Math 3170: Homework 10

Due: November 10, 2010

1. What is the chromatic number of a tree?
2. Is there a bipartite graph on nine vertices, with degrees 3, 3, 3, 3, 3, 5, 6, 6, 6?
3. Suppose a tree T has exactly one vertex of degree i for all $2 \leq i \leq m$ (all other vertices have degree 1). How many vertices does T have?
4. (a) Define an adjacency matrix A for directed graphs.
   (b) Show that A^k gives the number of directed paths with k steps from one vertex to another.
   (c) Characterize strongly connected graphs in terms of the adjacency matrix.