Lesson 1: The Concept of a Function

Classwork

Example 1

Suppose a moving object travels 256 feet in 4 seconds. Assume that the object travels at a constant speed, that is, the motion of the object is linear with a constant rate of change. Write a linear equation in two variables to represent the situation, and use it to make predictions about the distance traveled over various intervals of time.

Number of seconds (x)	Distance traveled in feet (y)
1	
2	
3	
4	

Example 2

The object, a stone, is dropped from a height of 256 feet. It takes exactly 4 seconds for the stone to hit the ground. How far does the stone drop in the first 3 seconds? What about the last 3 seconds? Can we assume constant speed in this situation? That is, can this situation be expressed using a linear equation?

Number of seconds (x)	Distance traveled in feet (y)
1	
2	
3	
4	

Lesson 4: More Examples of Functions

Exercises

3. A function produces the following table of values.

Input	Output
Banana	Yellow
Cherry	Red
Orange	Orange
Tangerine	Orange
Strawberry	Red

a. Can this function be described by a rule using numbers? Explain.

b. Describe the assignment of the function.

c. State an input and the assignment the function would give to its output.

Problem Set

2. A function has the table of values below. Examine the information in the table to answer the questions below.

Input	Output
one	3
two	3
three	5
four	4
five	4
six	3
seven	5

a. Describe the function.

b. What number would the function assign to the word “eleven”?

Lesson 5: Graphs of Functions and Equations

Exercises

1. The distance that Giselle can run is a function of the amount of time she spends running. Giselle runs 3 miles in 21 minutes. Assume she runs at a constant rate.

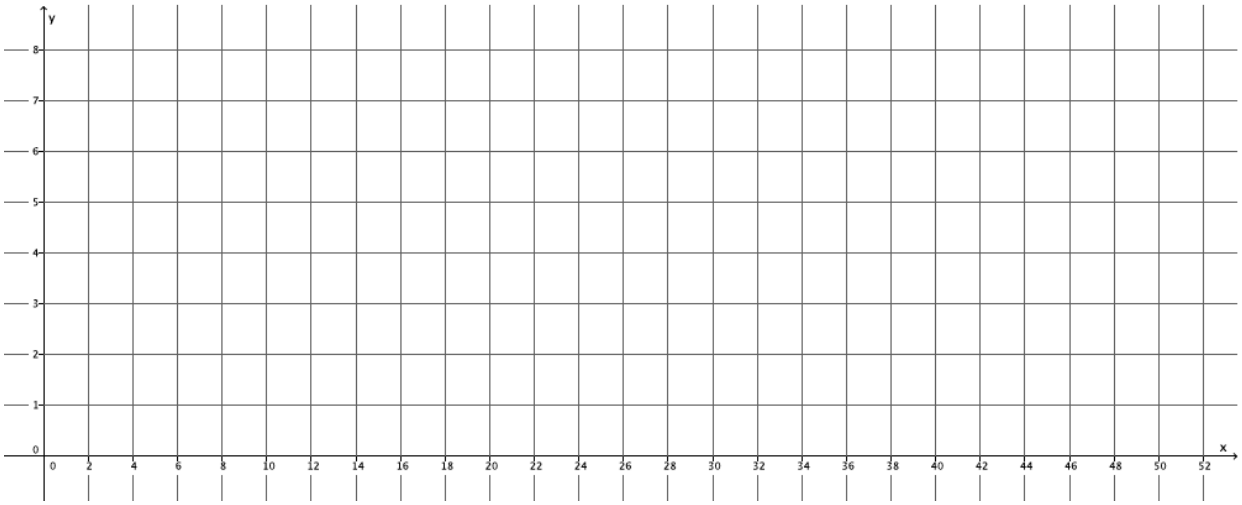
   a. Write an equation in two variables that represents her distance ran, y, as a function of the time, x, she spends running.

   b. Use the equation you wrote in part (a) to determine how many miles Giselle can run in 14 minutes.

   c. Use the equation you wrote in part (a) to determine how many miles Giselle can run in 28 minutes.

   d. Use the equation you wrote in part (a) to determine how many miles Giselle can run in 7 minutes.

   e. The input of the function, x, is time and the output of the function, y, is the distance Giselle ran. Write the input and outputs from parts (b)–(d) as ordered pairs and plot them as points on a coordinate plane.



f. What shape does the graph of the points appear to take?

g. Is the rate continuous or discrete?

h. Use the equation you wrote in part (a) to determine how many miles Giselle can run in 36 minutes. Write your answer as an ordered pair as you did in part (e) and include the point on the graph. Is the point in a place where you expected it to be? Explain.

i. Assume you used the rule that describes the function to determine how many miles Giselle can run for any given time and wrote each answer as an ordered pair. Where do you think these points would appear on the graph?

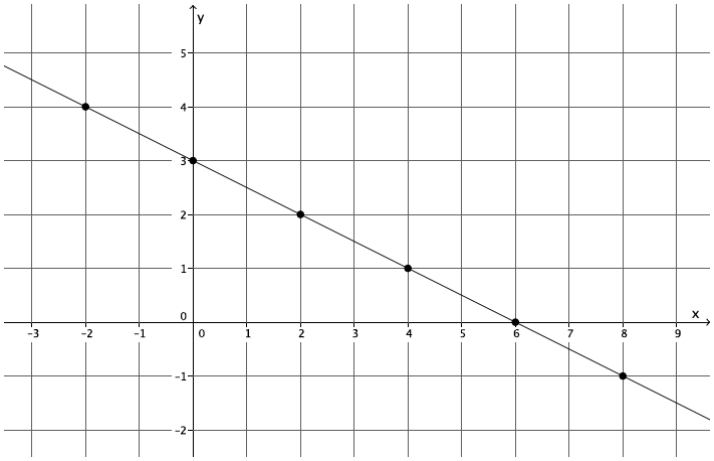
j. What do you think the graph of this function will look like? Explain.

k. Connect the points you have graphed to make a line. Select a point on the graph that has integer coordinates. Verify that this point has an output that the function would assign to the input.

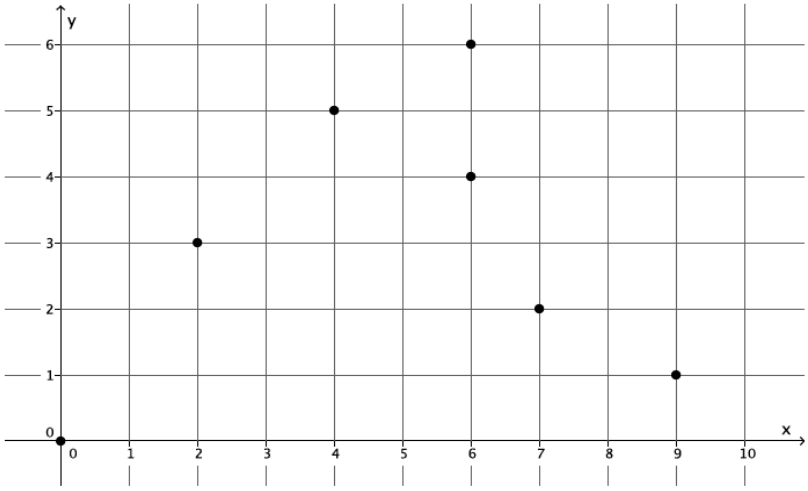
l. Graph the equation $y = \frac{1}{7}x$ using the same coordinate plane in part (e). What do you notice about the graph of the function that describes Giselle's constant rate of running and the graph of the equation $y = \frac{1}{7}x$?

4. Examine the three graphs below. Which, if any, could represent the graph of a function? Explain why or why not for each graph.

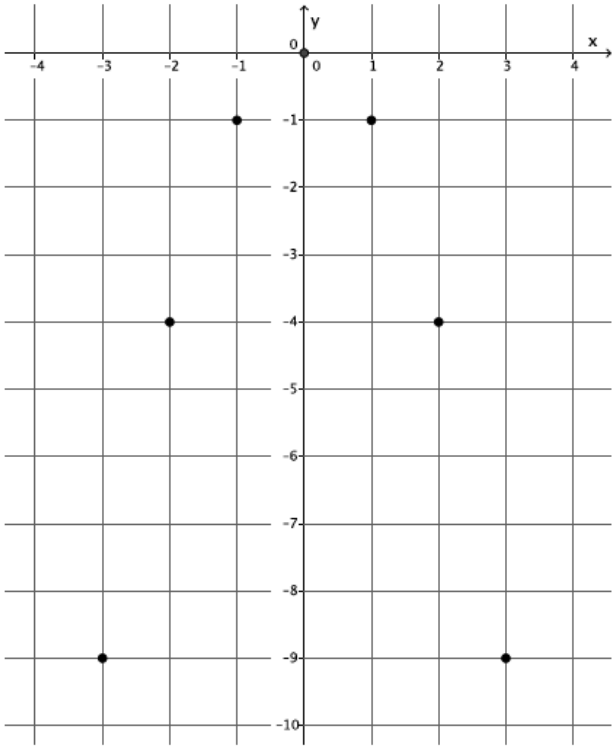
Graph 1:



Graph 2:



Graph 3:

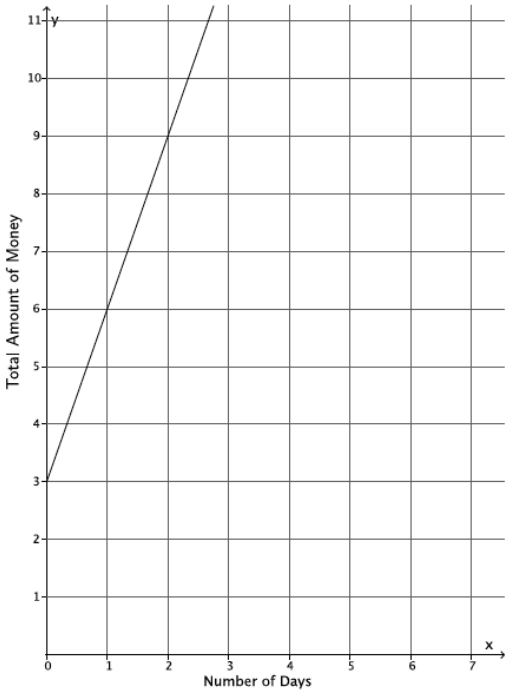


Lesson 7: Comparing Linear Functions and Graphs

Exercises

4. Two people, Adam and Bianca, are competing to see who can save the most money in one month. Use the table and the graph below to determine who will save more money at the end of the month. State how much money each person had at the start of the competition.

Adam's Savings:



Bianca's Savings:

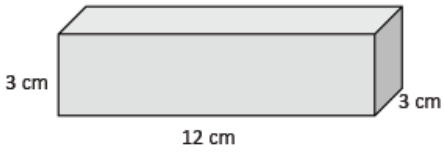
Input (Number of Days)	Output (Total amount of money)
5	$17
8	$26
12	$38
20	$62

Lesson 9: Examples of Functions from Geometry

As you complete Exercises 7–10, record the information in the table below.

	Area of base (A)	Height (h)	Volume
Exercise 7			
Exercise 8			
Exercise 9			
Exercise 10			

7. Use the figure below to answer parts (a)–(c).

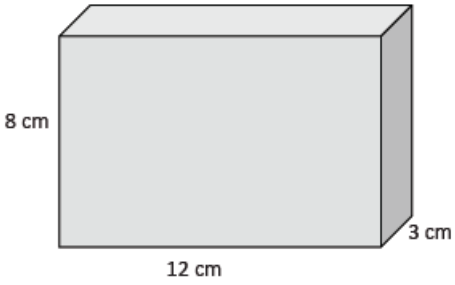


   a. What is the area of the base?

   b. What is the height of the figure?

   c. What is the volume of the figure?

8. Use the figure to the right to answer parts (a)–(c).

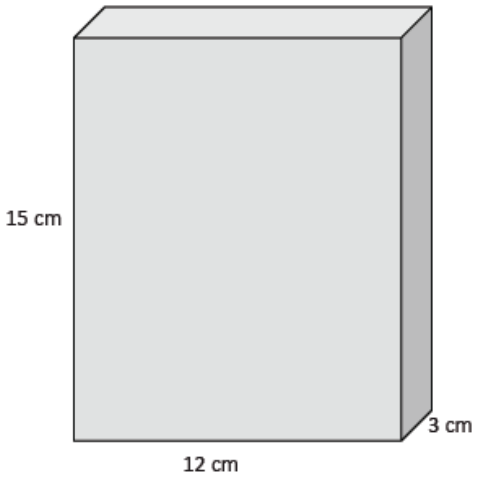


   a. What is the area of the base?

   b. What is the height of the figure?

   c. What is the volume of the figure?

9. Use the figure to the right to answer parts (a)–(c).

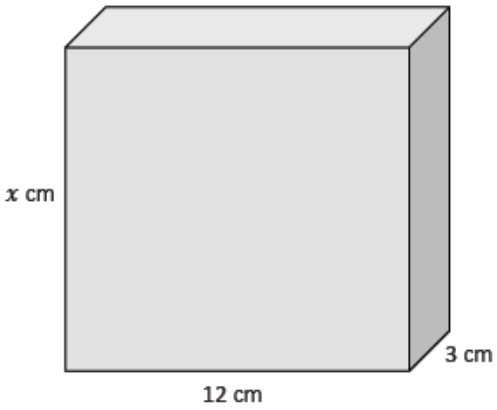


a. What is the area of the base?

b. What is the height of the figure?

c. What is the volume of the figure?

10. Use the figure to the right to answer parts (a)–(c).



a. What is the area of the base?

b. What is the height of the figure?

c. Write and describe a function that will allow you to determine the volume of any rectangular prism that has a base area of 36 cm^2.