NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Number and Quantity **The Real Number System (N-RN)**				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	B. Use properties of rational and irrational numbers.	**N-RN.B.3**	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. 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.	3a. Note: Tasks include rationalizing numerical denominators of the form $\frac{a}{\sqrt{b}}$ where a is an integer and b is a natural number.

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Number and Quantity Quantities (N-Q)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	A. Reason quantitatively and use units to solve problems. ★	**N-Q.A.1**	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.A.3	3. Choose a level of accuracy appropriate to limitations on measurement and context when reporting quantities.	

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Algebra Seeing Structure in Expressions (A-SSE)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	A. Interpret the structure of expressions.	**A-SSE.A.1**	1. Interpret expressions that represent a quantity in terms of its context. ★	
		A-SSE.A.1a	1a. Write the standard form of a given polynomial and identify the terms, coefficients, degree, leading coefficient, and constant term.	Note: This standard builds upon work started with standard 6. EE.A.2b. Identify parts of an expression using mathematical terms (term, coefficient, power, sum, difference, product, factor and quotient). View one or more parts of an expression as a single quantity.
		A-SSE.A.1b	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. Note: This standard is a fluency recommendation 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. For more guidance, see Fluency in the Glossary of Verbs Associated with the New York State Math Standards.
		A-SSE.A.2	2. Recognize and use the structure of an expression to identify ways to rewrite it. (Shared standard with Algebra II)	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. 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 $4(4x^2-9) = 4(2x+3)(2x-3)$ • $-2x^2+8x+10=-2(x^2-4x-5)=-2(x-5)(x+1)$

NYS Algebra I Mathematics Learning Standards (Revised 2017)			
Algebra **Seeing Structure in Expressions (A-SSE)**			
	Standard Code	**Standard**	**Additional Clarification/Examples**
B. Write expressions in equivalent forms to reveal their characteristics. ★	**A-SSE.B.3**	3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	
	A-SSE.B.3c	c. Use the properties of exponents to rewrite exponential expressions. (Shared standard with Algebra II)	Note: Exponential expressions will include those with integer exponents, as well 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. e.g., $3^{2x}=(3^2)^x=9^x$ $3^{2x+3}=3^{2x}3^3=9^x\cdot 27$

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Algebra Arithmetic with Polynomials and Rational Expressions (A-APR)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	A. Perform arithmetic operations on polynomials.	**A-APR.A.1**	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. For more guidance, see Fluency in the Glossary of Verbs Associated with the New York State Math Standards.

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Algebra Arithmetic with Polynomials and Rational Expressions (A-APR)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	B. Understand the relationship between zeros and factors of polynomials.	**A-APR.B.3**	3. Identify zeros of polynomials when suitable factorizations are available. (Shared standard with Algebra II)	Note: Algebra I tasks will focus on identifying the zeros of quadratic and cubic polynomials. For tasks that involve finding the zeros of cubic polynomials, the linear and quadratic factors of the cubic polynomial will be given (i.e., find the zeros of $P(x)=(x-2)(x^2-9)$). For factoring expectations, see standard A-SSE.A.2

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Algebra **Creating Equations (A-CED)**				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	A. Create equations that describe numbers or relationships. ★	**A-CED.A.1**	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 (F-IF.A.3 and F-BF.A.1a) could 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.A.2	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.A.3	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.A.4	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.

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Algebra Reasoning with Equations and Inequalities (A-REI)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	A. Understand solving equations as a process of reasoning and explain the reasoning.	**A-REI.A.1a**	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. (Shared standard with Algebra II)	

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Algebra Reasoning with Equations and Inequalities (A-REI)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	B. Solve equations and inequalities in one variable.	**A-REI.B.3**	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.B.4	4. Solve quadratic equations in one variable.	Note: Solutions may include simplifying radicals. Connect to work done in standard N-RN.B.3. For factoring expectations, see standard A-SSE.A.2

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Algebra Reasoning with Equations and Inequalities (A-REI)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	B. Solve equations and inequalities in one variable.	**A-REI.B.4a**	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.
		A-REI.B.4b	4b. Solve quadratic equations by: i) inspection; ii) taking square roots; iii) factoring; iv) completing the square; v) the quadratic formula; vi) graphing and recognizing when the process yields no real solutions. (Shared standard with Algebra II)	Note: Solutions may include simplifying radicals or writing solutions in simplest radical form, connecting to work done in standard N-RN.B.3. i) An example for inspection would be $x^2 = 49$, where a student should know that the solutions would include 7 and -7. iii) For factoring expectations, see standard A-SSE.A.2 iv) For completing the square, see standard A-REI.B.4a v) No coefficient limits when utilizing the quadratic formula. vi) The method of solving graphically shows the relationship between the zeros of a quadratic function and its graph; see standards A-APR.B.3, F-IF.B.4, F.IF.C.7a and F.IF.C.8a. Students should use technology where appropriate. Note: The discriminant is a sufficient way to do this.

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Algebra Reasoning with Equations and Inequalities (A-REI)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	C. Solve systems of equations.	**A-REI.C.6a**	6a. Solve systems of linear equations in two variables both algebraically and graphically. (Shared standard with Algebra II)	Note: Algebraic methods include both elimination and substitution.
		A.REI. C.7a	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.	

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Algebra **Reasoning with Equations and Inequalities (A-REI)**				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	D. Represent and solve equations and inequalities graphically.	**A-REI.D.10**	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. For more guidance, see Fluency in the Glossary of Verbs Associated with the New York State Math Standards.
		A-REI.D.11	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); and 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)	Note: 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 ($b \neq 1$). ii) Instructionally, students need to be exposed to both methods of obtaining solutions, graphing and creating tables of values, however, whenever solving any problem, students can choose either strategy.

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Algebra Reasoning with Equations and Inequalities (A-REI)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	D. Represent and solve equations and inequalities graphically.	**A-REI.D.12**	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). For more guidance, see Fluency in the Glossary of Verbs Associated with the New York State Math Standards.

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Functions Interpreting Functions (F-IF)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	A. Understand the concept of a function and use function notation.	**F-IF.A.1**	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, verbal description, and interval notations for functions of subsets of real numbers to the real numbers.
		F-IF.A.2	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.A.3	3. Recognize that a sequence is a function whose domain is a subset of the integers. (Shared standard with Algebra II)	Note: Sequences (arithmetic and geometric) will be written explicitly and only in subscript notation.

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Functions **Interpreting Functions (F-IF)**				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	B. Interpret functions that arise in applications in terms of the context. ★	**F-IF.B.4**	4a. 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.B.5	5. Determine the domain of a function from its graph and, where applicable, identify the appropriate domain for a function in context.	
		F-IF.B.6	6. Calculate and interpret the average rate of change of a function presented over a specified interval. (Shared standard with Algebra II)	Note: 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 exponentials of the form $f(x) = a(b)^x$ where $a>0$ and $b>0$ ($b \neq 1$).

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Functions Interpreting Functions (F-IF)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	C. Analyze functions using different representations.	**F-IF.C.7**	7. Graph functions and show key features of the graph by hand and by using technology where appropriate. ★	
		F-IF.C.7a	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. Exponentials are of the form $f(x) = a(b)^x$ where $a>0$ and $b>0$ ($b \neq 1$). 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. For more guidance, see Fluency in the Glossary of Verbs Associated with the New York State Math Standards.
		F-IF.C.7b	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.

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Functions Interpreting Functions (F-IF)				
		Standard Code	**Standard**	**Revised Standard Recommendation for 2018-19 Additional Information/Notes**
Cluster	C. Analyze functions using different representations.	**F-IF.C.8**	8. Write a function in different but equivalent forms to reveal and explain different properties of the function.	
		F-IF.C.8a	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.C.9	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 exponentials of the form $f(x) = a(b)^x$ where $a>0$ and $b>0$ ($b \neq 1$).

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Functions Building Functions (F-BF)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	A. Build a function that models a relationship between two quantities.	**F-BF.A.1**	1. Write a function that describes a relationship between two quantities. ★	
		F-BF.A.1a	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 (F-IF.A.3 and F-BF.A.1a) could 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.

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Functions Building Functions (F-BF)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	B. Build new functions from existing functions.	**F-BF.B.3a**	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 exponentials of the form $f(x) = a(b)^x$ where $a>0$ and $b>0$ ($b \neq 1$).

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Functions **Linear, Quadratic and Exponential Models (F-LE) ★**				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	A. Construct and compare linear, quadratic, and exponential models and solve problems.	**F-LE.A.1**	1. Distinguish between situations that can be modeled with linear functions and with exponential functions.	
		F-LE.A.1a	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.A.1b	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.A.1c	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.

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Functions **Linear, Quadratic and Exponential Models (F-LE) ★**				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	A. Construct and compare linear, quadratic, and exponential models and solve problems.	**F-LE.A.2**	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)	Note: Tasks are limited to constructing linear and exponential functions in simple context (not multi-step).
		F-LE.A.3	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.	

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Functions Linear, Quadratic and Exponential Models (F-LE) ★				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	B. Interpret expressions for functions in terms of the situation they model.	**F-LE.B.5**	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 and connects to work in standard A-SSE.A.1b. 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 $b>0$ ($b \neq 1$).

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Statistics and Probability Interpreting categorical and quantitative data (S-ID)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	A. Summarize, represent, and interpret data on a single count or measurement variable.	**S-ID.A.1**	1. Represent data with plots on the real number line (dot plots, histograms, and box plots).	
		S-ID.A.2	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 $s = \sqrt{\frac{\sum(X - \bar{X})^2}{n-1}}$ 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.A.3	3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Statistics and Probability Interpreting categorical and quantitative data (S-ID)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	B. Summarize, represent, and interpret data on two categorical and quantitative variables.	**S-ID.B.5**	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.	

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Statistics and Probability Interpreting categorical and quantitative data (S-ID)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	B.Summarize, represent, and interpret data on two categorical and quantitative variables.	**S-ID.B.6**	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.B.6a	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.

NYS Algebra I Mathematics Learning Standards (Revised 2017)				
Statistics and Probability Interpreting categorical and quantitative data (S-ID)				
		Standard Code	**Standard**	**Additional Clarification/Examples**
Cluster	C. Interpret linear models.	**S-ID.C.7**	7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	
		S-ID.C.8	8. Calculate (using technology) and interpret the correlation coefficient of a linear fit.	
		S-ID.C.9	9. Distinguish between correlation and causation.	