Nome: João Victor
Turma: CT11348
Prontuário: 1990527

Tarefa Básica

1.)

$\begin{vmatrix} x & 1 \\ 5 & 3 \end{vmatrix} = A$ A é inversa de B. $B = \begin{vmatrix} 3 & -1 \\ y & 2 \end{vmatrix}$

$x + y = ?$

$B^{-1} = \begin{vmatrix} 2 & 1 \\ -y & 3 \end{vmatrix} = \begin{vmatrix} x & 1 \\ 5 & 3 \end{vmatrix}$ $2 + (-5) = -3$

$2 = x$
$5 = -y \cdot (-1)$
$-5 = y$

C

2)

$$A = \begin{vmatrix} 1 & 0 & 1 \\ k & 1 & 3 \\ 1 & k & 3 \end{vmatrix} \begin{matrix} 1 & 0 \\ k & 1 \\ 1 & k \end{matrix}$$

$1 + 3k$

$3 + 0 + k^2$

$\det A = k^2 + 3 - (3k + 1)$
$\det A = k^2 - 3k + 2$

$2 + 1 = 3$
$2 \cdot 1 = 2$

1 e 2

C

3)

$A = \begin{vmatrix} 3 & 5 \\ 2 & 4 \end{vmatrix}$ $\quad \det A = 12 - 10 = 2$

$A' = \begin{vmatrix} 4 & -2 \\ -5 & 3 \end{vmatrix}$

C

$\bar{A} = \begin{vmatrix} 4 & -5 \\ -2 & 3 \end{vmatrix} \div 2$

$\bar{A} = \begin{vmatrix} 2 & -\frac{5}{2} \\ -1 & \frac{3}{2} \end{vmatrix}$

4)

$$20 + 2x + 3x$$

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

$$x^2 + 20 + 6$$

$\det = x^2 + 26 - (20 + 5x)$

$\det = x^2 - 5x + 6$

$2 + 3 = 5$

$2 \cdot 3 = 6$

A

$\{ x \neq 3 \text{ e } x \neq 2 \}$

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5)

$$A = \left|\begin{array}{ccc|cc} -1 & -1 & 2 & -1 & -1 \\ 2 & 1 & -2 & 2 & 1 \\ 1 & 1 & -1 & 1 & 1 \end{array}\right| \qquad \det A = 7 - 6 = \underline{1}$$

Cofatores:

$$A_{11} = \begin{vmatrix} 1 & -2 \\ 1 & -1 \end{vmatrix} = -1 - (-2) = \underline{1}$$

$$A_{12} = \begin{vmatrix} 2 & -2 \\ 1 & -1 \end{vmatrix} = -2 - (-2) = 0$$

$$A_{13} = \begin{vmatrix} 2 & 1 \\ 1 & 1 \end{vmatrix} = 2 - 1 = \underline{1}$$

$$A_{21} = \begin{vmatrix} -1 & 2 \\ 1 & -1 \end{vmatrix} = 1 - 2 = -1$$

impar $= \underline{1}$

$$A_{22} = \begin{vmatrix} -1 & 2 \\ 1 & -1 \end{vmatrix} = 1 - 2 = -\underline{1}$$

$$A_{23} = \begin{vmatrix} -1 & -1 \\ 1 & 1 \end{vmatrix} = -1 - (-1) = 0$$

$$A_{31} = \begin{vmatrix} -1 & 2 \\ 1 & -2 \end{vmatrix} = 2 - 2 = 0$$

$$A_{32} = \begin{vmatrix} -1 & 2 \\ 2 & -2 \end{vmatrix} = 2 - 4 = -2$$

impar $= 2$

$$A_{33} = \begin{vmatrix} -1 & -1 \\ 2 & 1 \end{vmatrix} = -1-(-2) = 1$$

$$A' = \begin{vmatrix} 1 & 0 & 1 \\ 1 & -1 & 0 \\ 0 & 2 & 1 \end{vmatrix}$$

B

$$\bar{A} = \begin{vmatrix} 1 & 1 & 0 \\ 0 & -1 & 2 \\ 1 & 0 & 1 \end{vmatrix}$$

$$\text{SOMA} = \begin{vmatrix} -1 & -1 & 2 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \end{vmatrix} + \begin{vmatrix} 1 & 1 & 0 \\ 0 & -1 & 2 \\ 1 & 0 & 1 \end{vmatrix} = \begin{vmatrix} 0 & 0 & 2 \\ 2 & 0 & 0 \\ 2 & 1 & 0 \end{vmatrix}$$

6)

$$((XA)^T)^T = B^T \rightarrow XA = B^T$$

$$XAA^{-1} = B^T A^{-1} \rightarrow XI = B^T A^{-1}$$

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

B

7)

$$C = \begin{vmatrix} 4x + 5y \\ 5x + 6y \end{vmatrix} \qquad B = \begin{vmatrix} X \\ Y \end{vmatrix} \qquad AB = \begin{vmatrix} AX \\ AY \end{vmatrix}$$

$$4x + 5y = AX$$
$$5x + 6Y = AY$$

$$C = \begin{vmatrix} 4 & 5 \\ 5 & 6 \end{vmatrix} \qquad \det = 24 - 25 = -1$$

S T Q Q S S D

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$$C' = \begin{vmatrix} 6 & -5 \\ -5 & 4 \end{vmatrix}$$

$$\bar{C} = \begin{vmatrix} 6 & -5 \\ -5 & 4 \end{vmatrix} \div -1$$

$$C^{-1} = \begin{vmatrix} -6 & 5 \\ 5 & -4 \end{vmatrix}$$

D

8)

$$A = \begin{vmatrix} 2 & k \\ -2 & 1 \end{vmatrix} \qquad \det A = 2 - 2k$$

$$\det A^{-1} = \det A \iff \frac{1}{\det A} = \det A, \ \det A \neq 0. \iff$$

$$(\det A^2) = 1 \iff \det A = 1 \text{ ou } \det A = -1$$

$$2 + 2k = 1 \qquad \text{ou} \qquad 2 + 2k = -1$$

$$k = \frac{-1}{2} \qquad\qquad k = \frac{-3}{2}$$

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

B

9)

A)

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

$A^2 - AB + BA - B^2$ $\underline{A^2 - AB + BA - B^2}$

b)

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

assim

$A^2 + 2AB + B^2 \longrightarrow AB = BA$ $\underline{AB = BA.}$

c) MATRIZ A de ordem 2:

det $\neq 0$

$\det(-A) = (-1)^2$

$\dfrac{\det(A)}{\det(-A)} = \dfrac{\det A}{\det A} = \underline{1}$ $\underline{1}$

d) Se B for inversa de A, ent

$\det(AB) = 1$

$\det(A) . \det(B) = 1$ $\det B = \dfrac{1}{\det A}$

$\det B = \dfrac{1}{\det A}$