YEAR 12	SUMMER TERM - YEAR 12
A Level Mathematics A (H240) **Notation and Proof** Including proof by exhaustion, disproof by counter example **Algebra and Functions** Surds, indices, simultaneous equations, quadratic functions **Binomial Expansion** Using the formula for the binomial expansion **Coordinate Geometry** Being able 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 **Polynomials and Graphs** Being able to identify key points and shapes of a graph to be able to sketch the graphs **Data Handling** Be able to interpret tables and diagrams for single-variable data. Work with a large data set (LDS). **Sampling** Be able to make inferences about populations, be able to use simple sampling techniques. **Vectors** Be able to use vectors in 2 dimensions **Kinematics** Be able to use SUVAT equations and interpret distance time graphs. **Probability** Using diagrams to help calculations for probability. Working with binomial probability distributions. **Differentiation** Understanding the concept of differentiation and being able to apply it to a variety of functions. **Polynomials** Be able to solve equations of varying order, using the factor theorem and the remainder theorem.	**Forces** Understand that forces are vectors and be able to use force diagrams. Able to use Newton's Third Law. **Equilibrium** Able to find normal reaction forces, frictional forces and investigate particles in equilibrium. **Data Presentation** Working with histograms, scatter diagrams, lines of regression **Averages, Spread and Outliers** Calculations of central tendency, mean, standard deviation and using calculator statistical functions. **Exponentials and Logs** Know how to use exponential and logarithmic functions, and the log laws to manipulate appropriate functions. **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. **Integrals** Be able to evaluate definite and indefinite integrals. Use integrals to find areas. Understand the link between integration and differentiation. **Hypothesis Testing** Be able to use the language of hypothesis testing. **Variable Acceleration** Derive and use the formula for constant acceleration using differentiation and integration	**Conditional Probability** Understand conditional probability and be able to use in conjunction with appropriate diagrams. **Functions** Be able to define a function, domain and range and use set notation to describe them. Use inverse functions and composite functions. **Radians** Understand the use of radians as an angle measure and be able to use them in appropriate geometric and trigonometric cases. **Binomial expansion** Extend knowledge of the binomial expansion to cases other than integer powers and know the constraints put upon this. **Arithmetic and Geometric progressions** Be able two different kinds of sequence and series to solve problems **Numerical methods** Use iterative processes to help solve equations. Be able to use the Newton-Rhapson method to help solve equations. **Moments about a point** Understand and be able to use the units for moments and calculate the forces about an axis. **Parametric forms** Understand and be able to use parametric equations of curves and be able to convert between them. **Normal distributions** Be able to use the normal distribution as a model and be able to find probabilities using the distribution. **Differential Equations** Be able to construct and solve simple differential equations in context.

Inequalities Be able to solve linear and quadratic inequalities		
ASSESSMENT Progress review 1 - Assessment based upon a mixture of topics. Progress review 2 - Assessment based upon a mixture of full examination papers.	**ASSESSMENT** Continual assessment using past papers for retrieval practice.	

HIGHFIELDS SCHOOL

OVERVIEW - SCHEME OF WORK 2021-2022

www.hswv.co.uk

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

AUTUMN TERM - YEAR 13	SPRING TERM – YEAR 13	SUMMER TERM - YEAR 13
Proof Proof by deduction, exhaustion and contradiction. Disproof by counterexample. **Functions** The modulus function. **Differentiation** Product and quotient rule. **Algebra** Partial fractions and binomial expansion. **Trigonometric Identities** Compound angle formula, $r\sin(\theta+\phi)$ form. **Further calculus** Differentials of exponentials, natural logs, trig functions and implicit differentiation. Integration by substitution and integration by parts. **Parametric Equations** Using parametric equations and differentiating parametric equations. **Differential Equations** Forming and solving differential equations **Statistical Hypothesis Testing** Carry out hypothesis tests using the Normal distribution. Identifying correlation coefficients. **Projectiles** Modelling the path of a projectile with constant acceleration equations. **A model for friction** Know how and when to use the coefficient for friction. **Forces and motion** Using Newtons Laws in two dimensions.	**Revision** Topics identified from Year 13 School Examinations	**Exam preparation** General revision Topic specific revision Past papers
ASSESSMENT Progress review 1 - Assessment based upon a mixture of topics. Progress review 2 - Assessment based upon a mixture of full examination papers.	**ASSESSMENT** Continual assessment using past papers for retrieval practice.	