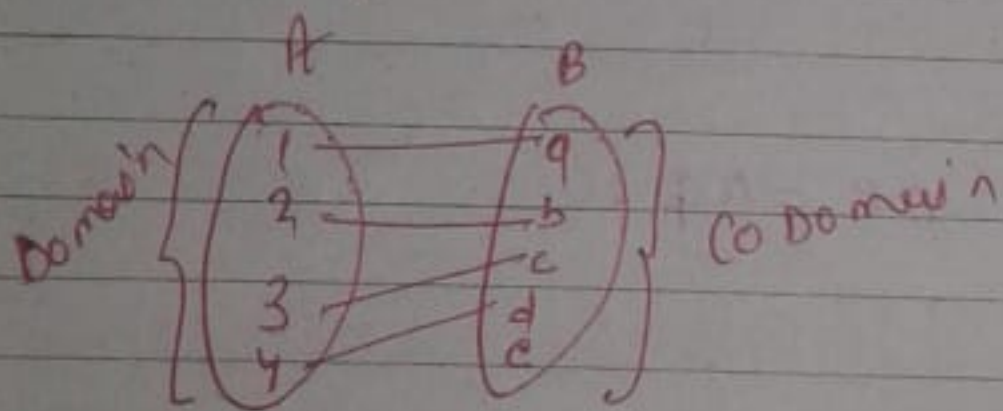
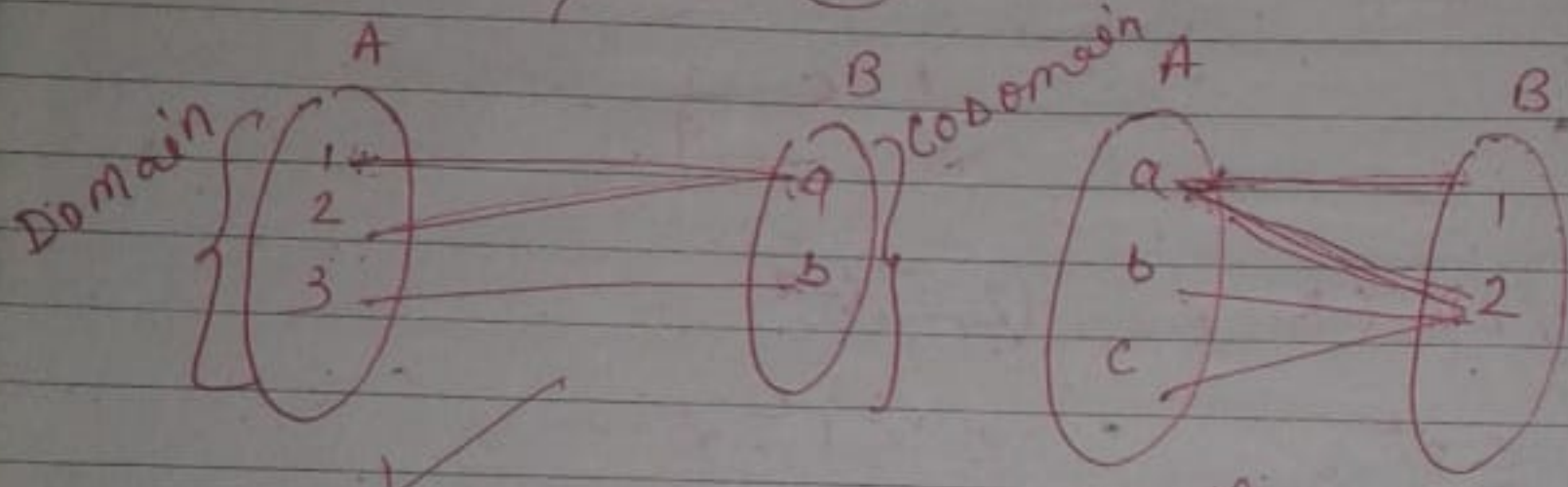
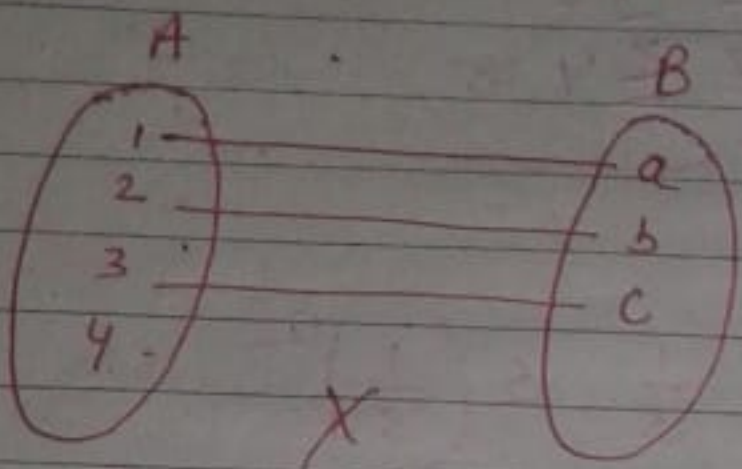


function

$$y = mx \Rightarrow y \text{ is +ve fun } x.$$

$\begin{matrix} \text{---} \\ \text{---} \\ \text{---} \\ \text{---} \end{matrix}$ $\begin{matrix} 2 \times 1 \\ | \\ 2 \times 2 \end{matrix}$



Range = a, b, c, d

$$f(x) = x^2 \checkmark$$

$$f(y) = y^2$$

Suppose $f(x) = f(y)$

$$x^2 = y^2$$

$$x = \sqrt{y^2}$$

$$= \pm y$$

$$x = y \checkmark$$

$$x = +y, \quad x = -y$$

This not a one-one function.

(Injective)

8) $f(x) = 3x + 4$, check one-one function.
Suppose

$$f(x) = f(y) = 3(y) + 4$$

$$3x + 4 = 3y + 4$$

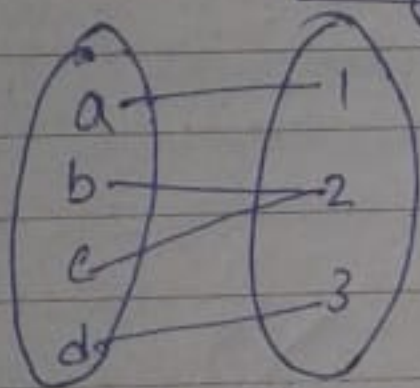
$$3x = 3y$$

$$\underline{\underline{x = y}}$$

It is one-one function.

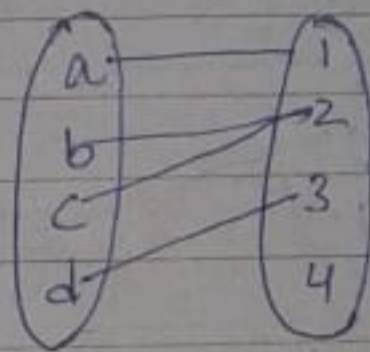
* Onto function. (Surjective)

Range = Co-domain



It is onto-function

$$\underline{\underline{R = C}}$$



It is not onto function

$$\underline{\underline{R \neq C}}$$

Ex: $f(x) = 3x + 2$ — (1)

$$y = 3x + 2$$

$$\Rightarrow \frac{y-2}{3} = x$$

$$f\left(\frac{y-2}{3}\right) = 3\left(\frac{y-2}{3}\right) + 2 =$$

$$= y$$

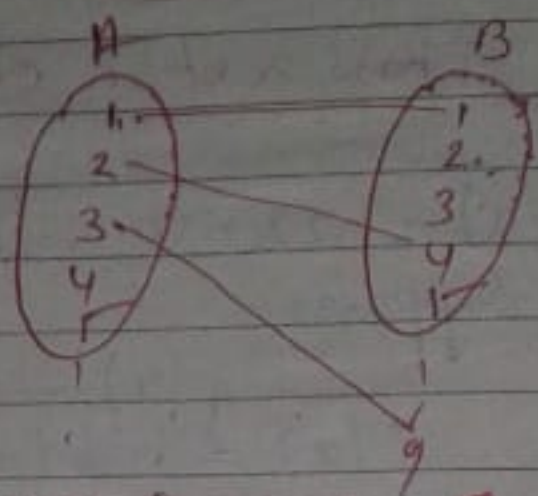
$$f(y) = y$$

Teacher's Signature

(11) $f(x) = x^2 - 1$ ($x \in \mathbb{N}$)

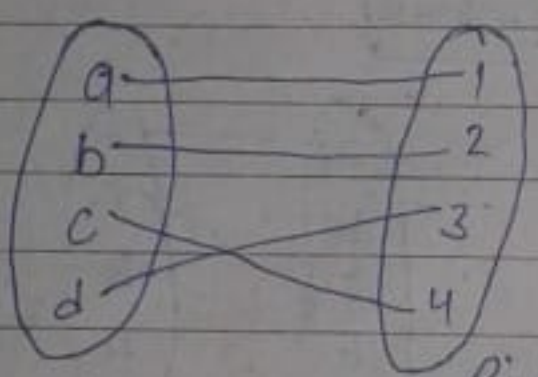
$y = x^2$
 $x = \sqrt{y}$

$f(\sqrt{y}) = (\sqrt{y})^2$
 $= +y$



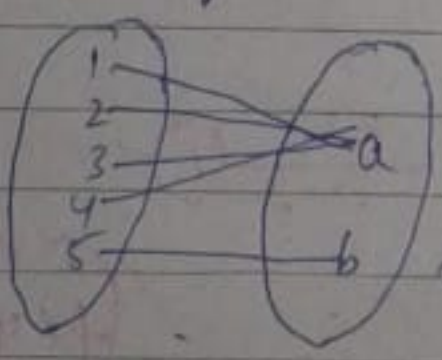
$2 \in \mathbb{N}$, ~~but there is no x in \mathbb{N}~~
 Thus is no $x \in \mathbb{N}$
 It is not onto func.
 Range \neq codomain.

One-One and Onto (^{surjective} Bijective)



Bijective

* Many one function (Bijective).



It is recognized when several Domain A has one image.