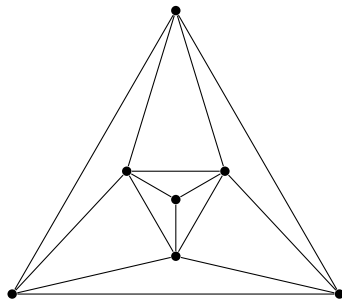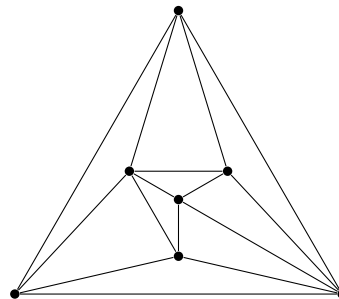# Group Quiz

> **Instructions**: Complete each of the following on separate, stapled sheets of paper.

1. Prove that the graph $K_{m,n}$ has mn edges.

2. What is the smallest number of edges that must be removed from K_5 to make a bipartite graph?

3. For each of the graphs G below, compute the chromatic number $\chi(G)$. Give a complete proof.

   (a)   (b)

4. Prove that every finite simple graph G has at least $\dbinom{\chi(G)}{2}$ edges (where $\chi(G)$ is the chromatic number of G).

5. Let G be a graph and let $\sim$ be the relation on $V(G)$ defined by $u \sim v$ when there is a walk in G from u to v. Prove that $\sim$ is an equivalence relation.