

What is HL1?

- Juniors preparing for HL2 their senior year.
- HL1 Math has the same core topics as SL1 Math but with further content in each topic. In addition, HL covers each topic in a deeper and more abstract manner. HL only content are in bold and underlined.

1. ALGEBRA (Sequence/Series, Exponents/Logarithms, Binomial Theorem, **Mathematical Induction, Complex Numbers, Polar Form, de Moivre's Theorem**)

2. FUNCTIONS (Compositions, Domain/Range, Inverses, Quadratics, Transformations, **Rational Functions, Polynomial Functions, One-to-One and Many-to-One Functions**)

3. TRIGONOMETRY (Arc Length/Sector Area, Sine/Cosine/Tangent, Basic Identities like $\cos^2 \theta + \sin^2 \theta = 1$, Periodic Functions, Sine/Cosine Rules and Applications, Secant/Cosecant/Cotangent, Additional Identities, Graphing Inverse Trig Functions like $y = \text{Arcsin}(x)$)

4. VECTORS (Components/Direction, Magnitude, Angle Between Vectors, Dot Product, Perpendicular Vectors, Vector Equations in relation to time, Intersections, Cross Product, Normal Vectors, 3D analysis of vectors and planes)

5. STATS & PROBABILITY (Frequency Tables, Box-and-Whisker Plots, Percentiles, Cumulative Frequencies, Venn/Tree Diagrams, Independent Events, Mutually Exclusive Events, Conditional Probability, Binomial Distribution, Combinations/Permutations, Bayes Theorem, Poisson Distribution)

- Both the second years of SL and HL are focused on Calculus, however HL also covers Calculus 2 content
- SL2 has an IA and two exams
- HL2 has an IA and three exams
- SL Math provides a solid mathematical foundation for future fields and study. IB states the following in reference to the typical SL student:

... “The majority of these students will expect to need a sound mathematical background as they prepare for future studies in subjects such as **chemistry, economics, psychology** and **business administration.**”

HL Math is intended for fields and study where mathematical abstract reasoning is essential and commonplace. HL moves at a much faster pace than SL. Consequently algebraic reasoning skills must be reflexive and new content must be understood quickly with little practice required. Summer study between HL1 and HL2 will be required. Due to the time and energy requirements, students should certainly enjoy mathematical reasoning and problem solving. From IB:

“... The majority of these students will be expecting to **include mathematics** as a **major component** of their university studies, either as a subject in its own right or within courses such as **physics, engineering** and **technology**. Others may take this subject because they have a **strong interest** in mathematics and enjoy meeting its challenges and engaging with its problems.”