

## Lesson 3.2.2: Representing, Naming, and Evaluating Functions

### Targets:

1. I understand that a function from one set (called the domain) to another set (called the range) assigns each element of the domain to exactly one element of the range and understand that if  $f$  is a function and  $x$  is an element of its domain, then  $f(x)$  denotes the output of  $f$  corresponding to the input  $x$ .
2. I can use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

### Warm Up:

Study the 4 representations of a function below. How are these representations alike? How are they different?

TABLE:

Input	0	1	2	3	4	5
Output	1	2	4	8	16	32

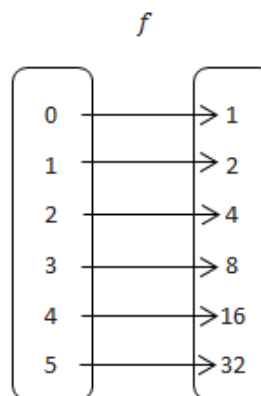
FUNCTION:

Let  $f: \{0,1,2,3,4,5\} \rightarrow \{1,2,4,8,16,32\}$  such that  $x \mapsto 2^x$ .

SEQUENCE:

Let  $a_{n+1} = 2a_n, a_0 = 1$  for  $0 \leq n \leq 4$  where  $n$  is an integer.

DIAGRAM:



### Practice 1

Let  $X = \{0,1,2,3,4,5\}$ . Complete the following table using the definition of  $f$ .

$f: X \rightarrow Y$

Assign each  $x$  in  $X$  to the expression  $2^x$ .

$x$	0	1	2	3	4	5
$f(x)$						

What are  $f(0)$ ,  $f(1)$ ,  $f(2)$ ,  $f(3)$ ,  $f(4)$ , and  $f(5)$ ?

What is the range of  $f$ ?

## Practice 2

The squaring function is defined as follows:

Let  $f: X \rightarrow Y$  be the function such that  $x \mapsto x^2$ , where  $X$  is the set of all real numbers.

What are  $f(0)$ ,  $f(3)$ ,  $f(-2)$ ,  $f(\sqrt{3})$ ,  $f(-2.5)$ ,  $f\left(\frac{2}{3}\right)$ ,  $f(a)$ , and  $f(3 + a)$ ?

What is the range of  $f$ ?

## Practice 3

The domain and range of this function are not specified. Evaluate the function for several values of  $x$ . What subset of the real numbers would represent the domain of this function? What subset of the real numbers would represent its range?

$$\text{Let } f(x) = \sqrt{x - 2}$$

## Exit Ticket

1. Let  $f(x) = 6x - 2$ , and let  $g(x) = .5(4)^x$ . Find the value of each function for the given input.

a.)  $f(0)$

b.)  $f(-10)$

c.)  $f(2)$

d.)  $f(1) + f(2)$

e.)  $g(0)$

f.)  $g(-1)$

g.)  $g(4)$

h.)  $g(6) - g(2)$

2. What is the range of each function given below?

a.) Let  $f(x) = 9x - 1$

b.) Let  $g(x) = 3^{2x}$

c.) Let  $f(x) = x^2 - 4$