Marietta City Schools

2024–2025 District Unit Planner

AP Calculus BC

Unit title	**MHS Unit 5 - AP Unit 8: Applications of Integration**	**Unit duration (hours)**	**10-12 hours**

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

GA DoE Standards

Standards

8.1 Finding the average value of a function on an interval
8.2 Connecting position, velocity, and acceleration of functions using integrals
8.3 Using accumulation functions and definite integrals in applied contexts
8.4 Finding the area between curves expressed as functions of x
8.5 Finding the area between curves expressed as functions of y
8.6 Finding the area between curves that intersect at more than two points
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
8.13 The arc length of a smooth, planar curve and distance traveled

Concepts/Skills to support mastery of standards

- Finding the average value of a function on an interval
- Connecting position, velocity, and acceleration of functions using integrals
- Using accumulation functions and definite integrals in applied contexts
- Finding the area between curves expressed as functions of x
- Finding the area between curves expressed as functions of y
- Finding the area between curves that intersect at more than two points

- Volumes with cross sections: squares and rectangles
- Volumes with cross sections: triangles and semicircles
- Volume with disc method: Revolving around the x- or y-axis
- Volume with disc method: revolving around other axes
- Volume with washer method: Revolving around the x- or y-axis
- Volume with washer method: revolving around other axes
- The arc length of a smooth, planar curve and distance traveled

Vocabulary

Average value, volume by rotation, disc method, washer method, arc length

Notation

Essential Questions

How is calculus used to relate position, velocity, and acceleration?
How do you calculate the area between functions?
How do you calculate volume with known cross sections?
How do you calculate the volume of solids formed by revolution?

Assessment Tasks

List of common formative and summative assessments.

Formative Assessment(s):

Notebook, HW quizzes, AP Classroom Progress Checks

Summative Assessment(s):

Unit Test

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
8.2 Connecting position, velocity, and acceleration of functions using integrals	Calc Medic 8.2 - Whitney's Bike Ride Task Connecting position, velocity, and acceleration using integrals.	Collaborative groups Technology: desmos, graphing calculators, if desired.
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	Mixed Six activity for Volumes by Revolution (8.9-8.12) 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) AP daily videos, progress checks
- Calculus textbook: Calculus, 11e, Larson & Edwards
- Tony Record (Avon HS) created resources
- Flippedmath.com
- Calc Medic website
- Khan Academy
- Delta Math
- Master Math Mentor (pdf files and videos)
- Teacher created resources