

# 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 Precalculus with Limits, a Graphing Approach, by Larson, Hostetler, Edwards (2005).

Supplemental materials include, but are not limited to Functions Modeling Change, by Deborah Hughes-Hallett et al, and Pre-calculus, 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, AP practice problems, 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:

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 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.