2023-24 Precalculus (juniors)

Textbook: *IB Mathematics Applications and Interpretations Standard Level*, Wathall et al. (Oxford)
(paperback, online supplement)

Dates	Unit	Topics	Project	Days
9/8 - 9/23	1. Measurement and accuracy	Precision, rounding, significant figures; right angle trigonometry	Graspable, Google slides authoring	12
9/28 - 10/7	2. Non-right angle trigonometry, 3D geometry	Sine, cosine rules, triangle area, volume, surface	Geogebra 3D graphing	7
10/11 - 10/21	3. Prior knowledge review and assessment	Algebra, fractions, rounding, absolute value, scientific notation, exponents, radicals, metric system, systems, probability, statistics, sets, Venn diagrams	Casio calculator use	9
10/24 - 11/4	4. Descriptive statistics	Frequency tables, central tendency, dispersion, box plots, histograms	Spreadsheets, jupyter notebooks	10
11/7 - 11/18	5. Coordinate geometry	Graphing linear equations, distance and midpoints, parallel and perpendicular slopes	Taxi fares	8
11/21 - 12/2	6. Linear functions	Linear functions, arithmetic sequences	Amphitheater design	8
12/5 - 12/16	7. Correlation and regression	Bivariate data, line of best fit	Desmos regression	10
1/17 - 2/3	8. Probability	Uncertainty, binomial and normal distributions	Simulations	9
2/6 - 2/17	9. Modeling with polynomial functions	Quadratics, cubics, inverse variation; graphs	Area vs perimeter model	10
2/27 - 3/10	10. Exponential models	Geometric sequences, compound interest, logarithms	Compound interest spreadsheet	10
3/13 - 3/24	11. Trigonometric models	Period functions, unit circle	Cyclic functions in nature	10
3/27 - 4/5	12. Differential calculus	Derivatives, tangent lines, optimization	Desmos tangent graphing	8
4/17 - 4/28	13. Integral calculus	Area under a curve, fundamental theorem of calculus	Casio integration functions	9

2022-23 SAT Math (dates may vary)

Textbook: Oxford *IB Mathematics Standard Level*, Wathall et al.
(paperback, online supplement)

Dates	Unit	Topics	Project	Days
9/8 - 9/23	1. Heart of Algebra	Solving equations and inequalities, graphing linear functions, arithmetic sequences	Graspable	12
9/28 - 10/7	2. Problem Solving	Ratio and proportion, percentage, units, word problems	Geogebra 3D graphing	7
10/24 - 11/4	3. Data analysis	Frequency tables, central tendency, dispersion, box plots, histograms	Spreadsheets, jupyter notebooks	10
11/7 - 11/18	4. Linear and exponential models	Compound growth, exponential functions, logarithms	Taxi fares	8
11/21 - 12/2	5. Introduction to probability and statistics	Experimental probability, binomial and normal distributions, simulations	Amphitheater design project	8
12/5 - 12/16	6. Descriptive statistics	Measures of central tendency, dispersion, graphs, correlation and regression	Desmos regression	10
1/3 -1/13	7. Bivariate data	Correlation, regression	Desmos tools	9
1/17-2/3	8.Probability	Uncertainty, binomial and normal distributions	Simulations	9
2/6-2/17	9. Applications	Apartment and housing search project	-	10
2/27-3/10	10. Applications	Employment and career	Salary data analysis	10
3/27-4/5	11. Differential calculus	Derivatives,tangent lines,	Desmos tangent graphing	8
4/17-4/28	12. Integral calculus	Area under a curve,fundamental theorem of calculus	Casio integration functions	9

Prior year archives
2021-22 IB Math: Applications and Interpretation

one year course - Class of 2023 (juniors)

Textbook: Oxford *IB Mathematics Standard Level*, Wathall et al.

(paperback, online supplement)

Calculator: Casio fx-9750GII

Dates	Chapter	Topics	Project	Days
9/13 - 11/5	1. Linear functions	Functions, linear equations, slope, graphing, arithmetic sequences	Taxi fares, Amphitheater design projects	30
10/18	Prior knowledge quiz	Algebra, fractions, rounding, absolute value, scientific notation, exponents, radicals, metric system, systems, probability, statistics, sets, Venn diagrams	Casio calculator use	1
11/8 - 11/23	2. Descriptive statistics	Frequency tables, central tendency, dispersion, box plots, histograms	Spreadsheet use	12
11/29 - 12/23	IA Project	Spreadsheets, G-docs, Desmos	-	18
1/3 - 1/21	3. Functions	Linear functions	Graspable math	14
1/24 - 2/11	4. Cubics and reciprocals	Quadratics, cubics, inverse function; graphs	Area vs perimeter model	10
2/14 - 3/9	5. Exponentials	Geometric sequences, compound interest, logarithms	Compound interest spreadsheet	10
3/14 - 4/14	6. Geometry	Linear equations, graphing; Sine, cosine rules, triangle area	Geogebra 3D graphing	13
5/6 - 5/9	Exams: Paper 1 and Paper 2	-	-	5
4/25 - 6/3 (exams)	7. Data analysis projects	Trip budget, apartments, demographics, taxes	Spreadsheets, slide decks	18

2020-21 IB Math: Applications and Interpretation
one year course - Class of 2022 (juniors)

Textbook: Oxford *IB Mathematics Standard Level*, Wathall et al.
(paperback, online supplement)

Calculator: Casio fx-9750GII

Dates	Chapter	Topics	Project	Days
10/1 - 10/9	1. Precision, trig review	Sig Figs, right angle trig. Algebra review: factoring, exponents, graphing	Desmos plotting	7
10/13 - 10/30	2. Trig rules, 3D geometry	Sine, cosine rules, triangle area; volume, surface area	Geogebra 3D graphing	14
11/2 - 11/13	3. Descriptive statistics	Frequency, central tendency, dispersion	Subway comparison	8
11/16 - 11/25	4. Coordinate geometry	Gradient, distance and midpoint formulas, Voronoi	Ballistics application	8
11/30 - 12/4	5. Linear functions	Functions, arithmetic sequences	Modeling	5
12/7 - 12/18	6. Bivariate analysis	Scatter plots, correlation, regression	IA Project	10
1/4 - 1/22	7. Probability, distributions	Diagrams and tables, binomial and normal distributions (Venn diagrams, trees)	Simulation (binomial?), Monte Hall	14
1/25 - 2/5	8. Statistical tests	Spearman's rank correlation, chi-squared and t tests	(plus 1 week: IA and review)	10
2/22 - 3/5	9. Polynomial functions	Quadratics, cubics, inverse function; graphs	Graphical function analysis	10
3/8 - 3/19	10. Exponential, log functions	Geometric sequences, compound interest, logarithms	Graphical solutions	10
3/22 - 4/1	11. Periodic functions	Modeling, unit circle, graphing	(Easter break)	8
4/7 - 4/16	12. Differential calculus	Limits, tangent and normals, max and min	Optimization	6
4/19 - 4/30	13. Integral calculus	Fundamental theorem of calculus		10

Class of 2020 - IB Math - 1st year 2018-19

Dates	Unit	Topics	Project	Days	IB Rec.
9/5 - 9/21	1. Algebra review (Chapter 1, 2, 4)	Notation, domain, range, factoring, exponents; graphing	Desmos plotting	8	
9/24 - 10/19	2. Functions (Chapter 1)	Inverse, composition, transformations	Inverse graphing	12	10
10/22 - 11/2	3. Quadratics (Chapter 2)	Completing square, graphs, roots, quadratic formula, discriminant	Ballistics application	8	5
11/5 - 11/21	3b. Rational functions (Chapt 5)	Solving, graphs, asymptotes	Reciprocal function graphing, asymptotes	9	
11/26 - 12/7	4. Exponents and logs (Chapter 4)	Solving, graphing, applications, logarithms	Desmos graph manual fit	7	10
12/10 - 12/18	4b. Exponential functions	Solving, graphing, applications		6	10
1/2 - 1/18	5. Polynomials (Chapter 6)	Zeros, symmetry, end behavior, graphing, imaginary numbers	Algebra 2 Mock Regents	10	
1/29 - 3/14	6. Probability (Chapter 3)	Definitions, counting, conditionals, frequency, Venn diagrams, trees	Simulation (binomial?), table, trees	9	10
3/18 - 3/28	7. Sequences (Chapter 6)	Arithmetic, geometric, recursive	Infinite geometric series	8	5
4/1 - 4/18	8. Descriptive statistics (Chapter 8)	Frequency, central tendency, dispersion	Subway comparison	8	5 (+10)
4/29 - 5/9	9. Bivariate analysis (Chapter 10)	Scatter plots, correlation, regression		8	8
5/13 - 5/23	10. Trig	periodic functions (Chapter 11, 13)	Trig ratios, unit circle, graphing	7	8 (+8)

(104) total instructional days (including projects and assessments)

Class of 2020 - IB Math - 2nd year 2019-20

Dates	Unit	Topics	Project	Days	IB Rec.
9/5 - 9/21	1. Functions review (Chapter 1)	Graphical features, in/decreasing, extrema (gradient), continuity; applications; sequences		10	
9/24 - 10/5	2. Derivatives (Chapter 7)	Limits, tangents/normals, differentiating polynomials		10	10
10/9 - 10/19	3. Vectors (Chapter 12)	Introduction, arithmetic, line equations, intersection, applications		9	8
10/22 - 11/2	4. Calculus (Chapter 7)	Graphical interpretations, kinematics, applications		10	10
11/5 - 11/21	5. Trig & periodic functions (Chapter 11, 13)	Sine, cosine rules, transformations, applications, identities, derivatives		11	8
11/26 - 12/7	6. Probability distributions (Chapter 15)	Binomial expansion, expected value, normal distribution		10	
12/10 - 12/18	7. Bivariate analysis (Chapter 10)	Review cumulative frequency; scatter plots, regression		7	
1/2 - 1/18	8. Integration (Chapter 9)	Antiderivatives, areas, motion applications		13	15
1/29 - 2/15	9. Calculus (Chapter 7)	Product/quotient/chain rules, kinematics, graphical interpretation, applications		13	5
2/25 - 3/8	10. Vectors (Chapter 12)	Dot product, angles, applications		10	8
3/11 - 3/22	11. Integration (Chapter 9)	Definite integrals, areas, volumes, kinematics		10	
3/25 - 4/5	12. Functions review (Chapter 1-4)	Exponentials, logarithms, rational expressions, sequences & series		10	
4/8 - 4/18	13. Probability & statistics review (Chapter 11, 13)	Independence, conditional, frequency, cumulative, & normal distributions		9	
4/29 - 5/3	14. Review			5	

137 instructional days (30 more than projected actual)

IB Guide for Math SL

Topic	Skills	Hours
Algebra	Sequences, exponent & log rules, binomial expansion	9
Functions and equations	Inverse, composition, graphing (max, min), transformations; quadratic, exponential, rational; applications	24
Circular functions and trigonometry	Radians, standard angles, identities, graphing; sine, cosine, area rules	16
Vectors	Operations, scalar product, angle calculation, line equations, intersections	16
Statistics and probability	Concepts, frequencies, cumulative, box plots, summary statistics, regression; probability, independence, conditional, sets, Venn diagrams, binomial & normal distributions	35
Calculus	Limits, derivative, tangents, product, quotient, chain rules, extrema, inflection, graphs, applications; integrals, areas, volumes, kinematics	40
Exploration		10
Total		150

Considerations and strategy

- Weak prior knowledge: reteach early followed by periodic mixed practice

- Shallow understanding, procedural: connect multiple representations, formal notation with explicit rationale

- Little writing or technology experience: projects, Desmos & MS Office instruction