

**Example 7** Find the domain of each of the following functions.

$$(i) \quad f(x) = \frac{x}{x^2 + 3x + 2} \quad (ii) \quad f(x) = [x] + x$$

## Solution

- (i)  $f$  is a rational function of the form  $\frac{g(x)}{h(x)}$ , where  $g(x) = x$  and  $h(x) = x^2 + 3x + 2$ .

Now  $h(x) \neq 0 \Rightarrow x^2 + 3x + 2 \neq 0 \Rightarrow (x + 1)(x + 2) \neq 0$  and hence domain of the given function is  $\mathbf{R} - \{-1, -2\}$ .

- (ii)  $f(x) = [x] + x$ , i.e.,  $f(x) = h(x) + g(x)$

where  $h(x) = [x]$  and  $g(x) = x$

The domain of  $h = \mathbf{R}$

and the domain of  $g = \mathbf{R}$ . Therefore

Domain of  $f = \mathbf{R}$