Exercícios - Tarefa básica

01 (FUVEST)

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

$1 + (-\alpha) + 0 - 0 - (-1) - 0 = 2$

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

$0 + (-3) + 0 - 0 - 3 - 0 = -6$

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

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

$$\det \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} = a \cdot \det \begin{bmatrix} e & f \\ h & i \end{bmatrix} - b \cdot \det \begin{bmatrix} d & f \\ g & i \end{bmatrix} + c \cdot \det \begin{bmatrix} d & e \\ g & h \end{bmatrix} =$$

$$x^2 \cdot \det \begin{bmatrix} 5 & 2 \\ 4 & 2 \end{bmatrix} - x \det \begin{bmatrix} 7,5 & 2 \\ 10 & 2 \end{bmatrix} + \frac{-1}{10} \det \begin{bmatrix} 7,5 & 5 \\ 10 & 4 \end{bmatrix}$$

$$\det \begin{bmatrix} 5 & 2 \\ 4 & 2 \end{bmatrix} = 2 \qquad \det \begin{bmatrix} 7,5 & 2 \\ 10 & 2 \end{bmatrix} = -5 \qquad \det \begin{bmatrix} 7,5 & 5 \\ 10 & 4 \end{bmatrix} = -20$$

$$x^2 \cdot 2 - x(-5) + \frac{1}{10}(-20)$$

$$\boxed{2x^2 + 5x + 2 = 0}$$

$\Delta = b^2 - 4 \cdot a \cdot c$

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

$\Delta = 25 - 16$

$\Delta = 9$

$x = \dfrac{-b \pm \sqrt{\Delta}}{2 \cdot a}$

$x = \dfrac{-5 \pm \sqrt{}}{2 \cdot 2}$

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

$x'' = \dfrac{-5-3}{4} = \dfrac{-8}{4} = -2$

03 (PUC-SP)

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

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

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

$$\begin{vmatrix} 0-(-x)\cdot x & 0-(-x)\cdot 0 & 3-(-x)\cdot 0 \\ -1 \div 0 \cdot x & x-0 \cdot 0 & 1-0 \cdot 0 \\ 0-0 \cdot x & -1-0 \cdot 0 & -2 \cdot 0 \cdot 0 \end{vmatrix} = \begin{vmatrix} x^2 & 0 & 3 \\ -1 & x & 1 \\ 0 & -1 & -2 \end{vmatrix} = \boxed{2x^3 + x^2 + 3}$$

04 (UFSCAR)

$$\begin{bmatrix} x & 1 & 0 & 0 & 0 \\ 0 & x & 1 & 0 & 0 \\ 0 & 0 & x & 1 & 0 \\ 0 & 0 & 0 & x & k \\ 0 & 0 & 0 & 1 & x \end{bmatrix} = \begin{vmatrix} x & k \\ 1 & x \end{vmatrix} = x^2 - 1k = k^3$$

$f(x) = x^5 - k x^3$

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

$8k = 40$

$k = \dfrac{40}{8} = 5$