مدرسة جيمس فيرست بوينت
GEMS FirstPoint School
THE VILLA

Mathematics Department: Yearly Overview Plan

Year 13 A2 Maths Further Pure 2 (Edexcel) *(one-third of A2)*

Unit	Learning Outcomes *Students will learn…*	Real World Application	Assessment Methods
1. Algebra and Function	1.1.Simplification of rational expressions including factorising and cancelling, and algebraic division. 1.2. Definition of a function. Domain and range of functions. Composition of functions. Inverse functions and their graphs. 1.3. The Modulus Function 1.4. Combinations of the transformations y = f(x) as represented by y = af(x), y = f(x) + a, y = f(x + a), y = f(ax).		Students will have regular assessments using previous exam questions from Pure 3, Pure 4 and Decision 1 past papers questions in different formats throughout the year to consistently assess which grade they are working at from A-E. **Formative assessment** **Ongoing** Classwork, homework, past paper questions **Summative assessment** **Term 1** P3 Assessment 1- wb. 6th October P3 Mock 1- w.b. 10th November D1 Assessment 1- w.b. 8th December **Term 2** - M2 Mock 2- w.b. 5th January ***Mechanics 2 External Examination 22nd January*** ***FP1 Resit 14th Jan*** ***M1 Resit 21st Jan.*** ***S2 Resit 23rd Jan*** - FP2 Mock 1- w.b. 23rd February
2. Trigonometry	2.1. Knowledge of secant, cosecant and cotangent and of arcsin, arccos and arctan. Their relationships to sine, cosine and tangent. Understanding of their graphs and appropriate restricted domains. 2.2Knowledge and use of sec2 θ = 1 + tan2θ and cosec2 θ = 1 + cot2θ. 2.3. Knowledge and use of double angle formulae; use of formulae for sin (A ± B), cos (A ± B) and tan (A ± B) and of expressions for a cos θ + b sin θ in the equivalent forms of r cos (θ ± a) or r sin (θ ± a).		
3. Exponential and Logarithms	3.1. The function ex and its graph. 3.2. The function ln x and its graph; ln x as the inverse function of ex. 3.3. Use logarithmic graphs to estimate parameters in relationships of the form y = axn and y = kbx.		
4. Differentiation	4.1. Differentiation of ekx, ln kx, sin kx, cos kx, tan kx and their sums and differences 4.2. Differentiation using the product rule, the quotient rule and the chain rule.		

	4.3. The use of dy/dx = 1/(dy/dx) 4.4. Understand and use exponential growth and decay.		**Term 3** - FP2 Mock 2- w.b. 12th April - FP3 Mock 1 w.b. 26th April ***FP2 Exam 15th May*** ***FP1 Resit 11th May.*** ***M1 Resit 14th May*** ***FP3 Exam 23rd May.*** ***M2 Resit 18th May.*** ***S2 Resit 22nd May***
5. Integration	5.1. Integration of 1e,,sinkx ,coskx and their sums and differences. 5.2. Integration by recognition of known derivatives to include integrals		
6. Numerical Methods	6.1. Location of roots of f(x) = 0 by considering changes of sign of f(x) in an interval of x in which f(x) is continuous. 6.2. Approximate solution of equations using simple iterative methods, including recurrence relations of the form xn+1 = f(xn)		
Year 13 A2 Pure 4 (Edexcel) (one-third of A2)			
1. Proof	1.1.Proof by contradiction		
2. Algebra and Functions	2.1. Decompose rational functions into partial fractions (denominators not more complicated than repeated linear terms).		
3. Co-ordinate geometry in the (x,y) plane	3.1.Parametric equations of curves and conversion between cartesian and parametric forms.		
4. Binomial Expansion	4.1.Binomial Series for any rational n.		
5. Differentiation	5.1.Differentiation of simple functions defined implicitly or parametrically. 5.2.Formation of simple differential equations.		
6. Integration	6.1.Evaluation of volume of revolution. 6.2. Simple cases of integration by substitution and integration by parts. Understand these methods as the reverse processes of the chain and product		

	rules respectively. 6.3. Simple cases of integration using partial fractions. 6.4. Analytical solution of simple first order differential equations with separable variables.		
7. Vectors	7.1.Vectors in two and three dimensions 7.2.Magnitude of a vector 7.3. Algebraic operations of vector addition and multiplication by scalars, and their geometrical interpretations 7.4. Position Vectors 7.5. The distance between two points 7.6. Vector equations of lines 7.7. the scalar product. Its use for calculating the angle between two lines		
Year 13 A2 Decision 1 (Edexcel) (one-third of A2)			
1. Algorithms	1.1.The general ideas of algorithms and the implementation of an algorithm given by a flow chart or text. 1.2. Students should be familiar with bin packing, bubble sort, quick sort, binary search.		
2. Algorithms on graphs	2.1.The minimum spanning tree (minimum connector) problem. Prim's and Kruskal's algorithm. 2.2.Dijkstra's algorithm for finding the shortest path.		
3. Algorithms on graphs II	3.1.Algorithm for finding the shortest route around a network, travelling along every edge at least once and ending at the start vertex. The network will have up to four odd nodes. (Chinese Postman) 3.2. The practical and classical Travelling Salesman problems. The classical problem for complete graphs satisfying the triangle inequality 3.3. Determination of upper and lower bounds		

	using minimum spanning tree methods 3.4. The nearest neighbour algorithm.		
4. Critical Path Analysis	4.1.Modelling of a project by an activity network, from a precedence table. 4.2. Completion of the precedence table for a given activity network. 4.3. Algorithm for finding the critical path. Earliest and latest event times. Earliest and latest start and finish times for activities. 4.4Total float. Gantt (cascade) charts. Scheduling.		
5. Linear Programming	5.1.Formulation of problems as linear programs. 5.2. Graphical solution of two variable problems using ruler and vertex methods. 5.3. Consideration of problems where solutions must have integer values.		