

AP CALCULUS BC COURSE SYLLABUS

Textbook: Calculus for AP, 2nd Edition by R. Larson & P. Battaglia

Marking Period 1

Unit 1: Limits and Continuity (Test 1.2 - 1.6)

Section	Title	2023 NJSLS for Mathematics
1.2	Finding Limits Graphically and Numerically	A-APR.D.7, F-IF.B.6
1.3	Evaluating Limits Analytically	A-APR.D.7, F-IF.B.6
1.4	Continuity & One-Sided Limits	A-APR.D.7, F-IF.B.6
1.5	Infinite Limits	A-APR.D.7, F-IF.B.6
1.6	Limits at Infinity	A-APR.D.7, F-IF.B.6

Unit 2: Differentiation (Test 2.1 - 2.7 & 7.7)

Section	Title	2023 NJSLS for Mathematics
2.1	The Derivative & Tangent Line Problem	A-APR.D.7, F-IF.B.6, F-LE.B.5
2.2	Basic Differentiation Rules & Rates of Change	A-APR.D.7, F-IF.B.6, F-LE.B.5
2.3	Product & Quotient Rules and Higher Order Derivatives	A-APR.D.7, F-IF.B.6, F-LE.B.5
2.4	Chain Rule	A-APR.D.7, F-IF.B.6, F-LE.B.5
2.5	Implicit Differentiation	A-APR.D.7, F-IF.B.6, F-LE.B.5
2.6	Derivatives of Inverse Functions	A-APR.D.7, F-IF.B.6, F-LE.B.5
2.7	Related Rates	A-APR.D.7, F-IF.B.6, F-LE.B.5
7.7	Indeterminate Forms & L'Hopital's Rule	A-APR.D.7, F-IF.B.6, F-LE.B.5

Unit 3: Applications of Derivatives (Test 3.1 - 3.7)

Section	Title	2023 NJSLS for Mathematics
3.1	Extrema on an Interval	F-IF.C.7.C, F-IF.B.6, F-IF.B.4, F-LE.B.5, G-MG.A.3
3.2	Rolle's & Mean Value Theorem	F-IF.C.7.C, F-IF.B.6, F-IF.B.4, F-LE.B.5, G-MG.A.3
3.3	Increasing & Decreasing Functions and the 1st Derivative Test	F-IF.C.7.C, F-IF.B.6, F-IF.B.4, F-LE.B.5, G-MG.A.3
3.4	Concavity & the 2nd Derivative Test	F-IF.C.7.C, F-IF.B.6, F-IF.B.4, F-LE.B.5, G-MG.A.3
3.5	Summary of Curve Sketching	F-IF.C.7.C, F-IF.B.6, F-IF.B.4, F-LE.B.5, G-MG.A.3
3.6	Optimization	F-IF.C.7.C, F-IF.B.6, F-IF.B.4, F-LE.B.5, G-MG.A.3
3.7	Linear Approximation & Differentials	F-IF.C.7.C, F-IF.B.6, F-IF.B.4, F-LE.B.5, G-MG.A.3

Marking Period 2**Unit 4: Integration (Test 4.1 - 4.3, Test 4.6-4.8, 7.2-7.5)**

Section	Title	2023 NJSLS for Mathematics
4.1	Antiderivatives & Indefinite Integration	F-BF.A.2, F-IF.B.6, F-LE.B.5
4.2	Area Under a Curve	F-BF.A.2, F-IF.B.6, F-LE.B.5
4.3	Riemann Sums & Definite Integrals	F-BF.A.2, F-IF.B.6, F-LE.B.5
4.6	Integration by Substitution	F-BF.A.2, F-IF.B.6, F-LE.B.5
4.7	Natural Logarithm Function: Integration	F-BF.A.2, F-IF.B.6, F-LE.B.5
4.8	Inverse Trigonometric Function: Integration	F-BF.A.2, F-IF.B.6, F-LE.B.5
7.2	Integration by Parts	F-BF.A.2, F-IF.B.6, F-LE.B.5
7.3	Trigonometric Integrals	F-BF.A.1.b, A-SSE.A.1b
7.4	Trigonometric Substitution	F-BF.A.1.b, A-SSE.A.1b
7.5	Partial Fractions (Linear Only)	F-BF.A.1.b, A-SSE.A.1b

Unit 5: Applications of Integration (Test 6.1, 6.2, 6.4)

Section	Title	2023 NJSLs for Mathematics
4.4	Fundamental Theorem of Calculus	N-Q.A.1, F-IF.C.7c, G-GMD.A.1, G-GMD.A.2, G-GMD.A.3, G-GMD.B.4
6.1	Area of a Region Between Two Curves	N-Q.A.1, F-IF.C.7c, G-GMD.A.1, G-GMD.A.2, G-GMD.A.3, G-GMD.B.4
6.2	Volume: Washer & Disc Method	N-Q.A.1, F-IF.C.7c, G-GMD.A.1, G-GMD.A.2, G-GMD.A.3, G-GMD.B.4
6.4	Arc Length & Surfaces of Revolution	N-Q.A.1, F-IF.C.7c, G-GMD.A.1, G-GMD.A.2, G-GMD.A.3, G-GMD.B.4

Unit 6: Differential Equations (Test 5.1 - 5.4)

Section	Title	2023 NJSLs for Mathematics
5.1	Slope Fields and Euler's Method	F-LE.B.5, F-BF.A.1.b, F-BF.A.1.c, F-IF.B.6
5.2	Growth & Decay	F-LE.B.5, F-BF.A.1.b, F-BF.A.1.c, F-IF.B.6
5.3	Separation of Variables	F-LE.B.5, F-BF.A.1.b, F-BF.A.1.c, F-IF.B.6
5.4	Logistic Equation	F-LE.B.5, F-BF.A.1.b, F-BF.A.1.c, F-IF.B.6

Marking Period 3**Unit 7: Parametric Equations, Polar Coordinates, & Vectors (Test 9.2, 9.4 & 9.6, Test 9.3, 9.5, 9.7, 9.8)**

Section	Title	2023 NJSLs for Mathematics
9.2	Plane Curves & Parametric Equations	F-IF.A.2, F-IF.B.4, F-IF.B.5, F-BF.A.1.b
9.4	Polar Coordinates & Polar Graphs	F-IF.A.2, F-IF.B.4, F-IF.B.5, F-BF.A.1.b
9.6	Vectors in the Plane	F-IF.A.2, F-IF.B.4, F-IF.B.5, F-BF.A.1.b
9.3	Parametric Equations & Calculus	F-IF.A.2, F-IF.B.4, F-IF.B.5, F-BF.A.1.b
9.5	Area and Arc Length in Polar Coordinates	F-IF.A.2, F-IF.B.4, F-IF.B.5, F-BF.A.1.b
9.7	Vector-valued Functions	F-IF.A.2, F-IF.B.4, F-IF.B.5, F-BF.A.1.b
9.8	Velocity & Acceleration	F-IF.A.2, F-IF.B.4, F-IF.B.5, F-BF.A.1.b

Unit 8: Infinite Series (Test 8.1 - 8.6 & 8.7 - 8.10)

Section	Title	2023 NJSLs for Mathematics
8.1	Sequences	F-IF.A.3, F-IF.C.8.a, F-IF.C.9, F-BF.A.2
8.2	Series and Convergence	F-IF.A.3, F-IF.C.8.a, F-IF.C.9, F-BF.A.2
8.3	Integral Test and P-Series	F-IF.A.3, F-IF.C.8.a, F-IF.C.9, F-BF.A.2
8.4	Comparison of Series	F-IF.A.3, F-IF.C.8.a, F-IF.C.9, F-BF.A.2
8.5	Alternating Series	F-IF.A.3, F-IF.C.8.a, F-IF.C.9, F-BF.A.2
8.6	The Ratio & Root Tests	F-IF.A.3, F-IF.C.8.a, F-IF.C.9, F-BF.A.2
8.7	Taylor Polynomials & Approximations	F-IF.A.3, F-IF.C.8.a, F-IF.C.9, F-BF.A.2
8.8	Power Series	F-IF.A.3, F-IF.C.8.a, F-IF.C.9, F-BF.A.2
8.9	Representation of Functions by Power Series	F-IF.A.3, F-IF.C.8.a, F-IF.C.9, F-BF.A.2
8.10	Taylor & MacLaurin Series	F-IF.A.3, F-IF.C.8.a, F-IF.C.9, F-BF.A.2

Marking Period 4**Unit 9: AP Test Review (Test Mock AP Test)**

Section	Title	2023 NJSLs for Mathematics
Supplement	Units 1 - 8	A-SSE.A.1b, A-APR.D.7, F-IF.C.7c, F-IF.C.8, F-IF.C.9, F-IF.B.6, F-LE.B.5, F-IF.B.4, F-IF.A.3, F-BF.A.2, F-BF.A.1.b, F-BF.A.1.c, G-MG.A.3, G-GMD.A.1, G-GMD.A.2, G-GMD.A.3, G-GMD.B.4, N-Q.A.1

Unit 10: Additional Topics (Test 4.5 & 6.3)

Section	Title	2023 NJSLs for Mathematics
4.5	The Net Change Theorem	F-IF.C.7, F-IF.B.6, F-IF.B.4, F-LE.B.5, G-MG.A.3
6.3	Shell Method	N-Q.A.1, F-IF.C.7c, G-GMD.A.1, G-GMD.A.2, G-GMD.A.3, G-GMD.B.4

Unit 11: Project

Section	Title	2023 NJSLS for Mathematics
Supplement	Marginal Analysis Project	F-BF.A.1.b, F-IF.B.5

Course Description:

AP Calculus BC is representative of a college-level calculus course. Students cultivate their understanding of differential and integral calculus through engaging with real-world problems represented graphically, numerically, analytically, and verbally and using definitions and theorems to build arguments and justify conclusions as they explore concepts like change, limits, and the analysis of functions.

Course Expectations and Skills

- Students are required to have proficiency in all prerequisite topics for Calculus. Those who do not demonstrate proficiency will be required to seek additional help after school to close their achievement gap in order to be successful in this course.
- Students are to bring their Chrome Book charged and ready to use for the lesson.
- Students are encouraged to have a graphing calculator.
- Students are required to participate in both small and large group discussions and activities, as directed.

Resources

Text Book: Calculus for AP , 2nd Edition by R. Larson & P. Battaglia

Additional Resources:

- <https://apcentral.collegeboard.org/>
- <https://sso.cengage.com/cb/>
- WebAssign
- CalcChat.com
- CalcView.com
- Desmos.com

Grading Breakdown	
Major Summative (MAJ)	60%
Minor Formative (MIN)	30%
Homework (HW)	10%