Finding and Using Inverses.

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

1. Find $A^{-1}$ if it exists. Check.

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

2. Find $A^{-1}$ if it exists. Check.

Let $B = \begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix}$.

3. Find $B^{-1}$ if it exists. Check.

Let $C = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$. We will record the operations you would use to reduce $A$ to an upper triangular matrix $U$.

4. Find a scaling matrix $R_1$ that scales the first row by $\frac{1}{2}$. Find $R_1C$.

5. Find a pivoting matrix $R_2$ that adds $-4$ times the first row of $R_1C$ to the second row.
6. Find $R_2R_1C$. Let $R_2R_1C = U$.

7. Find $R_1^{-1}$ and $R_2^{-1}$.

8. Solve the equation $R_2R_1C = U$ for $C$.

9. Find an lower-triangular matrix $L$ so that $C = LU$.

10. Let $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 1 & 3 & 7 \end{bmatrix}$. Find an $LU$ factorization of $A$. 