

Books, watches, notes or cell phones are **not** allowed. The **only** calculators allowed are the Sharp EL-531**. You **must** show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.

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 $E_2 E_1 A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 5 \\ 0 & 0 & 1 \end{bmatrix}$.