Standards for Mathematical Practice

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

North Carolina Math 1

Number and Quantity				
Current Standard Abbreviation	**Current Standard**	**Proposed Standard Abbreviation**	**First Draft Proposed Standard**	**Second Draft Proposed Standard**
The Real Number System ***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.		*Integrated into another standard or moved to another course.*	*Moved to NC.M2.N-RN.1*
N-RN.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.	NC.M1.N-RN.2	Rewrite algebraic expressions with integer exponents using the properties of exponents.	Rewrite algebraic expressions with integer exponents using the properties of exponents.
Quantities ***Reason quantitatively and use units to solve problems.***				
N-Q.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.		*Included in a mathematical practice.*	*Included in Standards for Mathematical Practices 1, 4, 5 and 6.*

Number and Quantity				
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N-Q.2	Define appropriate quantities for the purpose of descriptive modeling.		*Included in a mathematical practice.*	*Included in Standards for Mathematical Practices 1, 4, and 6.*
N-Q.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.		*Included in a mathematical practice.*	*Included in Standards for Mathematical Practices 1 and 6.*
Matrices *Perform operations on matrices and use matrices in applications.*				
N-VM.6	Added to this course	~~NC.M1.N-VM.6~~	Use matrices to represent and manipulate data.	*After the 1st draft, this standard was removed from NC Math 1, with the recommendation that it be added into 8th grade math to coherently connect to translations, dilations, and data from two-way tables.*
N-VM.7	Added to this Course	~~NC.M1.N-VM.7~~	Multiply matrices representing data by scalars to produce new matrices.	*After the 1st draft, this standard was removed from NC Math 1, with the recommendation that it be added into 8th grade math to coherently connect to translations, dilations, and data from two-way tables.*
N-VM.8	Added to this course	~~NC.M1.N-VM.8~~	Add and subtract matrices of appropriate dimensions.	*After the 1st draft, this standard was removed from NC Math 1, with the recommendation that it be added into 8th grade math to coherently connect to translations, dilations, and data from two-way tables.*

Algebra				
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Seeing Structure in Expressions ***Interpret the structure of expressions.***				
A-SSE.1 A-SSE.1a A-SSE.1b	Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret* $P(1+r)^n$ *as the product of P and a factor not depending on P.* ***Note:*** *At this level, limit to linear expressions, exponential expressions with integer exponents and quadratic expressions.*	NC.M1.A-SSE.1 NC.M1.A-SSE.1a NC.M1.A-SSE.1b	Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, coefficients, and exponents in context. b. Interpret a linear, quadratic or exponential (with integer exponents) expression made of multiple parts as a combination of single entities to give meaning to an expression in context.	Interpret expressions that represent a quantity in terms of its context. a. Identify and interpret parts of a linear, exponential, or quadratic expression, including terms, factors, coefficients, and exponents. b. Interpret a linear, exponential, or quadratic expression made of multiple parts as a combination of entities to give meaning to an expression.
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 $(x^2 - y^2)(x^2 + y^2)$	~~NC.M1.A-SSE.2~~	Write equivalent forms of linear, exponential, and quadratic expressions based on their structure.	*Moved to NC.M3.A-SSE.2 and Standard for Mathematical Practice 7.*
Seeing Structure in Expressions ***Write expressions in equivalent forms to solve problems.***				
A-SSE.3 A-SSE.3a	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Factor a quadratic expression to reveal the zeros of the function it defines. ***Note:*** *At this level, the limit is quadratic expressions of the form* $ax^2 + bx + c$.	NC.M1.A-SSE.3	Write an expression in equivalent forms to solve problems. a. Write equivalent forms of a quadratic expression by factoring to reveal the zeros of the associated function.	Write an equivalent form of a quadratic expression~~, by factoring, where *a* is an integer of the quadratic expression,~~ $ax^2 + bx + c$, where a is an integer, by factoring to reveal the solutions of the equation or the zeros of the function the expression defines.

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Arithmetic with Polynomial ~~and Rational~~ Expressions ***Perform arithmetic operations on polynomials.***				
A-APR.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. ***Note:*** *At this level, limit to addition and subtraction of quadratics and multiplication of linear expressions*	NC.M1.A-APR.1	Understand that operations with polynomials are comparable to operations with integers. Add and subtract quadratic expressions. Add, subtract, and multiply linear expressions.	Build an understanding that operations with polynomials are comparable to operations with integers by adding and subtracting quadratic expressions and by adding, subtracting, and multiplying linear expressions.
Arithmetic with Polynomial Expressions **Understand the relationship between zeros and factors of polynomials**				
A-APR.3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. ***Note:*** *At this level, limit to quadratic expressions.* Moved from Math II	NC.M1.A-APR.3	Understand the relationship between the zeros and the factors of quadratic functions.	Understand the relationships among the factors of a quadratic expression, the solutions of a quadratic equation, and the zeros of a quadratic function.
Creating Equations ***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. ***Note:*** *At this level, focus on linear and exponential functions.*	NC.M1.A-CED.1	Create equations and inequalities in one variable that represent linear, quadratic and exponential relationships.	Create equations and inequalities in one variable that represent linear, exponential, and quadratic relationships and use them to solve problems.
A-CED.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. ***Note:*** *At this level, focus on linear, exponential and quadratic. Limit to situations that involve evaluating exponential functions for integer inputs.*	NC.M1.A-CED.2	Create equations in two variables to represent linear, quadratic, and exponential relationships between quantities. Graph equations on coordinate axes with labels and scales.	Create and graph equations in two variables to represent linear, exponential, and quadratic relationships between quantities.

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A-CED.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.* ***Note:*** *At this level, limit to linear equations and inequalities.*	NC.M1.A-CED.3	Create systems of linear equations and inequalities, taking into consideration the constraints on the domain and range imposed by the context of the problem.	Create systems of linear equations and inequalities to model situations in context.
A-CED.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law* $V = IR$ *to highlight resistance* R. ***Note:*** *At this level, limit to formulas that are linear in the variable of interest, or to formulas involving squared or cubed variables.*	NC.M1.A-CED.4	Solve formulas to isolate a quantity of interest, using the same reasoning as used in solving equations; extend to formulas involving squared variables. Write an equivalent form of a linear equation with multiple variables to solve problems.	Solve for a quantity of interest in formulas used in science and mathematics using the same reasoning as in solving equations.
Reasoning with Equations and Inequalities ***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. ***Note:*** *Students should be able to justify the steps for any equation type solved in Math I.*	NC.M1.A-REI.1	For linear and factorable quadratic equations, justify a solution method and each step of the solution method using mathematical reasoning.	Justify a chosen solution method and each step of the solving process for linear and quadratic equations using mathematical reasoning.
Reasoning with Equations and Inequalities ***Solve equations and inequalities in one variable.***				
A-REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	NC.M1.A-REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Solve linear equations and inequalities in one variable.

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A-REI.4	Solve equations and inequalities in one variable. 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. ***Note:*** *Solve quadratic equations that have real solutions and recognize quadratic equations that do not have a real solution. (Writing complex solutions is not expected in Math II.)* *Moved from Math II*	NC.M1.A-REI.4	Find the real solutions of quadratic equations in one variable by taking square roots and factoring.	Solve for the real solutions of quadratic equations in one variable by taking square roots and factoring.
Reasoning with Equations and Inequalities ***Solve systems of equations.***				
A-REI.5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	NC.M1.A-REI.5	Explain why replacing one equation in a system by the sum of that equation and a multiple of the other produces a system with the same solutions.	Explain why replacing one equation in a system of linear equations by the sum of that equation and a multiple of the other produces a system with the same solutions.
A-REI.6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	NC.M1.A-REI.6	Solve systems of two linear equations in two variables, exactly and approximately, using tables, graphs, and the algebraic methods of substitution and elimination. Interpret solutions in a modeling context.	Use tables, graphs, or algebraic methods (substitution and elimination) to find approximate or exact solutions to systems of linear equations and interpret solutions in terms of a context.
Reasoning with Equations and Inequalities ***Represent and solve equations and inequalities graphically***				
A-REI.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). ***Note:*** *At this level, focus on linear and exponential equations.*	NC.M1.A-REI.10	Understand that for equations with two variables, x and y, all points, (x , y), on the graph of the equation are solutions to that equation. At this level, limit to linear, exponential and quadratic equations.	Understand that the graph of a two variable equation represents the set of all solutions to the equation.

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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. ***Note:*** *At this level, focus on linear and exponential functions.*	NC.M1.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. Limit to cases where $f(x)$ and/or $g(x)$ are linear, quadratic and exponential.	Build an understanding of why the x-coordinates of the points where the graphs of two linear, exponential, <u>and/</u>or quadratic equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$ and approximate solutions using graphing technology or successive approximations with a table of values.
A-REI.12	Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	NC.M1.A-REI.12	Represent the solutions to a linear inequality using a closed or open half-plane and the solution to a system of linear inequalities as the intersection of the solutions of each inequality.	Represent the solutions of a linear inequality or a system of linear inequalities graphically as a region of the plane.

Functions

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Interpreting Functions ***Understand the concept of a function and use function notation.***				
F-IF.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.	NC.M1.F-IF.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. • Recognize that 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. • Recognize that the graph of f is the graph of the equation $y = f(x)$.	Build an understanding 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 by recognizing that: • 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 $y = f(x)$.
F-IF.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. ***Note:*** *At this level, the focus is linear and exponential functions.*	NC.M1.F-IF.2	Use function notation to evaluate linear, quadratic, and exponential functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	Use function notation to evaluate linear, quadratic, and exponential functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
F-IF.3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example, the Fibonacci sequence is defined recursively by* $f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1)$ *for* $n \geq 1$.	NC.MI.F-IF.3	Recognize that recursively and explicitly defined sequences are functions whose domain is a subset of the integers. • Recognize that the terms of an arithmetic sequence are a subset of the range of a linear function • Recognize that the terms of a geometric sequence are a subset of the range of an exponential function.	Recognize that recursively and explicitly defined sequences are functions whose domain is a subset of the integers, the terms of an arithmetic sequence are a subset of the range of a linear function, and the terms of a geometric sequence are a subset of the range of an exponential function.

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Interpreting Functions ***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. ***Note:*** *At this level, focus on linear, exponential and quadratic functions; no end behavior or periodicity.*	NC.M1.F-IF.4	Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; and relative maximums and minimums.	Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities, including: intercepts; intervals where the function is increasing, decreasing, positive, or negative; and maximums and minimums.
F-IF.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.* ***Note:*** *Focus on linear, quadratic and exponential functions.*	NC.M1.F-IF.5	Interpret a function that arises in applications in terms of the context by relating the domain and range to its graph and, where applicable, to the quantitative relationship it describes.	Interpret a function in terms of the context by relating its domain and range to its graph and, where applicable, to the quantitative relationship it describes.
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.	NC.M1.F-IF.6	Calculate and interpret the average rate of change over a specified interval for a linear, quadratic, or exponential function presented symbolically, as a table, or as a graph	Calculate and interpret the average rate of change over a specified interval for a function presented numerically, graphically, and/or symbolically.
Interpreting Functions ***Analyze functions using different representations.***				
F-IF.7 F-IF.7a	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph linear and quadratic functions and show intercepts, maxima, and minima.	NC.M1.F-IF.7	Analyze linear, quadratic, and exponential functions using different representations by graphing to show key features of the graph, by hand in simple cases and using technology for more complicated cases. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; relative maximums and minimums; and end behavior.	Analyze linear, exponential, and quadratic functions by generating different representations, by hand in simple cases and using technology for more complicated cases, to show key features, including: domain and range; rate of change; intercepts; intervals where the function is increasing, decreasing, positive, or negative; maximums and minimums; and end behavior.

Functions				
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F-IF.7e	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. ***Note:*** *At this level, for part e, focus on exponential functions only.*		*Integrated into another standard or moved to another course.*	*This was incorporated into F.IF.7 as one standard instead of multiple parts of the same standard.*
F-IF.8 F-IF.8a	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. ***Note:*** *At this level, only factoring expressions of the form* $ax^2 + bx + c$*, is expected. Completing the square is not addressed at this level.*	NC.M1.F-IF.8 NC.M1.F-IF.8a	Rewrite an expression into equivalent forms to reveal and explain different properties of the function. a. Use an equivalent expression to write a quadratic function that reveals and explains different key features of the function. • Use the process of multiplying binomials to identify and interpret the y-intercept and the relative maximum or minimum in terms of a context. • Use the process of factoring quadratic expressions of the form $ax^2 + bx + c$, where a is an integer, to identify and interpret zeros in terms of a context.	Use equivalent expressions to reveal and explain different properties of a function. a. Rewrite a quadratic function to reveal and explain different key features of the function
F-IF.8b	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. 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*	NC.M1.F-IF.8b	*Moved to NC Math 3.*	b. Interpret and explain growth and decay rates for an exponential function.
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*	NC.M1.F-IF.9	Compare properties of two functions (linear, quadratic, or exponential) each with a different representation (symbolically, graphically, numerically in tables, or by verbal descriptions).	Compare key features of two functions (linear, quadratic, or exponential) each with a different representation (symbolically, graphically, numerically in tables, or by verbal descriptions).

Functions				
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	maximum. ***Note:*** *At this level, focus on linear, exponential, and quadratic functions.*			
Building Functions ***Build a function that models a relationship between two quantities.***				
F-BF.1 F-BF.1a F-BF.1b	Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context. ***Note:*** *Represent patterns informally using different forms including linear, quadratic and exponential data.* Write a function that describes a relationship between two quantities. 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.* ***Note****: Combine the following function types to create new functions to model and solve problems:* 1. *A constant to a linear, quadratic, or exponential* 2. *A linear to another linear or quadratic.*	NC.M1.F.BF.1 NC.M1.F-BF.1a NC.M1.F.BF.1b	Write a function that describes a relationship between two quantities. a. Represent a function that models a relationship with a recursive process or steps for calculation from a context. b. Build a function that models a relationship between two quantities by combining linear, quadratic, and exponential functions with addition and subtraction or two linear functions with multiplication.	Write a function that describes a relationship between two quantities. a. Build linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two ordered pairs (include reading these from a table). b. Build a function that models a relationship between two quantities by combining linear, exponential, or quadratic functions with addition and subtraction or two linear functions with multiplication.
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:*** *At this level, formal recursive notation is not used. Instead, use of informal recursive notation (such as NEXT = NOW + 5 starting at 3) is intended.*	NC.M1.F-BF.2	Translate between explicit and recursive forms of arithmetic and geometric sequences and use both to model situations.	Translate between explicit and recursive forms of arithmetic and geometric sequences and use both to model situations.
Building Functions ***Build new functions from existing functions.***				

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F-BF.3	Identify the effect on the graph of replacing $f(x)$ by $f(x)+k$, $k \cdot f(x)$, $f(kx)$, 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. ***Note:*** *At this level, limit to vertical and horizontal translations of linear and exponential functions. Even and odd functions are not addressed.*	~~NC.M1.F-BF.3~~	Identify the effect on the graphical and numerical representations of linear, quadratic, and exponential functions when replacing $f(x)$ with $k \cdot f(x)$ and $f(x)+k$ for specific values of k (both positive and negative). Experiment with cases and use graphing technology to illustrate an explanation of the effects	*Moved to NC.M2.F-BF.3*
Linear, Quadratic, and Exponential Models ***Construct and compare linear and exponential models and solve problems.***				

Functions				
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F-LE.1 F-LE.1a F-LE.1b F-LE.1c	Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	NC.M1.F-LE.1	Identify situations that can be modeled with linear and exponential functions; justify the most appropriate model for a situation based on the rate of change over equal intervals.	Identify situations that can be modeled with linear and exponential functions, and justify the most appropriate model for a situation based on the rate of change over equal intervals.
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).	~~NC.M1.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).	*This standard is integrated into NC.M1.F-BF.1.*
F-LE.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. ***Note:*** *At this level, limit to linear, exponential, and quadratic functions; general polynomial functions are not addressed.*	NC.M1.F-LE.3	Compare the end behavior of linear, quadratic, and exponential functions using graphs and tables to show that a quantity increasing exponentially eventually exceeds a quantity increasing linearly or quadratically.	Compare the end behavior of linear, exponential, and quadratic functions using graphs and tables to show that a quantity increasing exponentially eventually exceeds a quantity increasing linearly or quadratically.
Linear, Quadratic, and Exponential Models ***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.	NC.M1.F-LE.5	Interpret in context expressions for functions using the parameters a and b in a linear function $f(x) = ax + b$ or an exponential function $g(x) = ab^x$.	Interpret the parameters a and b in a linear function $f(x) = ax + b$ or an exponential function $g(x) = ab^x$ in terms of a context

Geometry				
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Congruence ***Experiment with transformations in the plane.***				
G-CO.1	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. ***Note:*** *At this level, distance around a circular arc is not addressed.*		*Integrated into another standard or moved to another course.*	*Removed as a standard and it will be addressed in curricular resources.*
Expressing Geometric Properties with Equations ***Use coordinates to prove simple geometric theorems algebraically.***				
G-GPE.4	Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point* $(1, \sqrt{3})$ *lies on the circle centered at the origin and containing the point* $(0, 2)$. ***Note:*** Conics is not the focus at this level, therefore the last example is not appropriate here.	NC.M1.G-GPE.4	Use coordinates to verify algebraically that a given set of points produces a particular type of triangle or quadrilateral.	Use coordinates to solve geometric problems involving polygons algebraically~~, based on properties learned in elementary and middle grades:~~ • Use coordinates to compute perimeters of polygons and areas of triangles and rectangles. • Use coordinates to verify algebraically that a given set of points produces a particular type of triangle or quadrilateral.
G-GPE.5	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	NC.M1.G-GPE.5	Use coordinates to prove the slope criteria for parallel and perpendicular lines and use them to solve problems. • Determine if two lines are parallel, perpendicular, or neither. • Find the equation of a line parallel or perpendicular to a given line that passes through a given point.	Use coordinates to prove the slope criteria for parallel and perpendicular lines and use them to solve problems. • Determine if two lines are parallel, perpendicular, or neither. • Find the equation of a line parallel or perpendicular to a given line that passes through a given point.
G-GPE.6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio. ***Note:*** *At this level, focus on finding the midpoint of a segment.*	NC.M1.G-GPE.6	Use coordinates to find the midpoint or endpoint of a line segment.	Use coordinates to find the midpoint or endpoint of a line segment.

Geometry				
Current Standard Abbreviation	**Current Standard**	**Proposed Standard Abbreviation**	**First Draft Proposed Standard**	**Second Draft Proposed Standard**
G-GPE.7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	~~NC.M1.G-GPE.7~~	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.	*Combined with NC.M1.G-GPE.4*
Geometric Measurement & Dimension ***Explain volume formulas and use them to solve problems.***				
G-GMD.1	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments. ***Note:*** *Informal limit arguments are not the intent at this level.*		*Integrated into another standard or moved to another course.*	*After the 1st draft, this standard was removed from Math 1, with the recommendation that it be added into 8th grade math.*
G-GMD.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. ***Note:*** *At this level, formulas for pyramids, cones and spheres will be given.*		*Integrated into another standard or moved to another course.*	*Moved to NC.M3.G-GMD.3*

Statistics and Probability				
Current Standard Abbreviation	**Current Standard**	**Proposed Standard Abbreviation**	**First Draft Proposed Standard**	**Second Draft Proposed Standard**
Interpreting Categorical and Quantitative Data ***Summarize, represent, and interpret data on a single count or measurement variable.***				
S-ID.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).	NC.M1.S-ID.1	Use technology to represent data with plots on the real number line with dot plots, histograms, and box plots. Interpret characteristics of the distribution in context.	Use technology to represent data with plots on the real number line (histograms, and box plots).
S-ID.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	NC.M1.S-ID.2	Use statistics to compare two or more data sets. Use statistics appropriate to the shape of the distribution. Statistics for center are mean and median, statistics for spread are interquartile range and standard deviation. Interpret differences in shape, center, and spread in the context of the data sets.	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. Interpret differences in shape, center, and spread in the context of the data sets.
S-ID.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	NC.M1.S-ID.3	Examine the effects of extreme data points (outliers) on shape, center, and/or spread.	Examine the effects of extreme data points (outliers) on shape, center, and/or spread.
Interpreting Categorical and Quantitative Data ***Summarize, represent, and interpret data on two categorical and quantitative variables.***				
S-ID.5	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.		*Integrated into another standard or moved to another course.*	*Moved to NC.M2.S-CP.4.*
S-ID-6 S-ID.6a S-ID.6b	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. 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 and exponential models. Informally assess the fit of a function by plotting and analyzing residuals. Note: At this level, for part b, focus on linear models.	NC.M1.S-ID.6 NC.M1.S-ID.6a NC.M1.S-ID.6b	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a least squares regression line to linear data using technology. Use the fitted function to solve problems. b. Assess the fit of a linear function by analyzing residuals.	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a least squares regression line to linear data using technology. Use the fitted function to solve problems. b. Assess the fit of a linear function by analyzing residuals.

Statistics and Probability				
Current Standard Abbreviation	**Current Standard**	**Proposed Standard Abbreviation**	**First Draft Proposed Standard**	**Second Draft Proposed Standard**
S-ID.6c	Fit a linear function for a scatter plot that suggests a linear association.	NC.M1.S-ID.6c	c. Fit a function to exponential data using technology. Use the fitted function to solve problems.	c. Fit a function to exponential data using technology. Use the fitted function to solve problems.
Interpreting Categorical and Quantitative Data ***Interpret linear models.***				
S-ID.7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	NC.M1.S-ID.7	Interpret in context the slope (rate of change) and the intercept (constant term) of a linear model Use the linear model to interpolate and extrapolate predicted values. Assess the validity of a predicted value.	Interpret in context the rate of change and the intercept of a linear model. Use the linear model to interpolate and extrapolate predicted values. Assess the validity of a predicted value.
S-ID.8	Compute (using technology) and interpret the correlation coefficient of a linear fit.	NC.M1.S-ID.8	*Integrated into another standard or moved to another course.*	~~*Include in fourth level Math.*~~ Analyze patterns and describe relationships between two variables in context. Using technology, determine the correlation coefficient of bivariate data and interpret it as a measure of the strength and direction of a linear relationship. Use a scatter plot, correlation coefficient, and a residual plot to determine the appropriateness of using a linear function to model a relationship between two variables.
S-ID.9	Distinguish between correlation and causation.	NC.M1.S-ID.9	Distinguish between association and causation.	Distinguish between association and causation.