

Sec 2.1.1

Determining if a relation is a function and determining it's domain and range

Definition- a relation is any set of ordered pairs.

The set of all of the first numbers (often "x") is the domain.....of all the second numbers (often "y") is the range.

Given this relation, determine the domain and range:

$(2,3), (4, 8), (0,5), (8,-4)$

Domain- $\{ 2, 4, 0, 8 \}$

Range- $\{ 3, 8, 5, -4 \}$

Functions



If a relation meets this criteria-
each element in the domain corresponds to
EXACTLY ONE element in the range
it is a function.



Said another way...if each input leads to
exactly one output

Consider this set of ordered pairs:



$(-2,0), (0,2), (2,4), (4,6)$

It is a function because -2 only "goes to"
(only "maps to") 0 .

Same for each x value...

Also a function...

$(-3,9), (-2,4), (-1,1), (0,0)$
 $(1,1), (2,4), (3,9)$

-3 only yields 9.
-3 doesn't yield (map to) any other
value.

same for each...

⇒ Not a function...

$(0,0), (1,1), (1,-1), (2,4), (2,-4)$

⇒ because 1 yields both +1 and -1

or 2....



Determining functionality given an equation.

- *solve each equation for "y"
- *simplify (clean up)

Determine if $x^2 + y^2 = 4$ is a function.

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

$$y = \begin{matrix} + \\ - \end{matrix} \sqrt{-x^2 + 4}$$

An arrow points from the plus/minus symbol to the text "not a function".

not a
function

Determine if $x^2 + y = 4$ is a function.

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

is a function

Determine if $2x + y = 6$ is a function.

$$y = -2x + 6$$

is a function

Determine if $x + y^3 = 27$ is a function.

is $y^3 = -x + 27$

$$y = \sqrt[3]{-x + 27}$$

Determine if $xy - 5y = 1$ is a function.

is $y(x - 5) = 1$

$$\rightarrow y = \frac{1}{x - 5}$$

Determine if $x - y = 5$ is a function.

is $-y = -x + 5$

$$y = x - 5$$



Suggested Practice

Sec 2.1.1

pp (223-224)

→ 1,2 (Concept & Vocab Check)

1-26 odds (regular exercise set)

1. relation
domain
range

2. function

$d: \{-3, -2, -1, 0\}$
 $r: \{-3, -2, -1, 0\}$

1. function
 $d: \{1, 3, 5\}$ $r: \{2, 4, 5\}$

3. not
 $d: \{3, 4\}$ $r: \{4, 5\}$

5. function
 $d: \{3, 4, 5, 7\}$

7. function $r: \{2, 1, 9\}$

9. not
 $d: \{1\}$ $r: \{4, 5, 6\}$

11. is

13. is

15. isn't

17. isn't

19. is

21.

23.

25.



