RESOLUÇÃO LISTA - 1

1:

$$
\begin{bmatrix}
x+2 & 2y-6 \\
z-3 & x+y \\
w+1 & 2w
\end{bmatrix}
=
\begin{bmatrix}
2x+2y & -2 \\
-z+w & 2-y \\
x+2z & x
\end{bmatrix}
$$

$2y - 6 = -2$
$2y = 4$
$\boxed{y = 2}$

$x + 2 = 2x + 2y$
$x + 2 = 2x + 2 \cdot 2$
$x - 2x = -2 + 4$
$-x = 2$
$\boxed{x = -2}$

$2w = x$
$2w = -2$
$\boxed{w = -1}$

$z - 3 = -z + w$
$z + z = +3 - 1$
$2z = 2$
$\boxed{z = 1}$

* Conferindo se está correto ... vou substituir os valores encontrados

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

2: a1

$$\begin{array}{ccc} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{array}_{3\times3}$$

$a_{11} = 1 \quad a_{12} = 0 \quad a_{13} = 0$

$a_{21} = 0 \quad a_{22} = 4 \quad a_{23} = 6$

$a_{31} = 1 \quad a_{32} = -1 \quad a_{33} = 9$

A matriz resultante é a abaixo:

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 4 & 0 \\ 1 & -1 & 9 \end{bmatrix}_{3\times3}$$

Matriz quadrada e Triangular inferior

b1

$$\begin{bmatrix} b_{11} & b_{12} & b_{13} & b_{14} \\ b_{21} & b_{22} & b_{23} & b_{24} \\ b_{31} & b_{32} & b_{33} & b_{34} \\ b_{41} & b_{42} & b_{43} & b_{44} \end{bmatrix}$$

$b_{11} = 1 \quad b_{12} = 2 \quad b_{13} = 3 \quad b_{14} = 4$

$b_{21} = 2 \quad b_{22} = 4 \quad b_{23} = 6 \quad b_{24} = 8$

$b_{31} = 3 \quad b_{32} = 6 \quad b_{33} = 9 \quad b_{34} = 12$

$b_{41} = 4 \quad b_{42} = 8 \quad b_{43} = 12 \quad b_{44} = 16$

A matriz resultante é a seguinte:

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 4 & 6 & 8 \\ 3 & 6 & 9 & 12 \\ 4 & 8 & 12 & 16 \end{bmatrix}_{4\times4}$$

Matriz quadrada e simétri

c)

$$\begin{bmatrix} c_{11} & c_{12} & c_{13} \\ c_{21} & c_{22} & c_{23} \\ c_{31} & c_{32} & c_{33} \end{bmatrix}_{3 \times 3}$$

$c_{11} = 2 \qquad c_{12} = 5 \qquad c_{13} = 10$

$c_{21} = 5 \qquad c_{22} = 8 \qquad c_{23} = 13$

$c_{31} = 10 \qquad c_{32} = 13 \qquad c_{33} = 18$

∴ A matriz resultante é a seguinte:

$$\begin{bmatrix} 2 & 5 & 10 \\ 5 & 8 & 13 \\ 10 & 13 & 18 \end{bmatrix}_{3 \times 3}$$

d)

$$\begin{bmatrix} d_{11} & d_{12} & d_{13} \\ d_{21} & d_{22} & d_{23} \\ d_{31} & d_{32} & d_{33} \end{bmatrix}$$

$d_{11} = -1 \qquad\qquad 0 \qquad\qquad 0$

$0 \qquad\qquad d_{22} = 2 \qquad\qquad 0$

$0 \qquad\qquad 0 \qquad\qquad d_{33} = 6$

∴ A matriz resultante é a seguinte:

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

Matriz Quadrada e Diagonal

$$3^{\underline{=}} \quad 3A = 3 \cdot \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 3a & 3b \\ 3c & 3d \end{bmatrix}$$

$$B + C = \begin{bmatrix} a & 6 \\ -1 & 2d \end{bmatrix} + \begin{bmatrix} 4 & a+b \\ c+d & 3 \end{bmatrix} = \begin{bmatrix} a+4 & 6+a+b \\ -1+c+d & 2d+3 \end{bmatrix}$$

$$\begin{bmatrix} 3a & 3b \\ 3c & 3d \end{bmatrix} = \begin{bmatrix} a+4 & 6+a+b \\ -1+c+d & 2d+3 \end{bmatrix}$$

$$3a = a+4 \qquad\qquad 3b = 6+a+b$$
$$2a = 4 \qquad\qquad\quad 2b = 8$$
$$\boxed{a = 2} \qquad\qquad\quad \boxed{b = 4}$$

$$3c = -1+c+d \qquad\qquad 3d = 2d+3$$
$$2c = -1+3 \qquad\qquad\qquad \boxed{d = 3}$$
$$\boxed{c = 1}$$

* Conferindo se os valores encontrados estão corretos:

$$\begin{bmatrix} 6 & 12 \\ 3 & 9 \end{bmatrix} = \begin{bmatrix} 6 & 12 \\ 3 & 9 \end{bmatrix} \qquad \checkmark$$

4ª

$$A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}_{2\times2}$$

$a_{11} = 1$ $a_{12} = 1/2$

$a_{21} = 2/1$ $a_{22} = 4$

$$B = \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix}_{2\times2}$$

$b_{11} = 2$ $b_{12} = 1/3$

$b_{21} = \dfrac{1}{2}$ $b_{22} = 9$

6. $A = \begin{bmatrix} 6 & 3 \\ 12 & 24 \end{bmatrix}$ $12B = \begin{bmatrix} 24 & 4 \\ 6 & 108 \end{bmatrix}$

$$6A - 12B = \begin{bmatrix} -18 & -1 \\ 6 & -84 \end{bmatrix}$$

5:

$$A \cdot B = \begin{bmatrix} 1 & 3 \\ -2 & 2 \end{bmatrix}_{2 \times 2} \cdot \begin{bmatrix} 4 & x \\ y & 3 \end{bmatrix}_{2 \times 2} = \begin{bmatrix} 4+3y & x+9 \\ -8+2y & -2x+6 \end{bmatrix}_{2 \times 2}$$

$$B \cdot A = \begin{bmatrix} 4 & x \\ y & 3 \end{bmatrix} \cdot \begin{bmatrix} 1 & 3 \\ -2 & 2 \end{bmatrix} = \begin{bmatrix} 4+(-2x) & 12+2x \\ y-6 & 3y+6 \end{bmatrix}$$

$4+3y = 4-2x$ $x+9 = 12+2x$

$3y = -2 \cdot (-3)$ $-x = 3$

$3y = 6$ $\boxed{x = -3}$ ✓

$\boxed{y=2}$ ✓

$-8+2y = y-6$ $-2x+6 = 3y+6$

$\boxed{y = 2}$ $-2 \cdot (-3)+6 = 3 \cdot 2+6$

$12 = 12$ ✓

$6°$ $A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \end{bmatrix}_{2\times 3} = \begin{bmatrix} 0 & 2 & 3 \\ 2 & 0 & 4 \end{bmatrix}$

$B = \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \\ b_{31} & b_{32} \end{bmatrix}_{3\times 2} = \begin{bmatrix} 1 & -1 \\ -1 & 1 \\ 1 & -1 \end{bmatrix}$

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

$A + B^T = \begin{bmatrix} 1 & 1 & 4 \\ 1 & 1 & 3 \end{bmatrix}_{2\times 3}$

$7°$ $A = \begin{bmatrix} 5 & 6x - 9 \\ x^2 & 12 \end{bmatrix}_{2\times 2}$

$6x - 9 = x^2$

$-x^2 - 9 + 6x = 0$

$x^2 + 9 - 6x = 0$

$x^2 - 6x^2 + 9 = 0$

$x_{1} = 3 \quad ; \quad x_{11} = 3$

8ª

$$\begin{bmatrix} x & y \\ z & w \end{bmatrix} \cdot \begin{bmatrix} 2 & 5 \\ 5 & 4 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$2x + 5y = 1 \qquad\qquad 5x + 4y = 0$$
$$2z + 5w = 0 \qquad\qquad 5z + 4w = 1$$

$$\begin{cases} 2x + 5y = 1 & \cdot (-4) \\ 5x + 4y = 0 & \cdot (5) \end{cases} \longrightarrow 5 \cdot \left(\dfrac{-4}{17}\right) + 4y = 0$$

$$\begin{array}{r} -8x - 20y = -4 \\ 25x + 20y = 0 \\ \hline \end{array}$$

$$\dfrac{-20}{17} + 4y = 0$$

$$17x = -4$$

$$\boxed{x = \dfrac{-4}{17}}$$

$$4y = \dfrac{20}{17}$$

$$\boxed{y = \dfrac{20}{17 \cdot 4} = \dfrac{5}{17}}$$

$$\begin{cases} 2z + 5w = 0 & \cdot (-4) \\ 5z + 4w = 1 & \cdot (5) \end{cases} \longrightarrow \dfrac{20}{17} + 5w = 0$$

$$5w = \dfrac{-20}{17}$$

$$\begin{array}{r} -8z - 20w = 0 \\ 25z + 20w = 5 \\ \hline \end{array}$$

$$\boxed{w = \dfrac{-1}{17}}$$

$$17z = 5$$

$$\boxed{z = \dfrac{5}{17}}$$

$$(x - z) + w - y = 3 \cdot \left(\dfrac{-9}{17}\right) - \dfrac{7}{17} = \dfrac{-27}{17} - \dfrac{7}{17} = \dfrac{-34}{17} = \boxed{-2}$$

9º

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}_{3 \times 3}$$

$a_{11} = 1 \qquad a_{12} = 3 \qquad a_{13} = 5$

$a_{21} = a_{12} \qquad a_{22} = 2 \qquad a_{23} = 7$

$a_{31} = a_{13} \qquad a_{32} = a_{23} \qquad a_{33} = 3$

$$A = \begin{bmatrix} 1 & 3 & 5 \\ 3 & 2 & 7 \\ 5 & 7 & 3 \end{bmatrix} \qquad 2A = \begin{bmatrix} 2 & 6 & 10 \\ 6 & 4 & 14 \\ 10 & 14 & 6 \end{bmatrix}$$

$$B = \begin{bmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \\ b_{31} & b_{32} & b_{33} \end{bmatrix}$$

$b_{11} = 1 \qquad b_{12} = 0 \qquad b_{13} = 0$

$b_{21} = 3 \qquad b_{22} = 2 \qquad b_{23} = 0$

$b_{31} = 5 \qquad b_{32} = 4 \qquad b_{33} = 3$

$$B = \begin{bmatrix} 1 & 0 & 0 \\ 3 & 2 & 0 \\ 5 & 4 & 3 \end{bmatrix} \qquad 2A + B = \begin{bmatrix} 3 & 6 & 10 \\ 9 & 6 & 14 \\ 15 & 18 & 9 \end{bmatrix}$$

$$A + B)^{q} = \begin{bmatrix} 3 & 9 & 15 \\ 6 & 6 & 18 \\ 10 & 14 & 9 \end{bmatrix}$$

10°

$$B \cdot C = \begin{bmatrix} 1 & x & 0 \\ 1 & 0 & x \end{bmatrix} \cdot \begin{bmatrix} 1 & 6 \\ 0 & -1 \\ x & 0 \end{bmatrix} = \begin{bmatrix} 1 & 6-x \\ 1+x^2 & 6 \end{bmatrix}$$

$$A = BC \rightarrow \begin{bmatrix} 1 & x^2 \\ 10 & 6 \end{bmatrix} = \begin{bmatrix} 1 & 6-x \\ 1+x^2 & 6 \end{bmatrix}$$

$$x^2 = 9$$
$$x = \pm 3 \qquad \boxed{x = +3}$$

Letra d₁