CS 381 Solutions to Homework 10

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b) Reflexive, symmetric, not antisymmetric, and transitive.
d) Reflexive, symmetric, not antisymmetric, and not transitive.

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b) R_1,

c) $\emptyset$

30

$\{< 1,1 >, < 1,2 >, < 2,1 >, < 2,2 >\}$.

For example $< 1,2 >$ in R and $< 2,1 >$ in S produce $< 1,1 >$ in $S \circ R$, and $< 1,3 >$ in R and $< 3,2 >$ in S produce $< 1,2 >$ in $S \circ R$.

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b) Since R and S are reflexive, for an arbitrary $x \in A$, $(x,x) \in R$ and $(x,x) \in S$.
Hence for an arbitrary $x \in A$, $(x,x) \in R \cap S$. Hence $R \cap S$ is reflexive.

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32.

#	Reflexive	Irreflexive	Symmetric	Antisymmetric	Transitive
26	Yes	No	No	No	No
27	No	No	Yes	No	No

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2. R is symmetric. Hence it is its own symmetric closure.

9. Symmetric closure of 5: $\{(a,b),(b,a),(a,c),(c,a),(b,d),(d,b),(c,d),(d,c)\}$

20 b) (a,b) in R^3 means that there is a two-stop (three leg) airline flight from city a to city b.

24. Not necessarily. For example let $R = \{< a,b >, < b,a >\}$ on the set $\{a,b\}$. Then $R^2 = \{< a,a >, < b,b >\}$, which is not irreflexive.