Arkansas Tutorials are designed specifically for the Arkansas Standards found in the Curriculum Framework documents to prepare students for the ACT Aspire in English, reading, writing, math and science tests.

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. REAL NUMBER SYSTEM

- **OPERATIONS ON RATIONAL AND IRRATIONAL NUMBERS**
  - **HSN.RN.B.3** *Explain why the sum/difference or product/quotient (where defined) of two rational numbers is rational; the sum/difference of a rational number and an irrational number is irrational; the product/quotient of a nonzero rational number and an irrational number is irrational; and the product/quotient of two nonzero rationals is a nonzero rational.*

- **MONITORING PRECISION AND ACCURACY**
  - **HSN.Q.A.2** *Define appropriate quantities for the purpose of descriptive modeling. (I.E., Use units appropriate to the problem being solved.)*
  - **HSN.Q.A.3** *Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.*
  - **HSN.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.*

2. EQUATIONS AND INEQUALITIES

- **ONE-STEP EQUATIONS AND INEQUALITIES**
  - **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.*
  - **HSA.CED.A.1** *Create equations and inequalities in one variable and use them to solve problems.*
  - **HSA.CED.A.3** *Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. Interpret solutions as viable or nonviable options in a modeling and/or real-world context.*
  - **HSA.REI.A.1** *Assuming that equations have a solution, construct a solution and justify the reasoning used.*
  - **HSA.REI.B.3** *Solve linear equations, inequalities and absolute value equations in one variable, including equations with coefficients represented by letters.*

- **MULTI-STEP EQUATIONS AND INEQUALITIES**
  - **HSA.REI.A.2** *Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.*

- **HSA.CED.A.3** *Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. Interpret solutions as viable or nonviable options in a modeling and/or real-world context.*
- **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.*
- **HSA.REI.A.1** *Assuming that equations have a solution, construct a solution and justify the reasoning used.*
- **HSA.REI.B.3** *Solve linear equations, inequalities and absolute value equations in one variable, including equations with coefficients represented by letters.*
- **HSA.CED.A.1** *Create equations and inequalities in one variable and use them to solve problems.*

- **LITERAL EQUATIONS**
  - **HSA.CED.A.1** *Create equations and inequalities in one variable and use them to solve problems.*
  - **HSA.REI.B.3** *Solve linear equations, inequalities and absolute value equations in one variable, including equations with coefficients represented by letters.*
  - **HSA.CED.A.4** *Rearrange literal equations using the properties of equality.*

3. WRITING EXPRESSIONS, EQUATIONS, AND INEQUALITIES

- **FORMULATING AND SOLVING EQUATIONS FROM WORD PROBLEMS**
  - **HSA.CED.A.1** *Create equations and inequalities in one variable and use them to solve problems.*
  - **HSF.IF.C.8** *Write expressions for functions in different but equivalent forms to reveal key features of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values (vertex), and symmetry of the graph, and interpret these in terms of a context.*
  - **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.*
  - **HSF.LE.A.1** *Distinguish between situations that can be modeled with linear functions and with exponential functions. Show that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*
  - **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
  - **HSA.SSE.A.1** *Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **HSF.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.*

- **FORMULATING AND SOLVING INEQUALITIES FROM WORD PROBLEMS**
  - **HSA.CED.A.1** *Create equations and inequalities in one variable and use them to solve problems.*
  - **HSA.REI.B.3** *Solve linear equations, inequalities and absolute value equations in one variable, including equations with coefficients represented by letters.*
  - **HSA.CED.A.3** *Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. Interpret solutions as viable or nonviable options in a modeling and/or real-world context.*
  - **HSA.SSE.A.1** *Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.*

4. FUNCTIONS

- **FUNCTIONS AND RELATIONS**
  - **HSF.IF.A.2** *In terms of a real-world context: use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation.*

- **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation = f(x).*
- **HSF.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.*
- **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*
- **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
- **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.*

- **DOMAIN AND RANGE**
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation = f(x).*
  - **HSF.IF.B.5** *Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.*
  - **HSF.LE.B.5** *In terms of a context, interpret the parameters (rates of growth or decay, domain and range restrictions where applicable, etc.) in a function.*

- **EVALUATING FUNCTIONS**
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation = f(x).*
  - **HSF.IF.A.2** *In terms of a real-world context: use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation.*
  - **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.*

5. GRAPHS OF LINEAR EQUATIONS AND INEQUALITIES 1

- **SLOPE**
  - **HSF.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.*
  - **HSF.IF.B.6** *Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate the rate of change from a graph.*
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation = f(x).*

- **GRAPHING AND ANALYZING LINEAR FUNCTIONS**
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation = f(x).*

- **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
- **HSF.IF.B.5** *Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.*
- **HSF.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.*
- **HSF.IF.B.6** *Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate the rate of change from a graph.*
- **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*
- **HSA.APR.B.3** *Identify zeros of polynomials (linear, quadratic only) when suitable factorizations are available. Use the zeros to construct a rough graph of the function defined by the polynomial.*

6. GRAPHS OF LINEAR EQUATIONS AND INEQUALITIES 2

- **GRAPHING AND MANIPULATING Y = MX + B**
  - **HSA.CED.A.2** *Create equations in two or more variables to represent relationships between quantities. Graph equations, in two variables, on a coordinate plane.*
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation $= f(x)$.*
  - **HSF.IF.B.6** *Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate the rate of change from a graph.*
  - **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*
  - **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
  - **HSS.ID.C.7** *Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.*
  - **HSF.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.*
  - **HSF.LE.B.5** *In terms of a context, interpret the parameters (rates of growth or decay, domain and range restrictions where applicable, etc.) in a function.*
  - **HSF.LE.A.1** *Distinguish between situations that can be modeled with linear functions and with exponential functions. Show that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*

- **GRAPHS OF LINEAR INEQUALITIES**
  - **HSA.REI.D.12** *Solve linear inequalities and systems of linear inequalities in two variables by graphing.*
  - **HSA.CED.A.3** *Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. Interpret solutions as viable or nonviable options in a modeling and/or real-world context.*
  - **HSA.REI.B.3** *Solve linear equations, inequalities and absolute value equations in one variable, including equations with coefficients represented by letters.*

7. LINEAR EQUATIONS

- **SLOPE-INTERCEPT FORM OF A LINEAR EQUATION**

- **HSS.ID.C.7** *Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.*
- **HSA.REI.D.10** *Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.*
- **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation $= f(x)$.*
- **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*
- **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
- **HSF.IF.B.6** *Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate the rate of change from a graph.*

- **POINT-SLOPE FORM OF A LINEAR EQUATION**
  - **HSA.REI.D.10** *Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.*
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation $= f(x)$.*
  - **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
  - **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*

8. TWO-VARIABLE LINEAR SYSTEMS

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: GUESS AND CHECK**
  - **HSA.CED.A.2** *Create equations in two or more variables to represent relationships between quantities. Graph equations, in two variables, on a coordinate plane.*
  - **HSA.CED.A.3** *Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. Interpret solutions as viable or nonviable options in a modeling and/or real-world context.*
  - **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.*
  - **HSA.REI.C.6** *Solve systems of equations algebraically and graphically.*
  - **HSA.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 by using technology to graph the functions, making tables of values, finding successive approximations. Include cases (but not limited to) where f(x) and/or g(x) are linear, polynomial, absolute value, exponential. (Introduction in Algebra 1, Mastery in Algebra 2)*
  - **HSA.REI.C.5** *Solve systems of equations in two variables using substitution and elimination. Understand that the solution to a system of equations will be the same when using substitution and elimination.*

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: GRAPHING**
  - **HSA.CED.A.3** *Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. Interpret solutions as viable or nonviable options in a modeling and/or real-world context.*
  - **HSA.REI.C.6** *Solve systems of equations algebraically and graphically.*
  - **HSA.REI.C.7** *Solve systems of equations consisting of linear equations and nonlinear equations in two variables algebraically*

and graphically.

- **HSA.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 by using technology to graph the functions, making tables of values, finding successive approximations. Include cases (but not limited to) where f(x) and/or g(x) are linear, polynomial, absolute value, exponential. (Introduction in Algebra 1, Mastery in Algebra 2)*
- **HSA.CED.A.2** *Create equations in two or more variables to represent relationships between quantities. Graph equations, in two variables, on a coordinate plane.*

- **SOLVING SYSTEMS OF LINEAR INEQUALITIES**
  - **HSA.REI.D.12** *Solve linear inequalities and systems of linear inequalities in two variables by graphing.*
  - **HSA.CED.A.3** *Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. Interpret solutions as viable or nonviable options in a modeling and/or real-world context.*

9. SOLVING TWO-VARIABLE LINEAR SYSTEMS ALGEBRAICALLY

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: SUBSTITUTION**
  - **HSA.CED.A.2** *Create equations in two or more variables to represent relationships between quantities. Graph equations, in two variables, on a coordinate plane.*
  - **HSA.CED.A.3** *Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. Interpret solutions as viable or nonviable options in a modeling and/or real-world context.*
  - **HSA.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 by using technology to graph the functions, making tables of values, finding successive approximations. Include cases (but not limited to) where f(x) and/or g(x) are linear, polynomial, absolute value, exponential. (Introduction in Algebra 1, Mastery in Algebra 2)*
  - **HSA.REI.C.6** *Solve systems of equations algebraically and graphically.*
  - **HSA.REI.C.7** *Solve systems of equations consisting of linear equations and nonlinear equations in two variables algebraically and graphically.*
  - **HSA.REI.C.5** *Solve systems of equations in two variables using substitution and elimination. Understand that the solution to a system of equations will be the same when using substitution and elimination.*

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: ELIMINATION**
  - **HSA.CED.A.2** *Create equations in two or more variables to represent relationships between quantities. Graph equations, in two variables, on a coordinate plane.*
  - **HSA.CED.A.3** *Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. Interpret solutions as viable or nonviable options in a modeling and/or real-world context.*
  - **HSA.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 by using technology to graph the functions, making tables of values, finding successive approximations. Include cases (but not limited to) where f(x) and/or g(x) are linear, polynomial, absolute value, exponential. (Introduction in Algebra 1, Mastery in Algebra 2)*
  - **HSA.REI.C.6** *Solve systems of equations algebraically and graphically.*
  - **HSA.REI.C.7** *Solve systems of equations consisting of linear equations and nonlinear equations in two variables algebraically and graphically.*
  - **HSA.REI.C.5** *Solve systems of equations in two variables using substitution and elimination. Understand that the solution to a system of equations will be the same when using substitution and elimination.*

10. EXPONENTIAL FUNCTIONS, EQUATIONS, AND INEQUALITIES

- **EXPONENTIAL FUNCTIONS**
  - **HSA.SSE.A.1** *Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **HSF.LE.A.1** *Distinguish between situations that can be modeled with linear functions and with exponential functions. Show*

that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

- **HSF.LE.A.3** *Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or any polynomial function.*
- **HSF.LE.B.5** *In terms of a context, interpret the parameters (rates of growth or decay, domain and range restrictions where applicable, etc.) in a function.*
- **HSF.IF.B.6** *Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate the rate of change from a graph.*
- **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
- **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation $= f(x)$.*
- **HSF.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.*
- **HSF.IF.B.5** *Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.*
- **HSA.CED.A.1** *Create equations and inequalities in one variable and use them to solve problems.*
- **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*
- **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.*

- **EXPONENTIAL GROWTH AND DECAY**
  - **HSF.LE.B.5** *In terms of a context, interpret the parameters (rates of growth or decay, domain and range restrictions where applicable, etc.) in a function.*
  - **HSA.SSE.A.1** *Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*
  - **HSF.LE.A.1** *Distinguish between situations that can be modeled with linear functions and with exponential functions. Show that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*
  - **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
  - **HSA.CED.A.2** *Create equations in two or more variables to represent relationships between quantities. Graph equations, in two variables, on a coordinate plane.*
  - **HSF.IF.B.6** *Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate the rate of change from a graph.*
  - **HSF.LE.A.3** *Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or any polynomial function.*

- **SOLVING EXPONENTIAL INEQUALITIES**
  - **HSA.CED.A.2** *Create equations in two or more variables to represent relationships between quantities. Graph equations, in*

two variables, on a coordinate plane.

- **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
- **HSA.SSE.A.1** *Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.*
- **HSA.CED.A.3** *Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. Interpret solutions as viable or nonviable options in a modeling and/or real-world context.*
- **HSF.LE.A.1** *Distinguish between situations that can be modeled with linear functions and with exponential functions. Show that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*

11. SEQUENCES

- **SEQUENCES**
  - **HSF.IF.A.3** *Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.*
  - **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.*
  - **HSF.LE.A.2** *Construct linear and exponential equations, 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**
  - **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
  - **HSF.IF.A.3** *Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.*
  - **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.*

12. ARITHMETIC WITH POLYNOMIALS

- **POLYNOMIAL BASICS**
  - **HSA.SSE.A.1** *Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.*

- **ADDITION AND SUBTRACTION OF POLYNOMIALS**
  - **HSA.APR.A.1** *Add, subtract, and multiply polynomials. Understand that polynomials, like the integers, are closed under addition, subtraction, and multiplication.*

- **MULTIPLICATION OF POLYNOMIALS**
  - **HSA.APR.A.1** *Add, subtract, and multiply polynomials. Understand that polynomials, like the integers, are closed under addition, subtraction, and multiplication.*

13. FACTORING POLYNOMIALS

- **FACTORING QUADRATIC TRINOMIALS**
  - **HSA.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*
  - **HSA.SSE.B.3** *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. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

- **HSA.SSE.A.1** *Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.*

- **FACTORING SPECIAL CASES**
  - **HSA.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*
  - **HSA.SSE.A.1** *Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **HSA.APR.C.4** *Prove polynomial identities and use them to describe numerical relationships.*

- **FACTORING HIGHER-ORDER POLYNOMIALS**
  - **HSA.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*
  - **HSA.SSE.A.1** *Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **HSA.APR.C.4** *Prove polynomial identities and use them to describe numerical relationships.*

14. GRAPHS AND REPRESENTATIONS OF QUADRATIC FUNCTIONS

- **QUADRATIC FUNCTIONS**
  - **HSF.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.*
  - **HSA.CED.A.2** *Create equations in two or more variables to represent relationships between quantities. Graph equations, in two variables, on a coordinate plane.*
  - **HSA.SSE.A.1** *Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **HSA.SSE.B.3** *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. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.*
  - **HSF.IF.C.8** *Write expressions for functions in different but equivalent forms to reveal key features of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values (vertex), and symmetry of the graph, and interpret these in terms of a context.*
  - **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.*

- **ANALYZING GRAPHS OF QUADRATIC FUNCTIONS**
  - **HSA.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*
  - **HSF.IF.C.9** *Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).*
  - **HSF.LE.B.5** *In terms of a context, interpret the parameters (rates of growth or decay, domain and range restrictions where applicable, etc.) in a function.*
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation $= f(x)$.*
  - **HSF.IF.B.5** *Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.*

- **HSF.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.*
- **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*
- **HSA.REI.D.10** *Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.*
- **HSA.APR.B.3** *Identify zeros of polynomials (linear, quadratic only) when suitable factorizations are available. Use the zeros to construct a rough graph of the function defined by the polynomial.*
- **HSF.IF.C.8** *Write expressions for functions in different but equivalent forms to reveal key features of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values (vertex), and symmetry of the graph, and interpret these in terms of a context.*

- **REPRESENTATIONS OF QUADRATIC FUNCTIONS**
  - **HSA.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*
  - **HSF.IF.C.8** *Write expressions for functions in different but equivalent forms to reveal key features of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values (vertex), and symmetry of the graph, and interpret these in terms of a context.*
  - **HSF.IF.C.9** *Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).*
  - **HSA.SSE.B.3** *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. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.*
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation $= f(x)$.*
  - **HSF.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.*
  - **HSA.APR.B.3** *Identify zeros of polynomials (linear, quadratic only) when suitable factorizations are available. Use the zeros to construct a rough graph of the function defined by the polynomial.*
  - **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.*
  - **HSA.REI.B.4** *Solve quadratic equations in one variable. 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. Solve quadratic equations (as appropriate to the initial form of the equation) by: inspection of a graph, taking square roots, completing the square, using the quadratic formula, factoring. Recognize complex solutions and write them as $a \pm bi$ for real numbers a and b. (Algebra 2 only)*
  - **HSA.CED.A.2** *Create equations in two or more variables to represent relationships between quantities. Graph equations, in two variables, on a coordinate plane.*

15. SOLVING QUADRATIC EQUATIONS

- **SOLVING QUADRATIC EQUATIONS BY FACTORING**
  - **HSA.REI.B.4** *Solve quadratic equations in one variable. 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. Solve quadratic equations (as appropriate to the initial form of the equation) by: inspection of a graph, taking square roots, completing the square, using the quadratic formula, factoring. Recognize complex solutions and write them as $a \pm bi$ for real numbers a and b. (Algebra 2 only)*
  - **HSA.SSE.B.3** *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. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.*

- **HSF.IF.C.8** *Write expressions for functions in different but equivalent forms to reveal key features of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values (vertex), and symmetry of the graph, and interpret these in terms of a context.*
- **HSA.APR.B.3** *Identify zeros of polynomials (linear, quadratic only) when suitable factorizations are available. Use the zeros to construct a rough graph of the function defined by the polynomial.*
- **HSA.APR.C.4** *Prove polynomial identities and use them to describe numerical relationships.*
- **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation $= f(x)$.*
- **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*
- **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.*

- **COMPLETING THE SQUARE**
  - **HSA.REI.B.4** *Solve quadratic equations in one variable. 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. Solve quadratic equations (as appropriate to the initial form of the equation) by: inspection of a graph, taking square roots, completing the square, using the quadratic formula, factoring. Recognize complex solutions and write them as $a \pm bi$ for real numbers a and b. (Algebra 2 only)*
  - **HSA.SSE.B.3** *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. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.*
  - **HSF.IF.C.8** *Write expressions for functions in different but equivalent forms to reveal key features of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values (vertex), and symmetry of the graph, and interpret these in terms of a context.*
  - **HSA.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*
  - **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*

- **QUADRATIC FORMULA**
  - **HSA.SSE.A.1** *Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression using appropriate vocabulary, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **HSA.REI.B.4** *Solve quadratic equations in one variable. 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. Solve quadratic equations (as appropriate to the initial form of the equation) by: inspection of a graph, taking square roots, completing the square, using the quadratic formula, factoring. Recognize complex solutions and write them as $a \pm bi$ for real numbers a and b. (Algebra 2 only)*
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation $= f(x)$.*
  - **HSF.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.*
  - **HSA.CED.A.3** *Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. Interpret solutions as viable or nonviable options in a modeling and/or real-world context.*
  - **HSF.BF.A.1** *Write a function that describes a relationship between two quantities. From a context, determine an explicit*

expression, a recursive process, or steps for calculation.

16. PARENT FUNCTIONS

- **LINEAR AND EXPONENTIAL PARENT FUNCTIONS**
  - **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
  - **HSA.REI.D.10** *Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.*
  - **HSF.LE.B.5** *In terms of a context, interpret the parameters (rates of growth or decay, domain and range restrictions where applicable, etc.) in a function.*
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation $= f(x)$.*
  - **HSF.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.*
  - **HSF.IF.B.5** *Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.*
  - **HSF.LE.A.1** *Distinguish between situations that can be modeled with linear functions and with exponential functions. Show that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*

- **QUADRATIC PARENT FUNCTION**
  - **HSF.IF.B.5** *Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.*
  - **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*
  - **HSF.LE.B.5** *In terms of a context, interpret the parameters (rates of growth or decay, domain and range restrictions where applicable, etc.) in a function.*
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation $= f(x)$.*

17. TRANSFORMATIONS OF PARENT FUNCTIONS

- **TRANSFORMATIONS OF THE LINEAR AND EXPONENTIAL PARENT FUNCTIONS**
  - **HSF.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 (k, a constant both positive and negative); Find the value of k given the graphs of the transformed functions. Experiment with multiple transformations and illustrate an explanation of the effects on the graph with or without technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.*

- **TRANSFORMATIONS OF THE QUADRATIC PARENT FUNCTION**
  - **HSF.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 (k, a constant both positive and negative); Find the value of k given the graphs of the transformed functions. Experiment with multiple transformations and illustrate an explanation of the effects on the graph with or without technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.*
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation = f(x).

- **HSF.IF.B.5** *Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.*

18. COMPARING FUNCTIONS

- **LINEAR VERSUS NONLINEAR FUNCTIONS**
  - **HSF.IF.B.6** *Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate the rate of change from a graph.*
  - **HSF.LE.A.1** *Distinguish between situations that can be modeled with linear functions and with exponential functions. Show that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*
  - **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
  - **HSF.IF.C.9** *Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).*
  - **HSF.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.*

- **MULTIPLE REPRESENTATIONS OF FUNCTIONS**
  - **HSF.IF.C.9** *Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).*
  - **HSA.CED.A.2** *Create equations in two or more variables to represent relationships between quantities. Graph equations, in two variables, on a coordinate plane.*
  - **HSF.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.*
  - **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*
  - **HSA.CED.A.1** *Create equations and inequalities in one variable and use them to solve problems.*
  - **HSF.LE.A.1** *Distinguish between situations that can be modeled with linear functions and with exponential functions. Show that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*

19. NONLINEAR FUNCTIONS

- **ABSOLUTE VALUE FUNCTIONS**
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation = f(x).*
  - **HSF.IF.B.5** *Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.*
  - **HSF.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.*
  - **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*

- **HSF.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 (k, a constant both positive and negative); Find the value of k given the graphs of the transformed functions. Experiment with multiple transformations and illustrate an explanation of the effects on the graph with or without technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.*

- **ANALYZING GRAPHS OF SQUARE ROOT FUNCTIONS**
  - **HSF.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 (k, a constant both positive and negative); Find the value of k given the graphs of the transformed functions. Experiment with multiple transformations and illustrate an explanation of the effects on the graph with or without technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.*
  - **HSF.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.*
  - **HSF.IF.C.7** *Graph functions expressed algebraically and show key features of the graph, with and without technology. Graph linear and quadratic functions and, when applicable, show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. Graph exponential functions, showing intercepts and end behavior.*
  - **HSF.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. Understand 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. Understand that the graph of f is the graph of the equation = f(x).*
  - **HSF.IF.B.5** *Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.*

- **SYSTEMS OF NONLINEAR EQUATIONS**
  - **HSA.REI.C.6** *Solve systems of equations algebraically and graphically.*
  - **HSA.REI.C.7** *Solve systems of equations consisting of linear equations and nonlinear equations in two variables algebraically and graphically.*
  - **HSA.REI.C.5** *Solve systems of equations in two variables using substitution and elimination. Understand that the solution to a system of equations will be the same when using substitution and elimination.*
  - **HSA.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 by using technology to graph the functions, making tables of values, finding successive approximations. Include cases (but not limited to) where f(x) and/or g(x) are linear, polynomial, absolute value, exponential. (Introduction in Algebra 1, Mastery in Algebra 2)*
  - **HSA.CED.A.3** *Represent and interpret constraints by equations or inequalities, and by systems of equations and/or inequalities. Interpret solutions as viable or nonviable options in a modeling and/or real-world context.*
  - **HSF.LE.A.2** *Construct linear and exponential equations, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*

20. STATISTICS

- **DATA ANALYSIS**
  - **HSS.ID.A.1** *Represent data with plots on the real number line (dot plots, histograms, and box plots).*
  - **HSS.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).*
  - **HSS.ID.A.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.*

- **FREQUENCY TABLES**
  - **HSS.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.*
  - **HSS.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).

21. SCATTERPLOTS AND REGRESSION

- **SCATTERPLOTS**
  - **HSS.ID.B.6** *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.*
  - **HSS.ID.C.9** *Distinguish between correlation and causation.*
  - **HSS.ID.C.7** *Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.*
  - **HSF.IF.B.6** *Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate the rate of change from a graph.*

- **SCATTERPLOTS AND MODELING**
  - **HSS.ID.B.6** *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.*
  - **HSS.ID.C.8** *Compute (using technology) and interpret the correlation coefficient of a linear fit.*
  - **HSS.ID.C.7** *Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.*
  - **HSF.LE.A.1** *Distinguish between situations that can be modeled with linear functions and with exponential functions. Show that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*