Example 5 Is the following relation a function? Justify your answer

(i) $R_1 = \{(2, 3), (\frac{1}{2}, 0), (2, 7), (-4, 6)\}$

(ii) $R_2 = \{(x, |x|) \mid x \text{ is a real number}\}$

Solution

Since $(2, 3)$ and $(2, 7) \in R_1$

$\Rightarrow$ $R_1(2) = 3$ and $R_1(2) = 7$

So $R_1(2)$ does not have a unique image. Thus R_1 is not a function.

(iii) $R_2 = \{(x, |x|) / x \in \mathbf{R}\}$

For every $x \in \mathbf{R}$ there will be unique image as $|x| \in \mathbf{R}$.

Therefore R_2 is a function.