All DP mathematics courses serve to accommodate the range of needs, interests and abilities of students, and to fulfill the requirements of various university and career aspirations.

The aims of these courses are to enable students to:

- develop mathematical knowledge, concepts and principles
- develop logical, critical and creative thinking
- employ and refine their powers of abstraction and generalization.

Students are also encouraged to appreciate the international dimensions of mathematics and the multiplicity of its cultural and historical perspectives.

In ACS(Independent), we are offering Mathematics: Analysis and Approaches HL & SL for the following reasons:

1. Universities, by and large, to-date are more receptive to the course content in Mathematics: Analysis and Approaches for admission purposes.
2. Our students would enjoy the academic rigour in Mathematics: Analysis and Approaches.
3. Our students are well-equipped to benefit from Mathematics: Analysis and Approaches.

Course Outline

Mathematics: Analysis and Approaches AA – Distinction between SL and HL

This course recognizes the need for analytical expertise in a world where innovation is increasingly dependent on a deep understanding of mathematics. This course includes topics that are both traditionally part of a pre-university mathematics course (for example, Functions, Trigonometry, Calculus) as well as topics that are amenable to investigation, conjecture and proof, for instance the study of Sequences and Series at both SL and HL, and proof by induction at HL.

Both courses encourage the use of technology, as fluency in relevant mathematical software and hand-held technology is increasingly important. Mathematics: Analysis and Approaches has a strong emphasis on the ability to construct, communicate and justify mathematical arguments. Students should be comfortable in the manipulation of algebraic expressions, enjoy the recognition of patterns and appreciate the mathematical generalization of these patterns. Students who wish to offer Mathematics: Analysis and Approaches at Higher level should ideally possess strong algebraic skills and the ability to understand simple proofs. They will be students who enjoy spending time with problems and derive satisfaction from solving challenging problems. These courses are suited for students interested in Mathematics, Engineering, Physical Sciences and Economics. However, if you are more passionate about the social sciences or other related courses, you may opt for Mathematics at Standard Level.

Both Mathematics: Analysis and Approaches at SL or HL courses cover the same 5 topics of Algebra, Functions, Geometry and Trigonometry, Statistics and Probability and Calculus with varying emphasis.

Mathematics : Analysis and Approaches HL		Mathematics : Analysis and Approaches SL	
External Assessment (80%)			
Paper 1 (2 h)	30 %	**Paper 1 (1 h 30 min)**	40 %
No calculators allowed		No calculators allowed	
Total of 110 marks		Total of 80 marks	
Section A : Compulsory short-response questions based on the syllabus Section B : Compulsory extended-response questions based on the syllabus		Section A : Compulsory short-response questions based on the syllabus Section B : Compulsory extended-response questions based on the syllabus	
Paper 2 (2 h)	30 %	**Paper 2 (1 h 30 min)**	40 %
Calculators required		Calculators required	
Total of 110 marks		Total of 80 marks	
Section A : Compulsory short-response questions based on the syllabus Section B : Compulsory extended-response questions based on the syllabus		Section A : Compulsory short-response questions based on the syllabus Section B : Compulsory extended-response questions based on the syllabus	
Paper 3 (1 h 15 min)	20 %		
Calculators required			
Total of 55 marks			
Two compulsory extended response problem-solving questions.			
Internal Assessment – Mathematics Exploration (20%)			
This component is internally assessed by the teacher and externally moderated by the IB at the end of the course. This is a piece of individual written work that involves investigating an area of mathematics of the student's choice. The assessment rubrics for HL & SL are the same except for Criteria E : Use of Mathematics.			

	Topics	SL (hr)	HL (hr)	Additional HL content (not exhaustive)
1	Algebra	19	39	Permutations & Combinations, Complex Numbers, Proof by Induction, Systems of Linear Equations
2	Functions	21	32	Polynomial functions, Rational Functions, Inverse functions
3	Geometry & Trigonometry	25	51	Vectors
4	Statistics & Probability	27	33	Bayes' Theorem, Continuous Random Variables
5	Calculus	28	55	Limits, Convergence and Divergence, l'Hopital's Rule, Maclaurin Series, Implicit Differentiation, First Order Differential Equations, Euler's Method, integrating factor etc.
6	Toolkit & Mathematical Exploration	30	30	
	Total Teaching Hours	150	240	

University Admission Requirements - It is recommended that students check the university admission requirements for their course of study at the institutions of their choice. The IB advises that you always check directly with the university concerned.

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