CS 381 Solutions to Homework 10

Textbook pp. 581 - 583:

4 (a) Not reflexive, not symmetric, transitive, antisymmetric
(b) Reflexive, symmetric, transitive, not antisymmetric

30 (b) $R_1 \cap R_2 = R_1$
(c) $\emptyset$

32. $S \circ R = \{< 1,1 >, < 1,2 >, < 2,1 >, < 2,2 >\}$

50 (d) Since R and S are reflexive, for every a in A, $< a, a > \in R$ and $< a, a > \in S$.
Hence $< a, a >$ is not in $R - S$ for any a in A. Hence $R - S$ is irreflexive.

p. 597:

32 for 27: Not reflexive, not irreflexive, symmetric, not antisymmetric, not asymmetric, not transitive.
32 for 28: Reflexive, not irreflexive, symmetric, not antisymmetric, not asymmetric, transitive.

pp. 606 - 607:

2. The set of ordered pairs of integers

9 for 6: Add the following arrows: $< a, c >, < b, a >, < c, b >$

20 (c) $< a, b > \in R^*$ if and only if b can be reached from a by taking a number of flights.

24. R^2 is not necessarily irreflexive.
For example let $R = \{< a, b >, < b, a >\}$ over $A = \{a, b\}$, where $a \neq b$. Then R is irreflexive but R^2 is reflexive.