	Progression of Topics from Foundations to Algebra I
	Expressions
Foundations	• Interpret key features of an expression. (1) • Create expressions that can be modeled by a real-world context. (2) • Use the structure of an expression to identify ways to rewrite it. (3) • Simplify and evaluate numerical and algebraic expressions. (4)
Algebra I	• **Interpret parts of an expression, such as terms, factors, and coefficients (A-SSE.1^{M})
	Equations and Inequalities
Foundations	• Compare and contrast an expression and an equation and give examples of each. (5) • Given an equation, solve for a specified variable of degree one. (6) • Fluently solve and check multi-step equations and inequalities with an emphasis on the distributive property, variables on both sides, and rational coefficients. Explain each step when solving a multistep equation and inequality. Justify each step using the properties of real numbers. (7) • Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. (8) • Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Solve inequalities of these forms fluently. (9) • Graph the solution point of an equation and the solution set of an inequality in one variable on a horizontal number line. For inequalities, be able to interpret and write the solution set in a variety of ways (e.g., set notation). (10) • Justify when linear equations in one variable will yield one solution, infinitely many solutions, or no solution. (11)
Algebra I	• Create (linear) equations and inequalities in one variable and use them to solve problems. (A-CED.1^{M}) • **Explain each step in solving a 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.1) • **Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. (A-REI.3) • Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context (A-CED.3^{M}) • Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. (A-CED.4^{M})

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** Direct connection to Foundations of Algebra content

^{M} Refers to Modeling – Standards with this notation should incorporate real-world contexts and multiple representations (ex: tables, graphs, equations); students are expected to create, compare, and interpret equations, graphs, and functions.

	Understanding Functions
Foundations	• Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. Use function notation, where appropriate. (12) • Compare and contrast a function and a relation. Use appropriate strategies to assess whether a given situation represents a function or a relation (e.g., the vertical line test). (13) • Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. (14)
Algebra I	• **Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and *x* is an element of its domain, then *f*(*x*) denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y* = *f*(*x*). (F.IF.1) • Create equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (A-CED.2^{M}) • Prove that linear functions grow by equal differences over equal intervals; recognize situations in which one quantity changes at a constant rate per unit interval relative to another. (F-LE.1a, b^{M}) • 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.10) • **Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. (F-IF.5^{M}) • Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. (F-IF.2)

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	Rate of Change (Linear)
Foundations	• Determine the rate of change of a linear function from a description of a relationship or from two (*x*, *y*) values, including reading these from a table or from a graph. Use the rate of change to determine if two lines are parallel, perpendicular, or neither. (15) • Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. (16) • Create and graph the equation of a linear function given the rate of change and y-intercept. Compare and contrast up to three linear functions written in a various forms (i.e., point-slope, slope-intercept, and standard form.) (17) • Determine the linear function that models two points, a graph, a table of values, a mapping, or a real-world context. ***Fluently*** convert between the point-slope, slope-intercept, and standard form of a line. (18)
Algebra I	• Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. (F.IF.6) • **Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. (S-ID.7^{M}) • Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (F-IF.7) • Recognize *situations* in which one quantity changes at a constant rate per unit interval relative to another. (F-LE.1b) NOTE: Students will extend their knowledge of rate of change to investigate linear, quadratic, and exponential models as well as use to solve problems in Algebra.

** Direct connection to Foundations of Algebra content

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	Comparing Linear and Quadratic Models
Foundations	• Create and identify the parent function for linear and quadratic functions in a Coordinate Plane. (19) • Compare the properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). (Limited to linear and quadratic functions.) (20) • Describe the following characteristics of linear and quadratic parent functions by inspection: domain/range, increasing/decreasing intervals, intercepts, symmetry, and asymptotic behavior. Identify each characteristic in set notation or words, were appropriate. (21) • Identify domain/range, increasing/decreasing intervals, intercepts, symmetry, and asymptotic behavior, given the graph of a function in the form $f(x) + k$, $kf(x)$, $f(kx)$, or $f(x + k)$, where k belongs to the set of the integers. Identify each characteristic in set notation or as an inequality, where appropriate.
Algebra I	• Create equations in two variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (A-CED.2^{M}) • Prove that linear functions grow by equal differences over equal intervals; recognize situations in which one quantity changes at a constant rate per unit interval relative to another. (F-LE.1a, b^{M}) • 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.10) • **Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. (F-IF.5^{M}) • **Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. (F-IF.2)

** Direct connection to Foundations of Algebra content

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