

Question 3: Let R be the relation on the set R of all real numbers defined by $a R b$ if and only if $|a - b| \leq 1$. Then R is _____.

Solution:

$$|a - a| = 0 < 1$$

Therefore, $a R a \forall a \in R$

Therefore, R is reflexive.

Again $a R b, |a - b| \leq 1 \Rightarrow |b - a| \leq 1 \Rightarrow b R a$

Therefore, R is symmetric.

Again $1 R [1/2]$ and $[1/2] R 1$ but $[1/2] \neq 1$

Therefore, R is not anti-symmetric.

Further, $1 R 2$ and $2 R 3$ but $[1 / R 3]$, [Because, $|1 - 3| = 2 > 1$]

Hence, R is not transitive.