Algebra II Honors

5 Credits – Level – Honors
Grades: 10-11
Prerequisite: Minimum grade of 80 in Geometry Honors (or a minimum of 90 in Geometry Level I)

Algebra II Honors serves the most able and motivated members of the student body. The course assumes that the student has a strong knowledge of the material taught in the 8th grade Algebra I course and the 9th grade Geometry Honors course. The material covered in this course is a more rigorous and faster paced approach to the material of the Algebra II (Level I) course.

PROFICIENCIES

INEQUALITIES
-Solve inequalities
-Solve combined inequalities
-Use inequality models to solve problems
-Solve absolute values in open sentences
-Solve absolute value sentences graphically

LINEAR EQUATION FUNCTIONS
-Solve open sentences in two variables
-Graph linear equations in two variables
-Find the slope of the line
-Write the equation of a line
-Solve systems of linear equations in two variables
-Apply systems of equations to solve real word problems
-Solve linear inequalities in two variables
-Find values of functions and graphs
-Find equations of linear functions and apply properties of linear functions
-Graph relations and determine when relations are functions

PRODUCTS AND FACTORS OF POLYNOMIALS
-Simplify, add and subtract polynomials
-Use laws of exponents to multiply a polynomial by a monomial
-Calculate the product of two or more polynomials
-Demonstrate factoring
-Solve polynomial equations and inequalities
-Apply polynomial equations to solve real world problems

RATIONAL EQUATIONS
-Simplify quotients using laws of exponents
-Simplify expressions involving the exponent zero and negative integral exponents
-Use scientific notation and significant digits
-Simplify rational algebraic expressions
-Simplify rational expressions by addition, subtraction, multiplication or division
-Simplify complex fractions
-Solve equations and inequalities that have fractional coefficients
-Solve and use fractional equations

IRRATIONAL AND COMPLEX NUMBERS
-Find roots of real numbers
-Simplify expressions involving
-Simplify expressions involving sums of radicals
-Simplify products and quotients of binomials that contain radicals
-Solve equations containing radicals
-Find and use decimal representations of real numbers
-Use the number *i* to simplify square roots of negative numbers
-Perform operations on complex numbers

QUADRATIC EQUATIONS AND FUNCTIONS
-Solve quadratic equations by completing the square
-Solve quadratic equations by using the quadratic formula
-Determine the nature of the roots of a quadratic equation using the discriminant
-Identify and solve equations in quadratic form
-Graph parabolas
-Identify the vertex, axes of symmetry, maximum or minimum value, and roots of a parabola
-Determine the relationship between the roots and coefficients of a quadratic equation

VARIATION AND POLYNOMIAL EQUATIONS
-Solve problems involving direct, inverse and joint variation
-Divide polynomials using long division and synthetic division
-Solve polynomial equations
-Write a polynomial equation given the roots

ANALYTIC GEOMETRY
-Find the distance between any two points and the midpoint of the line segment joining them
-Relate the center and the radius to the equation of a circle
-Identify the vertex, focus, directrix, axes of symmetry, maximum or minimum value, and roots of a parabola
-Identify the center, foci and intercepts of an ellipse by its equation
-Identify the foci, intercepts and asymptotes of a hyperbola by its equation
-Find an equation of a conic section with center not at the origin and to identify a conic as a circle, ellipse or hyperbola
-Use algebraic methods and graphs to find exact and estimate solutions of quadratic systems
-Solve systems of linear equations in three variables

EXPONENTIAL FUNCTIONS
-Expand the meaning of exponents to include rational numbers and irrational numbers and define exponential functions
-Find the composite of two given functions and find the inverse of a given function
-Define logarithmic functions and to learn how they are related to exponential functions
-Learn and apply the basic properties and/or laws of logarithms
-Evaluate logarithms with any given base

SEQUENCES AND SERIES
-Determine whether a sequence is arithmetic, geometric or neither, and supply missing terms of a sequence
-Find a formula for the nth term of an arithmetic or geometric sequence and find specified terms of arithmetic or geometric sequences
-Identify a series and use sigma notation
-Find sums of finite arithmetic and geometric series
-Find sums of an infinite geometric series

STATISTICS AND PROBABILITIES

-Display data using frequency distributions, histograms and stem-and-leaf plots, and to compute measures of central tendency
-Compute measure of dispersion and, together with measures of central tendency, to describe and compare distributions using these statistics
-Draw a scatter plot, determine the correlation coefficient, and to use the regression line for a set of ordered pairs of data
-Apply the fundamental counting principals
-Find the number of permutations and combinations of the elements of a set
-Find the probability that an event will occur

MATRICES

-Learn and apply matrix terminology
-Find sums and differences of matrices and products of a scalar and a matrix
-Find the product of two matrices