Honors Pre-Calculus
Mr. James Room 114

Course Description: Pre-Calculus offers students the opportunity to learn advanced level mathematics. Our emphasis is on mathematical modeling and the study of functions as a preparation for the study of Calculus.

Our textbook is <u>Precalculus with Limits, a Graphing Approach</u>, by Larson, Hostetler, Edwards (2005).

Supplemental materials include, but are not limited to <u>Functions Modeling Change</u>, by Deborah Hughes-Hallett et al, and <u>Pre-calculus</u>, Graphical, Numerical, Algebraic, by Ross Finney, et al.

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, and class participation are 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: Tutoring

90 - 100 = A   I am available until 4:30 pm most days to
80 - 89 = B   help students. I am available at other times
70 - 79 = C   by appointment. **Arrange all make-up**
60 - 69 = D   **work with me if you miss any**
below 60 = F   **assignments**.

Citizenship:

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

<u>Participate</u> in <u>all</u> class activities.

This is an honors college preparatory course. The highest standard of conduct and integrity is required at all times. Disruption of instruction cannot be tolerated.

Topics of Study:

Unit 1: Review of Algebra II topics including function basics, graphing, and modeling. New topics include the Rule of Four, the difference quotient as a function, and linear regression modeling.

Unit 2: Polynomial functions, their zeros, and their graphs; complex numbers, arithmetic and graphing; the Fundamental Theorem of Algebra; rational functions, their zeros, asymptotes, and their graphs; quadratic regression modeling.

Unit 3: Exponential and logarithmic functions and their graphs; logarithm properties; growth and decay modeling, logistic models, and Gaussian models; comparative regression modeling.

Unit 4: The unit circle and right angle trigonometry; basic trigonometric functions; fundamental trigonometric identities (Pythagorean, tangent, reciprocal, and cofunction), trigonometric graphs and models including harmonic motion.

Unit 5: Verifying trigonometric identities; solving trigonometric equations; sum and difference formulas; power reducing formulas.

Unit 6: Laws of sines and cosines; vectors and vector applications; the DOT product, unit vectors and direction; vector forms of complex numbers; DeMoivre's theorem and Euler's formula.

Unit 7: Solving linear systems by algebraic methods; matrices and matrix operations; the determinant and Cramer's rule; applications.

Unit 8: Discrete mathematics, series and sequences; the binomial theorem; combinatorics.

Unit 9: Analytic geometry and conic sections; parametric equations and their graphs; polar forms and their graphs; three dimensional extensions.

Unit 10: Introductory calculus: Limits; basic derivatives, tangent line slopes, intervals of increase and decrease, extrema, second derivatives, intervals of concavity, points of inflection; basic antiderivatives, area under curves, definite integrals.

When students need help. Extra help and tutoring are available two different ways. First, students may seek help in MS114 after school most days until 4:30 pm. Second, students may also want to view the videos and use the interactive practice found at the Khan Academy (**khanacademy.org**). Relevant links to the Khan Academy are provided and updated at the class web site at **tajames.net**.

Make up tests are available. In order to *qualify* for a make up test, students must attend tutoring in order to discuss areas of need. Appropriate remediation and practice will be assigned. After completion of assigned extra work, students may take a second version of the exam *before the conclusion of the next unit*. The higher score of the two exams taken will be entered into the grade book.

Grades are updated several times each week on School Loop (linked at **tajames.net**). Mr. James can be contacted at **tajames@tajames.net** or by phone at (909) 988-5560 ext. 2434.