Function

Definition: If X and Y are two non- empty sets and f gives a unique $y \in Y$ for each $x \in X$ then f is called a function from the set X to the set Y.

Let, $f: X \to Y$ is a function. Then X is called domain (D_f) of f, Y is called co-domain (C_f) of f and the image in Y of all f related elements is called range (R_f).

1) The function $f: \{0,1,2,3\} \to \{2,5,8,11,15\}$ is defined by $f(x) = 3x + 2$,

then find domain, $co - domain$ and range of f.

Solution: Given, $f: \{0,1,2,3\} \to \{2,5,8,11,15\}$ defined by $f(x) = 3x + 2$

$\therefore D_f = \{0,1,2,3\}$

$C_f = \{2,5,8,11,15\}$

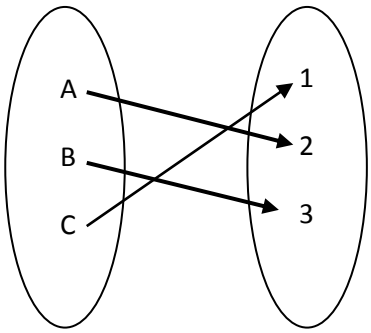
and, $R_f = \{f(0), f(1). f(2), f(3)\} = \{2,5,8,11\}$

2) The function $f: \{-2,-1,0,1,2\} \to \mathbb{R}$ is defined by $f(x) = x^2$, then find domain and range of f.

Solution: Given, $f: \{-2,-1,0,1,2\} \to \mathbb{R}$ defined by $f(x) = x^2$

$\therefore R_f = \{f(-2), f(-1), f(0), f(1), f(2)\} = \{4,1,0,1,4\} = \{0,1,4\}$

3) Find the domain and range of the following functions:



(i) $f(x) = \frac{1}{x-2}$ (ii) $f(x) = \frac{2}{x+3}$

Solution: (**i**) $f(x) = \frac{1}{x-2}$

f(x) gives real values for all real values except x=2

$\therefore D_f = \mathbb{R} - \{2\}$

Let, $y = \frac{1}{x-2}$

$\Rightarrow x - 2 = \frac{1}{y}$

$\Rightarrow x = \frac{1}{y} + 2$

x gives real values for all real values of y except $y = 0$

$\therefore R_f = \mathbb{R} - \{0\}$

Solution: **(ii)** $f(x) = \frac{2}{x+3}$

f (x) gives real values for all real values except x=-3

$\therefore D_f = \mathbb{R} - \{-3\}$

$\text{Let}, y = \frac{2}{x+3}$

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

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

x gives real values for all real values of y except $y = 0$

$\therefore R_f = \mathbb{R} - \{0\}$

H. W:: (i)$f(x) = \frac{x}{x+1}$ (ii)$f(x) = \frac{x-3}{2x+1}$ (iii) $f(x) = \frac{1}{7x-1}$ (iv) $f(x) = \frac{2x}{5x-4}$