Curriculum Map
Name of Teacher: Br. Hassan
Subject __AP Calculus_____

	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	
Unit Name or Theme	Unit1: Functions (Review) Limits & essentials of calculus	Derivatives: Rules that govern derivatives Apply differentiation to real world problem	Application of derivatives Graphing elementary functions using derivatives tests	Antiderivatives Definite integral Area under the curve Reimann Sums	Reimann Sums Indefinite integrals Integral formulas Area btw curves U-sub	**Unit Name or Theme**
Enduring Understandings and Performance Indicators	Students will be able to: -Review material from precalculus. -Graph functions and analyze them. -Understand procedure of limit and idea behind. -Computing limits by tables. -Use special technique to compute limits. -Indeterminate forms -Compute limits at infinity. -Infinite limits and end behavior. -Continuity concept.	SWBAT: -Understand the tangent line & slope of the tangent line -Compute the difference of quotients -derive from the limit definition the derivative of some parent functions like x, x^2 etc. -Apply the limit definition of derivative to more complex function. -Derive rules of derivatives such as power rule, product rule, quotient rule, constant multiple, chain rule. - process of using chain rule to power functions -apply implicit differentiation to equation and problems. -How to apply derivatives to real world problems.	SWBT: -Understand the extreme values -How to use graphs to find local min/ max and absolute min/max -implicit differentiation to equations -Derivatives of log/exp funtions -related rates -Graphing functions using first and second derivative tests -Intervals of increase and decrease.	SWBT: -Understand the process of antiderivatives (opposite to derivatives). -Learn and derive rules of integration using derivative intuition. -Apply the definite integral rules -Compute the area under velocity curve (Displacement) -Compute area using left, right end points and midpoint under a curve. -understand the Reimann Sums -Compute Reimann Sums.	SWBT: -Compute indefinite integral -Apply fundamental theorem of calculus. -Derive integral formulas for elementary functions x, x^2, 1/x, sinx, cosx, tanx, sec^2x and such. -compute area between curves Horizontally and vertically -Apply the technique of u substitution to compute definite and indefinite integrals.	**Enduring Understandings and Performance Indicators**
Essential Questions	-What is limit? -How can we tell if limit exists or not. -How can we use limits to analyze graphs. -How does domain of a function related concept of continuity and limit computation.	What is the tangent line? What is instantaneous velocity (rate)? What is derivative? What is the limit definition? How do we derive rules of differentiation? When do we say a function is differentiable? What is the relation between differentiation and continuity? What is a smooth curve? What is chain rule?	How do identify extreme values? What is the difference btw local extrema, absolute extrema? How is implicit differentiation is used to solve related rates real world problems? What is the first derivatives test and how it is used to get insight on the original function? What the second derivative test? How do we find interval of increase and decrease? How to graph any elementary function?	What is the integral? How do we approximate area under any curve using areas of rectangles? What is Antiderivative? What is the relationship between integrals and derivatives? How do we compute Reimann Sums? How is velocity related to displacement and acceleration? How did Euclid use integral calculus to estimate pi?	How do we find area btw curves? How do we use Reimann sums to derive some formulas. What is the use of derivatives to derive elementary functions integrals. What is the process of substitution how does it relate to chain rule. What is the different btw horizontally simple and vertically simple approaches to find area under the curve,	**Essential Questions**

Activities/Content						Activities/Content
	-Graphing using utilities. -Group work doing limit tables -One-to-one help solving problems. -Discussions leading to important concepts.		-Students practiced examples for each concept. -Students shared their answers to practice problem (handouts) coming to the board. -Students summarized each lesson using handouts fill in the plank for important key points of each lesson. -Students worked on AP sample problems hand in hand with the teacher going around. -Students created study cards to remember essential formulas	-Students are asked to find area under straight lines as practice to discover integral -Students asked to read material (handout) on Euclid work on estimating area to be able to get the idea of underestimate and overestimate of the actual area of a shape. -Student practiced similar examples after teacher explains concepts using examples. -Students asked to compare antiderivatives and derivatives using previous chapters to come up with some rules. -Students do handouts problems and compare answers.	-Students are asked to derive indefinite integrals for some function -Students asked to read some material beforehand to participate in class -Student practiced similar examples after teacher explains concepts using examples. -Students compared chain rule with u sub -Students do handouts problems and compare answers. -Student are given online material to practice more in class.	

Assessment Strategies Formative & Summative						Assessment Strategies Formative & Summative
	-Homework -Classwork assessments problem solving. -Summary of lessons -Exist ticket questions.	-Homework -Handouts of problems solved in class. -Quizzes -Exam -Lesson review (Pearson resources) -AP handouts for problem solving	-Handouts (Pearson resources) for practice examples -Homework questions and solutions carried in class. -Lesson quizzes at end of each concept ungraded. -Quiz -Take home Exam -Lesson review handouts	Handouts for practice examples. Homework Lesson quiz ungraded Lesson review handouts (AP college board)	Handouts for practice examples. Homework Lesson quiz Lesson review handouts (AP college board) Online material extended practice	

Time Frame						Time Frame
	4 Weeks	4 weeks	4 weeks	4 weeks	4 weeks	

Resources						Resources
	Book: Briggs Calculus. Pearson resources for AP sample problems.	Book: Briggs Calculus. Slides by Pearson	Book Slides by Pearson Handouts (College Board)	Book Slides by Pearson Handouts (College Board)	Book Slides by Pearson Handouts (College Board)	

Textbook (Chapter/pages)	Chapter 1: Pages 1,12 Chapter 2: Pages 54, 61, 69, 79, 88, 98	Chapter 2 & 3	Chapter 4	Chapter 4 section 4.8-4.9 And chapter 5 Section 5.1, 5.2	Chapter 5 section 5,2 , 5.3, 5.4, 5.5, 5.6	Textbook (Chapter/pages)

	FEBRUARY	**MARCH**	**APRIL**	**MAY**	**JUNE**	
Unit Name or Theme	Integration techniques: Integration by parts Trigonometric substitution Extended u substitution Partial fraction decomposition	Differential equations intro Separable equations Initial value diff equations Slope field	More on differential equations Slope fields Non-separable equations U substitution	Ap calculus exam preparation	Final exam review	Unit Name or Theme
Enduring Understandings and Performance Indicators	SWBT: -Derive new techniques for integrations (based on derivatives) -learn and apply integration by parts -learn and apply trig sub integrals -learn and apply integral formulas. -use long division to solve a category of integrals -apply more u substation on practice problem	SWBT: -Identify a differential equation -Identify a separable differential equation from non separable. -Use differential equations to solve initial value. - Draw slope fields -Interpret slope fields	SWBT: -will be practicing more about slope field -How to interpret graphs of slope fields -Turn a non separable equation into separable -Connect the idea of differential equations with slope of tangent lines from the beginning.	SWBT: -Daily practice of topics that will be in ap exam. -Students practice college board material free response questions -Students practice past exams 2017, 2018, 2019	SWBT: -Students review material from beginning of the year -Students solve problems and practice during class -Study similar problems that will be in final exam. -Student play kahoot about derivative and integrals for practice	Enduring Understandings and Performance Indicators
Essential Questions	How do we use integration by parts in problem solving? What are techniques of integral are used for? What type of problems belong to each category of integral techniques?	How do we solve exponential growth models? What logistic and exponential growth can tell us? How do we interpret differential equations?	How do we identify the equation from a pattern of slope field?	Review	Review	Essential Questions

Activities/Content						Activities/Content
	-Students solve many problems in class after teacher explains each concept. -Students come to board to explain concept (integral techniques) to other students. -Student use handouts about different integral techniques to explore how to solve each category.	-Students practiced problems solving after watching videos on similar examples. -Students read the book to gain more insight about growth, logistic model -Student finish handout about separable differential equations matching -Students practice more problem-solving differential equation and initial value problems.	-Students practiced handouts about slope fields from online resources. -Students read college board lesson about slope fields and differential equations. -Students practiced turning non-separable differential equation into separable using u sub technique. -Students tasked to watch solved problem on slope field and patterns (youtube)	-Students use past exam to prepare -Q/A's with teacher through email, class meetings to further assist them. -Solving problems during meeting about topics on AP exam.	-Problem solving of samples that will be in the final	
Assessments (Formative and Summative)	-Teacher checks every student understand after assigning practice problems going around class. -Students problem solve in groups and check answers with the teacher. -Exam on the material -Quiz -Quiz online college board -Direct questions to students in class. -Homework	-Quiz about the material -exam is given about differential equations -direct question through online meetings. -Homework	-Homework -Direct interaction with individual students Q/A's -Group work (handouts) -Quiz	-Past exams as homework (not graded) -Practiced Free response questions with teacher	-Sample questions for final -Direct interactions Q/A's about practice problems for final exam. -Free response question similar to ap calculus exam for homework	Assessments (Formative and Summative)
Textbook (Chapters/pages)	Book Slides by Pearson Handouts (College Board)	College board lessons College board previous AP exams Book	College board lessons College board previous AP exams Book has less info about differential equation. We used other available online resources.	-College board exams -College board online preparing questions similar to how exam will be.	Selected problem from book Selected problem from college board website	Textbooks (Chapters/pages)
Resources	Chapter 6 and 7	Chapter 8	Chapter 8 more	Online resources Exams for review	Online resources	Resources