

Course at a Glance

Plan

The Course at a Glance provides a useful visual organization of the AP Calculus AB and AP Calculus BC curricular components, including:

- Sequence of units, along with approximate weighting and suggested pacing. Please note, pacing is based on 45-minute class periods, meeting five days each week for a full academic year.
- Progression of topics within each unit.
- Spiraling of the big ideas and mathematical practices across units.

Teach

MATHEMATICAL PRACTICES

Mathematical practices spiral throughout the course.

- | | |
|----------------------------------------------|-------------------------------------|
| 1 Implementing Mathematical Processes | 3 Justification |
| 2 Connecting Representations | 4 Communication and Notation |

BIG IDEAS

Big ideas spiral across topics and units.

- | | |
|-------------------|----------------------------------|
| CHA Change | FUN Analysis of Functions |
| LIM Limits | |

BC ONLY

The purple shading represents BC only content.

Assess

Assign the Personal Progress Checks—either as homework or in class—for each unit. Each Personal Progress Check contains formative multiple-choice and free-response questions. The feedback from the Personal Progress Checks shows students the areas where they need to focus.

UNIT
1

Limits and Continuity

AP EXAM WEIGHTING **10–12% AB** **4–7% BC**

CLASS PERIODS **~22–23 AB** **~13–14 BC**

CHA	1.1 Introducing Calculus: Can Change Occur at an Instant?
2	
LIM	1.2 Defining Limits and Using Limit Notation
2	
LIM	1.3 Estimating Limit Values from Graphs
2	
LIM	1.4 Estimating Limit Values from Tables
2	
LIM	1.5 Determining Limits Using Algebraic Properties of Limits
1	
LIM	1.6 Determining Limits Using Algebraic Manipulation
1	
LIM	1.7 Selecting Procedures for Determining Limits
1	
LIM	1.8 Determining Limits Using the Squeeze Theorem
3	
LIM	1.9 Connecting Multiple Representations of Limits
2	
LIM	1.10 Exploring Types of Discontinuities
3	
LIM	1.11 Defining Continuity at a Point
3	
LIM	1.12 Confirming Continuity over an Interval
1	
LIM	1.13 Removing Discontinuities
1	
LIM	1.14 Connecting Infinite Limits and Vertical Asymptotes
3	
LIM	1.15 Connecting Limits at Infinity and Horizontal Asymptotes
2	
FUN	1.16 Working with the Intermediate Value Theorem (IVT)
3	

Personal Progress Check 1

Multiple-choice: ~45 questions
Free-response: 3 questions (partial)

UNIT
2

Differentiation: Definition and Basic Derivative Rules

AP EXAM WEIGHTING **10–12% AB** **4–7% BC**

CLASS PERIODS **~13–14 AB** **~9–10 BC**

CHA	2.1 Defining Average and Instantaneous Rates of Change at a Point
2	
CHA	2.2 Defining the Derivative of a Function and Using Derivative Notation
1	
4	
CHA	2.3 Estimating Derivatives of a Function at a Point
1	
FUN	2.4 Connecting Differentiability and Continuity: Determining When Derivatives Do and Do Not Exist
3	
FUN	2.5 Applying the Power Rule
1	
FUN	2.6 Derivative Rules: Constant, Sum, Difference, and Constant Multiple
1	
FUN	2.7 Derivatives of $\cos x$, $\sin x$, e^x , and $\ln x$
LIM	
1	
FUN	2.8 The Product Rule
1	
FUN	2.9 The Quotient Rule
1	
FUN	2.10 Finding the Derivatives of Tangent, Cotangent, Secant, and/or Cosecant Functions
1	

Personal Progress Check 2

Multiple-choice: ~30 questions
Free-response: 3 questions (partial)

NOTE: Partial versions of the free-response questions are provided to prepare students for more complex, full questions that they will encounter on the AP Exam.

UNIT 3

Differentiation: Composite, Implicit, and Inverse Functions

AP EXAM WEIGHTING **9–13% AB** **4–7% BC**

CLASS PERIODS **~10–11 AB** **~8–9 BC**

FUN	3.1	The Chain Rule
1		
FUN	3.2	Implicit Differentiation
1		
FUN	3.3	Differentiating Inverse Functions
3		
FUN	3.4	Differentiating Inverse Trigonometric Functions
1		
FUN	3.5	Selecting Procedures for Calculating Derivatives
1		
FUN	3.6	Calculating Higher-Order Derivatives
1		

Personal Progress Check 3

Multiple-choice: ~15 questions
Free-response: 3 questions (partial/full)

UNIT 4

Contextual Applications of Differentiation

AP EXAM WEIGHTING **10–15% AB** **6–9% BC**

CLASS PERIODS **~10–11 AB** **~6–7 BC**

CHA	4.1	Interpreting the Meaning of the Derivative in Context
1		
CHA	4.2	Straight-Line Motion: Connecting Position, Velocity, and Acceleration
1		
CHA	4.3	Rates of Change in Applied Contexts Other Than Motion
2		
CHA	4.4	Introduction to Related Rates
1		
CHA	4.5	Solving Related Rates Problems
3		
CHA	4.6	Approximating Values of a Function Using Local Linearity and Linearization
1		
LIM	4.7	Using L'Hospital's Rule for Determining Limits of Indeterminate Forms
3		

Personal Progress Check 4

Multiple-choice: ~15 questions
Free-response: 3 questions

UNIT 5

Analytical Applications of Differentiation

AP EXAM WEIGHTING **15–18% AB** **8–11% BC**

CLASS PERIODS **~15–16 AB** **~10–11 BC**

FUN	5.1	Using the Mean Value Theorem
3		
FUN	5.2	Extreme Value Theorem, Global Versus Local Extrema, and Critical Points
3		
FUN	5.3	Determining Intervals on Which a Function Is Increasing or Decreasing
2		
FUN	5.4	Using the First Derivative Test to Determine Relative (Local) Extrema
3		
FUN	5.5	Using the Candidates Test to Determine Absolute (Global) Extrema
1		
FUN	5.6	Determining Concavity of Functions over Their Domains
2		
FUN	5.7	Using the Second Derivative Test to Determine Extrema
3		
FUN	5.8	Sketching Graphs of Functions and Their Derivatives
2		
FUN	5.9	Connecting a Function, Its First Derivative, and Its Second Derivative
2		
FUN	5.10	Introduction to Optimization Problems
2		
FUN	5.11	Solving Optimization Problems
3		
FUN	5.12	Exploring Behaviors of Implicit Relations
1		
3		

Personal Progress Check 5

Multiple-choice: ~35 questions
Free-response: 3 questions

엠에스 프렙

UNIT 6

Integration and Accumulation of Change

AP EXAM WEIGHTING **17–20% AB** **17–20% BC**

CLASS PERIODS **~18–20 AB** **~15–16 BC**

CHA 4	6.1 Exploring Accumulations of Change
LIM 1	6.2 Approximating Areas with Riemann Sums
LIM 2	6.3 Riemann Sums, Summation Notation, and Definite Integral Notation
FUN 1	6.4 The Fundamental Theorem of Calculus and Accumulation Functions
FUN 2	6.5 Interpreting the Behavior of Accumulation Functions Involving Area
FUN 3	6.6 Applying Properties of Definite Integrals
FUN 3	6.7 The Fundamental Theorem of Calculus and Definite Integrals
FUN 4	6.8 Finding Antiderivatives and Indefinite Integrals: Basic Rules and Notation
FUN 1	6.9 Integrating Using Substitution
FUN 1	6.10 Integrating Functions Using Long Division and Completing the Square
FUN 1	6.11 Integrating Using Integration by Parts BC ONLY
FUN 1	6.12 Using Linear Partial Fractions BC ONLY
LIM 1	6.13 Evaluating Improper Integrals BC ONLY
FUN 1	6.14 Selecting Techniques for Antidifferentiation

Personal Progress Check 6

Multiple-choice:

- ~25 questions (AB)
- ~35 questions (BC)

Free-response: 3 questions

UNIT 7

Differential Equations

AP EXAM WEIGHTING **6–12% AB** **6–9% BC**

CLASS PERIODS **~8–9 AB** **~9–10 BC**

FUN 2	7.1 Modeling Situations with Differential Equations
FUN 3	7.2 Verifying Solutions for Differential Equations
FUN 2	7.3 Sketching Slope Fields
FUN 4	7.4 Reasoning Using Slope Fields
FUN 1	7.5 Approximating Solutions Using Euler's Method BC ONLY
FUN 1	7.6 Finding General Solutions Using Separation of Variables
FUN 1	7.7 Finding Particular Solutions Using Initial Conditions and Separation of Variables
FUN 3	7.8 Exponential Models with Differential Equations
FUN 3	7.9 Logistic Models with Differential Equations BC ONLY

Personal Progress Check 7

Multiple-choice:

- ~15 questions (AB)
- ~20 questions (BC)

Free-response: 3 questions

UNIT 8

Applications of Integration

AP EXAM WEIGHTING **10–15% AB** **6–9% BC**

CLASS PERIODS **~19–20 AB** **~13–14 BC**

CHA 1	8.1 Finding the Average Value of a Function on an Interval
CHA 1	8.2 Connecting Position, Velocity, and Acceleration of Functions Using Integrals
CHA 3	8.3 Using Accumulation Functions and Definite Integrals in Applied Contexts
CHA 4	8.4 Finding the Area Between Curves Expressed as Functions of x
CHA 1	8.5 Finding the Area Between Curves Expressed as Functions of y
CHA 2	8.6 Finding the Area Between Curves That Intersect at More Than Two Points
CHA 3	8.7 Volumes with Cross Sections: Squares and Rectangles
CHA 3	8.8 Volumes with Cross Sections: Triangles and Semicircles
CHA 3	8.9 Volume with Disc Method: Revolving Around the x- or y-Axis
CHA 2	8.10 Volume with Disc Method: Revolving Around Other Axes
CHA 4	8.11 Volume with Washer Method: Revolving Around the x- or y-Axis
CHA 2	8.12 Volume with Washer Method: Revolving Around Other Axes
CHA 3	8.13 The Arc Length of a Smooth, Planar Curve and Distance Traveled BC ONLY

Personal Progress Check 8

Multiple-choice: ~30 questions

Free-response: 3 questions

**UNIT
9****Parametric
Equations, Polar
Coordinates, and
Vector-Valued
Functions BC ONLY**AP EXAM
WEIGHTING **N/A AB 11–12% BC**CLASS PERIODS **N/A AB ~10–11 BC**

CHA 2	9.1 Defining and Differentiating Parametric Equations
CHA 1	9.2 Second Derivatives of Parametric Equations
CHA 1	9.3 Finding Arc Lengths of Curves Given by Parametric Equations
CHA 1	9.4 Defining and Differentiating Vector-Valued Functions
FUN 1	9.5 Integrating Vector-Valued Functions
FUN 1	9.6 Solving Motion Problems Using Parametric and Vector-Valued Functions
FUN 2	9.7 Defining Polar Coordinates and Differentiating in Polar Form
CHA 3	9.8 Find the Area of a Polar Region or the Area Bounded by a Single Polar Curve
CHA 3	9.9 Finding the Area of the Region Bounded by Two Polar Curves

Personal Progress Check 9Multiple-choice: ~25 questions
Free-response: 3 questions**UNIT
10****Infinite
Sequences and
Series BC ONLY**AP EXAM
WEIGHTING **N/A AB 17–18% BC**CLASS PERIODS **N/A AB ~17–18 BC**

LIM 3	10.1 Defining Convergent and Divergent Infinite Series
LIM 3	10.2 Working with Geometric Series
LIM 3	10.3 The n th Term Test for Divergence
LIM 3	10.4 Integral Test for Convergence
LIM 3	10.5 Harmonic Series and p -Series
LIM 3	10.6 Comparison Tests for Convergence
LIM 3	10.7 Alternating Series Test for Convergence
LIM 3	10.8 Ratio Test for Convergence
LIM 3	10.9 Determining Absolute or Conditional Convergence
LIM 1	10.10 Alternating Series Error Bound
LIM 3	10.11 Finding Taylor Polynomial Approximations of Functions
LIM 2	10.12 Lagrange Error Bound
LIM 2	10.13 Radius and Interval of Convergence of Power Series
LIM 2	10.14 Finding Taylor or Maclaurin Series for a Function
LIM 3	10.15 Representing Functions as Power Series

Personal Progress Check 10Multiple-choice: ~45 questions
Free-response: 3 questions