

## Unit 4 Lesson 4: Using Function Notation to Describe Rules (Part 1)

### 1 Notice and Wonder: Two Functions (Warm up)

#### Student Task Statement

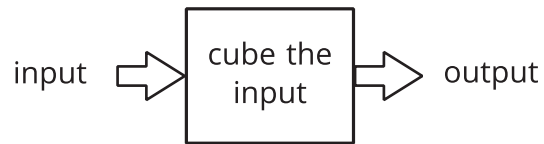
What do you notice? What do you wonder?

$x$	$f(x) = 10 - 2x$
1	8
1.5	7
5	0
-2	14

$x$	$g(x) = x^3$
-2	-8
0	0
1	1
3	27

## 2 Four Functions

### Images for Launch



### Student Task Statement

Here are descriptions and equations that represent four functions.

$$f(x) = 3x - 7$$

A. To get the output, subtract 7 from the input, then divide the result by 3.

$$g(x) = 3(x - 7)$$

B. To get the output, subtract 7 from the input, then multiply the result by 3.

$$h(x) = \frac{x}{3} - 7$$

C. To get the output, multiply the input by 3, then subtract 7 from the result.

$$k(x) = \frac{x - 7}{3}$$

D. To get the output, divide the input by 3, and then subtract 7 from the result.

1. Match each equation with a verbal description that represents the same function. Record your results.
2. For one of the functions, when the input is 6, the output is -3. Which is that function:  $f$ ,  $g$ ,  $h$ , or  $k$ ? Explain how you know.
3. Which function value— $f(x)$ ,  $g(x)$ ,  $h(x)$ , or  $k(x)$ —is the greatest when the input is 0? What about when the input is 10?

### 3 Rules for Area and Perimeter

#### Student Task Statement

1. A square that has a side length of 9 cm has an area of  $81 \text{ cm}^2$ . The relationship between the side length and the area of the square is a function.

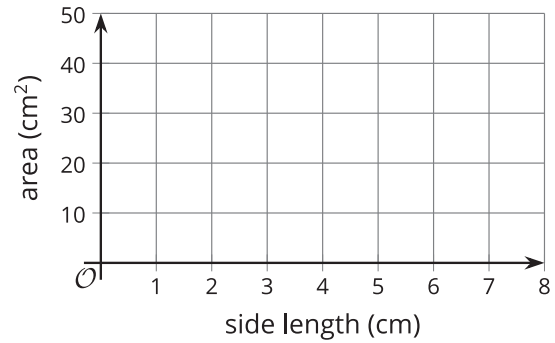
- a. Complete the table with the area for each given side length.

Then, write a rule for a function,  $A$ , that gives the area of the square in  $\text{cm}^2$  when the side length is  $s$  cm. Use function notation.

side length (cm)	area ( $\text{cm}^2$ )
1	
2	
4	
6	
$s$	

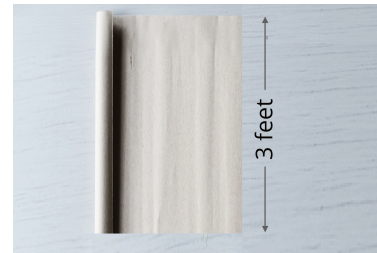
- b. What does  $A(2)$  represent in this situation? What is its value?

c. On the coordinate plane, sketch a graph of this function.



2. A roll of paper that is 3 feet wide can be cut to any length.

a. If we cut a length of 2.5 feet, what is the perimeter of the paper?



b. Complete the table with the perimeter for each given side length.

Then, write a rule for a function,  $P$ , that gives the perimeter of the paper in feet when the side length in feet is  $\ell$ . Use function notation.

side length (feet)	perimeter (feet)
1	
2	
6.3	
11	
$\ell$	

c. What does  $P(11)$  represent in this situation? What is its value?

d. On the coordinate plane, sketch a graph of this function.

