



**Marietta City Schools**  
**2023–2024 District Unit Planner**

*AP Calculus AB*

Unit title	AP Unit 8: Applications of Integration	Unit duration (hours)	4 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**

- 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

**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
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### **Vocabulary**

Average value, volume by rotation, disc method, washer method, line of revolution,

#### **CHA-4.B.1**

The average value of a continuous function

$f$  over an interval  $[a, b]$  is  $\frac{1}{b-a} \int_a^b f(x) dx$ .

### **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):**

Skills checks, 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	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) <ol style="list-style-type: none"> <li>1. Factual recall</li> <li>2. Carry out a procedure</li> <li>3. Classify a mathematical object</li> <li>4. Prove, show, justify</li> <li>5. Extend a concept</li> <li>6. Critique a fallacy</li> </ol>	Collaborative groups Technology: desmos, graphing calculators, if desired.
Content Resources		
<ul style="list-style-type: none"> <li>• AP Classroom (within AP Central, collegeboard.org) AP daily videos, progress checks</li> <li>• Calculus textbook: Calculus, 11e, Larson &amp; Edwards</li> <li>• Tony Record (Avon HS) created resources</li> <li>• Flippedmath.com</li> <li>• Calc Medic website</li> <li>• Khan Academy</li> <li>• Delta Math</li> <li>• Master Math Mentor (pdf files and videos)</li> <li>• Teacher created resources</li> </ul>		