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Cálculo Geral de Determinantes

1.

a)

$$A = \begin{vmatrix} 1 & a & 0 \\ 0 & 1 & 1 \\ 0 & -1 & 1 \end{vmatrix} = \begin{matrix} 1 \\ 0 \\ 0 \end{matrix} \text{ — } \begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix}$$

$2 \cdot 1 = 2$

$\det A = 2$

$1 \cdot 1 + (-1) \cdot 1$

$1 + 1 = 2$

b)

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

$1(-3) + 1(-3) = -6$

$\det B = -6$

$$\begin{bmatrix} 1 & 0 & 3 \\ a & -1 & 4 \\ 0 & 0 & 3 \end{bmatrix} \rightarrow -3$$

02.

$$\begin{vmatrix} x^2 & 0 & x & -\frac{1}{10} \\ 7.5 & 0 & 5 & 2 \\ 10 & 0 & 4 & 2 \\ 1 & 1 & 1 & 1 \end{vmatrix} \quad \begin{matrix} 0 \\ 0 \\ 0 \\ 1 \end{matrix}$$

$$\begin{bmatrix} x^2 & x & -\frac{1}{10} \\ 7.5 & 5 & 2 \\ 10 & 4 & 2 \end{bmatrix}$$

$$\begin{matrix} x^2 & x & -\frac{1}{10} \\ 7.5 & 5 & 2 \\ 10 & 4 & 2 \end{matrix} \quad \begin{matrix} x^2 & x \\ 7.5 & 5 \\ 10 & 4 \end{matrix}$$

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

$$x' = -2$$
$$x^2 = -\frac{1}{2}$$

03.

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

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

$$x \cdot 1 \cdot \begin{matrix} -2x^2 + 0 + 0 - (-x) \\ -2x^2 + x \end{matrix} = -2x^3 + x^2$$

$$\begin{matrix} 0 & 0 & 3 & 0 & 0 \\ -1 & x & 1 & -1 & x \\ 0 & -1 & -2 & 0 & -1 \end{matrix} \qquad \begin{matrix} 3 - 0 = 0 \\ -1 \cdot -1 \cdot 3 = 3 \end{matrix}$$

$$-2x^3 + x^2 + 3$$

Letra A

4.

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

$\det A =$ → Reduzir a matriz,

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

Multiplicar pelos elementos redutores

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

$x^3 \cdot (x^2 - k) = x^5 - kx^3$ $\quad Det\, A = x^5 - kx^3$

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

$f(-2) = -2^5 - k \cdot -2^3 = 8$

Substituir ~~o parâmetro~~ o parâmetro da função para isolar o k

$-32 - (-8k) = 8$

$-32 + 8k = 8$

$8k = 40$

$k = \frac{40}{8}$ $\quad (k = 5)$

Letra D