tarefa básica

MATRIZES

1) $A = (a_{ij})_{3\times2}$, onde $a_{ij} = 2i + 3j$

$$A = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \\ a_{31} & a_{32} \end{pmatrix} \quad \begin{cases} a_{11} = 2.1 + 3.1 = 2 + 3 = 5 \\ a_{12} = 2.1 + 3.2 = 2 + 6 = 8 \\ a_{21} = 2.2 + 3.1 = 4 + 3 = 7 \\ a_{22} = 2.2 + 3.2 = 4 + 6 = 10 \\ a_{31} = 2.3 + 3.1 = 6 + 3 = 9 \\ a_{32} = 2.3 + 3.2 = 6 + 6 = 12 \end{cases}$$

Então,

$$A = \begin{pmatrix} 5 & 8 \\ 7 & 10 \\ 9 & 12 \end{pmatrix}$$

2) $A = (a_{ij})_{3\times2}$, onde $a_{ij} = i^2 + 4j^2$

$$A = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} \quad \begin{cases} a_{11} = 1^2 + 4.1^2 = 1 + 4 = 5 \\ a_{12} = 1^2 + 4.2^2 = 1 + 16 = 17 \\ a_{21} = 2^2 + 4.1^2 = 4 + 4 = 8 \\ a_{22} = 2^2 + 4.2^2 = 4 + 16 = 20 \end{cases}$$

Então,

$$A = \begin{pmatrix} 5 & 17 \\ 8 & 20 \end{pmatrix} \longrightarrow \text{Alternativa A.}$$

3) $\begin{bmatrix} 1 & x+2 \\ y-1 & z+1 \end{bmatrix} = \begin{bmatrix} 1 & -x \\ 2y & -2z \end{bmatrix}$

$$\left.\begin{matrix} x + 2 = -x & y - 1 = 2y & z + 1 = -2z \\ 2x = -2 & -y = 1 \;\; (-1) & 3z = -1 \\ x = -1 & y = -1 & z = -1/3 \end{matrix}\right\} \quad x = -1,\; y = -1 \text{ e } z = -1/3$$

4) $\begin{bmatrix} 3 & -x \\ 3x & x \end{bmatrix} = \begin{bmatrix} 3 & y \\ 2x+1 & z-1 \end{bmatrix}$

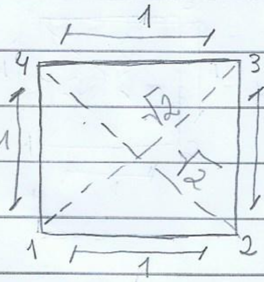
$-x = y \qquad 3x = 2x+1 \qquad x = z-1$

$y = -1 \leftarrow x = 1 \qquad 1 = z-1$

$z = 2$

$x = 1,\ y = -1$ e $z = 2$.

5)



diagonal do □ $\ell = 1$ $\left\{ \begin{array}{l} d^2 = \ell^2 + \ell^2 \\ d^2 = 2\ell^2 \\ d = \sqrt{2\ell^2} \\ d = \sqrt{2} \end{array} \right.$

$A = \begin{pmatrix} a_{11} & a_{12} & a_{13} & a_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \\ a_{41} & a_{42} & a_{43} & a_{44} \end{pmatrix}$

MATRIZ 4x4

calculando as distância entre vértices:

$a_{11} = 1a1 = 0$ | $a_{31} = 3a1 = \sqrt{2}$

$a_{12} = 1a2 = 1$ | $a_{32} = 3a2 = 1$

$a_{13} = 1a3 = \sqrt{2}$ | $a_{33} = 3a3 = 0$

$a_{14} = 1a4 = 1$ | $a_{34} = 3a4 = 1$

$a_{21} = 2a1 = 1$ | $a_{41} = 4a1 = 1$

$a_{22} = 2a2 = 0$ | $a_{42} = 4a2 = \sqrt{2}$

$a_{23} = 2a3 = 1$ | $a_{43} = 4a3 = 1$

$a_{24} = 2a4 = \sqrt{2}$ | $a_{44} = 4a4 = 0$

Então,

$$A = \begin{pmatrix} 0 & 1 & \sqrt{2} & 1 \\ 1 & 0 & 1 & \sqrt{2} \\ \sqrt{2} & 1 & 0 & 1 \\ 1 & \sqrt{2} & 1 & 0 \end{pmatrix} \longrightarrow \text{Alternativa B.}$$

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6) $A = \begin{bmatrix} -1 \\ 2 \\ 3 \end{bmatrix}$ e $B = \begin{bmatrix} 0 \\ -2 \\ 1 \end{bmatrix}$ $2A - B = ?$

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

$\left.\begin{array}{l} -2-0=-2 \\ 4-(-2)=6 \\ 6-1=5 \end{array}\right\}$ Então, $2A - B = \begin{bmatrix} -2 \\ 6 \\ 5 \end{bmatrix}$

→ Alternativa D.

7) $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$ e $B = \begin{bmatrix} -1 & 3 & 2 \\ 2 & 0 & 1 \end{bmatrix}$ $A - B^t = ?$

$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix} - B^t = \begin{bmatrix} -1 & 2 \\ 3 & 0 \\ 2 & 1 \end{bmatrix}$

$1-(-1)=2 \quad 2-2=0$

$3-3=0 \quad 4-0=4$

$5-2=3 \quad 6-1=5$

Então,

$A - B^t = \begin{bmatrix} 2 & 0 \\ 0 & 4 \\ 3 & 5 \end{bmatrix}$

→ Alternativa B

8) $A = \begin{bmatrix} 2 & -1 & 2y \\ x & 0 & -z \\ 4 & 3 & 2 \end{bmatrix}$ e $A^t = \begin{bmatrix} 2 & x & 4 \\ -1 & 0 & 3 \\ 2y & -z & 2 \end{bmatrix}$

$-1 = x \qquad \overset{(-1)}{-}z = 3 \qquad 4 = 2y$

$x = -1 \qquad z = -3 \qquad y = 2$

$x + y + z$

$-1 + 2 + (-3)$

$1 - 3$

-2

Alternativa A.

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9 $A = (a_{ij})_{3\times2}$ e $B = (b_{ij})_{3\times2}$

$a_{ij} = i + j \rightarrow i \neq j$
$a_{ij} = 1 \rightarrow i = j$
$b_{ij} = 0 \rightarrow i \neq j$
$b_{ij} = 2i - j \rightarrow i = j$

$$A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \\ a_{31} & a_{32} \end{bmatrix} \quad B = \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \\ b_{31} & b_{32} \end{bmatrix}$$

$a_{11} = \cancel{1+1=}$ $\quad b_{11} = 2.1 - 1 = 1$
$a_{12} = 1 + 2 = 3$ $\quad b_{12} = 0$
$a_{21} = 2 + 1 = 3$ $\quad b_{21} = 0$
$a_{22} = 1$ $\quad b_{22} = 2.2 - 2 = 2$
$a_{31} = 3 + 1 = 4$ $\quad b_{31} = 0$
$a_{32} = 3 + 2 = 5$ $\quad b_{32} = 0$

$$A = \begin{bmatrix} 1 & 3 \\ 3 & 1 \\ 4 & 5 \end{bmatrix} + B = \begin{bmatrix} 1 & 0 \\ 0 & 2 \\ 0 & 0 \end{bmatrix}$$

$1 + 1 = 2 \quad 3 + 0 = 3$
$3 + 0 = 3 \quad 1 + 2 = 3$
$4 + 0 = 4 \quad 5 + 0 = 5$

Então,

$$A + B = \begin{bmatrix} 2 & 3 \\ 3 & 3 \\ 4 & 5 \end{bmatrix} \rightarrow \text{Alternativa C.}$$

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(10) $M = \begin{bmatrix} x & 8 \\ 10 & y \end{bmatrix}$, $N = \begin{bmatrix} y & 6 \\ 12 & x+4 \end{bmatrix}$ e $P = \begin{bmatrix} 7 & 16 \\ 23 & 13 \end{bmatrix}$ $\Big\}$ $\frac{3}{2}M + \frac{2}{3}N = P$

$$\frac{3}{2} \cdot \begin{bmatrix} x & 8 \\ 10 & y \end{bmatrix} + \frac{2}{3} \cdot \begin{bmatrix} y & 6 \\ 12 & x+4 \end{bmatrix} = \begin{bmatrix} 7 & 16 \\ 23 & 13 \end{bmatrix}$$

$$\begin{bmatrix} \frac{3}{2}x & \frac{24}{2} \\ \frac{30}{2} & \frac{3}{2}y \end{bmatrix} + \begin{bmatrix} \frac{2}{3}y & \frac{12}{3} \\ \frac{24}{3} & \frac{2}{3}x + \frac{8}{3} \end{bmatrix} = \begin{bmatrix} 7 & 16 \\ 23 & 13 \end{bmatrix}$$

igualando os números e letras correspondentes:

$$\frac{3}{2}x + \frac{2}{3}y = 7 \qquad\qquad \frac{3}{2}y + \frac{2}{3}x + \frac{8}{3} = 13$$

MMC $$\frac{9x}{\cancel{6}} + \frac{4y}{\cancel{6}} = \frac{42}{\cancel{6}} \qquad\qquad \frac{9y}{\cancel{6}} + \frac{4x}{\cancel{6}} + \frac{16}{\cancel{6}} = \frac{78}{\cancel{6}}$$

$$9x + 4y = 42 \qquad\qquad 9y + 4x = 62$$

I II

equações

$$\begin{cases} 9x + 4y = 42 \\ 9y + 4x = 62 \end{cases} -$$

$y - x = ?$

subtração:

$$\text{II}\ 9y + 4x - (9x + 4y)^{\text{I}} = 62 - 42$$

$$9y + 4x - 9x - 4y = 20$$

$$5y - 5x = 20$$

$$5(y - x) = 20$$

$$y - x = \frac{20}{5}$$

$y - x = 4$ $\longrightarrow$ Alternativa B.