

Check whether the relation R defined in the set $\{1, 2, 3, 4, 5, 6\}$ as $R = \{(a, b) : b = a + 1\}$ is reflexive, symmetric or transitive.

Solution:

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

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

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

$$(a, a) \notin R, a \in A$$

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

$\therefore R$ is not reflexive.

$$(1, 2) \in R, \text{ but } (2, 1) \notin R$$

$\therefore R$ is not symmetric.

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

$(1,3) \notin R$

$\therefore R$ is not transitive.

R is neither reflective nor symmetric nor transitive.