Linear Algebra I **Worksheet 11** **Due May 3, 2007**

Name: OUID:

Instructions: Be sure to show as much work as possible, and please make a sincere effort to express your answers clearly and neatly. Please write your answers on your own paper, then staple your pages together using this sheet as a cover sheet.

1. Compute e^A, where $A = \begin{bmatrix} 1 & 1 \\ -2 & 4 \end{bmatrix}$

2. Suppose there are four teams in a curling league. At the end of the season, the results are as follows:

Team 1 beat teams 2 and 3, but lost to team 4.
Team 2 beat team 3, but lost to teams 1 and 4.
Team 3 beat team 4, but lost to teams 1 and 2.
Team 4 beat teams 1 and 2, but lost to team 3.

(a) Form the corresponding matrix A that reflects these results, where

$$a_{ij} = \begin{cases} 1 & \text{if team } i \text{ beat team } j \\ 0 & \text{otherwise} \end{cases}$$

(b) How small can the dominant eigenvalue for A be? How large? Explain.

(c) It turns out that the dominant eigenvalue is approximately 1.395, and the corresponding eigenvector is $\mathbf{v} = \begin{bmatrix} 0.552 \\ 0.321 \\ 0.448 \\ 0.626 \end{bmatrix}$. How should the teams be ranked?