Assignment #2 ***Math 260*** ***Name:***

1. Determine the inverse matrix of the following:

a) $A = \begin{bmatrix} 1 & -1 & 2 \\ 2 & 1 & 11 \\ 4 & -3 & 10 \end{bmatrix}$

b) $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & -1 & 2 \\ 3 & 3 & 4 \end{bmatrix}$

2. A square matrix A is called orthogonal if $A^T = A^{-1}$. Show that the following matrices are orthogonal.

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

b) $A = \begin{bmatrix} \cos t & \sin t \\ -\sin t & \cos t \end{bmatrix}$

3. Determine the LU factorization of the following matrices:

a) $\begin{bmatrix} 3 & 1 \\ 5 & 2 \end{bmatrix}$

b) $\begin{bmatrix} 3 & -1 & 2 \\ 6 & -1 & 1 \\ -3 & 5 & 2 \end{bmatrix}$

4. Use the LU factorization of A to solve $A\vec{x} = \vec{b}$

a) $A = \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}; \ \vec{b} = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$

b) $A = \begin{bmatrix} 1 & -3 & 5 \\ 3 & 2 & 2 \\ 2 & 5 & 2 \end{bmatrix}; \ \vec{b} = \begin{bmatrix} 1 \\ 5 \\ -1 \end{bmatrix}$