col 5 = col 1 + col 2 + col 4

$T(\underline{e_5}) = T(\underline{e_1}) + T(\underline{e_2}) + T(\underline{e_4})$

$T(\underline{e_1}) + T(\underline{e_2}) + T(\underline{e_4}) - T(\underline{e_5}) = 0$

$T(\underline{e_1} + \underline{e_2} + \underline{e_4} - \underline{e_5}) = 0$

$\underline{e_1} + \underline{e_2} + \underline{e_4} - \underline{e_5} \in \mathcal{N}$

$\Rightarrow \begin{bmatrix} 1 \\ 1 \\ 0 \\ 1 \\ -1 \end{bmatrix} \in \mathcal{N}$

clearly $\begin{bmatrix} 1 \\ 1 \\ -1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \\ 1 \\ 1 \end{bmatrix}$ are linearly independent because they're not scalar multiples of each other.

$\Rightarrow$ linearly independent vectors in $\mathcal{N}$.

g) Show n_1, n_2 form a basis for $\mathcal{N}$.

$x_1 + x_3 + x_4 + 2x_5 = 0$

$x_2 + x_3 + 2x_4 + 3x_5 = 0$

$x_4 + x_5 = 0.$

since cols 3 and 5 dont have plots, set them as free variables.

$x_3 = s$, $x_5 = t$

$$x = \left\{ \begin{bmatrix} -s-t \\ -s-t \\ s \\ -t \\ t \end{bmatrix} \middle| t \in \mathbb{R} \right\}$$