Name _____

ID# _____

Please show your work.
And remember: no calculators!
*The test is out of 100 points.*

1. [15 pts] Consider the following graph:

(a) Write the degrees of the vertices on the graph above.

(b) Does this graph have any Euler circuits? Why or why not?

(c) Does this graph have any Euler paths? Why or why not?

(d) On the copy of the graph below, give an optimal Eulerization of the graph.

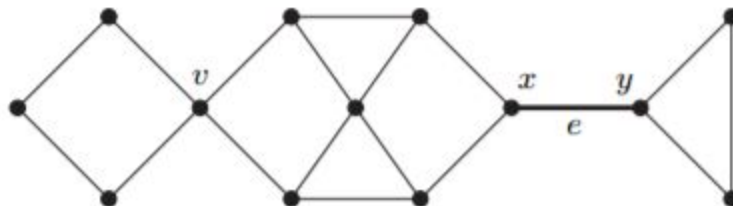(e) Finally, on your eulerized graph, give an Euler circuit.

2. [10 pts] Consider the following graph (ignore the fact that some edges are thicker than others):
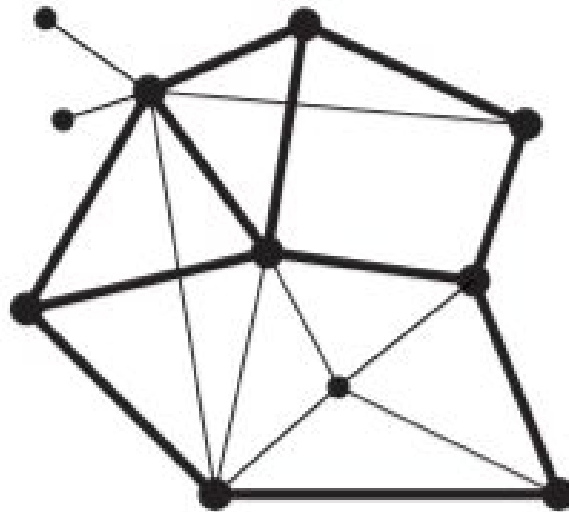
(a) Write the degrees of the vertices on the graph above.

(b) On the same graph given above, draw an Eulerization of the graph.

3. [10 pts] Consider the following graph:
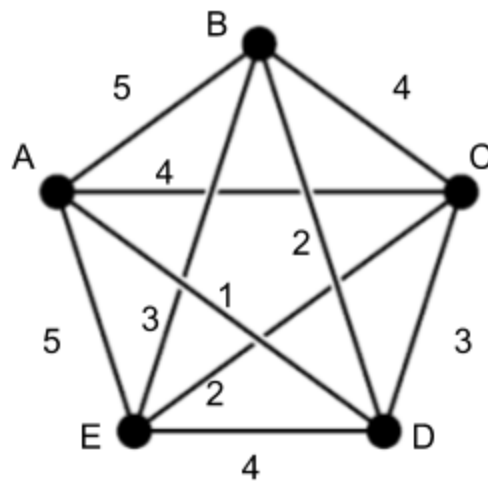

(a) Find a path from v to y of length 7.

(b) Find all circuits in the graph of length 5; indicate where they are. How many are there?

(c) Is edge "e" a bridge?

4. [10 pts] Find all spanning trees of the graph below. Draw a separate graph for each.

5. [15 pts] Consider the following weighted graph:

(a) Using the NNA starting at A, give the resulting Hamilton circuit and its total weight.
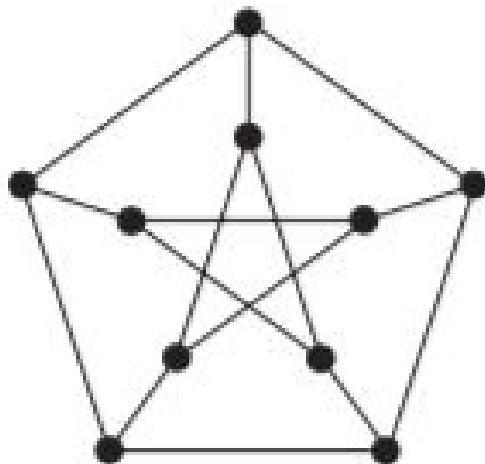
(b) Using the NNA starting at E, give the resulting Hamilton circuit and its total weight.

(c) Using the Cheapest link algorithm, give the resulting Hamilton circuit and its total weight.

6. [10 pts] For the weighted graph in problem #6, reproduced below, use Kruskal's algorithm to find an MST, and give its total weight.
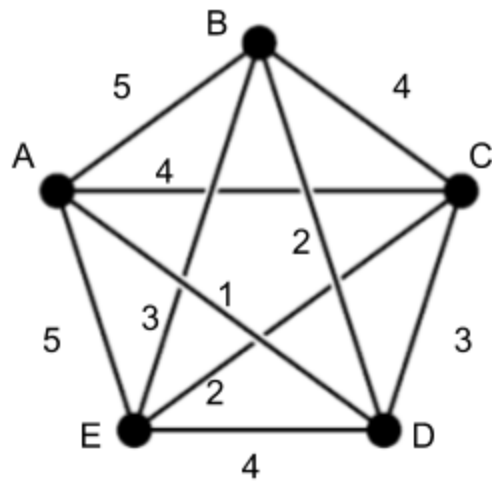
7. [10 pts] Find a Hamilton path in the graph below.

8. [15 pts]

(a) Draw a K₆ graph below.

(b) If each edge has weight 5, what is the total weight of an MST in your K₆ graph?

(c) If instead one edge has weight 2, and the rest have weight 5, what is the total weight of an optimal Hamilton circuit in your K₆ graph?

9. [5 pts] How many spanning trees does the following graph have?