

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.

Unit 1: Real Number System

• OPERATIONS ON RATIONAL AND IRRATIONAL NUMBERS

- HSN.RN.B.3: The Real Number System Use properties of rational and irrational numbers 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: Quantities Reason quantitatively and use units to solve problems Define appropriate quantities for the purpose of descriptive modeling. (I.E., Use units appropriate to the problem being solved.)
- HSN.Q.A.3: Quantities Reason quantitatively and use units to solve problems Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
- HSN.Q.A.1: Quantities Reason quantitatively and use units to solve problems 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.

Unit 2: Equations and Inequalities

- **ONE-STEP EQUATIONS AND INEQUALITIES**

- HSF.BF.A.1: Building Functions Build a function that models a relationship between two quantities 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: Creating Equations Create equations that describe numbers or relationships Create equations and inequalities in one variable and use them to solve problems.
- HSA.CED.A.3: Creating Equations Create equations that describe numbers or relationships 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: Reasoning with Equations and Inequalities Understand solving equations as a process of reasoning and explain the reasoning Assuming that equations have a solution, construct a solution and justify the reasoning used.
- HSA.REI.B.3: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable 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: Reasoning with Equations and Inequalities Understand solving equations as a process of reasoning and explain the reasoning Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
- HSA.CED.A.3: Creating Equations Create equations that describe numbers or relationships 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: Building Functions Build a function that models a relationship between two quantities 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: Reasoning with Equations and Inequalities Understand solving equations as a process of reasoning and explain the reasoning Assuming that equations have a solution, construct a solution and justify the reasoning used.
- HSA.REI.B.3: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable Solve linear equations, inequalities and absolute value equations in one variable, including equations with coefficients represented by letters.
- HSA.CED.A.1: Creating Equations Create equations that describe numbers or relationships Create equations and inequalities in one variable and use them to solve problems.

- **LITERAL EQUATIONS**

- HSA.CED.A.1: Creating Equations Create equations that describe numbers or relationships Create equations and inequalities in one variable and use them to solve problems.

- HSA.REI.B.3: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable Solve linear equations, inequalities and absolute value equations in one variable, including equations with coefficients represented by letters.
- HSA.CED.A.4: Creating Equations Create equations that describe numbers or relationships Rearrange literal equations using the properties of equality.

Unit 3: Writing Expressions, Equations, and Inequalities

• FORMULATING AND SOLVING EQUATIONS FROM WORD PROBLEMS

- HSA.CED.A.1: Creating Equations Create equations that describe numbers or relationships Create equations and inequalities in one variable and use them to solve problems.
- HSF.IF.C.8: Interpreting Functions Analyze functions using different representations 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: Building Functions Build a function that models a relationship between two quantities 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Seeing Structure in Expressions Interpret the structure of expressions 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: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

• FORMULATING AND SOLVING INEQUALITIES FROM WORD PROBLEMS

- HSA.CED.A.1: Creating Equations Create equations that describe numbers or relationships Create equations and inequalities in one variable and use them to solve problems.

- HSA.REI.B.3: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable Solve linear equations, inequalities and absolute value equations in one variable, including equations with coefficients represented by letters.
- HSA.CED.A.3: Creating Equations Create equations that describe numbers or relationships 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: Seeing Structure in Expressions Interpret the structure of expressions 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.

Unit 4: Functions

• FUNCTIONS AND RELATIONS

- HSF.IF.A.2: Interpreting Functions Understand the concept of a function and use function notation 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.B.4: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- HSF.IF.C.7: Interpreting Functions Analyze functions using different representations 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.

- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.LE.A.2: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Building Functions Build a function that models a relationship between two quantities 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.B.5: Interpreting Functions Interpret functions that arise in applications in terms of the context Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.
- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.LE.B.5: Linear, Quadratic, and Exponential Models Interpret expressions for functions in terms of the situation they model 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.

- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.

• EVALUATING FUNCTIONS

- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.A.2: Interpreting Functions Understand the concept of a function and use function notation 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.

- HSF.BF.A.1: Building Functions Build a function that models a relationship between two quantities Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.

Unit 5: Graphs of Linear Equations and Inequalities 1

• SLOPE

- HSF.IF.B.4: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- HSF.IF.B.6: Interpreting Functions Interpret functions that arise in applications in terms of the context 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.

• GRAPHING AND ANALYZING LINEAR FUNCTIONS

- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.LE.A.2: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.B.5: Interpreting Functions Interpret functions that arise in applications in terms of the context 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: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key

features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.B.6: Interpreting Functions Interpret functions that arise in applications in terms of the context 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: Interpreting Functions Analyze functions using different representations 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: Arithmetic with Polynomials and Rational Expressions Understand the relationship between zeros and factors of polynomials. 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.

Unit 6: Graphs of Linear Equations and Inequalities 2

• GRAPHING AND MANIPULATING $Y = MX + B$

- HSA.CED.A.2: Creating Equations Create equations that describe numbers or relationships 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.B.6: Interpreting Functions Interpret functions that arise in applications in terms of the context 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: Interpreting Functions Analyze functions using different representations 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Interpreting Categorical and Quantitative Data Interpret linear models Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
 - HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$ is the graph of the equation $y = f(x)$.
 - HSF.IF.B.4: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
 - HSF.LE.B.5: Linear, Quadratic, and Exponential Models Interpret expressions for functions in terms of the situation they model 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Reasoning with Equations and Inequalities Solve systems of equations Solve linear inequalities and systems of linear inequalities in two variables by graphing.
 - HSA.CED.A.3: Creating Equations Create equations that describe numbers or relationships 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: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable Solve linear equations, inequalities and absolute value equations in one variable, including equations with coefficients represented by letters.

Unit 7: Linear Equations

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

- HSS.ID.C.7: Interpreting Categorical and Quantitative Data Interpret linear models 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: Reasoning with Equations and Inequalities Solve systems of equations 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.C.7: Interpreting Functions Analyze functions using different representations 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.B.6: Interpreting Functions Interpret functions that arise in applications in terms of the context 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: Reasoning with Equations and Inequalities Solve systems of equations 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.

- HSF.LE.A.2: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.C.7: Interpreting Functions Analyze functions using different representations 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.

Unit 8: Two-Variable Linear Systems

• SOLVING SYSTEMS OF LINEAR EQUATIONS: GUESS AND CHECK

- HSA.CED.A.2: Creating Equations Create equations that describe numbers or relationships 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: Creating Equations Create equations that describe numbers or relationships 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: Building Functions Build a function that models a relationship between two quantities 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: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically Solve systems of equations algebraically and graphically.
- HSA.REI.D.11: Reasoning with Equations and Inequalities Solve systems of equations 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: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically 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: Creating Equations Create equations that describe numbers or relationships 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: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically Solve systems of equations algebraically and graphically.
- HSA.REI.C.7: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically Solve systems of equations consisting of linear equations and nonlinear equations in two variables algebraically and graphically.
- HSA.REI.D.11: Reasoning with Equations and Inequalities Solve systems of equations 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: Creating Equations Create equations that describe numbers or relationships 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: Reasoning with Equations and Inequalities Solve systems of equations Solve linear inequalities and systems of linear inequalities in two variables by graphing.
- HSA.CED.A.3: Creating Equations Create equations that describe numbers or relationships 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.

Unit 9: Solving Two-Variable Linear Systems Algebraically

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: SUBSTITUTION**

- HSA.CED.A.2: Creating Equations Create equations that describe numbers or relationships 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: Creating Equations Create equations that describe numbers or relationships 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: Reasoning with Equations and Inequalities Solve systems of equations 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: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically Solve systems of equations algebraically and graphically.
 - HSA.REI.C.7: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically Solve systems of equations consisting of linear equations and nonlinear equations in two variables algebraically and graphically.
 - HSA.REI.C.5: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically 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: Creating Equations Create equations that describe numbers or relationships 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: Creating Equations Create equations that describe numbers or relationships 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: Reasoning with Equations and Inequalities Solve systems of equations 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: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically Solve systems of equations algebraically and graphically.
 - HSA.REI.C.7: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically Solve systems of equations consisting of linear equations and nonlinear equations in two variables algebraically and graphically.
 - HSA.REI.C.5: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically 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.

Unit 10: Exponential Functions, Equations, and Inequalities

• EXPONENTIAL FUNCTIONS

- HSA.SSE.A.1: Seeing Structure in Expressions Interpret the structure of expressions 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Linear, Quadratic, and Exponential Models Interpret expressions for functions in terms of the situation they model 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: Interpreting Functions Interpret functions that arise in applications in terms of the context 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.

- HSF.IF.B.4: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- HSF.IF.B.5: Interpreting Functions Interpret functions that arise in applications in terms of the context 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: Creating Equations Create equations that describe numbers or relationships Create equations and inequalities in one variable and use them to solve problems.
- HSF.IF.C.7: Interpreting Functions Analyze functions using different representations 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: Building Functions Build a function that models a relationship between two quantities 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: Linear, Quadratic, and Exponential Models Interpret expressions for functions in terms of the situation they model 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: Seeing Structure in Expressions Interpret the structure of expressions 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: Interpreting Functions Analyze functions using different representations 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Creating Equations Create equations that describe numbers or relationships 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: Interpreting Functions Interpret functions that arise in applications in terms of the context 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Creating Equations Create equations that describe numbers or relationships 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Seeing Structure in Expressions Interpret the structure of expressions 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: Creating Equations Create equations that describe numbers or relationships 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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.

Unit 11: Sequences

- **SEQUENCES**

- HSF.IF.A.3: Interpreting Functions Understand the concept of a function and use function notation Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
- HSF.BF.A.1: Building Functions Build a function that models a relationship between two quantities 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Interpreting Functions Understand the concept of a function and use function notation Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
 - HSF.BF.A.1: Building Functions Build a function that models a relationship between two quantities Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.

Unit 12: Arithmetic with Polynomials

- **POLYNOMIAL BASICS**
 - HSA.SSE.A.1: Seeing Structure in Expressions Interpret the structure of expressions 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: Arithmetic with Polynomials and Rational Expressions Perform arithmetic operations on polynomials 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: Arithmetic with Polynomials and Rational Expressions Perform arithmetic operations on polynomials Add, subtract, and multiply polynomials. Understand that polynomials, like the integers, are closed under addition, subtraction, and multiplication.

Unit 13: Factoring Polynomials

- **FACTORING QUADRATIC TRINOMIALS**

- HSA.SSE.A.2: Seeing Structure in Expressions Interpret the structure of expressions Use the structure of an expression to identify ways to rewrite it.
- HSA.SSE.B.3: Seeing Structure in Expressions Write expressions in equivalent forms to solve problems Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. 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: Seeing Structure in Expressions Interpret the structure of expressions 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.
- **FACTORIZING SPECIAL CASES**
 - HSA.SSE.A.2: Seeing Structure in Expressions Interpret the structure of expressions Use the structure of an expression to identify ways to rewrite it.
 - HSA.SSE.A.1: Seeing Structure in Expressions Interpret the structure of expressions 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: Arithmetic with Polynomials and Rational Expressions Use polynomial identities to solve problems Prove polynomial identities and use them to describe numerical relationships.
- **FACTORIZING HIGHER-ORDER POLYNOMIALS**
 - HSA.SSE.A.2: Seeing Structure in Expressions Interpret the structure of expressions Use the structure of an expression to identify ways to rewrite it.
 - HSA.SSE.A.1: Seeing Structure in Expressions Interpret the structure of expressions 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: Arithmetic with Polynomials and Rational Expressions Use polynomial identities to solve problems Prove polynomial identities and use them to describe numerical relationships.

Unit 14: Graphs and Representations of Quadratic Functions

- **QUADRATIC FUNCTIONS**
 - HSF.IF.B.4: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

- HSA.CED.A.2: Creating Equations Create equations that describe numbers or relationships 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: Seeing Structure in Expressions Interpret the structure of expressions 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: Seeing Structure in Expressions Write expressions in equivalent forms to solve problems Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. 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: Interpreting Functions Analyze functions using different representations 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: Building Functions Build a function that models a relationship between two quantities 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: Seeing Structure in Expressions Interpret the structure of expressions Use the structure of an expression to identify ways to rewrite it.
 - HSF.IF.C.9: Interpreting Functions Analyze functions using different representations Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
 - HSF.LE.B.5: Linear, Quadratic, and Exponential Models Interpret expressions for functions in terms of the situation they model 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$ is the graph of the equation $y = f(x)$.
 - HSF.IF.B.5: Interpreting Functions Interpret functions that arise in applications in terms of the context Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.
 - HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.

- HSF.IF.B.4: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- HSF.IF.C.7: Interpreting Functions Analyze functions using different representations 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: Reasoning with Equations and Inequalities Solve systems of equations 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: Arithmetic with Polynomials and Rational Expressions Understand the relationship between zeros and factors of polynomials. 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.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.C.8: Interpreting Functions Analyze functions using different representations 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: Seeing Structure in Expressions Interpret the structure of expressions Use the structure of an expression to identify ways to rewrite it.
 - HSF.IF.C.8: Interpreting Functions Analyze functions using different representations 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: Interpreting Functions Analyze functions using different representations Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
- HSA.SSE.B.3: Seeing Structure in Expressions Write expressions in equivalent forms to solve problems Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$ is the graph of the equation $y = f(x)$.
- HSF.IF.B.4: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- HSA.APR.B.3: Arithmetic with Polynomials and Rational Expressions Understand the relationship between zeros and factors of polynomials. 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: Building Functions Build a function that models a relationship between two quantities 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: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable 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 $a + bi$ for real numbers a and b . (Algebra 2 only)
- HSA.CED.A.2: Creating Equations Create equations that describe numbers or relationships Create equations in two or more variables to represent relationships between quantities. Graph equations, in two variables, on a coordinate plane.

Unit 15: Solving Quadratic Equations

• SOLVING QUADRATIC EQUATIONS BY FACTORING

- HSA.REI.B.4: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable 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: Seeing Structure in Expressions Write expressions in equivalent forms to solve problems Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. 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: Interpreting Functions Analyze functions using different representations 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.REI.B.4: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable 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 $(x - p) = q$ 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.APR.B.3: Arithmetic with Polynomials and Rational Expressions Understand the relationship between zeros and factors of polynomials. 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: Arithmetic with Polynomials and Rational Expressions Use polynomial identities to solve problems Prove polynomial identities and use them to describe numerical relationships.
- HSA.REI.B.4: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable 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 $(x - p) = q$ 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.REI.B.4: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable 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 $(x - p) = q$ 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.C.7: Interpreting Functions Analyze functions using different representations 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: Building Functions Build a function that models a relationship between two quantities 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: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable 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 $a + bi$ for real numbers a and b . (Algebra 2 only)
 - HSA.SSE.B.3: Seeing Structure in Expressions Write expressions in equivalent forms to solve problems Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. 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: Interpreting Functions Analyze functions using different representations 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: Seeing Structure in Expressions Interpret the structure of expressions Use the structure of an expression to identify ways to rewrite it.
 - HSA.REI.B.4: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable 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.REI.B.4: Reasoning with Equations and Inequalities Solve quadratic equations and inequalities in one variable 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.C.7: Interpreting Functions Analyze functions using different representations 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: Seeing Structure in Expressions Interpret the structure of expressions 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: Reasoning with Equations and Inequalities Solve quadratic equations and inequalities in one variable 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.REI.B.4: Reasoning with Equations and Inequalities Solve quadratic equations and inequalities in one variable 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$ is the graph of the equation $y = f(x)$.

- HSF.IF.B.4: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- HSA.REI.B.4: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable 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 $(x - p) = q$ 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 $a + bi$ for real numbers a and b . (Algebra 2 only)
- HSA.CED.A.3: Creating Equations Create equations that describe numbers or relationships 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.4: Reasoning with Equations and Inequalities Solve equations and inequalities in one variable 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 $(x - p) = q$ 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 $a + bi$ for real numbers a and b . (Algebra 2 only)
- HSF.BF.A.1: Building Functions Build a function that models a relationship between two quantities Write a function that describes a relationship between two quantities. From a context, determine an explicit expression, a recursive process, or steps for calculation.

Unit 16: Parent Functions

• LINEAR AND EXPONENTIAL PARENT FUNCTIONS

- HSF.LE.A.2: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Reasoning with Equations and Inequalities Solve systems of equations 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: Linear, Quadratic, and Exponential Models Interpret expressions for functions in terms of the situation they model 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.

- HSF.IF.B.4: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.B.5: Interpreting Functions Interpret functions that arise in applications in terms of the context 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Interpreting Functions Interpret functions that arise in applications in terms of the context 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: Interpreting Functions Analyze functions using different representations 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: Linear, Quadratic, and Exponential Models Interpret expressions for functions in terms of the situation they model 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.

Unit 17: Transformations of Parent Functions

• TRANSFORMATIONS OF THE LINEAR AND EXPONENTIAL PARENT FUNCTIONS

- HSF.BF.B.3: Building Functions Build new functions from existing functions Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $f(x) - k$, $f(kx)$, and $f\left(\frac{x}{k}\right)$ for specific values of 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: Building Functions Build new functions from existing functions Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $f(x) - k$, $f(kx)$, and $f\left(\frac{x}{k}\right)$ for specific values of 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.B.5: Interpreting Functions Interpret functions that arise in applications in terms of the context Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.
- HSF.BF.B.3: Building Functions Build new functions from existing functions Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $f(x) - k$, $f(kx)$, and $f\left(\frac{x}{k}\right)$ for specific values of 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.

Unit 18: Comparing Functions

• LINEAR VERSUS NONLINEAR FUNCTIONS

- HSF.IF.B.6: Interpreting Functions Interpret functions that arise in applications in terms of the context 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Interpreting Functions Analyze functions using different representations Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
- HSF.IF.B.4: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- **MULTIPLE REPRESENTATIONS OF FUNCTIONS**
 - HSF.IF.C.9: Interpreting Functions Analyze functions using different representations Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
 - HSA.CED.A.2: Creating Equations Create equations that describe numbers or relationships 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: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
 - HSF.LE.A.2: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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: Creating Equations Create equations that describe numbers or relationships Create equations and inequalities in one variable and use them to solve problems.
 - HSF.LE.A.1: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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.

Unit 19: Nonlinear Functions

- **ABSOLUTE VALUE FUNCTIONS**

- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.B.5: Interpreting Functions Interpret functions that arise in applications in terms of the context Relate the domain of a function to its graph. Relate the domain of a function to the quantitative relationship it describes.
- HSF.IF.A.1: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$.
- HSF.IF.B.4: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- HSF.IF.C.7: Interpreting Functions Analyze functions using different representations 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: Building Functions Build new functions from existing functions Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $f(x) - k$, $f(kx)$, $f(x/k)$, and $f(x + k)$ for specific values of 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: Building Functions Build new functions from existing functions Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $f(x) - k$, $f(kx)$, $f(x/k)$, and $f(x + k)$ for specific values of 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: Interpreting Functions Interpret functions that arise in applications in terms of the context For a function that models a relationship between two quantities: interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

- HSF.IF.C.7: Interpreting Functions Analyze functions using different representations 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: Interpreting Functions Understand the concept of a function and use function notation 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 $y = f(x)$ is the graph of the equation $y = f(x)$.
- HSF.IF.B.5: Interpreting Functions Interpret functions that arise in applications in terms of the context 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: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically Solve systems of equations algebraically and graphically.
 - HSA.REI.C.7: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically Solve systems of equations consisting of linear equations and nonlinear equations in two variables algebraically and graphically.
 - HSA.REI.C.5: Reasoning with Equations and Inequalities Solve systems of equations and inequalities graphically 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: Reasoning with Equations and Inequalities Solve systems of equations 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: Creating Equations Create equations that describe numbers or relationships 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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).

Unit 20: Statistics

- **DATA ANALYSIS**

- HSS.ID.A.1: Interpreting Categorical and Quantitative Data Summarize, represent, and interpret data on a single count or measurement variable Represent data with plots on the real number line (dot plots, histograms, and box plots).
- HSS.ID.A.3: Interpreting Categorical and Quantitative Data Summarize, represent, and interpret data on a single count or measurement variable 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: Interpreting Categorical and Quantitative Data Summarize, represent, and interpret data on a single count or measurement variable 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: Interpreting Categorical and Quantitative Data Summarize, represent, and interpret data on two categorical and quantitative variables 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: Interpreting Categorical and Quantitative Data Summarize, represent, and interpret data on a single count or measurement variable Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

Unit 21: Scatterplots and Regression

- **SCATTERPLOTS**

- HSS.ID.B.6: Interpreting Categorical and Quantitative Data Summarize, represent, and interpret data on two categorical and quantitative variables Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.
- HSS.ID.C.9: Interpreting Categorical and Quantitative Data Interpret linear models Distinguish between correlation and causation.
- HSS.ID.C.7: Interpreting Categorical and Quantitative Data Interpret linear models 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: Interpreting Functions Interpret functions that arise in applications in terms of the context 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**

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- HSS.ID.B.6: Interpreting Categorical and Quantitative Data Summarize, represent, and interpret data on two categorical and quantitative variables Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. Fit a function to the data; use functions fitted to data to solve problems in the context of the data.
 - HSS.ID.C.8: Interpreting Categorical and Quantitative Data Interpret linear models Compute (using technology) and interpret the correlation coefficient of a linear fit.
 - HSS.ID.C.7: Interpreting Categorical and Quantitative Data Interpret linear models 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: Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems 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.