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Turma: CTII 348

Q1. a) $\begin{vmatrix} 2 & 3 \\ 1 & 5 \end{vmatrix} (2 \cdot 5) - (3 \cdot 1) = 10 - 3 = 7$

b) $\begin{vmatrix} -2 & -4 \\ 3 & 6 \end{vmatrix} -2 \cdot 6 - -4 \cdot 3 = 12 - 12 = 0$

c) $\begin{vmatrix} 3 & -1 & -1 \\ 2 & 1 & -1 \\ 1 & 4 & -2 \end{vmatrix} 3 - 1 - (-6 + 1 + 8) - (1 + -12 + 4)$
 $3 - 1 - 7 = 10$

d) $\begin{vmatrix} 3 & 2 & -1 \\ 2 & 3 & 1 \\ 1 & 1 & 4 \end{vmatrix} 3 \cdot 2 - 1 \cdot 1 - (36 + 2 - 2) - (-3 + 3 + 16)$
 $36 - 16 = 20$

Q2. $A = \begin{vmatrix} -3 & 0 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & -3 \end{vmatrix} -3 \cdot 0 - (-27 + 0 + 0) - (0 + 0 + 0)$
 $-27 - 0 = -27$ (A)

03.

$$\begin{vmatrix} x & 1 & x \\ 3 & x & 4 \\ 1 & 3 & 3 \end{vmatrix} = -3$$

$$(3x^2 + 3x + 4) - (x^2 + 12x + 3) = -3$$

$$2x^2 - 3x - 5 = -3$$

$$2x^2 - 3x - 2 = 0$$

$$\begin{vmatrix} x & 1 & x \\ 3 & x & 4 \end{vmatrix}$$

$$\frac{-(-3) \pm \sqrt{25}}{2 \cdot 2} = \frac{3 \pm 5}{4}$$

$$x_1 = \frac{2}{4}, \quad x_2 = \frac{8}{4}$$

$$\Delta = (-3)^2 - 4 \cdot 2 \cdot -2$$

$$\Delta = 9 + 16 = 25$$

$$x_1 = \frac{1}{2}, \quad x_2 = 2 \quad (\text{E})$$

04.

$$\begin{vmatrix} x-1 & -1 & 0 \\ 0 & x+1 & -1 \\ 2 & -1 & x+1 \end{vmatrix} = 2$$

$$(x-1) \cdot (x+1) = x^2 + x - x - 1 = x^2 - 1$$

$$x^2 - 1 \cdot (x+1) = x^3 + x^2 - x + 1$$

$$\begin{vmatrix} x-1 & -1 & 0 \\ 0 & x+1 & -1 \end{vmatrix} \rightarrow (x^3 + x^2 - x + 1) + 0 + 2 - (0 + x - 1 + 0)$$

$$x^3 + x^2 - 2x + 2 + 2 = 2$$

$$x^3 + x^2 - 2x + 2 = 0$$

Utilizando das relações de Girard sabemos que: $x_1 + x_2 + x_3 = -b/a$

$$-b/a = -1/1 = -1 \quad (\text{C})$$

05.

$$A = \begin{bmatrix} -1 & -4 \\ 1 & -2 \\ 3 & 0 \end{bmatrix} \quad B = \begin{bmatrix} 0 & 1 & 2 \\ -1 & 0 & 1 \end{bmatrix} \quad AB = \begin{bmatrix} 4 & -1 & -6 \\ 2 & 1 & 0 \\ 0 & 3 & 6 \end{bmatrix}$$

$$\begin{vmatrix} 4 & -1 & -6 \\ 2 & 1 & 0 \\ 0 & 3 & 6 \end{vmatrix} = (24 - 36 + 0) - (0 + 0 - 12) \\ 24 - 36 + 12 \\ 36 - 36 = 0 \quad (\text{C})$$

$$\begin{matrix} 4 & -1 & -6 \\ 2 & 1 & 0 \end{matrix}$$

06.

$$AB \begin{bmatrix} 2 & -4 \\ -2 & 2 \end{bmatrix} \rightarrow \begin{vmatrix} 2 & -4 \\ -2 & 2 \end{vmatrix} = 2 \cdot 2 - -4 \cdot -2 = 4 - 8 = -4 \quad (\text{D})$$