Eureka Math™ Tips for Parents

Grade 8
Module 5

What Came Before this Module:

Students extended what they already knew about unit rates and proportional relationships to linear equations and their graphs. They explored the connections between proportional relationships, lines, and linear equations. They transcribed and solved equations in one variable and then in two variables.

What Comes After this Module:

Students will be introduced to bivariate data. Students continue to work with functions and use their understanding of functions to model the possible relationships of bivariate data. Module 6 is important in setting a foundation for students' work in algebra in Grade 9 with respect to functions and statistics.

Examples of Functions from Geometry

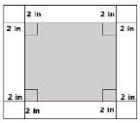
Students learn the concept of a function and why functions are necessary for describing geometric concepts and occurrences in everyday life. Students also learn about the important role functions play in making predictions. Students will inspect the rate of change of linear functions and conclude that the rate of change is the slope of the graph of a line. They will learn to interpret the equation $y = mx + b$ as defining a linear function whose graph is a line. Students will also gain some experience with non-linear functions, specifically by compiling and graphing a set of ordered pairs, and then by identifying the graph as something other than a straight line.

Key Words

Function
A *function* is a rule that assigns to each input exactly one output.
Input
The number or piece of data that is put into a function is the *input*.
Output
The number or piece of data that is the result of an input of a function is the *output*.

Write a function that would allow you to calculate the area, A, of a 2-inch white border for any sized square figure with sides of length s measured in inches.

Solution:



Let s represent the side length of the inner square. Then the area of th inner square is s^2. The side length of the larger square is $s + 4$ and th area is $(s + 4)^2$. If A is the area of the 2-inch border, then the functio that describes A is

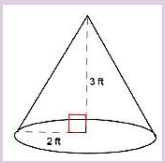
$$A = (s + 4)^2 - s^2$$

Function

A *function* is a rule that assigns to each input exactly one output. Functions can be represented in various ways. Some ways functions are seen in this module are **graph**, **table**, **rule**, and **verbal description**.

How can you help at home?

- ✓ Every day, ask your child what they learned in school and ask them to show you an example.
- ✓ Ask your child to explain how to identify a linear relationship.
- ✓ Ask your child to calculate the volume of the cone below. What formula did they use? How did they use the formula to determine the volume?



Key Common Core Standards:

Define, evaluate, and compare functions.

- 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).
- 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.

Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

- Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Understanding Functions

1.

Can the table shown below represent a function? Explain.

Input (x)	1	3	5	5	9
Output (y)	7	16	19	20	28

Solution:

No, the table cannot represent a function because the input of 5 has two different outputs. Functions assign only one output to each input.

2.

Can the table shown below represent a function? Explain.

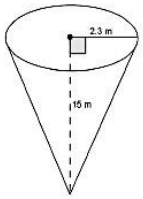
Input (x)	10	20	50	75	90
Output (y)	32	32	156	240	288

Solution:

Yes, the table can represent a function. Even though there are two outputs that are the same, each input has only one output.

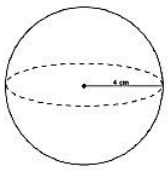
Three-Dimensional Solids Seen Frequently in this Module

CONE

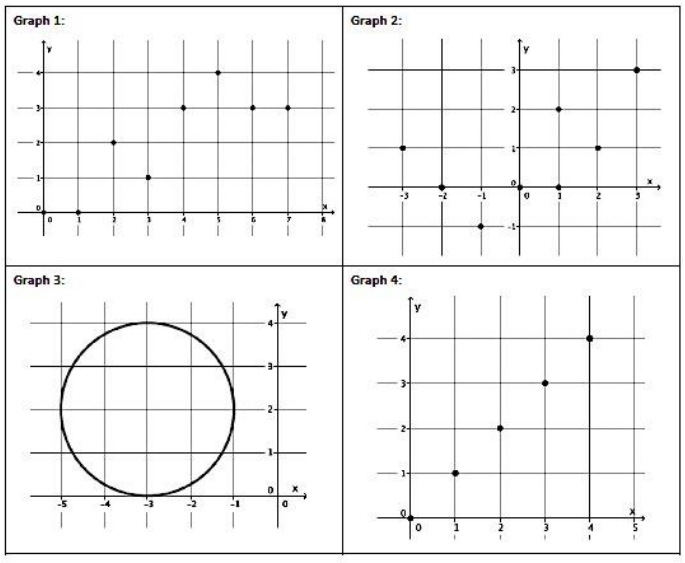


CYLINDER

SPHERE



Which of the four graphs (on the right) are functions? Explain.



Solution:

Graphs 1 and 4 are functions. Graphs 2 and 3 are not. Graphs 1 and 4 show that for each input of x, there is a unique output of y. For Graph 2, the input of x=1 has two different outputs, y=0 and y=2, which means it cannot be a function. For Graph 3, it appears that each value of x has two outputs, one on the lower half of the circle and one on the upper half, which means it does not fit the definition of function.