Nevada Tutorials are designed specifically for the Nevada Academic Content Standards to prepare students for the Nevada End-of-Course (EOC) exams.

Math Tutorials offer targeted instruction, practice and review designed to develop computational fluency, deepen conceptual understanding, and apply mathematical practices. They automatically identify and address learning gaps down to elementary-level content, using adaptive remediation to bring students to grade-level no matter where they start. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By constantly honing the ability to apply their knowledge in abstract and real world scenarios, students build the depth of knowledge and higher order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students through focused content, modeled logic and process, multi-modal representations, and personalized feedback as students reason through increasingly challenging problems. The Review It offers a high impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

1. INTRODUCTION TO ALGEBRAIC CONCEPTS

- **MONITORING PRECISION AND ACCURACY**
    - **N-Q.A.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.*
    - **N-Q.A.2** *Define appropriate quantities for the purpose of descriptive modeling.*
    - **N-Q.A.3** *Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.*

- **LAWS OF EXPONENTS**
    - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*
    - **A-APR.D.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.*
    - **A-REI.A.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.*
    - **N-RN.A.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.*
    - **N-RN.A.2** *Rewrite expressions involving radicals and rational exponents using the properties of exponents.*

- **AXIOMS OF EQUALITY**
    - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*
    - **A-REI.A.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.*

2. SEQUENCES

- **SEQUENCES**
    - **F-IF.A.3** *Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.*

- **F-BF.A.1a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*
- **F-BF.A.2** *Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*
- **F-LE.A.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).*

- **ARITHMETIC AND GEOMETRIC SEQUENCES**
  - **F-BF.A.2** *Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*
  - **F-IF.A.3** *Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.*
  - **F-BF.A.1a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*
  - **F-LE.A.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).*

- **SUMS OF GEOMETRIC SEQUENCES**
  - **A-SSE.B.4** *Derive and/or explain the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.*

3. LINEAR FUNCTIONS AND EQUATIONS

- **SLOPE**
  - **F-IF.B.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.*
  - **F-IF.A.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).*
  - **F-IF.B.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.*
  - **G-GPE.B.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).*

- **GRAPHING AND MANIPULATING Y = MX + B**
  - **A-CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*
  - **F-IF.A.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).*
  - **F-IF.B.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.*
  - **F-IF.C.7a** *Graph linear and quadratic functions and show intercepts, maxima, and minima.*
  - **F-LE.A.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).*
  - **S-ID.C.7** *Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.*
  - **F-IF.B.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.*
  - **F-LE.A.1b** *Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.*
  - **F-LE.B.5** *Interpret the parameters in a linear or exponential function in terms of a context.*

4. SOLVING TWO-VARIABLE SYSTEMS OF EQUATIONS

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: GRAPHING**
  - **A-CED.A.3** *Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.*
  - **A-REI.C.6** *Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear*

equations in two variables.
  - **A-REI.D.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.*
  - **A-CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: SUBSTITUTION**
  - **A-CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*
  - **A-REI.C.6** *Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.*
  - **A-CED.A.3** *Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.*
  - **A-REI.C.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.*

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: ELIMINATION**
  - **A-CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*
  - **A-REI.C.6** *Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.*
  - **A-CED.A.3** *Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.*
  - **A-REI.C.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.*

5. EXPONENTIAL FUNCTIONS AND EQUATIONS

- **EXPONENTIAL FUNCTIONS**
  - **A-SSE.A.1a** *Interpret parts of an expression, such as terms, factors, and coefficients.*
  - **A-SSE.A.1b** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **F-IF.C.8b** *Use the properties of exponents to interpret expressions for exponential functions.*
  - **F-LE.A.1a** *Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.*
  - **F-IF.B.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.*
  - **F-LE.A.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).*
  - **F-LE.A.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.*
  - **F-IF.A.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).*
  - **F-IF.B.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.*
  - **F-IF.B.5** *Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.*
  - **A-SSE.B.3c** *Use the properties of exponents to transform expressions for exponential functions.*
  - **A-CED.A.1** *Create equations and inequalities in one variable and use them to solve problems.*
  - **F-BF.A.1a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*
  - **F-LE.A.1c** *Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*
  - **F-LE.B.5** *Interpret the parameters in a linear or exponential function in terms of a context.*

- **EXPONENTIAL GROWTH AND DECAY**
  - **A-SSE.A.1a** *Interpret parts of an expression, such as terms, factors, and coefficients.*
  - **A-SSE.A.1b** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **F-IF.C.8b** *Use the properties of exponents to interpret expressions for exponential functions.*
  - **F-LE.A.1a** *Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.*
  - **F-LE.A.1c** *Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*
  - **F-LE.A.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).*
  - **F-LE.B.5** *Interpret the parameters in a linear or exponential function in terms of a context.*
  - **A-CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*
  - **F-LE.A.1b** *Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.*
  - **F-LE.A.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.*

- **SOLVING EXPONENTIAL EQUATIONS**
  - **A-SSE.B.3c** *Use the properties of exponents to transform expressions for exponential functions.*
  - **F-IF.B.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.*
  - **F-IF.C.8b** *Use the properties of exponents to interpret expressions for exponential functions.*
  - **F-BF.B.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.*
  - **F-LE.A.4** *Understand the inverse relationship between exponents and logarithms. For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.*
  - **F-LE.A.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).*
  - **F-IF.C.7e** *Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.*

6. RELATING EXPONENTIAL AND LOGARITHMIC FUNCTIONS

- **INVERSE FUNCTIONS**
  - **F-BF.B.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.*
  - **F-BF.B.4c** *Read values of an inverse function from a graph or a table, given that the function has an inverse.*
  - **F-BF.B.4d** *Produce an invertible function from a non-invertible function by restricting the domain.*

- **LOGARITHMIC FUNCTIONS**
  - **F-IF.B.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.*
  - **F-IF.C.7e** *Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.*
  - **F-BF.B.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.*
  - **F-BF.B.4c** *Read values of an inverse function from a graph or a table, given that the function has an inverse.*
  - **F-LE.A.4** *Understand the inverse relationship between exponents and logarithms. For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.*
  - **F-IF.A.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).*

7. LOGARITHMIC EXPRESSIONS AND EQUATIONS

- **EVALUATING LOGARITHMIC EXPRESSIONS**
  - **A-SSE.A.1a** *Interpret parts of an expression, such as terms, factors, and coefficients.*
  - **A-SSE.A.1b** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **F-LE.A.4** *Understand the inverse relationship between exponents and logarithms. For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.*

- **SOLVING LOGARITHMIC EQUATIONS**
  - **F-IF.A.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).*
  - **F-IF.B.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.*
  - **F-BF.B.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.*
  - **F-LE.A.4** *Understand the inverse relationship between exponents and logarithms. For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.*
  - **A-REI.A.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.*

8. OPERATIONS WITH POLYNOMIALS

- **ADDITION AND SUBTRACTION OF POLYNOMIALS**
  - **A-APR.A.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.*
  - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*

- **MULTIPLICATION OF POLYNOMIALS**
  - **A-APR.A.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.*
  - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*

- **DIVISION OF POLYNOMIALS**
  - **A-SSE.A.1a** *Interpret parts of an expression, such as terms, factors, and coefficients.*
  - **A-SSE.A.1b** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*
  - **A-APR.D.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.*

9. GRAPHS AND REPRESENTATIONS OF QUADRATIC FUNCTIONS

- **ANALYZING GRAPHS OF QUADRATIC FUNCTIONS**
  - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*
  - **F-IF.C.9** *Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).*
  - **F-IF.A.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).*

- **F-IF.B.5** *Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.*
- **F-IF.B.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.*
- **F-IF.C.7a** *Graph linear and quadratic functions and show intercepts, maxima, and minima.*
- **A-REI.B.4b** *Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.*
- **A-APR.B.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.*
- **F-IF.C.8a** *Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.*

- **REPRESENTATIONS OF QUADRATIC FUNCTIONS**
  - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*
  - **A-REI.B.4a** *Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.*
  - **A-SSE.B.3a** *Factor a quadratic expression to reveal the zeros of the function it defines.*
  - **A-CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*
  - **F-IF.A.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).*
  - **F-IF.B.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.*
  - **F-IF.C.8a** *Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.*
  - **F-IF.C.9** *Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).*
  - **F-BF.A.1a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*

- **PARABOLAS**
  - **G-GMD.B.4** *Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.*
  - **G-GPE.A.2** *Derive the equation of a parabola given a focus and directrix.*
  - **A-CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*

10. WORKING WITH EQUATIONS AND FUNCTIONS

- **SYSTEMS OF NONLINEAR EQUATIONS**
  - **A-REI.C.6** *Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.*
  - **A-REI.C.7** *Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.*
  - **A-REI.C.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.*
  - **A-REI.D.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.*
  - **A-CED.A.3** *Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.*
  - **F-LE.A.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).

- **ARITHMETIC OPERATIONS ON FUNCTIONS**
  - **F-BF.A.1b** *Combine standard function types using arithmetic operations.*

11. COMPARING FUNCTIONS

- **MULTIPLE REPRESENTATIONS OF FUNCTIONS**
  - **A-CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*
  - **F-IF.B.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.*
  - **F-IF.C.9** *Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).*
  - **F-LE.A.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).*
  - **F-LE.A.1a** *Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.*

- **LINEAR VERSUS NONLINEAR FUNCTIONS**
  - **F-IF.B.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.*
  - **F-LE.A.1a** *Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.*
  - **F-LE.A.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).*
  - **F-IF.B.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.*
  - **F-IF.C.9** *Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).*
  - **F-LE.A.1b** *Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.*
  - **F-LE.A.1c** *Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*

12. SOLVING QUADRATIC EQUATIONS

- **SOLVING QUADRATIC EQUATIONS BY FACTORING**
  - **A-SSE.B.3a** *Factor a quadratic expression to reveal the zeros of the function it defines.*
  - **A-REI.B.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.*
  - **F-IF.C.8a** *Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.*
  - **A-APR.B.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.*
  - **A-APR.C.4** *Prove polynomial identities and use them to describe numerical relationships.*
  - **F-IF.A.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).*
  - **F-IF.C.7a** *Graph linear and quadratic functions and show intercepts, maxima, and minima.*
  - **F-BF.A.1a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*

- **COMPLETING THE SQUARE**
  - **A-SSE.B.3b** *Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it*

defines.

- **A-REI.B.4a** *Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.*
- **A-REI.B.4b** *Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.*
- **F-IF.C.8a** *Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.*
- **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*
- **F-IF.C.7a** *Graph linear and quadratic functions and show intercepts, maxima, and minima.*

13. QUADRATIC FORMULA AND COMPLEX NUMBERS

- **QUADRATIC FORMULA**
  - **A-SSE.A.1a** *Interpret parts of an expression, such as terms, factors, and coefficients.*
  - **A-SSE.A.1b** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **A-REI.B.4a** *Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.*
  - **A-REI.B.4b** *Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.*
  - **N-CN.C.7** *Solve quadratic equations with real coefficients that have complex solutions.*
  - **F-IF.A.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).*
  - **F-IF.B.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.*
  - **F-BF.A.1a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*
  - **A-CED.A.3** *Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.*

- **COMPLEX NUMBERS AND QUADRATIC FUNCTIONS**
  - **A-REI.B.4b** *Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.*
  - **N-CN.C.7** *Solve quadratic equations with real coefficients that have complex solutions.*
  - **N-CN.A.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.A.2** *Use the relation $i^2 = –1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.*

14. FACTORING SPECIAL CASES AND CUBIC POLYNOMIALS

- **FACTORING SPECIAL CASES**
  - **A-SSE.A.1a** *Interpret parts of an expression, such as terms, factors, and coefficients.*
  - **A-SSE.A.1b** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*
  - **A-APR.C.4** *Prove polynomial identities and use them to describe numerical relationships.*
  - **A-APR.B.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.*

- **FACTORING CUBIC POLYNOMIALS**
  - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.

- **A-APR.B.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.*
- **A-APR.C.4** *Prove polynomial identities and use them to describe numerical relationships.*

15. FACTORING POLYNOMIALS AND THE FACTOR THEOREM

- **FACTORING HIGHER-ORDER POLYNOMIALS**
  - **A-SSE.A.1a** *Interpret parts of an expression, such as terms, factors, and coefficients.*
  - **A-SSE.A.1b** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **A-APR.B.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.*
  - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*
  - **A-APR.C.4** *Prove polynomial identities and use them to describe numerical relationships.*

- **FACTOR THEOREM AND REMAINDER THEOREM**
  - **A-APR.B.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 $p(x)$.*
  - **F-IF.A.2** *Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.*

16. POLYNOMIAL IDENTITIES AND COMPLEX NUMBERS

- **POLYNOMIAL IDENTITIES**
  - **A-APR.C.4** *Prove polynomial identities and use them to describe numerical relationships.*
  - **A-REI.B.4a** *Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.*
  - **A-REI.B.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.*
  - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*
  - **A-APR.C.5** *Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.*

- **COMPLEX NUMBERS**
  - **N-CN.A.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.A.2** *Use the relation $i^2 = –1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.*

- **POLYNOMIAL IDENTITIES AND COMPLEX NUMBERS**
  - **A-SSE.A.1a** *Interpret parts of an expression, such as terms, factors, and coefficients.*
  - **A-SSE.A.1b** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*
  - **A-APR.C.4** *Prove polynomial identities and use them to describe numerical relationships.*
  - **N-CN.C.8** *Extend polynomial identities to the complex numbers.*
  - **A-REI.B.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.*
  - **N-CN.A.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.C.7** *Solve quadratic equations with real coefficients that have complex solutions.*
- **N-CN.C.9** *Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.*

17. RADICAL FUNCTIONS AND EQUATIONS

- **ANALYZING GRAPHS OF SQUARE ROOT FUNCTIONS**
  - **F-BF.B.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.*
  - **G-CO.B.6** *Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.*
  - **F-BF.B.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.*
  - **F-IF.B.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.*
  - **F-IF.C.7b** *Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.*
  - **F-BF.B.4c** *Read values of an inverse function from a graph or a table, given that the function has an inverse.*
  - **F-IF.A.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).*

- **SOLVING SQUARE ROOT EQUATIONS**
  - **A-REI.A.2** *Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.*
  - **A-REI.A.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.*
  - **F-BF.A.1a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*

18. RATIONAL EXPRESSIONS AND EQUATIONS

- **OPERATIONS WITH RATIONAL EXPRESSIONS**
  - **A-SSE.A.1a** *Interpret parts of an expression, such as terms, factors, and coefficients.*
  - **A-SSE.A.1b** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **A-APR.D.7** *Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.*
  - **A-SSE.A.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 $(x^2 – y^2)(x^2 + y^2)$.*
  - **A-APR.D.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.*

- **SOLVING RATIONAL EQUATIONS**
  - **A-REI.A.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.*
  - **F-IF.A.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).*
  - **A-CED.A.3** *Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.*
  - **A-REI.A.2** *Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.*

19. RATIONAL FUNCTIONS

- **ANALYZING GRAPHS OF RATIONAL FUNCTIONS**
  - **F-BF.B.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.*
  - **F-IF.B.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.*
  - **F-IF.A.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).*
  - **F-IF.B.5** *Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.*

- **MODELING SITUATIONS WITH RATIONAL FUNCTIONS**
  - **A-SSE.A.1a** *Interpret parts of an expression, such as terms, factors, and coefficients.*
  - **A-SSE.A.1b** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **A-REI.A.2** *Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.*
  - **F-BF.A.1a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*

20. TRIGONOMETRY AND TRIGONOMETRIC FUNCTIONS

- **RADIANS AND THE UNIT CIRCLE**
  - **F-TF.A.1** *Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.*
  - **F-TF.A.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.*
  - **G-C.B.5** *Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.*
  - **F-TF.A.3** *Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosines, and tangent for π–x, π+x, and 2π–x in terms of their values for x, where x is any real number.*
  - **F-TF.A.4** *Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.*
  - **G-SRT.C.8** *Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*

- **TRIGONOMETRIC FUNCTIONS**
  - **F-IF.C.7e** *Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.*
  - **F-TF.B.5** *Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.*
  - **F-TF.C.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.*
  - **F-TF.A.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.*

21. PARENT FUNCTIONS AND TRANSFORMATIONS

- **PARENT FUNCTIONS**
  - **F-IF.B.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.*
  - **F-IF.C.7b** *Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.*
  - **F-IF.A.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).*
  - **F-IF.B.5** *Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.*

- **F-LE.A.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).*
- **F-BF.B.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.*
- **F-IF.C.7c** *Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.*
- **F-IF.C.7e** *Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.*

- **TRANSFORMATIONS OF PARENT FUNCTIONS**
  - **F-BF.B.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.*
  - **G-CO.A.2** *Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).*
  - **G-CO.B.6** *Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.*
  - **F-IF.A.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).*
  - **F-IF.C.7e** *Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.*

- **MULTIPLE TRANSFORMATIONS OF PARENT FUNCTIONS**
  - **F-BF.B.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.*
  - **G-CO.A.2** *Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).*
  - **G-CO.B.6** *Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.*
  - **G-CO.A.5** *Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.*
  - **F-IF.B.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.*
  - **F-IF.C.7c** *Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.*
  - **F-IF.C.7e** *Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.*

22. STATISTICAL DESIGN AND ANALYSIS

- **ANALYZING STATISTICAL SAMPLES**
  - **S-IC.A.1** *Understand statistics as a process for making inferences about population parameters based on a random sample from that population.*
  - **S-IC.A.2** *Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.*
  - **S-IC.B.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.*

- **EXPERIMENTAL AND OBSERVATIONAL DESIGN**
  - **S-IC.B.3** *Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.*

- **CONCLUSIONS IN DATA**

- **S-IC.B.5** *Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.*
- **S-IC.B.6** *Evaluate reports based on data.*

23. STATISTICS

- **SCATTERPLOTS AND MODELING**
  - **S-ID.B.6a** *Fit a function to the data (including with the use of technology); use functions fitted to data to solve problems in the context of the data.*
  - **S-ID.B.6b** *Informally assess the fit of a function by plotting and analyzing residuals, including with the use of technology.*
  - **S-ID.B.6c** *Fit a linear function for a scatter plot that suggests a linear association.*
  - **S-ID.C.8** *Compute (using technology) and interpret the correlation coefficient of a linear fit.*
  - **F-LE.A.1a** *Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.*
  - **F-LE.A.1c** *Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*
  - **S-ID.C.7** *Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.*

- **NORMAL DISTRIBUTION**
  - **S-ID.A.3** *Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).*
  - **S-ID.A.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.*
  - **S-IC.B.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.*

24. PROBABILITY

- **INTRODUCTION TO PROBABILITY**
  - **S-CP.A.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.*
  - **S-CP.B.8** *Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.*
  - **S-CP.A.5** *Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.*
  - **S-CP.B.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.*

- **CONDITIONAL PROBABILITY**
  - **S-CP.A.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.*
  - **S-CP.A.5** *Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.*
  - **S-CP.B.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.*
  - **S-CP.A.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.*
  - **S-ID.B.5** *Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.*
  - **S-CP.A.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.*
  - **S-CP.A.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”).

- **GEOMETRIC PROBABILITIES**
    - **G-MG.A.3** *Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).*
    - **S-MD.B.7** *Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).*
    - **S-CP.A.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.B.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.*