<II>(a) Find a basis for each of the four fundamental subspaces of the matrix

$$A := \begin{pmatrix} 1 & 2 & 1 \\ 0 & 1 & 2 \\ 1 & -1 & -5 \\ -1 & 3 & 9 \end{pmatrix}$$

($m=4$, $n=3$). Now consider the system

$$A\underline{x} = b$$

(b) For (i) $\underline{b}_1 = \begin{pmatrix} 1 \\ 0 \\ 1 \\ 1 \end{pmatrix}$ and (ii) $\underline{b}_2 = \begin{pmatrix} 2 \\ -1 \\ 5 \\ -7 \end{pmatrix}$ check if the system is solvable without finding the soluti

(c) For $\underline{b}_1$, $\underline{b}_2$ in (b), if a solution exists, find all solutions.