Written Assignment # 17

Math 38

Due: Wednesday, May 19, 2005

Read 5.1, 5.2 and 5.3

1. What does it mean to say that a graph is k-colorable? Give an example of a graph that is 3-colorable but not 2-colorable.

2. What does it mean for a graph to be color critical? Give an example of a graph that is 4-critical.

3. Define clique number and independence number. What do these numbers have to do with the chromatic number of a graph?

4. What is the cartesian product of two graphs? Draw $C_5 \Box C_5$ and determine its chromatic number.

5. What is the greedy coloring? Show how this works on the Petersen graph.

6. What are the bounds that we have found for $\chi(G)$?

7. State Brook's Theorem.

8. We know that the Clique number is a lower bound for $\chi(G)$. Give a class of graphs for which $\chi(G) = \omega(G)$ and one class of graphs for which this bound is not very good.

9. What is the minimum number of edges in a k-chromatic graph with n vertices?

10. Define the chromatic polynomial of a graph?

11. What is the chromatic polynomial of a tree?

12. What is the recurrence used to compute the chromatic polynomial? Explain why this recurrence works.