



Marietta City Schools
2024–2025 District Unit Planner

AP Calculus BC

Unit title	MHS Unit 2 - AP Calc BC Unit 2 & 3: Differentiation Rules	Unit duration (hours)	15 hours
-------------------	---	------------------------------	----------

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
- 3.1 The chain rule
- 3.2 Implicit differentiation
- 3.3 Differentiation inverse functions
- 3.4 Differentiation inverse trigonometric functions
- 3.5 Selecting procedures for calculating derivatives
- 3.6 Calculative higher order derivatives

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 $\cos(x)$, $\sin(x)$, e^x , and $\ln(x)$
- The product rule
- The quotient rule
- Finding the derivatives of tangent, cotangent, secant, and/or cosecant functions
- Implicit Differentiation
- Differentiating Inverse Functions
- Differentiation of Inverse Trig Function
- Selecting procedures for calculating derivatives
- Calculating higher order derivatives

Vocabulary

Average rate of change, instantaneous rate of change, secant line, tangent line, difference quotient, derivative, differentiability, power rule, product rule, quotient rule,

Composite function, chain rule, implicit differentiation, inverse functions, higher order derivatives

Notation

$$f'(x), y', \frac{dy}{dx}, \frac{d}{dx}(f(x))$$

$$y = f(u), u = g(x), f^{-1}(x), (f^{-1})'(x), \arcsin(x), \sin^{-1}(x)$$

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?
 How do we find derivatives of composite and inverse functions?
 How can we take the derivative of a function that is not explicitly solved for a single variable?
 How do you decide which derivative rules to utilize?
 How can we explore the relationship between a function and its first and second derivatives?

Assessment Tasks

List of common formative and summative assessments.

Formative Assessment(s):

Notebook, HW quizzes

Summative Assessment(s):

Unit test

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
3.1 The chain rule	Mixed Six activity for chain rule <ol style="list-style-type: none"> 1. Factual recall 2. Carry out a procedure 3. Classify a mathematical object 4. Prove, show, justify 5. Extend a concept 6. Critique a fallacy 	Collaborative groups Technology: desmos, graphing calculators, if desired.
3.2 Implicit differentiation	Mixed Six activity for implicit differentiation <ol style="list-style-type: none"> 1. Factual recall 2. Carry out a procedure 3. Classify a mathematical object 4. Prove, show, justify 5. Extend a concept 6. Critique a fallacy 	Collaborative groups Technology: desmos, graphing calculators, if desired.

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)
- CalcMedic
- Teacher created resources