

IB Mathematics: Analysis and Approaches SL and HL

This course is designed for students with strong ability in mathematics, enjoying the analytical aspects of the subject. The HL course is suitable for students considering further studies in Mathematics or in related subject, such as Physics and Engineering and some economics courses at top universities. Students commencing the HL course should have achieved a standard of Mathematics equivalent to a grade 9 at GCSE and ideally an advanced Mathematics course, such as Additional Mathematics. Students commencing the SL course should have achieved a standard of Mathematics equivalent to a grade 7 at GCSE.

The IB Mathematics: Analysis and Approaches course aims to enable students to:

- Understand and be able to recall Mathematical facts, concepts and techniques
- Recall, select and use their knowledge of Mathematical skills to both abstract and real world contexts to solve problems
- Communicate and interpret their Mathematics accurately
- Use technology accurately and efficiently to explore new ideas and solve problems
- Construct Mathematical arguments using precise language
- Investigate unfamiliar situations, making conjectures, drawing conclusions and testing their validity

Content

The course covers the five key areas of Mathematics (note the topics in *italics* are the additional topics required to study at the HL):

- **Number & Algebra:** Sequences and series, Indices and logarithms, *Permutations and combinations, Partial fractions, Complex numbers, Proof by induction*
- **Functions:** Equations of straight lines, Curve sketching, Definition of function, Quadratic functions, Graph transformations, *Factor and remainder theorem, Modulus function*
- **Geometry & Trigonometry:** Coordinate geometry, Volume and surface areas of 3D shapes, Trigonometry, Bearings, Circles, *Reciprocal trigonometric ratios, Compound angle identities, Vectors*
- **Statistics & Probability:** Classification of data, Sampling, Presentation of data, Measures of central tendency and dispersion, Linear correlation, Introduction to probability, Venn diagrams, Discrete random variables, Normal distribution, Binomial distribution, *Conditional probability, Regression line x on y , Bayes' Theorem, Continuous random variables*
- **Calculus:** Introduction to limits, differentiation of polynomials and basic trigonometric functions, equations of tangents and normal, Definite integrals, Chain, product and quotient rules, Kinematics, Indefinite integration and integration by substitution methods, Numerical methods, *Understanding of limits, Differentiation from first principles, L'Hopital's Rule, Implicit differentiation, Related rates and optimisation, Derivatives of more complex functions, Integration by parts, Volumes of revolution, First order differential equations, Maclaurin expansions*

Assessment

The core topics are assessed through 3 for HL, 2 for SL written papers taken at the end of the course. These contribute 80% of the final mark. No technology will be allowed for one of these papers. For HL, paper 3 will focus on extended response problem solving questions..

The Internal assessment, which contributes the remaining 20% of the final mark is through a written Mathematical exploration investigating an area of mathematics.

NB – Students on this course are required to have a Casio CG50 calculator.





IB Mathematics: Applications and Interpretation SL

This course is designed for students with varied backgrounds and abilities. The course focuses on application and interpretation of statistics and would therefore be an appropriate course for students who are considering, for example, social science and biomedicine. To comfortably cope with this course students should have achieved a standard of Mathematics equivalent to at least a grade 7 at GCSE level, those with a lower grade than this will find the course challenging.

The IB Mathematics: Applications and interpretation course aims to enable students to:

- Understand and be able to recall Mathematical facts, concepts and techniques
- Recall, select and use their knowledge of Mathematical skills to both abstract and real world contexts to solve problems
- Communicate and interpret their Mathematics accurately
- Use technology accurately and efficiently to explore new ideas and solve problems
- Construct Mathematical arguments using precise language
- Investigate unfamiliar situations, making conjectures, drawing conclusions and testing their validity

Content

The course covers the five key areas of Mathematics:

- **Number & Algebra:** Sequences and Series, Indices and Logarithms, Approximations and solving systems of linear and polynomial equations
- **Functions:** Equations of straight lines, Curve Sketching, Modelling
- **Geometry & Trigonometry:** Coordinate geometry, Volume and surface areas of 3D shapes, Trigonometry, Bearings, Circles
- **Statistics & Probability:** Classification of data, sampling, Presentation of data, Measures of central tendency and dispersion, Linear correlation, Introduction to probability, Venn diagrams, Discrete random variables, Normal distribution, Binomial distribution, Spearman's rank correlation coefficient, Hypothesis testing, Chi Square test
- **Calculus:** Introduction to limits, differentiation of polynomials functions, equations of tangents and normal, Definite integrals, numerical methods

Assessment

The core topics are assessed through two written papers taken at the end of the course. These contribute 80% of the final mark. Both papers are 90 minutes and require graphical calculators.

The Internal assessment, which contributes the remaining 20% of the final mark is through a written Mathematical exploration investigating an area of mathematics.

NB – Students on this course are required to have a Casio CG50 calculator.



Two written papers



Internal assessment

