

TAREFA BÁSICA 3

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01. Calcule os determinantes das seguintes matrizes:

a)

$$\begin{bmatrix} 2 & 3 \\ 1 & 5 \end{bmatrix}$$

$10 - 3 = 7$
 $\text{Det.} = 7$

b)

$$\begin{bmatrix} -2 & -4 \\ 3 & 6 \end{bmatrix}$$

$-12 - (-12) = 0$
 $\text{Det.} = 0$

c)

$$\begin{bmatrix} 3 & -1 & 1 \\ 2 & 1 & -1 \\ 1 & 4 & -2 \end{bmatrix}$$

$3 - (-6) = 10$
 $\text{det.} = 10$

d)

$$\begin{bmatrix} 3 & 2 & -1 \\ 2 & 3 & 1 \\ 1 & 1 & 4 \end{bmatrix}$$

$36 - 16 = 20$
 $\text{Det} = 20$

02. (MACK) Se $A = (a_{ij})$ é uma matriz quadrada de terceira ordem tal que

$$a_{ij} = \begin{cases} -3, & \text{se } i = j \\ 0, & \text{se } i \neq j \end{cases} \quad \text{então o determinante}$$

de A vale:

$A = (a_{ij})$

$$a_{ij} = \begin{cases} -3, & \text{se } i = j \\ 0, & \text{se } i \neq j \end{cases}$$

$a_{11} = -3$
 $a_{12} = 0$
 $a_{13} = 0$
 $a_{21} = 0$
 $a_{22} = -3$
 $a_{23} = 0$
 $a_{31} = 0$
 $a_{32} = 0$
 $a_{33} = -3$

$$\begin{bmatrix} -3 & 0 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & -3 \end{bmatrix}$$

$-27 - 0 = -27$
 $\text{Det.} = -27$

03. (FUVEST) Resolver a equação

03

$$\begin{vmatrix} x & 1 & x \\ 3 & x & 4 \\ 1 & 3 & 3 \end{vmatrix} = -3$$

x^2
 $12x$
 -9
 $3x^2$
 $9x$
 4

$$(3x + 3x + 4) - (x^2 + 12x + 9) = -3$$

$$2x^2 - 3x - 5 = -3$$

$$2x^2 - 3x - 5 + 3 = 0$$

$$2x^2 - 3x - 2 = 0 //$$

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

$$\Delta = (-3)^2 - 4 \cdot 2 \cdot (-2)$$

$$\Delta = 9 + 16$$

$$\Delta = 25$$

$$x = \frac{-(-3) \pm \sqrt{25}}{2 \cdot 2}$$

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

$$x'' = \frac{3+5}{4} = \frac{8}{4} = 2$$

$S = \left\{ -\frac{1}{2}; 2 \right\}$

04. (MACK) A soma das raízes da equação é:

04

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

$2(x-1) = 2x-2$
 0
 0
 $(x+1)(x+1)(x-1) = (x^2-1) \cdot (x+1)$
 x^2-1
 $x^3+x^2-x-1 //$

$$(x^3 + x^2 - x - 1 + 2) - 2x - 2$$

$$x^3 + x^2 - x + 1 - 2x - 2$$

$$x^3 + x^2 - 3x - 1 = 2$$

$$x^3 + x^2 - 3x - 1 - 2 = 0$$

$$x^3 + x^2 - 3x - 3 = 0 //$$

05. (UEL) Sejam as matrizes $A = (a_{ij})_{3 \times 2}$, tal que, $a_{ij} = 2i - 3j$ e $B = (b_{jk})_{2 \times 3}$, tal que $b_{jk} = k - j$. O determinante da matriz $A \cdot B$ é igual a

05

$A = (a_{ij})_{3 \times 2}$
 $a_{ij} = 2i - 3j$
 $B = (b_{jk})_{2 \times 3}$
 $b_{jk} = k - j$

$a_{11} = 2 \cdot 1 - 3 \cdot 1 = -1$
 $a_{12} = 2 \cdot 1 - 3 \cdot 2 = -4$
 $a_{21} = 2 \cdot 2 - 3 \cdot 1 = 1$
 $a_{22} = 2 \cdot 2 - 3 \cdot 2 = -2$
 $a_{31} = 2 \cdot 3 - 3 \cdot 1 = 3$
 $a_{32} = 2 \cdot 3 - 3 \cdot 2 = 0$

$b_{11} = 1 - 1 = 0$
 $b_{12} = 2 - 1 = 1$
 $b_{13} = 3 - 1 = 2$
 $b_{21} = 1 - 2 = -1$
 $b_{22} = 2 - 2 = 0$
 $b_{23} = 3 - 2 = 1$

$A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \\ a_{31} & a_{32} \end{bmatrix} = \begin{bmatrix} -1 & -4 \\ 1 & -2 \\ 3 & 0 \end{bmatrix}$

$B = \begin{bmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \end{bmatrix} = \begin{bmatrix} 0 & 1 & 2 \\ -1 & 0 & 1 \end{bmatrix}$

$AB = \begin{bmatrix} 4 & -1 & -6 \\ 2 & 1 & 0 \\ 0 & 3 & 6 \end{bmatrix}$

$4 \cdot 1 \cdot 6 = 24$
 $2 \cdot (-1) \cdot 6 = -12$
 $0 \cdot 3 \cdot 6 = 0$
 $24 - 12 + 0 = 12$
 $12 - 12 = 0$
 $\det AB = 0$

06. Dadas as matrizes

$A = \begin{bmatrix} 2 & 0 & -1 \\ -1 & 1 & 0 \end{bmatrix}$

$B = \begin{bmatrix} 1 & -1 \\ -1 & 1 \\ 0 & 2 \end{bmatrix}$

$AB = \begin{bmatrix} 2+0+0 & -2+0-2 \\ (-1)-1+0 & 1+1+0 \end{bmatrix} = \begin{bmatrix} 2 & -4 \\ -2 & 2 \end{bmatrix}$

$\det AB = -4 - (-4) = 0$