Unit #5: Advanced Integration

Content Area: **Mathematics**
Course(s): **Calculus A**
Time Period: **Semester 2**
Length: **17 weeks**
Status: **Published**

Standards

MA.K-12.1	Make sense of problems and persevere in solving them.
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.7b	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
MA.F-IF.C.7e	Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
MA.F-IF.C.8b	Use the properties of exponents to interpret expressions for exponential functions.
MA.F-TF.B.6	Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.
MA.G-GMD.A.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

Enduring Understandings

Integrals can be used to solve a variety of problems related to area, velocity, acceleration, volume, area of a surface of revolution, length of a curve, and work.

Integrals represent the summation of rectangles.

Essential Questions

How do we find the derivative of a logarithmic, exponential or other trancendental function?

How do we find the integral of a logarithmic, exponential or other trancendental function?

How do you find the area between two curves?

How can we determine the volume of a solid that is formed by revolving a 2-dimensional graph about an axis of revolution?

How can we use L'Hopital's Rule to help evalute limits?

Knowledge and Skills

- Find the derivative of logarithmic, exponential and other trancendental functions.
- Find the integral of logarithmic, exponential and other trancendental functions.
- Find the area between two curves.
- Determine the volume of a solid formed by revolving a 2-dimensional graph about an axis of revolution.
- Evaluate limits using L'Hopital's Rule.
- Evaulate integrals using Trigonometric substitution.
- Evaluate integrals using partial fractions.
- Evaluate integrals using integration by parts.

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.

In this unit students will be able to analyze a given function to determine which of their various integration strategies to apply. Students will also relate integration to applications such as volume of rotated solids.

Resources

Calculus of a Single Variable (6th Edition)

Authors: Edwards, Hostetler, Larson

Sections: 5.1 - 5.5

Sections: 5.7 - 5.9

Sections: 6.1 - 6.3

Sections: 7.1 - 7.5

Sections: 7.7 - 7.8

Graphing Calculator

www.desmos.com

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

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