Syllabus for Functions

 This class is designed to enhance techniques learned in Advanced Algebra and further develop an understanding of advanced mathematics. This class focuses primarily on functions and an analysis of what functions are, how they are used, and how to interpret and apply them in common settings. This class deals with most of the different ways in which functions can be expressed and how they can be manipulated.

Topic: Functions and Models

 Concepts: The Language of Functions

 Linear Models

 Linear Regression and Correlation

 Exponential Functions

 Exponential Models

 Quadratic Models

 Inverse Variation Models

 Choosing a Good Model

Topic: Transformations of Graphs and Data

 Concepts: Graphs of Parent Functions

 The Graph Translation Theorem

 Translations of Data

 Symmetries of Graphs

 The Graph Scale Change Theorem

 Scale Changes of Data

 Composition of Functions

 Inverses of Functions

Topic: Polynomial Functions

 Concepts: Characteristics of Polynomial Functions

 Polynomial Models

 Division and the Remainder Theorem

 The Factor Theorem

 Complex Numbers

 The Fundamental Theorem of Algebra

 Factoring Sums and Differences of Powers

 Advanced Factoring Techniques

Topic: Roots, Powers, and Logarithms

 Concepts: *n*th Root Functions

 Rational Exponents

 Logarithm Functions

 *e* and Natural Logarithms

 Properties of Logarithms

 Solving Exponential Equations

 Linearizing Data to Find Models

Topic: Analyzing Functions

 Concepts: A Review of Basic Function Ideas

 Maxima and Minima of Functions

 Increasing and Decreasing Functions

 End Behavior of Functions

 Exponential Functions

 Logarithmic Functions

Topic: Functions, Equations, and Inequalities

 Concepts: Arithmetic Operations on Functions

 Function Composition and Decomposition

 Inverses of Functions

 The Logic of Equation-Solving

 Solving Equations by Chunking or Factoring

 Graphs, Transformations and Solutions

 The Intermediate Value Theorem

 The Logic of Inequality-Solving

 Solving Inequalities by Factoring

 Absolute Value Equations and Inequalities

Topic: Integers and Polynomials

 Concepts: Factors of Integers and Polynomials

 The Quotient-Remainder Theorem

 Polynomial Division and the Remainder Theorem

 - Synthetic Division

 Zeros of Polynomials

 Prime Numbers and Prime Polynomials

 Modular Arithmetic

 Polynomial Representation of Integers

Topic Algebraic Fractions and Identities

 Concepts: Irrational Numbers

 Equivalent Rational Expressions

 Multiplying Algebraic Fractions

 Adding Algebraic Fractions

 Graphs of Rational Functions

 Solving Equations with Algebraic Fractions