Year 13 Curriculum Grid

Mathematics

Year/Term	Unit	Intent
Overall		To inspire students, nurture a passion for Mathematics, lay the groundwork for further study in mathematically related courses whilst providing numerous opportunities to equip students with the essential practical skills they need for future mathematical study.
Autumn	Pure – Algebraic Methods	Proof by contradiction. Algebraic fractions. Partial fractions. Repeated factors. Algebraic division.
	Pure – Functions and graphs	The modulus function. Functions and mappings. Composite functions. Inverse functions. Combining transformations. Solving modulus problems.
	Pure – Sequences and Series	Arithmetic sequences and series. Geometric sequences and series. Sum to infinity. Sigma notation. Recurrence relations. Modelling with series.
	Pure – Binomial Expansion	Expanding $(1+x)^n$. Expanding $(a+bx)^n$. Using partial fractions.
	Pure – Radians	Radian measure. Arc length. Areas of sectors and segments. Solving trigonometric equations. Small angle approximations.
	Pure – Trigonometric Functions	Secant, cosecant and cotangent. Graphs of $\sec x$, $cosec\ x$ and $\cot x$. Using $\sec x$, $cosec\ x$ and $\cot x$. Trigonometric identities. Inverse trigonometric functions.
	Pure – Trigonometry and modelling	Addition formulae. Double angle formulae. Solving trigonometric equations. Simplifying $a\cos x \pm b \sin x$. Proving trigonometric identities. Modelling with trigonometric functions.
	Pure – Differentiation	Differentiating $\sin x$, $\cos x$, exponentials and logarithms. The chain rule. The product rule. The quotient rule. Differentiating trigonometric functions. Parametric differentiation. Implicit differentiation. Using second derivatives. Rates of change.
	Pure – Integration	Integrating standard functions. Integrating $f(ax+b)$. Using trigonometric identities. Reverse chain rule. Integrating by substitution and by parts. Partial fractions. Finding areas. The trapezium rule. Solving differential equations. Modelling with differential equations.
Spring	Pure – Parametric Equations	Parametric equations. Using trigonometric identities. Curve sketching. Points of intersection. Modelling with parametric equations.

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	Pure – Numerical Methods	Locating roots. Iteration. The Newton-Raphson method. Applications to modelling.
	Pure - Vectors	3D coordinates. Vectors in 3D. Solving geometric problems. Application to mechanics.
	Mechanics – Moments	Moments. Resultant moments. Equilibrium. Centres of mass. Tilting.
	Mechanics – Forces and Friction	Resolving forces. Inclined planes. Friction.
	Mechanics – Projectiles	Horizontal projection. Horizontal and vertical components. Projection at any angle. Projectile motion formulae.
	Statistics – Regression, Correlation and Hypothesis Testing	Exponential models. Measuring correlation. Hypothesis testing for zero correlation.
	Statistics – Conditional Probability	Set notation. Conditional probability. Conditional probabilities in Venn diagrams. Probability formulae. Tree diagrams.
Summer	Mechanics – Applications of Forces	Static particles. Modelling with statics. Friction and static particles. Static rigid bodies. Dynamics and inclined planes. Connected particles.
	Mechanics – Further Kinematics	Vectors in kinematics. Vector methods with projectiles. Variable acceleration in one dimension. Differentiating vectors. Integrating vectors.
	Statistics – The Normal Distribution	The normal distribution. Finding probabilities for normal distributions. The inverse normal distribution function. The standard normal distribution. Approximating a binomial distribution. Hypothesis testing with the normal distribution.