Unit 4 Lesson 10: Domain and Range (Part 1)

1 Number of Barks (Warm up)

Student Task Statement

Earlier, you saw a situation where the total number of times a dog has barked was a function of the time, in seconds, after its owner tied its leash to a post and left. Less than 3 minutes after he left, the owner returned, untied the leash, and walked away with the dog.

1. Could each value be an input of the function? Be prepared to explain your reasoning.

   15 $84\frac{1}{2}$ 300

2. Could each value be an output of the function? Be prepared to explain your reasoning.

   15 $84\frac{1}{2}$ 300

2 Card Sort: Possible or Impossible?

Student Task Statement

Your teacher will give you a set of cards that each contain a number. Decide whether each number is a possible input for the functions described here. Sort the cards into two groups—possible inputs and impossible inputs. Record your sorting decisions.

1. The area of a square, in square centimeters, is a function of its side length, s, in centimeters. The equation $A(s) = s^2$ defines this function.

    a. Possible inputs:

    b. Impossible inputs:

2. A tennis camp charges $40 per student for a full-day camp. The camp runs only if at least 5 students sign up, and it limits the enrollment to 16 campers a day. The amount of revenue, in dollars, that the tennis camp collects is a function of the number of students that enroll.

    The equation $R(n) = 40n$ defines this function.

    a. Possible inputs:

    b. Impossible inputs:

3. The relationship between temperature in Celsius and the temperature in Kelvin can be represented by a function k. The equation $k(c) = c + 273.15$ defines this function, where c is the temperature in Celsius and $k(c)$ is the temperature in Kelvin.

    a. Possible inputs:
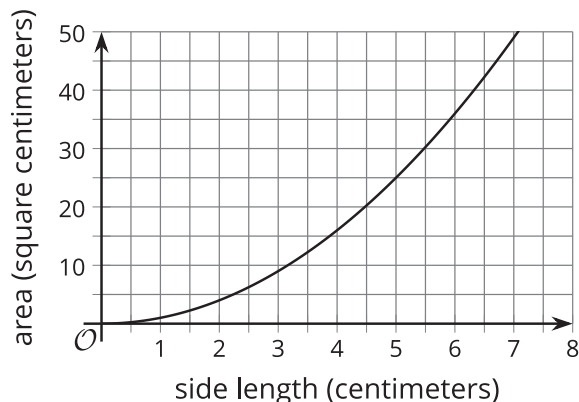
    b. Impossible inputs:

3 What about the Outputs?

Student Task Statement

In an earlier activity, you saw a function representing the area of a square (function A) and another representing the revenue of a tennis camp (function R). Refer to the descriptions of those functions to answer these questions.

1. Here is a graph that represents function A, defined by $A(s) = s^2$, where s is the side length of the square in centimeters.

   a. Name three possible input-output pairs of this function.

   b. Earlier we describe the set of all possible input values of A as "any number greater than or equal to 0." How would you describe the set of all possible output values of A?

2. Function R is defined by $R(n) = 40n$, where n is the number of campers.

   a. Is 20 a possible output value in this situation? What about 100? Explain your reasoning.

   b. Here are two graphs that relate number of students and camp revenue in dollars. Which graph could represent function R? Explain why the other one could not represent the function.
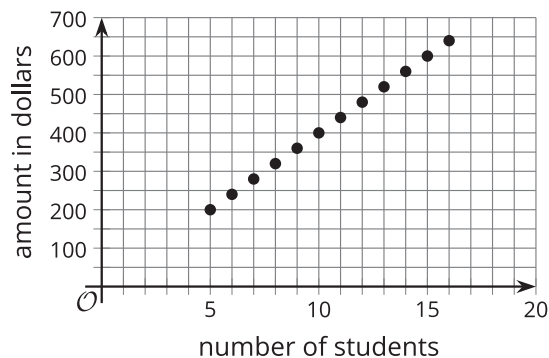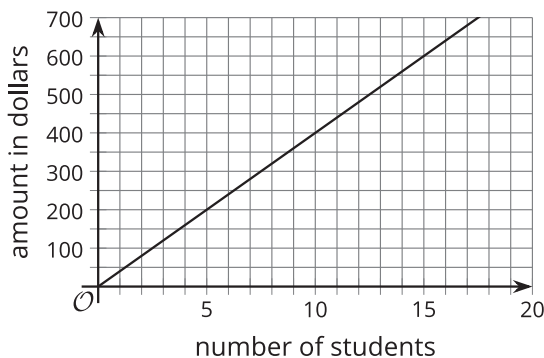
   c. Describe the set of all possible output values of R.

4 What Could Be the Trouble? (Optional)

Student Task Statement

Consider the function $f(x) = \dfrac{6}{x-2}$.

To find out the sets of possible input and output values of the function, Clare created a table and evaluated f at some values of x. Along the way, she ran into some trouble.

1. Find $f(x)$ for each x-value Clare listed.
   Describe what Clare's trouble might be.

x	-10	0	$\frac{1}{2}$	2	8
$f(x)$					

2. Use graphing technology to graph function f. What do you notice about the graph?

3. Use a calculator to compute the value you and Clare had trouble computing. What do you notice about the computation?

4. How would you describe the domain of function f?