Adv Pl Calculus AB

Pre-Requisites: Algebra I, Geometry, Algebra II, & Pre-Calculus or Trigonometry/Analytical Geometry
Credits: 0.5 (per segment)
Estimated Completion Time: 2 segments / 32-36 weeks
Earliest Start Date: March 2014

Description

This course consists of a full high school year of work that is comparable to calculus courses in colleges and universities. Students who complete an AP course in calculus seek college credit, college placement, or both from institutions of higher learning.

An interactive text, graphing software, and math symbol software combine with the exciting online course delivery to make calculus an adventure. This course is designed to prepare students for the AP Calculus AB exam given each year in May. With continuous enrollment, students can start the course and begin working on calculus as early as spring of the previous year.

Most colleges and universities offer a sequence of several courses in calculus, and entering students are placed within this sequence according to the extent of their preparation, as measured by the results of an AP examination or other criteria.

Note: This course meets one required math credit for high school graduation.

Major Topics and Concepts

Segment 1

Preparation for Calculus

Real Numbers

Cartesian Plane 10

Trigonometry Review

Graphs and Models

Linear Models and Rates of Change

Functions

Limits and Continuity

A Preview of Calculus

Finding Limits Graphically and Numerically

Evaluating Limits Analytically

Continuity and One-Sided Limits

Infinite Limits

Differentiation

The Derivative and Tangent Line Problem

Basic Differentiation Rules and Rates of Change

The Product and Quotient Rules and Higher Order Derivatives

The Chain Rule

Implicit Differentiation

Logarithmic Differentiation

Related Rates

Applications of Differentiation

Extrema on an Interval

Rolle's Theorem and the Mean Value Theorem

Increasing and Decreasing Functions and the First Derivative Test

Concavity and the Second Derivative Test

Limits at Infinity

Summary of Curve Sketching

Optimization Problems

Differentials

Integration

Antiderivatives and Indefinite Integration

Area

Segment 2

Integration

Riemann Sums and Definite Integrals

The Fundamental Theorem of Calculus

Average Value of a function and the Mean Value Theorem for Integrals

Integration by Substitution

Numerical Integration

Transcendental Functions

The Natural Logarithmic Function and Differentiation

The Natural Logarithmic Function and Integration

Inverse Functions

Exponential Functions: Differentiation and Integration

Bases other than e and Applications

Inverse Trigonometric Functions and Differentiation

Inverse Trigonometric Functions and Integration

Differential Equations

Differential Equations: Slope Fields

Differential Equations: Growth and Decay

Differential Equations: Separation of Variables

Applications of Integration

Area of a Region Between Two Curves

Volume: Disk Method

Integration Techniques

Basic Integration Rules

Indeterminate Forms and L'Hopital's Rule

AP Review

Required Materials

Calculator approved for use.

Course Objectives

Grading Policy

Besides engaging students in challenging curriculum, the course guides students to reflect on their learning and evaluate their progress through a variety of assessments. Assessments can be in the form of practice lessons, multiple choice questions, writing assignments, projects, research papers, oral assessments, and discussions. The course will use the state-approved grading scale and each course contains a unique end of course assessment. This assessment counts for 20% of the student’s overall grade and must be passed with a score of 60% or higher.

Students must take the Advanced Placement exam to receive Advanced Placement credit.

Communication Policy

To achieve success, students are expected to submit work in each course weekly. Students can learn at their own pace; however, “any pace” still means that students must make progress in the course every week. To measure learning, students complete self-checks, practice lessons, multiple choice questions, simulated AP exams, projects, discussion-based assessments, and discussions. Students are expected to maintain regular contact with teachers; the minimum requirement is monthly. When teachers, students, and parents work together, students are successful.

Students must take the Advanced Placement exam to receive Advanced Placement credit. Students who complete the course successfully but do not take the AP exam will receive honors-level credit in calculus.

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