

Year 4IP Advanced Mathematics Course Outline

	Topics
Term 1	
1	Binomial Theorem
1.1	Introduction to Binomial Theorem
1.2	Binomial Expansion
2	Permutations and Combinations
2.1	The basic counting principles
2.2	Permutations
2.3	Combinations
3	Further Trigonometric Identities
3.1	Addition Formulae
3.2	Double Angle Formulae
Term 2	
4	Differentiation
4.1	Concept of Limits
4.2	Differentiation by First Principles
4.3	The Gradient Functions
4.4	Basic Differentiation
4.5	Equations of Tangents and Normals
5	Rates of Change
5.1	Rates of Change
5.2	Connected Rates of Change
6	Stationary Points
6.1	Nature of Stationary Points
6.2	Second Derivatives
6.3	Maximum and Minimum Values
Term 3	
7	Derivatives of Simple Trigonometric Functions
7.1	Derivatives of $\sin x$, $\cos x$ and $\tan x$
8	Derivatives of Exponential and Logarithmic Functions
8.1	Exponential Functions
8.2	Logarithmic Functions
9	Integration
9.1	Integration and Indefinite Integrals
9.2	Definite Integrals
9.3	Integration of Trigonometric Functions
9.4	Integration of Exponential Functions and $\frac{1}{x}$
10	Applications of Integration
10.1	Area of a region
Term 4	
11	Kinematics
11.1	Displacement, Velocity and Acceleration