Unit 2: Functions, Limits and Continuity

Content Area: **Mathematics**
Course(s): **Honors Calculus**
Time Period: **October**
Length: **4 weeks**
Status: **Published**

Enduring Understandings:

- Algebra, trigonometry, and logarithms are essential tools for the study of calculus.
- Continuous functions model real-life phenomena.
- During direct substitution students will misinterpret solutions with zero as a denominator as Does not Exist.
- The concept of a limit is one of the foundations of calculus.

Essential Questions:

- How do limits guarantee the continuity of a function?
- How does the math that you previously studied relate to the math that you are going to be studying?
- What is the difference between calculating a limit and evaluating a function at a point?
- When do limits fail to exist?

Lesson Titles:

- An intuitive understanding of continuity. (The function values can be made as close as desired by taking sufficiently close values of the domain.)
- Analysis of end behavior of limits
- Analysis of graphs
- analysis of limits using technology
- Comparing relative magnitudes of functions and their rates of change (for example, contrasting exponential growth, polynomial growth, and logarithmic growth).
- Continuity as a property of functions
- Estimating limits from graphs or tables of data.
- Evaluating limits algebraically
- Geometric understanding of graphs of continuous functions (Intermediate Value Theorem and Extreme Value Theorem)
- Intro. of one and two sided limits
- Introduction of limits graphically
- Limits and continuity
- Limits approaching infinity
- Understanding continuity in terms of limits

Career Readiness, Life Literacies & Key Skills

WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.

Inter-Disciplinary Connections:

LA.RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LA.RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
LA.WHST.11-12.1	Write arguments focused on discipline-specific content.

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK:

- Analysis of end behavior of limits
- Analysis of graphs
- Blooms Analysis - Break down objects or ideas into simpler parts and find evidence to support generalizations
- Blooms Application - Apply Knowledge to actual situations
- Blooms Evaluation - Make and defend judgments based on internal evidence or external criteria
- Blooms Knowledge - Remember previously learned information
- Blooms Synthesis - Compile component ideas into a new whole or propose alternative solutions
- Intro. calculating limits utilizing direct substitution
- Intro. continuity
- Intro. finding limits of trig functions
- Intro. finding limits using conjugates
- Intro. indeterminate forms
- Intro. limits approaching asymptotes
- Intro. limits approaching infinity
- Intro. rational limits
- Provide individual activity
- Provide real world examples
- Provide team work activity
- review homework
- review vocabulary that is associated with this unit

Modifications

Formative Assessment:

- closure: pass out class infinity practice
- Pair share
- Partner answer/analyze questions
- Pass out of class
- warm up: partner continuity practice

Alternate Assessment

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Reflective pieces

Concept maps

Benchmark Assessment

Skills-based assessment- math practice

Summative Assessment:

- Individual Assignment
- Marking Period Assessment
- Performance Task
- Project

- quiz: continuity
- Quiz: evaluate limits
- Review game
- Tets: limits

Resources & Materials:

- Calculus: Graphical, Numerical, Algebraical, by Finney, Demana and Kennedy
- Establish a set of general strategies for student independence and self-evaluation
- Evoke student participation from their seats and at the board
- Graphing Calculator acitivities
- Independent/Cooperative learning explorations
- Powerpoint lessons
- Smartboard Lessons
- Teacher Generated Worksheets