Course Title: AP Calculus BC

Course Prerequisites: Refer To Registration Presentation

Course Description:

AP Calculus BC includes a study of limits, derivatives and integrals of rational, circular, and exponential functions and their inverses. The student may obtain college credit and/or advanced placement by taking the Calculus BC Advanced Placement examination. This course also prepares students to take the IB Math SL examination. From course catalog
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AP Calculus BC is roughly equivalent to both first and second semester college calculus courses. It extends the content learned in AB to different types of equations (polar, parametric, vector-valued) and new topics (such as Euler's method, integration by parts, partial fraction decomposition, and improper integrals), 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. Also included are the topics of Improper Integrals, Infinite Series, Parametric Equations, Vectors, and Functions of Several Variables. The course teaches students to approach calculus concepts and problems when they are represented graphically, numerically, analytically, and verbally, and to make connections amongst these representations. Students learn how to use technology to help solve problems, experiment, interpret results, and support conclusions.

Students entering this course should already have a mastery of the following concepts and possess the following skills:

Before studying calculus, all students should complete the equivalent of four years of secondary mathematics designed for college-bound students: courses which should prepare them with a strong foundation in reasoning with algebraic symbols and working with algebraic structures. Prospective calculus students should take courses in which they study algebra, geometry, trigonometry, analytic geometry, and elementary functions. These functions include linear, polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric, and piecewise defined functions. In particular, before studying calculus, students must be familiar with the properties of functions, the composition of functions, the algebra of functions, and the graphs of functions. Students must also understand the language of functions (domain and range, odd and even, periodic, symmetry, zeros, intercepts, and descriptors such as increasing and decreasing). Students should also know how the sine and cosine functions are defined from the unit circle and know the values of the trigonometric functions at the numbers 0, $\pi/6$, $\pi/4$, $\pi/3$, $\pi/2$, and their multiples. Students who take AP Calculus BC should have basic familiarity with sequences and series, as well as some exposure to polar equations.

Workload Expectations for this course (list typical amount of homework, projects, presentations, papers, etc.):

- Because this is the only AP course that is equivalent to two college semester classes (Math 150A and Math 150B from CSUF), the workload is typically more than other AP courses that are only one semester of college dragged out over an entire year of high school. Usually the rule of thumb for a college class is the amount of work is twice the amount of time spent in class. Because most students that take AP Calculus BC are fast workers and are able to learn new concepts quickly, the time is less than this for most students.
- Homework is usually assigned every day.
- One project/paper is given to IB Diploma math students in the school year they are taking the exam only.
- Communication is a key to understanding and students will participate by explaining homework problems to the rest of the class.