New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Number and Quantity **The Real Number System (N.RN)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Use properties of rational and irrational numbers.	**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.	**AI-N.RN.3 Use properties and operations to understand the different forms of rational and irrational numbers.** **a.) Perform all four arithmetic operations and apply properties to generate equivalent forms of rational numbers and square roots.** **Note: Tasks include rationalizing numerical denominators of the form $\frac{a}{\sqrt{b}}$ where *a* is an integer and *b* is a natural number.** b.) **Categorize** the sum or product of rational or irrational numbers. • The sum and product of two rational numbers is rational. • The sum of a rational number and an irrational number is irrational. • The product of a nonzero rational number and an irrational number is irrational. • **The sum and product of two irrational numbers could be either rational or irrational.**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Number and Quantity **Quantities (N.Q)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Reason quantitatively and use units to solve problems. ★	**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.	**AI-N.Q.1** Select quantities and use units as a way to: i) interpret and guide the solution of multi-step problems; ii) choose and interpret units consistently in formulas; and iii) choose and interpret the scale and the origin in graphs and data displays.
	N-Q.2 Define appropriate quantities for the purpose of descriptive modeling. PARCC: In Algebra I, this standard will be assessed 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. For example, a quantity of interest is not selected for the student by the task. For example, In a situation involving data, the student might autonomously decide that a measure of center is a key variable in a situation, and then choose to work with the mean.	**STANDARD REMOVED**
	N-Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. ~~NYSED: In Algebra I, the greatest precision for a result is only at the level of the least precise data point (example: if units are tenths and hundredths, then the appropriate preciseness is tenths). Calculation of relative error is not included in this standard.~~	**AI-N.Q.3** Choose a level of accuracy appropriate to limitations on measurement and **context** when reporting quantities.

NYSED Algebra I Draft: Specific modeling domains, clusters and standards are indicated by a star symbol ★.

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Algebra **Seeing Structure in Expressions (A.SSE)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Interpret the structure of expressions.	**A-SSE.1** Interpret expressions that represent a quantity in terms of its context. ★	**AI-A.SSE.1** Interpret expressions that represent a quantity in terms of its context. ★
	A-SSE.1a ~~Interpret parts of an expression, such as terms, factors, and coefficients.~~ ~~NYSED: 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).~~	**AI-A.SSE.1a Write the standard form of a given polynomial and identify the terms, coefficients, degree, leading coefficient, and constant term.**
	A-SSE.1b 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.*	**AI-A.SSE.1b** Interpret expressions by viewing one or more of their parts as a single entity. e.g., Interpret $P(1 + r)^n$ as the product of P and a factor not depending on P. **<u>Note</u>: This standard is a fluency expectation for Algebra I. Fluency in transforming expressions and chunking (seeing parts of an expression as a single object) is essential in factoring, completing the square, and other mindful algebraic calculations.**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Algebra **Seeing Structure in Expressions (A.SSE)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Interpret the structure of expressions.	**A-SSE.2** 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 $(x^2-y^2)(x^2+y^2)$.* PARCC: Tasks limited to numerical and polynomial expressions in one variable. 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). NYSED: Does not include factoring by grouping and factoring the sum and difference of cubes.	**AI-A.SSE.2 Recognize** and use the structure of an expression to identify ways to rewrite it. (Shared standard with Algebra II) **e.g.,** **$x^3 – x^2 - x = x(x^2 - x - 1)$** **$53^2 – 47^2 = (53 + 47) (53 - 47)$** **$16x^2 - 36 = (4x)^2 - (6)^2 = (4x + 6) (4x - 6) = 4(2x + 3) (2x - 3)$ or** **$16x^2 - 36 = 4(4x^2 - 9) = 4(2x + 3) (2x - 3)$** **$-2x^2 + 8x + 10 = -2(x^2 – 4x – 5) = -2(x - 5) (x + 1)$** **$x^4 + 6x^2 - 7 = (x^2 + 7)(x^2 - 1) = (x^2 + 7)(x + 1)(x - 1)$** Note: Algebra I expressions are limited to numerical and polynomial expressions in one variable. **Use factoring techniques such as factoring out a greatest common factor, factoring the difference of two perfect squares, factoring trinomials of the form ax^2+bx+c with a lead coefficient of 1, or a combination of methods to factor completely.** Factoring will not involve factoring by grouping and factoring the sum and difference of cubes.

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Algebra **Seeing Structure in Expressions (A.SSE)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Write expressions in equivalent forms to reveal their characteristics. ★	**A-SSE.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	**AI-A.SSE.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (Shared standard with Algebra II)
	A-SSE.3a Factor quadratic expression to reveal the zeros of the function it defines. NYSED: Includes trinomials with leading coefficients other than 1.	**STANDARD REMOVED**
	A-SSE.3b Complete the square in a quadratic expression to reveal the max and min value of the function it defines.	**STANDARD REMOVED**
	A-SSE.3c Use the properties of exponents to transform expressions for ~~exponential functions~~. ~~*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%.*~~ PARCC: Tasks are limited to exponential expressions with integer exponents. 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.	**AI-A.SSE.3c** Use the properties of exponents to rewrite exponential expressions. (Shared standard with Algebra II) **e.g.,** • $3^{2x} = (3^2)^x = 9^x$ • $3^{2x+3} = 3^{2x} \cdot 3^3 = 9^x \cdot 27$ Note: Exponential expressions will include those with integer exponents, **as well as those whose exponents are linear expressions**. **Any linear term in those expressions will have an integer coefficient. Rational exponents are an expectation for Algebra II.**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Algebra **Arithmetic with Polynomials and Rational Expressions (A.APR)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Perform arithmetic operations on polynomials.	**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.	**AI-A.APR.1** Add, subtract, and multiply polynomials and recognize that the result of the operation is also a polynomial. This forms a system analogous to the integers. **Note: This standard is a fluency recommendation for Algebra I. Fluency in adding, subtracting and multiplying polynomials supports students throughout their work in algebra, as well as in their symbolic work with functions.**
Understand the relationship between zeros and factors of polynomials.	**A-APR.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.~~ PARCC: Tasks are limited to quadratic and cubic polynomials in which linear and quadratic factors are available. *For example, find the zeros of* $(x-2)(x^2-9)$.	**AI-A.APR.3** Identify zeros of polynomial functions when suitable factorizations are available. (Shared standard with Algebra II) Note: Algebra I tasks will focus on identifying the zeros of quadratic and cubic polynomial functions. For tasks that involve finding the zeros of cubic polynomial functions, the linear and quadratic factors of the cubic polynomial function will be given (e.g., find the zeros of $P(x) = (x - 2)(x^2 - 9)$).

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Algebra **Creating Equations (A.CED)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Create equations that describe numbers or relationships. ★	**A-CED.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.* PARCC: Tasks are limited to linear, quadratic, or exponential equations with integer exponents.	**AI-A.CED.1** Create equations and inequalities in one variable to **represent a real-world context**. (Shared standard with Algebra II) Notes: • **This is strictly the development of the model (equation/inequality).** • **Limit equations to linear, quadratic, and exponentials of the form $f(x) = a(b)^x$ where $a > 0$ and $b > 0$ ($b \neq 1$).** • **Work with geometric sequences may involve an exponential equation/formula of the form $a_n = ar^{n-1}$, where a is the first term and r is the common ratio.** • **Inequalities are limited to linear inequalities.** • **Algebra I tasks do not involve compound inequalities.**
	A-CED.2 Create equations in two or more variables to represent relationships between quantities; ~~graph equations on coordinate axes with labels and scales.~~	**AI-A.CED.2** Create equations and linear inequalities in two variables to represent a **real-world context**. Notes: • **This is strictly the development of the model (equation/inequality).** • **Limit equations to linear, quadratic, and exponentials of the form $f(x) = a(b)^x$ where $a > 0$ and $b > 0$ ($b \neq 1$).**
	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. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*	**AI-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**.** e.g., Represent inequalities describing nutritional and cost constraints on combinations of different foods.
	A-CED.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.*	**AI-A.CED.4** Rewrite formulas to highlight a quantity of interest, using the same reasoning as in solving equations. e.g., Rearrange Ohm's law $V = IR$ to highlight resistance R.

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Algebra **Reasoning with Equations and Inequalities (A.REI)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Understand solving equations as a process of reasoning and explain the reasoning.	**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. ~~PARCC: Tasks are limited to quadratic equations.~~	**AI-A.REI.1a** Explain each step when solving a **linear or quadratic** 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.
Solve equations and inequalities in one variable.	**A-REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	**AI-A.REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. **Note: Algebra I tasks do not involve solving compound inequalities**.
	A-REI.4 Solve quadratic equations in one variable. NYSED: Solutions may include simplifying radicals.	**AI-A.REI.4** Solve quadratic equations in one variable. Note: Solutions may include simplifying radicals.
	A-REI.4a 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.	**AI-A.REI.4a** 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. **Understand** that the quadratic formula is a derivative of this process. **Note: When utilizing the method of completing the square, the quadratic's leading coefficient will be 1 and the coefficient of the linear term will be limited to even (after the possible factoring out of a GCF). Students in Algebra I should be able to complete the square in which manipulating the given quadratic equation yields an integer value for q.**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Algebra **Reasoning with Equations and Inequalities (A.REI)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Solve equations and inequalities in one variable.	**A-REI.4b** 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 $a + bi$, $a - bi$ for real numbers a and b.~~ PARCC: Tasks do not require students to write solutions for quadratic equations that have roots with non-zero imaginary parts. However, tasks can require the student to recognize cases in which a quadratic equation has no real solutions.	**AI-A.REI.4b** Solve quadratic equations by: i) inspection, ii) taking square roots, iii) factoring, iv) completing the square, v) the quadratic formula, and **vi) graphing.** **Recognize when the process yields no real solutions.** (Shared standard with Algebra II) <u>Notes</u>: • **Solutions may include simplifying radicals or writing solutions in simplest radical form.** • An example for inspection would be $x^2 = 49$, where a student should know that the solutions would include 7 and -7. • **When utilizing the quadratic formula, there are no coefficient limits.** • **The discriminant is a sufficient way to recognize when the process yields no real solutions.**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Algebra **Reasoning with Equations and Inequalities (A.REI)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Solve systems of equations.	**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.	**STANDARD REMOVED**
	A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. PARCC: Tasks have a real-world context. Tasks have hallmarks of modeling as a mathematical practice (less defined tasks, more of the modeling cycle, etc.).	**AI-A.REI.6a** Solve systems of linear equations in two variables **both algebraically and graphically.** **Note: Algebraic methods include both elimination and substitution**.
		AI-A.REI.7a Solve a system, with rational solutions, consisting of a linear equation and a quadratic equation (parabolas only) in two variables both algebraically and graphically. **(Shared standard with Algebra II)**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Algebra **Reasoning with Equations and Inequalities (A.REI)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Represent and solve equations and inequalities graphically.	**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).~~	**AI-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. **Note: Graphing linear equations is a fluency recommendation for Algebra I. Students become fluent in solving characteristic problems involving the analytic geometry of lines, such as writing down the equation of a line given a point and a slope. Such fluency can support them in solving less routine mathematical problems involving linearity; as well as modeling linear phenomena.**
	A-REI.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~~. ★ ~~PARCC: 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.~~	**AI-A.REI.11** Given the equations $y = f(x)$ and $y = g(x)$: i) **recognize** that each x-coordinate of the intersection(s) is the solution to the equation $f(x) = g(x)$; ii)find the solutions approximately using technology to graph the functions or make tables of values; and iii) **interpret the solution in context**. ★ (Shared standard with Algebra II) **Notes: Algebra I tasks are limited to cases where $f(x)$ and $g(x)$ are linear, polynomial, absolute value, and exponential functions of the form $f(x) = a(b)^x$ where $a > 0$ and $b > 0$ ($b \neq 1$).** **Students should be taught to find the solutions approximately by using technology to graph the functions *and* by making tables of values. When solving any problem, students can choose either strategy.**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Algebra **Reasoning with Equations and Inequalities (A.REI)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Represent and solve equations and inequalities graphically.	**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.	**AI-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. **Note: Graphing linear equations is a fluency recommendation for Algebra I. Students become fluent in solving characteristic problems involving the analytic geometry of lines, such as writing down the equation of a line given a point and a slope. Such fluency can support them in solving less routine mathematical problems involving linearity; as well as modeling linear phenomena (including modeling using systems of linear inequalities in two variables).**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Functions **Interpreting Functions (F.IF)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Understand the concept of a function and use function notation.	**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 graph of *f* is the graph of the equation *y = f(x)*.	**AI-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 graph of *f* is the graph of the equation *y = f(x)*. **Note: Domain and range can be expressed using inequalities, set builder notation, verbal description, and interval notations for functions of subsets of real numbers to the real numbers.**
	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.	**AI-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.
	F-IF.3 Recognize that sequences are functions, ~~sometimes defined recursively~~, whose domain is a subset of the integers~~. *For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.*~~ ~~PARCC: This standard is part of the Major work in Algebra I and will be assessed accordingly.~~	**AI-F.IF.3** Recognize that a sequence is a function whose domain is a subset of the integers. (Shared standard with Algebra II) Notes: • **Sequences (arithmetic and geometric) will be written explicitly and only in subscript notation.** • **Work with geometric sequences may involve an exponential equation/formula of the form $a_n = ar^{n-1}$, where *a* is the first term and *r* is the common ratio.**

New York State Next Generation Mathematics Learning Standards **Algebra I Crosswalk** **Functions** **Interpreting Functions (F.IF)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Interpret functions that arise in applications in terms of the context. ★	**F-IF.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.~~* PARCC: Tasks have a real-world context. Tasks are limited to linear functions, quadratic functions, square root functions, ~~cube root functions~~, piece-wise defined functions (including step functions and absolute value functions) and exponential functions with domains in the integers.	**AI-F.IF.4** For a function that models a relationship between two quantities: i) interpret key features of graphs and tables in terms of the quantities; and ii) sketch graphs showing key features given a verbal description of the relationship. (Shared standard with Algebra II) Notes: • Algebra I key features include the following: intercepts, **zeros**; intervals where the function is increasing, decreasing, positive, or negative; maxima, minima; and symmetries. • Tasks have a real-world context and are limited to the following functions: linear, quadratic, square root, piece-wise defined (including step and absolute value), and **exponential functions of the form $f(x) = a(b)^x$ where $a > 0$ and $b > 0$ ($b \neq 1$)**.
	F-IF.5 ~~Relate~~ the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *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.*	**AI-F.IF.5 Determine** the domain of a function from its graph and, where applicable, **identify** the appropriate domain for a function in context.
	F-IF.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. PARCC: Tasks have a real-world context. Tasks are limited to linear functions, quadratic functions, square root functions, ~~cube root functions~~, piece-wise defined functions (including step functions and absolute value functions) and exponential functions with domains in the integers.	**AI-F.IF.6** Calculate and interpret the average rate of change of a function over a specified interval. (Shared standard with Algebra II) Notes: • Functions may be presented by function notation, a table of values, or graphically. • Algebra I tasks have a real-world context and are limited to the following functions: linear, quadratic, square root, piece-wise defined (including step and absolute value), and exponential functions of the form **$f(x) = a(b)^x$ where $a > 0$ and $b > 0$, ($b \neq 1$).**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Functions **Interpreting Functions (F.IF)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Analyze functions using different representations.	**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. ★	**AI-F.IF.7** Graph functions and show key features of the graph by hand and by using technology where appropriate. ★ (Shared standard with Algebra II)
	F-IF.7a Graph linear and quadratic functions and show intercepts, maxima, and minima.	**AI-F.IF.7a** Graph linear, quadratic, and **exponential** functions and show key features. Notes: • Algebra I key features include the following: intercepts**, zeros; intervals where the function is increasing, decreasing, positive, or negative; maxima, minima; and symmetries.** • **Exponential functions are of the form $f(x) = a(b)^x$ where $a > 0$ and $b > 0$ ($b \neq 1$).** • **Graphing linear functions is a fluency recommendation for Algebra I. Students become fluent in solving characteristic problems involving the analytic geometry of lines, such as writing down the equation of a line given a point and a slope. Such fluency can support them in solving less routine mathematical problems involving linearity; as well as modeling linear phenomena**.
	F-IF.7b Graph square root, ~~cube root~~, and piecewise-defined functions, including step functions and absolute value functions.	**AI-F.IF.7b** Graph square root, and piecewise-defined functions, including step functions and absolute value functions and **show key features.** **Note: Algebra I key features include the following: intercepts, zeros; intervals where the function is increasing, decreasing, positive, or negative; maxima, minima; and symmetries.**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Functions **Interpreting Functions (F.IF)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Analyze functions using different representations.	**F-IF.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	**AI-F.IF.8** Write a function in different but equivalent forms to reveal and explain different properties of the function. (Shared standard with Algebra II)
	F-IF.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.	**AI-F.IF.8a For a quadratic function, use an algebraic process** to find zeros, maxima, minima, and symmetry of the graph, and interpret these in terms of context. **Note: Algebraic processes include but not limited to factoring, completing the square, use of the quadratic formula, and the use of the axis of symmetry.**
	F-IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.* PARCC: Tasks are limited to linear functions, quadratic functions, square root, ~~cube root~~, piecewise defined (including step functions and absolute value functions), and exponential functions with domains in the integers.	**AI-F.IF.9** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). (Shared standard with Algebra II) Note: Algebra I tasks are limited to the following functions: linear, quadratic, square root, piecewise defined (including step and absolute value), and **exponential functions of the form $f(x) = a(b)^x$ where $a > 0$ and $b > 0$ ($b \neq 1$).**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Functions **Building Functions (F.BF)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Build a function that models a relationship between two quantities.	**F-BF.1** Write a function that describes a relationship between two quantities. ★	**AI-F.BF.1** Write a function that describes a relationship between two quantities. ★ (Shared standard with Algebra II)
	F-BF.1a Determine an explicit expression, ~~a recursive process~~, or steps for calculation from a context. PARCC: Tasks have a real-world context. Tasks are limited to linear, quadratic and exponential functions with domains in the integers.	**AI-F.BF.1a Determine a function from context**. **Define a sequence explicitly or steps for calculation from a context.** (Shared standard with Algebra II) Notes: • Algebra I tasks are limited to linear, quadratic **and exponential functions of the form $f(x) = a(b)^x$ where $a > 0$ and $b > 0$ ($b \neq 1$).** • **Work with geometric sequences may involve an exponential equation/formula of the form $a_n = ar^{n-1}$, where a is the first term and r is the common ratio.** • **Sequences will be written explicitly and only in subscript notation**.
Build new functions from existing functions.	**F-BF.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. ~~PARCC: Identifying the effect on the graph of replacing *f(x)* by *f(x) +k*, *kf(x)*, 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.~~	**AI-F.BF.3a** Using *f(x) + k*, *k f(x)*, and *f(x + k)*: i) identify the effect on the graph when replacing *f(x)* by *f(x) + k*, *k f(x)*, and *f(x + k)* for specific values of *k* (both positive and negative); ii) find the value of *k* given the graphs; **iii) write a new function using the value of *k*;** and iv) use technology to experiment with cases and explore the effects on the graph. (Shared standard with Algebra II) **Note: Tasks are limited to linear, quadratic, square root, and absolute value functions; and exponential functions of the form $f(x) = a(b)^x$ where $a > 0$ and $b > 0$ ($b \neq 1$).**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Functions **Linear, Quadratic and Exponential Models (F.LE) ★**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Construct and compare linear, quadratic and exponential models and solve problems	**F-LE.1** Distinguish between situations that can be modeled with linear functions and with exponential functions.	**AI-F.LE.1** Distinguish between situations that can be modeled with linear functions and with exponential functions.
	F-LE.1a ~~Prove~~ that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.	**AI-F.LE.1a Justify** that a function is linear because it grows by equal differences over equal intervals, and that a function is exponential because it grows by equal factors over equal intervals.
	F-LE.1b Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	**AI-.F.LE.1b** Recognize situations in which one quantity changes at a constant rate per unit interval relative to another, **and therefore can be modeled linearly.** **e.g., A flower grows two inches per day.**
	F-LE.1c Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	**AI-F.LE.1c** Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another, **and therefore can be modeled exponentially.** **e.g., A flower doubles in size after each day.**
	F-LE.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). PARCC: Tasks are limited to constructing linear and exponential functions in simple context (not multi-step).	**AI-F.LE.2** Construct a linear or exponential function **symbolically** given: i) a graph; ii) a description of the relationship; iii) two input-output pairs (include reading these from a table). (Shared standard with Algebra II) <u>Note</u>: Tasks are limited to constructing linear and exponential functions in simple context (not multi-step).
	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.	**AI-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.

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Functions **Linear, Quadratic and Exponential Models (F.LE) ★**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Interpret expressions for functions in terms of the situation they model.	**F-LE.5** Interpret the parameters in a linear or exponential function in terms of a context. PARCC: Tasks have a real-world context. Exponential functions are limited to those with domains in the integers.	**AI-F.LE.5** Interpret the parameters in a linear or exponential function in terms of a context. (Shared standard with Algebra II) Note: Tasks have a real-world context. **Exponential functions are limited to those with domains in the integers and are of the form $f(x) = a(b)^x$ where $a > 0$ and $b > 0$ ($b \neq 1$).**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Statistics and Probability **Interpreting Categorical and Quantitative Data (S.ID)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Summarize, represent, and interpret data on a single count or measurement variable.	**S-ID.1** Represent data with plots on the real number line (dot plots, histograms, and box plots).	**AI-S.ID.1** Represent data with plots on the real number line (dot plots, histograms, and box plots).
	S-ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (inter-quartile range, standard deviation) of two or more different data sets.	**AI-S.ID.2** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (inter-quartile range, sample standard deviation) of two or more different data sets. **Note: Values in the given data sets will represent samples of larger populations. The calculation of standard deviation will be based on the sample standard deviation formula $s = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}}$. The sample standard deviation calculation will be used to make a statement about the population standard deviation from which the sample was drawn.**
	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).	**AI-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).

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Statistics and Probability **Interpreting Categorical and Quantitative Data (S.ID)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Summarize, represent, and interpret data on two categorical and quantitative variables.	**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.	**AI-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.
	S-ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	**AI-S.ID.6** Represent bivariate data on a scatter plot, and describe how the variables' values are related. **Note: It's important to keep in mind that the data must be linked to the same "subjects," not just two unrelated quantitative variables; being careful not to assume a relationship between the actual variables (correlation/causation issue).**
	S-ID.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~~. PARCC: Tasks have real world context. ~~Exponential functions are limited to those with domains in the integers.~~ NYSED: Includes the regression capabilities of the calculator.	**AI-S.ID.6a** Fit a function to real-world data; use functions fitted to data to solve problems in the context of the data. (Shared standard with Algebra II) Note: **Algebra I emphasis is on linear models** and includes the regression capabilities of the calculator.
	S-ID.6b Informally assess the fit of a function by plotting and analyzing residuals. NYSED: Includes creating residual plots using the capabilities of the calculator (not manually).	**STANDARD REMOVED**
	S-ID.6c Fit a linear function for a scatter plot that suggests a linear association. NYSED: Both correlation coefficient and residuals will be addressed in this standard.	**STANDARD REMOVED**

New York State Next Generation Mathematics Learning Standards		
Algebra I Crosswalk		
Statistics and Probability **Interpreting Categorical and Quantitative Data (S.ID)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Interpret linear models.	**S-ID.7** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	**AI-S.ID.7** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
	S-ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.	**AI-S.ID.8** Calculate (using technology) and interpret the correlation coefficient of a linear fit.
	S-ID.9 Distinguish between correlation and causation.	**AI-S.ID.9** Distinguish between correlation and causation.