Determinantes - Matriz de Ordem 1, 2 e 3 - Tarefa Básica

Tarefa Básica

01.

a-) $\begin{bmatrix} 2 & 3 \\ 1 & 5 \end{bmatrix}$ $\det A: 10-3=\underline{7}$

b-) $\begin{vmatrix} -2 & -4 \\ 3 & 6 \end{vmatrix} = -2.6 - 3.-4$

$-12-12=\underline{0}$

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

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

$-6+1+8=3$

$\Rightarrow 3-(-7)=10$

d-) $\begin{bmatrix} 3 & 2 & -1 \\ 2 & 3 & 1 \\ 1 & 1 & 4 \end{bmatrix} \begin{matrix} 3 & 2 \\ 2 & 3 \\ 1 & 1 \end{matrix}$

$-3+3+16=16$

$36+2-2=36$

$\Rightarrow 36-16=\underline{20}$

02.

$A_{3x3} = a_{ij} = \begin{cases} -3, \text{ se } i=j \\ 0, \text{ se } i \neq j \end{cases} \Rightarrow \begin{bmatrix} \underset{11}{-3} & \underset{12}{0} & \underset{13}{0} \\ \underset{21}{0} & \underset{22}{-3} & \underset{23}{0} \\ \underset{31}{0} & \underset{32}{0} & \underset{33}{-3} \end{bmatrix}$

$a_{11} = i = j = -3$

$a_{22} = i = j = -3$

$a_{33} = i = j = -3$

resto $= i \neq j = 0$

$0+0+0=0$

$\det A = \begin{vmatrix} -3 & 0 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & -3 \end{vmatrix} \begin{matrix} -3 & 0 \\ 0 & -3 \\ 0 & 0 \end{matrix} \Rightarrow -27-0=\underline{-27}=(A)$

$-27+0+0=-27$

03.

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

$$\left|\begin{matrix} x & 1 & x \\ 3 & x & 4 \\ 1 & 3 & 3 \end{matrix}\right| \begin{matrix} x & 1 \\ 3 & x \\ 1 & 3 \end{matrix} = 3x^2+4+9x-(x^2+12x+9) = -3$$

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

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

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

$$2x^2-3x-2 \Rightarrow A=2, B=-3, C=-2$$

$$\Delta = b^2-4.a.c \Rightarrow (-3)^2-4.2.-2$$

$$\Delta = 9+16 = \underline{\underline{25}}$$

$$x = \frac{-b \pm \sqrt{\Delta}}{2a}$$

$$x = \frac{-(-3) \pm \sqrt{25}}{2.2} \Rightarrow x = \frac{3 \pm 5}{4}$$

$$\left.\begin{matrix} x_1 = \frac{3+5}{4} = \frac{8}{4} = \underline{\underline{2}} \\ x_2 = \frac{3-5}{4} = \frac{-2}{4} = \underline{\underline{-\frac{1}{2}}} \end{matrix}\right\} (E)$$

04.

$\cancel{2x}0 + x - 1 + 0 = \underline{x-1}$

$$\left|\begin{matrix} x-1 & -1 & 0 \\ 0 & x+1 & -1 \\ 2 & -1 & x+1 \end{matrix}\right| \begin{matrix} x-1 & -1 \\ 0 & x+1 \\ 2 & -1 \end{matrix}$$

$x^3 + x^2 - \cancel{x} - 1 + 2 + 0 = \underline{x^3 + x^2 - x + 1}$

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

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

$x^3 + x^2 - 2x + \cancel{2} = \cancel{2}$

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

$x(x^2 + x - 2) = 0 \Rightarrow A = 1, B = 1, C = -2$

$\Delta = b^2 - 4.a.c \Rightarrow 1^2 - 4.1.-2 \Rightarrow 1 + 8 = 9$

$x = \frac{-b \pm \sqrt{\Delta}}{2.a} \Rightarrow \frac{-1 \pm \sqrt{9}}{2.1} \Rightarrow \frac{-1 \pm 3}{2}$

$x_1 = \frac{-1+3}{2} = \frac{2}{2} = \underline{1}$

$x_2 = \frac{-1-3}{2} = \frac{-4}{2} = \underline{-2}$

$x1 + x2 = -2 + 1 = -1$

R: $-1 = (C)$

05.

$A_{3x2} = a_{ij} = 2i - 3j$

$A_{3x2} . B_{2x3} = \exists = AB_{3x3}$

$B_{2x3} = b_{jk} = k - j$

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

$a_{11} = 2.1 - 3.1 = -1$

$a_{12} = 2.1 - 3.2 = -4$

$a_{21} = 2.2 - 3.1 = 1$

$a_{22} = 2.2 - 3.2 = -2$

$a_{31} = 2.3 - 3.1 = 3$

$a_{32} = 2.3 - 3.2 = 0$

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

$b_{11} = 1 - 1 = 0$ // $b_{21} = 1 - 2 = -1$

$b_{12} = 2 - 1 = 1$ // $b_{22} = 2 - 2 = 0$

$b_{13} = 3 - 1 = 2$ // $b_{23} = 3 - 2 = 1$

Continuação do 5.

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

$0+0-12=-12$

$$\det AB = \begin{vmatrix} +4 & -1 & -6 \\ 2 & 1 & 0 \\ 0 & 3 & 6 \end{vmatrix} \begin{matrix} +4 & -1 \\ 2 & 1 \\ 0 & 3 \end{matrix} \Rightarrow -12-(-12) = 0 = (C)$$

$24+0-36=-12$

06.

$$A_{2\times3} \cdot B_{3\times2} = \exists = AB_{2\times2} = \begin{bmatrix} 2 & 0 & -1 \\ -1 & 1 & 0 \end{bmatrix} \times \begin{bmatrix} 1 & -1 \\ -1 & 1 \\ 0 & 2 \end{bmatrix}$$

$$\begin{bmatrix} \underset{11}{\underline{2+0+0=2}} & \underset{12}{\underline{-2+0-2=-4}} \\ \underset{21}{\underline{-1-1+0=-2}} & \underset{22}{\underline{1+1+0=2}} \end{bmatrix}$$

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$$\det AB = \begin{vmatrix} 2 & -4 \\ -2 & 2 \end{vmatrix} = 4-8 = -4 = (D)$$

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