

**Example:** Find domain and range of the following functions:

a)  $f(x) = \frac{1}{x-3}$       b)  $f(x) = \frac{1}{2x+1}$

**Solution:** a) Given that

$$f(x) = \frac{1}{x-3}$$

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

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

Again,  $y = f(x) = \frac{1}{x-3}$

$$\Rightarrow x - 3 = \frac{1}{y}$$

$$\Rightarrow x = \frac{1}{y} + 3$$

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

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

b) Given that

$$f(x) = \frac{1}{2x+1}$$

Here  $f(x)$  is not defined for  $2x+1=0$  or  $x=-\frac{1}{2}$  and  $f(x)$  gives real values for all real values of  $x$  except  $x=-\frac{1}{2}$ .

$$D_f = \mathbb{R} - \left\{-\frac{1}{2}\right\}$$

$$\text{Again, } y = f(x) = \frac{1}{2x+1}$$

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

$$\Rightarrow x = \frac{1}{2} \left( \frac{1}{y} - 1 \right)$$

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

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