

AP Calculus (AB & BC)

Mr. James Room 114

Course Description: AP Calculus offers students their first opportunity to attempt collegiate level mathematics. This course has two distinct goals: First, to learn and appreciate Calculus as a significant mathematical and scientific tool and as a human achievement. Second, to prepare for the College Board's Advanced Placement Examination in Calculus (AB) to be given on Wednesday, May 9, 2012. Passing this examination may earn the student college credit when they enroll in a four year institution in the Fall of 2012. First semester topics are:

Our textbook is Calculus of a Single Variable, by Ron Larson, Robert Hostetler, and Bruce Edwards (Eighth Edition), 2006.

Supplemental materials include, but are not limited to Calculus, by Deborah Hughes-Hallett et al, Calculus, Graphical, Numerical, Algebraic, by Ross Finney, et al, and relevant materials developed by the community of AP Calculus instructors and the College Board. A CD ROM of test aids and resources for AP Exam preparation will be provided to each student during the second semester of this course.

A graphing calculator (the TI-83 or TI-84 is particularly recommended) is required. Students who are unable to obtain their own calculator may check out a calculator for the year in a manner somewhat similar to that of checking out textbooks.

Grading: Your homework, quizzes, notes, AP practice problems, and class participation add to 25% of your grade. Tests are 50% of your grade. A final examination at the end of the semester will count 25% of your grade.

Grading uses this scale:

90 - 100 = A
80 - 89 = B
70 - 79 = C
60 - 69 = D
below 60 = F

Tutoring

I am available until 4:00 pm most days to help students. I am available at other times by appointment. **Arrange all make-up work with me if you miss any assignments.**

Citizenship:

Every student is to be ready to learn: Bring pencil, paper, and notebook to class every day unless told otherwise. *You will need a graphing calculator.*

Participate in all class activities.

This is a college level course offered in the high school. The highest standard of conduct and integrity is required at all times. Disruption of instruction cannot be tolerated.

Topics of Study:

Summer Assignment: review topics in trigonometry and pre-calculus.

Unit 1: Comparison of pre-calculus and calculus; the Rule of Four; limits; local linearity.

Unit 2A: The meaning of the derivative; numerical and graphical interpretations; the definition of the derivative; basic derivative forms; linear approximations.

Unit 2B: The product, quotient, and chain rules for finding derivatives; implicit derivatives; related rates; applications to motion.

Unit 3A: The derivative and function analysis; intervals of increase/decrease; extrema of functions; the second derivative; concavity and points of inflection.

Unit 3B: Curve sketching; detailed function analysis; optimization; applications and problem Solving; l'Hôpital's rule; Newton's Method.

Unit 4A: The meaning of the integral; numerical and graphical interpretations; Riemann sums; the Fundamental Theorem of Calculus; integration theorems; basic antiderivative forms; areas under curves.

Unit 4B: The second Fundamental Theorem; integration by substitution; integration by parts; trapezoidal, midpoint, and Simpson approximations.

Unit 5: Differentiation and integration of transcendental functions.

Unit 6: Differential equations; slope fields; Euler approximations.

Unit 7: Applications of integration to geometry, physics, and economics.

Unit 8: AP practice and discussion.

All students are invited to AP study sessions on selected Saturday mornings during February, March and April in order to focus on the AP Exam, the style of its questions, the intent of its questions, and the expectations of the AP Test Development Committee for student success on the exam.

Students desiring to attempt the BC exam are expected to meet with Mr. James four afternoons per week for at least one hour per day in order to learn the additional topics (Maclaurin and Taylor Series, the calculus of vector valued functions, the calculus of polar forms, special functions, and additional techniques in integration). BC teaching and study sessions begin in February and continue until students are prepared (usually into early April).