Archbishop Beck Catholic College

KS5 Scheme of Work

Year 13 Maths Pure

Lesson Sequencing	The High 5 Lesson : to be used throughout year	Further Challenge Opportunities
Unit 3: Functions and modelling • 3b. Composite and inverse functions • 3c. Transformations • 3d. Modelling with functions (trigonometric, exponential, reciprocal etc.) **Unit 4: Series and sequences** • 4a. Arithmetic and geometric progressions (proofs of 'sum formulae') • 4b. Sigma notation • 4c. Recurrence and iterations **Unit 5: The binomial theorem** • 5a. Expanding $(a + bx)^n$ for rational n knowledge of range of validity • 5b. Expansion of functions by first using partial fractions	**Consolidation**: Tasks to support prior learning including past exam questions. **Modelling**: Model examples for each topic when taught. Also exam questions to recap. **Response and Feedback**: Q & A, oral feedback to whole class and individuals, improvement tasks, extension tasks, peer assessment tasks, marking of homework and assessments in depth. **Challenge**: use of exam questions and problem solving questions from text book. Mixed exercises also provide challenge questions. **Independence**: Pupils to work through mixed exercises and review exercises in text book.	**Extension** Exam and problem solving questions provided. Mixed exercises and review exercises provided to challenge HAP. Use of Advanced Maths Support Programme for problem solving days, STEP and AEA test preparation days.

Unit 6: Trigonometry • 6a. Radians (exact values), arcs and sectors • 6b. Small angles • 6c. Secant, cosecant and cotangent (definitions, identities and graphs); Inverse trigonometrical functions • 6d. Compound and double (and half) angle formulae; geometric proof of compound angle formula • 6e. R cos (x ± a) or R sin (x ± a) • 6f. Proving trigonometric identities • 6g. Solving problems in context (e.g. mechanics) **Unit 7: Parametric equations** • 7a. Definition and converting between parametric and Cartesian forms • 7b. Curve sketching and modelling **Unit 8: Differentiation** • 8a. Differentiating sin x and cos x from first principles • 8b. Differentiating exponentials and logarithms • 8c. Differentiating products, quotients, implicit and parametric functions. • 8d. Second derivatives (rates of change of gradient, inflections) • 8e. Rates of change problems (including growth and kinematics) - see Integration (part 2) – Differential equations	**Consolidation**: Tasks to support prior learning including past exam questions. **Modelling**: Model examples for each topic when taught. Also exam questions to recap. **Response and Feedback**: Q & A, oral feedback to whole class and individuals, improvement tasks, extension tasks, peer assessment tasks, marking of homework and assessments in depth. **Challenge**: use of exam questions and problem solving questions from text book. Mixed exercises also provide challenge questions. **Independence**: Pupils to work through mixed exercises and review exercises in text book.	**Extension** Exam and problem solving questions provided. Mixed exercises and review exercises provided to challenge HAP. Use of Advanced Maths Support Programme for problem solving days, STEP and AEA test preparation days.

Unit 9: Numerical methods - see Integration (part 2) for the trapezium rule • 9a. Location of roots • 9b. Solving by iterative methods (knowledge of 'staircase and cobweb' diagrams) • 9c. Newton-Raphson method • 9d. Problem solving **Unit 10: Integration (part 1)** 10a. Integrating x^n (including when n = –1), exponentials and trigonometric functions • 10b. Using the reverse of differentiation, and using trigonometric identities to manipulate integrals **Unit 11: Integration (part 2)** • 11a. Integration by substitution • 11b. Integration by parts • 11c. Use of partial fractions • 11d. Areas under graphs or between two curves, including understanding the area is the limit of a sum (using sigma notation) • 11e. The trapezium rule • 11f. Differential equations (including knowledge of the family of solution curves) **Unit 12: Vectors (3D)** • 12a. Use of vectors in three dimensions; knowledge of column vectors and i, j and k unit vectors	**Consolidation**: Tasks to support prior learning including past exam questions. **Modelling**: Model examples for each topic when taught. Also exam questions to recap. **Response and Feedback**: Q & A, oral feedback to whole class and individuals, improvement tasks, extension tasks, peer assessment tasks, marking of homework and assessments in depth. **Challenge**: use of exam questions and problem solving questions from text book. Mixed exercises also provide challenge questions. **Independence**: Pupils to work through mixed exercises and review exercises in text book.	**Extension** Exam and problem solving questions provided. Mixed exercises and review exercises provided to challenge HAP. Use of Advanced Maths Support Programme for problem solving days, STEP and AEA test preparation days.