

**Department:** Math  
**Revised:** April 2017

### **Mission Statement**

Every student can and should learn higher level mathematics. We will provide a variety of instructional methods and relearning opportunities for students to find success.

### **How We Will Achieve Our Mission**

- All students are expected to complete a standards aligned algebra and geometry curriculum.
- All students will be held to a high standard of learning with relearning opportunities and reassessment opportunities available to those who do not meet the standards initially.
- All students will have the opportunity to earn credit at the post-secondary level while completing high school graduation requirements.

### **Course: Advanced Algebra**

#### Trigonometric Ratios and Functions

Students understand that right triangle trigonometry is based on the ratios of the sides of right triangles and that there are many applications of these ratios in real life situations.

Students understand that there are many ways to measure angles and that each method may be the best in a given situation.

Students understand the concept of angles of rotation and the application in evaluating trig functions.

Students understand the process of graphing the basic trig functions and using those graphs to model real life data.

#### Review of Basic Algebra

Students understand the history of and usefulness of real numbers and real number operations.

Students understand the process of translating literal phrases into algebraic expressions.

Students understand the concept of the basic steps in solving linear and literal equations and inequalities.

Students understand the connection between absolute value inequalities and compound inequalities and their graphs.

#### Linear Equations

Students understand how to recognize and graph a real life situation that can be modeled by a linear equation.

Students understand the concept of slope as a rate of change and the different ways to express it.

Students understand the different ways to graph linear equations using slope intercept and standard form.

Students understand how to graph data in order to find a linear model and the different ways to produce that model.

#### Systems of Equations

Students understand the connections between the intersection of two lines the solution to a system of equations.

Students understand that there are several ways to solve a system of equations and that each has advantages and disadvantages.

Students understand the concept of solving a system of linear inequalities, and that there are infinite number of solutions, not a unique solution.

Students understand the concept of extending systems of equations to three or more dimensions, and the best methods to solve them.

#### Matrices and Matrix Operations

Students understand that the fundamental use of a matrix is to record and organize data.

Students understand that matrices can be operated on using the basic arithmetic operations of addition, subtraction, and multiplication.

Students understand and are able to recognize that matrices have characteristic features including determinants, inverses, identities, and transposes.

Students understand the connection between matrices and systems of equations and how matrices can be used to solve systems.

#### Quadratic Equations

Students understand the importance of having a collection of strategies for solving real life problems using quadratic models.

Students understand that the graph of a quadratic equation is parabolic and has several defining features.

Students understand that there is a connection between x-intercepts, roots, zeros, and solutions to a quadratic equation.

Students understand the connection between complex and imaginary numbers and the number of solutions to a quadratic equation.

## Functions and Function Operations

Students understand that functions are powerful mathematical tools for describing, analyzing, and organizing real-life information.

Students understand function operations are necessarily used in fields of physics, economics, engineering, and calculus.

Students understand many functions have inverses that are themselves functions with important applications.

Students understand the role of recursive functions in such contexts as biology, computer science, and physics.

## Powers, Roots, and Radicals

Students understand the properties of exponents and radicals and how to use them to manage and manipulate algebraic expressions.

Students understand that the real life contexts that can be modeled by equations containing radicals are found in physics, economics, and engineering.

Students understand the inverse relationship between exponential and logarithmic functions and their importance in the physical and biological sciences as well as statistics and economics.

Students understand that importance of the natural base and the natural logarithm in modeling real-life phenomena.

## Polynomials

Students understand the concept of polynomials as a larger family of functions that contains not only linear equations but quadratic equations as well.

Students understand the connections between factors, roots, and solutions to polynomial expressions and equations.

Students understand the Fundamental Theorem of Algebra and its elegance and importance in the world of algebra.

Students understand the connections between rational functions and the concept of inverse and joint variation of variables.

## Conic Sections

Students understand that the geometric figures studied are the outline of different slices of a cone, and each has its own standard equation.

Students understand the basic differences in the various equations and how to differentiate between them.

Students understand that the graphs of each of the conic sections do not represent functions but can be translated on the Cartesian plane.

Students understand the vast array of practical applications of conic sections in the modern world.