Name Mr Key　　　　　　　　　　　　　　　　　　　　Seat ________

MthSc 119

Quiz 5　　　　　　　　　　　　　　　　　　　　　　February 25, 2005

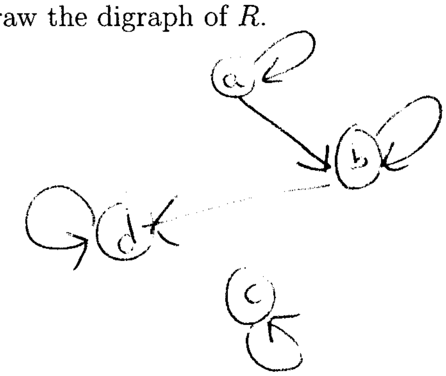
1. Complete the following definitions:

Let R be a relation defined on a set A. We call R **reflexive** provided $\forall x \in A,\ x R x$.

Let R be a relation defined on a set A. We call R **symmetric** provided $\forall x, y \in A,\ x R y \Rightarrow y R x$.

2. Let $A = \{a, b, c, d\}$ and let $R = \{(a, a), (b, b), (c, c), (d, d), (a, b), (b, d)\}$.

(a) Draw the digraph of R.



(b) Is R is transitive? Justify your answer.

No. $aRb \wedge bRd$ but $a \not R d$.

(OVER)

3. Let $A = \{1, 2, 3\}$ and let $R = \{(1,1), (1,2), (2,1), (3,3)\}$. Determine if R is reflexive, irreflexive, symmetric, antisymmetric and/or transitive.

A is not reflexive because $2 \not R 2$.

A is not irreflexive because $3R3$ (also $1R1$).

A is symmetric.

A is not antisymmetric: $1R2 \wedge 2R1$ but $1 \neq 2$.

A is not transitive because $2R1 \wedge 1R2$ but $2 \not R 2$.

4. Let $A = \{1, 2, 3, 4\}$ and let $R = \{(1,2), (2,1), (1,3), (4,4)\}$. Explain why R is <u>not</u> symmetric.

A is not symmetric because $1R3$ but $3 \not R 1$.