Math: Algebra II

UNIT/Weeks (not consecutive)	Timeline/Topics	Essential Questions
6	**Quadratic Functions and Equations** • Quadratic Equations • Completing the Square • The Quadratic Formula • Complex Numbers • Quadratic Systems	• What are the advantages of a quadratic function in vertex form versus standard form? • What are the similarities and differences of any quadratic function as compared to the parent function $y=x^2$? • How are the real solutions of a quadratic equation related to its graph?
4	**Functions, Equations, and Graphs** • Relations and Functions • Direct Variation • Linear Functions and Slope-Intercept Form • More About Linear Equations • Concept Byte: Piecewise Functions • Using Linear Models • Families of Functions • Absolute Value Functions and Graphs • Two-Variable Inequalities • Chapter Two Enrichment Project	• What are the similarities and differences in the different forms of a linear equation? • How do you graph an absolute value function using transformations? • How can you model real-life data with a linear function?
4	**Linear Systems** • Solving Systems Using Tables and Graphs • Solving Systems Algebraically • Systems of Inequalities • Linear Programming • Systems with Three Variables • Solving Systems Using Matrices	• How can you find the solution for a system of equations by representing them graphically? • How does writing equivalent equations help you solve a system of equations? • How are the properties of equality used in the matrix solution of a system of equations?
4	**Exponential and Logarithmic Functions** • Exploring Exponential Models • Properties of Exponential Functions • Logarithmic Functions as Inverses • Properties of Logarithms • Exponential and Logarithmic Equations	• How do you model a quantity that changes regularly over time by the same percentage?

	• Natural Logarithms	• What is the relationship between exponential functions and logarithmic functions? • How can you solve an exponential equation?
4	**Polynomials and Polynomial Functions** • Polynomial Functions • Polynomials, Linear Factors and Zeros • Solving Polynomial Equations • Dividing Polynomials • The Fundamental Theorem of Algebra • Theorems about Roots of Polynomial Equations • The Binomial Theorem • Polynomial Models in the Real World • Transforming Polynomial Functions	• What information does the degree of a polynomial give you? • What are the relationships between the factors, roots, zeros, and x-intercepts of a polynomial function?
5	**Radical Functions and Rational Exponents** • Roots and Radical Expressions • Multiplying and Dividing Radical Expressions • Binomial Radical Expressions • Rational Exponents • Solving Square Root and Other Radical Equations • Function Operations • Inverse Relations and Functions • Graphing Radical Functions	• How do you simplify the nth root of an expression? • What is necessary to solve any radical equation? • What are the relationships between a function and its inverse?
3.6	**Rational Functions** • Inverse Variation • The Reciprocal Function Family • Rational Functions and Their Graphs • Rational Expressions • Adding and Subtracting Rational Expressions • Solving Rational Equations	• What kind of proportionality do two quantities have if an increase in one corresponds to a decrease in another? • How do you find the asymptotes of a rational function? • Is the simplified form of a rational function equivalent to the original?

4	**Probability and Statistics** • Permutations and Combinations • Probability • Probability of Multiple Events • Conditional Probability • Analyzing Data • Standard Deviation • Samples and Surveys • Binomial Distributions • Normal Distributions	• Can you explain the difference between a permutation and a combination? • What is the difference between experimental and theoretical probability? • How are the measures of central tendency different from standard deviation?
1	**Matrices** • Adding and Subtracting Matrices • Matrix Multiplication • Determinants and Inverses • Inverse Matrices and Systems • Geometric Transformations • Vectors	• How is data organized in a matrix? • How can a matrix equation model a real life situation? • How can a matrix represent a transformation of a geometric figure in the plane?