



Marietta City Schools
2025–2026 District Unit Planner

AP Calculus AB/BC

Unit title	Unit 4: Analytical Applications of Differentiation	Unit duration (hours)	AB 3-4 weeks BC 2-3 weeks
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Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GA DoE Standards

Standards

- 5.1 Using the mean value theorem
- 5.2 Extreme value theorem, global versus local extrema, and critical points
- 5.3 Determining intervals on which a function is increasing or decreasing
- 5.4 Using the first derivative test to determine relative (local) extrema
- 5.5 Using the candidates test to determine absolute (global) extrema
- 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

Concepts/Skills to support mastery of standards

- Using the mean value theorem
- Extreme value theorem, global versus local extrema, and critical points
- Determining intervals on which a function is increasing or decreasing
- Using the first derivative test to determine relative (local) extrema
- Using the candidates test to determine absolute (global) extrema
- Determining concavity of functions over their domains
- Using the second derivative test to determine extrema
- Sketching graphs of functions and their derivatives

- Connecting a function, its first derivative, and its second derivative
- Introduction to optimization problems
- Solving optimization problems
- Exploring behaviors of implicit relations
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Vocabulary

Mean Value Theorem

Extreme Value Theorem

Global Extrema, Local Extrema

First Derivative Test

Concavity

Second Derivative Test

Optimization

it is safer and easier for students to make arguments about f based directly on the graph of the derivative, as in, " f is concave up on $a < x < b$ because the graph of f' is increasing on $a < x < b$." Students should always refer to f , f' , and f'' by name, rather than by "it" or "the function," which may leave the reader unsure of their intended meaning.

Notation

F' , f'' , and f with dy/dx , d^2y/dx^2

Essential Questions

How can calculus be used to verify certain aspects about a function?

How can we use derivatives to understand the behavior of the graph of a function without the use of a graphing device?

How is calculus used to find an optimal solution to a problem?

Assessment Tasks

List of common formative and summative assessments.

Formative Assessment(s):

Skills Checks

HW

Quizzes

Progress Checks in AP Classroom

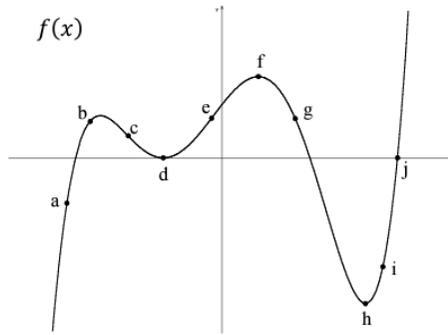
Summative Assessment(s):

Unit Test

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
5.8 5.9	Predict and Confirm Provide students with the graph of a differentiable function, for example,	Collaborative groups and extension on AP classroom



, but do not provide the rule for the function. Ask students to sketch a graph of the derivative of the function. Once students are done, reveal the rule for $f(x)$. Ask students to calculate $f'(x)$, and use technology to graph $f'(x)$ and compare it to their sketched graph.

Learning Experiences

Add additional rows below as needed.

Content Resources

- AP Classroom (within AP Central, collegeboard.org)
- Calculus textbook: Calculus, 11e, Larson & Edwards
- Tony Record (Avon HS) created resources
- Khan Academy
- Delta Math
- Master Math Mentor (pdf files and videos)
- Teacher created resources