Union County Educational Services Commission
High School Course Syllabus

Title: Algebra l Advanced

Timeline: Full Year; 5 Credits

Course Description: Students taking Algebra l Advanced will focus on learning the basics of Algebra while expressing that knowledge both verbally and through written expressions. They will learn the basic operations working with expressions, as well as how to write algebraic expressions with verbal descriptions. Students will also become familiar with linear equations, learning how to create them, graph them and interpret them. Students will graph and solve both equalities and inequalities. Students will be exposed to different classifications of polynomial expressions and basic computation with polynomials.

Scope and Sequence:

l. Basic Algebraic Concepts
ll. Solving Equations
lll. Linear Equations
IV. Solving Inequalities and Absolute Value
V. Systems of Linear Equations and Inequalities
Vl. Laws of Exponents

Refer to the attached curriculum map for a detailed outline of course objectives.

Curriculum Alignment:

New Jersey Student Learning Standards - Algebra l
Standards for Mathematical Content
Standards for Mathematical Practice
PARCC Evidence Tables - Algebra l

Grading Procedures:

Do Now	10%
Participation	20%
Class Assignments	50%
Assessments	20%

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Curriculum Mapping Format: Algebra I Advanced

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Number of Weeks	6 Weeks	6 Weeks	6 Weeks	6 Weeks	6 Weeks	6 Weeks
Topics	Basic Algebraic Concepts	Solving Equations	Linear Equations	Solving Inequalities and Absolute Value	Systems of Linear Equations and Inequalities	Laws of Exponents

Standards for Mathematical Content	**A.ARP.A.1 -** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	**A.CED.A.1 -** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. **A.CED.A.4 -** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R. **A.REI.A.1 -** Explain each step in solving a	**A.CED.A.2-** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **A.REI.D.10 -** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). **A.REI.D.12 -** Graph the solutions to a linear inequality in two variables as a half plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities	**A.REI.D.10 -** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	**A.CED.A.3 -** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. **A.REI.C.5** - Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. **A.REI.C.6 -** Solve systems of linear	**A.SSE.A.2 -** Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y4 as (x2) 2 – (y2) 2 , thus recognizing it as a difference of squares that can be factored as (x2 – y2)(x2 + y2).

	N.RN.A.1 - Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5 because we want (51/3) 3 = 5(1/3) 3 to hold, so (51/3) 3 must equal 5. **N.RN.A.2 -** Rewrite expressions involving radicals and rational exponents using the properties of exponents. **N.RN.B.3** - Explain why the sum or product of two rational numbers is rational; that the	simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. **A.REI.A.2 -** Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. **A.REI.B.3 -** Solve linear equations and inequalities in one variable, including equations with coefficients	in two variables as the intersection of the corresponding half-planes. **S.ID.C.7 -** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.		equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. **A.REI.C.7 -** Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = –3x and the circle x2 + y2 = 3. **A.REI.D.10 -** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	**N.RN.A.1 -** Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5 because we want (51/3) 3 = 5(1/3) 3 to hold, so (51/3) 3 must equal 5. **N.RN.A.2 -** Rewrite expressions involving radicals and rational exponents using the properties of exponents.

	sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	represented by letters.				
Standards for Mathematical Practice	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.					
Content	Real Numbers: Rational, irrational, integers, whole and natural numbers Imaginary Numbers Inequalities Absolute Value Order of Operations Exponent Expressions	Equations Variables Formulas Distributive Property Linear Properties	Intercepts Slope Equation Parallel and Perpendicular Lines Point-Slope Format Slope-Intercept Form Standard Format	Variables Inequalities Absolute Value	One solution No solution Infinite Solutions Coordinate Plane Elimination method Substitution -Method Graphing Method	Power Rule Monomials Properties
Skills	Adding and Subtracting Real Numbers Multiplying and Dividing Real Numbers	Solving Equations by Adding and Subtracting (One-Step)	Using Intercepts to Graph Linear Equations (standard form)	Graphing and Writing Inequalities Solving One-Step Inequalities	Solving a System of Linear Equations (graphically) Solving a System of Linear Equations (substitution)	Integer Exponents Multiplying Monomials Multiplication Property (Product of Powers Property)

	Order of Operations (PEMDAS) Simplifying Algebraic Expressions with Real Numbers	Solving Equations by Multiplying and Dividing (One-Step) Solving Two Step Equations Solving Multi-Step Equations Solving Equations Involving the Distributive Property Solving Equations with Variables on Both Sides Solving for a Variable Solving Word Problems Involving Linear Equations Solving Problems Using Formulas Solving Problems Using Literal Equations	Rate of Change and Definition of Slope Forms of Linear Equations (Standard) Forms of Linear Equations (Slope-Intercept) Form of Linear Equations (Point-Slope) Parallel Lines Perpendicular Lines Writing Linear Equations (given various pieces of information)	Solving Two-Step Inequalities Solving Multi-Step Inequalities Solving Inequalities with Variables on Both Sides Solving Compound Inequalities Absolute Value Equations Absolute Value Inequalities	Solving a System of Linear Equations (Elimination Method) Consistent and Inconsistent Systems Independent and Dependent Systems Solving and Graphing a Linear Inequalities with Two Variables Solving a System of Linear Inequalities	Multiplication Property (Power of a Power Property) Multiplication Property (Power of a Product Property) Dividing Monomials Division Property (Quotient of Powers Properties Division Property (Positive Power of a Quotient Property) Division Property (Negative Power of a Quotient Property)

Assessment	Algebra 1 Advanced Unit 1 Open-Ended Assessment		Algebra 1 Advanced Unit 3 Open-Ended Assessment			