



Relations Ex 1.1 Q5.

(i) aRb if $a-b > 0$

Let R be the set of real numbers.

Reflexivity: Let $a \in R$

$$\Rightarrow a - a = 0$$

$$\Rightarrow (a, a) \notin R$$

$\therefore R$ is not reflexive

Symmetric: Let aRb

$$\Rightarrow a - a > 0$$

$$\Rightarrow b - a < 0$$

$$\therefore b \not R a$$

$\therefore R$ is not Symmetric

Transitive: Let aRb and bRc

$$\Rightarrow a - a > \text{ and } b - c > 0$$

$$\Rightarrow a - c > 0$$

$$\Rightarrow aRc$$

$\therefore R$ is Transitive

We have, aRb iff $1 + ab > 0$

Let R be the set of real numbers

Reflexive: Let $a \in R$

$$\Rightarrow 1 + a^2 > 0$$

$$\Rightarrow aR a$$

$$\Rightarrow R \text{ is reflexive}$$

Symmetric: Let aRb

$$\Rightarrow 1 + ab > 0$$

$$\Rightarrow 1 + ba > 0$$

$$\Rightarrow bRa$$

$$\Rightarrow R \text{ is symmetric}$$

Transitive: Let aRb and bRc

$$\Rightarrow 1 + ab > 0 \text{ and } 1 + bc > 0$$

$$\nRightarrow 1 + ac > 0$$

$$\Rightarrow R \text{ is not transitive}$$

We have, aRb if $|a| \leq b$

Reflexivity: Let $a \in R$

$$\Rightarrow |a| \not\leq a \quad \left[\because \quad |-2| = 2 > -2 \right]$$

$\Rightarrow R$ is not reflexive

Symmetric: Let aRb

$$\Rightarrow |a| \leq b$$

$$\nRightarrow |b| \leq a \quad \left[\because \quad \begin{array}{l} \text{Let } a = 4, b = 6 \\ |4| \leq 6 \text{ but } |6| > 4 \end{array} \right]$$

$\Rightarrow R$ is not symmetric

Transitive: Let aRb and bRc

$$\Rightarrow |a| \leq b \text{ and } |b| \leq c$$

$$\Rightarrow |a| \leq |b| \leq c$$

$$\Rightarrow |a| \leq c$$

$$\Rightarrow a R c$$

$\Rightarrow R$ is transitive

Relations Ex 1.1 Q6.

Let $A = \{1, 2, 3, 4, 5, 6\}$.

A relation R is defined on set A as:

$$R = \{(a, b) : b = a + 1\}$$

$$\text{Therefore, } R = \{(1, 2), (2, 3), (3, 4), (4, 5), (5, 6)\}$$

We find $(a, a) \notin R$, where $a \in A$.

For instance, $(1, 1), (2, 2), (3, 3), (4, 4), (5, 5), (6, 6) \notin R$

Therefore, R is not reflexive.

It can be observed that $(1, 2) \in R$, but $(2, 1) \notin R$.

Therefore, R is not symmetric.

Now, $(1, 2), (2, 3) \in R$

But, $(1, 3) \notin R$

Therefore, R is not transitive

Hence, R is neither reflexive, nor symmetric, nor transitive.

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