

# Math 8C

## Unit 4

This unit will explore more about linear relationships in the context of functions and their solutions.

## Math 8C

### Unit 4 – Day 1

Standards:

- ✓ Determine if a relation is a function
- ✓ Determine the domain and range of a function

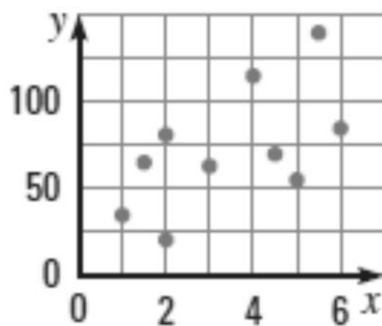
## What is a Function?

- A function can be described in many ways
  - By an equation
  - By an input-output table
  - In words
  - By a graph
  - As a set of ordered pairs
- But it's a special relationship with restrictions...

## Definition

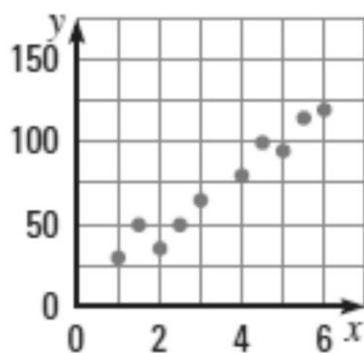
- A ***function*** is a relationship between two variables  $x$  and  $y$ . It is a rule that assigns each value of  $x$  to one and only one value of  $y$ .

## Look Familiar?



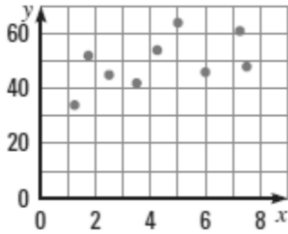
- This relation is **not** a function because for the  $x$  value of 2, we have two values of  $y$

## Look Familiar?

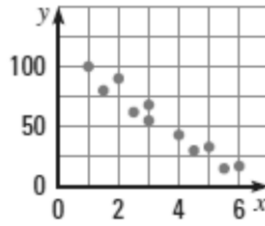


- This relation **is** a function because for each  $x$  value there is only one  $y$  value.

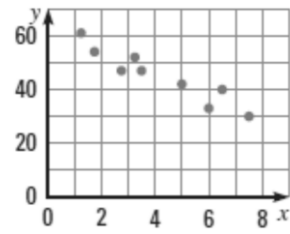
## Are these functions?



YES!



NO!



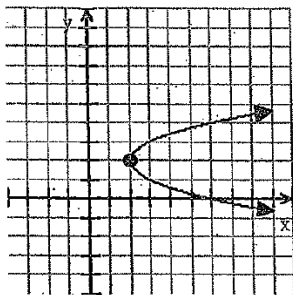
YES!

Why?

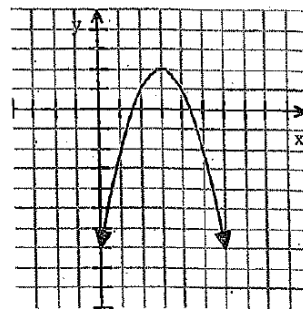
Yes, because each  $x$  value determines only one  $y$  value.

No, because the  $x$  value of 3 has two values of  $y$ .

## What About These?



NO!



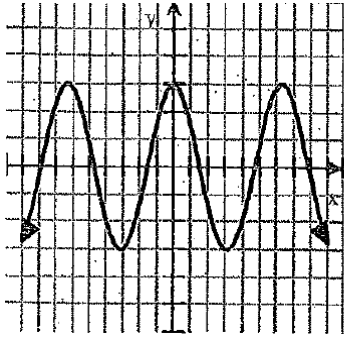
YES!

We can use a **vertical line test** for relations like these to check.

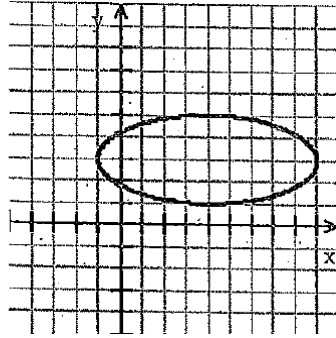
If a vertical line crosses the relation in more than one place, the relation is not a function.

## You Check!

- Use the *Vertical Line Test* to determine if the relations are functions:



YES!



NO!

## Domain and Range

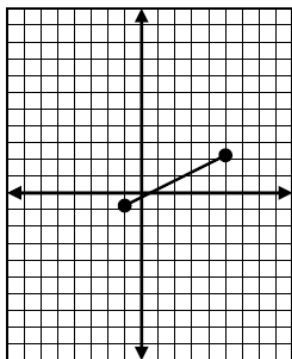
- Can you identify all the values of  $x$  and  $y$  for a relation?
- All possible  $x$  values are called the **domain** of a relation.
- All possible  $y$  values are called the **range** of a relation.

## Domain and Range

- $x$  values = ***domain***
- $y$  values = ***range***
  
- We can use inequalities to show these values

### Example

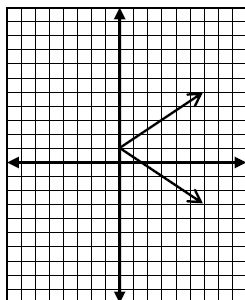
- Determine if the graph is a function and state the domain and range.



- Yes, this is a function
  
- Domain:  $-1 \leq x \leq 2$
  
- Range:  $-1 \leq y \leq 2$

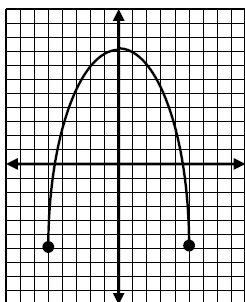
## Example

- Determine if the graph is a function and state the domain and range.



- Not a function
- Domain:  $0 \leq x \leq \infty$
- Range:  $-\infty \leq y \leq \infty$

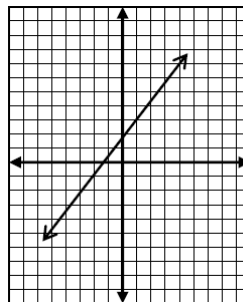
Talk to your table whether you think these are functions or not, and state the domain and range.



Function

Domain:  $-5 \leq x \leq 5$

Range:  $-6 \leq y \leq 8$



Function

Domain:  $-\infty \leq x \leq \infty$

Range:  $-\infty \leq y \leq \infty$

## In Class Practice

### **U4D1 - ICP**