Complementary Homework II for Linear Algebra II
due **Wednesday, April 13th, 2005**

For each of the following matrices
- Find eigenvalues
- Write the matrix as a product of a diagonal matrix and a rotation matrix
- Describe geometrically the linear transformation of the plane defined by the matrix
- Using the geometric description, compute the 10^{th} and the 13^{th} power of each matrix

(1) $A = \begin{pmatrix} \sqrt{3} & -1 \\ 1 & \sqrt{3} \end{pmatrix}$

(2) $A = \begin{pmatrix} \sqrt{3} & 1 \\ -1 & \sqrt{3} \end{pmatrix}$

(3) $A = \begin{pmatrix} -\sqrt{3}/2 & 1 \\ -1 & -\sqrt{3}/2 \end{pmatrix}$

(4) $A = \begin{pmatrix} 2 & 2 \\ -2 & 2 \end{pmatrix}$

(5) $A = \begin{pmatrix} -3 & 0 \\ 0 & -3 \end{pmatrix}$

(6) $A = \begin{pmatrix} a & -b \\ b & a \end{pmatrix}$. Here, your answer will have a, b and arctan in it.