1. [page 54, #11] Let $G$ be a bipartite graph with bipartition \{A, B\}. Assume that $\delta(G) \geq 1$, and that $d(a) \geq d(b)$ for every edge $ab$ with $a \in A$. Show that $G$ contains a matching of $A$.

2. [page 55, #14] Show that all stable matchings of a given graph cover the same vertices. (In particular, they have the same size.)

3. [page 55, #15] Show that the following ‘obvious’ algorithm need not produce a stable matching in a bipartite graph. Starting with any matching, if the current matching is not maximal, add an edge. If it is maximal but not stable, insert an edge that creates instability, deleting any current matching edges at its ends.

4. [page 55, #20] Derive the marriage theorem from Tutte’s theorem.

5. [page 83, #4] Let $X$ and $X'$ be minimal separators in $G$ such that $X$ meets at least two components of $G - X'$. Show that $X'$ meets at least two components of $G - X$, and $X$ meets all the components of $G - X'$.

6. [page 83, #10] Let $e$ be an edge in a 3-connected graph $G \neq K_4$. Show that either $G \div e$ or $G/e$ is again 3-connected.