

MATHS CLASS XII (Relations and Functions) Continuation.....

General direction for the students :-Whatever be the notes provided , everything must be copied in the Maths Copy and then do the Home work in the same Copy.

Exercise 1.2

Q19). $f(x) = \frac{|x| - x}{2x}$ find its domain and range.

Clearly $f(x)$ is defined $2x \neq 0 \Rightarrow x \neq 0$

$$\Rightarrow D_f = R - \{0\} \text{ Ans.}$$

$$\text{For range } y = f(x) = \frac{|x| - x}{2x}$$

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

$$\Rightarrow y = 0, -1$$

$$\Rightarrow R_f = \{0, -1\} \text{ Ans.}$$

Q21). If $f(x) = \log \left[\frac{1+x}{1-x} \right]$, then show that $f(x) + f(y) = f \left[\frac{x+y}{1+xy} \right]$

$$\begin{aligned} \text{LHS, } f(x) + f(y) &= \log \left[\frac{1+x}{1-x} \right] + \log \left[\frac{1+y}{1-y} \right] \\ &= \log \left[\frac{1+x}{1-x} \right] \left[\frac{1+y}{1-y} \right] \\ &= \log \left[\frac{1+x+y+xy}{1-x-y+xy} \right] \text{-----(1)} \end{aligned}$$

$$\begin{aligned} \text{RHS, } f \left[\frac{x+y}{1+xy} \right] &= \log \left[\frac{1 + \frac{x+y}{1+xy}}{1 - \frac{x+y}{1+xy}} \right] \\ &= \log \left[\frac{1+x+y+xy}{1-x-y+xy} \right] \text{-----(2)} \end{aligned}$$

From (1) and (2) the result is proved.

Q23 ii). Find the domain of the function $f(x) = \frac{1}{\sqrt{1 - \cos x}}$.

$f(x)$ is defined when $1 - \cos x > 0$

$$\Rightarrow \cos x < 1$$

We know $-1 \leq \cos x \leq 1 \quad \forall x \in R$

We know $\cos x = 1$, When $x = n\pi, n \in W$

$$D_f = R - \{n\pi, n \in W\} \text{ or } R - \{2n\pi, n \in I\}$$

HOME WORK : Exercise 1.2 , Left over questions from 17 to 24.