

Cálculo Geral de Determinantes:

1.

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

$\det A = \begin{bmatrix} 1 & a & 0 \\ 0 & 1 & 1 \\ 0 & -1 & 1 \end{bmatrix} \begin{matrix} 1a & 1 \cdot 1 \cdot 1 = 1 & -0 \cdot 1 \cdot 0 = 0 \\ 01 & a \cdot 1 \cdot 0 = 0 & 1 \cdot 1 \cdot 1 = 1 \\ 0-1 & 0 \cdot 0 \cdot -1 = 0 & 1 \cdot 0 \cdot a = 0 \end{matrix}$

$\det A = 1 + 1$ $B \rightarrow 1 \cdot (a_{22}) + 1 \cdot (a_{42})$
 $\det A = 2$

$a_{22} = \begin{bmatrix} 1 & 0 & 3 \\ 0 & 0 & 3 \\ 0 & 1 & 4 \end{bmatrix} \begin{matrix} 10 & 1 \cdot 0 \cdot 4 = 0 & -0 \cdot 0 \cdot 3 = 0 \\ 00 & 0 \cdot 3 \cdot 0 = 0 & -1 \cdot 3 \cdot 1 = -3 \\ 01 & 3 \cdot 0 \cdot 1 = 0 & -4 \cdot 0 \cdot 0 = 0 \end{matrix}$

$a_{22} = -3$

$a_{42} = \begin{bmatrix} 1 & 0 & 3 \\ a & -1 & 4 \\ 0 & 0 & 3 \end{bmatrix} \begin{matrix} 10 & 1 \cdot -1 \cdot 3 = -3 & -0 \cdot -1 \cdot 3 = 0 \\ a-1 & 0 \cdot 4 \cdot 0 = 0 & -0 \cdot 4 \cdot 1 = 0 \\ 00 & 3 \cdot a \cdot 0 = 0 & -3 \cdot a \cdot 0 = 0 \end{matrix}$

$a_{42} = -3$

$\det B = -3 + (-3)$
 $\det B = -3 - 3$
 $\det B = -6$

$R: \det A = 2; \det B = -6$

R: $\det A = 2$; $\det B = -6$

2.

②

$$\begin{bmatrix} x^2 & 0 & x & -\frac{1}{10} \\ 7,5 & 0 & 5 & 2 \\ 10 & 0 & 4 & 2 \\ 1 & 1 & 1 & 1 \end{bmatrix} = 0$$

$$1.(a42) = \begin{bmatrix} x^2 & x & -\frac{1}{10} \\ 7,5 & 5 & 2 \\ 10 & 4 & 2 \end{bmatrix} \begin{bmatrix} x^2 & x \\ 7,5 & 5 \\ 10 & 4 \end{bmatrix}$$

$$\begin{aligned} x^2 \cdot 5 \cdot 2 &= 10x^2 & -10 \cdot 5 \cdot -0,1 &= 5 \\ x \cdot 2 \cdot 10 &= 20x & -4 \cdot 2 \cdot x^2 &= -8x^2 \\ -0,1 \cdot 7,5 \cdot 4 &= -3 & -2 \cdot 7,5 \cdot x &= -15x \end{aligned}$$

$$\begin{aligned} 10x^2 + 20x - 3 + 5 - 8x^2 - 15x &= 0 \\ 10x^2 - 8x^2 + 20x - 15x + 5 - 3 &= 0 \\ 2x^2 + 5x + 2 &= 0 \end{aligned}$$

$$\Delta = 5^2 - 4 \cdot 2 \cdot 2$$

$$\Delta = 25 - 16$$

$$\Delta = 9$$

$$\frac{-b \pm \sqrt{\Delta}}{2 \cdot a}$$

$$x' = \frac{-2}{4} \rightarrow x' = -\frac{1}{2} \text{ ou } -0,5$$

$$x'' = \frac{-8}{4} \rightarrow x'' = -2$$

$$\mathcal{R}: x = -\frac{1}{2} \text{ ou } -0,5 \text{ ou } -2$$

R: X = -1/2 ou -0,5; ou X = -2

3.

$$\begin{aligned}
 & \textcircled{3} \begin{bmatrix} x & 0 & 0 & 3 \\ -1 & x & 0 & 0 \\ 0 & -1 & x & 1 \\ 0 & 0 & -1 & -2 \end{bmatrix} \quad X \cdot (a22) = \begin{bmatrix} x & 0 & 3 \\ 0 & x & 1 \\ 0 & -1 & -2 \end{bmatrix} \begin{bmatrix} x & 0 \\ 0 & x \\ 0 & -1 \end{bmatrix} \\
 & \quad \quad \quad = -2x^3 + x^2 \\
 & \quad \quad \quad X \cdot x \cdot -2 = -2x^2 \quad -0 \cdot x \cdot 3 = 0 \\
 & -1 \cdot (a32) = \begin{bmatrix} x & 0 & 3 \\ -1 & 0 & 0 \\ 3 & 0 & -1 \end{bmatrix} \begin{bmatrix} x & 0 \\ 0 & 1 \\ 0 & -1 \end{bmatrix} \quad \begin{aligned} & 0 \cdot 1 \cdot 0 = 0 & 1 \cdot 1 \cdot x = x \\ & 3 \cdot 0 \cdot -1 = 0 & 2 \cdot 0 \cdot 0 = 0 \end{aligned} \\
 & \quad \quad \quad X \cdot 0 \cdot -2 = 0 \quad -0 \cdot 0 \cdot x = 0 \quad X \cdot (-2x^2 + x) = -2x^3 + x^2 \\
 & \quad \quad \quad 0 \cdot 0 \cdot 0 = 0 \quad 1 \cdot 0 \cdot x = 0 \\
 & \quad \quad \quad 3 \cdot -1 \cdot -1 = 3 \quad 2 \cdot 1 \cdot 0 = 0 \\
 & X \cdot (a22) + (-1 \cdot (a32)) = \begin{bmatrix} x & 0 & 3 \\ -1 & 0 & 0 \\ 3 & 0 & -1 \end{bmatrix} \begin{bmatrix} x & 0 \\ 0 & 1 \\ 0 & -1 \end{bmatrix} + \begin{bmatrix} x & 0 & 3 \\ -1 & 0 & 0 \\ 3 & 0 & -1 \end{bmatrix} \begin{bmatrix} x & 0 \\ 0 & 1 \\ 0 & -1 \end{bmatrix} \\
 & \quad \quad \quad -2x^3 + x^2 + 3
 \end{aligned}$$

R: A) $-2x^3 + x^2 + 3$

4.

$$A = \begin{bmatrix} \textcircled{X} & 1 & 0 & 0 & 0 \\ 0 & X & 1 & 0 & 0 \\ 0 & 0 & X & 1 & 0 \\ 0 & 0 & 0 & X & K \\ 0 & 0 & 0 & 1 & X \end{bmatrix} \rightarrow A_{11} = \begin{bmatrix} \textcircled{X} & 1 & 0 & 0 \\ 0 & X & 1 & 0 \\ 0 & 0 & X & K \\ 0 & 0 & 1 & X \end{bmatrix} \rightarrow A_{11(11)} = \begin{bmatrix} X & 1 & 0 \\ 0 & X & K \\ 0 & 1 & X \end{bmatrix}$$

$\det A = X$
 $\det A_{11} = X$
 $\det A_{11(11)} = X^3 - KX$

$\det_{\text{geral}} = X \cdot X \cdot (X^3 - KX)$
 $\det_{\text{geral}} = X^2 \cdot (X^3 - KX)$
 $\det_{\text{geral}} = X^5 - KX^3$

$X \cdot X \cdot X = X^3$
 $-1 \cdot K \cdot X = -KX$
 $X^3 - KX$

$p(x) = X^5 - KX^3$
 $p(-2) = 8$

$p(-2) = (-2)^5 - K \cdot (-2)^3 = 8$
 $p(-2) = -32 - 8 \cdot K = 8$
 $p(-2) = -40 \cdot K = 8$
 $p(-2) = -K = 8$

$p(-2) = -K = -5 \cdot (-1)$
 $p(-2) = K = 5$

$K = 5$

$R: D) 5$

R: D) 5