Tennessee Tutorials are designed specifically for the Tennessee Academic Standards to prepare students for the Tennessee Comprehensive Assessment Program (TCAP) and the TNReady assessments.

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: Accuracy, Equations, and Inequalities

- **MONITORING PRECISION AND ACCURACY**
  - A1.N.Q.A.1c: Use units as a way to understand real-world problems. Define and justify appropriate quantities within a context for the purpose of modeling.
  - A1.N.Q.A.1b: Use units as a way to understand real-world problems. Use appropriate quantities in formulas, converting units as necessary.
  - A1.N.Q.A.1a: Use units as a way to understand real-world problems. Choose and interpret the scale and the origin in graphs and data displays.
  - A1.N.Q.A.1d: Use units as a way to understand real-world problems. Choose an appropriate level of accuracy when reporting quantities.
- **ONE-STEP EQUATIONS AND INEQUALITIES**
  - A1.A.REI.B.2a: Solve linear and absolute value equations and inequalities in one variable. Solve linear equations and inequalities, including compound inequalities, in one variable. Represent solutions algebraically and graphically.

- A1.A.CED.A.3: Create individual and systems of equations and/or inequalities to represent constraints in a contextual situation, and interpret solutions as viable or non-viable.
- A1.A.CED.A.1: Create equations and inequalities in one variable and use them to solve problems in a real-world context.
- A1.A.REI.A.1: Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method.

- **SOLVING EQUATIONS USING ROOTS**
  - A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.

Unit 2: Applying Properties of Equations and Inequalities

- **MULTI-STEP EQUATIONS AND INEQUALITIES**
  - A1.A.CED.A.1: Create equations and inequalities in one variable and use them to solve problems in a real-world context.
  - A1.A.REI.B.2a: Solve linear and absolute value equations and inequalities in one variable. Solve linear equations and inequalities, including compound inequalities, in one variable. Represent solutions algebraically and graphically.
  - A1.A.REI.A.1: Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method.
- **AXIOMS OF EQUALITY**
  - A1.A.REI.A.1: Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method.
- **LITERAL EQUATIONS**
  - A1.A.REI.A.1: Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method.
  - A1.A.CED.A.4: Rearrange formulas to isolate a quantity of interest using algebraic reasoning.

Unit 3: Writing Expressions and Equations

- **FORMULATING AND SIMPLIFYING ALGEBRAIC EXPRESSIONS**
  - A1.A.SSE.A.1a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients.
- **FORMULATING AND SOLVING EQUATIONS FROM WORD PROBLEMS**
  - A1.A.CED.A.1: Create equations and inequalities in one variable and use them to solve problems in a real-world context.
  - A1.A.REI.B.2a: Solve linear and absolute value equations and inequalities in one variable. Solve linear equations and inequalities, including compound inequalities, in one variable. Represent solutions

algebraically and graphically.

- **FORMULATING AND SOLVING INEQUALITIES FROM WORD PROBLEMS**
  - A1.A.CED.A.3: Create individual and systems of equations and/or inequalities to represent constraints in a contextual situation, and interpret solutions as viable or non-viable.
  - A1.A.CED.A.1: Create equations and inequalities in one variable and use them to solve problems in a real-world context.
  - A1.A.REI.B.2a: Solve linear and absolute value equations and inequalities in one variable. Solve linear equations and inequalities, including compound inequalities, in one variable. Represent solutions algebraically and graphically.

Unit 4: Functions

- **FUNCTIONS AND RELATIONS**
  - A1.F.IF.A.2b: Use function notation. Interpret statements that use function notation in terms of a context.
  - A1.F.IF.A.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If is a function and is an element of its domain, then () denotes the output of corresponding to the input . The graph of is the graph of the equation = ().
  - A1.F.IF.B.5: Relate the domain of a function to its graph and, where applicable, to the context of the function it models.
  - A1.F.IF.A.2a: Use function notation. Use function notation to evaluate functions for inputs in their domains, including functions of two variables.
  - A1.F.IF.A.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If is a function and is an element of its domain, then () denotes the output of corresponding to the input . The graph of is the graph of the equation = ().
  - A1.F.IF.A.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If is a function and is an element of its domain, then () denotes the output of corresponding to the input . The graph of is the graph of the equation = ().
- **DOMAIN AND RANGE**
  - A1.F.IF.B.5: Relate the domain of a function to its graph and, where applicable, to the context of the function it models.
  - A1.F.IF.A.2b: Use function notation. Interpret statements that use function notation in terms of a context.
  - A1.F.IF.B.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

- A1.F.IF.A.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If is a function and is an element of its domain, then () denotes the output of corresponding to the input . The graph of is the graph of the equation = ().
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- A1.F.IF.A.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If is a function and is an element of its domain, then () denotes the output of corresponding to the input . The graph of is the graph of the equation = ().

- **EVALUATING FUNCTIONS**
  - A1.F.IF.A.2a: Use function notation. Use function notation to evaluate functions for inputs in their domains, including functions of two variables.
  - A1.F.IF.A.2b: Use function notation. Interpret statements that use function notation in terms of a context.

Unit 5: Graphs of Linear Equations and Inequalities 1

- **SLOPE**
  - A1.F.IF.B.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
  - A1.F.IF.B.6: Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.
  - A1.S.ID.C.5: Interpret the rate of change and the constant term of a linear model in the context of data.

- **GRAPHING AND ANALYZING LINEAR FUNCTIONS**
  - A1.F.LE.A.2: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.
  - A1.A.CED.A.2: Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.
  - A1.F.IF.B.5: Relate the domain of a function to its graph and, where applicable, to the context of the function it models.
  - A1.A.REI.D.5: Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
  - A1.F.IF.C.7: Graph functions expressed algebraically and show key features of the graph by hand and using technology.
  - A1.F.IF.A.2b: Use function notation. Interpret statements that use function notation in terms of a context.
  - A1.F.IF.B.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
  - A1.F.LE.B.3: Interpret the parameters in a linear or exponential function in terms of a context.
  - A1.F.IF.B.6: Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.

Unit 6: Graphs of Linear Equations and Inequalities 2

- **GRAPHING AND MANIPULATING Y = MX + B**
  - A1.A.CED.A.2: Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.
  - A1.F.IF.B.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
  - A1.F.IF.B.6: Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.
  - A1.F.LE.B.3: Interpret the parameters in a linear or exponential function in terms of a context.
  - A1.S.ID.C.5: Interpret the rate of change and the constant term of a linear model in the context of data.
- **GRAPHS OF LINEAR INEQUALITIES**
  - A1.A.CED.A.2: Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations with two

variables on coordinate axes with labels and scales, and use the graphs to make predictions.

- A1.A.CED.A.3: Create individual and systems of equations and/or inequalities to represent constraints in a contextual situation, and interpret solutions as viable or non-viable.
- A1.N.Q.A.1c: Use units as a way to understand real-world problems. Define and justify appropriate quantities within a context for the purpose of modeling.

Unit 7: Linear Equations

- **SLOPE-INTERCEPT FORM OF A LINEAR EQUATION**
  - A1.F.IF.B.6: Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.
- **POINT-SLOPE FORM OF A LINEAR EQUATION**
  - A1.F.IF.C.9b: Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions. Compare properties of the same function on two different intervals or represented in two different ways.

Unit 8: Two-Variable Linear Systems

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: GUESS AND CHECK**
  - A1.A.CED.A.3: Create individual and systems of equations and/or inequalities to represent constraints in a contextual situation, and interpret solutions as viable or non-viable.
  - A1.A.REI.C.4: Write and solve a system of linear equations in real-world context.
  - A1.A.REI.D.6: Explain why the -coordinates of the points where the graphs of the equations = () and = () intersect are the solutions of the equation () = (). Find approximate solutions by graphing the functions or making a table of values, using technology when appropriate.
  - A1.A.REI.D.6: Explain why the -coordinates of the points where the graphs of the equations = () and = () intersect are the solutions of the equation () = (). Find approximate solutions by graphing the functions or making a table of values, using technology when appropriate.
- **SOLVING SYSTEMS OF LINEAR EQUATIONS: GRAPHING**
  - A1.A.REI.D.6: Explain why the -coordinates of the points where the graphs of the equations = () and = () intersect are the solutions of the equation () = (). Find approximate solutions by graphing the functions or making a table of values, using technology when appropriate.
  - A1.A.REI.C.4: Write and solve a system of linear equations in real-world context.
  - A1.A.REI.D.6: Explain why the -coordinates of the points where the graphs of the equations = () and = () intersect are the solutions of the equation () = (). Find approximate solutions by graphing the functions or making a table of values, using technology when appropriate.
  - A1.A.REI.D.6: Explain why the -coordinates of the points where the graphs of the equations = () and = () intersect are the solutions of the equation () = (). Find approximate solutions by graphing the functions or making a table of values, using technology when appropriate.

Unit 9: Solving Two-Variable Linear Systems Algebraically

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: SUBSTITUTION**
  - A1.A.REI.C.4: Write and solve a system of linear equations in real-world context.
- **SOLVING SYSTEMS OF LINEAR EQUATIONS: ELIMINATION**
  - A1.A.CED.A.3: Create individual and systems of equations and/or inequalities to represent constraints in a contextual situation, and interpret solutions as viable or non-viable.
  - A1.A.REI.C.4: Write and solve a system of linear equations in real-world context.
- **SOLVING SYSTEMS OF LINEAR INEQUALITIES**
  - A1.A.CED.A.3: Create individual and systems of equations and/or inequalities to represent constraints in a contextual situation, and interpret solutions as viable or non-viable.
  - A1.A.REI.D.7: Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Unit 10: Exponential Functions, Equations, and Inequalities

- **EXPONENTIAL FUNCTIONS**
  - A1.F.IF.C.7: Graph functions expressed algebraically and show key features of the graph by hand and using technology.
  - A1.F.IF.A.2b: Use function notation. Interpret statements that use function notation in terms of a context.
  - A1.F.IF.B.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
  - A1.F.LE.B.3: Interpret the parameters in a linear or exponential function in terms of a context.
  - A1.A.SSE.A.1b: Interpret expressions that represent a quantity in terms of its context. Interpret complicated expressions by viewing one or more of their parts as a single entity.
  - A1.F.IF.A.2a: Use function notation. Use function notation to evaluate functions for inputs in their domains, including functions of two variables.
- **EXPONENTIAL GROWTH AND DECAY**
  - A1.F.IF.A.2b: Use function notation. Interpret statements that use function notation in terms of a context.
  - A1.F.LE.B.3: Interpret the parameters in a linear or exponential function in terms of a context.
  - A1.A.SSE.A.1b: Interpret expressions that represent a quantity in terms of its context. Interpret complicated expressions by viewing one or more of their parts as a single entity.
  - A1.F.LE.A.1c: Distinguish between situations that can be modeled with linear functions and with exponential functions. Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.

- A1.F.LE.A.1a: Distinguish between situations that can be modeled with linear functions and with exponential functions. Know that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.
- A1.F.IF.C.9a: Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions. Compare properties of two different functions. Functions may be of different types and/or represented in different ways.
- A1.F.IF.A.2a: Use function notation. Use function notation to evaluate functions for inputs in their domains, including functions of two variables.
- A1.N.Q.A.1b: Use units as a way to understand real-world problems. Use appropriate quantities in formulas, converting units as necessary.

- **SOLVING EXPONENTIAL INEQUALITIES**
  - A1.A.CED.A.3: Create individual and systems of equations and/or inequalities to represent constraints in a contextual situation, and interpret solutions as viable or non-viable.

Unit 11: Sequences

- **SEQUENCES**
  - A1.F.LE.A.2: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.
  - A1.F.BF.A.1a: Build a function that describes a relationship between two quantities. Determine steps for calculation, a recursive process, or an explicit expression from a context.
- **ARITHMETIC AND GEOMETRIC SEQUENCES**
  - A1.F.BF.A.1a: Build a function that describes a relationship between two quantities. Determine steps for calculation, a recursive process, or an explicit expression from a context.
  - A1.F.LE.A.2: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.

Unit 12: Polynomials

- **ADDITION AND SUBTRACTION OF POLYNOMIALS**
  - A1.A.APR.A.1: Add, subtract, and multiply polynomials. Use these operations to demonstrate that polynomials form a closed system that adhere to the same properties of operations as the integers.
  - A1.A.SSE.A.1b: Interpret expressions that represent a quantity in terms of its context. Interpret complicated expressions by viewing one or more of their parts as a single entity.
- **MULTIPLICATION OF POLYNOMIALS**
  - A1.A.APR.A.1: Add, subtract, and multiply polynomials. Use these operations to demonstrate that polynomials form a closed system that adhere to the same properties of operations as the integers.
  - A1.A.SSE.A.1b: Interpret expressions that represent a quantity in terms of its context. Interpret complicated expressions by viewing one or more of their parts as a single entity.

Unit 13: Factoring Quadratics

- **FACTORING QUADRATIC TRINOMIALS**
  - A1.A.SSE.A.1b: Interpret expressions that represent a quantity in terms of its context. Interpret complicated expressions by viewing one or more of their parts as a single entity.
  - A1.A.SSE.A.1a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients.
- **FACTORING SPECIAL CASES**
  - A1.A.SSE.A.1b: Interpret expressions that represent a quantity in terms of its context. Interpret complicated expressions by viewing one or more of their parts as a single entity.
  - A1.A.SSE.A.1a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients.
  - A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.
  - A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.
  - A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.

Unit 14: Graphs and Representations of Quadratic Functions

- **QUADRATIC FUNCTIONS**
  - A1.A.REI.D.5: Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
  - A1.F.IF.C.7: Graph functions expressed algebraically and show key features of the graph by hand and using technology.
  - A1.F.IF.A.2b: Use function notation. Interpret statements that use function notation in terms of a context.
  - A1.F.IF.B.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- **ANALYZING GRAPHS OF QUADRATIC FUNCTIONS**
  - A1.F.IF.B.5: Relate the domain of a function to its graph and, where applicable, to the context of the function it models.

- A1.F.IF.C.7: Graph functions expressed algebraically and show key features of the graph by hand and using technology.
- A1.F.IF.B.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- A1.F.BF.B.2: Identify the effect on the graph of replacing () by () + , (), (), and (+) for specific values of (both positive and negative); find the value of given graphs.
- A1.F.IF.C.9b: Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions. Compare properties of the same function on two different intervals or represented in two different ways.
- A1.F.BF.B.2: Identify the effect on the graph of replacing () by () + , (), (), and (+) for specific values of (both positive and negative); find the value of given graphs.
- A1.F.BF.B.2: Identify the effect on the graph of replacing () by () + , (), (), and (+) for specific values of (both positive and negative); find the value of given graphs.
- A1.F.BF.B.2: Identify the effect on the graph of replacing () by () + , (), (), and (+) for specific values of (both positive and negative); find the value of given graphs.
- A1.F.BF.B.2: Identify the effect on the graph of replacing () by () + , (), (), and (+) for specific values of (both positive and negative); find the value of given graphs.

- **REPRESENTATIONS OF QUADRATIC FUNCTIONS**
  - A1.A.CED.A.3: Create individual and systems of equations and/or inequalities to represent constraints in a contextual situation, and interpret solutions as viable or non-viable.
  - A1.F.IF.C.8a: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Rewrite quadratic functions to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a real-world context.
  - A1.F.IF.C.7: Graph functions expressed algebraically and show key features of the graph by hand and using technology.
  - A1.F.IF.A.2b: Use function notation. Interpret statements that use function notation in terms of a context.
  - A1.F.IF.B.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

Unit 15: Solving Quadratic Functions and Inequalities

- **SOLVING QUADRATIC EQUATIONS BY FACTORING**
  - A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.

- A1.A.CED.A.1: Create equations and inequalities in one variable and use them to solve problems in a real-world context.
- A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.

- **COMPLETING THE SQUARE**
  - A1.F.IF.C.8a: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Rewrite quadratic functions to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a real-world context.
  - A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.
  - A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.
- **QUADRATIC FORMULA**
  - A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.
  - A1.F.IF.C.8a: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Rewrite quadratic functions to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a real-world context.
  - A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.
  - A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.
  - A1.A.CED.A.2: Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.
  - A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and

factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.

- A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.
- A1.A.REI.B.3a: Solve quadratic equations and inequalities in one variable. Solve quadratic equations by inspection (e.g., for = 49), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers.

- **SOLVING QUADRATIC INEQUALITIES**
  - A1.A.CED.A.2: Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.
  - A1.A.CED.A.1: Create equations and inequalities in one variable and use them to solve problems in a real-world context.
  - A1.A.REI.B.3b: Solve quadratic equations and inequalities in one variable. Solve quadratic inequalities using the graph of the related quadratic equation.

Unit 16: Parent Functions

- **LINEAR AND EXPONENTIAL PARENT FUNCTIONS**
  - A1.F.LE.A.1a: Distinguish between situations that can be modeled with linear functions and with exponential functions. Know that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.
  - A1.F.IF.B.5: Relate the domain of a function to its graph and, where applicable, to the context of the function it models.
  - A1.F.IF.C.7: Graph functions expressed algebraically and show key features of the graph by hand and using technology.
  - A1.F.IF.B.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
  - A1.F.LE.A.2: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs.
- **QUADRATIC PARENT FUNCTION**
  - A1.F.IF.B.5: Relate the domain of a function to its graph and, where applicable, to the context of the function it models.
  - A1.F.IF.C.7: Graph functions expressed algebraically and show key features of the graph by hand and using technology.

Unit 17: Transformations of Parent Functions

- **TRANSFORMATIONS OF THE LINEAR AND EXPONENTIAL PARENT FUNCTIONS**
  - A1.F.IF.C.7: Graph functions expressed algebraically and show key features of the graph by hand and using technology.
- **TRANSFORMATIONS OF THE QUADRATIC PARENT FUNCTION**
  - A1.F.IF.C.7: Graph functions expressed algebraically and show key features of the graph by hand and using technology.
  - A1.F.BF.B.2: Identify the effect on the graph of replacing () by () + , (), (), and (+) for specific values of (both positive and negative); find the value of given graphs.
  - A1.F.BF.B.2: Identify the effect on the graph of replacing () by () + , (), (), and (+) for specific values of (both positive and negative); find the value of given graphs.
  - A1.F.BF.B.2: Identify the effect on the graph of replacing () by () + , (), (), and (+) for specific values of (both positive and negative); find the value of given graphs.

Unit 18: Nonlinear Functions and Systems

- **LINEAR VERSUS NONLINEAR FUNCTIONS**
  - A1.F.LE.A.1c: Distinguish between situations that can be modeled with linear functions and with exponential functions. Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.
  - A1.F.IF.C.9a: Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions. Compare properties of two different functions. Functions may be of different types and/or represented in different ways.
  - A1.F.LE.A.1a: Distinguish between situations that can be modeled with linear functions and with exponential functions. Know that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.
  - A1.F.LE.A.1b: Distinguish between situations that can be modeled with linear functions and with exponential functions. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
  - A1.F.IF.C.9b: Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions. Compare properties of the same function on two different intervals or represented in two different ways.
  - A1.F.IF.B.6: Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.
  - A1.S.ID.C.5: Interpret the rate of change and the constant term of a linear model in the context of data.
  - A1.F.IF.C.7: Graph functions expressed algebraically and show key features of the graph by hand and using technology.
- **ABSOLUTE VALUE FUNCTIONS**

- A1.F.IF.B.5: Relate the domain of a function to its graph and, where applicable, to the context of the function it models.
- A1.F.IF.C.7: Graph functions expressed algebraically and show key features of the graph by hand and using technology.
- A1.F.IF.A.2b: Use function notation. Interpret statements that use function notation in terms of a context.
- A1.F.IF.B.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- A1.F.IF.C.9a: Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions. Compare properties of two different functions. Functions may be of different types and/or represented in different ways.
- A1.F.BF.B.2: Identify the effect on the graph of replacing () by () + , (), (), and (+) for specific values of (both positive and negative); find the value of given graphs.
- A1.F.IF.C.9b: Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions. Compare properties of the same function on two different intervals or represented in two different ways.
- A1.A.CED.A.1: Create equations and inequalities in one variable and use them to solve problems in a real-world context.
- A1.A.REI.A.1: Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method.
- A1.A.REI.B.2b: Solve linear and absolute value equations and inequalities in one variable. Solve absolute value equations and inequalities in one variable. Represent solutions algebraically and graphically.
- A1.F.IF.B.6: Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.
- A1.F.BF.B.2: Identify the effect on the graph of replacing () by () + , (), (), and (+) for specific values of (both positive and negative); find the value of given graphs.

- **MULTIPLE REPRESENTATIONS OF FUNCTIONS**
  - A1.F.IF.C.7: Graph functions expressed algebraically and show key features of the graph by hand and using technology.
  - A1.F.IF.A.2b: Use function notation. Interpret statements that use function notation in terms of a context.
  - A1.F.IF.C.9a: Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions. Compare properties of two different functions. Functions may be of different types and/or represented in different ways.

- A1.F.LE.A.1a: Distinguish between situations that can be modeled with linear functions and with exponential functions. Know that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.
- A1.F.IF.C.9b: Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions. Compare properties of the same function on two different intervals or represented in two different ways.
- A1.F.IF.C.8a: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Rewrite quadratic functions to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a real-world context.

- **SYSTEMS OF NONLINEAR EQUATIONS**
  - A1.A.REI.D.6: Explain why the -coordinates of the points where the graphs of the equations = () and = () intersect are the solutions of the equation () = (). Find approximate solutions by graphing the functions or making a table of values, using technology when appropriate.

Unit 19: Statistics and Scatterplots

- **DATA ANALYSIS**
  - A1.N.Q.A.1a: Use units as a way to understand real-world problems. Choose and interpret the scale and the origin in graphs and data displays.
  - A1.S.ID.A.1: Use measures of center to solve real-world and mathematical problems.
  - A1.S.ID.A.3: Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points.
  - A1.S.ID.A.2: Use statistics appropriate to the shape of the data distribution to compare center (mean, median, and/or mode) and spread (range, interquartile range) of two or more different data sets.
- **SCATTERPLOTS**
  - A1.A.CED.A.2: Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.
  - A1.F.IF.B.6: Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph.
  - A1.S.ID.C.6: Use technology to compute the correlation coefficient of a linear model; interpret the correlation coefficient in the context of the data.
  - A1.S.ID.C.5: Interpret the rate of change and the constant term of a linear model in the context of data.
  - A1.S.ID.B.4: Represent data from 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.
  - A1.S.ID.C.7: Explain the differences between correlation and causation. Recognize situations where an additional factor may be affecting correlated data.

- **SCATTERPLOTS AND MODELING**
  - A1.F.LE.A.1c: Distinguish between situations that can be modeled with linear functions and with exponential functions. Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another.
  - A1.S.ID.B.4: Represent data from 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.
  - A1.S.ID.C.6: Use technology to compute the correlation coefficient of a linear model; interpret the correlation coefficient in the context of the data.