Algebra II Honors

Course Description

This course is a comprehensive, full year college preparatory Algebra course exploring all high school Algebra II concepts. This class teaches and requires students to demonstrate fluent understanding of concepts and procedures, reason abstractly and quantitatively, justify and communicate reasoning clearly, model with mathematics, solve problems, and analyze data. Students who successfully complete this course, will have mastered Algebra II math standards and will be ready to continue to Pre-calculus and Statistics courses. In alignment with the skills detailed in the **Portrait of the Crusader,** students practice solving problems with innovation and imagination, and they are taught to think critically about the synthesis of data and respond with defendable, original work.

Throughout the course, teachers strive to include varied assessments, including traditional quizzes and tests to measure discrete skills; problem/solution/explanation opportunities where students solve a complex problem and communicate their reasoning; and real-world scenarios where students define the problem, develop a plan, and solve the problem, adjusting as necessary and communicating their reasoning when required.

Essential Questions
1. How do we represent patterns and operations using algebra?
2. How do we interpret and analyze real life situations using algebra?
3. How do we use technology to solve and/or visualize mathematical sentences?

FIrst Quarter:
Review of summer work to reinforce prerequisite skills:
- Solve linear equations
- Simplify expressions and equations
- Translate words into symbols
- Perform operations with real numbers
- Identify and graph slope and equations of lines
- Graph inequalities
- Solve and graphing absolute value inequalities
- Model real-world problem solving
- Solve systems of equations in two variables by graphing, substitution and elimination.
- Determine expected value (mean), median and mode (Statistics)

Extensions
- Solve problems using functions and systems
- Perform 3 x 3 systems
- Solve linear systems of inequalities
- Interpret and analyze word problems.
- Use technology to solve problems

Matrices
- Perform matrix operations
- Solve matrix equations
- Use technology to assist with solving matrices

Second Quarter:
 Functions
- Define and recognize types of linear functions
- Find domain and range of a function
- Perform function operations
- Solve composite functions
- Identify linear and nonlinear functions

Exponents & Polynomials
- Apply laws of exponents
- Evaluate negative exponents and zero exponents
- Perform operations involving exponents
- Simplify expressions involving exponents
- Perform operations with polynomials (factoring/distributing)

Factoring Polynomials
- Explain the purpose of factoring
- Factor polynomials by greatest common factor (GCF)
- Factor trinomials
- Factor by special products: difference of squares, sum/difference of cubes

Solving Equations
- Solve equations by factoring using the zero product property
- Solve equations by graphing and using technology
- Apply the skills to solve real-world problems

Third Quarter:
Radicals
- Simplify radicals and radical expressions
- Write radicals as rational exponents
- Write rational exponents as radicals.
- Add, subtract, and multiply radicals
- Rationalize the denominator
- Solve radical equations
- Perform operations on complex and imaginary numbers

Quadratic Functions
- Discover the properties and characteristics of quadratic functions algebraically and through graphing technology
- Explain the properties and characteristics of quadratic functions; identify quadratic functions
- Solve equations using quadratic methods
- Determine the number and type of solutions using the discriminant
- Apply the skills used in this unit and in previous units to solve real-world problems.

Fourth Quarter:

Rational Expressions
- Simplify rational expressions
- Perform operations on rational expression
- Simplify complex fractions
- Perform long division
- Use synthetic division to find roots
- Solve equations containing rational expressions
- Solve rational equations and real word problems

Higher degree equations and functions
- Find the zeros of polynomials functions
- Apply the fundamental theorem of algebra
- Graph higher order polynomials
- Solve real world problems using higher degree equations and functions

Resources
- Algebra 2 Martin-Gay
- MyMathLab. (mymathlabforschool.com)
- Graphing Calculator (Suggested TI-84+)
- Desmos application (ISO/Android or web)

Grading Policy
- 20 % MyMathLab,
- 25% Quizzes
- 25% Student Work
- 30 % Tests