IB Maths AI HL: syllabus checklist

77 points in plain English, grouped by the five syllabus topics.

Tick a box only when you can do that point without notes. Every point has free notes and practice questions at **ibmathrevision.com/syllabus/ib-maths-ai-hl**, where your ticks are also saved.

Topic 1 Number and algebra

- [ ] Simple interest and compound interest SL
- [ ] Geometric sequences and series SL
- [ ] Financial mathematics (loans, annuities, depreciation) SL
- [ ] Scientific notation, approximations and bounds SL
- [ ] Percentage error and estimation SL
- [ ] Solving systems of linear equations (up to 3×3) SL
- [ ] Exponentials and logarithms (base 10 and base e) SL
- [ ] Number patterns and predictions SL
- [ ] Infinite geometric series HL only
- [ ] Logarithms — natural and change of base HL only
- [ ] Complex numbers: Cartesian, polar, Argand diagrams HL only
- [ ] Matrices: operations, determinant, inverse HL only
- [ ] Eigenvalues and eigenvectors (2×2) HL only
- [ ] Markov chains and transition matrices HL only

Topic 2 Functions

- [ ] Function fundamentals (domain, range, notation) SL
- [ ] Graphing linear and quadratic functions SL
- [ ] Graphing exponential and logarithmic functions SL
- [ ] Piecewise, cubic and other polynomial models SL
- [ ] Trigonometric (sinusoidal) modelling SL
- [ ] Real-world applications of functions SL
- [ ] Solving equations graphically SL
- [ ] Composite and inverse functions HL only
- [ ] Transformations of graphs HL only
- [ ] Advanced modelling (logistic, piecewise) HL only
- [ ] Scaling and linearising data (log-log, semi-log) HL only
- [ ] Non-linear regression models HL only

Topic 3 Geometry and trigonometry

- [ ] Coordinate geometry: distance, midpoint SL
- [ ] Equations of straight lines SL
- [ ] Voronoi diagrams and toxic-waste problems SL
- [ ] Right-angled trigonometry (SOHCAHTOA) SL
- [ ] Non-right triangles: sine rule + cosine rule SL
- [ ] 3D geometry: surface area and volume of solids SL
- [ ] Angles of elevation and depression SL
- [ ] Vectors and vector notation (2D + 3D) HL only
- [ ] Scalar product HL only
- [ ] Vector equations of lines HL only
- [ ] Kinematics with vectors HL only
- [ ] Voronoi diagrams (extended) HL only
- [ ] Graph theory: adjacency matrices, walks HL only
- [ ] Minimum spanning trees (Kruskal + Prim) HL only
- [ ] Chinese postman & travelling salesman HL only

Topic 4 Statistics and probability

- [ ] Sampling techniques and bias SL
- [ ] Descriptive statistics (mean, median, mode, spread) SL
- [ ] Cumulative frequency, quartiles, IQR SL
- [ ] Bivariate data: scatter, correlation r SL
- [ ] Linear regression and predictions SL

- [ ] Probability rules and Venn diagrams SL
- [ ] Independent and conditional probability SL
- [ ] Discrete and normal distributions SL
- [ ] χ^2 tests for independence and goodness of fit SL
- [ ] Data collection and non-linear regression HL only
- [ ] Poisson distribution HL only
- [ ] Linear combinations of random variables HL only
- [ ] Sampling distribution of the mean + CLT HL only
- [ ] Confidence intervals for a mean HL only
- [ ] Hypothesis testing (z-tests, t-tests) HL only
- [ ] χ^2 tests for independence + goodness of fit HL only
- [ ] Type I and Type II errors HL only
- [ ] Markov chains (steady state) HL only

Topic 5 Calculus

- [ ] Introduction to limits and rates of change SL
- [ ] Differentiation from first principles (informal) SL
- [ ] Power rule (positive integer powers) SL
- [ ] Tangents and normals SL
- [ ] Local max/min and optimisation SL
- [ ] Integration as reverse of differentiation SL
- [ ] Definite integrals and area under curves SL
- [ ] Trapezoidal rule for approximations SL
- [ ] Advanced differentiation and chain rule HL only
- [ ] Related rates HL only
- [ ] Second derivative, concavity, points of inflection HL only
- [ ] Optimisation with constraints HL only
- [ ] Advanced integration (substitution) HL only
- [ ] Kinematics and area under curves HL only
- [ ] Volumes of revolution HL only
- [ ] Differential equations & Euler's method HL only
- [ ] Coupled DEs, phase portraits HL only
- [ ] Maclaurin series (first few terms) HL only

This checklist is written in our own words by IB Math Revision. It is not the official subject guide: always check the International Baccalaureate (IB)'s own document.