

# Lesson 19

## Properties of Functions

### *Functions*

*Defn:* A **function** is a relation where there is **only one y-value for each x-value**

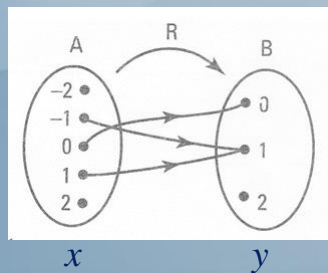
**NB:**  $f(x) = y$

# Functions

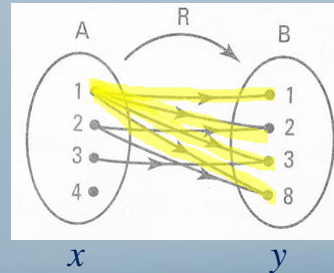
## Mapping Diagram

Ex. Which of the following is a function?

Function



Not a function

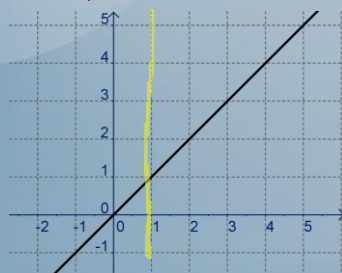


# Functions

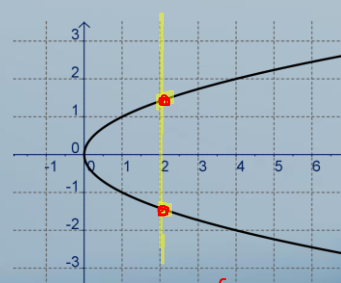
## Cartesian graph

Ex. Which of the following is a function?

Function



Not a function



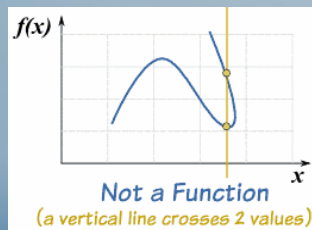
Inverse of a quadratic function

## Functions

### Vertical Line Test:

To verify whether a graph represents a function you must be able to draw a vertical line anywhere and intersect the function **at one point only**. If it is possible to intersect at two points it is not a function.

Ex.

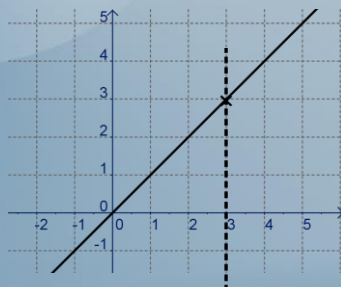


## Functions

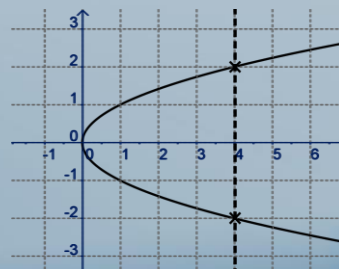
### Cartesian graph

Ex. Which of the following is a function?

Function



Not a function



## Functions

### Set of ordered pairs

Ex. Which of the following is a function?

$\{(0,1), (1,1), (2,8), (3, 27)\}$       Function

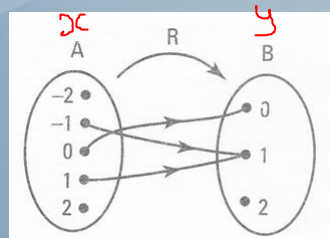
$\{(0,0), (1,-1), (1,1), (4, 2)\}$       Not a function

## Properties of Functions

**Domain:** All possible  $x$ -values of the function

**Range:** All possible  $y$ -values of the function

Ex. Find the Domain and Range of the function:



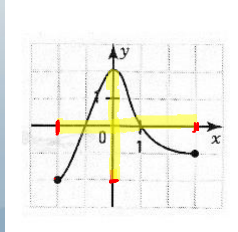
$\text{dom } f: \{-1, 0, 1\}$

$\text{ran } f: \{0, 1\}$

$(-1, 1) (0, 0) (1, 1)$

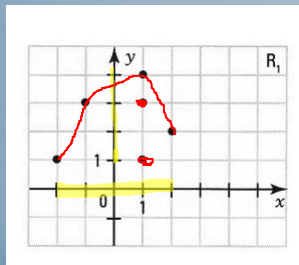
## Properties of Functions

Ex. Find the Domain and Range of the function:



$$\text{dom } f : [-2, 3]$$

$$\text{ran } f : [-2, 2]$$

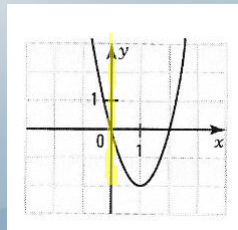


$$\text{dom } f : [-2, 2]$$

$$\text{ran } f : [1, 4]$$

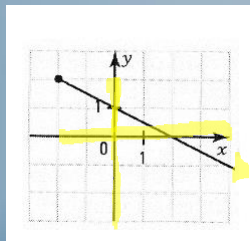
## Properties of Functions

Ex. Find the Domain and Range of the function:



$$\text{dom } f : ]-\infty, +\infty[$$

$$\text{ran } f : [-2, +\infty[$$



$$\text{dom } f : [-2, +\infty[$$

$$\text{ran } f : ]-\infty, 2]$$

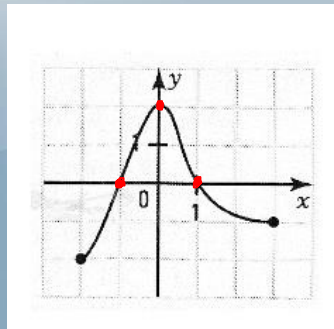
## *Properties of Functions*

**Zero:** Value of  $x(s)$  when  $y=0$  ( $x, 0$ )  
(ie. **x-intercept**)

**Initial Value:** Value of  $y$  when  $x=0$  ( $0, y$ )  
(ie. **y-intercept**)

## *Properties of Functions*

**Ex.** Find the zero(s) and the initial value of the following function:

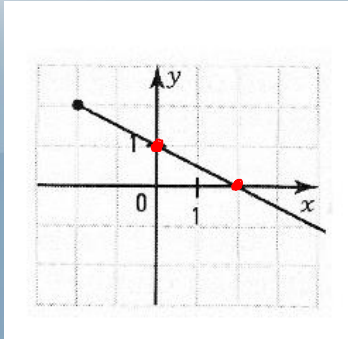


Zero(s) : -1 & 1

Init Val : 2

## Properties of Functions

**Ex.** Find the zero(s) and the initial value of the following function:

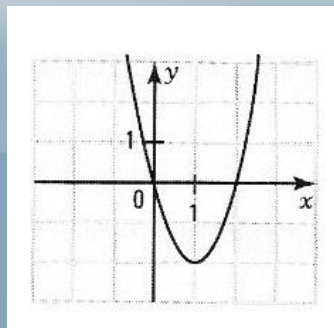


Zero(s): 2

Init Val: 1

## Properties of Functions

**Ex.** Find the zero(s) and the initial value of the following function:



Graphically

Zero(s) : 0 & 2

Init Val : 0