

Algebra I

Lesson 1.6

Represent Functions as Rules and Tables

Warm-Up

Determine if 3 is a solution of each equation or inequality.

(a) $2x - 4 = 2$

$$\begin{aligned} 2(3) - 4 &= 2 \\ 6 - 4 &= 2 \\ 2 &= 2 \text{ YES!} \end{aligned}$$

(b) $3z + 4 \geq 6$

$$\begin{aligned} 3(3) + 4 &\geq 6 \\ 9 + 4 &\geq 6 \\ 13 &\geq 6 \text{ YES!} \end{aligned}$$

(c) $4n + 4 < 17$

$$\begin{aligned} 4(3) + 4 &< 17 \\ 12 + 4 &< 17 \\ 16 &< 17 \text{ YES!} \end{aligned}$$

(d) $-2t - 4 \leq 0$

$$\begin{aligned} -2(3) - 4 &\leq 0 \\ -6 - 4 &\leq 0 \\ -10 &\leq 0 \text{ YES!} \end{aligned}$$

Function - A PAIRING OF INPUTS WITH OUTPUTS WHERE EACH INPUT IS PAIRED WITH EXACTLY ONE OUTPUT

Domain - THE SET OF NUMBERS CONTAINING THE INPUTS

Range - THE SET OF NUMBERS CONTAINING THE OUTPUTS

Example 1. Identify the Domain and Range of a Function

The following table of inputs and outputs shows the amount of money Miguel earns at his job for several numbers of hours. Identify the domain and range of the function.

| | | | | |
|------------------|----|----|----|----|
| Input (hours) | 2 | 5 | 7 | 8 |
| Output (dollars) | 14 | 35 | 49 | 56 |

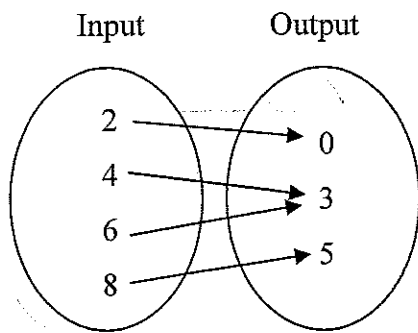
RULE
 $OUTPUT = 7 \cdot INPUT$

Domain: 2, 5, 7, 8

Range: 14, 35, 49, 56

Example 2. Mapping Diagrams

Another way to display information about a function is with a **mapping diagram**. Take the information from the mapping diagram and write it in the table.



| | | | | |
|--------|---|---|---|---|
| Input | 2 | 4 | 6 | 8 |
| Output | 0 | 3 | 3 | 5 |

Is this a function?

Domain: 2, 4, 6, 8

Range: 0, 3, 5

YES, each input is paired with EXACTLY ONE output

Example 3. Identify a Function

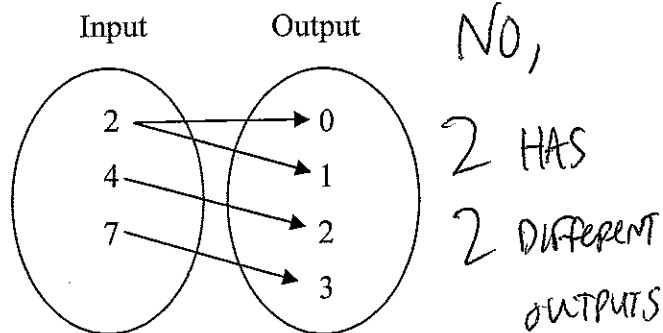
Tell whether the pairing is a function.

(a)

| | | | | |
|--------|---|---|---|----|
| Input | 3 | 6 | 9 | 12 |
| Output | 1 | 2 | 2 | 1 |

YES, EACH INPUT HAS EXACTLY
ONE OUTPUT

(b)



Example 4. Make a Table for a Function

The domain of the function $y = x + 4$ is 0, 2, 3, 6 and 7. Make a table for the function. Identify the range.

output input

| | | | | | | |
|-------------|---|---|---|----|----|--------|
| x | 0 | 2 | 3 | 6 | 7 | DOMAIN |
| $y = x + 4$ | 4 | 6 | 7 | 10 | 11 | RANGE |

RANGE: 4, 6, 7, 10, 11

Example 5. Write a Function Rule

Write a rule in words and as an equation to describe the function in the table provided.

| | | | | | |
|--------|---|---|---|---|---|
| Input | 1 | 2 | 4 | 7 | 9 |
| Output | 0 | 1 | 3 | 6 | 8 |

Words:

OUTPUT = INPUT - 1

Equation:

$y = x - 1$

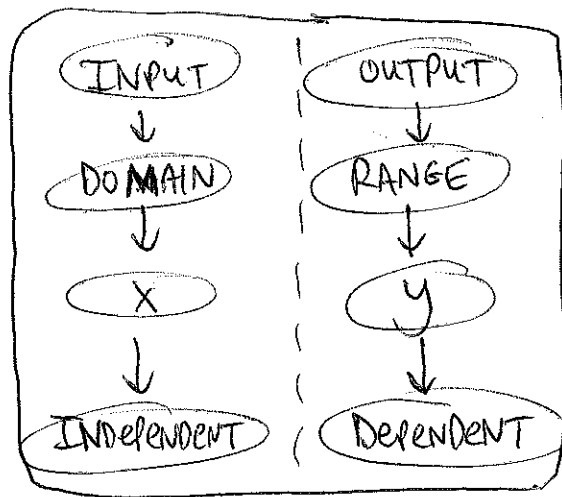
Assignment: Pages 38 - 39 (3 - 21)

Review:

Write each verbal sentence as an equation or inequality.

- Four times a number x decreased by eleven is six.
- Eleven decreased by the quantity four times a number x is four.
- Four increased by the quantity eleven times a number x is less than three.
- The product of seven and a number y is 42.
- Twenty divided by a number n is less than or equal to two.
- Ten more than a number x is greater than fourteen.
- The quotient of four and a number x is two.
- The sum of twelve and a number x is at least four.
- While planning a vacation, your family budgets \$1200 to spend on lodging. The hotel costs \$129 per night. Will you have enough money in the budget to stay for 7 nights?

You write the inequality $129h \leq 1200$ to model the situation. What do the 129, h , and 1200 represent?



* OUTPUT DEPENDS
ON THE INPUT