Department: Mathematics
Course Name: Honors Precalculus

Course Description:
Honors Precalculus is the highest level of mathematics preceding Calculus and prepares students for the algebraic complexities and the analytical nature of calculus. In the first semester, this course delves further into the functions and concepts learned in Algebra 2. A thorough exploration of trigonometry follows in the second semester as well as an introduction to parametric equations, polar coordinates, vector-valued functions, limits, and derivatives. The ability to synthesize material is extremely important; assessments include conceptual questions and incorporate previously studied material. The course requires the ability to write mathematics and insists on correct notation and vocabulary throughout. The graphing calculator is used for demonstrations by the instructor and for exploration by the student. While not intended to adhere to the AP Precalculus syllabus, students may take the AP Precalculus exam in the spring. This course places an emphasis on critical thinking, complex communication, collaboration, creativity, and risk-taking to prepare students for rigorous college work. A TI-84 graphing calculator is required. A course average of a B or higher is expected for continuation to AP Calculus AB.

Content:
Prerequisites
Polynomial and rational functions
Exponential and logarithmic functions
Trigonometric and Polar functions
Parametric and Vector-valued functions
Limits and an introduction to Calculus

Skills:
Describing how quantities change with respect to each other
Describing end behavior of polynomial and rational functions
Identifying asymptotes and holes in the graphs of rational functions
Modeling aspects of scenarios using polynomial and rational functions
Identifying assumptions and limitations of function models
Relating geometric sequences and exponential functions
Modeling data sets with exponential functions
Composing functions and finding inverses
Modeling scenarios with logarithmic functions
Validating a function model using a residual plot
Relating right triangle trigonometry to the sine, cosine, and tangent functions
Modeling data and scenarios with sinusoidal functions
Using inverse trigonometric functions to solve trigonometric equations
Graphing functions using polar coordinates
Describing how angles and radii change with respect to each other in a polar graph
Describing how quantities change with respect to each other in a parametric function
Using vectors to describe motion of an object
Find limits graphically, numerically, and analytically
Use the definition of a derivative to find slopes of tangent lines

Text and Materials:
Stewart, Redlin, and Watson Precalculus, Mathematics for Calculus 6e (Brooks/Cole Cengage Learning, 6th ed., 2012)
Desmos and Handheld TI84 Graphing Calculator

Methods of Instruction:
Recitation with note taking
Guided individual practice
Interactive questioning
Graphing calculator demonstrations

Methods of Evaluation:
Formative and Summative (formal and informal)
Cumulative semester and final exams