Unit #1: Limits and Continuity

Content Area: **Mathematics**
Course(s): **Calculus A**
Time Period: **Semester 1**
Length: **2 weeks**
Status: **Published**

Standards

MA.A-SSE.A	Interpret the structure of expressions
MA.F-IF.A.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
MA.F-IF.B.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
MA.F-IF.B.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
MA.F-IF.C.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MA.F-IF.C.8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
MA.F-IF.C.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

Enduring Understandings

Calculus is a collection of powerful ideas; not a set of rules, formulas and procedures. To learn calculus requires focus on the understanding of a few big ideas, not merely memorizing techniques.

There are certain skills from previous math courses that are essential to success in Calculus.

There are different ways to calculate limits.

The concept of a limit is one of the foundations of Calculus.

Essential Questions

Why is calculus more powerful than previous math studied?

How do you find the limit of a function?

When does a limit fail to exist?

How do you determine continuity of a function?

How do you find a one sided limit?

Where does a function have vertical asymptotes?

Knowledge and Skills

- Compare precalculus and calculus.
- Estimate a limit using a numerical or graphical approach.
- Identify different ways that a limit can fail to exist.
- Evaluate a limit using the properties of limits.
- Develop and use a strategy for finding limits.
- Estimate a limit using simplifying and rationalizing techniques.
- Evaluate one sided limits.
- Evaluate infinite limits from the left and from the right.
- Find and sketch the vertical asymptote on a graph of a function.

Transfer Goals

Recognize and solve practical or theoretical problems involving mathematics, including those for which the solution approach is not obvious, by using mathematical reasoning and strategic thinking.

Understanding the situation better allows you to pick the appropriate strategy.

Resources

Calculus of a Single Variable (6th Edition)

Authors: Edwards, Hostetler, Larson

Sections: 1.1 - 1.5

Graphing Calculator

www.desmos.com

https://www.edx.org/school/davidson-next

http://www.larsoncalculus.com/calc10/content/interactive-examples/