UBD Algebra 1 - Functions

Time Frame: 18 Lessons	Unit 4: Functions	Course Name: Algebra 1

Stage 1: Desired Results

Established Goal(s)

Competencies Addressed:
Functions

Standards:
HSF-IF.A.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and *x* is an element of its domain, then *f*(*x*) denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y* = *f*(*x*).
HSF-IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
HSF-IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
HSF-IF.C Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for

Transferable Skills

Students will be able to independently use their learning to...

- **develop their capacity to represent, interpret, and use functions to make sense of quantities in situations and to solve problems.**
- develop clear and effective communication.
- increase self-direction.
- develop creative and practical problem-solving.
- become responsible and involved citizens.
- develop informed and integrative thinking.

Meaning

Understandings

Students will understand that....

- functions are a mathematical way to describe relationships between two quantities that vary.
- functions can be represented in a variety of ways.
- many real world functional relationships can be represented by equations.
- equations can be used to find the solution of given real-world problems.

Essential Questions

- How can you represent and describe functions?
- How can functions describe real-world situations, model predictions and solve problems?

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	Acquisition	
more complicated cases. **HSF-IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. **HSF-IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. **HSF-IF.C.7** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **HSF-IF.C.7.b** Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. **HSA-REI.D.11** Explain why the x-coordinates of the points where the graphs of the equations *y = f(x)* and *y = g(x)* intersect are the solutions of the equation *f(x) = g(x)*; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where *f(x)* and/or *g(x)* are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. **HSS-ID.B.6.a** Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a	*Students will know...* ● what function notation is and why it exists. ● real world data can be modeled with a function. ● Functions can be written in various forms, including graphs, tables and equations. ● graphs can be translated to describe a variety of situations. ● data that varies directly, can be written in the form y = kx. Numerical data are responses to questions that are numbers that can be ordered in a natural way. ● there are different ways to find the value of a function and to solve equations written in function notation. ● that domain is the set of all possible input values in a function. ● that range is the set of all possible output values in a function. ● what makes a function a piecewise function ● the meaning of "inverse function" and how it could be found. ● how to identify independent and dependent variables in a function, and use words and graphs to represent the function. ● function notation can be used to express functions that have specific inputs and outputs. ● function notation can be used to efficiently represent a relationship between two quantities in a situation. ● that technology can be used to graph a function given in function notation, and use the graph to find the values of the function. ● words and equations can both be used to describe the inverse function. ● how to determine reasonable domain and range for the function.	*Students will be able to...* ● explain when a relationship between two quantities is a function. ● make sense of descriptions and graphs of functions and explain what they tell us about situations. ● describe the connections between a statement in function notation and the graph of the function. ● use statements in function notation to sketch a graph of a function. ● write equations that represent the rules of functions. ● identify important features of graphs of functions and explain what they mean in the situations represented. uise the terms "horizontal intercept," "vertical intercept," "maximum," and "minimum" when talking about functions and their graphs. ● estimate or calculate the average rate of change between two points. ● compare the features of graphs of functions and explain what they mean in the situations represented. ● make sense of a graph of a piecewise function in terms of a situation, and sketch a graph of the function when the rules are given. ● make sense of the rules of a piecewise function when they are written in function notation and explain what they mean in the situation represented. Mathematical Practices: ● make sense of problems and persevere in solving them. ● reason abstractly and quantitatively. ● construct viable arguments and critique the reasoning of others. ● model with mathematics.

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function suggested by the context. Emphasize linear, quadratic, and exponential models. **HSS-ID.B.6.c** Fit a linear function for a scatter plot that suggests a linear association.	• how to explain the meaning of absolute value function in terms of distance. • how to calculate absolute errors and create a scatter plot of the data.	• use appropriate tools strategically. • attend to precision. • look for and make use of structure. • look for and express regularity in repeated reasoning.