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Exercícios - Tarefa básica

01. $A = (a_{ij})_{3\times 2}$ $\quad i$ = linhas

lei = $a_{ij} = 2i + 3j$ $\quad j$ = colunas

3×2 $\quad 2i + 3j$

$a_{11}\ a_{12}$ $\quad a_{11} = 2\cdot 1 + 3\cdot 1 = 2+3 = 5$

$a_{21}\ a_{22}$ $\quad a_{12} = 2\cdot 1 + 3\cdot 2 = 2+6 = 8$

$a_{31}\ a_{32}$ $\quad a_{21} = 2\cdot 2 + 3\cdot 1 = 4+3 = 7$

$a_{22} = 2\cdot 2 + 3\cdot 2 = 4+6 = 10$

$a_{31} = 2\cdot 3 + 3\cdot 1 = 6+3 = 9$

$a_{32} = 2\cdot 3 + 3\cdot 2 = 6+6 = 12$

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

02. $A = (a_{ij})_{2\times 2}$

$a_{ij} = i^2 + 4j^2$

2×2 $\quad i^2 + 4j$

$a_{11}\ a_{12}$ $\quad a_{11} = 1^2 + 4\cdot 1^2 = 5$

$a_{21}\ a_{22}$ $\quad a_{12} = 1^2 + 4\cdot 2^2 = 17$

$a_{21} = 2^2 + 4\cdot 1^2 = 8$

$a_{22} = 2^2 + 4\cdot 2^2 = 20$

$$A = \begin{bmatrix} 5 & 17 \\ 8 & 20 \end{bmatrix}$$

R: (A)

03. $x, y, z \rightarrow \begin{bmatrix} 1 & x+2 \\ y-1 & z+1 \end{bmatrix} = \begin{bmatrix} 1 & -x \\ 2y & -2z \end{bmatrix}$

$1 = 1$ $\quad x+2 = -x$ $\quad y-1 = 2y$ $\quad z+1 = -2z$

$2 = -x - x$ $\quad -1 = 2y - y$ $\quad 1 = -2z - z$

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

$x = \frac{2}{-2}$ $\quad -3z = 1$

$x = -1$ $\quad z = -\frac{1}{3}$

$x = -1,\ y = -1;\ z = -\frac{1}{3}$ //

spiral

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04. $x, y, z \rightarrow \begin{bmatrix} 3-x & y \\ 3x & x \end{bmatrix} = \begin{bmatrix} 3 & y \\ 2x+1 & z-1 \end{bmatrix}$

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

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

$x = 1$ $\quad 1+1 = z$

$2 = z$

$x = 1;\ y = -1;\ z = 2$

05

4x4

$$\begin{matrix} a_{11} & a_{12} & a_{13} & a_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \\ a_{41} & a_{42} & a_{43} & a_{44} \end{matrix} = \begin{bmatrix} 0 & 1 & \sqrt{2} & 1 \\ 1 & 0 & 1 & \sqrt{2} \\ \sqrt{2} & 1 & 0 & 1 \\ 1 & \sqrt{2} & 1 & 0 \end{bmatrix}$$ R: (B)

$a_{11} = 0$ $(1-1=0)$

$a_{12} = 1$ $(2-1=0)$

a_{13} = diagonal = $\sqrt{2}$

$a_{14} = 1$

$a_{21} = 1$

$a_{22} = 0$

$a_{23} = 1$

$a_{24} = \sqrt{2}$

$a_{31} = \sqrt{2}$

$a_{32} = 1$

$a_{33} = 0$

$a_{34} = 1$

$a_{41} = 1$

$a_{42} = \sqrt{2}$

$a_{43} = 1$

$a_{44} = 0$

↳ quando os números são sequentes a distância será 1 $(2^a - 1^a)$

↳ quando os números são iguais a distância será 0 ou nula

↳ quando os números têm uma diferença de 2 distâncias o valor será $\sqrt{2}$, sempre equivalente a diagonal de um quadrado.

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06. $A = \begin{bmatrix} -1 \\ 2 \\ 3 \end{bmatrix}$ e $B = \begin{bmatrix} 0 \\ -2 \\ 1 \end{bmatrix}$

$2A - B$

$\begin{bmatrix} -2 \\ 4 \\ 6 \end{bmatrix} - \begin{bmatrix} 0 \\ -2 \\ 1 \end{bmatrix} = \begin{bmatrix} -2 \\ 6 \\ 5 \end{bmatrix}$ R: (D)

$-2 - 0 = -2$
$4 + 2 = 6$
$6 - 1 = 5$

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

B^T → transposta

$A - B^T$

$\begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix} - \begin{bmatrix} -1 & 2 \\ 3 & 0 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} 2 & 0 \\ 0 & 4 \\ 3 & 5 \end{bmatrix}$ R: (B)

08. $A \rightarrow A = A^t$

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

$2 = 2$ $\quad -1 = x$ $\quad 2y = 4$ $\quad 2 = 3$

$x = -1$ $\quad y = \frac{4}{2}$

$y = 2$

$x + y + 2$
$= 1 + 2 - 3$
$= -4 + 2$
$= -2$

R: (A)

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09. $A = (a_{ij})_{3\times 2} = \begin{cases} i+j, \text{ se } i \neq j \\ 1, \text{ se } i = j \end{cases}$

$B = (b_{ij})_{3\times 2} = \begin{cases} 0, \text{ se } i \neq j \\ 2i-j, \text{ se } i = j \end{cases}$

$$A_{3\times 2} = \begin{bmatrix} 1 & 3 \\ 3 & 1 \\ 4 & 5 \end{bmatrix} \quad \begin{matrix} a_{11} & a_{12} \\ a_{21} & a_{22} \\ a_{31} & a_{32} \end{matrix} \qquad B_{3\times 2} = \begin{bmatrix} 1 & 0 \\ 0 & 2 \\ 0 & 0 \end{bmatrix} \quad \begin{matrix} B_{11} & B_{12} \\ B_{21} & B_{22} \\ B_{31} & B_{32} \end{matrix}$$

$i \neq j, a_{ij} = i+j$
$a_{12} = 1+2 = 3$
$a_{21} = 2+1 = 3$
$a_{31} = 3+1 = 4$
$a_{32} = 3+2 = 5$

$i = j, a_{ij} = 1$
$a_{11} = 1$
$a_{12} = 1$

$i \neq j, B_{ij} = 0$
$B_{12} = 0$
$B_{21} = 0$
$B_{31} = 0$
$B_{32} = 0$

$i = j, B_{ij} = 2i-j$
$B_{11} = 2 \cdot 1 + 1 = 1$
$B_{22} = 2 \cdot 2 - 2 = 2$

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

R (c)

10. $\frac{3}{2}M + \frac{2}{3}N = P$

$$M = \begin{bmatrix} \frac{3}{2}x & 12 \\ 15 & \frac{3}{2}y \end{bmatrix} \quad N = \begin{bmatrix} \frac{2}{3}y & 4 \\ 8 & \frac{2x+8}{3} \end{bmatrix} \quad P = \begin{bmatrix} 7 & 16 \\ 27 & 13 \end{bmatrix}$$

todos multiplicados por $\frac{3}{2}$

Todos multiplicados por $\frac{2}{3}$.

$\frac{3}{2}x + \frac{2}{3} = 7$

$\frac{9x}{6} + \frac{4y}{6} = \frac{42}{6}$

$9x + 4y = 42$

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

$\frac{9y}{6} + \frac{4x+16}{6} = \frac{78}{6}$

$9y + 4x = 78 - 16$

$9y + 4x = 62$

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$$\begin{cases} 9x + 4y = 42 \quad (-2,25) \\ 4x + 9y = 82 \end{cases}$$

$$\begin{cases} -20,5x - 9y = -94,5 \\ 4x + 9y = 82 \end{cases}$$

$$-16,25x = -32,5$$

$$x = \frac{-32,5}{-16,25}$$

$$x = 2$$

$$9x + 4y = 42$$
$$9 \cdot 2 + 4y = 42$$
$$18 + 4y = 42$$
$$4y = 42 - 18$$
$$y = \frac{24}{4}$$
$$y = 6$$

$y - x = ?$

$6 - 2 = 4$ //

R: (B)