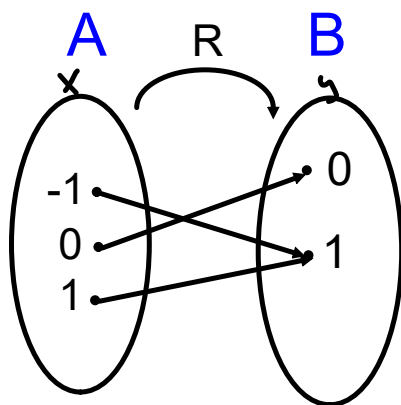


## Properties of Functions

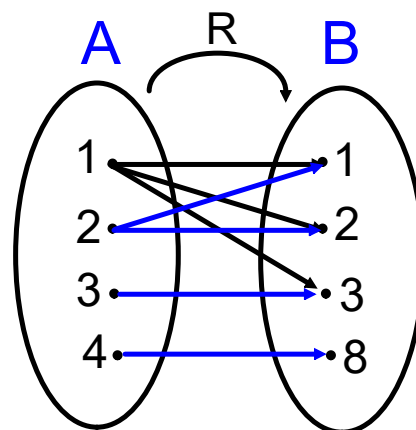
### 1) Mapping Diagrams

- A relation is a function if there is **at most** one arrow drawn from each element of the source set.



Source Set      Target Set

This is a function



Source Set      Target Set

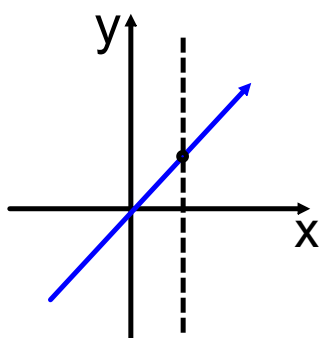
This is NOT a function

Since 1 and 2 are in relation to more than one element of the target set

## 2) Cartesian Plane - Vertical Line Test

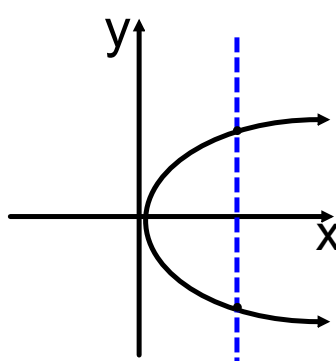
A relation is a function if any vertical line intersects the graph of the relation in at **most one** point.

ex.



$y=x$  is a function

ex.



$x=y^2$  is not a function

## 3) Set of Ordered Pairs

Given a set of ordered pairs, the relation is a function if the **1st coordinate** of each pair in the relation appears **only once**.

Examples:

- $\{(0,1), (1,1), (2,8), (3,27)\}$   $\longrightarrow$  is a function
- $\{(0,0), (\underline{1}, -1), (\underline{1}, 1)\}$   $\longrightarrow$  is **not** a function