C2.0 Algebra 1 Unit 2 – Linear and Exponential Relationships

Topic	Overview
Topic 1: Characteristics of Functions	Unit two focuses on linear and exponential relationships in two variables, beginning with developing a solid understanding of functions. In this topic, students learn function notation and develop the concepts of domain and range. Students learn to determine and interpret a function's rate of change. ***Concepts:*** • Identify the independent and dependent variables in a functional relationship. • Define a function, use function notation, and write functions using verbal, tabular, graphical, and symbolic models. • Classify variables as continuous or discrete. • Represent continuous domains or ranges using inequalities. • Understand that each element within a domain has exactly one corresponding element in the range. • Determine whether a situation is a function and justify the answer. • Describe the characteristics of functions such as domain, range, increasing, decreasing, intercepts, discrete and continuous. • Distinguish between the domain of a function and the domain of a situation. • Use function notation to interpret the meaning of the situation. • Interpret key features of a graph when given a brief description of real world events. • Sketch a graph based on a real world situation. • Create a real world situation for a given graph. • Determine the key features of a graph and table. • Compare and contrast the key features of a function when presented in different forms. • Understand that a table of values may look like a discrete function but actually only shows some of the solution points for a continuous function. • Compare discrete and continuous situations.

Topic	Overview
Topic 2: Constructing and Comparing Linear and Exponential Functions	Students continue their learning through the exploration of many examples of functions, including sequences. Students interpret arithmetic sequences as linear functions and geometric sequences as exponential functions. They also describe key features of both linear and exponential functions. Students interpret functions given graphically, numerically, symbolically, and verbally, translate between representations, and understand the limitations of various representations. ***Concepts:*** • Analyze patterns to determine the next figure in a sequence. • Identify and articulate the relationships between different methods to solve a problem. • Construct an arithmetic sequence. • Construct recursive and explicit equations from an arithmetic sequence. • Construct a geometric sequence. • Construct recursive and explicit equations from a geometric sequence. • Identify and articulate the relationship between arithmetic and geometric sequences with increasing and decreasing common differences and common ratios. • Represent arithmetic and geometric sequences in a variety of ways including recursive and explicit functions. • Analyze patterns to determine the next term in a sequence. • Construct recursive and explicit equations from a table. • Analyze patterns to determine the "arithmetic means" in an arithmetic sequence. • Analyze patterns to determine the "geometric means" in a geometric sequence. • Identify and state differences between discrete and continuous functions. • Identify and classify linear and exponential functions based on their pattern of growth. • Identify and classify linear and exponential functions based on different representations of functions. • Compare and contrast similarities and differences between linear and exponential functions. • Categorize linear and exponential functions by their graphs, tables and equations. • Create linear and exponential functions based on real-life situations. • Compare the forms of linear and exponential equations to determine which is most effective for the given situation. • Determine an exponential equation from different representations of the real world function. • Apply the exponential growth and decay formulas to real life situations. • Solve equations using a table, graph or equation.

Topic	Overview
Topic 3: Systems of Equations and Inequalities in Two Variables	Students develop methods to write and solve systems of equations and linear inequalities. They will be able to represent constraints as inequalities. Students continue to achieve fluency writing, interpreting, and translating between various forms of linear equations and inequalities in two variables, and use them to solve problems. ***Concepts:*** • Develop a problem-solving strategy and model to solve a mathematical situation, given the characteristics of the problem. • Determine whether ordered pairs are viable or non-viable solutions to an equation and/or inequality. • Graph solutions sets to inequalities in two variables based on determined solutions and non-solutions. • Recognize, analyze, and graph a linear function written in standard form and slope-intercept form. • Change real world linear functions from standard form to slope intercept form and vice versa. • Graph linear equations using intercepts. • Write a system of linear inequalities to demonstrate a specific constraint. • Graph the system of linear inequalities to determine solutions to a problem. • Analyze graphically, numerically from a table, and algebraically, the solution to a system of equations. • Use substitution to solve a system of equations. • Develop an informal method for solving a system of equations in which the coefficient of one of the variables is the same in both equations. • Create a system of equations, with two unknown variables. • Obtain equivalent systems of equations by substitution. • Formally solve a system of equations by substitution to determine the values of both variables. • Write and solve a system of linear inequalities by graphing the boundary lines and shading the appropriate half-plane represented by the constraints. • Identify parallel lines when written in standard form. • Graph and solve system of inequalities using real life applications. • Formulate conclusions to a real life application based on graphs of linear inequalities.