Calculus AB/BC (2 Periods)

		Content	# of days	ACT Standard	Assessment
1st nine weeks		Review PreCalculus and Trigonometry	4-5	33-36	
		Apply the informal definition of a limit to one-and two-sided limits.	½		
		Identify limits that fail to exist, know and apply the properties of limits	½		
		Find finite limits graphically, numerically, and analytically, using direct substitution, cancellation techniques, and rationalization technique.	2 ½		
		Use limits to compare relative magnitudes of functions and their rates of change	½		
		Know and apply the properties of continuity and determine continuity on open and closed intervals	1 ½		
		Identify and apply the definition of continuity to determine continuity at a point and identify points of discontinuity	1		
		Apply the Intermediate Value Theorem	½		
		Use infinite limits to determine the asymptotic behavior of a function, including vertical asymptotes	½		
		Know and apply the formal definition and alternate form of the formal definition to determine basic derivatives, equations of tangent lines, local linearity, differentiability, and continuity	4		
		Know and apply the basic rules of differentiation, including constant multiple, power, sum and difference, product and quotient rules.	2		
		Know and apply the rules of differentiation for transcendental functions	2		
		Communicate the concept of a derivative in terms of slope, local linearity, and instantaneous and average rate of change.	1		
		Determine higher order derivatives	½		
		Apply the chain rule of derivatives	2 ½		
		Compute the derivative of a function numerically using a graphing calculator	1		
		Determine relative (local) and absolute (global) extrema on an interval and know and apply the Extreme Value Theorem	½		
		Determine the critical values of a function	½		
		Know and apply Rolle's Theorem and the Mean Value Theorem	1		
		Determine increasing and decreasing intervals	1		

		of a function				
		Determine monotonic functions	½			
		Use the first and second derivative test to determine relative minima and maxima	1 ½			
		Determine intervals of concavity of a function	1			
		Determine points of inflection of a function	1			
		Find limits at infinity and discuss these limits in relation to the end behavior of a function	½			
		Apply the relationships of f, f',f" in a variety of applications, including curve sketching	3 ½			
		Solve applied minimum and maximum problems (optimization)	2			
		Estimate numeric derivatives using local linear approximations	1			
		Review, Quizzes, Tests, and Curriculum Adjustment	4-5			
2nd nine weeks						
		Determine the numerical solution of differential equations using Euler's method	1			
		Interpret rates of change including numerical data and slope fields	2			
		Interpret the derivatives as a rate of change in a variety of applied contexts, including velocity, speed, and acceleration	3			
		Use implicit differentiation to determine the derivative of a function including inverse functions	1			
		Apply derivatives to real world problems involving related rates	2			
		Determine the derivative of a parametric, polar, and vector valued function	2			
		Apply derivatives in the analysis of planar curves given in parametric, polar, vector form, including velocity and acceleration	4			
		Estimate Area using left, right, midpoint, upper, lower, and trapezoidal sums	1			
		Approximate definite integrals of functions represented algebraically, geometrically, and by tables of values, using Riemann Sums and Trapezoidal Rule (including distance travelled by a particle along a line)	1			
		Compute Riemann Sums using left, right, midpoint, upper, lower and evaluation points	1			
		Find Area using the limit definition of a Riemann Sum	1			
		Know and apply the definition of a definite integral as a limit of a summing process	1 ½			
		Know and apply the properties of definite	1 ½			

		integrals and find the constant of integration			
		Find the anti-derivatives following directly from derivatives of basic functions including use of a general power rule	1		
		Use the Fundamental Theorem of Calculus to evaluate definite integrals	1		
		Know and apply the Mean Value Theorem for integrals and find the Average Value of a function	1		
		Evaluate a definite integral using a graphing calculator	½		
		Find anti-derivatives by substitution of variables including change of limits for definite integrals	2 ½		
		Know and apply integration formulas and methods to integrate trigonometric, exponential, logarithmic, and inverse trig functions	2		
		Find the antiderivatives by parts and simple partial fractions with non-repeating linear factors only	2		
		Review, Quizzes, Tests, and Curriculum Adjustment	5-6		
		Review and Semester Exam	4-5		
		Use the Fundamental Theorem of Calculus to represent a particular anti-derivative and perform an analytical and graphical analysis of a function so defined	1		
		Use the Second Fundamental Theorem of Calculus to interpret a Rate of Change as a change of a quantity over an interval	1		
3rd nine weeks		Solve separable differential equations and use them in modeling, including applications with growth and decay	2		
		Use a geometric interpretation of differential equations via slope fields to show the relationship between slope fields and derivatives of implicitly defined functions	1		
		Solve logistic differential equations and use them in modeling	1		
		Apply integration methods to find the area of a region bounded by planar curves	2		
		Use an integral of a rate of change to give accumulated change	2		
		Find the volume of a solid of revolution about a horizontal or vertical axis using the disc and	3		

		washer methods			
		Find the volume of a solid with a known cross section	1		
		Find the length of a curve including a curve given in parametric form	1		
		Apply integration methods to find area of a region bounded by polar curves	2		
		Apply terms of series as areas of rectangles and relate them to proper integrals	½		
		Use technology to explore and determine convergence and divergence	½		
		Apply the concept of a series to examples including decimal expansion	½		
		Apply geometric series in application	½		
		Define a series as a sequence of partial sums and convergence as the limit of the sequence of partial sums	1		
		Find limits using L'Hospital's rule	1		
		Find improper integrals as limits of definite integrals	1		
		Use L'Hospital's rule to determine convergence and divergence of improper integrals and series	1		
		Determine the convergence or divergence of geometric, telescoping, p,and harmonic series	2		
		Determine convergence or divergence of series using comparison, limit comparison, integral test, nth term divergence, alternating series test, ratio and root test	5		
		Approximate the sum of an alternating series and determine error bound	2		
		Review, Quizzes, Tests, and Curriculum Adjustment	10-12		
4th nine weeks					
		Determine the radius and interval of convergence of power series	2		
		Represent a given function by a power series	1		
		Determine the general Taylor series at x=a	1		
		Find an nth degree polynomial approximation of a given function, including Taylor and Ma claurin's polynomials, with graphical demonstration of convergence	4		
		Determine the Lagrange error bound for Taylor polynomials.	1		

		Find the Maclaurin series for functions e^x, sin x, cos x, and 1/(1-x), and use them in the formation of the new series	2		
		Use formal manipulation of Taylor series and shortcuts to compute Taylor series, including differentiation, anti-differentiation, and formation of new series from known series	3		
		Review, Quizzes, Tests, and Curriculum Adjustment	8		
		Analyze, synthesize, and apply learned objectives for the course to solve AP caliber problems in a variety of settings	10-15		
		Review and Final Exam	4-6		