

1.(FUVEST) Calcule os determinantes

①

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

1. col (11)

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

$\det A = 1 \cdot 2$
 $\det A = 2$

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

1. col (a22)

$$\begin{vmatrix} 1 & 0 & 3 \\ 0 & 0 & 3 \\ 0 & 1 & 4 \end{vmatrix} = 1 \cdot \begin{vmatrix} 0 & 3 \\ 1 & 4 \end{vmatrix} = 1 \cdot (0 \cdot 4 - 3 \cdot 1) = -3$$

1. col (a42)

$$\begin{vmatrix} 1 & 0 & 3 \\ a & 1 & -1 \\ 0 & 0 & 3 \end{vmatrix} = 1 \cdot \begin{vmatrix} 0 & 3 \\ 1 & -1 \end{vmatrix} = 1 \cdot (0 \cdot (-1) - 3 \cdot 1) = -3$$

$0 - 3 = -3$
 $-3 + -3 = -6$
 $\det B = -6$

2.(FATEC) Calcule x na equação

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. col (a22)

$$\begin{vmatrix} x^2 & x \\ 7,5 & 5 \\ 10 & 4 \end{vmatrix} = x^2 \cdot \begin{vmatrix} 5 & 2 \\ 4 & 2 \end{vmatrix} - x \cdot \begin{vmatrix} 7,5 & 2 \\ 10 & 2 \end{vmatrix} = x^2 \cdot (5 \cdot 2 - 8) - x \cdot (7,5 \cdot 2 - 20) = x^2 \cdot 2 - x \cdot (-5) = 2x^2 + 5x$$

$(10x^2 + 20x - 3) - (8x^2 + 15x - 5) = 2x^2 + 5x + 2 = 0$

$\Delta = (5)^2 - 4 \cdot 2 \cdot 2$
 $\Delta = 25 - 16$
 $\Delta = 9$

$x = \frac{-(-5) \pm \sqrt{9}}{2 \cdot 2}$

$x' = \frac{-5 + 3}{4} = -\frac{1}{2}$

$x'' = \frac{-5 - 3}{4} = -2$

$S = \{-1/2 \text{ ou } -2\}$

3.(PUCSP) O determinante representa o polinômio:

③

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

↳ escolhido

$x \cdot \text{col. (1)}$

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

$-2x^2 - (-x)$
 $-2x^2 + x$
 $x \cdot (-2x^2 + x)$
 $-2x^3 + x^2$

$-1 \cdot \text{col. (2)}$

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

$(2+1) = \text{ímpar}$
 $3 \rightarrow -3$
 $-1 \cdot (-3) = 3$

$A = -2x^3 + x^2 + 3$

4.(UFSCAR) Sejam a matriz A e a função $f: \mathbb{R} \rightarrow \mathbb{R}$ tal que $f(x) = \det A$ e $f(-2)=8$, então k vale:

④

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

$x^3 \cdot (x^2 - k)$

$\det A = x^3(x^2 - k)$
 $8 = (-2)^3 \cdot [(-2)^2 - k]$
 $8 = -8 \cdot (4 - k)$
 $-1 = 4 - k$
 $k = 5$