**Instructions:** Work problems on a separate sheet of paper and attach work to this page. You should show all work to receive full credit for problems. Checking your work with computer algebra systems is fine, but that doesn't count as "work" since you won't be able to use CAS programs on exams or quizzes. Sketch any graphs you obtain. Questions with compact answers can be recorded directly on this page. Graphs and longer answers that won't fit here, indicate which page of the work the answer can be found on and be sure to clearly indicate it on the attached pages.
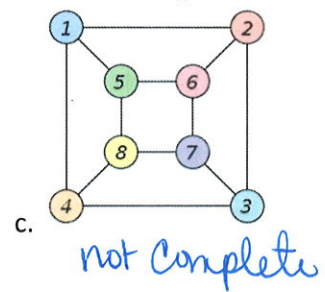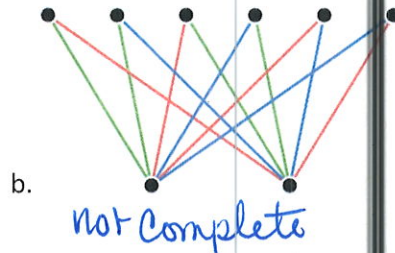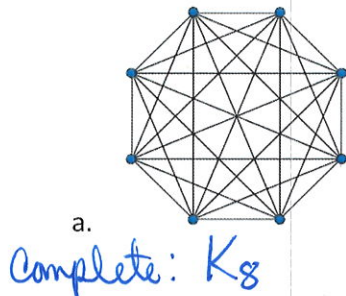
1. Identify the degree of each vertex.

a.

b.
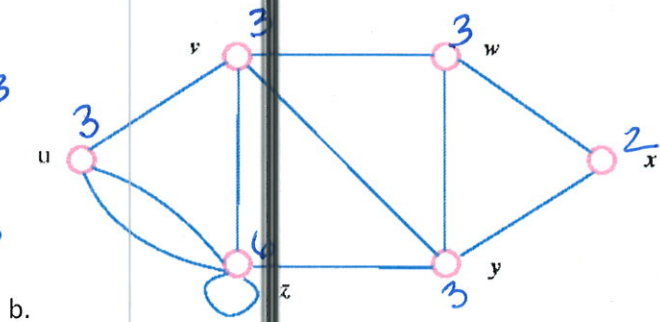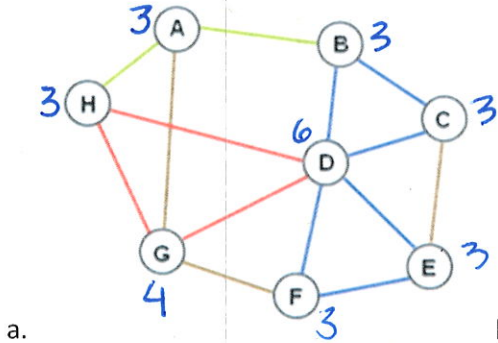
2. Determine if the following graphs are isomorphic. Explain your reasoning.
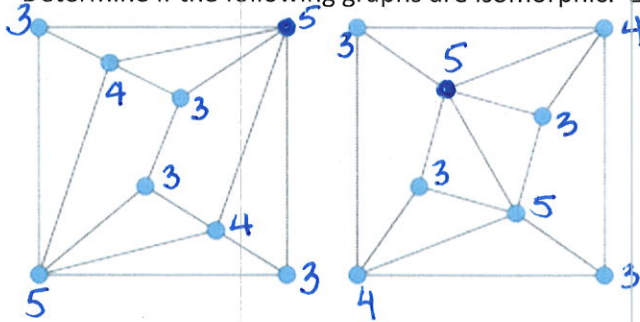
they are not

3. Determine if the following graphs are complete, and label the complete graphs with K_n.

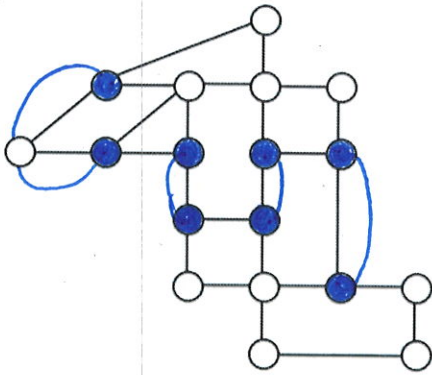a. Complete: K_8

b. Not Complete

c. Not Complete

4. Determine if the graph has an Euler circuit. If it does not, does it have an Euler path? If either is the case, find it by numbering the edges of the circuit/path.
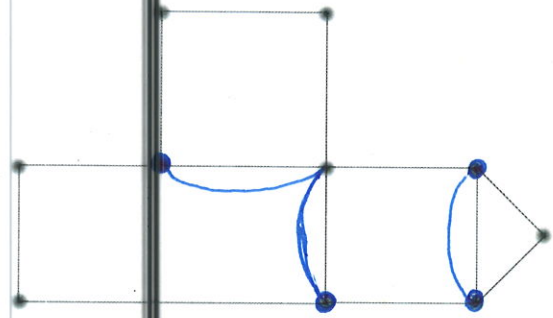
The graph at top (vertices A, B, C, D, E, F, G) with edge numbers: 1, 2, 7, 10, 3, 6, 11, 12, 9, 5, 7, 4, 8
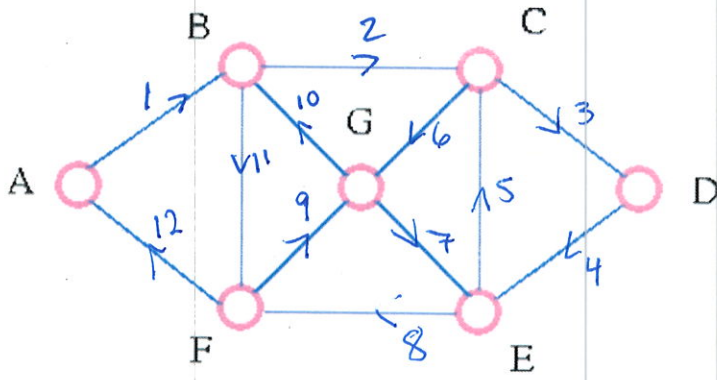
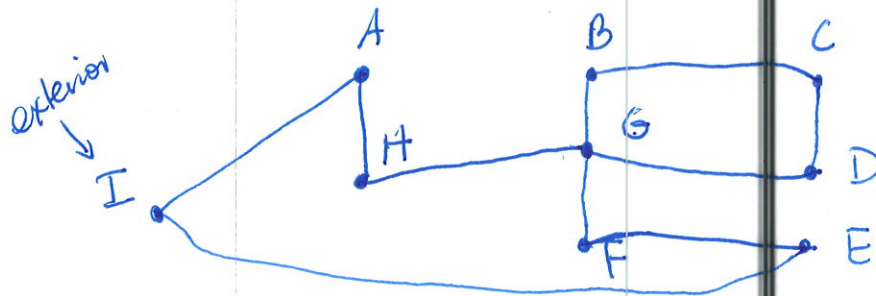has an Euler circuit

answers may vary

5. Eulerize the graphs below.
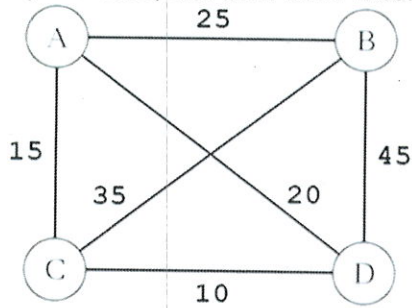

a.

b.

6. Draw a Graph that represents the floor plan below.

exterior

I   A   H   B   G   C   D   F   E
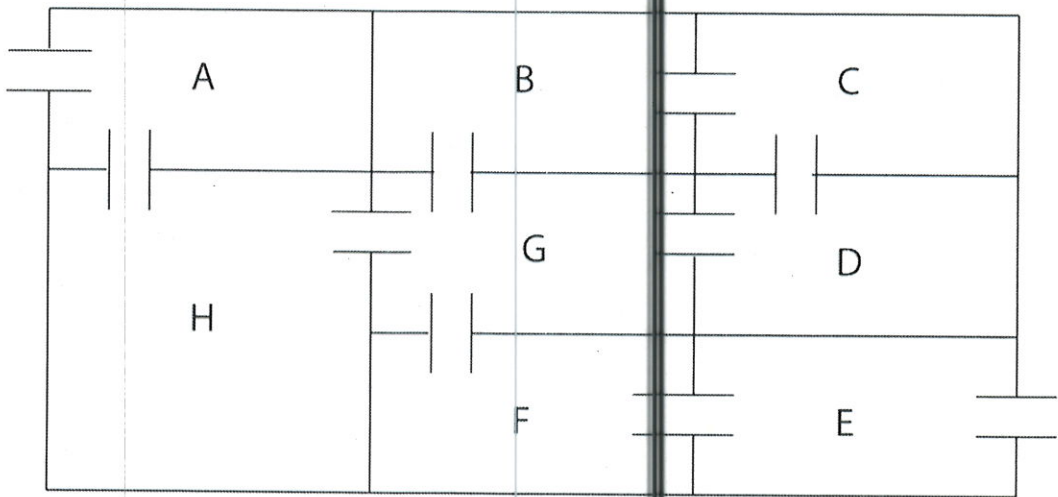
7. Use Brute Force to find the optimal Hamilton circuit for the graph below. Be sure to list all unique circuits, and their sum. Clearly label the least cost graph.
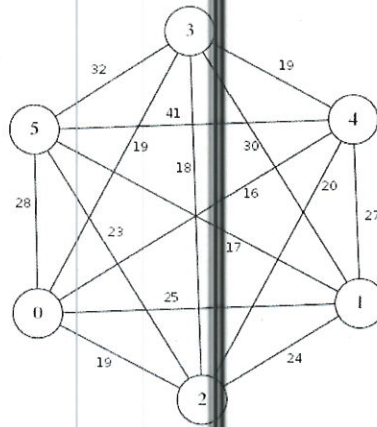

$ABCDA = 25 + 35 + 10 + 20 = \boxed{90}$
$ABDCA = 25 + 45 + 10 + 15 = 95$
$ACBDA = 15 + 35 + 45 + 20 = 115$

8. Approximate the lowest cost Hamilton circuit using Nearest Neighbor (starting at A or 1), and Cheapest Link. Clearly state the value of the lowest cost circuit in each case.
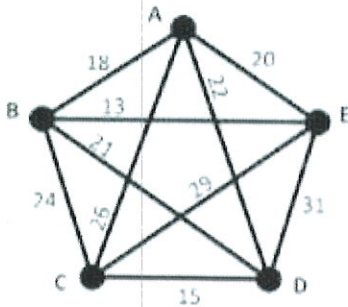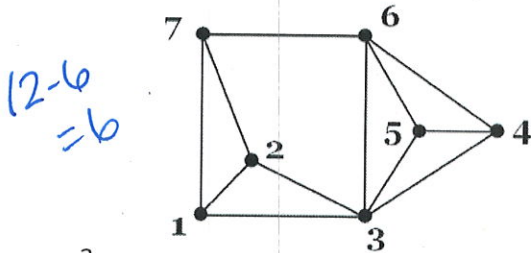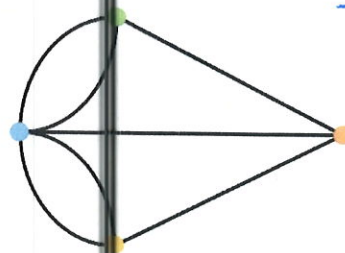
a.

b.

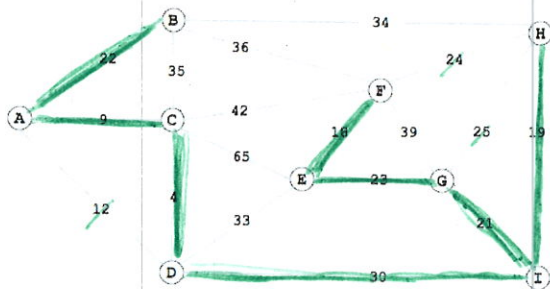9. Calculate the redundancy of the graphs below.

a.

$12-6$
$=6$

b.

$7-3=4$

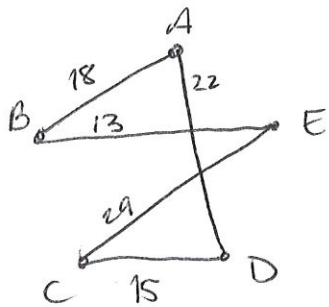10. Use Kruskal's Algorithm to find the lowest cost spanning tree for the following graphs.

a.

$4 + 9 + 18 + 19 + 21 + 22 + 23 + 30 = \boxed{146}$
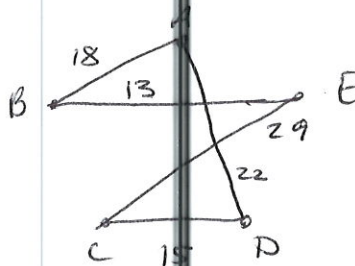
MTH 151   Homework #8 Key

8a. Nearest Neighbor
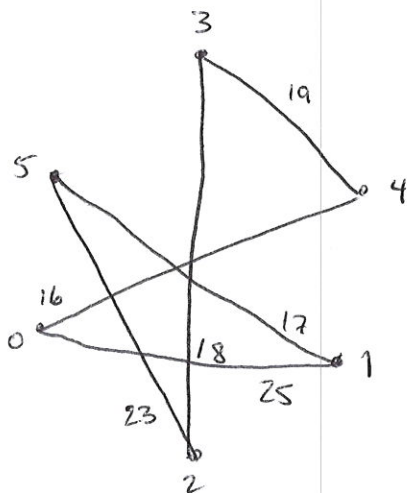

A
18   22
B   13   E

29
C   15   D

ABECDA
(97)

Cheapest Link

18
B   13   E
29
22
C   15   D

ABECDA
(97)

b.

3
19
5   4
16   17
0   1
18
23   25
2

1 0 4 3 2 5 1
(118)

3
19
5   4
23   30
16   17
0   1
19
2

1 5 2 0 4 3 1
(12√)

11.

Rome 1182 Berlin
Brussels
261
Paris
502 602   341   Dublin
463
Munich 1361   London
1450
Madrid
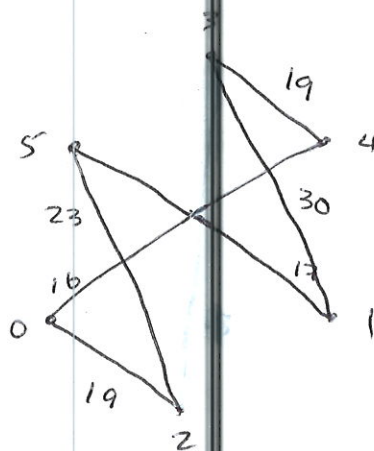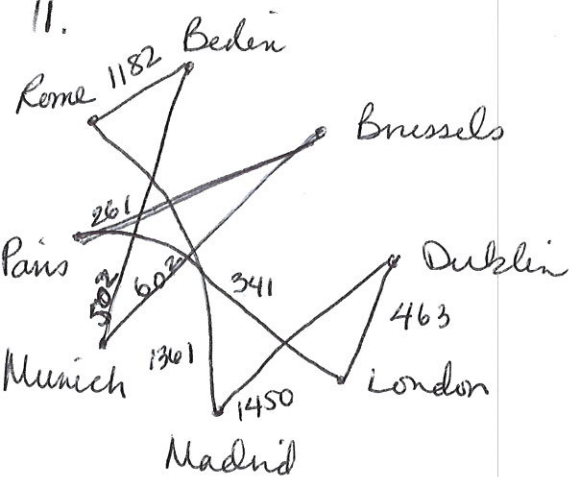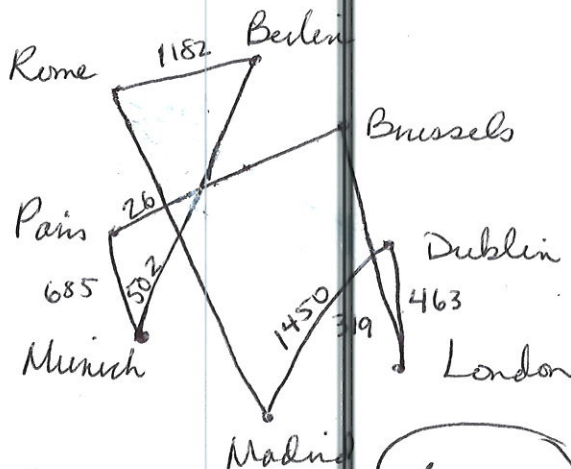
261+319 +463+502+685+ 1182 +1361 +1450 = (6223)

$502 + 602 + 261 + 341 + 463 + 1450 +$
$1361 + 1182 =$ (6162)

Rome   1182   Berlin
Brussels
Paris   26
502
685   Dublin
1450   319   463
Munich   London
Madrid
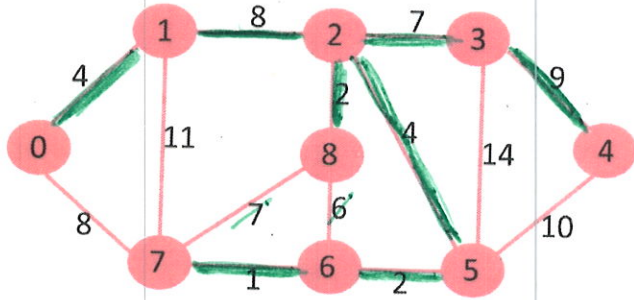
1+2+2+4+4+7+8+9

=(37)

b.

11. A mileage table is shown below. Use Nearest Neighbor starting at Berlin, and Cheapest Link to approximate the lowest cost Hamilton circuit spanning all the listed cities. Clearly state the cost of the final circuit.

Berlin							
652	Brussels						
1315	773	Dublin					
930	315	465	London				
1868	1314	1450	1263	Madrid			
505	602	1375	916	1485	Munich		
877	261	777	340	1053	685	Paris	
1182	1171	1882	1431	1361	698	1106	Rome

12. Convert the following measurements to the indicated units.
    a. 250 mm to meters
    b. 5.3 km to miles
    c. 4.1L to quarts
    d. 7634 grams to pounds
    e. 10°F to Celsius

.25 m= 250/1000

5.3×.62 = 3.3 miles

4 qts   3.47 lbs

$\frac{5(10-32)}{9}$ = -12.2°C

13. Identify the meaning of the following prefixes:
    a. Milli $1/1000 = 10^{-3}$
    b. Centi $1/100 = 10^{-2}$
    c. Mega $1,000,000 = 10^{6}$
    d. Nano $1/1,000,000,000 = 10^{-9}$
    e. Femto 10^{-15}
    f. Tera 10^{12}
    g. Kilo $1000 = 10^{3}$
    h. Deca 10
    i. Micro $1/1,000,000 = 10^{-6}$
    j. Giga $1,000,000,000 = 10^{9}$