AP Calculus(AB)					
Time	***Unit***	***Big Ideas/Concepts***	***Skills/Standards***	***Key Vocabulary***	***Assessments/ Resources***
12 class periods	Functions, Limits & Graphs	•Analysis of graphs •Limits of functions (including one-sided limits) •Asymptotic and unbounded behavior •Continuity as a property of functions	• An intuitive understanding of the limiting process. • Calculating limits using algebra. • Estimating limits from graphs or tables of data. • Understanding asymptotes in terms of graphical behavior. • Describing asymptotic behavior in terms of limits involving infinity. • Comparing relative magnitudes of functions and their rates of change (for example, contrasting exponential growth, polynomial growth, and logarithmic growth). • An intuitive understanding of continuity. (The function values can be made as close as desired by taking sufficiently close values of the domain.) • Understanding continuity in terms of limits. • Geometric understanding of graphs of continuous functions (Intermediate Value Theorem and Extreme Value Theorem).	•Limit •Indeterminate Form •Intermediate Value Theorem •Squeeze Theorem •Continuity •Removable/Non-Removable Discontinuity •Vertical Asymptote •Horizontal Asymptote	*Calculus with Analytic Geometry*, *6th Ed*. (1998) AP Practice Problems of Released Items Approved Graphing Calculators Quiz 1.2-1.4 Quiz 1.5, 3.5 Major Unit 1 Test
36 Class Periods	Derivatives	•Concept of the derivative •Derivative at a point •Derivative as a function •Applications of derivatives •Computation of derivatives	• Derivative presented graphically, numerically, and analytically. • Derivative interpreted as an instantaneous rate of change. • Derivative defined as the limit of the difference quotient. • Relationship between differentiability and continuity. • Slope of a curve at a point. Examples are emphasized, including points at which there are vertical tangents and points at which there are no tangents. • Tangent line to a curve at a point and local linear approximation. • Instantaneous rate of change as the limit of average rate of change. • Approximate rate of change from graphs and tables of values. • Corresponding characteristics of graphs of f and $f\cdot$. • Relationship between the increasing and decreasing behavior of f and the sign of $f\cdot$. • The Mean Value Theorem and its geometric interpretation. • Equations involving derivatives. Verbal descriptions are translated into equations involving derivatives and vice versa. • Corresponding characteristics of the graphs of f, $f\cdot$, and $f\ \cdot$. • Relationship between the concavity of f and the sign of $f\ \cdot$.	•Tangent Line •Secant Line •Derivative •Power Rule •Quotient Rule •Chain Rule •Average ROC •Instantaneous ROC •Implicit Differentiation •Velocity •Acceleration •Monotonic •Orthogonal •Extrema(rel/abs min. and max.) •Critical Number •Extreme Value Thm. •Rolle's Theorem •Mean Value Theorem •Concavity	*Calculus with Analytic Geometry*, *6th Ed*. (1998) AP Practice Problems of Released Items Approved Graphing Calculators Quiz 2.1-2.2 Quiz 2.4-2.6 Major Ch. 2 Test Quiz 5.3-5.6(diff.) Quiz 5.1, 5.5, 5.8 Major Ch 5 Test Quiz 3.1-3.2

			• Points of inflection as places where concavity changes. • Analysis of curves, including the notions of monotonicity and concavity. • Optimization, both absolute (global) and relative (local) extrema. • Modeling rates of change, including related rates problems. • Use of implicit differentiation to find the derivative of an inverse function. • Interpretation of the derivative as a rate of change in varied applied contexts, including velocity, speed, and acceleration. • Geometric interpretation of differential equations via slope fields and the relationship between slope fields and solution curves for differential equations. • Knowledge of derivatives of basic functions, including power, exponential, logarithmic, trigonometric, and inverse trigonometric functions. • Derivative rules for sums, products, and quotients of functions. • Chain rule and implicit differentiation. • Using differentiation and L'Hpoital's Rule to evaluate limits	•Inflection •Optimization •L'Hopitals Rule	Quiz 3.3-3.4 Quiz 3.7 Quiz on Linearization and L'Hopitals Rule) MIDTERM EXAM Major Ch 3 Test
24 Class Periods	Integrals	•Interpretations and properties of definite integrals •Applications of integrals •Fundamental Theorem of Calculus •Techniques of antidifferentiation •Applications of antidifferentiation •Numerical approximations to definite integrals.	•Use of Riemann sums (using left, right, and midpoint evaluation points) and trapezoidal sums to approximate definite integrals of functions represented algebraically, graphically, and by tables of values. • Definite integral as a limit of Riemann sums. • Definite integral of the rate of change of a quantity over an interval interpreted as the change of the quantity over an interval • Basic properties of definite integrals (examples include additivity and linearity). •Appropriate integrals are used in a variety of applications to model physical, biological, or economic situations. Although only a sampling of applications can be included in any specific course, students should be able to adapt their knowledge and techniques to solve other similar application problems. Whatever applications are chosen, the emphasis is on using the method of setting up an approximating Riemann sum and representing its limit as a definite integral. To provide a common foundation, specific applications should include finding the area of a region, the volume of a solid with known cross sections, the average value of a function, the distance traveled by a particle along a line, and accumulated change from a rate of change. • Use of the Fundamental Theorem to evaluate definite integrals. • Use of the Fundamental Theorem to represent a particular antiderivative, and the analytical and graphical analysis of	•Antiderivative •Integral(definite & indefinite) •Differential Equation •General & Particular Solutions to Differential Equations •Separation of Variables •Constants and Limits of Integration •Left, Right & Midpoint Sums •Trapezoid Rule •Riemann Sum •Fundamental Theorem of Calculus •Mean Value Theorem(for integrals) •Average Value •Second Fundamental Theorem of Calculus •U-substitution for Integration	*Calculus with Analytic Geometry*, *6th Ed*. (1998) AP Practice Problems of Released Items Approved Graphing Calculators Quiz 4.1-4.3 Quiz 4.4 Major Test 4.1-4.4(with AP Application) Quiz Ch. 4-5 integration using U-substitution) Quiz 6.1-6.2 Major Test on

			functions so defined. • Antiderivatives following directly from derivatives of basic functions. • Antiderivatives by substitution of variables (including change of limits for definite integrals). • Finding specific antiderivatives using initial conditions, including applications to motion along a line. • Solving separable differential equations and using them in modeling (including the study of the equation y· = ky and exponential growth).	•Slope Field •Area Between Curves •Disc, Washer & Shell Method for finding Rotational Volume • Volume of Known Cross Section	U-subst. and Rotational Volume) FINAL EXAM