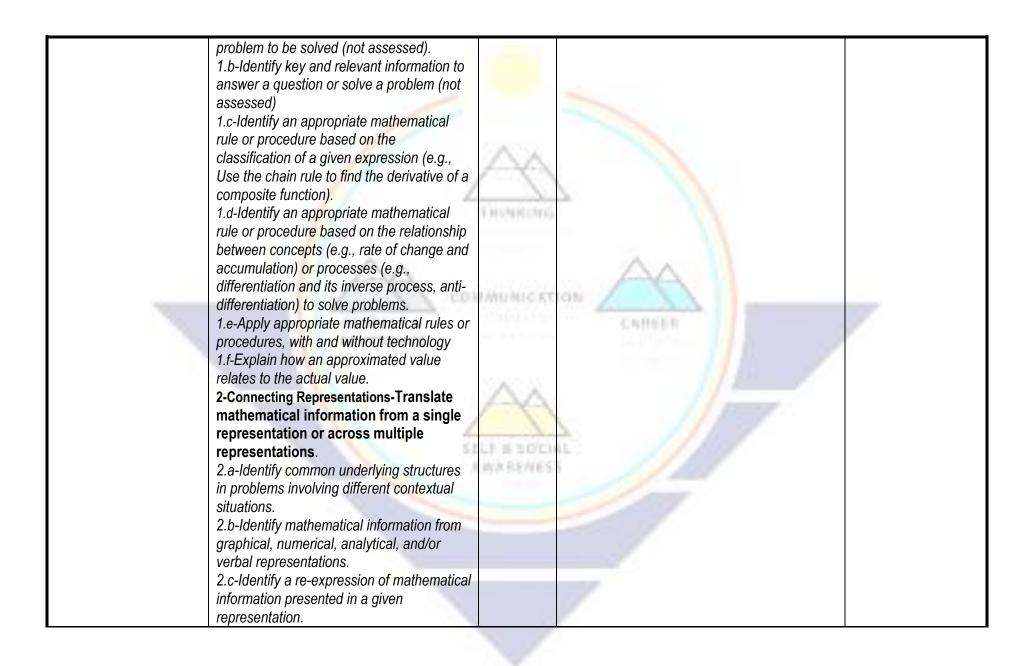
## Ganado Unified School District AP Calculus AB

PACING Guide SY 2021-22

R. B	erl	key
------	-----	-----

Timeline & Resources	AP-Calculus-Mathematics-Standards	Essential Questions HESS Matrix	Learning Goal	Vocabulary Content/Academic
Textbook  Finney, Demana, Waits, Kennedy, and Bressoud. Calculus—Graphical, Numerical, Algebraic. 5rd ed. Pearson Prentice Hall, Boston, MA, 2016.	<ol> <li>Make sense of problems and persevere in solving them.</li> <li>Reason abstractly and quantitatively.</li> <li>Construct viable arguments and</li> </ol>	TA STRUME	CARSER CARSER	
Based on: AP-Calculus-AB-BC- course-and-exam- description at https://bit.ly/3bHq6km	<ul> <li>critique the reasoning of others.</li> <li>4. Model with mathematics.</li> <li>5. Use appropriate tools strategically.</li> <li>6. Attend to precision.</li> <li>7. Look for and make use of structure.</li> <li>8. Look for and express regularity</li> </ul>	LI S SOCI		
Kahn Academy	in repeated reasoning.			
Delta Math	-will be applied in all units of study			
	1 Implementing Mathematical Processes- Determine expressions and values using mathematical procedures and rules 1.a-Identify the question to be answered or	V		



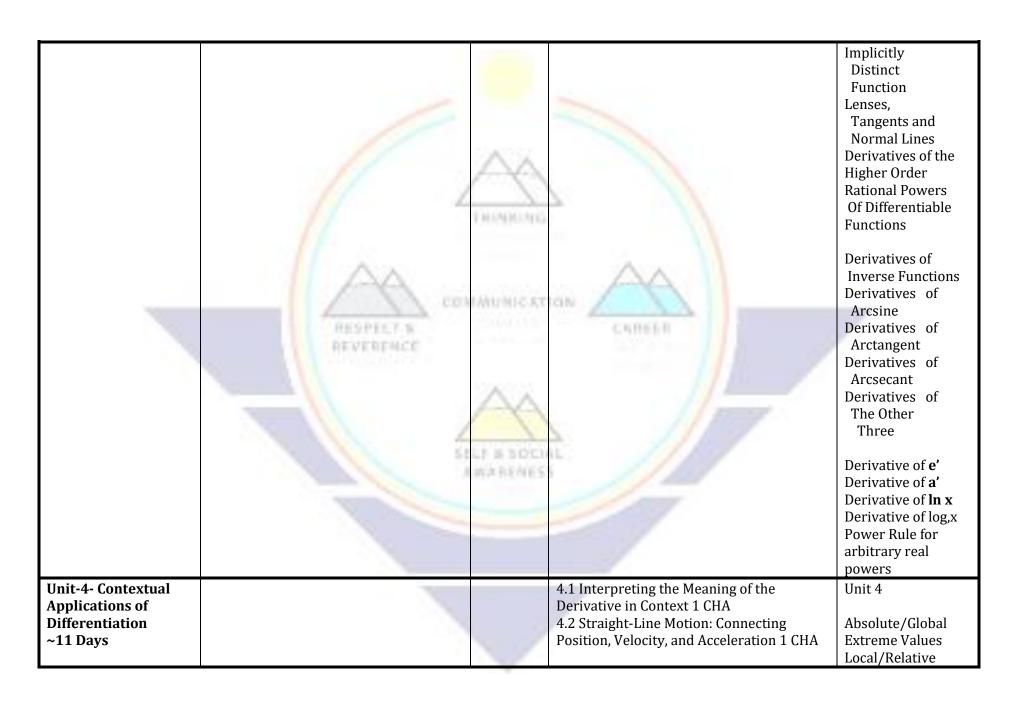


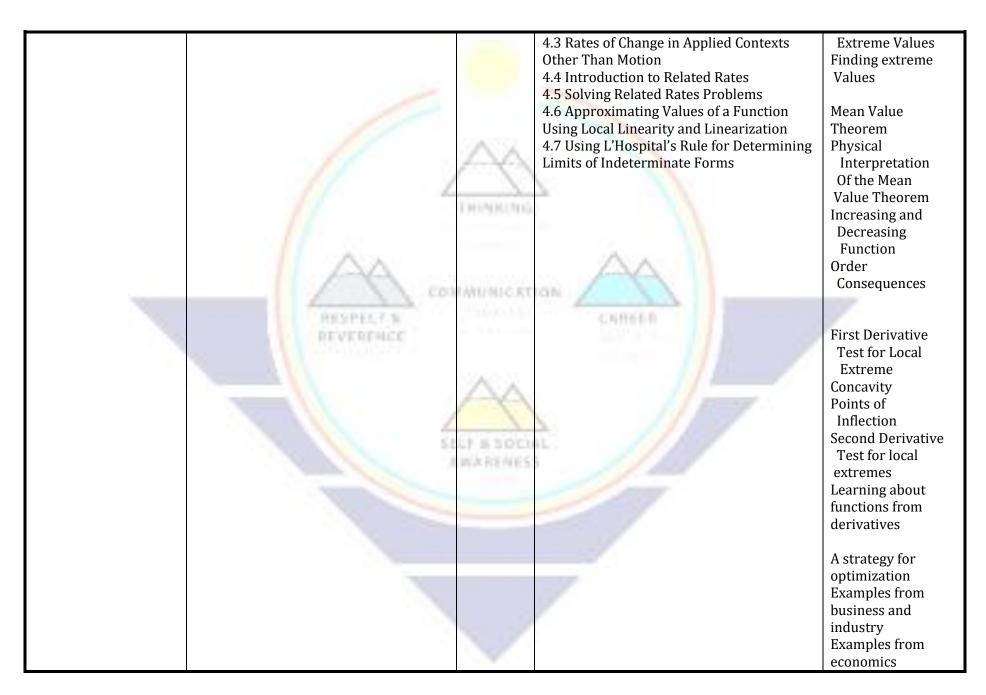
	BIG IDEA 1: CHANGE (CHA) Using derivatives to describe rates of change of one variable with respect to another or using definite integrals to describe the net change in one variable over an interval of another allows students to understand change in a variety of contexts. It is critical that students grasp the relationship between integration and differentiation as expressed in the Fundamental Theorem of Calculus—a central idea in AP Calculus.  BIG IDEA 2: LIMITS (LIM) 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.  BIG IDEA 3: ANALYSIS OF FUNCTIONS (FUN) 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.	EP IS SOCIAL MARENES	CHREER	
Unit 0- prerequisites for calculus ~10 days			0.1 linear functions 0.2 functions and graphs 0.3 exponential functions 0.4 parametric functions(Bc) 0.5 inverse functions and logarithms 0.6 trigonometric functions 0.7 rational functions	
Unit 1-Limits and Continuity			1.1 Introducing Calculus: Can Change Occur at an Instant?	Unit 1

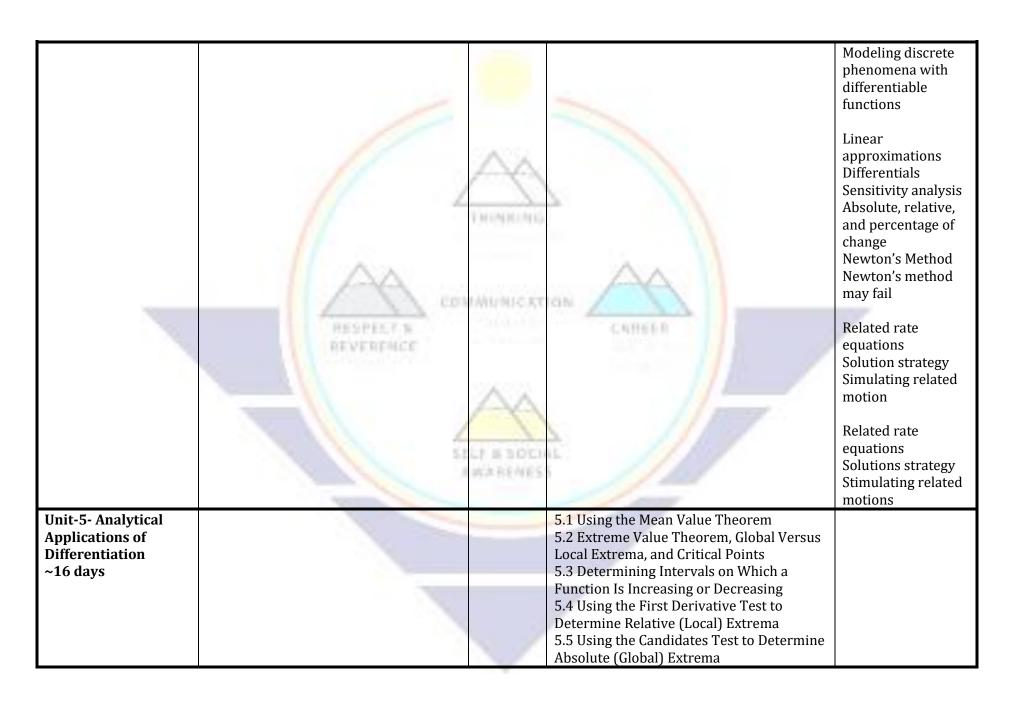
~23 days			1.2 Defining Limits and Using Limit	Key Ideas
~25 uays			Notation	Ney lucas
			1.3 Estimating Limit Values from Graphs	Average and
			1.4 Estimating Limit Values from Tables	Instantaneous
			1.5 Determining Limits Using Algebraic	Speed
			Properties of Limits	Definition of limit
		COMMONO	1.6 Determining Limits Using Algebraic	Properties of limits
	the state of the s		Manipulation	One-sided and Two-
			1.7 Selecting Procedures for Determining	sided limits
	1/ /		Limits	Squeeze
	//	THE MINISTER	1.8 Determining Limits Using the Squeeze	Squeeze
	//		Theorem	Finite limits as x >>
			1.9 Connecting Multiple Representations of	+/- infinity
	// A A		Limits	Squeeze Theorem
	4-3/-3	1,000,000	1.10 Exploring Types of 3 Discontinuities	Revisited
-	COL	TAGININA	1.11 Defining Continuity at a point	Revisiteu
	RESPECTS	750 C	1.12 Confirming Continuity over an	End Behavior
	BEVERENCE		Interval	Models
	111111111111111111111111111111111111111		1.13 Removing 1Discontinuities	"Seeing Limits" as x
			1.14 Connecting infinite limits and vertical	>>> +/- infinity
		A	asymptotes	if illilling
			1.15 Connecting infinite limits and	Continuity as a
			Horizontal asymptotes	point
	57	CHURCHEN	1.16 Working with the Intermediate Value	Continuous
	The state of the s	CF S SDCI	Theorem (IVT)	function
		WARENES!	Thousand (14.1)	Algebraic
	-			combinations
				Composites
				Intermediate value
				theorem for
				continuous
				functions
				Average Rates of
				Change
	000	- 17		Tangent to a Curve
				Slope of a Curve
				Speed Revisited
				opeca Revisica

				Normal to a Curve Speed revisited Sensitivity
Unit-2- Differentiation: Definition and Basic Derivative Rules ~14 days	RESPECTS	THINNING AT	2.1 Defining Average and Instantaneous Rates of Change at a Point 2.2 Defining the Derivative of a Function and Using Derivative Notation 2.3 Estimating Derivatives of a Function at a Point 2.4 Connecting Differentiability and continuity: determining when derivative do & don't exist. 2.5 Applying the Power Rule 2.6 Derivative Rules: Constant, Sum, Difference, and constant Multiple 2.7 Derivatives of cos x, sin x, e^x, and ln(x) 2.8 The Product Rule 2.9 The Quotient Rule	Unit 2  Definition of Derivative Notation Relationship between the graphs of f and f' Graphing the derivative from data One-sided Derivatives How f'(a) might fail to exist Differentiation implies local linearity Numerical derivatives on a calculator Differentiability implies continuity Intermediate value theorem for derivatives Positive integer Powers, multiples, sums and differences Products and quotients

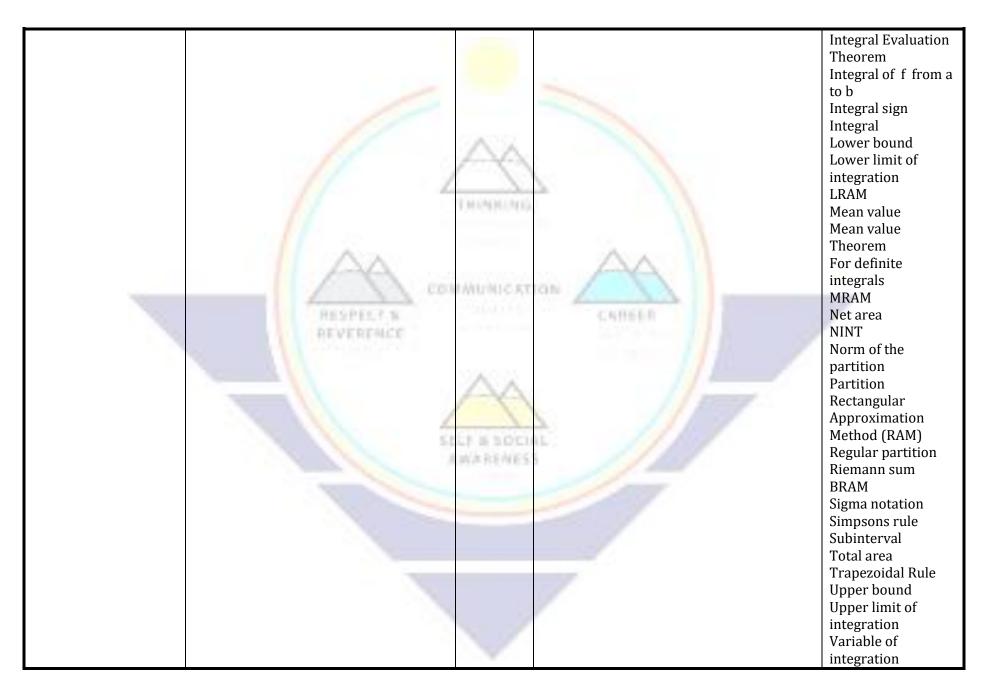
	PESPELT B REVERENCE	CHREE	Negative Integer powers of x Second higher order derivatives Instantaneous rates of change Motion along a line Sensitivity to change Derivatives in Economics Derivative of the sine function Derivative of the cosine function Simple harmonic motion Jerk Derivatives of the other basic trigonometric functions
Unit-3- Differentiation: Composite, Implicit, and Inverse Functions ~11 days	3. 3. 3. Fr 3. D	3.1 The Chain Rule 3.2 Implicit Differentiation 3.3 Differentiating Inverse Functions 3.4 Differentiating Inverse Trigonometric Functions 3.5 Selecting Procedures for Calculating Derivatives 3.6 Calculating Higher Order Derivatives	Unit 3 Derivatives of a composite function "Outside-inside" rule Repeated use of the Chain Rule Power Chain Rule Slopes of Parametrized Curves Power Chain Rule



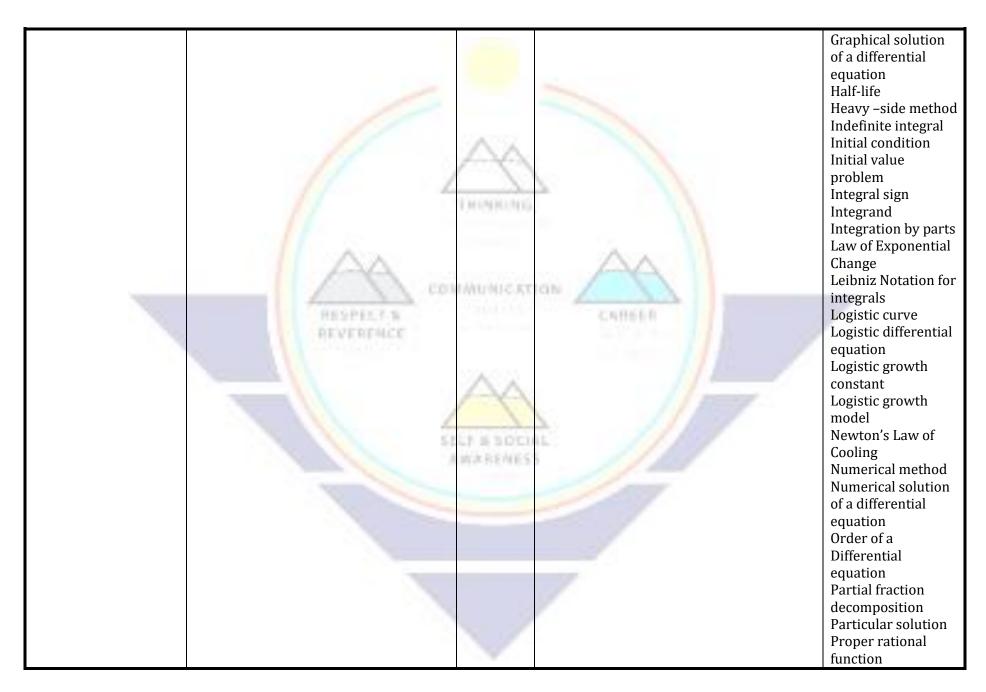




		ancare A	5.6 Determining Concavity of Functions over Their Domains 5.7 Using the Second Derivative Test to Determine Extrema 5.8 Sketching Graphs of Functions and Their Derivatives 5.9 Connecting a Function, Its First Derivative, and Its Second Derivative 5.10 Introduction to Optimization Problems. 5.11 Solving Optimization problems. 5.12 Exploring Behaviors of Implicit Relations	
Unit-6- Integration and Accumulation of Change ~20 Days	RESPECT B REVERENCE	S SOCIAL REVIES S	6.1 Exploring Accumulations of Change 6.2 Approximating Areas with Riemann Sums 6.3 Riemann Sums, Summation Notation, and Definite Integral Notation 6.4 The Fundamental Theorem of Calculus and Accumulation Functions 6.5 Interpreting the Behavior of Accumulation Functions Involving Area 6.6 Applying Properties of 3 Definite Integrals 6.7 The Fundamental Theorem of Calculus and Definite Integrals 6.8 Finding Antiderivatives and Indefinite Integrals: Basic Rules and Notation 6.9 Integrating Using Substitution 6.10 Integrating Functions Using Long Division and Completing the Square 6.14 Selecting Techniques 1 for Antidifferentiation	Unit 6 Accumulator function Area under a curve Average value Bounded function Cardiac output Characteristic function of the rationals Definite integral Differential calculus Dummy variables Error bounds Fundamental Theorem of Calculus Antiderivatives Fundamental Theorem of calculus Evaluation Part Integral function Integral calculus



Unit-7- Differential Equations ~9 Days	RESPECT W REVERENCE	THINKING AT	7.1 Modeling Situations with Differential Equations 2 FUN 7.2 Verifying Solutions for Differential Equations 7.3 Sketching Slope Fields 7.4 Reasoning Using Slope Fields 7.6 Finding General Solutions Using Separation of Variables 7.7 Finding Particular Solutions Using Initial Conditions and Separation of Variables 7.8 Exponential Models with Differential Equations	Unit 7 Antidifferen-tiation by parts Antidifferen-tiation by substitution Carbon-14 dating Carrying capacity Compounded continuously Constant of integration Continuous interest rate Differential equation Euler's method Evaluate an integral Exact differential equation Exponential decay constant Exponential growth constant
		WARENES		Exponential growth



		Properties of
		Indefinite Integrals
		Radioactive
		Radioactive decay
		Resistance
		proportional to
	V. V.	velocity
		Second-order of a
		differential
	The same of the sa	equation
	DOMESTICATO	Separable
		differential
		equation
		Separation of
	CONTRACTOR OF THE PARTY OF THE	variables
4	EDEMINICATION .	Slope Field
100	RESPECT & CARGOD	Solution to a
	REVERFACE	differential
		equation
	17	Substitution in
		definite integrals
		Tabular integration
		Variable of
	SACE A MORNAL	integration
<b>Unit-8- Applications</b>	8.1 Finding th <mark>e Av</mark> erage Value of a Function	Unit 8
of Integration	on an Interval 1 CHA	Accumulation
~20 days	8.2 Connecting Position, Velocity, and	Area between
_	Acceleration of Functions Using Integrals	curves
	8.3 Using Accumulation Functions and	Cavalier's Theorem
	Definite Integrals in Applied Contexts	Center of mass
	8.4 Finding the Area Between Curves	Constant force
	Expressed as Functions of x	formula
	8.5 Finding the Area Between Curves	Cylindrical shells
	Expressed as Functions of y	Displacement
	8.6 Finding the Area Between Curves That	Fluid force
	Intersect at More Than Two Points	Fluid pressure

Review for AP Exam	RESPECT N REVERENCE	HIMHINIC AT	8.7 Volumes with Cross Sections: Squares and Rectangles 8.8 Volumes with Cross Sections: Triangles and Semicircles 8.9 Volume with Disc Method: Revolving Around the x- or y-Axis 8.10 Volume with disc method: revolving around other axes 8.11 Volume with Washer Method: Revolving Around the x- or y-Axis 8.12 Volume with washer method: revolving around other axes	Foot- pound Force constant Gaussian curve Hooke's Law Inflation rate Joule Mean Moment Net change Newton Normal curve Normal PDF (Probability Density Function) Solid of revolution Standard deviation Surface area Total distance travelled Universal gravitational constant Volume by cylindrical shells Volume of a solid Weight density work
Review for AP Exam ~24 days Test ~ on May 5 <sup>th</sup>			Review Previous years Free-Response Questions	

**Applications of** Epidemics, Biome carrying capacity, Logistic, and investments loans, car loans, credit cards, **Financial Functions** Car insurance. ~15 days THE PROPERTY. RESPECTS SELF & BOCIAL AWARENESS