



Capital School District Honors Pre-Calculus

Honors Pre-Calculus is designed to prepare the student mathematically for calculus. The concept of function is developed with variations and considerable time is spent with the transcendental functions (exponential, logarithmic, trigonometric, inverse trigonometric functions). Other topics include systems of equations and inequalities, matrices, sequences, probability, statistics and selected topics in analytic geometry. The finale is the study of limits and a preview of some calculus concepts. A graphing calculator is used daily.

Marking Period 1: Functions: Linear, quadratic, rational, radical and polynomial

- Use of arithmetic and geometric sequences and sums.
- Analysis of linear functions and their attributes (slope, intercepts, regression).
- Apply and solve quadratic, rational and radical functions by various methods.
- Solve linear, quadratic, rational inequalities.
- Identify and apply transformations to functions along with composition and inverse.
- Use the graphing calculator to facilitate solving equations and finding pertinent information about the function (intercepts, zeros, local maxima and minima).
- Find real zeros of a polynomial function.

Marking Period 2: Functions: Complex numbers, matrices, exponential/logarithmic functions, conic sections

- Graph rational functions and find intercepts and asymptotes.
- Perform basic operations on complex numbers and use them to solve polynomial equations.
- Perform basic operations on matrices and apply them to solving systems of equations.
- Simplifying exponential and logarithmic expressions and applying those skills to solving exponential and logarithmic equations.
- Graph and find the pertinent information of the four basic conic sections (circle, ellipse, parabola and hyperbola).

Marking Period 3: Trigonometry: functions, graphs, equations

- Use right triangle trigonometry to solve problems.
- Evaluate trigonometric expressions and solve trigonometric equations involving the 6 basic functions (sine, cosine, tangent, cotangent, secant, cosecant).
- Graph the six basic trigonometric functions and determine parameters of the graph (period, amplitude, vertical shift and phase shift).
- Use trigonometric inverses and identities to solve equations.

Marking Period 4: Applications of trigonometric laws, polar and parametric equations, statistics and probability, limits

- Apply law of sines and cosines to solve problems.

- Graph polar and parametric equations.
- Convert between rectangular and polar/parametric form and vice-versa.
- Calculate and apply measures of central tendency including the normal distribution.
- Calculate and apply basic probability.
- Determine the limit of a function and whether it is continuous.