	Marietta City Schools
	2023–2024 District Unit Planner

AP Calculus AB

Unit title	Unit 2: Differentiation: Definition and Basic Derivative Rules	**Unit duration (hours)**	**3 Weeks**

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GA DoE Standards

Standards

2.1 Defining average and instantaneous rates of change
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 with continuity
2.5 Applying the power rule
2.6 Derivative rules: constant, sum, difference, and constant multiple
2.7 Derivative of $\cos(x)$, $\sin(x)$, e^x, and $\ln(x)$
2.8 The product rule
2.9 The quotient rule
2.10 Finding the derivatives of tangent, cotangent, secant, and/or cosecant functions

Concepts/Skills to support mastery of standards

- Defining average and instantaneous rates of change
- Defining the derivative of a function and using derivative notation
- Estimating derivatives of a function at a point
- Connecting differentiability with continuity
- Applying the power rule
- Derivative rules: constant, sum, difference, and constant multiple
- Derivative of $\cos(x)$, $\sin(x)$, ex, and $\ln(x)$
- The product rule

- The quotient rule
- Finding the derivatives of tangent, cotangent, secant, and/or cosecant functions

Notation

4.C Use appropriate mathematical symbols and notation (e.g., Represent a derivative using $f'(x)$, y', and $\frac{dy}{dx}$).

For $y = f(x)$, notations for the derivative include $\frac{dy}{dx}$, $f'(x)$, and y'.

ESSENTIAL KNOWLEDGE

CHA-2.A.1
The difference quotients $\frac{f(a+h)-f(a)}{h}$ and $\frac{f(x)-f(a)}{x-a}$ express the average rate of change of a function over an interval.

CHA-2.B.1
The instantaneous rate of change of a function at $x = a$ can be expressed by $\lim_{h \to 0}\frac{f(a+h)-f(a)}{h}$ or $\lim_{x \to a}\frac{f(x)-f(a)}{x-a}$, provided the limit exists. These are equivalent forms of the definition of the derivative and are denoted $f'(a)$.

Essential Questions

How do derivatives allow us to find instantaneous rates of change?
Why do mathematical properties and rules for simplifying and evaluating limits apply to differentiation?
What does a derivative tell us about a real world scenario?

Assessment Tasks

List of common formative and summative assessments.

Formative Assessment(s):

Homework

Quizzes/Skills Checks

Summative Assessment(s):

Unit Test

	Learning Experiences	
	Add additional rows below as needed.	
Objective or Content	**Learning Experiences**	**Personalized Learning and Differentiation**
2.5 Applying the power rule 2.6 Derivative rules: constant, sum, difference, and constant multiple 2.7 Derivative of cos(x), sin(x), e^x, and ln(x) 2.8 The product rule 2.9 The quotient rule 2.10 Finding the derivatives of tangent, cotangent, secant, and/or cosecant functions	Error Analysis Round Table Students will analyze the derivatives of functions and identify. Allow them to check their answers. Ask half of the class to redo their work to include an error, thus having the wrong answer. Ask students to record their correct or incorrect work on a card. Mix up the cards and redistribute, having students determine if the answer is correct or incorrect. If incorrect, they should explain what error was made, and find the correct answer.	Collaborative groups Technology: desmos, graphing calculators, if desired. Some criteria could be removed based on student needs/timing.

Content Resources

- AP Classroom (within AP Central, collegeboard.org)
- Calculus textbook: Calculus, 22e, Larson & Edwards
- Tony Record (Avon HS) created resources
- www.flippedmath.com
- Khan Academy
- Delta Math
- Master Math Mentor (pdf files and videos)
- Teacher created resources