TNReady Algebra II Blueprint

Clusters on Part I	# of Items	% of Part I	Additional Clusters on Part II (All Part I Clusters will also be assessed on Part II)	# of Items	% of Part II	% of Test
Number Systems: Real and Complex • Extend the properties of exponents to rational exponents. • Perform arithmetic operations with complex numbers. • Use complex numbers in polynomial identities and equations.	2–3	8–12%	No additional clusters	4–7	11–19%	10–16%
Structure and Operations with Expressions and Quantities • Reason quantitatively and use units to solve problems. • Interpret the structure of expressions • Write expressions in equivalent forms to solve problems • Understand the relationship between zeros and factors of polynomials • Use polynomial identities to solve problems • Rewrite rational expressions	5–7	21–29%	No additional clusters	1–4	3–11%	13–15%
Creating and Reasoning with Equations and Inequalities • Create equations that describe numbers or relationships • Understand solving equations as a process of reasoning and explain the reasoning • Solve equations and inequalities in one variable • Solve systems of equations • Represent and solve equations and inequalities graphically	2–3	8–13%	No additional clusters	7–9	19–24%	18–23%
Interpreting and Building Functions • Understand the concept of a function and use function notation • Interpret functions that arise in applications in terms of the context • Analyze functions using different representations • Build a function that models a relationship between two quantities • Build new functions from existing functions	10–12	42–50%	No additional clusters	2–5	5–13%	21–24%

Linear, Quadratic, Exponential and Trigonometric Functions and Conic Equations • Construct and compare linear, quadratic, and exponential models and solve problems • Translate between the geometric description and the equation for a conic section	1–4	4–17%	Linear, Quadratic, Exponential and Trigonometric Functions and Conic Equations • Interpret expressions for functions in terms of the situation they model • Extend the domain of trigonometric functions using the unit circle • Model periodic phenomena with trigonometric functions • Prove and apply trigonometric identities	8–10	21–27%	18–20%
Interpreting Data, Making Inferences and Justifying Conclusions • Understand and evaluate random processes underlying statistical experiments • Make inferences and justify conclusions from sample surveys, experiments, and observational studies	0–2	0–8%	Interpreting Data, Making Inferences and Justifying Conclusions • Summarize, represent, and interpret data on a single count or measurement variable • Summarize, represent, and interpret data on two categorical and quantitative variables • Understand independence and conditional probability and use them to interpret data • Use the rules of probability to compute probabilities of compound events in a uniform probability model	8–10	21–26%	15–19%
Total	23–26	100%	Total	37–38	100%	100%

Reading the Revisions: The totals on the blueprints released in Spring 2015 were estimated totals of the test forms. The revised blueprints reflect actual totals for the test forms. The Form Summaries line provides the range of actual form totals. There are multiple forms per grade.

Part I – Calculator Allowed

Cluster	Standards		# of Items
Number Systems: Real and Complex	N.RN.A- Extend the properties of exponents to rational exponents	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.	2–3
		Rewrite expressions involving radicals and rational exponents using the properties of exponents.	
	N.CN.A- Perform arithmetic operations with complex numbers	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.	
		Use the relation $i^2 = –1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	
	N.CN.C- Use complex numbers in polynomial identities and equations	Solve quadratic equations with real coefficients that have complex solutions.	
Structure and Operations with Expressions and Quantity	N-Q.A- Reason quantitatively and use units to solve problems	Define appropriate quantities for the purpose of descriptive modeling.	5–7
	A.SSE.A- Interpret the structure of expressions	Use the structure of an expression to identify ways to rewrite it.	
	A.SSE.B- Write expressions in equivalent forms to solve problems	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. c. Use the properties of exponents to transform expressions for exponential functions.	
		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.	
	A-APR.A- Understand the relationship between zeros and factors of polynomials	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 $p(x)$.	
		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.	
	A-APR.B- Use polynomial identities to solve problems	Prove polynomial identities and use them to describe numerical relationships.	

Cluster	Standards		# of Items
	A-APR.C- Rewrite rational expressions	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.	
Creating and Reasoning with Equations and Inequalities	A-CED- Create equations that describe numbers or relationships	Create equations and inequalities in one variable and use them to solve problems.	2–3
	A.REI.A- Understand solving equations as a process of reasoning and explain the reasoning	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.	
		Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	
	A.REI.B- Solve equations and inequalities in one variable	Solve quadratic equations in one variable. b. 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.	
	A.REI.C- Solve systems of equations	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	
		Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	
	A.REI.D- Represent and solve equations and inequalities graphically	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.	
Interpreting and Building Functions	F.IF.A- Understand the concept of a function and use function notation	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	10–12
	F.IF.B- Interpret functions that arise in applications in terms of the context	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.	
		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.	

Cluster	Standards		# of Items
	F.IF.C- Analyze functions using different representations	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	
		Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. b. Use the properties of exponents to interpret expressions for exponential functions.	
		Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	
	F.BF.A- Build a function that models a relationship between two quantities	Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations.	
		Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	
	F.BF.B- Build new functions from existing functions	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.	
		Find inverse functions. a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.	
Linear, Quadratic, Exponential, and Trigonometric Functions and Conic Equations	F.LE- Construct and compare linear, quadratic, and exponential models and solve problems	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).	1–4
		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.	
	G-GPE- Translate between the geometric description and the equation for a conic section	Derive the equation of a parabola given a focus and directrix.	
Interpreting Data, Making Inferences and Justifying Conclusions	S.IC.A- Understand and evaluate random processes underlying statistical experiments	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	0–2
		Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.	

Cluster	Standards		# of Items
	S.IC.B- Make inferences and justify conclusions from sample surveys, experiments, and observational studies	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	
		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.	
		Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	
		Evaluate reports based on data.	

Part II – Calculator and Non-Calculator Portions

Cluster	Standards		# of Items
Number Systems: Real and Complex	N.RN.A- Extend the properties of exponents to rational exponents	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.	4–7
		Rewrite expressions involving radicals and rational exponents using the properties of exponents.	
	N.CN.A- Perform arithmetic operations with complex numbers	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.	
		Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	
	N.CN.C- Use complex numbers in polynomial identities and equations	Solve quadratic equations with real coefficients that have complex solutions.	
Structure and Operations with Expressions and Quantity	N-Q- Reason quantitatively and use units to solve problems	Define appropriate quantities for the purpose of descriptive modeling.	1–4
	A.SSE.A- Interpret the structure of expressions	Use the structure of an expression to identify ways to rewrite it.	
	A.SSE.B- Write expressions in equivalent forms to solve problems	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. c. Use the properties of exponents to transform expressions for exponential functions.	
		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.	
	A-APR.A- Understand the relationship between zeros and factors of Polynomials	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 $p(x)$.	
		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.	
	A-APR.B- Use polynomial identities to solve problems	Prove polynomial identities and use them to describe numerical relationships.	

Cluster	Standards		# of Items
	A-APR.C- Rewrite rational expressions	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.	
Creating and Reasoning with Equations and Inequalities	A-CED- Create equations that describe numbers or relationships	Create equations and inequalities in one variable and use them to solve problems.	7–9
	A.REI.A- Understand solving equations as a process of reasoning and explain the reasoning	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.	
		Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	
	A.REI.B- Solve equations and inequalities in one variable	Solve quadratic equations in one variable. b. 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.	
	A.REI.C- Solve systems of equations	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	
		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 $x^2 + y^2 = 3$.*	
	A.REI.D- Represent and solve equations and inequalities graphically	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.	
Interpreting and Building Functions	F.IF.A- Understand the concept of a function and use function notation	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	2–5
	F.IF.B- Interpret functions that arise in applications in terms of the context	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.	
		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.	

Cluster	Standards		# of Items
	F.IF.C- Analyze functions using different representations	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	
		Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. b. Use the properties of exponents to interpret expressions for exponential functions.	
		Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	
	F.BF.A- Build a function that models a relationship between two quantities	Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations.	
		Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	
	F.BF.B- Build new functions from existing functions	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.	
		Find inverse functions. a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.	
Linear, Quadratic, Exponential, and Trigonometric Functions and Conic Equations	F.LE- Construct and compare linear, quadratic, and exponential models and solve problems	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).	8–10
		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.	
	G-GPE- Translate between the geometric description and the equation for a conic section	Derive the equation of a parabola given a focus and directrix.	

Cluster	Standards		# of Items
	F.LE- Interpret expressions for functions in terms of the situation they model	Interpret the parameters in a linear or exponential function in terms of a context.	
	F-TF.A- Extend the domain of trigonometric functions using the unit circle	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	
		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.	
	F-TF.B- Model periodic phenomena with trigonometric functions	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	
	F-TF.C- Prove and apply trigonometric identities	Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.	
Interpreting Data, Making Inferences and Justifying Conclusions	S.IC.A- Understand and evaluate random processes underlying statistical experiments	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	8–10
		Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.	
	S.IC.B- Make inferences and justify conclusions from sample surveys, experiments, and observational studies	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	
		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.	
		Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	
		Evaluate reports based on data.	
	S.ID.A- Summarize, represent, and interpret data on a single count or measurement variable	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.	

Cluster	Standards		# of Items
	S-ID.B- Summarize, represent, and interpret data on two categorical and quantitative variables	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.	
	S.CP.A- Understand independence and conditional probability and use them to interpret data	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").	
		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.	
		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*.	
		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.	
		Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	
	S.CP.B- Use the rules of probability to compute probabilities of compound events in a uniform probability model	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.	
		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.	

Overall Blueprint (Includes Part I and Part II)

Cluster	Standards		# of Items
Number Systems: Real and Complex	N.RN.A- Extend the properties of exponents to rational exponents	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.	6–10
		Rewrite expressions involving radicals and rational exponents using the properties of exponents.	
	N.CN.A- Perform arithmetic operations with complex numbers	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.	
		Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	
	N.CN.C- Use complex numbers in polynomial identities and equations	Solve quadratic equations with real coefficients that have complex solutions.	
Structure and Operations with Expressions and Quantity	N-Q- Reason quantitatively and use units to solve problems	Define appropriate quantities for the purpose of descriptive modeling.	8–10
	A.SSE.A- Interpret the structure of expressions	Use the structure of an expression to identify ways to rewrite it.	
	A.SSE.B- Write expressions in equivalent forms to solve problems	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. c. Use the properties of exponents to transform expressions for exponential functions.	
		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.	
	A-APR.A- Understand the relationship between zeros and factors of polynomials	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 $p(x)$.	
		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.	
	A-APR.B- Use polynomial identities to solve problems	Prove polynomial identities and use them to describe numerical relationships.	

Cluster	Standards		# of Items
	A-APR.C- Rewrite rational expressions	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.	
Creating and Reasoning with Equations and Inequalities	A-CED- Create equations that describe numbers or relationships	Create equations and inequalities in one variable and use them to solve problems.	11–14
	A.REI.A- Understand solving equations as a process of reasoning and explain the reasoning	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.	
		Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	
	A.REI.B- Solve equations and inequalities in one variable	Solve quadratic equations in one variable. b. 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.	
	A.REI.C- Solve systems of equations	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	
		Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	
	A.REI.D- Represent and solve equations and inequalities graphically	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.	
Interpreting and Building Functions	F.IF.A- Understand the concept of a function and use function notation	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	13–16
	F.IF.B- Interpret functions that arise in applications in terms of the context	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.	
		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.	

Cluster	Standards		# of Items
	F.IF.C- Analyze functions using different representations	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	
		Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. b. Use the properties of exponents to interpret expressions for exponential functions.	
		Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	
	F.BF.A- Build a function that models a relationship between two quantities	Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations.	
		Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	
	F.BF.B- Build new functions from existing functions	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.	
		Find inverse functions. a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.	
Linear, Quadratic, Exponential, and Trigonometric Functions and Conic Equations	F.LE- Construct and compare linear, quadratic, and exponential models and solve problems	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).	10–13
		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.	
	G-GPE- Translate between the geometric description and the equation for a conic section	Derive the equation of a parabola given a focus and directrix.	

Cluster	Standards		# of Items
	F.LE- Interpret expressions for functions in terms of the situation they model	Interpret the parameters in a linear or exponential function in terms of a context.	
	F-TF.A- Extend the domain of trigonometric functions using the unit circle	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	
		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.	
	F-TF.B- Model periodic phenomena with trigonometric functions	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	
	F-TF.C- Prove and apply trigonometric identities	Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.	
Interpreting Data, Making Inferences and Justifying Conclusions	S.IC.A- Understand and evaluate random processes underlying statistical experiments	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	9–12
		Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.	
	S.IC.B- Make inferences and justify conclusions from sample surveys, experiments, and observational studies	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	
		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.	
		Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	
		Evaluate reports based on data.	
	S.ID.A- Summarize, represent, and interpret data on a single count or measurement variable	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.	

Cluster	Standards		# of Items
	S-ID.B- Summarize, represent, and interpret data on two categorical and quantitative variables	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.	
	S.CP.A- Understand independence and conditional probability and use them to interpret data	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").	
		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.	
		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*.	
		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.	
		Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	
	S.CP.B- Use the rules of probability to compute probabilities of compound events in a uniform probability model	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.	
		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.	