Tarefa Básica - Matriz Inversa

01 $A = \begin{bmatrix} x & 1 \\ 5 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 3 & -1 \\ y & 2 \end{bmatrix}$

$$\begin{bmatrix} x & 1 \\ 5 & 3 \end{bmatrix} \cdot \begin{bmatrix} 3 & -1 \\ y & 2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\begin{pmatrix} x.3+1.y & x.(-1)+1.2 \\ 5.3+3.y & 5.(-1)+3.2 \end{pmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$3x+(-5)=1$
$3x=1+5$
$3x=6$
$x=\frac{6}{3}=2$

$-x+2=0$
$-x=-2$
$x=\frac{-2}{-1}=2$

$15+3y=0$
$3y+15=0$
$3y=-15$
$y=\frac{-15}{3}=-5$

$-5+6=1$
$1=1$
$\frac{1}{1}=1$

$A^{-1} = \begin{pmatrix} 2 & 2 \\ -5 & 1 \end{pmatrix}$

$(x+y) = 2+(-5) = -3$

02 $\begin{bmatrix} 1 & 0 & 1 \\ K & 1 & 3 \\ 1 & K & 3 \end{bmatrix}$

$1+3K+0 = 1+3K$

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

$3+0+K^2 = 3+K^2$

$\Delta = b^2-4.a.c$
$\Delta = -3^2-4.1.2$
$\Delta = 9-8$
$\Delta = 1$

$x = \frac{-b \pm \sqrt{\Delta}}{2.a}$

$x' = \frac{3+1}{2} = \frac{4}{2} = 2$ //

$x'' = \frac{3-1}{2} = \frac{2}{2} = 1$ //

03)

$A = \begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix}$ $12 - 10 = 2$ $\det = 2$ $\rightarrow \begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix} \div 2 = \begin{bmatrix} 3/2 & 5/2 \\ 1 & 2 \end{bmatrix}$ A^t

10 12

destacando a diagonal $\rightarrow \begin{bmatrix} 2 & -5/2 \\ -1 & 3/2 \end{bmatrix}$ C//
e trocando o sinal

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

$2x + 2x + 3x = 20 + 5x$

$x^2 + 26 - 20 - 5x = x^2 + 6 - 5x$

$x^2 - 5x + 6 = 0$

$x^2 + 2x + 6 = x^2 + 26$

$\Delta = b^2 - 4.a.c$
$\Delta = -5^2 - 4.1.6$
$\Delta = 25 - 24$
$\Delta = 1$

$x = \frac{-(-5) \pm \sqrt{1}}{2.1}$

$x' = \frac{5+1}{2} = \frac{6}{2} = 3$ //

$x'' = \frac{5-1}{2} = \frac{4}{2} = 2$ //

05) $\begin{bmatrix} -1 & -1 & 2 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \end{bmatrix}$ $A^{-1} = ?$

$2 + 2 + 2 = 6$

$7 - 6 = 1$

$\det = 1$

$1 + 2 + 4 = 7$

Calculando matriz adjunta

$\begin{bmatrix} 1 & -1 & 2 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \\ -1 & -1 & 2 \\ 2 & 1 & -2 \end{bmatrix}$ $\begin{matrix} -1 & -1 \\ x & x \\ 1 & 1 \\ x & x \\ -1 & -1 \end{matrix}$

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

Continuação (5)

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

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

(06) $(X.A)^T = B$

$XA.A = B^T.A^{-1}$

$XI = B^T.A^{-1}$

$X = B^T.A^{-1}$ // (B)

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

$$A=\begin{bmatrix}4 & 5\\ 5 & 6\end{bmatrix} \cdot B=\begin{bmatrix}x\\ y\end{bmatrix}=\begin{bmatrix}4x+5y\\ 5x+6y\end{bmatrix}$$

25 24

$detA = -1$

$$A^{-1}=\begin{bmatrix}6 & -5\\ 5 & 4\end{bmatrix} \div (-1) = A^{-1}=\begin{bmatrix}-6 & 5\\ 5 & -4\end{bmatrix}$$ (D)

08)

$$A = \begin{bmatrix} 2 & k \\ -2 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 2 & k \\ -2 & 1 \end{bmatrix} = 2 - (-2k) = 2k + 2$$

$-2k \quad 2$

$2k_1 + 2 = 1$ $\quad$ $2k_2 + 2 = -1$

$2k_1 = -1$ $\quad$ $2k_2 = -3$

$k_1 = \frac{-1}{2}$ $\quad$ $k_2 = \frac{-3}{2}$

$$\frac{-1}{2} + \left(\frac{-3}{2}\right) = \frac{-4}{2} = -2$$

B