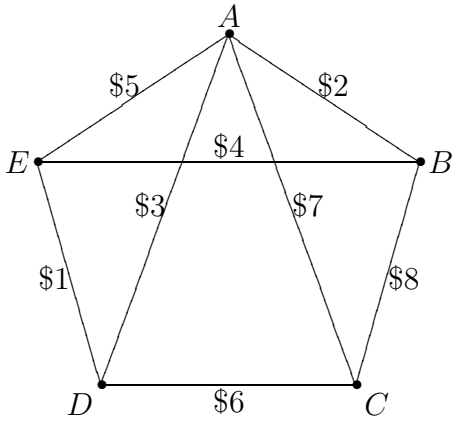
Math 1001 Quiz 3 Solutions

1. (5 points) You want to build a network between the 5 cities below of minimal cost. Using Kruskal's algorithm, give a list of the edges you should include and the total cost.



You should include edges $ED, AB, AD,$ and DC, for a total cost of \$12.

2. (4 points, 1 each) True or false. Circle the correct answer, no justification.

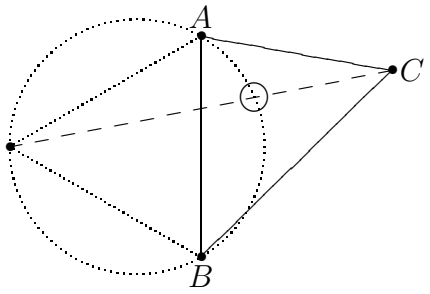
   TRUE Kruskal's algorithm always finds a network of minimal cost in a graph.

   TRUE A bridge is the same thing as an edge that is not redundant.

   TRUE A Hamilton path is automatically a minimal network.

   FALSE Every triangle has a Steiner point in the interior.

3. (3 points) A fellow student started to use Toricelli's method to find a Steiner point in the triangle ABC, but forgot the final steps. Finish it off and label the Steiner point.



The newly drawn line is dashed and the Steiner point is circled.

4. (3 points) Someone tells you that they built a computer network between 367 different computers on campus using only cables that go directly from one computer to another. They tell you that they used 367 cables to do so. Is their network minimal? Why or why not?

   This network is not minimal. A minimal network between 367 different computers would always require exactly 366 cables.