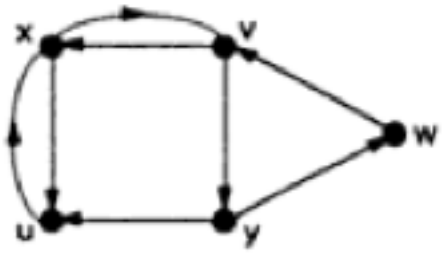
MATH 3330: Applied Graph Theory

ASSIGNMENT #2

Due Thu. Feb 4

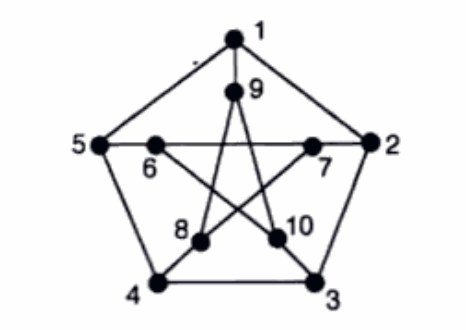
1. For the graph shown below and the given vertex sequences (i-iv),



i) <x,v,y,w,v>
ii) <x,u,x,u,x>
iii) <x,u,v,y,x>
iv) <x,v,y,w,v,u,x>

a) Which of the vertex sequences represent a directed walk in the graph?
b) What are the lengths of those that are directed walks?
c) Which directed walks are directed paths?
d) Which directed walks are directed cycles?

2. In the Petersen graph shown below,



a) Find a trail of length 5.
b) Find a path of length 9.
c) Find cycles of length 5, 6, 8 and 9.

3. Determine the girth of the graphs indicated:

   a) Complete bipartite graph $K_{m,n}$ for $m \geq n \geq 3$,
   b) Complete graph $K_{m,n}$ $n \geq 3$, and
   c) The Petersen graph.

4. Determine whether the Petersen graph is hamiltonian.

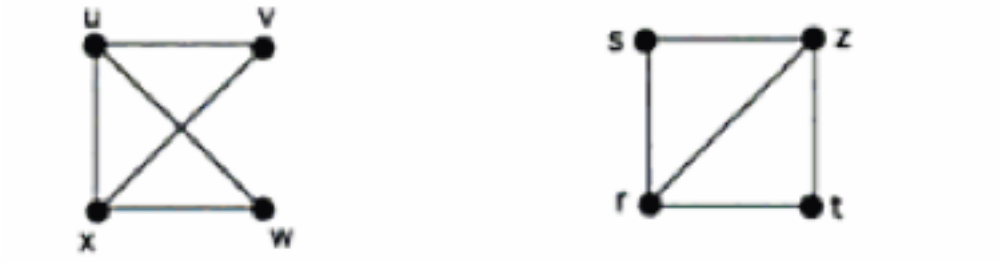
5. Give the number of different eulerian tours in K_4.

6. Find all possible isomorphism types of a simple connected graph with 4 vertices.

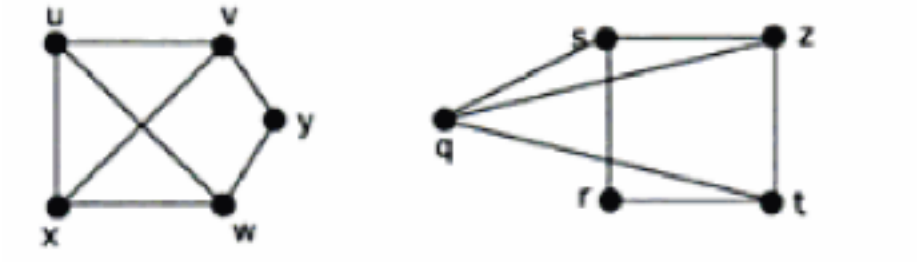
7. Find all possible isomorphism types of a simple graph with 3 vertices and 3 edges.

8. For the following, find a vertex-bijection that specifies an isomorphism between the two graphs shown.

   a)

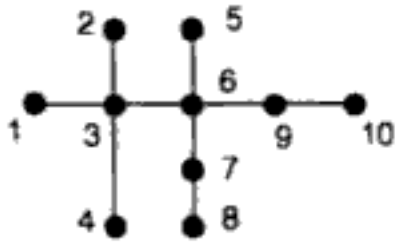


   b)

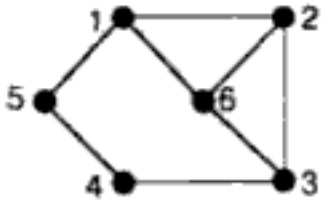


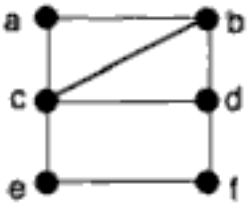
9. For each of the following, determine whether the graphs or digraphs in the given pair are isomorphic.

a)



b)





c)