New York State Next Generation Mathematics Learning Standards		
Algebra II Crosswalk		
Number and Quantity **The Real Number System (N.RN)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Extend the properties of exponents to rational exponents.	**N-RN.1** ~~Explain~~ how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define* $5^{\frac{1}{3}}$ *to be the cube root of 5 because we want* $(5^{\frac{1}{3}})^3 = 5^{(\frac{1}{3})3}$ *to hold, so* $(5^{\frac{1}{3}})^3$ *must equal 5.*	**AII-N.RN.1 Explore** how the meaning of rational exponents follows from extending the properties of integer exponents. e.g., We define $5^{\frac{1}{3}}$ to be the cube root of 5 because we want $(5^{\frac{1}{3}})^3 = 5^{(\frac{1}{3})3}$ to hold, so $(5^{\frac{1}{3}})^3$ must equal 5.
	N-RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents. NYSED: Includes expressions with variable factors, such as $\sqrt[3]{27x^5y^3}$.	**AII-N.RN.2** Convert between radical expressions and expressions with rational exponents using the properties of exponents. **<u>Note</u>: All radical expressions involving variables assume the variables are representing positive numbers. Includes expressions with variable factors, such as $\sqrt[3]{27x^5y^3}$, being equivalent to $(27x^5y^3)^{\frac{1}{3}}$which equals $3x^{\frac{5}{3}}y$.**

New York State Next Generation Mathematics Learning Standards		
Algebra II Crosswalk		
Number and Quantity **Quantities (N-Q)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Reason quantitatively and used units to solve problems. ★	**N-Q.2** Define appropriate quantities for the purpose of descriptive modeling. PARCC: This standard will be assessed in Algebra II by ensuring that some modeling tasks (involving Algebra II content or securely held content from previous grades and courses) require the student to create a quantity of interest in the situation being described (i.e., this is not provided in the task). For example, in a situation involving periodic phenomena, the student might autonomously decide that amplitude is a key variable in a situation, and then choose to work with peak amplitude.	**STANDARD REMOVED**

New York State Next Generation Mathematics Learning Standards		
Algebra II Crosswalk		
Number and Quantity **The Complex Number System (N.CN)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Perform arithmetic operations with complex numbers.	**N-CN.1** Know there is a complex number *i* such that $i^2 = -1$, and every complex number has the form $a + bi$ with *a* and *b* real.	**AII-N.CN.1** Know there is a complex number *i* such that $i^2 = -1$, and every complex number has the form $a + bi$ with *a* and *b* real.
	N-CN.2 Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	**AII-N.CN.2** Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. **Note: Tasks include simplifying powers of *i*.**
Use complex numbers in polynomial identities and equations.	**N-CN.7** Solve quadratic equations with real coefficients that have complex solutions.	**STANDARD REMOVED**

New York State Next Generation Mathematics Learning Standards		
Algebra II 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* $(x^2 - y^2)(x^2 + y^2)$. NYSED: Includes factoring by grouping. PARCC: i.) Tasks are limited to polynomial, rational, or exponential expressions. ii.) Examples: 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). In recognizing the equation x^2 +2x+1+y^2 =9, see the opportunity to rewrite the first three terms as $(x+1)^2$, thus recognizing the equation of a circle with radius 3 and center (-1,0). See (x^2 +4)/ (x^2 +3) as ((x^2 +3) +1)/(x^2+3), thus recognizing an opportunity to write it as 1+1/ (x^2 +3).	**AII-A.SSE.2 Recognize** and use the structure of an expression to identify ways to rewrite it. (Shared standard with Algebra I) e.g. • **$81x^4$ - $16y^4$ is equivalent to $(9x^2)^2$ - $(4y^2)^2$ or $(9x^2 - 4y^2)(9x^2 + 4y^2)$ or $(3x + 2y)(3x - 2y)(9x^2 + 4y^2)$** • $\frac{x^2+4}{x^2+3}$ is equivalent to $\frac{(x^2+3)+1}{x^2+3} = \frac{x^2+3}{x^2+3} + \frac{1}{x^2+3} = 1 + \frac{1}{x^2+3}$ • **$3x^3$ - $5x^2$ - 48x + 80 is equivalent to $3x(x^2 - 16) - 5(x^2 - 16)$, which when factored completely is $(3x - 5)(x + 4)(x - 4)$** Notes: • Includes factoring by grouping and **factoring the sum and difference of cubes.** • Tasks are limited to polynomial, rational, or exponential expressions. **Quadratic expressions include leading coefficients other than 1.** • **This standard is a fluency expectation for Algebra II. The ability to see structure in expressions and to use this structure to rewrite expressions is a key skill in everything from advanced factoring (e.g., grouping) to summing series, to rewriting of rational expressions, to examining the end behavior of the corresponding rational function.**

New York State Next Generation Mathematics Learning Standards		
Algebra II 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.	**AII-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 I)
		AII-A.SSE.3a Factor a quadratic expression to reveal the zeros of the function it defines.
	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* $(1.15^{\frac{1}{12}})^{12t} \approx 1.012^{12t}$ *to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.* PARCC: i) Tasks have a real-world context. As described in the standard, there is 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. ii) Tasks are limited to exponential expressions with rational or real exponents.	**AII-A.SSE.3c** Use the properties of exponents to **rewrite** exponential expressions. (Shared standard with Algebra I) Note: Tasks include rewriting exponential expressions with rational coefficients in the exponent.
	A-SSE.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. *For example, calculate mortgage payments.* NYSED: Includes using summation notation.	**STANDARD REMOVED**

New York State Next Generation Mathematics Learning Standards		
Algebra II Crosswalk		
Algebra **Arithmetic with Polynomials and Rational Expressions (A.APR)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Understand the relationship between zeros and factors of polynomials.	**A-APR.2** ~~Know and~~ apply the Remainder Theorem: For a polynomial *p(x)* and a number *a*, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.	**AII-A.APR.2** Apply the Remainder Theorem: For a polynomial *p(x)* and a number *a*, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.
	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: i) Tasks include quadratic, cubic, and quartic polynomials and polynomials for which factors are not provided. For example, find the zeros of $(x^2 - 1)(x^2 + 1)$.	**AII-A.APR.3** Identify zeros of polynomial functions when suitable factorizations are available. (Shared standard with Algebra I)
Use polynomial identities to solve problems.	**A-APR.4** Prove polynomial identities and use them to describe numerical relationships. *For example, the polynomial identity* $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ *can be used to generate Pythagorean triples.*	**STANDARD REMOVED**
Rewrite rational expressions.	**A-APR.6** Rewrite simple rational expressions in different forms; write (a(x))/(b(x)) in the form $q(x) + {}^{r(x)}/_{b(x)}$ where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.	**AII-A.APR.6** Rewrite simple rational expressions in different forms; write (a(x))/(b(x)) in the form $q(x) + {}^{r(x)}/_{b(x)}$ where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$. **<u>Note</u>: This standard is a fluency expectation for Algebra II. This standard sets an expectation that students will divide polynomials with remainders by inspection in simple cases. For example, one can view the rational expression $\frac{x+4}{x+3}$ as $\frac{(x+3)+1}{x+3}$ which is $1 + \frac{1}{x+3}$.**

New York State Next Generation Mathematics Learning Standards		
Algebra II 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. ~~*(Tasks are limited to linear, quadratic, or exponential equations with integer exponents.)*~~ ~~PARCC: i) Tasks are limited to exponential equations with rational or real exponents and rational functions.~~ ii) Tasks have a real-world context.	**AII-A.CED.1** Create equations and inequalities in one variable to represent a real-world context. (Shared standard with Algebra I) **Note: This is strictly the development of the model (equation/inequality). Tasks include linear, quadratic, rational, and exponential functions.**

New York State Next Generation Mathematics Learning Standards		
Algebra II 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: i) Tasks are limited to simple rational or radical equations.	**AII-A.REI.1b** Explain each step **when solving rational or radical equations** as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
	A-REI.2 Solve ~~simple~~ rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	**AII-A.REI.2** Solve rational and radical equations in one variable, identify extraneous solutions, and explain how they arise. **Note: Radical equations may include but are not limited to those of the form $x^{3/5} = 8$ and $3x^{3/4} + 5 = 86$.**

New York State Next Generation Mathematics Learning Standards		
Algebra II 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.4** Solve quadratic equations in one variable.	**AI-A.REI.4** Solve quadratic equations in one variable. **<u>Note</u>: Solutions may include simplifying radicals.**
	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 $a \pm bi$ for real numbers a and b. PARCC: i) In the case of equations that have roots with nonzero imaginary parts, students write the solutions as $a \pm bi$ for real numbers a and b.	**AII-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**. Write complex solutions in $a + bi$ form. (Shared standard with Algebra I) **<u>Notes</u>:** • **An example for inspection would be $x^2 = -81$, where a student should know that the solutions would include ±9i.** • **An example where students need to factor out a leading coefficient while completing the square would be $4x^2 + 8x - 9 = 0$.**

New York State Next Generation Mathematics Learning Standards		
Algebra II 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.6** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. PARCC/NYSED: i) Tasks are limited to 3x3 systems only. Systems of 3 linear equations with 3 variables only.	**STANDARD REMOVED**
	A-REI.7 Solve a ~~simple~~ system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. *For example, find the points of intersection between the line* $y = -3x$ *and the circle* $x^2 + y^2 = 3$.	**AII-A.REI.7b** Solve a system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. **(Shared standard with Algebra I)** **Note: Conics are limited to parabolas and circles.**
Represent and solve equations and inequalities graphically.	**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: i) Tasks may involve any of the function types mentioned in the standard.	**AII-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; **iii) find the solution of f(x) < g(x) or f(x) ≤ g(x) graphically;** and **iv) interpret the solution in context. ★** (Shared standard with Algebra I) Note: Tasks include cases where *f(x)* and/or *g(x)* are linear, polynomial, absolute value, **square root, cube root, trigonometric**, exponential, and logarithmic functions.

New York State Next Generation Mathematics Learning Standards		
Algebra II 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.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: i) This standard is supporting work in Algebra II.~~ This standard should support the ~~major~~ work in F-BF.2 for coherence.	**AII-F.IF.3** Recognize that a sequence is a function whose domain is a subset of the integers. (Shared standard with Algebra I) Notes: • In Algebra II, sequences will be defined/written recursively and explicitly **in subscript notation**. • **This standard is a fluency expectation for Algebra II. Fluency in translating between recursive definitions and closed forms is helpful when dealing with many problems involving sequences and series, with applications ranging from fitting functions to tables to problems in finance.**
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: i) Tasks have a real-world context. ii) Tasks may involve polynomial, exponential, logarithmic, and trigonometric functions.	**AII-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 I) Notes: • Algebra II key features include: intercepts, **zeros**; intervals where the function is increasing, decreasing, positive, or negative; relative maxima and minima; symmetries; end behavior; and periodicity. • Tasks may involve real-world context and may include polynomial, **square root, cube root**, exponential, logarithmic, and trigonometric functions.
	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: i) Tasks have a real-world context. ii)Tasks may involve polynomial, exponential, logarithmic, and trigonometric functions.	**AII-F.IF.6** Calculate and interpret the average rate of change of a function over a specified interval. (Shared standard with Algebra I) Notes: • Functions may be presented by **function notation**, a table of values, or graphically. • Algebra II tasks have a real-world context and may involve polynomial, **square root, cube root**, exponential, logarithmic, and trigonometric functions.

New York State Next Generation Mathematics Learning Standards		
Algebra II 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. ★	**AII-F.IF.7** Graph functions and show key features of the graph by hand and using technology when appropriate. ★ (Shared standard with Algebra I)
	F-IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.	**AII-F.IF.7c** Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
	F-IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	**AII-F.IF.7e** Graph **cube root**, exponential and logarithmic functions, showing intercepts and end behavior; and trigonometric functions, showing period, midline, and amplitude. Note: Trigonometric functions include sin(x), cos(x) and tan(x).
	F-IF.8 Write a function ~~defined by an expression~~ in different but equivalent forms to reveal and explain different properties of the function.	**AII-F.IF.8** Write a function in different but equivalent forms to reveal and explain different properties of the function. (Shared standard with Algebra I)
	F-IF.8b Use the properties of exponents to interpret expressions for exponential functions. *For example, identify percent rate of change in functions such as* $y = (1.02)^t, y = (0.97)^{t,}, y = (1.01)^{12t}, y = (1.2)^{\frac{t}{10}}$ *and classify them as representing exponential growth or decay.* NYSED: Includes $A=Pe^{rt}$ and $A=P(1+r/n))^{nt}$	**AII-F.IF.8b** Use the properties of exponents to interpret exponential functions, and classify them as representing exponential growth or decay. **Note:** **Tasks also include real world problems that involve compounding growth/decay ($A = P(1 + (r/n))^{nt}$) and continuous compounding growth/decay ($A = Pe^{rt}$).**
	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 may involve polynomial, exponential, logarithmic and trigonometric functions.	**AII-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 I) Note: Tasks may involve polynomial, **square root, cube root**, exponential, logarithmic, and trigonometric functions.

New York State Next Generation Mathematics Learning Standards		
Algebra II 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.	**AII-F.BF.1** Write a function that describes a relationship between two quantities. (Shared standard with Algebra I)
	F-BF.1a Determine an explicit expression, a recursive process, or steps for calculation from a context. PARCC: i) Tasks have a real-world context ii) Tasks may involve linear functions, quadratic functions, and exponential functions.	**AII-F.BF.1a Determine a function from context**. Determine an explicit expression, a recursive process, or steps for calculation from a context. (Shared standard with Algebra I) Notes: • Tasks may involve linear functions, quadratic functions, and exponential functions. • In Algebra II, sequences will be defined/written recursively and explicitly **in subscript notation.**
	F-BF.1b Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.*	**AII-F.BF.1b** Combine standard function types using arithmetic operations. e.g., Build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.
	F-BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	**AII-F.BF.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. Note: In Algebra II, sequences will be defined/written recursively and explicitly **in subscript notation**.

New York State Next Generation Mathematics Learning Standards		
Algebra II Crosswalk		
Functions **Building Functions (F.BF)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
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: i) Tasks may involve polynomial, exponential, logarithmic, and trigonometric functions ii) Tasks may involve recognizing even and odd functions.	**AII-F.BF.3b** Using *f(x) + k*, *k f(x)*, *f(kx)*, and *f(x + k)*: i) identify the effect on the graph when 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); 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. Include recognizing even and odd functions from their graphs. (Shared standard with Algebra I) <u>Note</u>: Algebra II tasks may involve polynomial, **square root, cube root**, exponential, logarithmic, and trigonometric functions.
	F-BF.4 Find inverse functions.	**STANDARD REMOVED**
	F-BF.4a Solve an equation of the form *f(x) = c* for a simple function *f* that has an inverse and write an expression for the inverse. *For example,* $f(x) = 2x^3$ *or* *f(x) = (x+1)/(x–1) for* $x \neq 1$.	**AII-F.BF.4a** Find the inverse of a one-to-one function both algebraically and **graphically**.

New York State Next Generation Mathematics Learning Standards		
Algebra II Crosswalk		
Functions **Building Functions (F.BF)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Build new functions from existing functions.		**AII-F.BF.5a Understand inverse relationships between exponents and logarithms algebraically and graphically.**
		AII-F.BF.6 Represent and evaluate the sum of a finite arithmetic or finite geometric series, using summation (sigma) notation.
		AII-F.BF.7 Explore the derivation of the formulas for finite arithmetic and finite geometric series. Use the formulas to solve problems. ★

New York State Next Generation Mathematics Learning Standards		
Algebra II 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.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 will include solving multi-step problems by constructing linear and exponential functions.	**AII-F.LE.2** Construct a linear or exponential function symbolically given: i) a graph; ii) a description of the relationship; and iii) two input-output pairs (include reading these from a table). (Shared standard with Algebra I)
	F-LE.4 For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers ~~and the base b is 2, 10, or e~~; evaluate the logarithm using technology.	**AII-F.LE.4** Use logarithms to solve exponential equations, such as $ab^{ct} = d$ (where a, b, c, and d are real numbers and $b > 0$) and evaluate the logarithm using technology.
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: i) Tasks have a real-world context. ii) Tasks are limited to exponential functions with domains not in the integers.	**AII-F.LE.5** Interpret the parameters in a linear or exponential function in terms of a context. (Shared standard with Algebra I) <u>Note</u>: Algebra II tasks have a real-world context and exponential functions are not limited to integer domains.

New York State Next Generation Mathematics Learning Standards		
Algebra II Crosswalk		
Functions **Trigonometric Functions (F.TF)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Extend the domain of trigonometric functions using the unit circle.	**F-TF.1** Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	**AII-F.TF.1** Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
	F-TF.2 ~~Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.~~ NYSED: Includes the reciprocal trigonometric functions.	**AII-F.TF.2 Apply concepts of the unit circle in the coordinate plane to calculate the values of the six trigonometric functions given angles in radian measure.**
		AII-F.TF.4 Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions. **<u>Note</u>:** **Focus of this standard is on cos(x), sin(x) and tan(x).**
Model periodic phenomena with trigonometric functions. ★	**F-TF.5** Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	**AII-F.TF.5** Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency**, horizontal shift**, and midline.
Prove and apply trigonometric identities.	**F-TF.8** Prove the Pythagorean identity $sin^2(\theta) + cos^2(\theta) = 1$ and use it to find *sin(θ), cos(θ),* or *tan(θ)* given *sin(θ), cos(θ),* or *tan(θ)* and the quadrant of the angle.	**AII-F.TF.8** Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$. **Find the value of any of the six trigonometric functions given any other trigonometric function value and when necessary find the quadrant of the angle.**

New York State Next Generation Mathematics Learning Standards		
Algebra II Crosswalk		
Geometry **Expressing Geometric Properties with Equations (G.GPE)**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Translate between the geometric description and the equation for a conic section.	**G-GPE.2** Derive the equation of a parabola given a focus and directrix.	**STANDARD REMOVED**

New York State Next Generation Mathematics Learning Standards		
Algebra II 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.4** ~~Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.~~	**AII-S.ID.4a. Recognize whether or not a normal curve is appropriate for a given data set.** **AII-S.ID.4b If appropriate, determine population percentages using a graphing calculator for an appropriate normal curve.**
Summarize, represent, and interpret data on two categorical and quantitative variables.	**S-ID.6** Represent data on ~~two quantitative variables~~ on a scatter plot, and describe how the variables are related.	**AII-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. Do not assume that an association between two variables implies that one causes another to change.**
	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: i) Tasks have a real-world context. ~~ii) Tasks are limited to exponential functions with domains not in the integers and trigonometric functions.~~	**AII-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 I) **Note:** **Algebra II emphasis is on quadratic, exponential, and power models, including the regression capabilities of the calculator**.

New York State Next Generation Mathematics Learning Standards		
Algebra II Crosswalk		
Statistics and Probability ★ Making Inferences and Justifying Conclusions (S.IC) ★		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Understand and evaluate random processes underlying statistical experiments.	**S-IC.1** Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	**STANDARD REMOVED**
	S-IC.2 ~~Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?*~~	**AII-S.IC.2 Determine if a value for a sample proportion or sample mean is likely to occur based on a given simulation.** **Note:** **For the purposes of this course, if the statistic falls within two standard deviations of the mean (95% interval centered on the population parameter), then the statistic is considered likely (plausible, usual).**
Make inferences and justify conclusions from sample surveys, experiments and observational studies.	**S-IC.3** Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	**AII-S.IC.3** Recognize the purposes of and differences among surveys, experiments, and observational studies. Explain how randomization relates to each.
	S-IC.4 ~~Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.~~	**AII-S.IC.4 Given a simulation model based on a sample proportion or mean, construct the 95% interval centered on the statistic (+/- two standard deviations) and determine if a suggested parameter is plausible.**
	S-IC.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	**STANDARD REMOVED**
	S-IC.6 ~~Evaluate reports based on data.~~	**AII-S.IC.6a Use the tools of statistics to draw conclusions from numerical summaries.** **AII-S.IC.6b Use the language of statistics to critique claims from informational texts. For example, causation vs correlation, bias, measures of center and spread.**

New York State Next Generation Mathematics Learning Standards		
Algebra II Crosswalk		
Statistics and Probability ★ **Conditional Probability and Rules of Probability (S.CP) ★**		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Understand independence and conditional probability and use them to interpret data.	**S-CP.1** Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").	**AII-S.CP.1** Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").
	S-CP.2 Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	**STANDARD REMOVED**
	S-CP.3 Understand the conditional probability of *A* given *B* as *P (A and B)/P(B)*, and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.	**STANDARD REMOVED**
	S-CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.*	**AII-S.CP.4** Interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and calculate conditional probabilities.
	S-CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer*.	**STANDARD REMOVED**

New York State Next Generation Mathematics Learning Standards		
Algebra II Crosswalk		
Statistics and Probability ★ Conditional Probability and Rules of Probability (S.CP) ★		
Cluster	**NYS P-12 CCLS**	**NYS Next Generation Learning Standard**
Use the rules of probability to compute probabilities of compound events in a uniform probability model.	**S-CP.6** Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model.	**STANDARD REMOVED**
	S-CP.7 Apply the Addition Rule, *P(A or B) = P(A) + P(B) – P(A and B)*, and interpret the answer in terms of the model.	**AII-S.CP.7** Apply the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B), and interpret the answer in terms of the model.