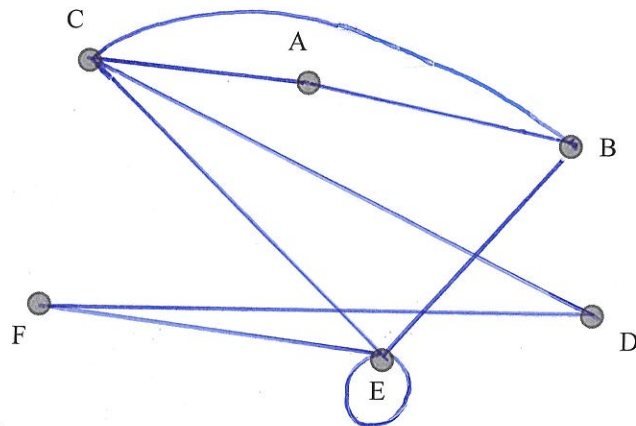
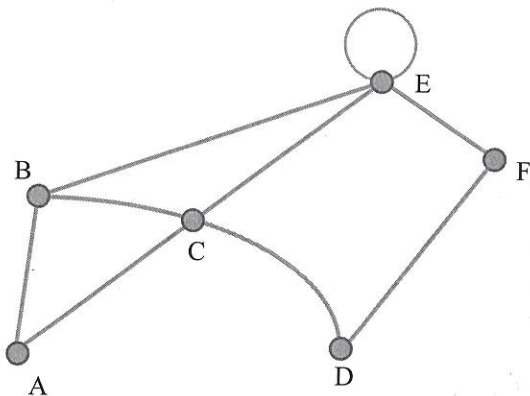
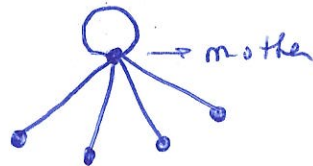


- 1) (4 points) Draw an equivalent graph to the given graph below by connecting the vertices:



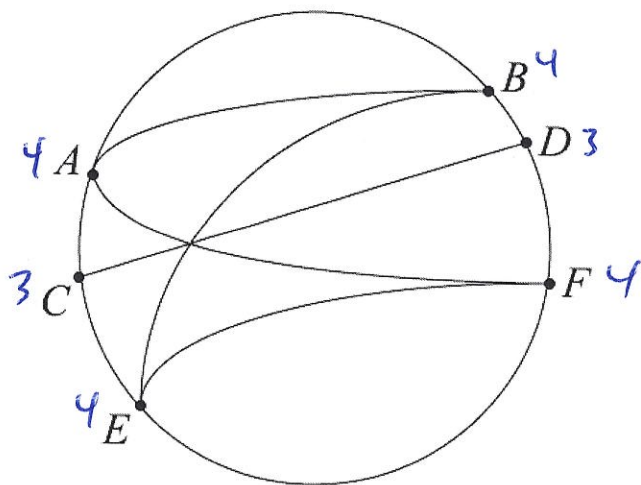
- 2) (3 points) Draw a graph that represents the following situation:

A mother serves cake to four children at a birthday party and serves a piece of cake to herself.



- 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:

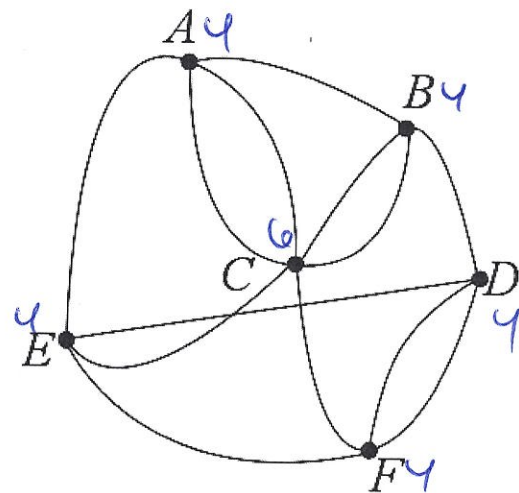
a)



Euler path

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

b)



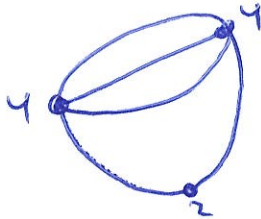
Euler Circuit

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.

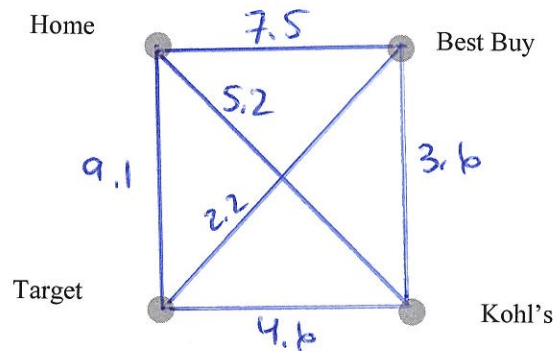


Noope...

5) Mike needs to do some shopping on December 26th 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		7.5	9.1	5.2
Best Buy	7.5		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?

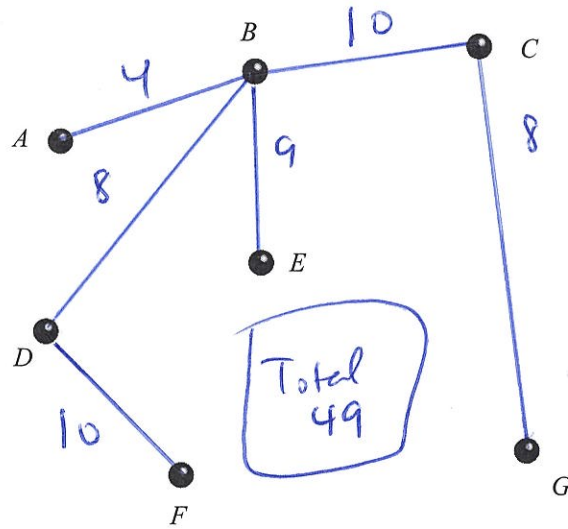
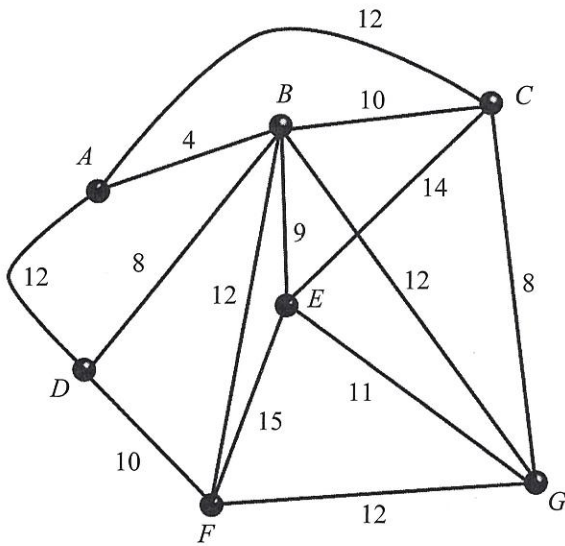
HBKTH ☐ $7.5 + 3.6 + 4.6 + 9.1 = 24.8 \text{ mi}$
~~HBTKH ☒ $7.5 + 2.2 + 4.6 + 5.2 = 19.5 \text{ mi}$~~
~~HTBKH ☒ $9.1 + 2.2 + 3.6 + 5.2 = 20.1 \text{ mi}$~~

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

H K B T H $= 20.1 \text{ miles}$
 $\underbrace{H \rightarrow K}_{3.2} \underbrace{K \rightarrow B}_{3.6} \underbrace{B \rightarrow T}_{2.2} \underbrace{T \rightarrow H}_{9.1}$

22

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

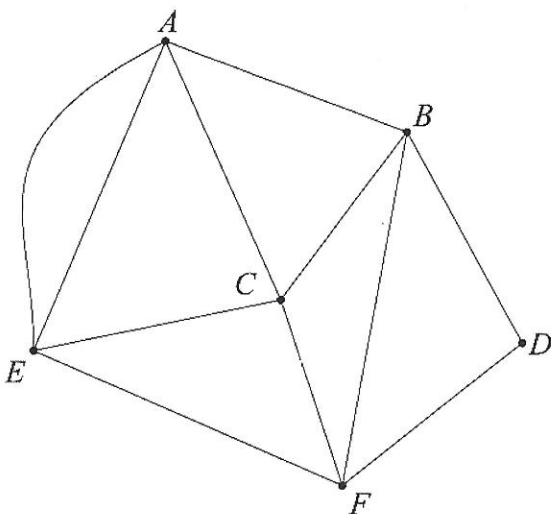


- 7) (2 points each) Define the following terms. Examples will not be accepted for credit:
a) Path
b) Adjacent Vertices

words please!

- 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) $BCAEFDB$
b) $ABDFBCFECAE$
c) $CBDFEA$
d) $ABDFBCFECAEA$

Ham Circuit

PATH

Ham PATH

Euler Circuit

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Be sure to show unit fractions as needed!

9) (3 points each) Convert as directed. Round to two places as needed.

a) 72 inches to feet

b) 48 cm to in.

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

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

10) (3 points) **Explain** how to use the sentence *King Henry Died Monday Drinking Chocolate Milk* to convert 0.538 km to cm.

carefully

11) (5 points) A cheetah can reach a top speed of 120.7 kilometers per hour. What is this speed in feet per second? Round answer to two places.

$$\frac{120.7 \text{ km}}{1 \text{ hr}} \cdot \frac{1 \text{ mi}}{1.609 \text{ km}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{1 \text{ hr}}{3600 \text{ sec}}$$

$$\approx 110.02 \text{ ft/second}$$

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.

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

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

Be sure to show unit fractions as needed!

- 13) (3 points) A bathtub is 6 ft by 4 ft by 3 ft. How many liters of water will it hold? Round to two places.

$$6\text{ ft} \cdot 4\text{ ft} \cdot 3\text{ ft} = 72\text{ ft}^3$$

$$72\text{ ft}^3 \cdot \frac{7.48\text{ gal}}{1\text{ ft}^3} \cdot \frac{4\text{ qt}}{1\text{ gal}} \cdot \frac{1\text{ L}}{1.0567\text{ qt}} = \boxed{2038.65\text{ L}}$$

- 14) (3 points each) The Guinness World Record for Heaviest Pumpkin is 2,624.6 pounds.
Rounding only the final answer to two places, what is its weight in...

a) Ounces

b) Grams

c) Kilograms

$$2624.6\text{ lb} \cdot \frac{16\text{ oz}}{1\text{ lb}}$$

$$\boxed{41,993.6\text{ oz}}$$

$$41,993.6\text{ oz} \cdot \frac{28.35\text{ g}}{1\text{ oz}} \rightarrow \text{Kilograms}$$

$$\boxed{1,190,518.56\text{ g}}$$

$$1190.51856 \rightarrow \boxed{1190.52\text{ kg}}$$

- 15) (3 points each) Convert as directed. Round to two places as needed:

a) 14°F to $^\circ\text{C}$

b) 240°C to $^\circ\text{F}$

$$C = \frac{5}{9}(14 - 32)$$
$$= \boxed{-10^\circ\text{C}}$$

$$F = \frac{9}{5}(240) + 32$$
$$\boxed{F = 464^\circ\text{F}}$$

18
6