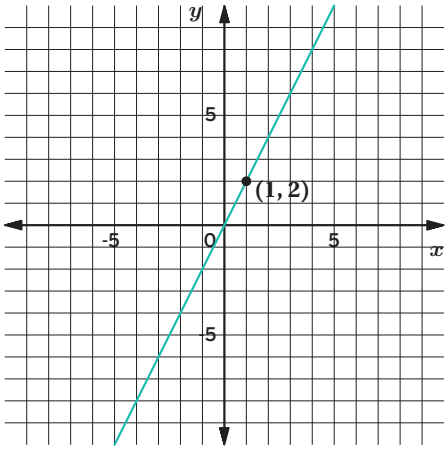
Connecting Representations of Functions

Let's connect tables, equations, graphs, and stories of functions.

Warm-up Three Representations

Refer to the graph, equation, and table shown here.

Graph:



Equation:

$z = 2r$

Table:

p	-2	-1	0	1	2	3
q	-4	-2	0	2	4	6

1. How are they similar?

2. How are they different?

Log in to Amplify Math to complete this lesson online.

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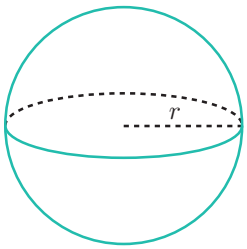
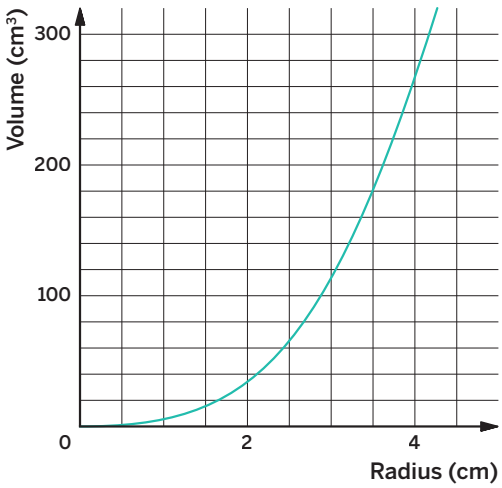
Activity 1 Junior Olympics

Tyler, Elena, and Clare are participating in various sports during the Junior Olympics. You will be given a graph, an equation, and a table representing the number of steps they take over a period of time. With your group, work together to award Tyler, Elena, and Clare a medal for each scenario described. For each scenario, award the gold medal to the person who took the greatest number of steps, and award the bronze medal to the person who took the least number of steps. Be prepared to explain your thinking. An example is shown in the first row.

	Gold medal 	Silver medal 	Bronze medal 
Example: Steps taken in the first 10 minutes.	**Elena:** $s = 130 \cdot 10$ $s = 1300$ 1,300 steps	**Clare:** 1,200 steps	**Tyler:** About 1,000 steps
1. Steps taken in the first 20 minutes.			
2. Steps taken in the first 30 minutes.			
3. Total steps taken.			

Activity 2 Comparing Volumes

Consider the following information about the volume of a cube and the volume of a sphere.

	Volume
Cube 	The volume V of a cube with an edge length of s cm is given by the equation $V = s^3$.
Sphere 	The graph represents the volume of a sphere as a function of its radius (in centimeters). 

1. Is the volume of a cube with an edge length of 3 cm greater than or less than the volume of a sphere with a radius of 3 cm? Explain your thinking.

2. Consider a sphere that has the same volume as a cube with an edge length of 5 cm. Determine the radius of the sphere.

3. Calculate the outputs of the two volume functions when the input is 2.

Compare and Connect:
How does the volume of a cube relate to the volume of a sphere if the cube's side length is equal to the radius of the sphere?

STOP

Name: Date: Period:

Summary

In today's lesson . . .

You compared functions represented in a table, graph, and equation. Even though you were looking for the same information, you performed different actions depending on the representation of the function. Each representation gives you the ability to calculate input-output pairs, but each representation has its benefits and drawbacks.

- Graphs require estimation, but can visually provide information, such as the highest point.
- Tables immediately provide output values, but only for limited input values.
- Equations precisely compute outputs for all inputs, but do not provide visual information.

Reflect:

Practice

Name: Date: Period:

1. The equation and the table represent two different functions.

Equation

$b = 4a - 5$

Table

a	-3	0	2	5	10	12
c	-20	7	3	21	19	45

a When $a = -3$, is the value of b or c greater? Explain your thinking.

b When $c = 21$, what is the value of a? What is the value of b for this value of a?

c For what values of a, do you know that the value of c is greater than b? Explain your thinking.

Name: _____ Date: _____ Period: _____

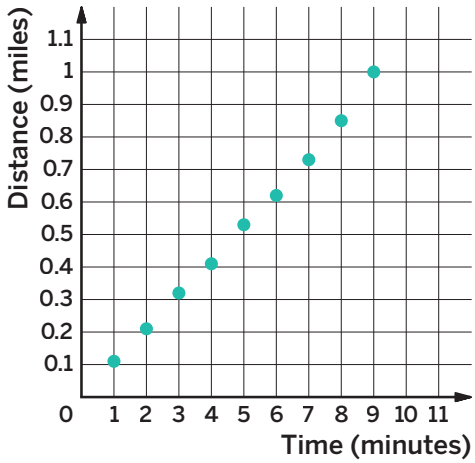
Practice

2. Elena and Lin train for a race. Elena runs her mile at a constant speed of 7.5 mph. Lin's total distance, shown in the table, is recorded every minute.

Time (minutes)	1	2	3	4	5	6	7	8	9
Distance (miles)	0.11	0.21	0.32	0.41	0.53	0.62	0.73	0.85	1

a Who finished their mile first? Explain your thinking.

b The graph represents Lin's progress. On the same graph, draw a line that represents Elena's distance, in miles, and time, in minutes.



3. The solution to a system of equations is $(6, 3)$. Select two equations that could make up the system.

A. $y = -3x + 6$

B. $y = 2x - 9$

C. $y = -5x + 27$

D. $y = 2x - 15$

E. $y = -4x + 27$

4. Determine whether each table could represent a linear relationship. Show or explain your thinking.

a

x	y
1	5
3	6
6	7

b

x	y
1	5
3	6
7	8