

Course Title:	Algebra I (H)
Grade(s):	8 and 9

Course Description

This course is the initial mathematics course in the college and career readiness program. The course focuses on the study of linear and quadratic functions and introduces students to other functions that will be developed in more depth in later courses. Topics include: solving equations and inequalities, working with linear functions (writing, graphing, and modeling), solving systems of linear equations and inequalities, solving and graphing absolute value functions, properties of exponents, working with quadratic functions (writing, graphing, modeling), and solving quadratic equations. Problem-solving techniques relating algebra to real-life applications are incorporated throughout the course. Many activities in the course will require the use of a graphing calculator.

Honors Level (H)

Honors-level courses are designed to challenge the advanced learner. Students should expect to reach a deeper scope of skills than the academic class: a higher reading stamina, the motivation to revise work, critical thinking skills, and the propensity to finish complex tasks in a timely manner. Students in honors-level classes are expected to have a solid foundation of skills from previous courses, an ability to connect these skills to new learning, and the ability to apply them in problem-solving. Students taking an honors-level class have demonstrated the ability to take responsibility for their own learning and work fluidly both independently and collaboratively. These students should consistently aspire to achieve higher-level quality work through self-reflection and self-advocacy. These classes are recommended to students by teachers who have evaluated a student's past practice and achievement.

Course Units:

1. Solving Equations and Inequalities
2. Intro to Functions
3. Linear Functions
4. Systems of Linear Equations and Inequalities in Two Variables
5. Piecewise Functions / Absolute Value Function
6. Exponents & Exponential Functions / Radicals
7. Polynomials and Factoring
8. Quadratic Functions
9. Statistics

Approved Curricular Materials/Textbook(s)

enVision Algebra I Common Core 2018

Unit Title	Unit Description (Include Unit Objectives)	Unit Pacing
Unit 1: SOLVING LINEAR EQUATIONS & INEQUALITIES	This unit focuses on strengthening and extending students' understanding of writing and solving equations and inequalities. It includes equations and inequalities that require multiple steps to solve, as well as equations and inequalities that have variables on both sides of the equation or inequality. These skills and concepts should have been introduced and practiced in earlier grades and are foundational skills needed to be successful when Linear Functions are studied in more depth in this course. Unit Topics Include: • Operations on Real Numbers • Solving Linear Equations • Solving Equations with a Variable on Both Sides • Literal Equations and Formulas • Solving & Graphing Inequalities in One Variable • Compound Inequalities	4 weeks (August - September)
Unit 2: INTRODUCTION TO FUNCTIONS	Students develop their capacity to represent, interpret, and use functions to make sense of quantities in situations and to solve problems. They are introduced to new tools for communicating about functions: function notation, domain and range, average rates of change, and mathematical terms for describing key features of graphs. They also develop their ability to gather information about a function from its graph. Students will begin to distinguish categories of functions: linear functions, piecewise-defined functions, the absolute value function, and quadratic functions. Unit Topics Include: • The Coordinate Plane • Relations and Functions	2.5 weeks - 3 weeks (October)

	• Domain and Range & Evaluating Functions • Recognizing Linear, Quadratic, Exponential and Absolute Value Functions	
Unit 3: LINEAR FUNCTIONS	The unit focuses on extending students' understanding of linear equations. Students analyze descriptions of lines and write their equations in different forms: Slope-Intercept Form, Point-Slope Form, and Standard Form. Students will learn that the choice of the form is dependent on the given information, and that any form can be converted to another form using the properties of equality. Unit Topics Include: • Slope • Slope-Intercept Form • Point-Slope Form • Standard Form • Arithmetic Sequences • Parallel and Perpendicular Lines • Scatter Plots / Lines of Best Fit	4 weeks - 5 weeks (mid-October through mid-November)
Unit 4: SYSTEMS OF LINEAR EQUATIONS & INEQUALITIES	Students will extend their understanding of solving equations to solving systems of equations. They will begin the unit by developing a conceptual understanding of what is meant by the solution to a system of equations. Students learn different methods to solve systems of linear equations and can identify when each solution method is most useful. They will solve systems of equations graphically and by several algebraic methods and will be able to identify when systems of linear equations have one, none, or infinite solutions. Unit Topics Include: • Solving Systems of Equations by Graphing • Solving Systems of Equations by Substitution • Solving Systems of Equations by Elimination • Linear Inequalities in Two Variables • Systems of Linear Inequalities • Applications of Systems of Linear Equations	3 weeks - 4 weeks (mid-November through mid-December)

Unit 5: ABSOLUTE VALUE FUNCTIONS & PIECEWISE DEFINED FUNCTIONS	Students will learn to solve absolute value equations and inequalities. The focus on this topic is extending the concept of functions to include absolute value functions and other piecewise-defined functions. Students identify the characteristics of each of these types of functions and understand that transformations can be applied to these functions. Unit Topics Include: • Absolute Value Equations • Absolute Value Inequalities • The Absolute Value Function / Transformations • Piecewise-Defined Functions	3 weeks (Mid December - Mid January)
Unit 6: EXPONENTS, EXPONENTIAL FUNCTIONS & RADICALS	Students will extend their knowledge of functions to include exponential functions. Students will use the properties of exponents to simplify expressions. Students learn to identify, write, graph, and transform exponential functions. Students use exponential functions to model real-world situations and make predictions. In Algebra 1, students use multiple representations to model exponential functions arising from real-world phenomena like population change, interest on investments, and radioactive decay. Similar to their work with linear functions, students use recursive thinking to generate y-values in a table for exponential functions. They notice that instead of a constant rate of change like linear functions, exponential functions have a constant growth/decay factor. Students describe recursive thinking with statements like, “to get the NEXT y-value, I multiply the y-value I have NOW by the growth factor of 1.4.” Eventually, students build their skills in writing explicit representations purely from contexts. To do so, students distinguish between rates and factors and learn, for example, that a growth rate of 2% equates to a growth factor of 1.02. Unit Topics Include: • Properties of Exponents & Rational Exponents • Exponential Functions • Exponential Growth and Decay • Geometric Sequences • Transformations of Exponential Functions	3 weeks - 4 weeks (mid January through February)

Unit 7: POLYNOMIALS & FACTORING	This unit focuses on extending students' understanding of polynomials and their ability to work with polynomial functions. Students will be able to identify the parts and factors of polynomials. They will be able to factor polynomials by identifying the greatest common factor, binomial factors, and other special patterns. They will perform basic operations with polynomials, including adding, subtracting, and multiplying. Unit Topics Include: • Addition and Subtraction of Polynomials • Multiplication of Polynomials • Factoring Polynomials - Greatest Common Factor (GCF) • Factoring - Difference of Two Squares • Factoring Quadratic Trinomials (Leading coefficient equal to 1) • Factoring Quadratic Trinomials (Leading coefficient greater than 1)	5 weeks (February-March)
Unit 8: QUADRATIC FUNCTIONS	The unit on Quadratic functions focuses on extending students' previous understanding of functions to include quadratic functions: graphing them, using them to model real-world situations, and comparing them to linear and exponential functions. Students learn to solve quadratic equations using tables, graphs, and factoring. Students also solve quadratic equations using square roots, completing the square, and the quadratic formula. Students learn different methods, such as graphing, elimination, and substitution, for solving linear-quadratic systems. Unit Topics Include: • Solving Quadratic Equations Using Graphs and Tables • Solving Quadratic Equations by Factoring • Solving Quadratic Equations Using Square Roots / Simplifying Radicals • Completing the Square / Rewriting Quadratic Expressions • The Quadratic Formula and the Discriminant / Simplifying Radicals • Key Features of a Quadratic Function • Quadratic Functions in Vertex Form • Quadratic Functions in Factored Form / Intercept Form • Quadratic Functions in Standard Form • Modeling with Quadratic Functions • Linear, Exponential, and Quadratic Models	6 weeks (April - Mid May)

Unit 9: STATISTICS	The unit on statistics focuses on extending students' knowledge of dot plots, box plots, and histograms. Students identify that standard deviation is used to compare a specific value to other values in a given data set. Students understand how to find joint, marginal, and relative frequencies. Students learn methods to interpret data displays and create inferences based on the data. Unit Topics Include: • Analyzing Data Displays / Dot Plots, Box Plots, Histograms • Comparing Data Sets / Mean, Median, Mode • Interpreting the shapes of data displays • Standard Deviation - 2 Days • Two-Way Frequency Tables • Review and Testing	2 weeks (May - June)
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