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

**AP Calculus BC**

<table>
<thead>
<tr>
<th>Unit title</th>
<th>Unit duration (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1: Limits &amp; Continuity</td>
<td>3 Weeks</td>
</tr>
</tbody>
</table>

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

**GA DoE Standards**

**Standards**
- 1.1 Introducing Calculus: Can change occur at an instant?
- 1.2 Defining limits and using limit notation
- 1.3 Estimating limit values from graphs
- 1.4 Estimating limit values from tables
- 1.5 Determining limits using algebraic properties of limits
- 1.6 Determining limits using algebraic manipulation
- 1.7 Selecting procedures for determining limits
- 1.8 Determining limits using the Squeeze Theorem
- 1.9 Connecting multiple representations of limits
- 1.10 Exploring types of discontinuities
- 1.11 Defining continuity at a point
- 1.12 Confirming continuity over an interval
- 1.13 Removing discontinuities
- 1.14 Connecting infinite limits and vertical asymptotes
- 1.15 Connecting limits at infinity and horizontal asymptotes
- 1.16 Working with the Intermediate Value Theorem (IVT)

**Concepts/Skills to support mastery of standards**
- Introducing Calculus: Can change occur at an instant?

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Resources, materials, assessments not linked to SGO or unit planner will be reviewed at the local school level.
Defining limits and using limit notation
Estimating limit values from graphs
Estimating limit values from tables
Determining limits using algebraic properties of limits
Determining limits using algebraic manipulation
Selecting procedures for determining limits
Determining limits using the Squeeze Theorem
Connecting multiple representations of limits
Exploring types of discontinuities
Defining continuity at a point
Confirming continuity over an interval
Removing discontinuities
Connecting infinite limits and vertical asymptotes
Connecting limits at infinity and horizontal asymptotes
Working with the Intermediate Value Theorem (IVT)

Vocabulary

<table>
<thead>
<tr>
<th>Instantaneous rate of change</th>
<th>limit</th>
<th>One sided limit</th>
<th>Types of discontinuities</th>
</tr>
</thead>
<tbody>
<tr>
<td>continuity</td>
<td>asymptotes</td>
<td>Intermediate value theorem</td>
<td></td>
</tr>
</tbody>
</table>

Notation

\[
\frac{\Delta y}{\Delta x} = \lim_{x \to c^-} f(x) = L = \lim_{x \to c^+} f(x) = L
\]

Essential Questions

Can change occur at an instant?
How does knowing the value of a limit, or that a limit does not exist, help you to make sense of interesting features of functions and their graphs?
How do we close loopholes so that a conclusion about a function is always true?

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### Assessment Tasks

*List of common formative and summative assessments.*

**Formative Assessment(s):**
- Homework
- Quizzes

**Summative Assessment(s):**
- Unit 1 Assessment

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#### Learning Experiences

Add additional rows below as needed.

<table>
<thead>
<tr>
<th>Objective or Content</th>
<th>Learning Experiences</th>
<th>Personalized Learning and Differentiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.9 Connecting multiple representations of limits</td>
<td>CalcMedic - Unit 1 - Day 8 - Card sort Students will use the Card Sort: Connecting multiple representations of limits to review and connect limits and continuities on a graph, equation, and verbal description.</td>
<td>Collaborative groups Technology: desmos, graphing calculators, if desired. Some criteria could be removed based on student needs/timing.</td>
</tr>
<tr>
<td>1.10 Exploring types of discontinuities</td>
<td></td>
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#### Content Resources

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

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