Math 3170: Homework 11

Due: December 5, 2012

1. Is there a bipartite graph on nine vertices, with degrees 3, 3, 3, 3, 3, 5, 6, 6, 6?
2. 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?
3. (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.
4. Find a ranking for two universities and two students such that both perfect matchings are stable.
5. Find the chromatic polynomial for the complete graph on n vertices with one edge missing.