Question 1. *(5 marks)* Consider the matrices A, B, C, all square and of the same size. Assume that the linear systems $A\mathbf{x} = 0$ and $B\mathbf{x} = 0$ have only the trivial solution and that C is row equivalent to B. Prove that AC can be written as a product of elementary matrices.

Question 2.

a. *(4 marks)* Find the inverse of the matrix A using the inversion algorithm:

$$A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 5 \\ -2 & -2 & -11 \end{bmatrix}$$

b. *(2 marks)* Solve for x, y, z, where $\begin{bmatrix} x & y & z \end{bmatrix} A = \begin{bmatrix} -1 & 0 & 1 \end{bmatrix}$ using the A^{-1} found in part a.

c. *(2 marks)* Find two elementary matrices E_1 and E_2 which satisfy $E_2 E_1 A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 5 \\ 0 & 0 & 1 \end{bmatrix}$.