HOMEWORK 2

Problem 1. Using Guassian elimination on the extended matrix as desccribed in the book, find the inverse to

$$\begin{bmatrix} 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Problem 2. Express the following matrix as a product of elementary matrices:

$$A = \begin{bmatrix} 2 & 1 \\ 0 & 2 \end{bmatrix}.$$

Problem 3. Suppose A is a 3 by 3 matrix that can be row reduced to I using the following row operations, in the order given:

$$\begin{aligned} &2\text{R2} \to \text{R2} \\ &\text{R1} - \text{R2} \to \text{R1} \\ &\text{R3} - \text{R2} \to \text{R3} \\ &\text{R2} - \text{R1} \to \text{R2} \\ &\text{R3} \leftrightarrow \text{R2} \end{aligned}$$

What is A?

Problem 4. For any real number r, the following matrix has an inverse. Calculate the inverse:

$$\begin{bmatrix} 1 & r & 0 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix}$$

Problem 5. Suppose r is a real number. Find the inverse of the following matrix, except for those values of r that make the matrix singular:

$$\begin{bmatrix} 1 & r & 0 \\ 1 & 1 & 0 \\ 2 & 2 & 1 \end{bmatrix}$$

Problem 6. Problem 15 on page 59.

Problem 7. Problem 29 on page 60.