



Functions Ex 3.3 Q2

(i) We have,

$$f(x) = \sqrt{x-2}$$

Clearly, $f(x)$ assumes real values, if

$$x-2 \geq 0$$

$$\Rightarrow x \geq 2$$

$$\Rightarrow x \in [2, \infty)$$

Hence, $\text{Domain}(f) = [2, \infty]$

(ii) We have,

$$f(x) = \frac{1}{\sqrt{x^2-1}}$$

Clearly, $f(x)$ assumes real values, if

$$x^2-1 > 0$$

$$\Rightarrow (x-1)(x+1) > 0$$

$$\Rightarrow x < -1 \text{ or } x > 1$$

$$\Rightarrow x \in (-\infty, -1) \cup (1, \infty)$$

$$[\because a^2 - b^2 = (a-b)(a+b)]$$

Hence, $\text{domain}(f) = (-\infty, -1) \cup (1, \infty)$

(iii) We have,

$$f(x) = \sqrt{9-x^2}$$

Clearly, $f(x)$ assumes real values, if

$$9-x^2 \geq 0$$

$$\Rightarrow 9 \geq x^2$$

$$\Rightarrow x^2 \leq 9$$

$$\Rightarrow -3 \leq x \leq 3$$

$$\Rightarrow x \in [-3, 3]$$

Hence, $\text{domain}(f) = [-3, 3]$

(iv) We have,

$$f(x) = \sqrt{\frac{x-2}{3-x}}$$

Clearly, $f(x)$ assumes real values, if

$$x-2 \geq 0 \quad \text{and} \quad 3-x > 0$$

$$\Rightarrow x \geq 2 \quad \text{and} \quad 3 > x$$

$$\Rightarrow x \in [2, 3)$$

Hence, $\text{domain}(f) = [2, 3)$.

***** END *****