Mathematics Scope and Sequence
Algebra 1

Unit	Common Core State Standards	Approximate Time Frame
One: **Expressions, Equations, and Functions**	HSA.SSE.A.1 Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. HSA.SSE.A.2 Use the structure of an expression to identify ways to rewrite it. HSA.CED.A.1 Create equations and inequalities in one variable and use them to solve problems. HSA.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. HSA.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. HSA.REI.A.1 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. HSA.REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. HSA.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). HSF.IF.A.1 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). HSF.IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. HSF.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	22 Days
Two: **Linear Equations and Inequalities**	HSA.CED.A.1 Create equations and inequalities in one variable and use them to solve problems. HSA.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. HSA.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. HSA.REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	20 Days

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	HSA.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 in two variables as the intersection of the corresponding half-planes. HSF.BF.A.1 Write a function that describes a relationship between two quantities. HSF.BF.B.4.a Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. HSF.IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. HSF.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. HSF.IF.B.6 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. HSF.IF.C.7.a Graph linear and quadratic functions and show intercepts, maxima, and minima. HSF.LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. HSF.LE.A.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). HSS.ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	
Three: **Systems of Linear Equations and Inequalities**	HSN.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. HSN.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. HSA.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. HSA.REI.C.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. HSA.REI.D.11 Explain why the x coordinates of the points where the graphs of the equations y=f(x) and y=g(x) intersect are the solutions of the equation f(x)=g(x); find the solutions approximately using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. HSA.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 in two variables as the intersection of the corresponding half-planes. HSA.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph	19 Days

	equations on coordinate axes with labels and scales. HSA.CED.A.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. HSA.CED.3 Linear Programming/ real-life applications. HSA.REI.7 Solve a system with a linear equation and quadratic equation.	
Four: **Exponents and** **Exponential** **Function**	HSA.SSE.A.2 Use the structure of an expression to identify ways to rewrite it. HSA.SSE.B.3c Use the properties of exponents to transform expressions for exponential functions. HSN.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. HSN.RN.A.2 Rewrite expressions involving radicals and rational exponents using property of exponents. HSA.REI.D.11 Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions HSF.LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. HSF.LE.A.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). HSF.LE.A.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. HSF.BF.B.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. HSF.IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes HSF.IF.B.6 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 HSF.IF.C.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. HSF.IF.C.8b Use the properties of exponents to interpret expressions for exponential functions. HSF.LF.2 Construct and compare exponential models and solve problems	15 Days
Five: **Quadratic** **Expressions and**	HSA.APR.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. HSA.REI.A.1 Explain each step in solving a simple equation as following from the equality of numbers asserted	23 Days

Equations	at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. HSA.REI.B.4b Solve quadratic equations by inspection (e.g., for x2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b. HSA.SSE.A.1 Interpret expressions that represent a quantity in terms of its context. HSA.SSE.A.1a Interpret parts of an expression, such as terms, factors, and coefficients. HSA.SSE.A.2 Use the structure of an expression to identify ways to rewrite it. HSA.SSE.B.3a Factor a quadratic expression to reveal the zeros of the function it defines.	

Six:
Quadratic
Functions
	HSA.APR.B.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
	HSA.REI.B.4 Solve quadratic equations in one variable.
	HSA.SSE.3b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
	HSF.BF.B.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
	HSF.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
	HSF.IF.B.6 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.
	HSF.IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
	    a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
	    b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
	    c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
	HSF.IF.C.8a Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
	HSF.IF.C.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
	HSF.LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.
	HSF.LE.A.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a
		19 Days

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	graph, a description of a relationship, or two input-output pairs (include reading these from a table). HSF.LE.A.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. HSS.ID.B.6a Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. HSA.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 $x^2 + y^2 = 3$.	
Seven: **Function Analysis**	HSA.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. HSA.REI.D.11 Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. HSN.RN.A.2 Rewrite expressions involving radicals and rational exponents using property of exponents. HSF.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. HSF.BF.B.3 Identify the effect on the graph of replacing $f(x)$ by $f(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ for specific values of k (both positive and negative); find the value of k given the graphs. HSN.RN.B.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and irrational number is irrational and that the product of a nonzero rational number and an irrational number is irrational. HSF.FIF.C.7b Graph square root functions.	18 Days
Eight: **Statistics**	HSS.ID.A.1 Represent data with plots on the real number line (dot plots, histograms, and box plots). HSS.ID.A.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. HSS.ID.A.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). HSS.ID.B.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. HSS.ID.B.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.	18 Days

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| | c. Fit a linear function for a scatter plot that suggests a linear association.
HSS.ID.C.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.
HSS.ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
HSS.ID.C.9 Distinguish between correlation and causation. | |

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