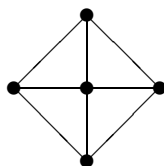


## Exam 3

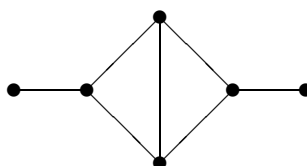
December 02, 2004

You have 1 hour 20 min to solve the following problems. The problems worth 10 points each. You can use your notes, books, calculators, etc. Show your reasoning.

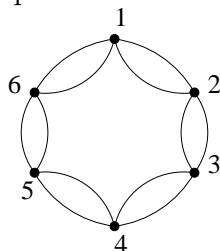
1. Find the number of spanning trees of the following graph:



2. Find the chromatic polynomial and the number of acyclic orientations of the following graph:



3. Find the number of closed Eulerian paths that start and end at the vertex 1 in the following graph:



4. Let  $G$  be a *regular* graph without loops and multiple edges such that the eigenvalues of the adjacency matrix of  $G$  are  $3, 1, 0, 0, -2, -2$ .
- (a) Find the number of spanning trees of the graph  $G$ .
- (b) Present a graph that has such eigenvalues.