

Collected Homework on Graph Theory

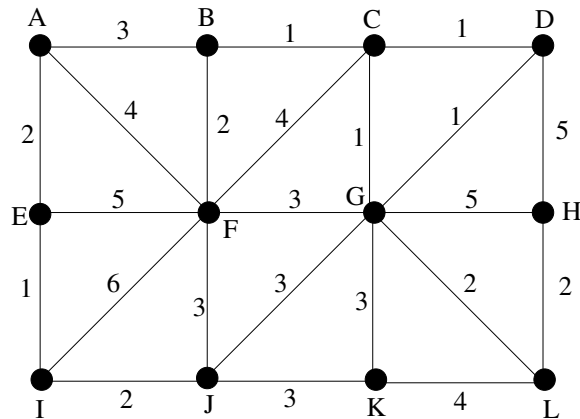
MATH 110: Discovering in Mathematics

Due December 6, 2019 at 2:00pm

Name (Print): _____

You may discuss this assignment with someone or work on your own. If you do discuss it with someone, please indicate that you did so. Each person should write up their own assignment after any discussion. Please complete your work on this handout, be neat and staple your work.

1.



(a) Use **Prim's** algorithm to find a minimum spanning tree of the above weighted graph. Note that different people may obtain different trees or obtain the same tree but in different ways. **Make it clear where you are beginning.** List the edges in the order they are selected, sketch the minimum spanning tree, and give the total weight of the minimum spanning tree.

(b) Use **Kruskal's** algorithm to find a minimum spanning tree of the above weighted graph. Note that different people may obtain different trees or obtain the same tree but in different ways. List the edges in the order they are selected, sketch the minimum spanning tree, and give the total weight of the minimum spanning tree.

2. (a) Draw a graph on eight vertices with 13 edges. (Note that there are many ways to do this, so if you are working with someone else, be sure to draw different graphs!)

(b) How many edges will be in the complement of your graph. Explain.

(c) Draw the complement of your graph.

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.