Math 958 Fall 2008 **Homework #2**

Other interesting problems: 3.5: 2,8,10,13,14,19

1. Exercise 3.5.1
2. Exercise 3.5.3
3. Exercise 3.5.7
4. Exercise 3.5.17
5. Prove that $\chi_f(G) \geq n(G)/\alpha(G)$.

6. Let G be a triangle-free graph with n vertices and with $\delta(G) > \frac{2}{5}n$.
   (a) Suppose that v_1, v_2, v_3, v_4, v_5 is a path of length 4 in G. Prove that v_1 and v_5 have a common neighbor.
   (b) Prove that G cannot contain a copy of C_5.
   (c) Prove that G is bipartite.
   (d) Prove that the result of part (c) is sharp: For an infinite number of values of n, demonstrate a non-bipartite triangle-free graph H with n vertices and $\delta(H) = \frac{2}{5}n$.