

**Math 60**  
**Homework 5**

Name \_\_\_\_\_  
Due Wednesday October 19 before 4:00 PM

1. Write the matrix  $A = \begin{bmatrix} 1 & 2 \\ -1 & -1 \end{bmatrix}$  as a product of elementary matrices.
2. Find the inverse of  $A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 2 & 1 \\ 1 & 1 & -2 \end{bmatrix}$  or show that  $A$  is not invertible.
3. Use a change of basis matrix to write the vector  $(1, -1, 2) \in \mathbb{R}^3$  as a linear combination of the vectors  $\vec{u}_1 = (1, 1, 1)$ ,  $\vec{u}_2 = (0, 1, -1)$  and  $\vec{u}_3 = (0, 0, 2)$ .
4. Prove the *Shoe-Sock Theorem*: If  $A$  and  $B$  are invertible matrices then their product  $AB$  is invertible with  $(AB)^{-1} = B^{-1}A^{-1}$ .