

Determinantes - Matrizes de ordem 1, 2 ou 3,

01-

$$a) \begin{vmatrix} 2 & 3 \\ 1 & 5 \end{vmatrix} \rightarrow \det a = (2 \cdot 5) - (1 \cdot 3) = 7$$

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

$$c) \begin{vmatrix} 3 & -1 & 1 \\ 2 & 1 & -1 \\ 1 & 4 & -2 \end{vmatrix} \rightarrow \det c = 3 \cdot (-7) = -21$$

$$= 1 - 12 + 4 = -7$$

$$\begin{vmatrix} 3 & -1 & 1 & 3 & -1 \\ 2 & 1 & -1 & 2 & 1 \\ 1 & 4 & -2 & 1 & 4 \end{vmatrix}$$

$$= -6 + 1 + 8 = 3$$

$$d) \begin{vmatrix} 3 & 2 & -1 \\ 2 & 3 & 1 \\ 1 & 1 & 4 \end{vmatrix} \rightarrow \det d = 36 - 16 = 20$$

$$= -3 + 3 + 16 = 16$$

$$\begin{vmatrix} 3 & 2 & -1 & 3 & 2 \\ 2 & 3 & 1 & 2 & 3 \\ 1 & 1 & 4 & 1 & 1 \end{vmatrix}$$

$$= 36 + 2 - 2 = 36$$

Q2- $A = (a_{ij})$ $A = 3 \times 3$

$$a_{ij} = \begin{cases} -3, & \text{if } i = j \\ 0, & \text{if } i \neq j \end{cases}$$

$$\begin{bmatrix} -3 & 0 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & -3 \end{bmatrix}$$

$$0 + 0 + 0 = 0$$

$$\begin{vmatrix} -3 & 0 & 0 & -3 & 0 \\ 0 & -3 & 0 & 0 & -3 \\ 0 & 0 & -3 & 0 & 0 \end{vmatrix}$$

$$\rightarrow \det = -27 - 0 = -27$$

$$-27 + 0 + 0 = -27$$

$$\det = -27$$

(A)

Q3-

$$x^2 + 12x + 9 =$$

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

$$3x^2 + 4 + 9x =$$

$$3x^2 + 9x + 4 - (x^2 + 12x + 9)$$

$$3x^2 + 9x + 4 - x^2 - 12x - 9$$

$$2x^2 + 9x + 4 - 12x - 9$$

$$2x^2 - 3x + 4 - 9$$

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

$$\det \rightarrow 2x^2 - 3x - 5$$

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

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

$$\Delta = 9 + 16$$

$$\Delta = 25$$

$$x_1 = -0,5$$

$$x = \frac{3 \pm \sqrt{25}}{4}$$

$$4$$

$$x_2 = 2$$

(E)

$$\det \rightarrow \{-1/2; 2\}$$

$$0 + x - 1 + 0$$

$$04 - \begin{vmatrix} x-1 & -1 & 0 & x-1 & -1 \\ 0 & x+1 & -1 & 0 & x+1 \\ 2 & -1 & x+1 & 2 & -1 \end{vmatrix} = 2$$

$$x^3 + x^2 - x - 1 + 2 + 0$$

$$\det \rightarrow x^3 + x^2 - x - 1 + 2 + x - 1 = 2$$

$$x^3 + x^2 - 1 + 2 - 1 = 2$$

$$x^3 + x^2 - 1 - 1 = 0$$

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

$$x \cdot (x^2 + x) - 2 = 0$$

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

$$\Delta = 1^2 - 4 \cdot 1 \cdot -2$$

$$\Delta = 1 + 8$$

$$\Delta = \sqrt{9} = 3$$

$$x = \frac{-1 \pm 3}{2} \quad \begin{matrix} x_1 = 1 \\ x_2 = -2 \end{matrix}$$

$$x_1 - x_2 = 1 - 2 = -1$$

(C)

05-

$$A_{ij} = 2i - 3j$$

$$A = \begin{bmatrix} -1 & -4 \\ 1 & -2 \\ 3 & 0 \end{bmatrix}_{3 \times 2}$$

$$\begin{matrix} A & B \\ 3 \times 2 & 2 \times 3 \\ \underline{=} & \\ C \end{matrix}$$

$$\begin{bmatrix} 0 & 1 & 2 \\ -1 & 0 & 1 \end{bmatrix}$$

$$0 + 0 + 12$$

$$\begin{vmatrix} 4 & -1 & -6 & 4 & -1 \\ 2 & 1 & 0 & 2 & 1 \\ 0 & 3 & 6 & 0 & 3 \end{vmatrix}$$

$$24 + 0 - 36$$

$$B_{jk} = k - j$$

$$\begin{bmatrix} -1 & -4 \\ 1 & -2 \\ 3 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 0+4 & -1+0 & -2+4 \\ 0+2 & 1+0 & 2+2 \\ 0+0 & 3+0 & 6+0 \end{bmatrix}$$

$$\begin{matrix} \det \rightarrow -12 - (-12) \\ \det = -12 + 12 \\ \det = 0 \end{matrix}$$

$$B = \begin{bmatrix} 0 & 1 & 2 \\ -1 & 0 & 1 \end{bmatrix}_{2 \times 3}$$

$$\begin{bmatrix} 4 & -1 & -6 \\ 2 & 1 & 0 \\ 0 & 3 & 6 \end{bmatrix}$$

(C)

Q6-

$$B = \begin{bmatrix} 1 & -1 \\ -1 & 1 \\ 0 & 2 \end{bmatrix} \checkmark$$

3x2

$$A = \begin{bmatrix} 2 & 0 & -1 \\ -1 & 1 & 0 \end{bmatrix}$$

2x3

$$A \cdot B = \begin{bmatrix} 2 & -4 \\ -2 & 2 \end{bmatrix}$$

$$-2 \times -4 = 8$$

$$\rightarrow \det = 4 - 8 = -4$$

$$2 \times 2 = 4$$

(D)