AP Calculus AB
Course #158251-158252
1 credit (2 semesters)
Prerequisite: Precalculus

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Course Objectives and Goals: To facilitate student learning equivalent to one semester of college calculus and analytic geometry. In addition, students should learn strategies for college success in many different disciplines and be prepared to take the Advanced Placement Calculus AB test with the goal of earning college credit.

Approved Resources: *Calculus for AP®: A Complete Course*-Stewart/Kokoska; Graphing Calculator

Class Procedures:

Be prepared with questions at start of class if you wish them discussed in class. Collected assignments should be turned in to the trays at the rear of the room. They will be returned to the similar "get back" trays. Papers without names will be posted at the back of the room until the end of the quarter. Homework quizzes will always be announced.

Supplies/Materials:

A notebook (spiral or looseleaf) for notes;
Additional paper for homework assignments;
A pencil is recommended, but pen is acceptable;
A graphing calculator (if you do not own one, I hope to check one out to you)
A separate single subject spiral/composition notebook to serve as a log book

Grading Policy: Grades will be 70% major and 30% minor summative assessments.

Major grades will primarily be tests or large assessments
Minor grades will be log books, small presentations and possibly homework quizzes

This will be an evolving system as the year goes on, but my goal is to assign a grade that accurately reflects your mastery of the calculus material that has been covered.

Tests: At least two tests will be given each quarter. If more than two, the teacher has the discretion to use later tests to show mastery of earlier material. **Note 1:** Tests are used to show mastery of the material and as such must be finished in the time allotted to create a fair grading criterion for all students. **Note 2:** Any retests will be full length exams, different from the original assessment. New significant learning must be shown during tutorials and the retest must be scheduled and taken at a time of the teacher's convenience within four school days of the original feedback. If you think this might be necessary, start coming to tutorials *before* you get your first assessment back.

Log Problems: The minor portion of your grade (30%) each quarter will primarily be the average of n - 1 take home log problems (where n is the number of log problems assigned in the quarter). <u>One score will be dropped each quarter. It is up to the student to get the logbook in by or before the due date regardless of attendance</u>. These may be submitted electronically but should be verified in the log book physically the first day of following week.

Important Dates:

Study Sessions/Tutorials-Thursdays 7:30-9:30 pm when announced
Practice Exams: Thursday, TBA (probably April 11 or 18);; 5:30-9:00 pm
AP Test: Tuesday May 14th, 2019

Scope and Sequence:

Material to be covered as defined by the College Board:

Big Idea 1: Limits

Many calculus concepts are developed by first considering a discrete model and then the consequences of a limiting case. Therefore, the idea of limits is essential for discovering and developing important ideas, definitions, formulas, and theorems in calculus. Students must have a solid, intuitive understanding of limits and be able to compute various limits, including one-sided limits, limits at infinity, the limit of a sequence, and infinite limits. They should be able to work with tables and graphs in order to estimate the limit of a function at a point. Students should know the algebraic properties of limits and techniques for finding limits of indeterminate forms, and they should be able to apply limits to understand the behavior of a function near a point. Students must also understand how limits are used to determine continuity, a fundamental property of functions.

Big Idea 2: Derivatives

Using derivatives to describe the rate of change of one variable with respect to another variable allows students to understand change in a variety of contexts. In AP Calculus, students build the derivative using the concept of limits and use the derivative primarily to compute the instantaneous rate of change of a function. Applications of the derivative include finding the slope of a tangent line to a graph at a point, analyzing the graph of a function (for example, determining whether a function is increasing or decreasing and finding concavity and extreme values), and solving problems involving rectilinear motion. Students should be able to use different definitions of the derivative, estimate derivatives from tables and graphs, and apply various derivative rules and properties. In addition, students should be able to solve separable differential equations, understand and be able to apply the Mean Value Theorem, and be familiar with a variety of real-world applications, including related rates, optimization, and growth and decay models.

Big Idea 3: Integrals

Integrals are used in a wide variety of practical and theoretical applications. AP Calculus students should understand the definition of a definite integral involving a Riemann sum, be able to approximate a definite integral using different methods, and be able to compute definite integrals using geometry. They should be familiar with basic techniques of integration and properties of integrals. The interpretation of a definite integral is an important skill, and students should be familiar with area, volume, and motion applications, as well as with the use of the definite integral as an accumulation function. It is critical that students grasp the relationship between integration and differentiation as expressed in the Fundamental Theorem of Calculus — a central idea in AP Calculus. Students should be able to work with and analyze functions defined by an integral.

Big Idea 4: Series

The AP Calculus BC curriculum includes the study of series of numbers, power series, and various methods to determine convergence or divergence of a series. Students should be familiar with Maclaurin series for common functions and general Taylor series representations. Other topics include the radius and interval of convergence and operations on power series. The technique of using power series to approximate an arbitrary function near a specific value allows for an important connection to the tangent-line problem and is a natural extension that helps achieve a better approximation. The concept of approximation is a common theme throughout AP Calculus, and power series provide a unifying, comprehensive conclusion.

This is what the College Board deems essential to the first two semesters of a college sequence. Our course covers additional items and not necessarily in the order above. For an idea of how we are headed chronologically, I refer you to the table of contents.

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