

Math 213, Quiz 8 (Solutions); Friday, March 28, 2008

1. Let $A = \{1, 2, 3\}$ and let

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

be a relation on A .

(a) Is the relation R

- (1) reflexive?
- (2) symmetric?
- (3) transitive?

Provide explanation of your answers.

(b) Write down the matrix M_R representing this relation.

Solution.

(a)

(1) Relation R is reflexive since $(1, 1), (2, 2), (3, 3) \in R$.

(2) Yes, the relation is symmetric.

(3) No, the relation is not transitive. Indeed, $(1, 2), (2, 3) \in R$ but $(1, 3) \notin R$.

(b)

$$M_R = \begin{pmatrix} 1 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 1 \end{pmatrix}.$$