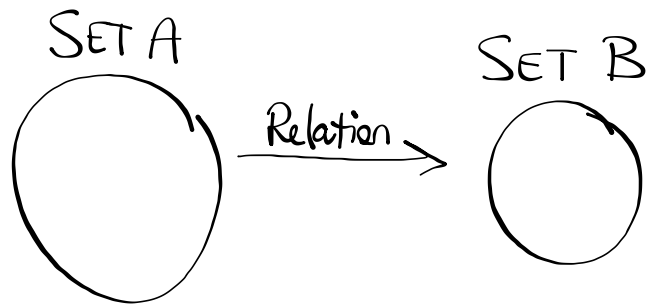


FUNCTIONS & DOMAIN

A relation is a rule that relates two quantities.



SET REPRESENTATIONS

1) Verbally

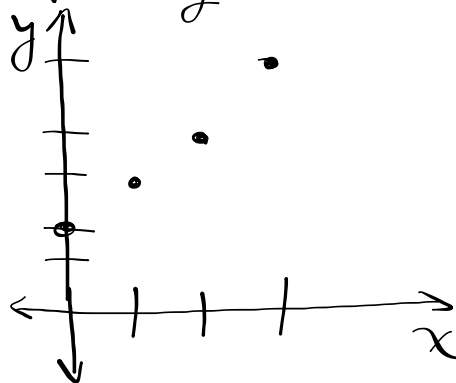
Ex. "The output value is 2 more than the input value."

2) Numerically

- Table, ordered pairs, etc.

- $\{(0,2), (1,3), (2,4), (3,5)\}$

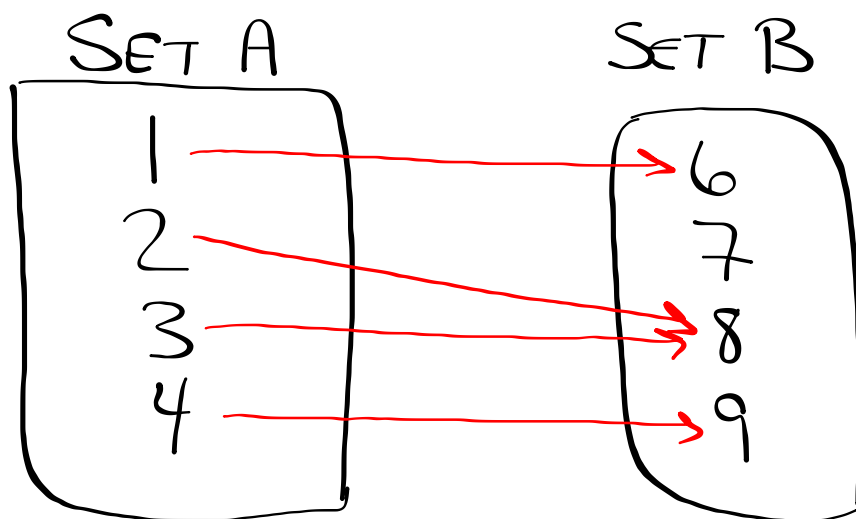
3) Graphically



4) Algebraically

$$y = x + 2$$

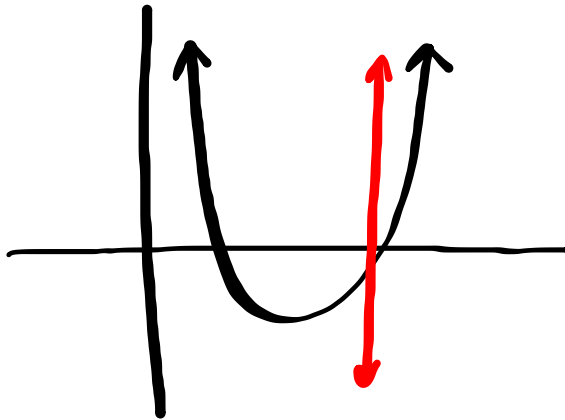
A function is a special type of relation where each input (domain) maps to exactly one output (range).



This is a function because each input maps to exactly one output.

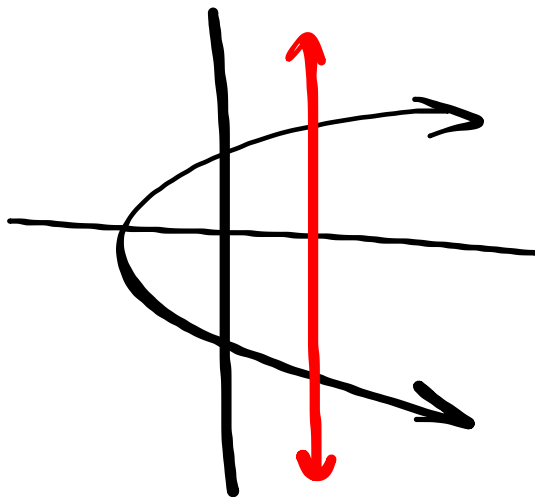
Domain: $\{1, 2, 3, 4\}$

Range: $\{6, 8, 9\}$



Function!

- Vertical Line Test
- Draw a vertical line.
 - Hits function exactly once = function!



Not a function,
but just a relation

Student ID \rightarrow Student score
on test

Function; one ID corresponds to
exactly one score.

x	y
-6	-7
2	3
5	8
5	9
9	22

Not a function;
5 has two outputs

$$y^2 - 2x = 5 \quad * \text{Solve for } y.$$

$$\begin{array}{r} y^2 - 2x = 5 \\ + 2x \quad + 2x \\ \hline y^2 = 2x + 5 \end{array}$$

$$y = \pm \sqrt{2x + 5}$$

For any x, y will
have 2 outputs.

Not a function!

$$y = -6x \iff f(x) = -6x$$

$$f(x) = x^2 + 8x - 24$$

$$f(6) = (6)^2 + 8(6) - 24$$

$$= 36 + 48 - 24$$

$$f(6) = 60$$