Answer to Question #87692 – Math – Discrete Mathematics

Question

Let A = {1, 2, 3, 4} and let R be a relation on A such that R = {(1, 1),(2, 2),(3, 3),(4, 4),(1, 2),(2, 3),(3, 2),(2, 1)}. Is R Transitive? Symmetric? Reflexive?

Solution

A relation R is **reflexive** if (a, a) ∈ R, for all a ∈ A.

(1, 1), (2, 2), (3, 3), (4, 4) ∈ R. Hence R is reflexive.

A relation R is **symmetric** if (a, b) ∈ R, then (b, a) ∈ R, for a, b ∈ A

(1, 2) ∈ R, (2, 1) ∈ R.

(2, 3) ∈ R, (3, 3) ∈ R.

Thus R is symmetric.

A relation R is **transitive** if (a, b) ∈ R, (b, c) ∈ R, then (a, c) ∈ R, for all a, b, c ∈ A

(1, 2) ∈ R and (2, 3) ∈ R, but (1, 3) ∉ R.

Thus, R is not transitive.

Answer: it is not transitive, it is symmetric, it is reflexive.