

**Department:** Mathematics

**Course Name:** Advanced Placement Calculus

**Course Description:**

AP Calculus BC is roughly equivalent to both first and second semester college calculus courses, this course covers Calculus AB and extends the content to different types of equations and introduces the topic of sequences and series. The AP course covers topics in differential and integral calculus, including concepts and skills of limits, derivatives, definite integrals, the Fundamental Theorem of Calculus, and series. The course teaches students to approach calculus concepts and problems when they are represented graphically, numerically, analytically, and verbally, and to make connections among these representations. Students learn how to use technology to help solve problems, experiment, interpret results, and support conclusions. An emphasis on critical thinking, complex communication, collaboration, creativity, and risk-taking while promoting a global perspective will prepare students for rigorous college work. Students are required to take the AP Calculus BC exam in the spring. A TI-84 graphing calculator is required.

**Content:**

Limits and continuity

Differentiation: definition and fundamental principles

Differentiation: composite, implicit, and inverse functions

Contextual applications of differentiation

Analytical applications of differentiation

Integration and accumulation of change

Differential equations

Applications of integration

Parametric equations, polar coordinates, and vector-valued functions (BC only)

Infinite sequences and series (BC only)

**Skills:**

Mathematical Practices:

Identify the question to be answered or problem to be solved

Identify key and relevant information to answer a question or solve a problem

Identify an appropriate mathematical rule or procedure

Apply appropriate mathematical rules or procedures, with and without technology

Explain how an approximated value relates to the actual value

Connecting Representations:

Identify common underlying structures in problems involving different contextual situations

Identify mathematical information from graphical, numerical, analytical, and/or verbal representations

Identify a re-expression of mathematical information presented in a given representation

Identify how mathematical characteristics or properties of functions are related

Describe the relationships among different representations of functions and their derivatives

Justification:

Apply technology to develop claims and conjectures

Identify an appropriate mathematical definition, theorem, or test to apply

Confirm whether hypotheses or conditions of a selected definition, theorem, or test have been satisfied

Apply an appropriate mathematical definition, theorem, or test

Provide reasons or rationales for solutions and conclusions

Explain the meaning of mathematical solutions in context.

Confirm that solutions are accurate and appropriate

Communication and Notation:

Use precise mathematical language

Use appropriate units of measure

Use appropriate mathematical symbols and notation

Use appropriate graphing techniques

Apply appropriate rounding procedures

**Text and Materials:**

Finney, Demana, Waits, Kennedy, Bressoud, Calculus: Graphical, Numerical, Algebraic (AP Edition, Pearson, 5<sup>th</sup> ed., 2016)

[AP Calculus Course At-A-Glance](#)

**Methods of Instruction:**

Lecture

Small group discussion

AP Classroom videos,

AP Classroom progress checks

Worksheets

Homework assignments

Desmos

**Methods of Evaluation:**

Tests

Quizzes

Online assessments

