



Today's Materials

- pencil
- a smile

Using Function Notation to Describe Rules (Part 1)



4.1: Notice and Wonder: Two Functions

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4.1 Notice and Wonder: Two Functions

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

Today's Goals

- ❑ I can make sense of rules of functions when they are written in function notation, and create tables and graphs to represent the functions.
- ❑ I can write equations that represent the rules of functions.





4.2 Four Functions

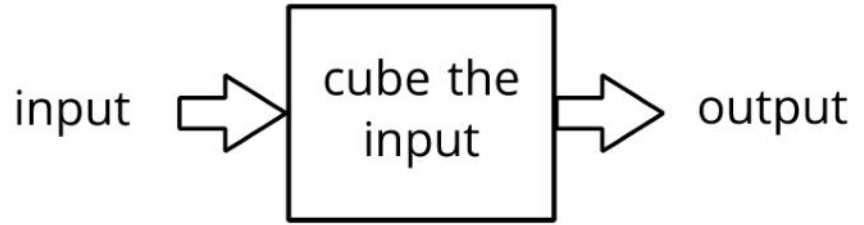
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4.2 Four Functions

This Function machine takes any input and cubes it to generate the output.

1. Find the output when the inputs are 0, 1, 3, and X
1. Write the input-output relationship using function notation and name the function .



Let's Check!

$$g(0)=0$$

$$g(1)=1$$

$$g(3)=27$$

$$g(x)=x^3$$

Some functions have a specific rule for getting its output. The rule can be described in words (like “cube the input”) or with expressions (such as x^3)

4.2 Four Functions

Here are descriptions and equations that represent four functions.

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

Search document

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

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

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

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

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

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

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.

4.2: Four Functions

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

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

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

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

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

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

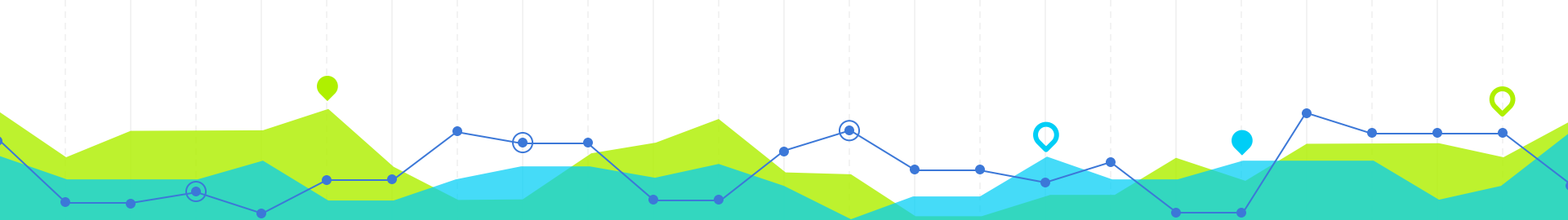
C. To get the output, multiply the input by 3, then subtract 7 from the result.

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

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?





4.3 Rules for Area and Perimeter

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4.3 Rules for Area and Perimeter

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

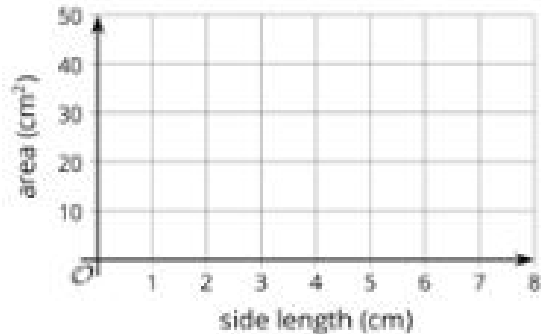
a. Complete the table with the area for each given side length.

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

b. What does s represent in this situation? What is its value?

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

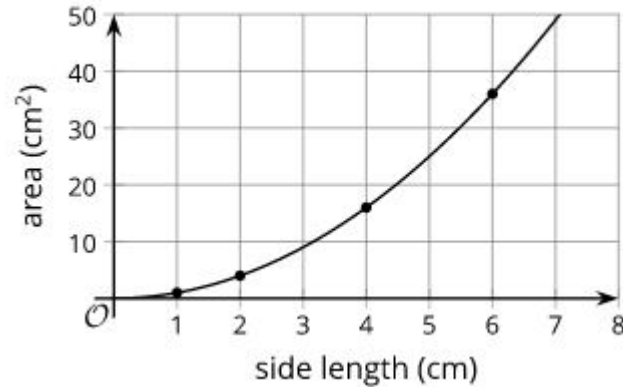
Complete Question 1 (a-c) in your groups



side length (cm)	area (cm^2)
1	
2	
4	
6	
s	

4.3 Rules for Area and Perimeter

What rule did your group come up with?



side length (cm)	area (cm ²)
1	1
2	4
4	16
6	36
s	s^2

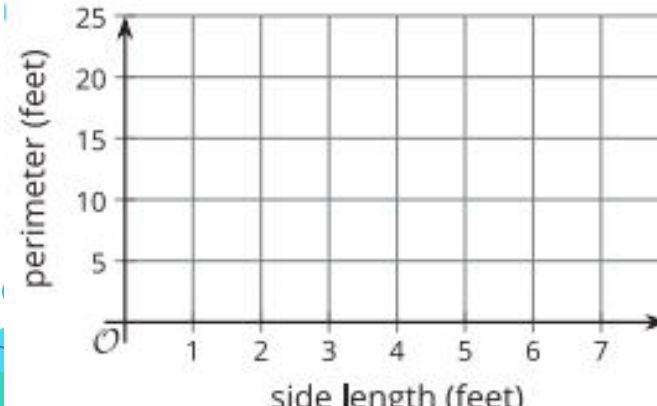
4.3 Rules for Area and Perimeter

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 l . Use function notation.

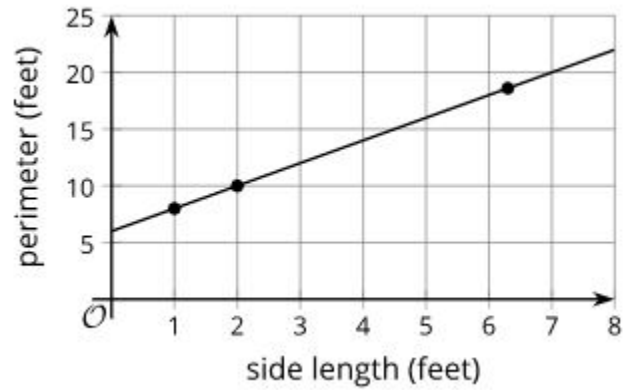
- a. What does $P(11)$ represent in this situation? What is its value?
- b. On the coordinate plane, sketch a graph of this function.

side length (feet)	perimeter (feet)
1	
2	
6.3	
11	
l	



Let's share your rule!

side length (feet)	perimeter (feet)
1	8
2	10
6.3	18.6
11	28
l	$6 + 2l$



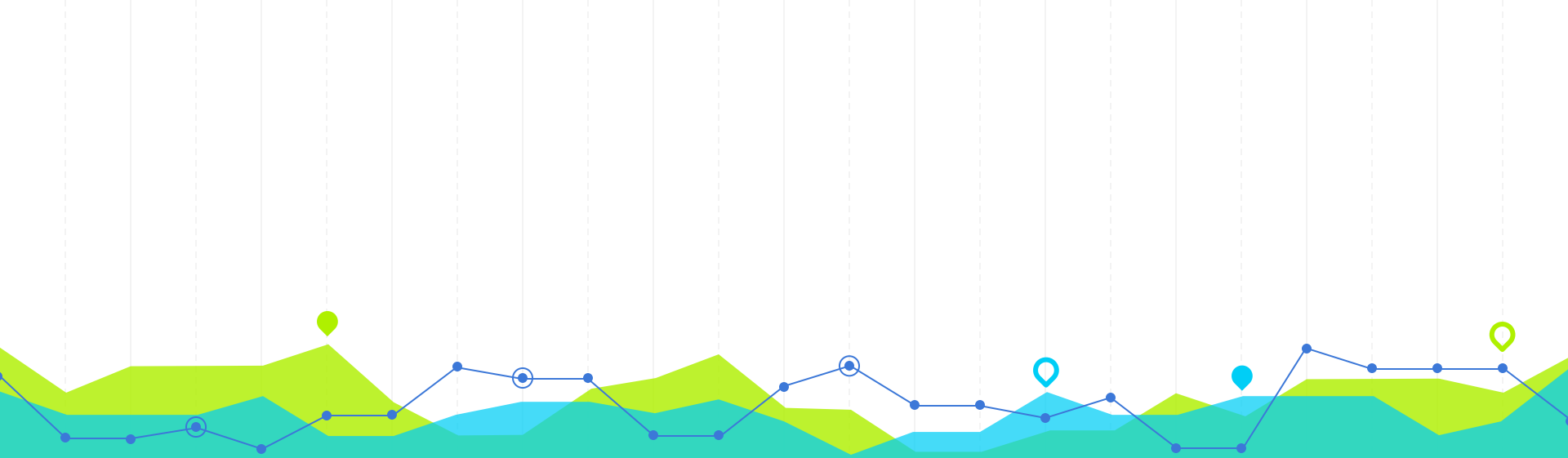
Lesson Synthesis

4.3 : Rules for Area and Perimeter

$$f(x)=5x+3$$

$$g(x)=10x-4$$

- How would you describe to a classmate who is absent today what each equation means? What would you say to help them make sense of these?”
- How do the rules help us find the value of $f(10)$ or $g(10)$?
- Is it possible to graph a function described this way? How?



Cool Down: Perimeter of a Square

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

Cool Down: Perimeter of a Square

1. Complete the table with the perimeter of a square for each given side length.

side length (inches)	perimeter (inches)
0.5	
7	
20	

2. Write a rule for a function, P , that gives the perimeter of a square in inches when the side length is x inches.
3. What is the value of $P(9.1)$? What does it tell us about the side length and perimeter of the square?