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Turma: **CTII 348**
IFSP - Câmpus Cubatão

Tarefa Básica 8
Matriz Inversa

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

$\begin{cases} 3x + y = 1 \\ 15 + 3y = 0 \end{cases}$ $\qquad$ $\begin{cases} -x + 2 = 0 \rightarrow -x = -2 \cdot (-1) \\ -5 + 6 = 1 \end{cases}$ $\quad x = \boxed{2}$

$3y = -15$

$y = -15/3 = \boxed{-5}$

$x + y \rightarrow 2 - 5 = \boxed{-3}$

C

2.

1	0	1	1	0	$3k$
k	1	3	k	1	$\det A \rightarrow k^2 - 3k + 2$
1	k	3	1	k	
			$3 + 0 + k^2$		

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

$k^2 - 3k + 2 = 0$

$1 + 2 = 3$

$1 \cdot 2 = 2$

$\boxed{1 \text{ e } 2}$ ←

C

3. $A = \begin{pmatrix} 3 & 5 \\ 2 & 4 \end{pmatrix}$ $\qquad 12 - 10 = 2 \neq 0$

$B = \begin{pmatrix} 4 & -5 \\ -2 & 3 \end{pmatrix} \div \det A$

C

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

4.

x	1	2	x	1	$2x$ $3x$
3	1	2	3	1	$x^2 - 5x + 6 \neq 0$
10	1	x	10	1	$2x^2$ 20 6

$2 + 3 = 5$

$2 \cdot 3 = 6$

$\boxed{x' \neq 2}$

$\boxed{x'' \neq 3}$

A

5. $\begin{pmatrix} -1 & -1 & 2 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \end{pmatrix} \begin{matrix} -1 & -1 \\ 2 & 1 \\ 1 & 1 \end{matrix}$ $\det A = 1$

$1 \quad 2 \quad 4$

$$A = \begin{pmatrix} -1 & -1 & 2 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \end{pmatrix} \qquad A^1 = \begin{pmatrix} 1_2 & 0_3 & 1_4 \\ -1_3 & -1_4 & 0_5 \\ 0_1 & -2_5 & 1_6 \end{pmatrix} \to \begin{pmatrix} 1 & 0 & 1 \\ 1 & -1 & 0 \\ 0 & 2 & 1 \end{pmatrix}$$

$$\bar{A} = \begin{pmatrix} 1 & 1 & 0 \\ 0 & -1 & 2 \\ 1 & 0 & 1 \end{pmatrix} \div \det A \to A^{-1} = \begin{pmatrix} 1 & 1 & 0 \\ 0 & -1 & 2 \\ 1 & 0 & 1 \end{pmatrix}$$

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

B

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

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

$X \cdot A = B^T$

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

B

7. $A \cdot B = C$

$$\begin{pmatrix} x \\ y \end{pmatrix}$$

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} 4x+5y \\ 5x+6y \end{pmatrix}$$

↓

$A = \begin{pmatrix} 4 & 5 \\ 5 & 6 \end{pmatrix}$ $\det A = 24 - 25 = -1$ $A^{-1} = \begin{pmatrix} 6 & -5 \\ -5 & 4 \end{pmatrix} \div \det A$

(1)

$$\boxed{A^{-1} = \begin{pmatrix} -6 & 5 \\ 5 & -4 \end{pmatrix}}$$

8

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

$(2+2k) \cdot (2+2k) = 1 \neq 0$

$(2+2k) \cdot (2+2k) - 1 = 0$

$4 + 4k + 4k + 4k^2 - 1 = 0$

$4k^2 + 8k + 3 = 0$

$-0,5 + -1,5 = -2$

$-0,5 \cdot -1,5 = 0,75$

$k' = -0,5$

$k'' = -1,5$

$-1,5 + -0,5 = \boxed{-2}$

(B)

9.

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

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

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

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

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

$AB + BA = 2AB$

$AB + BA = AB + AB$

$AB - AB + BA = AB \rightarrow \boxed{AB = BA}$

c) $A = \begin{pmatrix} x & y \\ z & b \end{pmatrix}$ $\quad \det A = xb - zy$

$-A = \begin{pmatrix} -x & -y \\ -z & -b \end{pmatrix}$ $\quad \det -A = xb - zy$

$\frac{\det A}{\det -A} = \frac{xb - zy}{xb - zy} = \boxed{1}$

d) $\det A . \det A^{-1} = 1$

$\det A^{-1} = \frac{1}{\det A} \rightarrow \boxed{\det B = \frac{1}{\det A}}$