Linear algebra: Homework Week 3 (2^{nd} part): Determinants, matrix inversion and systems of linear equations.

Ex. (1) Calculate trace and determinant of the following matrix:

$$Q = \begin{bmatrix} 1 & 2 & -1 \\ 1 & 1 & -1 \\ -2 & 0 & -1 \end{bmatrix}$$

Ex. (2) Find the solutions of the following system of linear equations:

$$\Sigma : \begin{cases} 4x - 2y + 3z = 1 \\ x + 3y - 4z = -7 \\ 3x + y + 2z = 5 \end{cases}$$

Ex. (3) Calculate determinant and inverse of the following 4x4 tridiagonal matrix:

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

Ex. (4) For which values of the real parameter k is the following matrix T non invertible?

$$T = \begin{bmatrix} -1 & 2 & -3 \\ 1 & -5 & 5 \\ -17 + k & 11 & -14 \end{bmatrix}$$