

Rationale for Module Sequence in Algebra I

Module 1: By the end of eighth grade, students have learned to solve linear equations in one variable and have applied graphical and algebraic methods to analyze and solve systems of linear equations in two variables. Now, students analyze and explain precisely the process of solving an equation. Students, through reasoning, develop fluency writing, interpreting, and translating between various forms of linear equations and inequalities and make conjectures about the form that a linear equation might take in a solution to a problem. They reason abstractly and quantitatively by choosing and interpreting units in the context of creating equations in two variables to represent relationships between quantities. They master the solution of linear equations and apply related solution techniques and the properties of exponents to the creation and solution of simple exponential equations. They learn the terminology specific to polynomials and understand that polynomials form a system analogous to the integers.

Module 2: This module builds upon students' prior experiences with data, providing students with more formal means of assessing how a model fits data. Students display and interpret graphical representations of data, and if appropriate, choose regression techniques when building a model that approximates a linear relationship between quantities. They analyze their knowledge of the context of a situation to justify their choice of a linear model. With linear models, they plot and analyze residuals to informally assess the goodness of fit.

Module 3: In earlier grades, students defined, evaluated, and compared functions in modeling relationships between quantities. In this module, students learn function notation and develop the concepts of domain and range. They explore many examples of functions, including sequences; they interpret functions given graphically, numerically, symbolically, and verbally, translate between representations, and understand the limitations of various representations. Students build on their understanding of integer exponents to consider exponential functions with integer domains. They compare and contrast linear and exponential functions, looking for structure in each and distinguishing between additive and multiplicative change. Students explore systems of equations and inequalities, and they find and interpret their solutions. They interpret arithmetic sequences as linear functions and geometric sequences as exponential functions. In building models of relationships between two quantities, students analyze the key features of a graph or table of a function.

Module 4: In this module, students build on their knowledge from Module 3. Students strengthen their ability to discern structure in polynomial expressions. They create and solve equations involving quadratic and cubic expressions. In this module's modeling applications, students reason abstractly and quantitatively in interpreting parts of an expression that represent a quantity in terms of its context; they also learn to make sense of problems and persevere in solving them by choosing or producing equivalent forms of an expression (e.g., completing the square in a quadratic expression to reveal a maximum value). Students consider quadratic functions, comparing the key characteristics of quadratic functions to those of linear and exponential functions. They learn through repeated reasoning to anticipate the graph of a quadratic function by interpreting the structure

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

of various forms of quadratic expressions. In particular, they identify the real solutions of a quadratic equation as the zeros of a related quadratic function.

Module 5: In this module, students expand their experience with functions to include more specialized functions—linear, exponential, quadratic, square, and cube root, and those that are piecewise-defined, including absolute value and step. Students select from among these functions to model phenomena using the modeling cycle (see page 61 of the CCLS).

Alignment Chart

Module and Approximate Number of Instructional Days	Common Core Learning Standards Addressed in Algebra I Modules
<p>Module 1: Relationships Between Quantities and Reasoning with Equations and Their Graphs (40 days)</p>	<p>Reason quantitatively and use units to solve problems.</p> <p>N-Q.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.</p> <p>N-Q.2⁴ Define appropriate quantities for the purpose of descriptive modeling.</p> <p>N-Q.3⁵ Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</p> <p>Interpret the structure of expressions</p> <p>A-SSE.1 Interpret expressions that represent a quantity in terms of its context.[*]</p> <ol style="list-style-type: none"> Interpret parts of an expression, such as terms, factors, and coefficients.⁶ Interpret complicated expressions by viewing one or more of their parts as a single entity.

⁴ This standard will be assessed in Algebra I by ensuring that some modeling tasks (involving Algebra I content or securely held content from Grades 6-8) require the student to create a quantity of interest in the situation being described.

⁵ The greatest precision for a result is only at the level of the least precise data point (e.g., if units are tenths and hundredths, then the appropriate level of precision is tenths). Calculation of relative error is not included in this standard (in preparation for Regents Exams).

⁶ The “such as” listed are not the only parts of an expression students are expected to know; others include, but are not limited to, degree of a polynomial, leading coefficient, constant term, and the standard form of a polynomial (descending exponents) (in preparation for Regents Exams).

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	<p style="text-align: center;"><i>For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.</i></p> <p>A-SSE.2⁷ Use the structure of an expression to identify ways to rewrite it. <i>For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.</i></p> <p>Perform arithmetic operations on polynomials</p> <p>A-APR.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.</p> <p>Create equations that describe numbers or relationships</p> <p>A-CED.1⁸ Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*</i></p> <p>A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*</p> <p>A-CED.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. <i>For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*</i></p> <p>A-CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. <i>For example, rearrange Ohm’s law $V = IR$ to highlight resistance R.*</i></p>

⁷ In Algebra I, tasks are limited to numerical expressions and polynomial expressions in one variable. Examples: Recognize $53^2 - 47^2$ as a difference of squares and see an opportunity to rewrite it in the easier-to-evaluate form $(53 - 47)(53 + 47)$. See an opportunity to rewrite $a^2 + 9a + 14$ as $(a + 7)(a + 2)$. This does not include factoring by grouping and factoring the sum and difference of cubes (in preparation for Regents Exams).

⁸ In Algebra I, tasks are limited to linear, quadratic, or exponential equations with integer exponents.

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	<p>Understand solving equations as a process of reasoning and explain the reasoning</p> <p>A-REI.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.</p> <p>Solve equations and inequalities in one variable</p> <p>A-REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</p> <p>Solve systems of equations</p> <p>A-REI.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.</p> <p>A-REI.6⁹ Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.</p> <p>Represent and solve equations and inequalities graphically</p> <p>A-REI.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).</p> <p>A-REI.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.</p>
<p>Module 2: Descriptive Statistics (25 days)</p>	<p>Summarize, represent, and interpret data on a single count or measurement variable</p> <p>S-ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).[*]</p> <p>S-ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median,</p>

⁹ Tasks have a real-world context. In Algebra I, tasks have hallmarks of modeling as a mathematical practice (less defined tasks, more of the modeling cycle, etc.).

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	<p>mean) and spread (interquartile range, standard deviation) of two or more different data sets.*</p> <p>S-ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).*</p> <p>Summarize, represent, and interpret data on two categorical and quantitative variables</p> <p>S-ID.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.*</p> <p>S-ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.*</p> <ol style="list-style-type: none"> Fit a function to the data; use functions fitted to data to solve problems in the context of the data. <i>Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.</i>¹⁰ Informally assess the fit of a function by plotting and analyzing residuals.¹¹ Fit a linear function for a scatter plot that suggests a linear association.¹² <p>Interpret linear models</p> <p>S-ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.*</p> <p>S-ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.*</p> <p>S-ID.9 Distinguish between correlation and causation.*</p>

¹⁰ Tasks have a real-world context. In Algebra I, exponential functions are limited to those with domains in the integers. Includes the use of the regression capabilities of the calculator (in preparation for Regents Exams).

¹¹ Includes creating residual plots using the capabilities of the calculator (not manually) (in preparation for Regents Exams).

¹² Both correlation coefficient and residuals will be addressed in this standard (in preparation for Regents Exams).

Module and Approximate Number of Instructional Days	Common Core Learning Standards Addressed in Algebra I Modules
<p>Module 3: Linear and Exponential Functions (35 days)</p>	<p>Write expressions in equivalent forms to solve problems</p> <p>A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*</p> <p>c. Use the properties of exponents to transform expressions for exponential functions. <i>For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.¹³</i></p> <p>Create equations that describe numbers or relationships</p> <p>A-CED.1¹⁴ Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*</i></p> <p>Represent and solve equations and inequalities graphically</p> <p>A-REI.11¹⁵ 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. <i>Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.*</i></p> <p>Understand the concept of a function and use function notation</p> <p>F-IF.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</p>

¹³ Tasks have a real-world context. As described in the standard, there is an interplay between the mathematical structure of the expression and the structure of the situation such that choosing and producing an equivalent form of the expression reveals something about the situation. In Algebra I, tasks are limited to exponential expressions with integer exponents.

¹⁴ In Algebra I, tasks are limited to linear, quadratic, or exponential equations with integer exponents.

¹⁵ In Algebra I, tasks that assess conceptual understanding of the indicated concept may involve any of the function types mentioned in the standard except exponential and logarithmic functions. Finding the solutions approximately is limited to cases where $f(x)$ and $g(x)$ are polynomial functions.

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	<p>graph of f is the graph of the equation $y = f(x)$.</p> <p>F-IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.</p> <p>F-IF.3¹⁶ Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. <i>For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.</i></p> <p>Interpret functions that arise in applications in terms of the context</p> <p>F-IF.4¹⁷ 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. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*</i></p> <p>F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*</i></p> <p>F-IF.6¹⁸ 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.*</p> <p>Analyze functions using different representations</p> <p>F-IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple</p>

¹⁶ This standard is part of the Major Content in Algebra I and will be assessed accordingly.

¹⁷ Tasks have a real-world context. In Algebra I, tasks are limited to linear functions, quadratic functions, square root functions, cube root functions, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers. The focus in this module is on linear and exponential functions.

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	<p>cases and using technology for more complicated cases.*</p> <p>a. Graph linear and quadratic functions and show intercepts, maxima, and minima.</p> <p>F-IF.9¹⁹ Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i></p> <p>Build a function that models a relationship between two quantities</p> <p>F-BF.1²⁰ Write a function that describes a relationship between two quantities.*</p> <p>a. Determine an explicit expression, a recursive process, or steps for calculation from a context.</p> <p>Build new functions from existing functions</p> <p>F-BF.3²¹ 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. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i></p> <p>Construct and compare linear, quadratic, and exponential models and solve problems</p> <p>F-LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.*</p> <p>a. Prove that linear functions grow by equal differences over equal intervals, and that</p>

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²⁰ Tasks have a real-world context. In Algebra I, tasks are limited to linear functions, quadratic functions, and exponential functions with domains in the integers.

²¹ In Algebra I, identifying 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) is limited to linear and quadratic functions. Experimenting with cases and illustrating an explanation of the effects on the graph using technology is limited to linear functions, quadratic functions, square root functions, cube root functions, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers. Tasks do not involve recognizing even and odd functions. The focus in this module is on linear and exponential functions.

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	<p>exponential functions grow by equal factors over equal intervals.</p> <p>b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.</p> <p>c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.</p> <p>F-LE.2²² 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).*</p> <p>F-LE.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.*</p> <p>Interpret expressions for functions in terms of the situation they model</p> <p>F-LE.5²³ Interpret the parameters in a linear or exponential function in terms of a context.*</p>
<p>Module 4: Polynomial and Quadratic Expressions, Equations and Functions (30 days)</p>	<p>Use properties of rational and irrational numbers.</p> <p>N-RN.3 Explain why the sum or product of two rational numbers is rational; that the 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.</p> <p>Interpret the structure of expressions</p> <p>A-SSE.1 Interpret expressions that represent a quantity in terms of its context.*</p> <p>a. Interpret parts of an expression, such as terms, factors, and coefficients.²⁴</p>

²² In Algebra I, tasks are limited to constructing linear and exponential functions in simple context (not multi-step).

²³ Tasks have a real-world context. In Algebra I, exponential functions are limited to those with domains in the integers.

²⁴ The “such as” listed are not the only parts of an expression students are expected to know; others include, but are not limited to, degree of a polynomial, leading coefficient, constant term, and the standard form of a polynomial (descending exponents) (in preparation for Regents Exams).

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	<p>b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.</p> <p>A-SSE.2²⁵ Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.</p> <p>Write expressions in equivalent forms to solve problems</p> <p>A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*</p> <p>a. Factor a quadratic expression to reveal the zeros of the function it defines.²⁶</p> <p>b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.</p> <p>Perform arithmetic operations on polynomials</p> <p>A-APR.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.</p> <p>Understand the relationship between zeros and factors of polynomials</p> <p>A-APR.3²⁷ 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.</p>

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²⁶ Includes trinomials with leading coefficients other than 1 (in preparation for Regents Exams).

²⁷ In Algebra I, tasks are limited to quadratic and cubic polynomials in which linear and quadratic factors are available. For example, find the zeros of $(x - 2)(x^2 - 9)$.

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	<p>Create equations that describe numbers or relationships</p> <p>A-CED.1²⁸ Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear and quadratic functions, and simple rational and exponential functions.</i>[*]</p> <p>A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.[*]</p> <p>Solve equations and inequalities in one variable</p> <p>A-REI.4²⁹ Solve quadratic equations in one variable.</p> <ol style="list-style-type: none"> Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), 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 $a \pm bi$ for real numbers a and b.³⁰ <p>Represent and solve equations and inequalities graphically</p> <p>A-REI.11³¹ 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</p>

²⁸ In Algebra I, tasks are limited to linear, quadratic, or exponential equations with integer exponents.

²⁹ Solutions may include simplifying radicals (in preparation for Regents Exams).

³⁰ Tasks do not require students to write solutions for quadratic equations that have roots with nonzero imaginary parts. However, tasks can require the student to recognize cases in which a quadratic equation has no real solutions.

³¹ In Algebra I, tasks that assess conceptual understanding of the indicated concept may involve any of the function types mentioned in the standard except exponential and logarithmic functions. Finding the solutions approximately is limited to cases where $f(x)$ and $g(x)$ are polynomial functions.

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	<p>value, exponential, and logarithmic functions.*</p> <p>Interpret functions that arise in applications in terms of the context</p> <p>F-IF.4³² 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. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i>*</p> <p>F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.</i>*</p> <p>F-IF.6³³ 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.*</p> <p>Analyze functions using different representations</p> <p>F-IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*</p> <ol style="list-style-type: none"> Graph linear and quadratic functions and show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

³² Tasks have a real-world context. In Algebra I, tasks are limited to linear functions, quadratic functions, square root functions, cube root functions, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers. The focus in this module is on linear and exponential functions.

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	<p>F-IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p> <p>a. 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.</p> <p>F-IF.9³⁴ Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i></p> <p>Build new functions from existing functions</p> <p>F-BF.3³⁵ 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. <i>Include recognizing even and odd functions from their graphs and algebraic expressions for them.</i></p>

³⁴ In Algebra I, tasks are limited to linear functions, quadratic functions, square root functions, cube root functions, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers.

³⁵ In Algebra I, identifying 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) is limited to linear and quadratic functions. Experimenting with cases and illustrating an explanation of the effects on the graph using technology is limited to linear functions, quadratic functions, square root functions, cube root functions, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers. Tasks do not involve recognizing even and odd functions.

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<p>Module 5: A Synthesis of Modeling with Equations and Functions (20 days)</p>	<p>Reason quantitatively and use units to solve problems.</p> <p>N-Q.3³⁶ Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</p> <p>Create equations that describe numbers or relationships</p> <p>A-CED.1³⁷ Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*</i></p> <p>A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*</p> <p>Interpret functions that arise in applications in terms of the context</p> <p>F-IF.4³⁸ 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. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*</i></p> <p>F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate</i></p>

³⁶ The greatest precision for a result is only at the level of the least precise data point (e.g., if units are tenths and hundredths, then the appropriate level of precision is tenths). Calculation of relative error is not included in this standard (in preparation for Regents Exams).

³⁷ In Algebra I, tasks are limited to linear, quadratic, or exponential equations with integer exponents.

³⁸ Tasks have a real-world context. In Algebra I, tasks are limited to linear functions, quadratic functions, square root functions, cube root functions, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers.

Module and Approximate Number of Instructional Days	Common Core Learning Standards Addressed in Algebra I Modules
	<p><i>domain for the function.</i>[*]</p> <p>F-IF.6³⁹ 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.[*]</p> <p>Build a function that models a relationship between two quantities</p> <p>F-BF.1⁴⁰ Write a function that describes a relationship between two quantities.[*]</p> <p>a. Determine an explicit expression, a recursive process, or steps for calculation from a context.</p> <p>Construct and compare linear, quadratic, and exponential models and solve problems</p> <p>F-LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.[*]</p> <p>b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.</p> <p>c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.</p> <p>F-LE.2⁴¹ 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).[*]</p>

³⁹ Tasks have a real-world context. In Algebra I, tasks are limited to linear functions, quadratic functions, square root functions, cube root functions, piecewise-defined functions (including step functions and absolute value functions), and exponential functions with domains in the integers.

⁴⁰ Tasks have a real-world context. In Algebra I, tasks are limited to linear functions, quadratic functions, and exponential functions with domains in the integers.

⁴¹ In Algebra I, tasks are limited to constructing linear and exponential functions in simple context (not multi-step).