Unit E - *Integration*

Overview

Students are introduced to the concept of an antiderivative using the concepts learned in Unit C. Using Riemann sums and sigma notation, students will see the connection of an integral to the area under a curve. Students will explore definite and indefinite integrals. Students will learn the integration technique of substitution.

21st Century Capacities: Synthesizing, Collective Intelligence

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

MP 1 Make sense sense of problems and persevere in solving them
MP2 Reason abstractly and quantitatively
MP5 Use appropriate tools strategically
MP6 Attend to precision
MP7 Look for and make use of structure

Transfer:

Students will be able to independently use their learning in new situations to...

1. Make sense of a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution. (Collective Intelligence)
2. Apply familiar mathematical concepts to a new problem or apply a new concept to rework a familiar problem. (Synthesizing)

Meaning:

UNDERSTANDINGS: *Students will understand that:*

1. Mathematicians flexibly use different tools, strategies, and operations to build conceptual knowledge or solve problems.
2. Mathematicians identify relevant tools, strategies, relationships, and/or information in order to draw conclusions.
3. Mathematicians use geometric models, and spatial sense to interpret and make sense of the physical environment.

ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:*

A. What math tools/models/strategies can I use to solve the problem?
B. How can I simplify the problem?
C. How can I break a problem down into manageable parts?

	Acquisition:	
	Students will know…	*Students will be skilled at…*
	1. The summation formulas 2. Right end, left end and midpoint approximations 3. The difference between signed area and total area 4. Integration by substitution 5. Vocabulary: antiderivative, indefinite integral, definite integral, Reimann Sums, definite integral, integrable, average value	1. Evaluating basic indefinite integrals 2. Finding velocity and position functions given the acceleration function and initial value 3. Finding a function satisfying given conditions 4. Computing sums of values of f(x) evaluated a) at given finite intervals b) for limit as (# sums) $n \rightarrow \infty$ 5. Using n subintervals in a Reimann sum to compute the area under a curve 6. Evaluating definite integrals using a)Reimann Sums b) Fundamental Theorem of Calculus 7. Determining the area between two curves evaluating definite integrals using methods of substitution