ALGEBRA 2 COMMON CORE CURRICULUM

Code: M551 **Full Year (1 Credit)** **Rank Weight: 1.00**

Prerequisite: Successful completion of Geometry with a final average of 80% or higher, OR Algebra 2N with a final average of 85% or higher with teacher recommendation.

Course Description: This Regents course builds a foundation of mathematics for those students going on to Pre-Calculus and/or students who are college bound. Algebra II builds upon topics that were first introduced in Algebra I. Additional topics include, but are not limited to, Systems of Linear & Circle Equations, Rational Expressions, Rational, Irrational and Complex Numbers, Quadratic Equations & Functions, Sequences & Series, Relations & Functions, Exponents & Exponential Functions, Logarithms, and Introductory Trigonometry. This course ends with a New York State Regents Examination. Successful completion of this course and the Algebra II Regents Examination is a requirement for a New York State Regents Diploma with Advanced Designation.

Areas of Study

Unit 0: Functions

Function Notation Evaluating Functions
Composition of Functions
Average Rate of Change
Inverse of a Function

Unit 1: Polynomials

Definition of polynomial/basic operations (add/subtract)
The Multiplication of Polynomials
The Division of Polynomials
Comparing Methods - Long Division/Synthetic Division Putting It All Together
The Special Role of Zero in Factoring

Unit 2: Factoring

How to determine GCF and factor with a GCF
Factoring Trinomials
Factor Trinomials with a>1
Factor Using Difference of Two Perfect Squares Factor by Grouping
Factoring Quadratic Form
Factor Completely
Graphing Factored Polynomials
Structure in Graphs of Polynomial Functions
The Remainder Theorem

Unit 3: Rational Expressions

Simplify Numerical Fractions and One Variable Fractions
Simplify Rational Expressions

Multiplying & Dividing Rational Expressions
Adding & Subtracting Rational Expressions
Solving Rational Equations
Word Problems Leading to Rational Equations

Unit 4: Radicals

Generate List of Perfect Squares and Perfect Cubes
Simplify Radicals Including Variables and Higher Order Roots
Operations of Radicals
Solving Radical Equations
Monomial Rationalizing

Unit 5: Solving Quadratics

Solve by Factoring
Solve by Completing the Square (Vertex Form)
Solving By Quadratic formula
Modeling Real World Applications of Quadratics

Unit 6: Complex Numbers

Imaginary Unit
Definition of Complex Numbers
Operations of Complex Numbers
Graphing with Complex Numbers
Complex Numbers as Solutions to Equations

Unit 7: Systems

Linear Systems in Two Variables
Solving Linear Systems in Three Variables
Graphing Systems of Equations
Graphing and Solving Algebraically Circle/Linear Systems

Unit 8: Parabolas

Characteristics of Basic Parabolas
Transformations of Functions
Revisit Vertex Form
The Definition of a Parabola Are All Parabolas Congruent? Are All Parabolas Similar?
Directrix/Focus

Unit 9: Trigonometry

Basic Right Triangle Trigonometry
Special Right Triangle
Unit Circle
Reciprocal Functions
Cofunctions
Evaluating Trigonometric Function
Basic Trigonometric Identities

Unit 10: Graphing Trigonometric Functions

Transforming the Graphing the Sine & Cosine Functions
Modeling Real World Behavior
Domain of Sine & Cosine to All Real Numbers Graphing the Tangent Function
Identify Reciprocal Trigonometric Functions by Graph
Proving Basic Trigonometric Identities (Pythagorean)

Unit 11: Exponential Functions

Basic Characteristics of Exponentials (including graphing)
Rational Exponents
Solving Equations with Rational Exponents
Solve by Method of Common bases
The Number e
Modeling Real World Applications of Exponentials (Financial Problems)
Transformations of the Graphs of Exponential Functions

Unit 12: Logarithms

Converting Between Exponentials and Logarithms (Inverse Relationship)
Changing the Base
Solving Basic Logarithmic Equations (No Properties)
Natural Logarithm
Graphing the Logarithm Function
Transformations of the Graphs of Logarithmic Functions
Modeling Real World Applications of Logarithms

Unit 13: Sequence and Series

Review Arithmetic and Geometric Sequences
Arithmetic and Geometric Series
Applying All Sequences and Series Formulas
Modeling with Sequences and Series

Unit 14: Probability

Chance Experiments, Sample Spaces & Events
Calculating Probabilities of Events Using Two-Way Tables
Calculating Conditional Probabilities & Evaluating Independence Using Two-Way Tables Events & Venn Diagrams
Probability Rules

Unit 15: Statistics

Review Measures of Central Tendencies and Graphs Standard Deviation
Linear Regression
Types of Statistical Studies
Normal Distributions- Shape, Center, Spread Margin of Error, and Confidence Interval Applications with Margin of Error
Normal CDF