AP Calculus AB	
Unit	**Concepts and Skills**
1-Functions, Graphs, and Limits	**Analysis of graphs** ● Limits of functions (including one-sided limits); *Intuitive understanding of the limiting process, Algebraic calculation of limits, Graphical or tabular estimation of limits* ● Asymptotic and unbounded behavior; Asymptotes in terms of graphical behavior, *Limits involving infinity, Comparison of relative magnitudes of functions and their rates of change* ● Continuity as a property of functions; *Intuitive understanding of continuity, Continuity in terms of limits, Intermediate Value Theorem and Extreme Value Theorem* ● Using L'Hospital's Rule for finding limits of expressions with indeterminate form
2-Derivatives	**Concept of derivative** ● Derivatives presented graphically, numerically, and analytically, Interpretation as instantaneous rate of change, ● Limit of the difference quotient, ● Relationship between differentiability and continuity **Derivative at a point** ● Slope of a curve at a point ● Tangent line to a curve and local linearity ● Instantaneous rate of change as limit of average rate of change ● Approximate rate of change graphically and tabularly **Derivative of a function** ● Characteristics of and relationship between increasing and decreasing of and the sign of ● Mean Value Theorem (with geometric consequences) ● Equations involving derivatives **Second derivatives** ● Characteristics of and Relationship between concavity of

	● and the sign of, ● Points of inflection **Applications of derivative**s; ● Analysis of curves (notion of monotonicity and concavity) ● Optimization (absolute (global) and relative (local) extrema) ● Related-rates problems ● Implicit differentiation to find derivative of inverse function ● Relationship between and with velocity, speed, and acceleration ● Geometric interpretation of differential equations (slope fields and solution curves for differential equations) **Computation of derivative** ● Knowledge of basic derivative function ● Basic rules for derivatives (sums, products, quotients) ● Chain rule and implicit differentiation
3-Integrals	**Properties of definite integrals** ● Using Sigma notation and limits to define Riemann Sums ● Computation of Riemann sums (left, right, midpoint) ● Definite integral as a rate of change of a quantity ● Basic properties of definite integrals (additivity and linearity) **Applications of integrals** ● Area under a curve ● Volume of a solid with known cross sections ● Average value of a function ● Distance traveled by a particle along a line **Fundamental Theorem of Calculus** ● Evaluation of definite integrals using the Fundamental Theorem of Calculus ● Represent a particular antiderivative using the Fundamental Theorem of Calculus

	● Analytic and graphical analysis of functions defined by using the Fundamental Theorem of Calculus **Techniques of antidifferentiation** ● Antiderivatives from derivatives of basic functions ● Antiderivatives by substitution of variables **Applications of antidifferentiation** ● Using specific conditions to find specific antiderivatives ● Solving separable differential equations and using them in modeling ● Numerical approximations to definite integrals ● Use Riemann sums and trapezoidal sums to approximate definite integrals algebraically, graphically, and tabularly