High Bluff Academy

Honors Precalculus

Textbook: Larson, Hostetler, Edwards: Calculus 1 with Precalculus: A One-Year Course, 2nd ed. (2006)

<u>Course Description</u>
Honors Precalculus involves a study of numerical, analytical, and graphical properties of functions and their applications in fundamental concepts of first-semester calculus. Course content includes polynomial, rational, exponential, logarithmic, and trigonometric functions. Additional topics include inverse functions, complex numbers, polar coordinates, matrices, conic sections, sequences, series, and the binomial theorem. Topics in calculus include finite and infinite limits, derivatives, and their applications. This course is designed to prepare students for advanced placement calculus and other college-level mathematics courses.

At the completion of the course, students will be able to do the following:
- Understand and be able to apply the Fundamental Theorem of Algebra
- Solve polynomial, rational, exponential, and logarithmic equations
- Graph polynomial, rational, exponential, and logarithmic functions
- Prove formulas using mathematical induction
- Apply polar coordinates and vectors in the plane
- Understand conic sections analytically and geometrically
- Understand the effect of a parameter on a graph and graph parametric equations
- Be familiar with the unit circle and its importance in trigonometry
- Define and graph the six trigonometric functions
- Define and graph inverse trigonometric functions
- Use trigonometric identities to simplify and solve trigonometric problems analytically
- Apply trigonometric laws to solve problems involving right and oblique triangles
- Use trigonometry to solve problems related to physics and other sciences
- Identify real-life applications of precalculus
- Evaluate limits graphically and analytically
- Find the equation of a line tangent to a graph
- Take derivatives of explicit and implicit functions and apply them to problems of related rates
- Find critical points of a graph, including zeros, extrema, and inflection points, and apply them to problems of curve sketching and optimization
- Take derivatives of exponential, logarithmic, trigonometric, and inverse trigonometric functions
- Graph and find the derivatives of parametric equations