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Set A

1. $A_{22} = (-1)^{22} \begin{vmatrix} 5 & 7 \\ 4 & 10 \end{vmatrix} = 50 - 28 = 22$

2. $b = [2 \quad -5 \quad 3]$

3. $\begin{bmatrix} 1 & 3 & 8 \\ 0 & 1 & 3 \\ 0 & 6 & 0 \end{bmatrix}$

4. $A^T = \begin{bmatrix} 1 & 3 & 5 \\ 4 & 2 & 6 \\ 5 & 6 & 3 \end{bmatrix} = No \neq A$

5. $-40 \begin{vmatrix} -5 & -3 \\ -2 & -1 \end{vmatrix} - 16 \begin{vmatrix} 13 & -3 \\ 5 & -1 \end{vmatrix} + 9 \begin{vmatrix} 13 & -5 \\ 5 & -2 \end{vmatrix}$

$= -40(5 - 6) - 16(-13 + 15) + 9(-26 + 25)$

$= 40 - 32 - 9$

$= -1$

6. Not multiplicable

7. $-80 - 90 = -170 = \det(C)$

$C_{11} = -5 \qquad C_{13} = 9$

$C_{12} = -10 \qquad C_{14} = -16$

$$\text{cofC}^T = \begin{bmatrix} -5 & -10 \\ 9 & -16 \end{bmatrix}^T = \begin{bmatrix} -5 & 9 \\ -10 & -16 \end{bmatrix}$$

$$C^{-1} = \frac{1}{-170} \begin{bmatrix} -5 & 9 \\ -10 & -16 \end{bmatrix}$$

8. $2B = \begin{bmatrix} 10 & 16 & -8 \\ 2 & 4 & +18 \end{bmatrix}$

$$A+2B = \begin{bmatrix} 5 & 22 & -7 \\ 4 & 02 & -9 \end{bmatrix}$$

9. $\det(A) = 10\begin{vmatrix} 2 & 0 \\ 0 & -2 \end{vmatrix} + 4\begin{vmatrix} -1 & 0 \\ 1 & -2 \end{vmatrix} + \alpha\begin{vmatrix} -1 & 2 \\ 1 & 0 \end{vmatrix}$

$= -40 + 8 - 2\alpha$

$= -2\alpha - 32$

$\therefore -2\alpha - 32 = 0$

$\Rightarrow 2\alpha = -32$

$\Rightarrow \alpha = -16$

10. $3 \times \boxed{2 \quad 2} \times 1$

11. 2