THE WORTHGATE SCHOOL
CANTERBURY

COURSE DESCRIPTOR

INTERNATIONAL BACCALAUREATE

MATHEMATICS: ANALYSIS AND APPROACHES (AA)

HIGHER LEVEL (HL)

SUBJECT OVERVIEW

Mathematics analysis and approaches is for students who enjoy developing their mathematics to become fluent in the construction of mathematical arguments and develop strong skills in mathematical thinking. They will also be fascinated by exploring real and abstract applications of these ideas, with and without technology. Students who take Mathematics: analysis and approaches will be those who enjoy the thrill of mathematical problem solving and generalization.
This course recognises 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, and proof by induction. The course allows the use of technology, as fluency in relevant mathematical software and hand-held technology is important, regardless of choice of course. The course also places a strong emphasis on the ability to construct, communicate and justify correct mathematical arguments by developing conceptual understanding of interrelated elements related to approximation, change, equivalence, generalisation, modelling, patterns, quantity, relationships, space, systems, and validity.

PRIOR LEARNING REQUIRED

It is expected that most students embarking on this course will have studied mathematics for at least 10 years. There will be a wide variety of topics studied, and differing approaches to teaching and learning. Thus, students will have a wide variety of skills and knowledge when they start this course. Most will have some background in arithmetic, algebra, geometry, trigonometry, probability, and statistics. Some will be familiar with an inquiry approach and may have had an opportunity to complete an

extended piece of work in mathematics. Areas of number and algebra; functions; geometry and trigonometry; probability and statistics; and calculus are assumed prior learning for the mathematics courses. It is recognised that this may contain certain aspects unfamiliar to some students, but it is anticipated that there may be other topics in the syllabus itself which these students have already encountered.

IELTS 5.5 or equivalent

EXAM BOARD

International Baccalaureate

COURSE CONTENT

Year 1	Year 2
Core topics Number Algebra Geometry Trigonometry Statistics	Further trigonometry Exponential functions Logarithms Real polynomials Further functions Counting Binomial theorem Reasoning and proof Complex numbers Proof by mathematical induction Vectors Calculus Kinematics Maclaurin series Discrete and continuous random variables

ASSESSMENT

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Formal internal assessments take place regularly once every half term and homework is set on a regular basis. Grades are determined by final examinations, which take place in May/June at the end of the 2-year course.

Paper	Length of paper	Weighting
Paper 1 No technology allowed *Section A* Compulsory short-response questions based on the syllabus *Section B* Compulsory extended-response questions based on the syllabus	120 minutes 110 marks	30%
Paper 2 Technology required *Section A* Compulsory short-response questions based on the syllabus *Section B*	120 minutes 110 marks	30%

Compulsory extended-response questions based on the syllabus.		
Paper 3 Technology required Two compulsory extended response problem-solving questions	60 minutes 55 marks	20%
Internal assessment This component is internally assessed by the teacher and externally moderated by the IB at the end of the course. Mathematical exploration Internal assessment in mathematics is an individual exploration. This is a piece of written work that involves investigating an area of mathematics	Levels 1-7 20 marks (completed in the second year of the course)	20%

TEXTBOOKS/REVISION GUIDES

Title	ISBN	Author
Haese mathematics Core topics HL 1 Analysis and Approaches	9781925489583	Michael Haese Mark Humphries Chris Sangwin

		Ngoc Vo
Haese mathematics Core topics HL2 Analysis and Approaches	9781782943204	Michael Haese Mark Humphries Chris Sangwin Ngoc Vo

Revision resources Maths AA HL
https://www.revisionvillage.com/ib-math/analysis-and-approaches-hl/
https://ibmathsresources.com/mathsdingbats/

HIGHER EDUCATION PATHWAYS

Mathematics may be a beneficial choice for students considering careers in, for example, finance, planning, healthcare systems or coding, tourism industries, the technology industry, social informatics, or urban planning. Mathematics helps students to understand the value of systematic approaches, how to analyse complex real-world contexts, how to communicate this concisely and precisely and understand the implications of conclusions.

COMPLEMENTARY SUBJECTS OF STUDY

Chemistry, Psychology, Economics, Physics, Business

CURRICULUM DIRECTOR

Mr Scott Graham