Year 13 Curriculum Grid

Mathematics

Year/Term	Unit	Intent
Overall		
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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Mathematics

	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.