



What is BC Calculus?

AP Calculus BC focuses on students' understanding of calculus concepts and provide experience with methods and applications. Through the use of big ideas of calculus (e.g., modeling change, approximation and limits, and analysis of functions), the course becomes a cohesive whole, rather than a collection of unrelated topics. The course requires students to use definitions and theorems to build arguments and justify conclusions. The courses feature a multirepresentational approach to calculus, with concepts, results, and problems expressed graphically, numerically, analytically, and verbally.

College Course Equivalent AP Calculus BC is designed to be the equivalent to both first and second semester college calculus courses. AP Calculus BC applies the content and skills learned in AP Calculus AB to parametrically defined curves, polar curves, and vector-valued functions; develops additional integration techniques and applications; and introduces the topics of sequences and series.

Prerequisites Before studying calculus, all students should complete the equivalent of four years of secondary mathematics designed for college-bound students: courses that should prepare them with a strong foundation in reasoning with algebraic symbols and working with algebraic structures. Prospective calculus students should take courses in which they study algebra, geometry, trigonometry, analytic geometry, and elementary functions. These functions include linear, polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric, and piecewise-defined functions. In particular, before studying calculus, students must be familiar with the properties of functions, the composition of functions, the algebra of functions, and the graphs of functions. Students must also understand the language of functions (domain and range, odd and even, periodic, symmetry, zeros, intercepts, and descriptors such as increasing and decreasing). Students should also know how the sine and cosine functions are defined from the unit circle and know the values of the trigonometric functions at the numbers, and their multiples. Students who take AP Calculus BC should have basic familiarity with sequences and series, as well as some exposure to parametric and polar equations.

Big Ideas The big ideas serve as the foundation of the course and allow students to create meaningful connections among concepts.

BIG IDEA 1: CHANGE Using derivatives to describe rates of change of one variable with respect to another or using definite integrals to describe the net change in one variable over an interval of another allows students to understand change in a variety of contexts.

BIG IDEA 2: LIMITS Beginning with a discrete model and then considering the consequences of a limiting case allows us to model real-world behavior and to discover and understand important ideas, definitions, formulas, and theorems in calculus: for example, continuity, differentiation, integration, and series bc only.

BIG IDEA 3: ANALYSIS OF FUNCTIONS Calculus allows us to analyze the behaviors of functions by relating limits to differentiation, integration, and infinite series and relating each of these concepts to the others.

Units Exam and Weighting (BC)

Unit 1: Limits and Continuity 4–7%

Unit 2: Differentiation: Definition and Fundamental Properties 4–7%

Unit 3: Differentiation: Composite, Implicit, and Inverse Functions 4–7%

Unit 4: Contextual Applications of Differentiation 6–9%

Unit 5: Analytical Applications of Differentiation 8–11%

Unit 6: Integration and Accumulation of Change 17–20%

Unit 7: Differential Equations 6–9%

Unit 8: Applications of Integration 6–9%

Unit 9: Parametric Equations, Polar Coordinates, and Vector-Valued Functions 11–12%

Unit 10: Infinite Sequences and Series 17–18%