MATH 634, Spring 2014
Homework 13
to be prepared for presentation at 5:00pm on Monday, April 7.

Background reading: Pearls in Graph Theory, Sections 8.1–8.3, 9.1, 9.2, and 10.1.

13-1. Find and prove an "Euler's formula" for **disconnected** planar graphs.

13-2. This question has to do with planar duality:

(a) Show that for all n, the wheel graph W_n is self-dual.

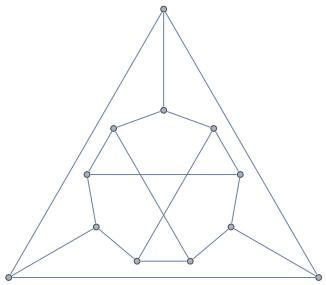
(b) Find a graph that has two non-isomorphic planar duals.
[*Hint: Look for different planar embeddings.*]

13-3. Prove that the graph G in Figure 9.1.18 (p. 189) is non-planar using two methods:

(a) Find a subdivision of $K_{3,3}$ or K_5 that is a subgraph of G.

(b) Through a series of edge deletions and edge contractions, show that either $K_{3,3}$ or K_5 is a minor of G.

13-4. Show that the Petersen graph is a minor of this graph:



13-5. 9.1.1ab

13-6. (a) Show that $\theta(K_7) = 2$.

(b) Show that $\text{genus}(K_6) = 2$