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QUESTÃO 3

A (3x3), sendo $a_{ij} = i+j$, então a matriz é dada por:

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \Rightarrow \begin{bmatrix} 2 & 3 & 4 \\ 3 & 4 & 5 \\ 4 & 5 & 6 \end{bmatrix} //$$

a)

logo, a transposta de A é dada por:

$$A^T = \begin{bmatrix} 2 & 3 & 4 \\ 3 & 4 & 5 \\ 4 & 5 & 6 \end{bmatrix} //$$

b) * cofatores de A //

$COF(a_{11}) = (-1)^2 \cdot \begin{vmatrix} 4 & 5 \\ 5 & 6 \end{vmatrix} \Rightarrow -1 //$

$COF(a_{12}) = (-1)^3 \cdot \begin{vmatrix} 3 & 5 \\ 4 & 6 \end{vmatrix} \Rightarrow -1 \cdot -2 = 2 //$

$COF(a_{13}) = (-1)^4 \begin{vmatrix} 3 & 4 \\ 4 & 5 \end{vmatrix} \Rightarrow -1 //$

$COF(a_{21}) = (-1)^3 \begin{vmatrix} 3 & 4 \\ 5 & 6 \end{vmatrix} \Rightarrow -1 \cdot -2 = 2 //$

$COF(a_{22}) = (-1)^4 \begin{vmatrix} 2 & 4 \\ 4 & 6 \end{vmatrix} \Rightarrow -4 //$

$COF(a_{23}) = (-1)^5 \begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} \Rightarrow -1 \cdot -2 = 2 //$

$COF(a_{31}) = (-1)^4 \cdot \begin{vmatrix} 3 & 4 \\ 4 & 5 \end{vmatrix} = -1 //$

$COF(a_{32}) = (-1)^5 \begin{vmatrix} 2 & 4 \\ 3 & 5 \end{vmatrix} = -1 \cdot -2 = 2$

$COF(a_{33}) = (-1)^6 \begin{vmatrix} 2 & 3 \\ 3 & 4 \end{vmatrix} = -1 //$

Matriz dos cofatores: $\begin{bmatrix} -1 & 2 & -1 \\ 2 & -4 & 2 \\ -1 & 2 & -1 \end{bmatrix} //$

c) TRANSPOSTA DE A =>

$A^T = \begin{bmatrix} 2 & 3 & 4 \\ 3 & 4 & 5 \\ 4 & 5 & 6 \end{bmatrix}$, a inversa é dada por $\frac{1}{\det A} \cdot \operatorname{Adj} A$ //

DET =>

$$\begin{array}{ccc:cc} 2 & 3 & 4 & 2 & 3 \\ 3 & 4 & 5 & 3 & 4 \\ 4 & 5 & 6 & 4 & 5 \end{array}$$

DET = 48 + 60 + 60 − (54 + 50 + 64)

DET = 168 − 168 = 0 //

NÃO EXISTE INVERSA DE A^T //

QUESTÃO 2:

* escalonamento

① $R_2 - 1R_1 \to R_2$
$$\begin{vmatrix} 1 & 1 & 0 & -1 & 0 \\ 0 & -1 & -1 & 2 & 2 \\ 0 & 1 & 1 & -1 & -3 \\ 1 & 1 & 0 & -2 & 1 \end{vmatrix}$$

② $R_4 - 1R_1 R_4$
$$\begin{vmatrix} 1 & 1 & 0 & -1 & 0 \\ 0 & -1 & -1 & 2 & 2 \\ 0 & 1 & 1 & -1 & -3 \\ 0 & 0 & 0 & -1 & 1 \end{vmatrix}$$

③ $-1R_2 \to R_2$
$$\begin{vmatrix} 1 & 1 & 0 & -1 & 0 \\ 0 & 1 & 1 & -2 & -2 \\ 0 & 1 & 1 & -1 & -3 \\ 0 & 0 & 0 & -1 & 1 \end{vmatrix}$$

④ $R_3 - 1R_2 \to R_3$
$$\begin{vmatrix} 1 & 1 & 0 & -1 & 0 \\ 0 & 1 & 1 & -2 & -2 \\ 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & -1 & 1 \end{vmatrix}$$

⑤ $-1R_4 \to R_4$
$$\begin{vmatrix} 1 & 1 & 0 & -1 & 0 \\ 0 & 1 & 1 & -2 & -2 \\ 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 1 & -1 \end{vmatrix}$$

⑥ $R_4 - 1R_3 \to R_4$
$$\begin{vmatrix} 1 & 1 & 0 & -1 & 0 \\ 0 & 1 & 1 & -2 & -2 \\ 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 \end{vmatrix}$$

⑦ $R_2 + 2R_3 \to R_2$
$$\begin{vmatrix} 1 & 1 & 0 & -1 & 0 \\ 0 & 1 & 1 & 0 & -4 \\ 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 \end{vmatrix}$$

⑧ $R_1 + 1 \cdot R_3 \to R_1$
$$\begin{vmatrix} 1 & 1 & 0 & 0 & -1 \\ 0 & 1 & 1 & 0 & -4 \\ 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 \end{vmatrix}$$

⑨ $R_1 - 1 \cdot R_2 \to R_1$
$$\begin{vmatrix} 1 & 0 & -1 & 0 & 3 \\ 0 & 1 & 1 & 0 & -4 \\ 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 \end{vmatrix}$$
=> matriz em forma escada //

letra a) $\begin{vmatrix} 1 & 0 & -1 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{vmatrix}$ * * * PC = 3 //

letra b) $\begin{vmatrix} 1 & 0 & -1 & 0 & 3 \\ 0 & 1 & 1 & 0 & -4 \\ 0 & 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 \end{vmatrix}$ * * * PA = 3 //

letra c) sistema possível e indeterminado (SDI); grau de liberdade: 1 // (4-3)
pois a variável x e y adotam infinitas soluções para qualquer valor de z //
e n < p //
↳ incógnitas

$\begin{pmatrix} x = 3 + z & z = z \\ y = -4 - z & w = -1 \end{pmatrix}$ * soluções // => $\begin{pmatrix} x - z = 3 \\ y + z = -4 \end{pmatrix}$