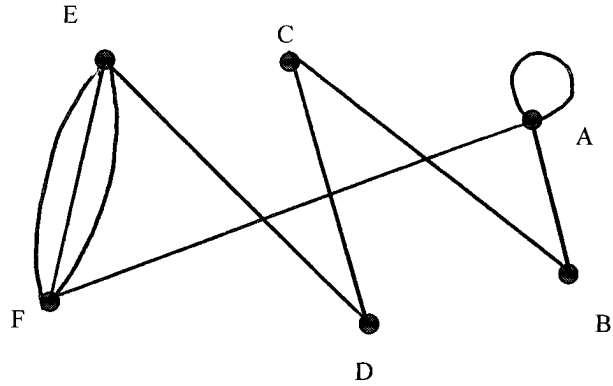
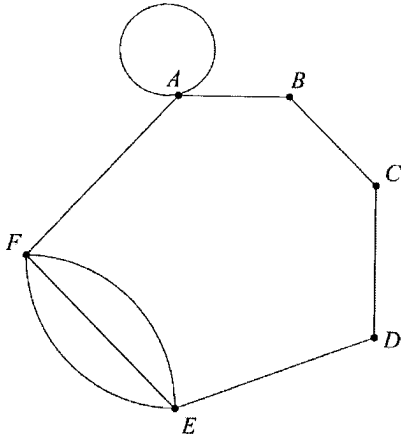
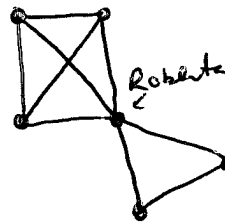


1) (4 points) Draw an equivalent graph to the given graph below by connecting the vertices:



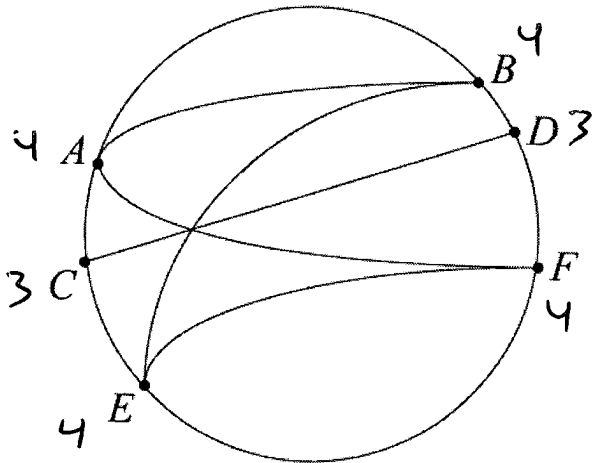
2) (3 points) Draw a graph that represents the following situation:

Roberta belongs to two clubs. The first club has 3 other members and the second club has 2 other members. Roberta is the only person that belongs to both clubs

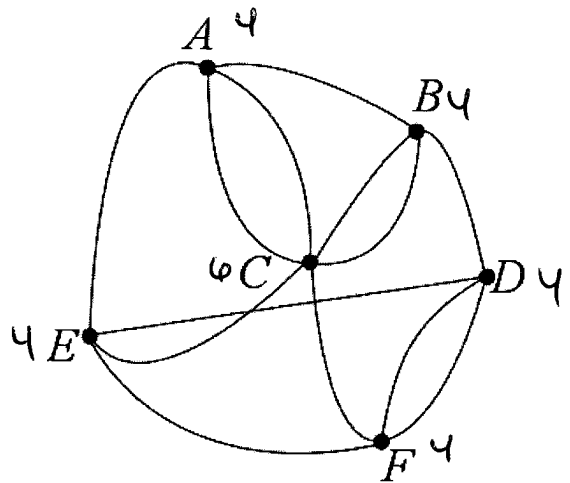


3) (8 points each) For the following graphs below, label each vertex with its degree. Also, determine if there is an Euler Circuit, Euler Path, or neither. **If there is an Euler Circuit or Euler Path, give an example of one.** If there is neither, explain why not:

a)



b)



Euler Path

~~CABAFECDBEFD~~

CABAFECDBEFD

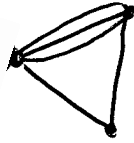
Euler Circuit

A E F D B A C E D F C B C A

23

4) (4 points) Draw a graph that meets the following requirements or explain why the graph cannot exist.

- a) A connected graph with only 3 vertices, all of them even degree, where the total degree is 10:
 b) A graph that contains a bridge and has an Euler Circuit.

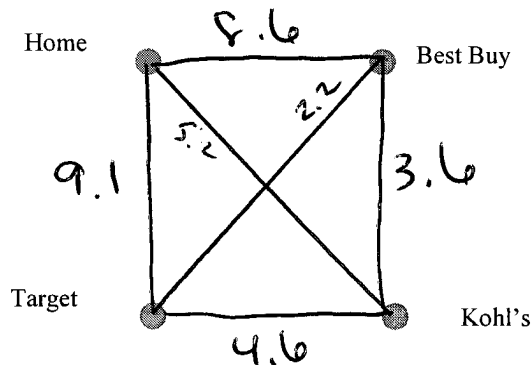


Noope because...

5) Mike needs to do some shopping on Black Friday to get some amazing deals. He finds the distances between the stores that he plans on visiting. The distances are in miles:

	Home	Best Buy	Target	Kohl's
Home		8.6	9.1	5.2
Best Buy	8.6		2.2	3.6
Target	9.1	2.2		4.6
Kohl's	5.2	3.6	4.6	

a) (3 points) Based on the information in the chart, draw a weighted graph below:



b) (7 points) List the three unique Hamilton Circuits for this graph and find the corresponding total weight. According to the Brute Force Method and assuming Mike wants to travel the shortest route, which Circuit should Mike choose?

HKBTH \square $8.6 + 3.6 + 4.6 + 9.1 = 25.9$

HBTkH \boxtimes $8.6 + 2.2 + 4.6 + 5.2 = 20.6$

HKBTH \boxtimes $5.2 + 3.6 + 2.2 + 9.1 = 20.1$

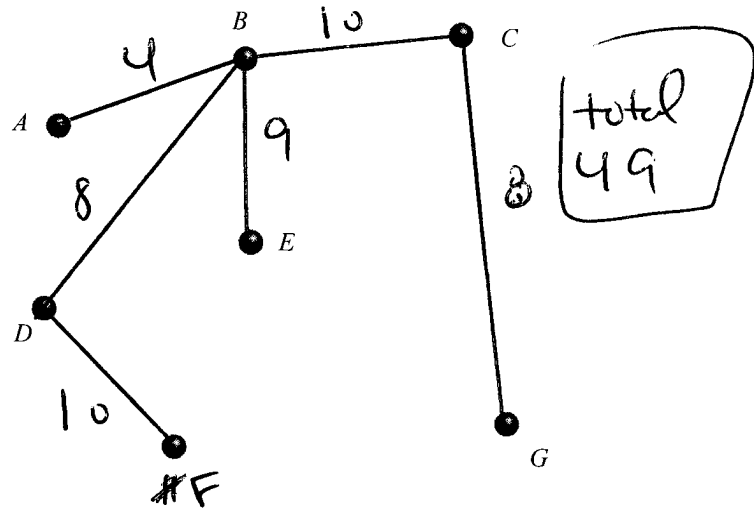
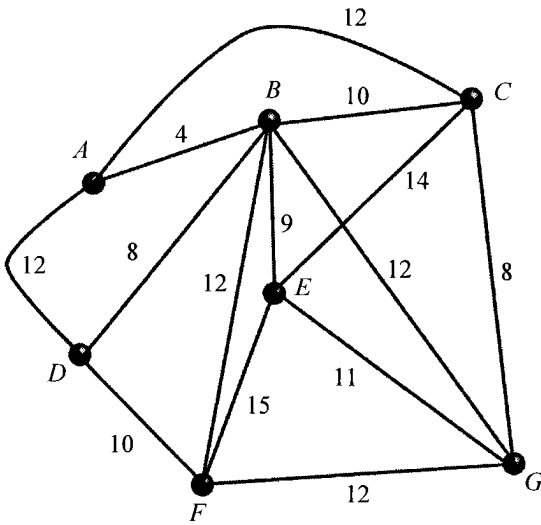
c) (4 points) For the same graph in part a, solve the problem using the Nearest Neighbor Method:

HKBTH

20.1

22

6) (6 points) For the weighted graph below, draw a minimal spanning tree. Also, declare what the minimal weight is:

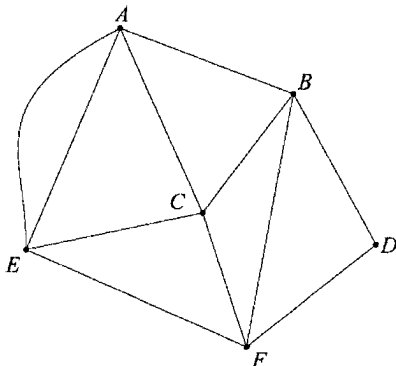


7) (2 points each) Define the following terms. Examples will not be accepted for credit:
 a) Bridge
 b) Euler Circuit

< insert words here >

8) (2 points each) For the following graph, select the best answer from the following list. Not all terms will be used:

Path Circuit Euler Path Euler Circuit Hamilton Path Hamilton Circuit



- a) *BCAEFDB* HAM CIRCUIT
- b) *ABDFBCFECAE* PATH
- c) *CBDFEA* HAM PATH
- d) *ABDFBCFECAEA* Euler Circuit

TS

Be sure to show unit fractions as needed!

9) (3 points each) Convert as directed.

a) 72 inches to feet

$$72 \text{ in} \cdot \frac{1 \text{ ft}}{12 \text{ in}} = 6 \text{ ft}$$

b) 48 cm to in.

$$48 \text{ cm} \cdot \frac{1 \text{ in}}{2.54 \text{ cm}} = 18.90 \text{ in}$$

10) (3 points) **Explain** how to use the sentence *King Henry Died Monday Drinking Chocolate Milk* to convert 0.038 km to cm.

Ummmm...

11) (5 points) A peregrine falcon can reach a top speed of 259.1 kilometers per hour. What is this speed in feet per second? Round answer to two places.

$$\frac{259.1 \text{ km}}{1 \text{ hr}} \cdot \frac{1 \text{ hr}}{3600 \text{ sec}} \cdot \frac{1 \text{ mi}}{1.609 \text{ km}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}}$$

$$\approx 236.18 \text{ ft/sec}$$

12) (5 points) An American football field has dimensions of 120 yd. by 53.5 yd. If it costs \$1,200,400 a year to maintain the field, how much does it cost to maintain one square meter? Round to two decimal places.

$$120 \text{ yd} \cdot 53.5 \text{ yd} = 6420 \text{ yd}^2$$

$$\frac{\$1,200,400}{6420 \text{ yd}^2} \cdot \frac{1 \text{ yd}^2}{9 \text{ ft}^2} \cdot \frac{1 \text{ ft}^2}{0.093 \text{ m}^2} \approx \$223.39 / \text{m}^2$$

19

