Varsity College
Year 11 Specialist Mathematics 2023

Term 1

Week	Date	Topics	Assessment
1	23-27 January **Australia Day PH - Thurs**	**Unit 1 Topic 2: Vectors in the plane** Representing vectors in the plane by directed line segments: • Definition of a scalar and vector **Ch. 6A** • Represent vectors in multiple forms **Ch. 6B, 6C** • Add and subtract vectors **Ch. 6A**	
2	30 Jan – 3 Feb **Swimming Carnival - Mon**	Algebra of vectors in the plane: • Vector notation • Conversion between Cartesian and polar form **Ch. 6C** • Displacement vectors **Ch. 6B**	
3	6-10 February	• Unit vectors **Ch 6B** • Operations of vectors in polar form **Ch. 6C** • Scalar (dot) product **Ch. 6D**	
4	13-17 February	• Parallel and perpendicular vectors **Ch. 6A** • Projections of vectors **Ch. 6E**	
5	20-24 February	• Applications of vectors Ch. 6F, 6G, 6H	
6	27 Feb – 3 Mar	**Unit 1 Topic 1: Combinatorics** The inclusion-exclusion principle for the union of two sets and three sets: • Addition principle **Ch. 7A, 7I** • Multiplication principle **Ch. 7A** Permutations (ordered arrangements) and combinations (unordered selections): • Permutations and factorial notation Ch. 7B	
7	6-10 March **GIPSA - Wednesday**	• Permutations - with/without restrictions **Ch. 7C** • Permutations of like objects Ch. 7D	
8	13-17 March	• Combinations - with/without restrictions Ch. 7E, 7F • Circular arrangements (OneNote) • Identities associated with Pascal's triangle Ch. 7G • Binomial expansion using Pascal's triangle (OneNote)	
9	20-24 March	• Permutations and combinations combined Ch. 7F • Applications to probability Ch. 7J • Pigeon-hole principle Ch. 7H	
10	27-31 March **Cross Country - Thurs**	**Exam Block**	
School Holidays: Saturday April 1 – Sunday April 16			

Term 2

Week	Date	Topics	Assessment
1	17-21 April **Athletics Carnival - Wednesday**	**Unit 1 Topic 3: Introduction to proof** The nature of proof: • Conditional statements and proof terms **Ch. 8A** • Proof by contrapositive **Ch. 8B** Rational and irrational numbers • Express rational numbers as terminating or eventually recurring decimals **(OneNote)** • Proof by contradiction **Ch. 8C**	
2	24-28 April **ANZAC Day PH - Tues**	Circle properties and their proofs: • Angle properties of circles **Ch. 10A** • Tangents **Ch. 10B**	
3	1-5 May **Labour Day PH - Monday** **GIPSA - Wednesday**	• Alternate segment theorem **Ch. 10B** • Chords in circles **Ch. 10C**	
4	8-12 May	• Geometric proofs using vectors **Ch. 9I** • Exam Revision	
5	15-19 May **GIPSA - Wednesday**	• Exam Revision • EXAM – students withdrawn from lesson 3 class to complete exam	**Unit 1 Exam Friday Lessons 3&4**
6	22-26 May **GIPSA - Wednesday**	**Unit 2 Topic 3: Matrices** Matrix arithmetic: • Matrix notation **Ch. 17A** • Matrix addition/subtraction and scalars **Ch. 17B** • Multiplication of matrices **Ch. 17C** • Identities, inverses and determinants of 2 × 2 matrices **Ch. 17D**	
7	29 May – 2 June	• Solve matrix equations (including simultaneous equations with 2 variables) **Ch. 17E** • Inverses and determinants for n × n matrices **Ch. 17F** • Solve matrix equations using technology **Ch. 17G**	
8	5-9 June **Exam Block – Tuesday L1,2** **GIPSA - Wednesday**	Transformations in the plane • Translations **(OneNote)** • Rotations, reflections and dilations **Ch. 18B, 18C**	
9	12-16 June	• Combined transformations Ch. 18A, 18D, 18E, 18G	**PSMT hand out** Lesson 2
10	19-23 June	**Exam Block**	
School Holidays: Saturday June 24 – Sunday July 9			

Term 3

Week	Date	Topics	Assessment
1	10-14 July	**Unit 2 Topic 1: Complex numbers 1** Complex numbers: • The set of complex numbers **Ch. 15A** • Addition/subtraction of complex numbers **Ch. 15A** • Multiplication/division of complex numbers **Ch. 15B** The complex plane (the Argand plane): • Geometric representation of complex numbers **Ch. 15C**	**Checkpoint 1**
2	17-21 July	Complex arithmetic using polar form: • Multiplication and division in polar form **Ch. 15E** • De Moivre's theorem **Ch. 15F** Roots of equations: • Quadratic equations with complex roots **Ch. 15D** • Linear factors of real quadratic polynomials **Ch. 15D**	**Checkpoint 2**
3	24-28 July	The basic trigonometric functions: • Sketching trigonometric graphs **Ch. 13D, 13E** • Solving trigonometric equations **Ch. 13C, 13E** Applications of trigonometric functions to model periodic phenomena: • Modelling periodic motion **Ch. 13I**	**Checkpoint 3**
4	31 July – 4 August	The reciprocal trigonometric functions, secant, cosecant and cotangent • Develop reciprocal ratios and graphs **Ch. 13H** • Transform graphs of reciprocal functions **Ch. 13H** Trigonometric identities • Pythagorean identities	**PSMT due** Start of Lesson 2
5	7-11 August	• Angle sums and differences • Double angle identities • Identities for products of sines and cosines expressed as sums and differences	
6	14-18 August	• Convert sums to products • Sketch and solve functions expressed as sums • Multi-angle trigonometric identities	
7	21-25 August	Sketching graphs • Absolute value function • Apply the relationship between the graph of f(x) and the graph of the reciprocal	
8	28 August – 1 Sept.	• Sketching graphs of rational functions	
9	4-8 September	• Review of Unit 2 leading to Unit 2 Exam	
10	11-15 September	**Exam Block**	**Unit 2 Exam**
School Holidays: Saturday September 16 – Monday October 2			

Term 4

Week	Date	Topics	Assessment
1	2-6 October **King's Birthday PH - Mon**	**Unit 3 Topic 2: Applications of matrices** • Review basic matrix methods including operations, inverses and determinants **Ch. 7A, 7B, 7D** Dominance and Leslie matrices **Ch. 7F, 7G**	
2	9-13 October	**Unit 3 Topic 2: Systems of linear equations** • recognise the general form of a system of linear equations • solve systems of linear equations using matrix algebra; review use of inverse matrix and Gaussian techniques of elimination to solve a system of linear equations examine the three cases for solutions of systems of equations **Ch. 6A, 6B, 6C,**	**PSMT hand out** Lesson 2
3	16-20 October	examine the three cases for solutions of systems of equations **Ch. 6A, 6B, 6C**	**Checkpoint 1**
4	23-27 October	**Unit 3 Topic 3: Complex numbers 2** • review Cartesian form of a complex number; real & imaginary parts and arithmetic **Ch. 9A, 9B, 9C** prove the identities involving modulus and argument **Ch. 9D**	**Checkpoint 2**
5	30 Oct – 3 Nov	• prove and use De Moivre's theorem for integral powers **Ch. 9D** examine the nth roots of unity and of complex numbers including their location in the complex plane **Ch. 9G**	**Checkpoint 3**
6	6-10 November	identify subsets of the complex plane determined by straight lines and circles **Ch. 9H**	**PSMT due** Lesson 2
7	13-17 November	**Factorisation of polynomials: Review** • prove and apply the factor theorem and the remainder theorem for polynomials • consider conjugate roots for polynomials with real coefficients solve polynomial equations to order 4 **Ch. 9F**	
8	20-24 November	**Exam Block**	
School Holidays: Saturday November 25 – Sunday January 21, 2024			