Read Rosen Section 6.1, 6.3, 6.4 up to page 403
Exercises in Rosen:

• page 382: 4, 18, 28b, 36

• Does a relation on a set $A$ which is symmetric and transitive necessarily have to be reflexive? Prove it or give a counterexample relation.

• page 395: 2, 8abc

• Page 407: 26ab

• Recall the recursive definition of transitive closure:

  Given a binary relation $R$ on a set $A$, we use the following rules to construct the relation $tc(R)$.
  
  1. “Basis”: if $(x, y) \in R$, then $(x, y) \in tc(R)$.
  2. “Induction”: if $(x, y) \in tc(R)$ and $(y, z) \in tc(R)$, then $(x, z) \in tc(R)$.
  3. No pair is in $tc(R)$ unless it is shown there using a finite number of applications of rules 1 and 2.

THE ORIGINAL PROBLEM WAS FALSE! Instead, prove by induction on $n$ that if $(x, y) \in R^n$, then $(x, y)$ can be shown to be in $tc(R)$ using some finite number of rule applications.