S T Q Q S S D __/__/__

Tarefa Básica - Matriz Inversa

01) $A^{-1} = B$

$A^{-1} = \begin{bmatrix} x & 1 \\ 5 & 3 \end{bmatrix}$ $\quad B = \begin{bmatrix} 3 & -1 \\ y & 2 \end{bmatrix}$

$\begin{bmatrix} 3 & -1 \\ y & 2 \end{bmatrix} \to \begin{bmatrix} 2 & 1 \\ -y & 3 \end{bmatrix} \to \begin{bmatrix} x & 1 \\ 5 & 3 \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ -5 & 3 \end{bmatrix}$ R: C //

$x = 2 \quad y = -5$

$2 - 5 = -3$

02) $A = \begin{pmatrix} 1 & 0 & 1 \\ k & 1 & 3 \\ 1 & k & 3 \end{pmatrix} = 0$

$$\begin{array}{ccc} & 1 \quad 3k \quad 0 & \\ A = & \left|\begin{array}{ccc|cc} 1 & 0 & 1 & 1 & 0 \\ k & 1 & 3 & k & 1 \\ 1 & k & 3 & 1 & k \end{array}\right. & \\ & 3 \quad 0 \quad k^2 & \end{array}$$

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

$= k^2 - 3k + 2$

$a = 1 \quad \Delta = 9 - 8 \quad x = \frac{3 \pm 1}{2}$

$b = -3 \quad \Delta = 1$

$c = 2$

$x_1 = 2$

$x_2 = 1$

$S = \{1, 2\}$ R: C //

03) $B = A^{-1}$

matriz de ordem 2

$A = \begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix} \to A^{-1} = \begin{bmatrix} 4 & -5 \\ -2 & 3 \end{bmatrix} \div 2$ (det)

R: C //

$D = 12 - 10$ $\quad A^{-1} = B = \begin{bmatrix} 2 & -5/2 \\ -1 & 3/2 \end{bmatrix}$ //

$D = 2$

04) $\begin{bmatrix} x & 1 & 2 \\ 3 & 1 & 2 \\ 10 & 1 & x \end{bmatrix} = 0 \rightarrow$

$$\begin{array}{ccc|cc} x & 1 & 2 & x & 1 \\ 3 & 1 & 2 & 3 & 1 \\ 10 & 1 & x & 10 & 1 \end{array}$$

$20 \quad 2x \quad 3x$

$x^2 \quad 20 \quad 6$

$= x^2+20+6-20-2x-3x$

$= x^2-5x+6$

$a=1 \qquad \Delta = 25-24$

$b=-5 \qquad \Delta = 1$

$c=6$

$x = \frac{5 \pm 1}{2}$

$x_1 = 3$

$x_2 = 2$

$S = \{x=3 \text{ e } x=2\}$

R: A //

05) $\left[\begin{array}{ccc|ccc} -1 & -1 & 2 & 1 & 0 & 0 \\ 2 & 1 & -2 & 0 & 1 & 0 \\ 1 & 1 & -1 & 0 & 0 & 1 \end{array}\right] \cdot(-1) \; \cdot(-2) \rightarrow \left[\begin{array}{ccc|ccc} 1 & 1 & -2 & -1 & 0 & 0 \\ 2 & 1 & -2 & 0 & 1 & 0 \\ 1 & 1 & -1 & 0 & 0 & 1 \end{array}\right]$

$\rightarrow \left[\begin{array}{ccc|ccc} 1 & 1 & -2 & -1 & 0 & 0 \\ 0 & -1 & 2 & 2 & 1 & 0 \\ 1 & 1 & -1 & 0 & 0 & 1 \end{array}\right] \cdot(-1) \quad (-1) \rightarrow \left[\begin{array}{ccc|ccc} 1 & 1 & -2 & -1 & 0 & 0 \\ 0 & 1 & -2 & -2 & -1 & 0 \\ 1 & 1 & -1 & 0 & 0 & 1 \end{array}\right]$

$\left[\begin{array}{ccc|ccc} 1 & 1 & -2 & -1 & 0 & 0 \\ 0 & 1 & -2 & -2 & -1 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 \end{array}\right] \cdot(-2) \quad \left[\begin{array}{ccc|ccc} 1 & 1 & -2 & -1 & 0 & 0 \\ 0 & 1 & 0 & 0 & -1 & 2 \\ 0 & 0 & 1 & 1 & 0 & 1 \end{array}\right] \cdot(2)$

$\left[\begin{array}{ccc|ccc} 1 & 1 & 0 & 1 & 0 & 2 \\ 0 & 1 & 0 & 0 & -1 & 2 \\ 0 & 0 & 1 & 1 & 0 & 1 \end{array}\right] \cdot(-1) \quad \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & -1 & 2 \\ 0 & 0 & 1 & 1 & 0 & 1 \end{array}\right]$

$$A + A^{-1} = \begin{bmatrix} -1 & -1 & 2 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \end{bmatrix} + \begin{bmatrix} 1 & 1 & 0 \\ 0 & -1 & 2 \\ 1 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 2 \\ 2 & 0 & 0 \\ 2 & 1 & 0 \end{bmatrix}$$

R: B //

S T Q Q S S D

06) $(X \cdot A)^t = B$

$((X \cdot A)^t)^t = B^t$

$X \cdot A = B^t$

$X \cdot A \cdot A^{-1} = B^t \cdot A^{-1}$

$X \cdot I = B^t \cdot A^{-1}$

$\boxed{X = B^t \cdot A^{-1}}$ R: B //

07)

$B = \begin{bmatrix} x \\ y \end{bmatrix}$ $C = \begin{bmatrix} 4x + 5y \\ 5x + 6y \end{bmatrix}$

$A \cdot B = C$

$A = \frac{C}{B} = \begin{bmatrix} 4 & 5 \\ 5 & 6 \end{bmatrix} \Rightarrow A^{-1} = \begin{bmatrix} 6 & -5 \\ -5 & 4 \end{bmatrix} \div -1 = \begin{bmatrix} -6 & 5 \\ 5 & -4 \end{bmatrix}$ //

$D = 24 - 25$

$D = -1$

R: D //

08)

$A = \begin{pmatrix} 2 & k \\ -2 & 1 \end{pmatrix} = 2 + 2k = 0$

$\hookrightarrow \det A = \det A^{-1}$

det A

$2 + 2k = 0$

$2k = -2$

$k = \frac{-2}{2}$

$\boxed{k = -1}$

det A^{-1}

$2 + 2k = 0$

$2k = -2$

$k = \frac{-2}{2}$

$\boxed{k = -1}$

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

R: B //

spiral

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09)

a- $(A+B).(A-B)$

$A^2 - AB + BA - B^2$

b- $(A+B)^2 = (A+B)(A+B) = A^2 + AB + BA + B^2$

se $AB = BA$, $A^2 + 2AB + B^2$

c- $\det(A) = 1$, todos os elementos da matriz $-A$ estarão ao contrá-
$\det(-A) =$ rio de A ou seja, com sinal negativo.
Mas quando ocorrer a multiplicação das diagonais, os valores se tornarão positivos.
Sendo $\det(A) = \det(-A)$.

d- $B = A^{-1}$, logo $\det B = \frac{1}{\det A}$