2. (a) State a necessary and sufficient condition, in terms of its determinant, for a square matrix to have an inverse. [2]

(b) Find the inverse of the matrix $A$ where

$$A = \begin{pmatrix} -2 & -2 & -1 \\ -2 & 1 & 1 \\ 3 & 2 & 1 \end{pmatrix}$$

[4]

(c) Solve the system of equations

$$\begin{cases} -2x & -2y & -z & = 1 \\ -2x & +y & +z & = 0 \\ 3x & +2y & +z & = -2 \end{cases}$$

[4]