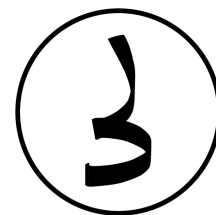


Group 5: IB Mathematics

BIRKERØD
GYMNASIUM



All IB students must take one of the two Mathematics subjects offered at either Higher Level or Standard Level.

The two subjects:

Mathematics: Analysis and Approaches (HL and SL)

This subject is aimed at students who will go on to study subjects with substantial mathematics content such as mathematics itself, engineering, physical sciences, or economics for example.

Analysis and Approaches is appropriate 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 the use of technology. Students who take Mathematics: Analysis and Approaches will be those who enjoy the thrill of mathematical problem solving and generalisation.

At HL everything at SL plus:

- Counting principles
- Complex numbers
- Proof by induction
- 3x3 systems of equations
- Polynomial functions
- Vectors
- Continuity and differentiability
- Limits and l'Hôpital's rule
- Implicit differentiation
- Differential Equations

The subject title reflects the emphasis on calculus and on algebraic, graphical and numerical approaches.

AT SL the course includes:

- Sequences and Series
- Exponents, Logarithms
- Binomial theorem, Proof
- Functions and Transformations of Graphs
- Trigonometry: Sine and Cosine rule, the unit circle, radians, circular functions and equations
- Data, statistical measures, correlation, probability, random variables, binomial and normal distributions
- Calculus: Derivatives, integrals and kinematics

Mathematics: Applications and Interpretation (HL and SL)

This subject is aimed at students who will go on to study subjects such as social sciences, natural sciences, statistics, business, some economics, psychology, and design, for example.

Applications and Interpretation is appropriate for students who are interested in developing their mathematics for describing our world and solving practical problems. They will also be interested in harnessing the power of technology alongside exploring mathematical models. Students who take Mathematics: Applications and Interpretation will be those who enjoy mathematics best when seen in a practical context.

At HL everything at SL plus:

- Matrices, eigenvalues/vectors
- Complex numbers
- Vectors, graph theory
- Non-linear regression
- Confidence intervals, t-distribution
- Markov Chains
- Kinematics
- Differential equations, Euler's method
- Phase portraits
- Solutions of second order differential equations by Euler's method

The subject title emphasises the applied nature of the subject, and also that interpretation of results in context is an important element of the subject.

At SL the course includes:

- Sequences and Series
- Exponents and Logarithms (base 10 and e)
- Functions and Modelling with functions
- Trigonometry and Voronoi diagrams
- Data, statistical measures, correlation, probability, random variables, binomial and normal distributions, and hypothesis testing
- Calculus: Derivatives, integrals and optimisation

Students will have to choose which of the two subjects they will take before starting their first IB year, but both courses will follow a Core period until Christmas and so students should be able to change subject, as long as there is room in the other classes.

Students are required to choose between HL and SL. It is expected that students who choose HL will have a solid mathematical background and good grades in Mathematics examinations. This will be tested by an entrance test upon arrival at Birkerød Gymnasium for all new students, regardless of choice of level.

Graphic Display Calculators (GDC's)



In all Maths classes, a graphic display calculator (GDC) is required from the start of the programme to the final exam. We base our teaching on

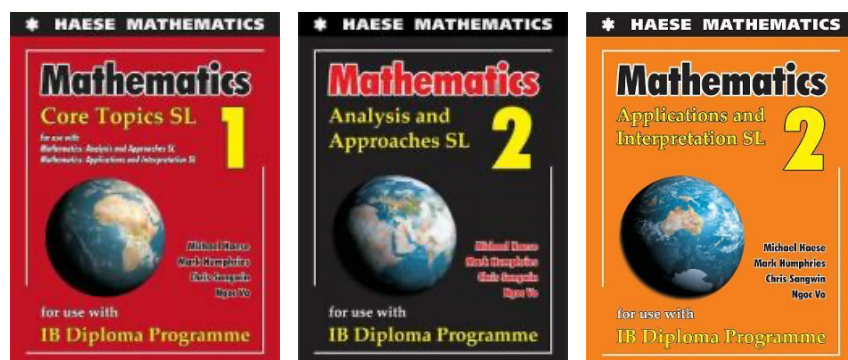
Texas Instruments model TI-84 (Plus CE)

Calculators with computer algebra systems (CAS), e.g. TI-89, Casio ClassPad, or any Hewlett Packard GDC, are not allowed in the exams.

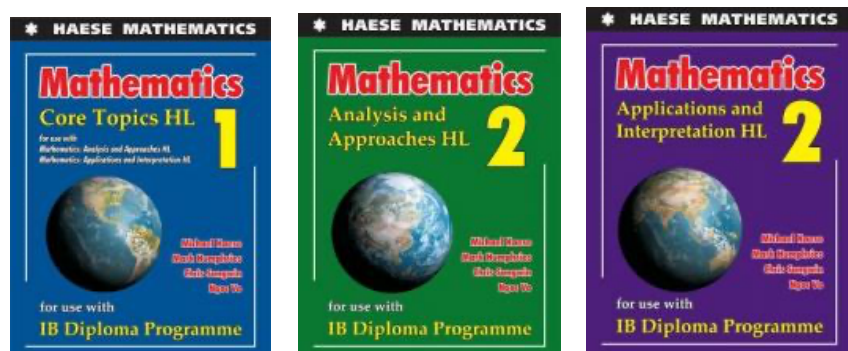
We ask that all students purchase the TI-84 ready for start of school in August.

Textbooks in use:

In Standard Level:



In Higher Level:



Assessment

At all four courses, the final IB mark is based on 20% internal assessment and 80% exams.

20% internal assessment Internally assessed work done during the two-year programme

Each student writes a ‘mathematical exploration’. This is a short report written by the student based on a topic chosen by him or her. The exploration is intended to provide students with opportunities to increase their understanding of mathematical concepts and processes, and to develop a wider appreciation of mathematics.

80% exams The final exams consist of two or three written examinations

Mathematics: Analysis and Approaches (HL)

- Paper 1: A 2-hour non-calculator exam
- Paper 2: A 2-hour exam with Graphic Display Calculator (GDC)
- Paper 3: A 1-hour exam with two compulsory extended-response questions with GDC

Mathematics: Analysis and Approaches (SL)

- Paper 1: A 1½-hour non-calculator exam
- Paper 2: A 1½-hour exam with GDC

Mathematics: Applications and Interpretation (HL)

- Paper 1: A 2-hour exam with GDC: short questions
- Paper 2: A 2-hour exam with GDC: extended response questions
- Paper 3: A 1-hour exam with two compulsory extended-response questions with GDC

Mathematics: Applications and Interpretation (SL)

- Paper 1: A 1½-hour exam with GDC: short questions
- Paper 2: A 1½-hour exam with GDC: extended response questions