Algebra 1

ELG HS.F.1: Understand the concept of a function and use function notation

Vertical Progression:

7th Grade	**7.RP.A Analyze proportional relationships and use them to solve real-world and mathematical problems.** o **7.RP.A.2** Recognize and represent proportional relationships between quantities. o **7.RP.A.2.a** Decide whether two quantities are in a proportional relationship. o **7.RP.A.2.b** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. o **7.RP.A.2.c** Represent proportional relationships by equations. o **7.RP.A.2.d** Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.
8th Grade	**8.F.A Define, evaluate, and compare functions.** o **8.F.A.1** 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.
Algebra 1	**ELG.MA.HS.F.1 Understand the concept of a function and use function notation.** o **F-IF.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). o **F-IF.2** Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. o **F-IF.3** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1. Note: Functions may include linear, quadratic, exponential, polynomial (quadratic or cubic), square root, cube root, and piecewise-defined functions (including step and absolute value).
Algebra 2	**ELG.MA.HS.F.1 Understand the concept of a function and use function notation.** o **F-IF.3** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1. Note: Functions may include linear, quadratic, exponential, polynomial, square root, cube root, piecewise defined (including step and absolute value), **rational, trigonometric, and logarithmic.**

Students will demonstrate command of the ELG by:

- Explaining why an equation/relation is or is not a function.
- Using function notation to evaluate functions for inputs in their domain.
- Interpreting statements in function notation in the context of a problem.
- Writing sequences as functions.

> Note: Functions may include linear, quadratic, exponential, polynomial (quadratic or cubic), square root, cube root, and piecewise-defined functions (including step and absolute value).

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Vocabulary:

- Domain
- Function
- Function notation
- Input
- Output
- Range
- Sequence

Sample Instructional/Assessment Tasks:

1) **Standard(s): F-IF.2**

Source: Illustrated Mathematics
https://www.illustrativemathematics.org/content-standards/HSF/IF/A/2/tasks/625

Item Prompt: Yam in the Oven

You put a yam in the oven. After 45 minutes, you take it out. Let f(t) be the temperature of the yam t minutes after you placed it in the oven.

Explain the meaning of each statement in everyday language.
- **a.** f(0)=65
- **b.** f(5)<f(10)
- **c.** f(40)=f(45)
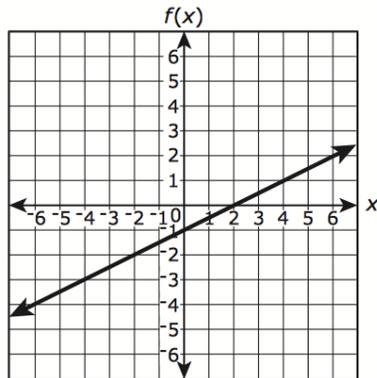- **d.** f(45)>f(60)

Correct Answer:
- **a.** f(0)=65 means that when you placed the yam in the oven, its temperature was 65 degrees Fahrenheit.
- **b.** f(5)<f(10) means that the temperature of the yam 5 minutes after you placed it in the oven was less than its temperature 10 minutes after you placed it in the oven.
- **c.** f(40)=f(45) means that the temperature of the yam 40 minutes after you placed it in the oven was the same as its temperature 45 minutes after you placed it in the oven.
- **d.** f(45)>f(60) means that the temperature of the yam 45 minutes after you placed it in the oven was greater than its temperature 60 minutes after you placed it in the oven.

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2) **Standard(s): F-IF.2**

Source: PARCC Algebra 1 PBA Practice Test

Item Prompt:

The graph of the function $f(x) = -1 + 0.5x$ is shown on the coordinate plane.
For what value of x does $f(x) = 0$?

Correct Answer(s)

$x=2$