

Date _____
Page _____

\therefore Transitive :- $(x, y) \in R, (y, z) \in R$ then $(x, z) \in R$
 $(1, 2) \in R, (2, 3) \in R$ and $(1, 3) \notin R$
No, It is not Transitive.

Proved!!

⑦

$R \rightarrow$ Set of all the books in a library of a college.
 $R = \{(x, y) : x \text{ and } y \text{ have same no. of pages.}\}$

\therefore Reflexive :- $(x, y) \in R \Rightarrow (x, x) \in R$
Here $(x, y) \in R$ and $(x, x) \in R$
It is Reflexive.

\therefore Symmetric :- $(x, y) \in R \Rightarrow (y, x) \in R$
Here $(x, y) \in R$ and $(y, x) \in R$
It is Symmetric.

\therefore Transitive :- $(x, y) \in R, (y, z) \in R$ then $(x, z) \in R$
Here all these books belongs to R .
It is Transitive.

Proved!!

⑧

Set $A = \{1, 2, 3, 4, 5\}$

$R = \{(a, b) : |a - b| \text{ is even}\}$.

~~Ex~~ $|1 - 2| \Rightarrow 1 \text{ odd. } |1 - 5| \Rightarrow 4 \text{ even.}$

$|1 - 3| \Rightarrow 2 \text{ even}$

~~(1, 2)~~ ~~(1, 4)~~ $\{(1, 3), (1, 5)\}$

\therefore Reflexive :- $(x, y) \in R \Rightarrow (x, x) \in R$
Here,

⑨ $R \rightarrow Z \quad 0 \leq x < 12$

$R = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$.

(i) $R = \{(a, b) : |a-b| \text{ is a multiple of } 4\}$.

$\Rightarrow (1, 5) : |1-5| = 4$
 $(1, 9) : |1-9| = 8$
 $\{(1, 5), (1, 9)\}$.

\therefore Reflexive :- $(x, y) \in R \Rightarrow (x, x) \in R$

$(1, 5) \in R \Rightarrow (1, 1) \in R$

It is reflexive.

\therefore Symmetric :- $(x, y) \in R \Rightarrow (y, x) \in R$

$(1, 5) \in R \Rightarrow (5, 1) \in R$

It is symmetric

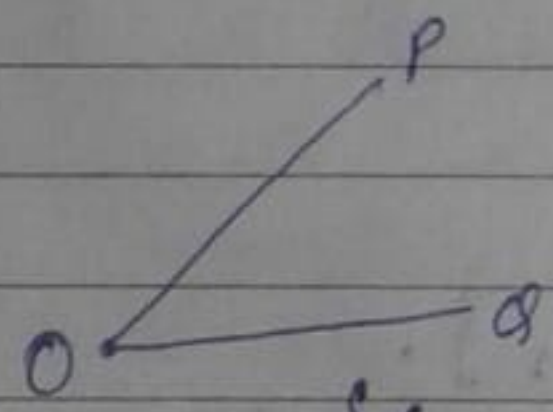
$(12, 8), (8, 4)$

\therefore Transitive :- $(x, y) \in R, (y, z) \in R$ then $(x, z) \in R$

$\Rightarrow (1, 9) \in R, (9, \dots)$

$\Rightarrow (1, 5) \in R, (5, \dots)$

⑪



$\{(0, p), (0, q)\}$.

Reflexive :- $(x, y) \in R \Rightarrow (x, x) \in R$

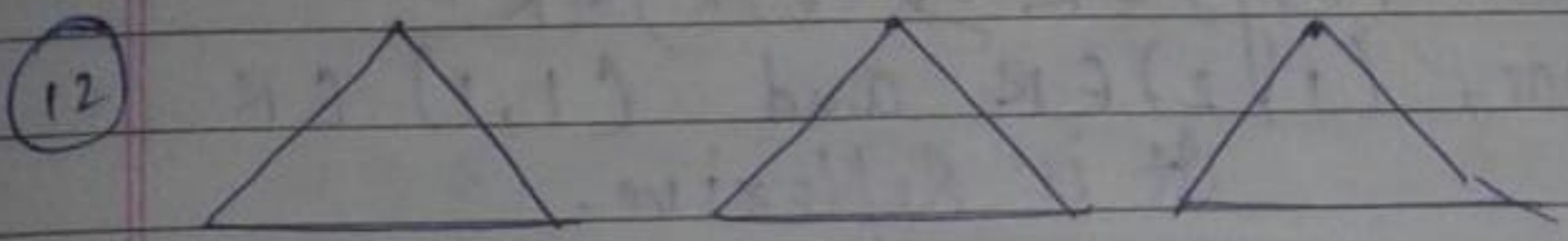
Here, $(0, p) \in R \Rightarrow (0, 0) \in R$

It is Reflexive

\therefore Symmetric :- $(x, y) \in R \Rightarrow (y, x) \in R$
 Here, $(0, p) \in R \Rightarrow (p, 0) \in R$
 It is symmetric

\therefore Transitive :- $(x, y) \in R, (y, z) \in R$ and $(x, z) \in R$
 Here, $(0, p) \in R, (p, 0) \in R$ and $(0, 0) \in R$
 It is Transitive.

(second part) \rightarrow not done (understand).

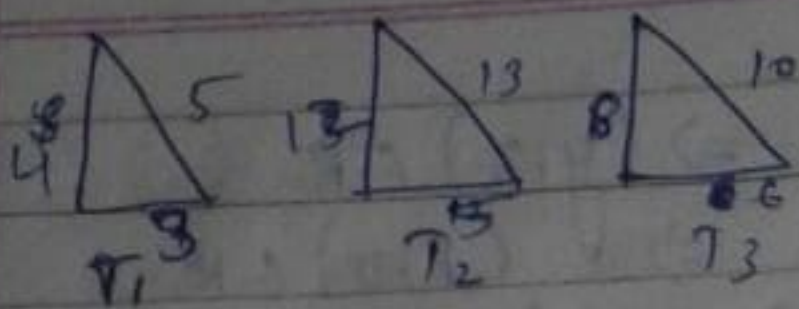


\Rightarrow
 To prove :- $R = \{(T_1, T_2) : T_1 \text{ is similar to } T_2\}$ is
 equivalence relation.

\therefore Reflexive :- $(x, y) \in R \Rightarrow (x, x) \in R$
 $(T_1, T_2) \in R \Rightarrow (T_1, T_1) \in R$
 It is Reflexive.

\therefore Symmetric :- $(x, y) \in R \Rightarrow (y, x) \in R$
 Here, $(T_1, T_2) \in R, (T_2, T_1) \in R$
 It is symmetric.

\therefore Transitive :- $(x, y) \in R, (y, z) \in R$ and $(x, z) \in R$
 Here, $(T_1, T_2) \in R, (T_2, T_3) \in R$ and
 $(T_1, T_3) \in R$. (Triangle)
 It is Transitive



which Δ among T_1, T_2 and T_3 are related
(second part) \rightarrow ??

15

$$R = \{1, 2, 3, 4\}$$

$$R = \{(1, 2), (2, 2), (1, 1), (4, 4), (1, 3), (3, 3), (3, 2)\}$$

Reflexive :- $(x, y) \in R \Rightarrow (x, x) \in R$ ✓
Here, $(1, 2) \in R$ and $(1, 1) \in R$
It is Reflexive.

Symmetric :- $(x, y) \in R \Rightarrow (y, x) \in R$ ✓
Here, $(1, 1) \in R \Rightarrow (1, 1) \in R$ ✓
It is symmetric.

Transitive :- $(x, y) \in R, (y, z) \in R$ then $(x, z) \in R$
Here, $(1, 3) \in R, (3, 1) \notin R$ then $(1, 3) \in R$
It is not Transitive.

(A) is the right answer.

Hence, R is reflexive and symmetric but not transitive.