

Unit 3: day 2 Notes: Relations

Name: _____

Objective: I can identify and solve for the Domain and Range.

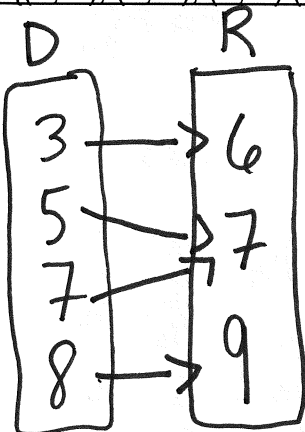
| Word | Definition | Examples |
|---|---|--|
| Dependent Variable (Range) y | Value depends on the <u>value</u> chosen for another variable. Values are called <u>range</u> . | $(1, 2) (-3, -4)$ Range: $2, -4$ |
| Independent Variable (Domain) x | Value that will cause a <u>change</u> to the dependent variable. Values are called <u>domain</u> . | $(1, 2) (-3, -4)$ Domain: $\{1, -3\}$ |
| Relation | Pairing of numbers in one set of values (<u>domain</u>) with numbers in another set of values (<u>range</u>). | $(1, 2) (3, 4) (5, 6)$ Domain: $1, 3, 5$ Range: $2, 4, 6$ |
| Function | A relationship that pairs each input (<u>x</u> values) with exactly <u>one</u> output value. | $(1, 2) (3, 4) (5, 6)$ D: $1, 3, 5$ all different = function |

Note: The value of one variable may uniquely determine the value of another variable. Such relationships may be represented using tables, words, equations, sets of ordered pairs, and graphs.

Identify the domain and range of each relation. Use a mapping diagram to determine whether the relation is a function.

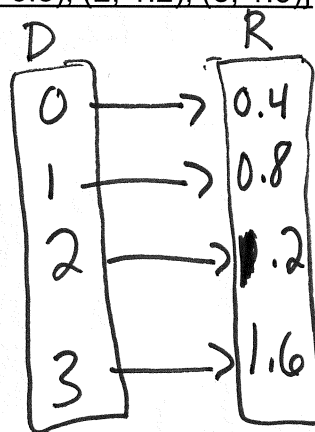
3. $\{(3, 6), (5, 7), (7, 7), (8, 9)\}$

4. $\{(0, 0.4), (1, 0.8), (2, 1.2), (3, 1.6)\}$



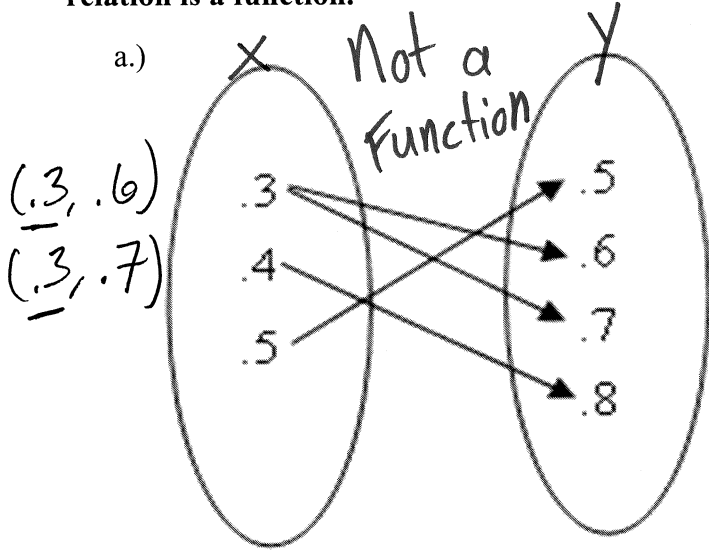
Domain has only one range

yes a function



yes a function
 Domain has 1 range

Identify the domain and range of each relation. Use a mapping diagram to determine whether the relation is a function.



Domain: .3, .4, .5
 Range: .5, .6, .7, .8

b.)

| x | y |
|---|---|
| 0 | 3 |
| 1 | 5 |
| 2 | 7 |
| 3 | 9 |

Domain: 0, 1, 2, 3
 Range: 3, 5, 7, 9

Find the range of each function for the given domain.

1. $f(x) = -3x + 2; \{-1, 0, 1, 2\}$

$$f(-1) = -3(-1) + 2$$

$$= 3 + 2$$

$$f(-1) = 5$$

$(-1, 5)$

$$f(0) = -3(0) + 2$$

$$= 0 + 2$$

$$f(0) = 2$$

$(0, 2)$

yes, is a ~~dom~~ Function

$$f(1) = -3(1) + 2$$

$$= -3 + 2$$

$$f(1) = -1$$

$(1, -1)$

$$f(2) = -3(2) + 2$$

$$= -6 + 2$$

$$f(2) = -4$$

$(2, -4)$

2. $f(x) = x^2 + 2; \{-2, 0, \frac{1}{4}\}$

$$f(-2) = (-2)^2 + 2$$

$$= 4 + 2$$

$$f(-2) = 6$$

$(-2, 6)$

$$f(0) = (0)^2 + 2$$

$$= 0 + 2$$

$$f(0) = 2$$

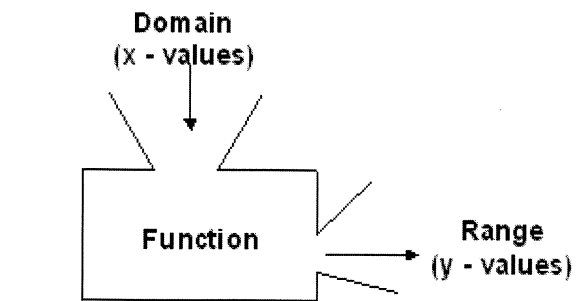
$(0, 2)$

$$f(\frac{1}{4}) = (\frac{1}{4})^2 + 2$$

$$= \frac{1}{16} + 2$$

$$f(\frac{1}{4}) = 2\frac{1}{16}$$

$(\frac{1}{4}, 2\frac{1}{16})$
 $(\frac{1}{4}, 2.0625)$



Arrow Notations:

$$g: x \rightarrow \underline{4 + 3x - x^2}$$

Function Notation:

$$g(\underline{n}) = 4 + 3\underline{n} - \underline{n}^2$$

two variable: $y = 4 + 3n - n^2$

$$y = 4 + 3x - x^2$$

$$f(x) = y$$

Write each equation in function notation.

a) $y = 4x + 2$

$$f(x) = 4x + 2$$

b) $y = x^2 - 2x + 1$

$$f(x) = x^2 - 2x + 1$$

Write each function as an equation in two variables.

a) $f(x) = 3x - 5$

$$y = 3x - 5$$

b) $g(x) = 3x^2 + 4$

$$y = 3x^2 + 4$$

Function Notation: remember, in function notation $g(1)$ means 1 is your input and you plug it in for x .

Ex 3)

Given: $g: x \rightarrow 4x - x^2$, with the set of real numbers as the domain, find the following:

$$g(1) = 4(1) - (1)^2$$

$$= 4 - 1$$

$$g(1) = 3$$

$$(1, 3)$$

$$g(-1) = 4(-1) - (-1)^2$$

$$= -4 - 1$$

$$g(-1) = -5$$

$$(-1, -5)$$

$$g(2) = 4(2) - (2)^2$$

$$= 8 - 4$$

$$g(2) = 4$$

$$(2, 4)$$

Ex 4) Find the values for the function $g: x \rightarrow \frac{12}{2x+1}$

$g(-1)$

$g(0)$

$g(3)$

Ex 5)

Plug the domain value(x) into the function and then solve for the range F(x).

$$F(x) = 3x + 2$$

$$x = -7$$

$$x = -2$$

$$x = 12$$

Ex 6)

A car can travel 32 mi for each gallon of gasoline. the function $d(x) = 32x$ represents the distance $d(x)$, in miles, that the car can travel with x gallons of gasoline.

a) Find $d(10) = 32(10)$

$$d(10) = 320$$

b) What does $d(10)$ represent?

the car traveled 320 miles
in 10 gallons