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**CTII348**

**Cálculo Geral de Determinantes**

(1) $A = \begin{vmatrix} 1 & a & 0 \\ 0 & 1 & 1 \\ 0 & -1 & 1 \end{vmatrix}$ $\quad B = \begin{vmatrix} 1 & 0 & 0 & 3 \\ a & 1 & -1 & 4 \\ 0 & 0 & 0 & 3 \\ 0 & 1 & 1 & 3 \end{vmatrix}$

A:

1. cof(a11)

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

B:

1. cof(a22)

$0 + 3 + 0 = 3$

$\begin{vmatrix} 1 & 0 & 3 \\ 0 & 0 & 3 \\ 0 & 1 & 1 \end{vmatrix} \begin{matrix} 1 & 0 \\ 0 & 0 \\ 0 & 1 \end{matrix}$ DET $= 0 - 3 = -3$

$0 + 0 + 0 = 0$

1. cof(42)

$0 + 0 + 0 = 0$

$\begin{vmatrix} 1 & 0 & 3 \\ a & -1 & 4 \\ 0 & 0 & 3 \end{vmatrix} \begin{matrix} 1 & 0 \\ a & -1 \\ 0 & 0 \end{matrix}$ DET $= -3 - 0 - 3$

$-3 + 0 + 0 = -3$

$-3 + (-3) = -6$

(2) $\begin{vmatrix} x^2 & 0 & x & -1/10 \\ 7,5 & 0 & 5 & 2 \\ 10 & 0 & 4 & 2 \\ 1 & 1 & 1 & 1 \end{vmatrix} = 0$

1. cof(a42)

$$-5 + 8x^2 + 15x$$

$$1.\left|\begin{array}{ccc|cc} x^2 & x & -1/10 & x^2 & x \\ 7,5 & 5 & 2 & 7,5 & 5 \\ 10 & 4 & 2 & 10 & 4 \end{array}\right.$$

$$10x^2 + 20x - 3$$

$$10x^2 + 20x - 3 - (8x^2 + 15x - 5)$$
$$10x^2 + 20x - 3 - 8x^2 - 15x + 5$$

$$2x^2 + 5x + 2 = 0$$
$$\Delta = 5^2 - 4.2.2$$
$$\Delta = 25 - 16$$
$$\Delta = 9$$

$$x = \frac{-5 \pm \sqrt{9}}{2.2} = \frac{-5 \pm 3}{4}$$
$$x_1 = -2/4 = -1/2$$
$$x_2 = -8/4 = -2$$

3-) $\begin{vmatrix} x & 0 & 0 & 3 \\ -1 & x & 0 & 0 \\ 0 & -1 & x & 1 \\ 0 & 0 & -1 & -2 \end{vmatrix}$

x. cof(a11)

$$0 - 1x + 0 = -1x$$

$$x.\left|\begin{array}{ccc|cc} x & 0 & 0 & x & 0 \\ -1 & x & 1 & -1 & x \\ 0 & -1 & -2 & 0 & 1 \end{array}\right.$$

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

$$\text{Det} = -2x^2 - (-1x) =$$
$$-2x^2 + x$$

-1. cof(a21)

$0+0+0=0$

$$1.\ \begin{array}{ccc|cc} 0 & 0 & 3 & 0 & 0 \\ -1 & x & 1 & -1 & x \\ 0 & -1 & -2 & 0 & -1 \end{array}$$

$Det = 3 - 0 = 3$ $\quad 1$

$i+j = impar$

$-3\ 1$

$0+0+3=-3$

$x(-2x^2+x)$

$-2x^3+x^2$

$-1 \cdot -3$

$3$

$\boxed{-2x^3+x^2+3}$

A

4. $\begin{vmatrix} x & 1 & 0 & 0 & 0 \\ 0 & x & 1 & 0 & 0 \\ 0 & 0 & x & 1 & 0 \\ 0 & 0 & 0 & x & K \\ 0 & 0 & 0 & 1 & x \end{vmatrix}$

$f(x) = DET\ A$

$f(-2) = -8$

$x \cdot cof(a11)$

$x \begin{vmatrix} x & 1 & 0 & 0 \\ 0 & x & 1 & 0 \\ 0 & 0 & x & K \\ 0 & 0 & 1 & x \end{vmatrix}$

$DEt = x^4 - x^2K$

$DEt =$

$\rightarrow x \cdot (x^4 - x^2K)$

$\boxed{x^5 - x^3K}$

$x \cdot cof(a11)$

$0 + K \cdot x + 0 = Kx$

$x \begin{array}{ccc|cc} x & 1 & 0 & x & 1 \\ 0 & x & K & 0 & x \\ 0 & 1 & x & 0 & 1 \end{array}$

$DEt = x^3 - Kx$

$x^3 + 0 + 0 = x^3$

$\rightarrow x \cdot (x^3 - Kx)$

$\boxed{x^4 - x^2K}$

$f(x) = DET\ A \Rightarrow f(x) = x^5 - x^3 K$

$f(-2) = -2^5 - (-2)^3 = 8$

$f(-2) = -32 + 8K = 8$

$-32 + 8K = 8$

$-8K = -32 - 8 \quad x(-1)$

$8K = 32 + 8$

$8K = 40$

$K = 40/8$

$\boxed{K = 5}$

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