Kentucky Tutorials are designed specifically for the Kentucky Academic Standards to prepare students for the K-PREP, EOC exams, ACT, and ACT Plan.

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

- **LAWS OF EXPONENTS**
  - KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.
  - KY.HS.A.10: Rewrite simple rational expressions in different forms.
  - KY.HS.A.16: Understand each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
  - KY.HS.N.2: Rewrite expressions involving radicals and rational exponents using the properties of exponents.
  - KY.HS.N.1: Extend the properties of integer exponents to rational exponents, allowing for the expression of radicals in terms of rational exponents.
- **MONITORING PRECISION AND ACCURACY**
  - KY.HS.N.5: Define appropriate units in context for the purpose of descriptive modeling.
  - KY.HS.N.6: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.N.4.a: Use units in context as a way to understand problems and to guide the solution of multi-step problems; Choose and interpret units consistently in formulas;
- KY.HS.N.4.b: Use units in context as a way to understand problems and to guide the solution of multi-step problems; Choose and interpret the scale and the origin in graphs and data displays.
- KY.HS.G.8.a: Create and apply geometric constructions. Make formal geometric constructions with a variety of tools and methods.

Unit 2: Equations and Inequalities

- **ONE-STEP EQUATIONS AND INEQUALITIES**
  - KY.HS.A.12: Create equations and inequalities in one variable and use them to solve problems.
  - KY.HS.A.14: Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.
  - KY.HS.A.18: Solve linear equations and inequalities in one variable, including literal equations with coefficients represented by letters.
  - KY.HS.A.16: Understand each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
  - KY.HS.F.6.a: Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context.
- **MULTI-STEP EQUATIONS AND INEQUALITIES**
  - KY.HS.A.14: Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.
  - KY.HS.A.18: Solve linear equations and inequalities in one variable, including literal equations with coefficients represented by letters.
  - KY.HS.A.16: Understand each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
  - KY.HS.A.12: Create equations and inequalities in one variable and use them to solve problems.

Unit 3: Applications of Equations

- **AXIOMS OF EQUALITY**
  - KY.HS.A.16: Understand each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
  - KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.

Copyright© Edmentum Inc. All Rights Reserved.

- **LITERAL EQUATIONS**
  - KY.HS.A.18: Solve linear equations and inequalities in one variable, including literal equations with coefficients represented by letters.
  - KY.HS.A.15: Rearrange formulas to solve a literal equation, highlighting a quantity of interest, using the same reasoning as in solving equations.
  - KY.HS.A.12: Create equations and inequalities in one variable and use them to solve problems.
  - KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.

Unit 4: Writing Expressions and Equations

- **FORMULATING AND SIMPLIFYING ALGEBRAIC EXPRESSIONS**
  - KY.HS.F.6.a: Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context.
  - KY.HS.A.1.a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors and coefficients.
  - KY.HS.A.1.b: Interpret expressions that represent a quantity in terms of its context. Interpret complicated expressions, given a context, by viewing one or more of their parts as a single entity.
  - KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.
  - KY.HS.A.3.a: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Write the standard form of a given polynomial and identify the terms, coefficients, degree, leading coefficient and constant term.
- **FORMULATING AND SOLVING EQUATIONS FROM WORD PROBLEMS**
  - KY.HS.F.6.a: Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context.
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
  - KY.HS.F.11.b: 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.
  - KY.HS.A.12: Create equations and inequalities in one variable and use them to solve problems.
  - KY.HS.A.18: Solve linear equations and inequalities in one variable, including literal equations with coefficients represented by letters.
  - KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. For a function that models a relationship between two quantities, interpret key

Copyright© Edmentum Inc. All Rights Reserved.

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

- KY.HS.A.1.a: 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 INEQUALITIES FROM WORD PROBLEMS**
  - KY.HS.A.18: Solve linear equations and inequalities in one variable, including literal equations with coefficients represented by letters.
  - KY.HS.A.14: Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.
  - KY.HS.A.12: Create equations and inequalities in one variable and use them to solve problems.

Unit 5: Functions

- **FUNCTIONS AND RELATIONS**
  - KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. 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.
  - KY.HS.F.1.b: Understand properties and key features of functions and the different ways functions can be represented. Using appropriate function notation, evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context.
  - KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
  - KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
  - KY.HS.F.4.f: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph piecewise functions, including step functions.

- **DOMAIN AND RANGE**
  - KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. Understand that a function from one set (called the domain) to another set (called the

Copyright© Edmentum Inc. All Rights Reserved.

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 .

- KY.HS.F.1.d: Understand properties and key features of functions and the different ways functions can be represented. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
- KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
- KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
- KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
- KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
- KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .

- **EVALUATING FUNCTIONS**
  - KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
  - KY.HS.F.1.b: Understand properties and key features of functions and the different ways functions can be represented. Using appropriate function notation, evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context.
  - KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. Understand that a function from one set (called the domain) to another set (called the

Copyright© Edmentum Inc. All Rights Reserved.

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 .

- KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
- KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
- KY.HS.F.6.a: Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context.

Unit 6: Introduction to Linear Functions

- **SLOPE**
  - KY.HS.F.3.a: Understand average rate of change of a function over an interval. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval.
  - KY.HS.F.3.b: Understand average rate of change of a function over an interval. Estimate the rate of change from a graph.
  - KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
  - KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. 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.
  - KY.HS.G.22: Justify and apply the slope criteria for parallel and perpendicular lines and use them to solve geometric problems.
- **GRAPHING AND ANALYZING LINEAR FUNCTIONS**
  - KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. 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.
- KY.HS.F.4.a: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph linear and quadratic functions and show intercepts, maxima and minima.
- KY.HS.F.1.b: Understand properties and key features of functions and the different ways functions can be represented. Using appropriate function notation, evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context.
- KY.HS.F.14: Interpret the parameters in a linear or exponential function in terms of a context.
- KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
- KY.HS.F.1.d: Understand properties and key features of functions and the different ways functions can be represented. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- KY.HS.A.23: Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.
- KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
- KY.HS.F.4.d: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph exponential and logarithmic functions, showing intercepts and end behavior.
- KY.HS.F.13: Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

Unit 7: Graphs of Linear Equations and Inequalities

- **GRAPHING AND MANIPULATING Y = MX + B**
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
  - KY.HS.A.13: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
  - KY.HS.F.3.a: Understand average rate of change of a function over an interval. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified

Copyright© Edmentum Inc. All Rights Reserved.

interval.

- KY.HS.F.4.a: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph linear and quadratic functions and show intercepts, maxima and minima.
- KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. 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.
- KY.HS.SP.7: Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
- KY.HS.F.14: Interpret the parameters in a linear or exponential function in terms of a context.
- KY.HS.F.11.b: 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.

- **GRAPHS OF LINEAR INEQUALITIES**
  - KY.HS.A.25.a: Graph linear inequalities in two variables. Graph the solutions to a linear inequality as a half-plane (excluding the boundary in the case of a strict inequality).
  - KY.HS.A.18: Solve linear equations and inequalities in one variable, including literal equations with coefficients represented by letters.

Unit 8: Linear Equations

- **SLOPE-INTERCEPT FORM OF A LINEAR EQUATION**
  - KY.HS.SP.7: Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
  - KY.HS.A.13: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
  - KY.HS.F.4.a: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph linear and quadratic functions and show intercepts, maxima and minima.
  - KY.HS.G.22: Justify and apply the slope criteria for parallel and perpendicular lines and use them to solve geometric problems.
  - KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. 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.

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.F.3.a: Understand average rate of change of a function over an interval. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval.

- **POINT-SLOPE FORM OF A LINEAR EQUATION**
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
  - KY.HS.A.13: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
  - KY.HS.F.4.a: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph linear and quadratic functions and show intercepts, maxima and minima.
  - KY.HS.G.22: Justify and apply the slope criteria for parallel and perpendicular lines and use them to solve geometric problems.
  - KY.HS.G.1.b: Know and apply precise definitions of the language of Geometry: Understand properties of and differences between perpendicular and parallel lines.

Unit 9: Two-Variable Linear Systems

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: GUESS AND CHECK**
  - KY.HS.A.13: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
  - KY.HS.A.14: Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.
  - KY.HS.F.6.a: Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context.
  - KY.HS.A.20.b: Solve systems of linear equations in two variables. Solve systems of linear equations with graphs, substitution and elimination, focusing on pairs of linear equations in two variables.
- **SOLVING SYSTEMS OF LINEAR EQUATIONS: GRAPHING**
  - KY.HS.A.20.b: Solve systems of linear equations in two variables. Solve systems of linear equations with graphs, substitution and elimination, focusing on pairs of linear equations in two variables.
  - KY.HS.A.14: Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.
  - KY.HS.A.24: Justify that the solutions of the equations () = () are the -coordinates of the points where the graphs of = () and = () intersect. Find the approximate solutions graphically, using technology or tables.

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.A.24: Justify that the solutions of the equations () = () are the -coordinates of the points where the graphs of = () and = () intersect. Find the approximate solutions graphically, using technology or tables.
- KY.HS.A.24: Justify that the solutions of the equations () = () are the -coordinates of the points where the graphs of = () and = () intersect. Find the approximate solutions graphically, using technology or tables.
- KY.HS.A.24: Justify that the solutions of the equations () = () are the -coordinates of the points where the graphs of = () and = () intersect. Find the approximate solutions graphically, using technology or tables.
- KY.HS.A.13: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

Unit 10: Solving Two-Variable Linear Systems Algebraically

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: SUBSTITUTION**
  - KY.HS.A.13: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
  - KY.HS.A.14: Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.
  - KY.HS.A.20.b: Solve systems of linear equations in two variables. Solve systems of linear equations with graphs, substitution and elimination, focusing on pairs of linear equations in two variables.
  - KY.HS.A.20.a: Solve systems of linear equations in two variables. Understand a system of two equations in two variables has the same solution as a new system formed by replacing one of the original equations with an equivalent equation.
- **SOLVING SYSTEMS OF LINEAR EQUATIONS: ELIMINATION**
  - KY.HS.A.20.b: Solve systems of linear equations in two variables. Solve systems of linear equations with graphs, substitution and elimination, focusing on pairs of linear equations in two variables.
  - KY.HS.A.13: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
  - KY.HS.A.14: Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.
  - KY.HS.A.20.a: Solve systems of linear equations in two variables. Understand a system of two equations in two variables has the same solution as a new system formed by replacing one of the original equations with an equivalent equation.

Unit 11: Linear Systems

- **SOLVING SYSTEMS OF LINEAR INEQUALITIES**

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.A.14: Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.
- KY.HS.A.25.a: Graph linear inequalities in two variables. Graph the solutions to a linear inequality as a half-plane (excluding the boundary in the case of a strict inequality).
- KY.HS.A.25.b: Graph linear inequalities in two variables. Graph the solution set to a system of linear inequalities as the intersection of the corresponding half-planes.

- **SOLVING THREE-VARIABLE SYSTEMS OF LINEAR EQUATIONS**
  - KY.HS.A.20.a: Solve systems of linear equations in two variables. Understand a system of two equations in two variables has the same solution as a new system formed by replacing one of the original equations with an equivalent equation.
  - KY.HS.A.13: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
  - KY.HS.A.14: Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.
  - KY.HS.A.24: Justify that the solutions of the equations () = () are the -coordinates of the points where the graphs of = () and = () intersect. Find the approximate solutions graphically, using technology or tables.

Unit 12: Exponential Functions, Equations, and Inequalities

- **EXPONENTIAL FUNCTIONS**
  - KY.HS.A.1.a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors and coefficients.
  - KY.HS.F.11.a: Distinguish between situations that can be modeled with linear functions and with exponential functions. Recognize and justify that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.
  - KY.HS.F.5.b: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Use the properties of exponents to interpret expressions for exponential functions and classify the exponential function as representing growth or decay.
  - KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. 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.
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
  - KY.HS.F.3.a: Understand average rate of change of a function over an interval. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified

Copyright© Edmentum Inc. All Rights Reserved.

interval.

- KY.HS.F.13: Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
- KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
- KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
- KY.HS.F.1.d: Understand properties and key features of functions and the different ways functions can be represented. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- KY.HS.F.14: Interpret the parameters in a linear or exponential function in terms of a context.
- KY.HS.F.6.a: Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context.
- KY.HS.A.13: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- KY.HS.F.11.c: 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 percent rate per unit interval relative to another.
- KY.HS.A.12: Create equations and inequalities in one variable and use them to solve problems.

- **EXPONENTIAL GROWTH AND DECAY**
  - KY.HS.F.14: Interpret the parameters in a linear or exponential function in terms of a context.
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
  - KY.HS.A.1.a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors and coefficients.
  - KY.HS.F.11.a: Distinguish between situations that can be modeled with linear functions and with exponential functions. Recognize and justify that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.
  - KY.HS.F.11.c: 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 percent rate per unit interval relative to another.

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.A.1.b: Interpret expressions that represent a quantity in terms of its context. Interpret complicated expressions, given a context, by viewing one or more of their parts as a single entity.
- KY.HS.F.5.b: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Use the properties of exponents to interpret expressions for exponential functions and classify the exponential function as representing growth or decay.
- KY.HS.F.13: Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
- KY.HS.A.3.c: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Use the properties of exponents to rewrite exponential expressions.
- KY.HS.F.11.b: 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.
- KY.HS.F.4.d: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph exponential and logarithmic functions, showing intercepts and end behavior.

Unit 13: Sequences

- **SEQUENCES**
  - KY.HS.F.6.a: Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context.
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
  - KY.HS.F.7.a: Use arithmetic and geometric sequences to model situations and scenarios. Use formulas (explicit and recursive) to generate terms for arithmetic and geometric sequences.
  - KY.HS.F.7.b: Use arithmetic and geometric sequences to model situations and scenarios. Write formulas to model arithmetic and geometric sequences and apply those formulas in realistic situations.
  - KY.HS.F.2: Recognize that arithmetic and geometric sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
  - KY.HS.F.7.c: Use arithmetic and geometric sequences to model situations and scenarios. Translate between recursive and explicit formulas.
  - KY.HS.F.1.b: Understand properties and key features of functions and the different ways functions can be represented. Using appropriate function notation, evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context.
- **ARITHMETIC AND GEOMETRIC SEQUENCES**

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
- KY.HS.F.7.a: Use arithmetic and geometric sequences to model situations and scenarios. Use formulas (explicit and recursive) to generate terms for arithmetic and geometric sequences.
- KY.HS.F.7.b: Use arithmetic and geometric sequences to model situations and scenarios. Write formulas to model arithmetic and geometric sequences and apply those formulas in realistic situations.
- KY.HS.F.6.a: Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context.
- KY.HS.F.2: Recognize that arithmetic and geometric sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
- KY.HS.F.7.c: Use arithmetic and geometric sequences to model situations and scenarios. Translate between recursive and explicit formulas.

Unit 14: Polynomials

- **POLYNOMIAL BASICS**
  - KY.HS.A.3.a: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Write the standard form of a given polynomial and identify the terms, coefficients, degree, leading coefficient and constant term.
  - KY.HS.A.1.a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors and coefficients.
- **ADDITION AND SUBTRACTION OF POLYNOMIALS**
  - KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.
  - KY.HS.A.5: Add, subtract and multiply polynomials.
- **MULTIPLICATION OF POLYNOMIALS**
  - KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.
  - KY.HS.A.5: Add, subtract and multiply polynomials.
  - KY.HS.A.3.a: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Write the standard form of a given polynomial and identify the terms, coefficients, degree, leading coefficient and constant term.

Unit 15: Factoring

- **FACTORING QUADRATIC TRINOMIALS**
  - KY.HS.A.3.b: 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

Copyright© Edmentum Inc. All Rights Reserved.

function it defines.

- KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.
- KY.HS.A.3.a: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Write the standard form of a given polynomial and identify the terms, coefficients, degree, leading coefficient and constant term.
- KY.HS.A.1.a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors and coefficients.
- KY.HS.A.1.b: Interpret expressions that represent a quantity in terms of its context. Interpret complicated expressions, given a context, by viewing one or more of their parts as a single entity.
- KY.HS.A.7: Identify roots of polynomials when suitable factorizations are available. Know these roots become the zeros (-intercepts) for the corresponding polynomial function.

- **FACTORING SPECIAL CASES**
  - KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.
  - KY.HS.A.1.a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors and coefficients.
  - KY.HS.A.1.b: Interpret expressions that represent a quantity in terms of its context. Interpret complicated expressions, given a context, by viewing one or more of their parts as a single entity.
  - KY.HS.A.8: Prove polynomial identities and use them to describe numerical relationships.
- **FACTORING HIGHER-ORDER POLYNOMIALS**
  - KY.HS.A.3.a: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Write the standard form of a given polynomial and identify the terms, coefficients, degree, leading coefficient and constant term.
  - KY.HS.A.1.a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors and coefficients.
  - KY.HS.A.1.b: Interpret expressions that represent a quantity in terms of its context. Interpret complicated expressions, given a context, by viewing one or more of their parts as a single entity.
  - KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.
  - KY.HS.A.8: Prove polynomial identities and use them to describe numerical relationships.

Unit 16: Graphs of Quadratic Functions

- **QUADRATIC FUNCTIONS**
  - KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. For a function that models a relationship between two quantities, interpret key

Copyright© Edmentum Inc. All Rights Reserved.

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

- KY.HS.A.13: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- KY.HS.A.3.a: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Write the standard form of a given polynomial and identify the terms, coefficients, degree, leading coefficient and constant term.
- KY.HS.A.1.a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors and coefficients.
- KY.HS.A.23: Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.
- KY.HS.F.5.a: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Identify zeros, extreme values and symmetry of the graph within the context of a quadratic function.
- KY.HS.F.6.a: Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context.

- **ANALYZING GRAPHS OF QUADRATIC FUNCTIONS**
  - KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.
  - KY.HS.F.1.b: Understand properties and key features of functions and the different ways functions can be represented. Using appropriate function notation, evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context.
  - KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
  - KY.HS.F.1.d: Understand properties and key features of functions and the different ways functions can be represented. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
  - KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. 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.
  - KY.HS.F.4.a: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph linear and quadratic functions and show intercepts, maxima and minima.
  - KY.HS.F.5.a: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Identify zeros, extreme values and symmetry of the graph

Copyright© Edmentum Inc. All Rights Reserved.

within the context of a quadratic function.

- KY.HS.A.23: Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.
- KY.HS.A.7: Identify roots of polynomials when suitable factorizations are available. Know these roots become the zeros (-intercepts) for the corresponding polynomial function.
- KY.HS.F.1.e: Understand properties and key features of functions and the different ways functions can be represented. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

- **REPRESENTATIONS OF QUADRATIC FUNCTIONS**
  - KY.HS.A.19.b: Solve quadratic equations in one variable. Use the method of completing the square to transform any quadratic equation in into an equation of the form ( ) = that has the same solutions. Derive the quadratic formula from this form.
  - KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.
  - KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. 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.
  - KY.HS.A.23: Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.
  - KY.HS.A.13: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
  - KY.HS.F.1.b: Understand properties and key features of functions and the different ways functions can be represented. Using appropriate function notation, evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context.
  - KY.HS.F.6.a: Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context.
  - KY.HS.A.19.a: Solve quadratic equations in one variable. Solve quadratic equations by taking square roots, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as for real numbers and .
  - KY.HS.A.3.b: 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.

Unit 17: Solving Quadratic Equations

- **SOLVING QUADRATIC EQUATIONS BY FACTORING**

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.A.19.a: Solve quadratic equations in one variable. Solve quadratic equations by taking square roots, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as for real numbers and .
- KY.HS.F.5.a: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Identify zeros, extreme values and symmetry of the graph within the context of a quadratic function.
- KY.HS.A.3.b: 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.
- KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.
- KY.HS.A.19.a: Solve quadratic equations in one variable. Solve quadratic equations by taking square roots, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as for real numbers and .
- KY.HS.A.7: Identify roots of polynomials when suitable factorizations are available. Know these roots become the zeros (-intercepts) for the corresponding polynomial function.
- KY.HS.A.8: Prove polynomial identities and use them to describe numerical relationships.
- KY.HS.A.19.a: Solve quadratic equations in one variable. Solve quadratic equations by taking square roots, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as for real numbers and .
- KY.HS.A.7: Identify roots of polynomials when suitable factorizations are available. Know these roots become the zeros (-intercepts) for the corresponding polynomial function.
- KY.HS.A.19.a: Solve quadratic equations in one variable. Solve quadratic equations by taking square roots, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as for real numbers and .
- KY.HS.A.7: Identify roots of polynomials when suitable factorizations are available. Know these roots become the zeros (-intercepts) for the corresponding polynomial function.
- KY.HS.F.4.a: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph linear and quadratic functions and show intercepts, maxima and minima.
- KY.HS.F.6.a: Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context.

- **COMPLETING THE SQUARE**

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.A.19.b: Solve quadratic equations in one variable. Use the method of completing the square to transform any quadratic equation in into an equation of the form ( ) = that has the same solutions. Derive the quadratic formula from this form.
- KY.HS.A.19.a: Solve quadratic equations in one variable. Solve quadratic equations by taking square roots, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as for real numbers and .
- KY.HS.A.3.d: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
- KY.HS.A.19.c: Solve quadratic equations in one variable. Solve quadratic equations by completing the square.
- KY.HS.A.19.b: Solve quadratic equations in one variable. Use the method of completing the square to transform any quadratic equation in into an equation of the form ( ) = that has the same solutions. Derive the quadratic formula from this form.
- KY.HS.A.2: Use the structure of an expression to identify ways to rewrite it and consistently look for opportunities to rewrite expressions in equivalent forms.
- KY.HS.A.19.b: Solve quadratic equations in one variable. Use the method of completing the square to transform any quadratic equation in into an equation of the form ( ) = that has the same solutions. Derive the quadratic formula from this form.
- KY.HS.F.4.a: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph linear and quadratic functions and show intercepts, maxima and minima.
- KY.HS.F.5.a: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Identify zeros, extreme values and symmetry of the graph within the context of a quadratic function.

- **QUADRATIC FORMULA**
  - KY.HS.F.6.a: Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from a context.
  - KY.HS.F.1.b: Understand properties and key features of functions and the different ways functions can be represented. Using appropriate function notation, evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context.
  - KY.HS.A.1.a: Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors and coefficients.
  - KY.HS.A.19.a: Solve quadratic equations in one variable. Solve quadratic equations by taking square roots, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as for real numbers and .

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. 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.
- KY.HS.A.19.a: Solve quadratic equations in one variable. Solve quadratic equations by taking square roots, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as for real numbers and .
- KY.HS.F.5.a: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Identify zeros, extreme values and symmetry of the graph within the context of a quadratic function.
- KY.HS.A.14: Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.
- KY.HS.A.19.a: Solve quadratic equations in one variable. Solve quadratic equations by taking square roots, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as for real numbers and .

Unit 18: Parent Functions

- **LINEAR AND EXPONENTIAL PARENT FUNCTIONS**
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
  - KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
  - KY.HS.F.1.d: Understand properties and key features of functions and the different ways functions can be represented. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
  - KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. 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.
  - KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.F.11.c: 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 percent rate per unit interval relative to another.

- **QUADRATIC PARENT FUNCTION**
  - KY.HS.F.4.a: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph linear and quadratic functions and show intercepts, maxima and minima.
  - KY.HS.F.5.a: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Identify zeros, extreme values and symmetry of the graph within the context of a quadratic function.
  - KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
  - KY.HS.F.1.d: Understand properties and key features of functions and the different ways functions can be represented. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

Unit 19: Nonlinear Functions

- **LINEAR VERSUS NONLINEAR FUNCTIONS**
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
  - KY.HS.F.11.a: Distinguish between situations that can be modeled with linear functions and with exponential functions. Recognize and justify that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.
  - KY.HS.F.3.a: Understand average rate of change of a function over an interval. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval.
  - KY.HS.F.13: Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
  - KY.HS.F.3.b: Understand average rate of change of a function over an interval. Estimate the rate of change from a graph.
  - KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. 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.
  - KY.HS.F.11.b: 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

Copyright© Edmentum Inc. All Rights Reserved.

interval relative to another.

- **ABSOLUTE VALUE FUNCTIONS**
  - KY.HS.F.1.a: Understand properties and key features of functions and the different ways functions can be represented. 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 .
  - KY.HS.F.1.d: Understand properties and key features of functions and the different ways functions can be represented. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
  - KY.HS.F.4.f: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph piecewise functions, including step functions.
  - KY.HS.F.4.b: Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). Graph square root, cube root and absolute value functions.
- **SYSTEMS OF NONLINEAR EQUATIONS**
  - KY.HS.A.24: Justify that the solutions of the equations () = () are the -coordinates of the points where the graphs of = () and = () intersect. Find the approximate solutions graphically, using technology or tables.
  - KY.HS.A.21: Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.
  - KY.HS.A.20.a: Solve systems of linear equations in two variables. Understand a system of two equations in two variables has the same solution as a new system formed by replacing one of the original equations with an equivalent equation.
  - KY.HS.A.14: Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.
  - KY.HS.A.24: Justify that the solutions of the equations () = () are the -coordinates of the points where the graphs of = () and = () intersect. Find the approximate solutions graphically, using technology or tables.
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
  - KY.HS.A.24: Justify that the solutions of the equations () = () are the -coordinates of the points where the graphs of = () and = () intersect. Find the approximate solutions graphically, using technology or tables.

Unit 20: Working with Functions

- **ARITHMETIC OPERATIONS ON FUNCTIONS**

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.F.6.b: Write a function that describes a relationship between two quantities. Combine standard function types using arithmetic operations.

- **MULTIPLE REPRESENTATIONS OF FUNCTIONS**
  - KY.HS.F.1.c: Understand properties and key features of functions and the different ways functions can be represented. 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.
  - KY.HS.F.12: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
  - KY.HS.F.1.b: Understand properties and key features of functions and the different ways functions can be represented. Using appropriate function notation, evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context.
  - KY.HS.F.1.e: Understand properties and key features of functions and the different ways functions can be represented. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
  - KY.HS.F.11.a: Distinguish between situations that can be modeled with linear functions and with exponential functions. Recognize and justify that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.

Unit 21: Two-Variable Data

- **SCATTERPLOTS**
  - KY.HS.SP.6.a: Represent data on two quantitative variables on a scatter plot and describe how the explanatory and response variables are related. Calculate an appropriate mathematical model, or use a given mathematical model, for data to solve problems in context.
  - KY.HS.SP.6.b: Represent data on two quantitative variables on a scatter plot and describe how the explanatory and response variables are related. Informally assess the fit of a model (through calculating correlation for linear data, plotting, calculating and/or analyzing residuals).
  - KY.HS.SP.8.c: Understand the role and purpose of correlation in linear regression. Describe the limitations of correlation when establishing causation.
  - KY.HS.F.3.a: Understand average rate of change of a function over an interval. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval.
  - KY.HS.SP.7: Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

- **SCATTERPLOTS AND MODELING**
  - KY.HS.SP.6.a: Represent data on two quantitative variables on a scatter plot and describe how the explanatory and response variables are related. Calculate an appropriate mathematical model, or use a given mathematical model, for data to solve problems in context.

Copyright© Edmentum Inc. All Rights Reserved.

- KY.HS.SP.6.b: Represent data on two quantitative variables on a scatter plot and describe how the explanatory and response variables are related. Informally assess the fit of a model (through calculating correlation for linear data, plotting, calculating and/or analyzing residuals).
- KY.HS.SP.8.a: Understand the role and purpose of correlation in linear regression. Use technology to compute correlation coefficient of a linear fit.
- KY.HS.SP.8.b: Understand the role and purpose of correlation in linear regression. Interpret the meaning of the correlation within the context of the data.
- KY.HS.F.11.a: Distinguish between situations that can be modeled with linear functions and with exponential functions. Recognize and justify that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.
- KY.HS.F.11.c: 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 percent rate per unit interval relative to another.

Copyright© Edmentum Inc. All Rights Reserved.