

Tarefa Básica

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

$$\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \\ a_{31} & a_{32} \end{bmatrix} \quad \begin{array}{l} a_{11} = 2 \cdot 1 + 3 \cdot 1 = 5 \\ a_{21} = 2 \cdot 2 + 3 \cdot 1 = 7 \\ a_{31} = 2 \cdot 3 + 3 \cdot 1 = 9 \end{array} \quad \begin{array}{l} a_{12} = 2 \cdot 1 + 3 \cdot 2 = 8 \\ a_{22} = 2 \cdot 2 + 3 \cdot 2 = 10 \\ a_{32} = 2 \cdot 3 + 3 \cdot 2 = 12 \end{array}$$

$$\hookrightarrow \begin{bmatrix} 5 & 8 \\ 7 & 10 \\ 9 & 12 \end{bmatrix} \quad 3 \times 2$$

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

$$A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \quad \begin{array}{l} a_{11} = 1^2 + 4 \cdot 1^2 = 5 \\ a_{21} = 2^2 + 4 \cdot 1^2 = 8 \end{array} \quad \begin{array}{l} a_{12} = 1^2 + 4 \cdot 2^2 = 17 \\ a_{22} = 2^2 + 4 \cdot 2^2 = 20 \end{array}$$

$$\hookrightarrow \begin{bmatrix} 5 & 17 \\ 8 & 20 \end{bmatrix} \quad \left\{ \text{alternativo A} \right.$$

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

$$\begin{array}{l} z+2 = -z \\ z+z = -2 \\ 2z = -2 \\ z = -1 \end{array} \quad \left\{ \begin{array}{l} y-1 = 2y \\ 2y-y = -1 \\ y = -1 \end{array} \right. \quad \left\{ \begin{array}{l} -z = 2z \\ z+z = -1 \\ 2z = -1 \\ z = -\frac{1}{2} \end{array} \right.$$

$$\textcircled{4} \quad \begin{bmatrix} 3 & -x \\ 3x & x \end{bmatrix} = \begin{bmatrix} 3 & 4 \\ 2x+1 & x-1 \end{bmatrix} \quad \begin{array}{l} \textcircled{1} - x = 4 \\ y = -1 \end{array}$$

$$\begin{cases} -x = y \textcircled{1} \\ x = 3 - 1 \textcircled{2} \\ 3x = 2x + 1 \end{cases} \rightarrow 3x - 2x = 1 \quad \begin{array}{l} \textcircled{2} x = 3 - 1 \\ 1 = 3 - 1 \\ x = 1 \end{array} \quad \begin{array}{l} \textcircled{1} y = -1 \\ y = 1 - 1 = \underline{\underline{0}} \end{array}$$

$$\textcircled{5} \quad \begin{bmatrix} 0_{11} & 0_{12} & 0_{13} & 0_{14} \\ 0_{21} & 0_{22} & 0_{23} & 0_{24} \\ 0_{31} & 0_{32} & 0_{33} & 0_{34} \\ 0_{41} & 0_{42} & 0_{43} & 0_{44} \end{bmatrix} \quad \begin{array}{l} 0_{12}(2-1) = 1 \\ 0_{22}(2-2) = 0 \\ 0_{32}(3-2) = 1 \\ 0_{42}(\text{diagonal de quadrado}) \end{array}$$

distância entre os vértices i e j : $\sqrt{1^2} \rightarrow 1\sqrt{2} = \sqrt{2}$

$$\left. \begin{array}{l} \textcircled{1} \\ \textcircled{2} \\ \textcircled{3} \\ \textcircled{4} \end{array} \right\} \begin{array}{l} 0_{11}(1-1) = 0 \\ 0_{21}(2-1) = 1 \\ 0_{31}(\text{diagonal}) = \sqrt{2} \\ 0_{41} = 1 // \end{array} \quad \left. \begin{array}{l} \textcircled{13}(\text{diagonal}) = \sqrt{2} \\ 0_{23}(3-2) = 1 \\ 0_{33}(3-3) = 0 \\ 0_{43}(4-3) = 1 \end{array} \right\}$$

$$0_{14} = 1 //$$

$$\begin{array}{l} 0_{24}(\text{diagonal}) = \sqrt{2} \\ 0_{34}(4-3) = 1 \\ 0_{44}(4-4) = 0 \end{array}$$

$$\left. \begin{array}{l} 0 & 1 & \sqrt{2} & 1 \\ 1 & 0 & 1 & \sqrt{2} \\ \sqrt{2} & 1 & 0 & 1 \\ 1 & \sqrt{2} & 1 & 0 \end{array} \right\} \text{alternativo b}$$

$$\textcircled{6} \quad A = \begin{bmatrix} -1 \\ 2 \\ 3 \end{bmatrix}, \quad B = \begin{bmatrix} 0 \\ -2 \\ 1 \end{bmatrix}, \quad 2A - B = ?$$

$$2A = \begin{bmatrix} -2 \\ 4 \\ 6 \end{bmatrix} \quad \left\{ \begin{array}{l} 2A - B = \begin{bmatrix} (1-2-0) \\ (4-(-2)) \\ (6-1) \end{bmatrix} \rightarrow \begin{bmatrix} -2 \\ 6 \\ 5 \end{bmatrix} \\ \text{alternativa} \\ \text{tire} \end{array} \right.$$

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

$$B^t = \begin{bmatrix} -1 & 2 \\ 3 & 0 \\ 2 & 1 \end{bmatrix} \quad \left\{ A - B^t = \begin{bmatrix} (1-(-1)) & (2-2) \\ (3-3) & (4-0) \\ (5-2) & (6-1) \end{bmatrix} \right.$$

↙

$$\begin{bmatrix} 2 & 0 \\ 0 & 4 \\ 3 & 5 \end{bmatrix} \quad \text{alternativa (b)}$$

(8) $A = A^t, x+y+z = ?$

$$A = \begin{bmatrix} 2 & -1 & 2y \\ 1 & 0 & -3 \\ 4 & 3 & 2 \end{bmatrix} \quad \left\{ A^t = \begin{bmatrix} 2 & 1 & 4 \\ -1 & 0 & 3 \\ -2y & -3 & 2 \end{bmatrix} \right.$$

$$x = \boxed{-1} \quad \left\{ \begin{array}{l} -3 = 3 \\ 3 = \boxed{-3} \end{array} \right. \quad \left\{ \begin{array}{l} x + y + z = -1 + 2 + (-3) \\ 1 - 3 = \boxed{-2} \end{array} \right.$$

$$\begin{aligned} 2y &= 4 \\ y &= \frac{4}{2} = \boxed{2} \end{aligned}$$

alternativa (A)

⑨ $A = (a_{ij})_{3 \times 2}$, $B = (b_{ij})_{3 \times 2}$, $A + B = ?$

$$\begin{cases} \text{Se } i \neq j \rightarrow a_{ij} = i + j \\ \text{Se } i = j \rightarrow a_{ij} = 1 \end{cases} \quad \begin{cases} \text{Se } i \neq j \rightarrow b_{ij} = 0 \\ \text{Se } i = j \rightarrow b_{ij} = 2i - j \end{cases}$$

$$A = \begin{bmatrix} 011 & 012 \\ 021 & 022 \\ 031 & 032 \end{bmatrix} \quad \begin{array}{l} i \neq j \rightarrow 012 = 1+2=3 \\ \rightarrow 021 = 2+1=3 \\ \rightarrow 031 = 3+1=4 \\ \rightarrow 032 = 3+2=5 \end{array} \quad \begin{cases} i=j \\ 011=1 \\ 022=1 \end{cases}$$

$$\left. \begin{array}{c} \text{L} \\ \text{*} \end{array} \right\} \begin{bmatrix} 1 & 3 \\ 3 & 1 \\ 4 & 5 \end{bmatrix}_{3 \times 2} \quad \left. \begin{array}{l} B = \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \\ b_{31} & b_{32} \end{bmatrix} \\ \text{---} \\ b_{12}, b_{21}, b_{31}, b_{32} = 0 \end{array} \right\} \begin{array}{l} i \neq j \\ \text{---} \end{array}$$

$$i=j \rightarrow b_{11} = 2 \cdot 1 - 1 = 1 \quad \hookrightarrow \begin{bmatrix} 1 & 0 \\ 0 & 2 \\ 0 & 0 \end{bmatrix} \quad 3 \times 2$$

$$\rightarrow b_{22} = 2 \cdot 2 - 2 = 2 \quad *$$

$$\underline{A+B} = \begin{bmatrix} 2 & 3 \\ 3 & 3 \\ 4 & 5 \end{bmatrix} \text{ alternative } \textcircled{C}$$

$$\textcircled{10} \quad \frac{3}{2}M + \frac{2}{3}N = P, \quad y - x = ?$$

$$M = \begin{vmatrix} x & 8 \\ 10 & y \end{vmatrix}, N = \begin{vmatrix} y & 6 \\ -12 & x+4 \end{vmatrix}, P = \begin{vmatrix} 7 & 16 \\ x_3 & 13 \end{vmatrix}$$

$$\left\{ \begin{array}{l} \frac{3}{2}M = \begin{bmatrix} \frac{3}{2}x & 12 \\ 15 & \frac{3}{2}y \end{bmatrix} \\ 2N = \begin{bmatrix} \frac{2}{3}y & 4 \\ 8 & 2(x+4) \end{bmatrix} \end{array} \right.$$

$$\begin{array}{rcl} 3M + 2N = P \\ 2 & 3 \end{array} \quad \rightarrow 9x + 4y = 42$$

$$\hookrightarrow \left\{ \begin{array}{l} 3x + 2y = 7 \\ 2 & 3 \end{array} \right. \quad \rightarrow 9x + 4y = 42 \quad \textcircled{I}$$

$$\left(\frac{3}{2}y + 2(x+4) = 13 \right) \quad \rightarrow \quad 9y + 4(x+4) = 78$$

$$\left\{ \begin{array}{l} 9y + 4x + 16 = 78 \\ 9y + 4x = 78 - 16 \\ 9y + 4x = 62 \end{array} \right. \quad \textcircled{II}$$

$$\left\{ \begin{array}{l} 9x + 4y = 42 \\ 4x + 9y = 62 \end{array} \right. \quad \textcircled{I} \quad \textcircled{II}$$

* Subtract equations \textcircled{II} from \textcircled{I}

$$\hookrightarrow 4x + 9y - (9x + 4y) = 62 - 42$$

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

$$5y - 5x = 20$$

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

$$y - x = \frac{20}{5} \rightarrow y - x = \boxed{4} \quad (\text{alternative } \textcircled{b})$$