AP Calculus AB Year at a Glance

Scope and Sequence 2022 - 2023
Please Note: All standards in the state course description are designed to be learned by the end of the course. This guide represents a recommended timeline and sequence to be used voluntarily by teachers for planning purposes. Specific question regarding when content will be addressed in a specific course are best answered by the individual teacher.
Course Resources
Publisher Resource: Calculus: Graphical, Numerical, Algebraic 6e, Savvas Learning Company (Clever – use your active directory; does not support Internet Explorer) **Supplemental Resources:** Khan Academy (does not support Internet Explorer)
In AP Calculus AB, instructional time will emphasize eight areas:
(1) Limits and Continuity (2) Differentiation: Definition and Fundamental Properties (3) Differentiation: Composite, Implicit, and Inverse Functions (4) Contextual Applications of Differentiation (5) Analytical Applications of Differentiation (6) Integration and Accumulation of Change (7) Differential Equations (8) Applications of Integration

Quarter 1 (August 10 – October 14)
Chapter 0: Prerequisites for Calculus Students will graph, solve and evaluate functions (linear, exponential, parametric, and trigonometric).

AP Calculus AB Year at a Glance

Unit 1: Limits and Continuity

Students will be introduced to limits and the subtle distinction between evaluating a function at a point and considering what value the function is approaching, if any, as x approaches a point. This distinction will allow students to extend understanding of asymptotes and holes in graphs with formal definitions of continuity.

Unit 2: Differentiation: Definition and Fundamental Properties
Students will learn how derivatives determine instantaneous rates of change. They will develop an understanding of how the definition of the derivative applies limits o average rates of changes. Students will explore how various operations affect slopes of tangent lines.

Unit 3: Differentiation: Composite, Implicit, and Inverse Functions
Students will learn how to differentiate composite functions using the chain rule and apply that understanding to determine derivatives of implicit and inverse functions. Students need to understand that for composite functions, y is a function of u while u is a function of x.

Quarter 2 (October 18 – December 21)

Unit 3: Differentiation: Composite, Implicit, and Inverse Functions
Students will learn how to differentiate composite functions using the chain rule and apply that understanding to determine derivatives of implicit and inverse functions. Students need to understand that for composite functions, y is a function of u while u is a function of x.

Unit 4: Contextual Applications of Differentiation
Students will develop an understanding of average and instantaneous rates of change in problems involving motion. Students will then identify differentiation as a common underlying structure on which to build understanding of change in a variety of contexts.

Unit 5: Analytical Applications of Differentiation
Students will focus on abstract structures and formal conclusions. Reasoning with definitions and theorems establishes that answers and conclusions are more than conjectures; they have been analytically determined. Students will learn to present justifications for their conclusions about the behavior of

functions over certain intervals or the locations of extreme values or points of inflection. Students will apply abstract reasoning skills to justify solutions for realistic optimization problems.

Quarter 3 (January 5 – March 9)

Unit 6: Integration and Accumulation of Change

Students will establish the relationship between differentiation and integration using the Fundamental Theorem of Calculus. Students exploring the contextual meaning of areas of certain regions bounded by rate functions. Integration determines accumulation of change over an interval, just as differentiation determines instantaneous rate of change at a point. Students should understand that integration is a limiting case of a sum of products (areas) in the same way that differentiation is a limiting case of a quotient of differences (slopes).

Unit 7: Differential Equations

Students will learn to set up and solve separable differential equations. Slope fields can be used to represent solution curves to a differential equation and build understanding that there are infinitely many general solutions to a differential equation, varying only by a constant of integration. Students can locate a unique solution relevant to a particular situation, provided they can locate a point on the solution curve.

Quarter 4 (March 20 – May 25)

Unit 8: Applications of Integration

Students will learn how to find the average value of a function, model particle motion and net change, and determine areas, and volumes defined by the graphs of functions.

Exam Review

Students will review all material covered in this AP course in preparation for the upcoming AP Exam

AP Calculus AB Exam: May 8th