

Curriculum Plan

Year: 13 (A level)

Subject: Pure Mathematics P4 (WMA14/01)

Term	Week	Focus	Summary	Learning Outcomes	Parental Support	Indenpendant Learning
1A	1	Proof by Contradiction	Mastering contradiction as a method of mathematical proof.	Understanding that to prove by contradiction you start by assuming that the statement is not true.	Encourage logical thinking in everyday situations. Discuss the concept of proving statements true/false.	Practice the contradiction method constructing proofs for various types of statements from exercises. Focus on clear, logical steps. Exercises: Ex1A.
	2	Partial Fractions	Extending the concept of partial fractions to more complex rational functions.	Decompose rational functions into partial fractions including cases with repeated linear factors and quadratic factors in the denominator.	Review algebraic division from P3. Support with algebraic simplification practice.	Focus on setting up correct forms for different denominator types. Practice ample exercises for each case. Exercises: Ex2A to 2C.
	3	Coordinate Geometry in the (x,y) Plane	Converting parametric equations into Cartesian form using substitution and trigonometric identities	Understand and use parametric equations of curves: be able to convert into Cartesian form using substitution and trigonometric identities, sketch parametric curves and	Review basic coordinate geometry from GCSE and P2. Encourage drawing diagrams to visualise problems.	Practice converting parametric equations. Work through problems involving parametric equations of curves. Exercises: Ex 3A to 3C.

				solve coordinate geometry problems.		
4-5	Binomial Expansion	Using the binomial expansion for non-integer powers and its applications.	Expand $(1+x)^n$ and $(a+bx)^n$ where n is any rational number, and find the range of validity. Use partial fractions to expand fractional expressions.	Review binomial expansion for positive integer powers. Discuss the concept of approximation.	Practice deriving expansions. Pay attention to conditions for validity. Exercises: 4A to 4C.	
6	Term 1 Review & Assessment	Consolidation of Proof, Partial Fractions, Coordinate Geometry and Binomial Expansion.	Confidently apply various proof methods. Perform partial fraction decomposition, parametric conversions and use binomial expansion for rational powers.	Encourage detailed review of misconceptions. Ensure timed practice of relevant past paper questions.	Complete Review Exercise 1. Re-attempt challenging questions. Work through relevant P4 past paper questions.	

Term	Week	Focus	Summary	Learning Outcomes	Parental Support	Independant Learning
1B	7-8	Differentiation (Parametric & Implicit)	Extending differentiation to functions defined parametrically and implicitly.	Differentiate functions defined parametrically using $dy/dx=(dy/dt)/(dx/dt)$. Differentiate implicitly to find dy/dx . Find equations of tangents and normal to curves defined parametrically or implicitly. Solve problems involving connected rates of change and construct simple differential equations.	Review chain rule from P3. Discuss scenarios where explicit differentiation is not feasible.	Practice differentiating parametric and implicit functions. Focus on finding equations of tangents and normal. Exercises: Ex5A to 5C.
	9-10	Further Integration (Parametric & Volumes)	Extending integration to parametric forms and volumes of revolution. Solve real-life differential equations.	Integrate functions defined parametrically to find areas. Calculate volumes of revolution when revolving about the x-axis and y-axis using integration. Integration by substitution, parts and	Visualise 3D shapes formed by revolution. Review P1/P2/P3 integration rules.	Practice integrating parametric functions for area. Work through problems involving volumes of revolution about both axes and practice modelling real-life situations with

				partial fractions. Model real-life situations with differential equations.		differential equations. Exercises: Ex6A to 6G.
11-12	Vectors	2D and 3D vectors and the vector equation of a line.	Understand the magnitude and direction of a vector. Be able to use vectors to solve geometric problems. Understand and use 2D and 3D position vectors. Be able to form the vector equation of a line $r=a+b$. Determine if a point lies on a line and if two lines intersect. Determine the scalar product for two vectors.	Encourage visualising 3D space using real-world examples. Discuss how vector methods simplify 3D geometry problems compared to Cartesian coordinates.		Practice setting up vector equations of lines. Work through exercises involving points on lines, points of intersection, angle between two vectors their scalar product. Exercises: 7A to 7K.
13	Comprehensive P4 Review & Consolidation	Systematic review of all P4 syllabus content, reinforcing connections between topics.	Confidently apply all P4 concepts from proof, algebra, vectors, and advanced calculus. Identify and rectify common misconceptions across the module.	Encourage active recall of formulas and methods across P1-P4. Discuss areas of difficulty calmly and collaboratively.		Revisit all P4 chapters. Work through challenging problems from Review Exercise 2. Create self-made revision cards.
14	P4 Mock Exams & Exam Technique	Practice full P4 papers under timed conditions and refine exam strategies for P4.	Master time management for P4 exams, which are often time-pressured. Understand mark scheme expectations	Provide a quiet, high-pressure environment for mock exams to simulate real conditions. Offer detailed, constructive		Complete multiple full P4 past papers under timed conditions. Use mark schemes to understand common mistakes and optimal

				and present detailed, logical solutions clearly.	feedback on performance and exam strategy.	answering styles, particularly for multi-step problems and proofs.