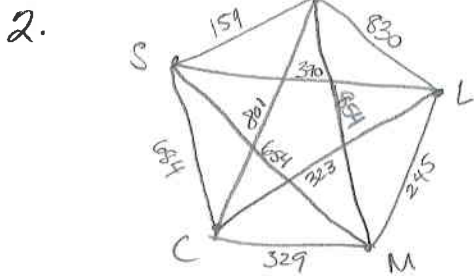
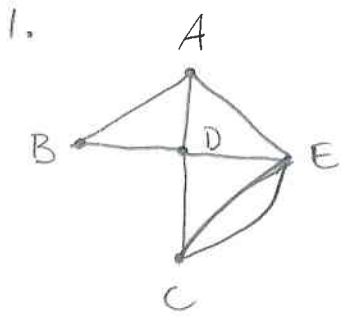
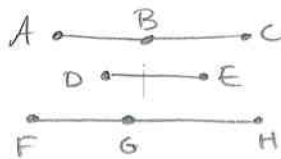


# Math 1116 Homework #3 Key

1

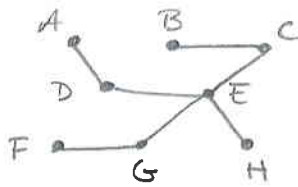


3. a. not connected



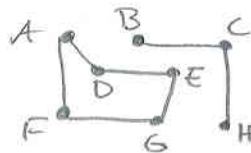
A, C, D, E, F, H = degree 1  
B, G = degree 2

b. Connected



A, B, F, H: degree 1  
C, D, G: degree 2  
E: degree 4

c. not connected



B, H: degree 1  
A, C, D, E, F, G: degree 2

4. a. there is an Euler path but not a circuit since D, C vertices are degree 3, all others are degree 4.

Path: D, E, A, B, C, A, D, B, E, C

Your answer may vary slightly  
must begin at D or C however

b. an Euler circuit exists since all vertices are even degree

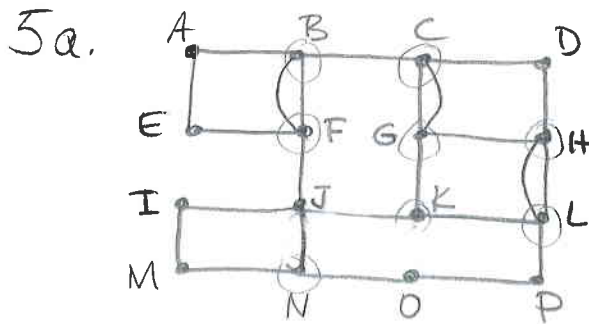
Circuit: A, C, D, F, E, B, F, C, B, A

your answers may vary  
you may begin anywhere

4c. Euler circuit exists since all vertices are even degree <sup>(2)</sup>

Circuit: A, D, E, B, C, A, B, A

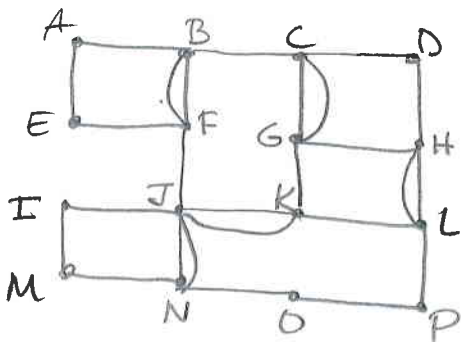
your answers may vary  
you may begin at any vertex



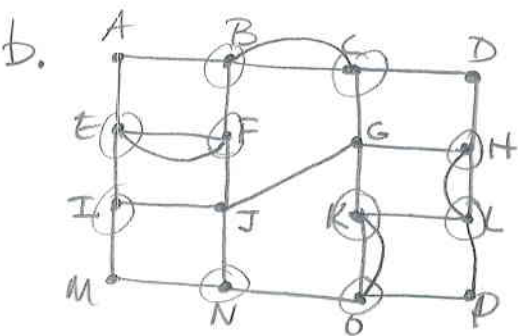
find all odd vertices first  
connect nearby odd vertices  
adding edges BF, CG, HL forms a  
Semi-Eulerization since it leaves only  
K and N odd, which is enough for  
a path.

to fully Eulerize the graph, however,  
you will need to add JK and JN

Path: N, M, I, J, N, O, P, L, H, D, C, B, A, E, F, B, F, J, K, G, C, G, H, L, K



Circuit: follow same path as above but  
add new edges... K, J, N to return to  
start.

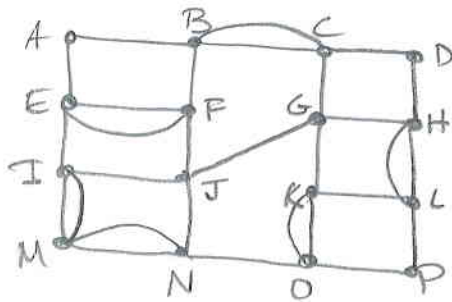


odd vertices are circled  
leave two odd for semi-Eulerization  
Other options are available  
(for instance, you will add the same # of  
edges if C, H remain odd and you  
connect KL, ON, EI and BF instead)

Path: begin at an odd vertex

I, M, N, O, P, L, H, D, C, B, A, E, I, J, F, E, F, B, C, G, H, L, K, O, K, G, J, N

5b cont'd



to connect a circuit add edges  
NM and MI, then follow the previous  
path + these two additional edges  
... NMI

6. Since I can't just add BC, but must duplicate  
existing edges, I need 2 edges connecting B to C w/ the  
least weight.

$$BAC = 10 + 8 = 18$$

$$BEC = 6 + 11 = 17$$

$$BDC = 4 + 12 = 16 \leftarrow \text{Choose this one}$$

So duplicate BD and DC