Maths α

Precision in Learning, Excellence in Results

Year 13 Course Plan (Maths Syllabus)

Topic	Subtopics
1. Algebraic Methods	1.1 Proof by contradiction
	1.2 Algebraic fractions
	1.3 Partial fractions
	1.4 Repeated factors
	1.5 Algebraic division
	Mixed exercise 1
2. Functions and Graphs	2.1 The modulus function
	2.2 Functions and mappings
	2.3 Composite functions
	2.4 Inverse functions
	2.5 y =
	2.6 Combining transformations
	2.7 Solving modulus problems
	Mixed exercise 2
3. Sequences and Series	3.1 Arithmetic sequences
	3.2 Arithmetic series
	3.3 Geometric sequences
	3.4 Geometric series

	3.5 Sum to infinity
	3.6 Sigma notation
	3.7 Recurrence relations
	3.8 Modelling with series
	Mixed exercise 3
4. Binomial Expansion	4.1 Expanding $(1 + x)^n$
	4.2 Expanding $(a + bx)^n$
	4.3 Using partial fractions
	Mixed exercise 4
5. Radians	5.1 Radian measure
	5.2 Arc length
	5.3 Areas of sectors and segments
	5.4 Solving trigonometric equations
	5.5 Small angle approximations
	Mixed exercise 5
6. Trigonometric Functions	6.1 Secant, cosecant and cotangent
	6.2 Graphs of sec x, cosec x and cot x
	6.3 Using sec x, cosec x and cot x
	6.4 Trigonometric identities
	6.5 Inverse trigonometric functions
	Mixed exercise 6
7. Trigonometry and Modelling	7.1 Addition formulae
	7.2 Using the angle addition formulae
	7.3 Double-angle formulae
	7.4 Solving trigonometric equations

	7.5 Simplifying a cos x ± b sin x
	7.6 Proving trigonometric identities
	7.7 Modelling with trigonometric functions
	Mixed exercise 7
8. Parametric Equations	8.1 Parametric equations
	8.2 Using trigonometric identities
	8.3 Curve sketching
	8.4 Points of intersection
	8.5 Modelling with parametric equations
	Mixed exercise 8
9. Differentiation	9.1 Differentiating sin x and cos x
	9.2 Differentiating exponentials and logarithms
	9.3 The chain rule
	9.4 The product rule
	9.5 The quotient rule
	9.6 Differentiating trigonometric functions
	9.7 Parametric differentiation
	9.8 Implicit differentiation
	9.9 Using second derivatives
	9.10 Rates of change
	Mixed exercise 9
10.Numerical Methods	10.1 Locating roots
	10.2 Iteration
	10.3 The Newton–Raphson method
	10.4 Applications to modelling

	Mixed exercise 10
11.Integration	11.1 Integrating standard functions
	11.2 Integrating f(ax + b)
	11.3 Using trigonometric identities
	11.4 Reverse chain rule
	11.5 Integration by substitution
	11.6 Integration by parts
	11.7 Partial fractions
	11.8 Finding areas
	11.9 The trapezium rule
	11.10 Solving differential equations
	11.11 Modelling with differential equations
	Mixed exercise 11
12.Vectors	12.1 3D coordinates
	12.2 Vectors in 3D
	12.3 Solving geometric problems
	12.4 Application to mechanics
	Mixed exercise 12
	Mixed exercise 12