Unit 3c -Working with Functions

Content Area: **Math**
Course(s): **Algebra 1 ACC Honors**
Time Period: **Marking Period 4**
Length: **enVision Chapter 10, 16 Days**
Status: **Published**

Essential Questions

- What are some operations of functions that you can use to create models and solve problems?

Big Ideas

- Translate square root and cube root functions
- Graph and analyze translations of absolute value, exponential, quadratic, and radical functions
- Perform operations on functions and determine how the operations affect the domain and range of the new functions
- Find inverse functions and determine the key features of those functions

Technology Integration

8.2.8.ETW.2 Analyze the impact of modifying resources in a product or system (e.g., materials, energy, information, time, tools, people, capital).

Activity: Compare linear, exponential and quadratic equations by manipulating the values, a, b, c, h, k and x in order to analyze a topic such as interest earned, population, growth or decay, cost to complete a project.

Enduring Understandings

Interpreting Functions

F.IF.B4 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. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

- Graphing Relationships

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- Graphing Relationships

F.IF.B5[M] Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

- Graphing Functions

F.IF.B6 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.

- Rate of Change and Slope

- The Slope Formula

F.IF.C7b Graph linear and quadratic functions and show intercepts, maxima, and minima. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

Building Functions

F.BF.A1 Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model. c. (+) Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.

F.BF.B3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

- Transforming Quadratic Functions

F.BF.B4 Find inverse functions. a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2 x3 or f(x) = (x+1)/(x–1) for x ≠1. b. (+) Verify by composition that one function is the inverse of another. c. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse. d. (+) Produce an invertible function from a non-invertible function by restricting the domain.

Mathematical Practices Focus

1. Make sense of problems and persevere in solving them. Pages 432

2. Reason abstractly and quantitatively. Pages 425, 438, 451

3. Construct viable arguments and critique the reasoning of others. Pages 445, 451

4. Model with mathematics. Pages 418, 444

5. Use appropriate tools strategically. Pages 411

6. Attend to precision. Pages 411, 425, 438, 445

7. Look for and make use of structure. Pages 411, 418, 425, 432, 438, 445, 451

8. Look for and express regularity in repeated reasoning. Page 418, 432