

Collected Homework on Graph Theory

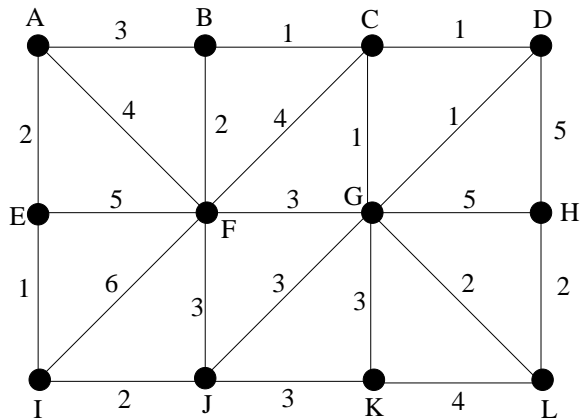
Math 110: Discovering in Mathematics

Due December 11, 2009 at 3:00pm

Name (Print): _____

You may work with someone or on your own to do this assignment. If you do work with someone, please indicate that you did so. Each person should write up his or her own assignment. Please be neat and staple your work.

1.



(a) Use **Prim's** algorithm to find a minimal spanning tree of the above weighted graph. Make it clear where you are beginning. List the edges in the order they are selected, sketch the minimal spanning tree, and give the total weight of the minimal spanning tree.

(b) Use **Kruskal's** algorithm to find a minimal spanning tree of the above weighted graph. List the edges in the order they are selected, sketch the minimal spanning tree, and give the total weight of the minimal spanning tree.

2. Draw all the different (simple) graphs with four vertices. (Hint: Come up with a strategy for finding these graphs. Perhaps start with the fewest number of edges a graph can have and work up from there, looking for all graphs on four vertices that have that number of edges. Note that these graphs need not be connected.)

3. As we mentioned in class, a graph is **regular** if all its vertices have the same degree.

(a) Draw all the different regular (simple) graphs on four vertices. Explain why you have found them all.

(b) Draw all the different regular (simple) graphs on five vertices. Explain why you have found them all.