DP Mathematics HL

No matter what you end up doing in life, you'll do it better if you're good at math.

What is math?

Mathematics is required by both artists when considering perspective and scientists when performing research. Math is a lot more than just dealing with the numbers - it's also a *language* in which the universe speaks to us. It allows us to speak and communicate the ideas that are difficult or impossible otherwise. The elegance and power of mathematics is that it never lies to you.

What is math HL?

The higher level mathematics offers an excellent level of knowledge and skills for further studies in, for example, physics, mathematics and technology. The students taking higher level mathematics will also be luck enough to study optional calculus at more advanced level.

The IB DP higher level mathematics course focuses on developing important mathematical concepts in a comprehensible, coherent and rigorous way, achieved by a carefully balanced approach. Students are encouraged to apply their mathematical knowledge to solve problems set in a variety of meaningful contexts. Development of each topic should feature justification and proof of results. Students should expect to develop insight into mathematical form and structure, and should be intellectually equipped to appreciate the links between concepts in different topic areas. They are also encouraged to develop the skills needed to continue their mathematical growth in other learning environments.

The internally assessed exploration allows students to develop independence in mathematical learning. Students are encouraged to take a considered approach to various mathematical activities and to explore different mathematical ideas. The exploration also allows students to work without the time constraints of a written examination and to develop the skills they need for communicating mathematical ideas.

- IBO Mathematics HL guide

Who it is for?

"Math HL is the most beautiful things that happened to me during my diploma program"
"The course is quite challenging and because of this very reason I like this course :)"
Math HL students

The Mathematics HL course caters for students with a very strong background and interest in Mathematics. They are expected to have attained a high degree of competence in a range of mathematical and technical skills. The course is designed mainly for the students who expect to study Mathematics at university, either as a subject in its own right or as a major component of a related subject.

Mathematics HL is quite demanding and the students embarking on this course are expected to spend a considerable amount of time and energy. A key skill is to develop logical, critical and creative thinking, and patience and persistence in problem-solving. They should be intellectually equipped to appreciate the connections between different mathematical ideas and concepts.

How is it taught at ISH?

Given the nature and breadth of the course, different methods are practiced at ISH to make the course more effective and enjoyable. This includes, but not limited to:

1. Video analysis tools: (to extract mathematics out of real life)
2. GDC: (Ti-Nspire are extensively used to visualise rather abstract concepts(
3. Investigation based teaching: (Students are challenged through various tasks and activities to develop the mathematical concepts by their own)
4. 21st Century tools: (Various advanced tools are introduced throughout the course to make the students confident working in this modern era. This includes, typesetting in \LaTex, using advanced computational tools like Wolfram|Mathematica, introduction to programming etc.)

The End

DP Mathematics HL (tentative Course Plan)

Main Resource: Paul Fannon - Cambridge Mathematics Higher Level, for IB Diploma. (CUP)

Secondary Resource: Kognity Math HL (onine)

GDC: TI Nspire cx

Semester 1:

- Topic1: Exponents and logarithms, Polynomials Algebraic Structures (Chapters 2,3, and 4)
- Topic 2: The theory of Functions, graphing techniques, quadratic functions and equations. Transformations (Chapters 5 and 6)
- Topic 1: (continued): Sequence and series, Binomial expansion (Chapter 7 and 8)
- Topic 3: Circular measure and trigonometric functions. Trigonometric equation and identities. (Chapters 9 and 10)

Semester 2:

- Topic 3: (continued): Geometry of triangles and circles. Further trigonometry. (Chapter 11 ,12)
- Topic 4: Vectors. Line and shapes in space. (Chapter 13 and 14)
- Topic 1: (continued): Complex numbers. (Chapter 15)
- Topic 6: Basic differentiation and its application. (Chapters 16)
- Topic 6: Basic Integration and its application. (Chapter 17)
- Topic 6: Further differentiation methods. (Chapter 18)
- Topic 6: Further integration methods. (Chapter 19)
- Topic 6: Further application of calculus. (Chapter 20)
- IA starts

Semester 3:

- Topic 1: (Continued): Counting principle. (Chapter 1)
- Topic 5: Summarising data (Chapter 21)
- Topic 5: Probability (Chapter 22)
- Topic 5: Discrete probability distribution. Continuous Distribution. (Chapter 23 and 24)
- IA (Draft)

Semester 4:

- Topic 1: (continued): Mathematical Induction. (Chapter 25)
- Option: Calculus.
- Revision
- IA (Final)