Name: \_

Directions: Show all work. No credit for answers without work.

1. **[4 points]** A drawing of a connected planar graph has 200 edges and 60 regions (including the unbounded region). How many vertices are in the graph?



(a) **[3 points]** Is G bipartite? Give a *short* proof.

(b) [3 points] Determine whether G is planar. If G is planar, give a planar drawing. If G is not planar, find a subgraph homeomorphic to  $K_5$  or  $K_{3,3}$ .