MA 514 Homework #6
Due Friday, October 19, in Class

1. Problem 5A.

2. Problem 5C.

3. Problem 5D.

4. Problem 5F.

5. Define a subset I of vertices of a graph to be *independent* if no two vertices in I are joined by an edge. Define a subset K of edges of a graph to be a *covering of vertices by edges* if every vertex is an endpoint of at least one of the edges of K.

   (a) Let G be any graph. Prove that the size of any independent set of vertices is less than or equal to the size of any covering of vertices by edges.

   (b) Let G be a bipartite graph with no vertices of degree zero. Prove that the size of a maximum cardinality independent set of vertices equals the size of a minimum covering of vertices by edges. Suggestion: Use the theorem that the size of a maximum cardinality matching equals the size of a minimum covering of edges by vertices. Relate independent sets of vertices to coverings of edges by vertices, and coverings of vertices by edges to matchings.

   (c) Give an example that to show that the above theorem is not true for arbitrary graphs.

6. Extra Credit: Find a partner and practice doing the card trick in Example 5.1 (see the notes at the end of the chapter).