

**New IB Math courses coming for the IB Class of 2021**

Please see the program documentation for a discussion of the math curriculum changes effective September 2019 for the IB Class of 2021.

The following chart summarizes the new courses and provides guidance in course selection:

<b>New math course starting in September 2019 for IB Class of 2021</b>	<b>Course description from IB</b>	<b>Approximate current equivalent</b>	<b>Recommended prior math background</b>
Mathematics: Applications and interpretation	This course is designed for students who enjoy describing the real world and solving practical problems using mathematics, those who are interested in harnessing the power of technology alongside exploring mathematical models and enjoy the more practical side of mathematics.	<p>STANDARD LEVEL (SL):</p> <p>This class is most similar to the current Mathematical Studies SL course.</p> <p>HIGHER LEVEL (HL):</p> <p>This course will include new content, including statistics. It is intended to meet the needs of students whose interest in mathematics is more practical than theoretical but seek more challenging content.</p>	<p>STANDARD LEVEL (SL):</p> <p>Strong Algebra 1 skills</p> <p>HIGHER LEVEL (HL):</p> <p>Strong Algebra 2 skills</p>
Mathematics: Analysis and approaches	This course is intended for students who wish to pursue studies in mathematics at university or subjects that have a large mathematical content; it is for students who enjoy developing mathematical arguments, problem solving and exploring real and abstract applications, with and without technology.	<p>STANDARD LEVEL (SL):</p> <p>This class is most similar to the current Mathematics SL course.</p> <p>HIGHER LEVEL (HL):</p> <p>This class is most similar to the current Mathematics HL course.</p>	<p>STANDARD LEVEL (SL):</p> <p>Strong Algebra 2H skills</p> <p>HIGHER LEVEL (HL):</p> <p>Very strong Algebra 2H skills</p>

The following pages summarize the projected content of the new courses, extracted from *DP Mathematics Curriculum Review*, April 2017.

## The Content

The content is still under development and items below may be subject to change when the guides are published:

### Mathematics: Analysis and approaches

The **number and algebra SL** looks at: scientific notation, arithmetic and geometric sequences and series and their applications including financial applications, laws of logarithms and exponentials, solving exponential equations, simple proof, approximations and errors, and the binomial theorem. The **number and algebra HL** looks at: permutations and combinations, partial fractions, complex numbers, proof by induction, contradiction and counter-example, and solution of systems of linear equations.

The **functions SL** looks at: equations of straight lines, concepts and properties of functions and their graphs, including composite, inverse, the identity, rational, exponential, logarithmic and quadratic functions. Solving equations both analytically and graphically, and transformation of graphs. The **functions HL** looks at: the factor and remainder theorems, sums and products of roots of polynomials, rational functions, odd and even functions, self-inverse functions, solving function inequalities and the modulus function.

The **geometry and trigonometry SL** looks at: volume and surface area of 3d solids, right-angled and non-right-angled trigonometry including bearings and angles of elevation and depression, radian measure, the unit circle and Pythagorean identity, double angle identities for sine and cosine, composite trigonometric functions, solving trigonometric equations. The **geometry and trigonometry HL** looks at: reciprocal trigonometric ratios, inverse trigonometric functions, compound angle identities, double angle identity for tangent, symmetry properties of trigonometric graphs, vector theory, applications with lines and planes, and vector algebra.

The **statistics and probability SL** looks at: collecting data and using sampling techniques, presenting data in graphical form, measures of central tendency and spread, correlation, regression, calculating probabilities, probability diagrams, the normal distribution with standardization of variables, and the binomial distribution. The **statistics and probability HL** looks at: Bayes theorem, probability distributions, probability density functions, expectation algebra.

The **calculus SL** looks at: informal ideas of limits and convergence, differentiation including analysing graphical behaviour of functions, finding equations of normals and tangents, optimisation, kinematics involving displacement, velocity, acceleration and total distance travelled, the chain, product and quotient rules, definite and indefinite integration. The **calculus HL** looks at: introduction to continuity and differentiability, convergence and divergence, differentiation from first principles, limits and L'Hopital's rule, implicit differentiation, derivatives of inverse and reciprocal trigonometric functions, integration by substitution and parts, volumes of revolution, solution of first order differential equations using Euler's method, by separating variables and using the integrating factor, Maclaurin series.

### Mathematics: Applications and interpretation

The **number and algebra SL** looks at: scientific notation, arithmetic and geometric sequences and series and their applications in finance including loan repayments, simple treatment of logarithms and exponentials, simple proof, approximations and errors. The **number and algebra HL** looks at: laws of logarithms, complex numbers and their practical applications, matrices and their applications for solving systems of equations, for geometric transformations, and their applications to probability.

The **functions SL** looks at: creating, fitting and using models with linear, exponential, natural logarithm, cubic and simple trigonometric functions. The **functions HL** looks at: use of log-log graphs, graph transformations, creating, fitting and using models with further trigonometric, logarithmic, rational, logistic and piecewise functions.

The **geometry and trigonometry SL** looks at: volume and surface area of 3d solids, right-angled and non-right-angled trigonometry including bearings, surface area and volume of composite 3d solids, establishing optimum positions and paths using Voronoi diagrams. The **geometry and trigonometry HL** looks at: vector concepts and their applications in kinematics, applications of adjacency matrices, and tree and cycle algorithms.

The **statistics and probability SL** looks at: collecting data and using sampling techniques, presenting data in graphical form, measures of central tendency and spread, correlation using Pearson's product-moment and Spearman's rank correlation coefficients, regression, calculating probabilities, probability diagrams, the normal distribution, Chi-squared test for independence and goodness of fit. The **statistics and probability HL** looks at: the

binomial and Poisson distributions, designing data collection methods, tests for reliability and validity, hypothesis testing and confidence intervals.

The **calculus SL** looks at: differentiation including analysing graphical behavior of functions and optimisation, using simple integration and the trapezium/trapezoidal rule to calculate areas of irregular shapes. The **calculus HL** looks at: kinematics and practical problems involving rates of change, volumes of revolution, setting up and solving models involving differential equations using numerical and analytic methods, slope fields, coupled and second-order differential equations in context.

**All the above should be considered as a work in progress and may or may not reflect the material which will finally appear in the guides.**