

AMT Curriculum Framework

Module #: Module Title ____**Functions**____ (Remember to balance modules, Modules do not have to only include one domain)

Time Frame: 3 weeks

Brief discussion (1-2 sentences) of module. What will students be doing/learning?

Students will define functions, represent functions in a table/ graph. They will be able to distinguish functions and no-functions and use the vertical line test. Students will also evaluate function for different domain values when represented in function notation. Comparison of linear and quadratic functions are also done.

Objectives

- Objectives (standards) for module would go here. What will students be able to do? Put content standards into objective language. Do not have too many objectives! Students will be able
 - Define relations, functions, domain and range.
 - Understand and apply the vertical line test.
 - Use function notation and graph linear and quadratic functions
 - Interpret graphs of linear functions
 - Use functions to model relationships between quantities
 - Analyze functions using different representations
 - Build a function that models a relationship between two quantities.
 - Compare functions
 - Use functions to model relationships between quantities
 - Construct functions and analyze it.

Math Standards (taken from curriculum- which ones to address in this module determined by developer). Standards have already been rewritten as objectives (below).

- Math Objectives (from curriculum objectives for this module identified by developer)
 - Functions (F)

4.F.1 , 4.F.2 , 4.F.3 I, 4.F.4 , 4.F.5 , 5.F.IF.1 , 5.F.IF.2, 5.F.BF.1 , 5.F.BF.2

, 5.F.LE.1 Outcomes (summative evaluations that assess skills/content knowledge)

- Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
- Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change

- Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.
- Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values
- Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
- Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- Graph linear and quadratic functions and show intercepts, maxima, and minima.
- Write a function that describes a relationship between two quantities.
- Determine an explicit expression, a recursive process, or steps for calculation from a context.

Exploratory Activity- (Done after Assessments are determined) Could be a video, discussion board, review activity, response to contextual math questions

Explanation- (Done after Assessments are determined) How will students' conceptual understanding of the topic be addressed? Video, Synchronous class meeting, recording of teacher?

Practice- (Done after assessments are determined) How will students practice the procedure or become more fluent? How will students practice applying this math in context of application?

Students graphs linear and quadratic functions using desmos

[Students construct and solve real world mathematical problems](#)

Assessments

- Students take a test which requires them to

- analyze given relations and find out domain , range and determine whether it is function or not.
- graph linear and quadratic functions.
- analyze graphs and apply vertical line test
- evaluate function for different domain values.
- write functions from real-world mathematical problems

Additional Concepts to be Addressed within the Lesson

- **Mathematical Practices-** Within a module all 8 will likely be modeled by the instructor and practiced by the student but within Skills or Lessons MPs should be identified. This can be done at the end of each objective or in the sections of the lesson.
- **Technology Skills** (identified by developer)

Learning Resources

To be determined later