TAREFA BÁSICA MATRIZ INVERSA

① $A = \begin{bmatrix} x & 1 \\ 5 & 3 \end{bmatrix}$

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

IMPAR INVERTE O SINAL NA INVERSA

$x = 2$

$y = -5$

LOGO $B = \begin{bmatrix} 3 & -1 \\ -5 & 2 \end{bmatrix}$

$x + y =$

$2 - 5$ ALTERNATIVA (C)

-3

$1+3K0$

$A = \begin{pmatrix} 1 & 0 & 1 \\ K & 1 & 3 \\ 1 & K & 3 \end{pmatrix} \begin{matrix} 1 & 0 \\ K & 1 \\ 1 & K \end{matrix}$

DET A $= 3 + K2 - 3K - 1$

DET A $= K^2 + 2 - 3K$

A C B

$3 + K^2$

TAREFA BÁSICA

① $A = \begin{bmatrix} x & 1 \\ 5 & 3 \end{bmatrix}$

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

IMPAR INVERTE O SINAL NA INVERSA

$x = 2$
$y = -5$

LOGO $B = \begin{pmatrix} 3 & -1 \\ -5 & 2 \end{pmatrix}$

$x + y$
$2 - 5$
-3

ALTERNATIVA (C)

$1 + 3K0$

② $A = \begin{pmatrix} 1 & 0 & 1 \\ K & 1 & 3 \\ 1 & K & 3 \end{pmatrix} \begin{matrix} 1 & 0 \\ K & 1 \\ 1 & K \end{matrix}$

$3 + K^2$

DET $A = 3 + K2 - 3K - 1$

DET $A = K^2 + 2 - 3K$

A C B

$\Delta = B^2 - 4.A.C$
$\Delta = -3^2 - 4.1.2$
$\Delta = 9 - 8$
$\Delta = 1$

$K = \dfrac{3 \pm 1}{2} \to K' = \dfrac{3+1}{2} = \dfrac{4}{2} = 2$

$K'' = \dfrac{3-1}{2} = \dfrac{2}{2} = 1$

$K^2 + 2 - 3K = 0$
$2^2 + 2 - 3.2 = 0$
$4 + 2 - 6 = 0$
$6 - 6 = 0$

$K^2 + 2 - 3K = 0$
$1^2 + 2 - 3.1 = 0$
$3 - 3 = 0$

ALTERNATIVA (C)

③ $A=\begin{bmatrix}3 & 5\\2 & 4\end{bmatrix}$ DET A = 12 - 10
DET A = 2 DET A ≠ 0
É INVERSÍVEL

$\begin{pmatrix}3 & 5\\2 & 4\end{pmatrix}\cdot\begin{pmatrix}X & Y\\A & B\end{pmatrix}=\begin{pmatrix}1 & 0\\0 & 1\end{pmatrix}$ $B=\begin{pmatrix}2 & -\frac{5}{2}\\-1 & \frac{3}{2}\end{pmatrix}$ ALTERNATIVA (C)

$3X+5A=1 \mid 3Y+5B=0$ $X=2$ $Y=-\frac{5}{2}$
$2X+4A=0 \mid 2Y+4B=1$ $A=-1$ $B=\frac{3}{2}$

$\begin{cases}3X+5A=1\\2X+4A=0\end{cases}$ $\begin{cases}3Y+5B=0\\2Y+4B=1\end{cases}$

$\begin{pmatrix}3 & 5\\2 & 4\end{pmatrix}$ DET = 2 $\begin{pmatrix}3 & 5\\2 & 4\end{pmatrix}$ DET = 2

$\begin{pmatrix}1 & 5\\0 & 4\end{pmatrix}$ DET = 4 - 0
DET = 4

$\begin{pmatrix}0 & 5\\1 & 4\end{pmatrix}$ DET = 0 - 5
DET = -5

$X=\frac{4}{2}=2$ $Y=\frac{-5}{2}$

$3X+5A=1$
$3.2+5A=1$
$6+5A=1-6$
$5A=-5$
$A=\frac{-5}{5}=-1$

$2Y+4B=1$
$2.\frac{-5}{2}+4B=1$
$-5+4B=1+5$
$B=\frac{6^{:2}}{4_{:2}}=\frac{3}{2}$

④ $A = \begin{bmatrix} x & 1 & 2 \\ 3 & 1 & 2 \\ 10 & 1 & x \end{bmatrix} \begin{matrix} x & 1 \\ 3 & 1 \\ 10 & 1 \end{matrix}$

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

$DET = \underset{A}{x^2} + \underset{C}{6} - \underset{B}{5x}$

$x^2 + 2016 = x^2 + 26$

$20 + 4x + 3x = 20 + 5x$

$\Delta = B^2 - 4 . A . C$ $\qquad x = \frac{-B \pm \sqrt{\Delta}}{2A}$

$\Delta = -5^2 - 4 . 1 . 6$

$\Delta = 25 - 24$ $\qquad x = \frac{5 \pm 1}{2 . 1} \rightarrow x' = \frac{5 + 1}{2} = \frac{6}{2} = 3$

$\Delta = 1$

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

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

$3^2 + 6 - 5 . (3) = 0$ $\qquad 2^2 + 6 - 5 . 2 = 0$

$9 + 6 - 15 = 0$ $\qquad 4 + 6 - 10 = 0$

$15 - 15 = 0$ $\qquad 10 - 10 = 0$

$V = \{(2, 3)\}$.

PARA SER INVERCIVEL

$V = \{(x \neq 2, x \neq 3)\}$

ALTERNATIVA (A)

(5) $A = \begin{bmatrix} -1 & -1 & 2 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \end{bmatrix} \begin{matrix} -1 & -1 \\ 2 & 1 \\ 1 & 1 \end{matrix}$ DET $A = 7 - 6 = 1$

$2+2+2=6 \qquad 1+2+4=7$

$$\begin{array}{r|rrrr} -1 & -1 & 2 & -1 & -1 \\ \hline 2 & 1 & -2 & 2 & 1 \\ 1 & 1 & -1 & 1 & 1 \\ -1 & -1 & 2 & -1 & -1 \\ 2 & 1 & -2 & 2 & 1 \end{array} \qquad A^{-1} = \begin{pmatrix} 1 & 1 & 0 \\ 0 & -1 & 2 \\ 1 & 0 & 1 \end{pmatrix}$$

$A + A^{-1}$

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

$$\downarrow$$

$$\begin{pmatrix} 0 & 0 & 2 \\ 2 & 0 & 0 \\ 2 & 1 & 0 \end{pmatrix}$$

ALTERNATIVA (B)

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

$AB \neq BA$

$A.A^{-1} = \text{IDENTIDADE} = A^{-1}.A$

MATRIZ IDENTIDADE É IGUAL A 1.

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

$X.A = B^T \Rightarrow X.A.A^{-1} = B^T.A^{-1}$

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

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

ALTERNATIVA (B)

7) $B = \begin{bmatrix} X \\ Y \end{bmatrix}$ $C = \begin{bmatrix} 4X+5Y \\ 5X+6Y \end{bmatrix}$

$A.B = C$

$A = \begin{bmatrix} A & B \\ C & D \end{bmatrix} . B = \begin{bmatrix} X \\ Y \end{bmatrix} = C \begin{bmatrix} 4X+5Y \\ 5X+6Y \end{bmatrix}$

$A = \begin{bmatrix} 4 & 5 \\ 5 & 6 \end{bmatrix}$ DET A $= 24 - 25 = -1$

$\begin{pmatrix} -4 & -5 \\ -5 & -6 \end{pmatrix}$ PASSA DIVIDINDO OS ELEMENTOS DE A

INVERTA OS ELEMENTOS DA DIAGONAL PRINCIPAL

$\begin{pmatrix} -6 & -5 \\ -5 & -4 \end{pmatrix}$ INVERTA O SINAL DOS ELEMENTOS DA DIAGONAL SECUMDARIA

$A^T = \begin{pmatrix} -6 & 5 \\ 5 & -4 \end{pmatrix}$ ALTERNATIVA (D)

8 $A = \begin{bmatrix} 2 & K \\ -2 & 1 \end{bmatrix}$

$\det A = 2 + 2K$

$2 + 2K = 0$

$2K = -2$

$K = \frac{-2}{2} = -1$

$\div$

DIVIDA OS ELEMENTOS DE A POR DET A

$\begin{pmatrix} -2 & -K \\ 2 & -1 \end{pmatrix}$ INVERTA OS ELEMENTOS DA DIAGONAL PRINCIPAL

$\downarrow$

$\begin{pmatrix} -1 & -K \\ 2 & -2 \end{pmatrix}$ INVERTA O SINAL DOS ELEMENTOS DA DIAGONAL SECUNDARIA

$\downarrow$

$A^T = \begin{pmatrix} -1 & K \\ -2 & -2 \end{pmatrix}$ $\det A^T = 2 + 2K$

$2 + 2K = 0$

$2K = -2$

$K = \frac{-2}{2} = -1$

$K + K$

$-1 + (-1)$ $K + K = -2$

$-1 - 1$

-2 ALTERNATIVA (B)

⑧ $A = \begin{bmatrix} 2 & K \\ -2 & 1 \end{bmatrix}$ DET A = 2+2K

2+2K = 0

2K = -2

$K = \frac{-2}{2} = -1$ DIVIDA OS ELEMENTOS DE A POR DET A

$\div$

$\begin{pmatrix} -2 & -K \\ 2 & -1 \end{pmatrix}$ INVERTA OS ELEMENTOS DA DIAGONAL PRINCIPAL

$\begin{pmatrix} -1 & -K \\ 2 & -2 \end{pmatrix}$ INVERTA O SINAL DOS ELEMENTOS DA DIAGONAL SECUNDARIA

$A^T = \begin{pmatrix} -1 & K \\ -2 & -2 \end{pmatrix}$ DET A^T = 2+2K

2+2K = 0

2K = -2

$K = \frac{-2}{2} = -1$

K+K

-1+(-1) K+K = -2

-1-1

-2 ALTERNATIVA (B)

9) A

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

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

B) $AB \neq BA$, MAS CASO $AB=BA$, A MAIORIA DAS REGRAS DE MULTIPLICAÇÃO E DIVISÃO SERÃO VÁLIDAS ENTÃO SERÁ VERDADE QUE:

$(A+B)^2=A^2+2.A.B+B^2$

C)

SE $A=\begin{bmatrix} A & B \\ C & D \end{bmatrix}$ ENTÃO $-A=\begin{bmatrix} -A & -B \\ -C & -D \end{bmatrix}$

$DET A = AD-CB$ $DET -A = AD-CB$

$\frac{DET A}{DET B} = \frac{AD-CB}{AD-CB} = 1$

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

$DET B = DET A^{-1}$

$A.A^{-1}$ = IDENTIDADE → DET. IDENTIDADE É 1

$DET A . DET A^{-1} = 1$

$DET A^{-1} = \frac{1}{DET A}$

→ $DET B = \frac{1}{DET A}$