# WRITTEN ASSIGNMENT # 4
## MATH 38
### DUE: MONDAY 11, 2005

**Read Section 1.2**

1. Give an example of a connected graph with 6 vertices and 9 edges that contains a cut-edge and one that does not contain a cut-edge.

2. Give an example of a connected graph with 6 vertices and 9 edges that contains a cut-vertex and one that does not contain a cut-vertex.

3. What is the difference between an induced subgraph and a subgraph of a graph $G$. Give an example of a graph G and a subgraph $H$ that is not an induced subgraph.

4. According to Theorem 1.2.14 if you want to increase the number of components in a graph by removing one edge, what edges should you consider?

5. What condition must a vertex in a connected graph satisfy so that if we delete it the graph remains connected?

6. According to Theorem 1.2.14 how can you check that a graph does not contain a cut-edge?

7. True/False: Every even walk contains an even cycle. Justify your answer.

8. How would you prove that a graph is not bipartite? See Theorem 1.2.18.

9. What is the easiest way to prove that a graph $G$ is bipartite?

10. How is the union of graphs defined in page 25 in book? What is the difference between union and decomposition? Give an example different to the one in the book of the union of graphs.

11. Which of the following graphs are Eulerian: $K_5$, $K_{2,3}$, the Petersen graph?

12. For which values of $n$ is $K_n$ Eulerian?