Section 1.1 - Characteristics of a Function

Learning Goal:

By the end of today I will be able to recognize the difference between a FUNCTION and a RELATION.

By the end of today, I will be able to recognize a function using the vertical line test.

By the end of today, I will have a better understanding of functional notation and set notation.

Sep 9-9:43 PM

## FUNCTIONS
### TERMINOLOGY

## Relation
➡ a relationship between two variables

## Function
➡ a relation for which each element in the domain is assigned only one element in the range

## Domain
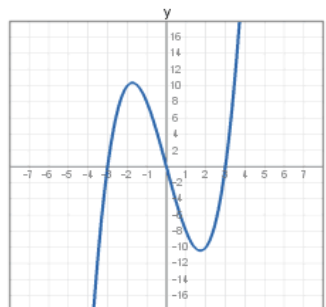➡ set of all x coordinates

➡ horizontal axis

➡ independent variable

## Range
➡ set of all y coordinates

➡ vertical axis

➡ dependent variable

## Set Notation
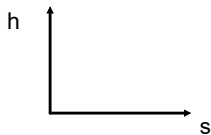➡ a way of writing a set of items or numbers within curly brackets {   }.

## Mapping Diagram
➡ a drawing with arrows to show the relationship between each value of x and the corresponding values of y
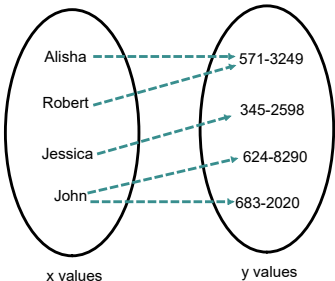
Jul 4-3:42 PM

## Which of the following fit the definition of a Function?
Remember...to be a function an x-value cannot have two y-values

**Example 1** The height of a football after the time kicked

h

s

The ball will never be at two heights at one time, therefore it IS a function.

**Example 2**

Alisha — 571-3249

Robert — 345-2598

Jessica — 624-8290

John — 683-2020

x values          y values

It's okay that Alisha and Robert share a phone number but NOT a function because John has two phone numbers.

Jul 5-12:42 AM

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## Which of the following fit the definition of a Function?
Remember...to be a function an x-value cannot have two y-values
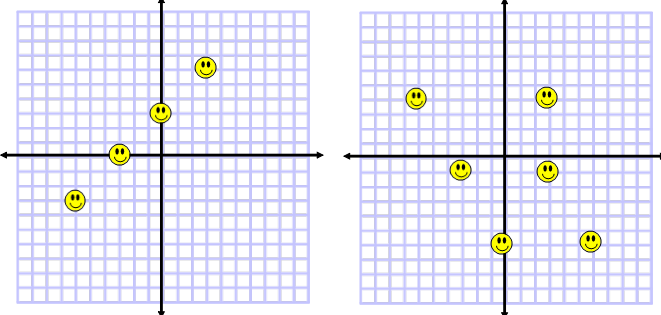
**Example 3**

a)
| x | y |
|----|----|
| -1 | 3 |
| 2 | -3 |
| 1 | -1 |
| -2 | 0 |
| 3 | 1 |

YES a Function
no repeated x-values

b)
| x | y |
|----|----|
| 3 | 3 |
| 2 | -1 |
| 4 | 1 |
| 3 | -2 |
| 1 | 2 |

NOT a Function
x=3 has two y-values

**Example 4**

YES a Function
no repeated x-values

NOT a Function
x=7 has four y-values

Jul 5-12:52 AM

**2**

Using reasoning to decide whether a relation is a function...

b)

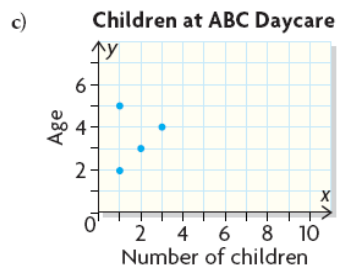| x | y |
|---|---|
| −1 | −3 |
| 0 | 1 |
| 1 | 5 |
| 2 | 9 |

## Solution

Domain = $\{-1, 0, 1, 2\}$
Range = $\{-3, 1, 5, 9\}$

This relation is a function.

Jul 5-12:07 AM

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Using reasoning to decide whether a relation is a function...

c)      **Children at ABC Daycare**

Age vs Number of children

## Solution

c)      **Children at ABC Daycare**
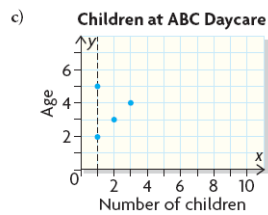
Domain = $\{1, 2, 3\}$
Range = $\{2, 3, 4, 5\}$

This relation is not a function.

Jul 5-12:06 AM

**3**

## DETERMINING IF A RELATION IS A FUNCTION
## ...USING THE VLT

**vertical-line test**

a test to determine whether the graph of a relation is a function. The relation is not a function if at least one vertical line drawn through the graph of the relation passes through two or more points
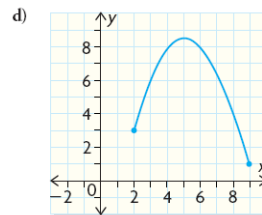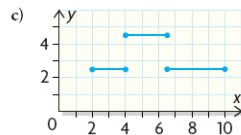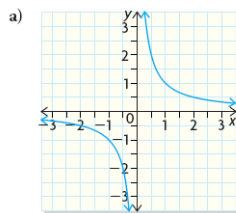
Feb 10-2:09 PM

# Connecting functions with graphs
### Which of the following graphs are functions?

Vertical
Line Test

a)

b)

c)

d)

Jul 5-12:06 AM

Homework

Pg. 10-11 #1,2,7,9

Check out www.desmos.com

Sep 10-9:21 PM