# AP Calculus AB 2

MTHH072057
Credits: 0.5 units / 5 hours | NCAA Approved

## Course Description

In AP Calculus AB 2 students will gain experience in the use of calculus methods and learn to apply these methods to real-world problems. In this second semester course, students continue their exploration of calculus with antiderivatives and definite integrals, including differential equations, slope fields, the Chain Rule, antiderivatives of logarithms and exponentials, inverse trigonometric functions, trigonometric substitutions and the Fundamental Theorem of Calculus. They will also explore the applications of integrals: net change and displacement, volume, separable differential equations, and work. This is the second semester of the AP Calculus AB series that will prepare students to take the AP Calculus AB exam. This course has been approved by College Board. A graphing calculator is required.

***Prerequisites**:* Two years of Algebra, one year of Ggeometry, one year Pre-Calculus, and AP Calculus AB 1.

## Course Assessments

2 Unit Evaluations, 2 Projects, 2 Progress Tests, 4 Teacher Connect Activities

## Course Objectives

When you have completed the materials in this course, you should be able to:

1. Define the antiderivaitve and indefinite integral.
2. Use substitution to find antiderivatives.
3. Find antiderivatives of exponential, logarithmic, and trigonometric functions.
4. Find the area between two curves.
5. Find volumes of solids by cross sections.
6. Define work done on an object.
7. Solve problems related to growth and decay.
8. Define theorems in calculus and use them.

## Course Outline

### Unit 4: Integration, Logarithms and Exponentials

Lesson 21: Antiderivatives and Indefinite Integration
Lesson 22: Area
Lesson 23: Riemann Sums and Definite Integrals
Lesson 24: The Fundamental Theorem of Calculus
Lesson 25: Integration by Substitution
Lesson 26: Numerical Integration
Teacher Connect 1
Lesson 27: The Natural Logarithmic Function: Differentiation
Lesson 28: The Natural Logarithmic Function: Integration
Lesson 29: Inverse Functions
Lesson 30: Exponential Functions: Differentiation and Integration
Lesson 31: Bases Other than e and Applications
Unit 4 Evaluation
Teacher Connect 2
Project 4
Progress Test 1

### Unit 5: Other Transcendental Functions, Differential Equations and Applications of Integration

Lesson 32: The Indeterminate Form and L'Hopital's Rule
Lesson 33: Inverse Trigonometric Functions: Differentiation
Lesson 34: Inverse Trigonometric Functions: Integration
Lesson 35: Hyperbolic Functions
Lesson 36: Differential Equations and Slope Fields
Lesson 37: Differential Equations: Growth and Decay
Teacher Connect 3
Lesson 38: Separation of Variables and the Logistic Equation
Lesson 39: Area of a Region between Two Curves
Lesson 40: Volume: The Disk Method
Lesson 41: Volume: The Shell Method
Lesson 42: Arc Length and Surfaces of Revolution
Lesson 43: Work
Unit 5 Evaluation
Teacher Connect 4
Project 5
Progress Test 2

## Review for Progress Test 2Required Textbook and Materials

**(available through Follett virtual bookstore at http://highschool.nebraska.bkstr.com)**

Textbook: *Calculus (AP ® Edition)*, *10th ed.* by Larson and Edwards. National Geographic/Cengage Learning. ISBN: 9781285060309

TI-83+ Graphing Calculator or similar