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tarefa básica

DETERMINANTES

① a) $\begin{bmatrix} 2 & 3 \\ 1 & 5 \end{bmatrix} \longrightarrow det = 10 - 3 = 7$

3

10

b) $\begin{bmatrix} -2 & -4 \\ 3 & 6 \end{bmatrix} \longrightarrow det = -12 - (-12) = 0$

-12

-12

c) $1 - 12 + 4 = -7$

$\left[\begin{array}{ccc} 3 & -1 & 1 \\ 2 & 1 & -1 \\ 1 & 4 & -2 \end{array}\right] \begin{array}{cc} 3 & -1 \\ 2 & 1 \\ 1 & 4 \end{array} \longrightarrow det = 3 - (-7) = 10$

$-6 + 1 + 8 = 3$

d) $-3 + 3 + 16 = 16$

$\left[\begin{array}{ccc} 3 & 2 & -1 \\ 2 & 3 & 1 \\ 1 & 1 & 4 \end{array}\right] \begin{array}{cc} 3 & 2 \\ 2 & 3 \\ 1 & 1 \end{array} \longrightarrow det = 36 - 16 = 20$

$36 + 2 - 2 = 36$

② $A = (a_{ij})\ 3\times3$

$a_{ij} = \begin{cases} -3 \to i = j \\ 0 \to i \neq j \end{cases}$

$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$

$0 + 0 + 0 = 0$

$\longrightarrow A = \left[\begin{array}{ccc} -3 & 0 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & -3 \end{array}\right] \begin{array}{cc} -3 & 0 \\ 0 & -3 \\ 0 & 0 \end{array} \longrightarrow det = -27$

$-27 + 0 + 0$

alternativa A.

S T Q Q S S D

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$x^2+12x+9$

3) $\begin{bmatrix} x & 1 & x \\ 3 & x & 4 \\ 1 & 3 & 3 \end{bmatrix} \begin{matrix} x & 1 \\ 3 & x \\ 1 & 3 \end{matrix} = -3$

$3x^2+4+9x$

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

$3x^2+4+9x-x^2-12x-9+3=0$

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

$a=2 \quad b=-3 \quad c=-2$

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

$\Delta=(-3)^2-4.2.(-2)$

$\Delta=9+16$

$\Delta=25$

$x=\frac{-b\pm\sqrt{25}}{2.a}$

$x=\frac{3\pm5}{4} \rightarrow x'=\frac{3-5}{4}=\frac{-1}{2}$

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

Resposta: alternativa E)

$\{-1/2, 2\}$

$0+(x-1)+0$

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

$(x-1)(x+1)(x+1)+2+0$

$(x-1)(x+1)(x+1)+2-(x-1)=2$

$(x^2\cancel{+x}\cancel{-x}-1)(x+1)+\cancel{2}-x+1-\cancel{2}=0$

$x^3+x^2-x\cancel{-1}-x\cancel{+1}=0$

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

$a=1 \quad b=1 \quad c=-2 \quad d=0$

Relações de Girard:

$r_1+r_2+r_3=-b/a$

$\rightarrow r_1+r_2+r_3=-1/1=-1$

Resposta: alternativa C)

S T Q Q S S D ___/___/___

(5)

$A = (a_{ij})_{3\times2}$
$a_{ij} = 2i - 3j$

$a_{11} = 2.1 - 3.1 = -1$
$a_{12} = 2.1 - 3.2 = -4$
$a_{21} = 2.2 - 3.1 = 1$
$a_{22} = 2.2 - 3.2 = -2$
$a_{31} = 2.3 - 3.1 = 3$
$a_{32} = 2.3 - 3.2 = 0$

$$\rightarrow A = \begin{bmatrix} -1 & -4 \\ 1 & -2 \\ 3 & 0 \end{bmatrix}$$

$B = (b_{jk})_{2\times3}$
$b_{jk} = k - j$

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

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

$\underset{3\times2}{A} \cdot \underset{2\times3}{B}$ (=)

$\underset{3\times3}{A \cdot B}$

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

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

$0 + 0 - 12 = -12$

$$A \cdot B = \left[\begin{matrix} 4 & -1 & -6 \\ 2 & 1 & 0 \\ 0 & 3 & 6 \end{matrix}\right] \begin{matrix} 4 & -1 \\ 2 & -1 \\ 0 & 3 \end{matrix} \rightarrow \det = -12 - (-12) = 0$$

$24 + 0 - 36 = -12$

alternativa c)

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⑥ $A = \begin{bmatrix} 2 & 0 & -1 \\ -1 & 1 & 0 \end{bmatrix}$ e $B = \begin{bmatrix} 1 & -1 \\ -1 & 1 \\ 0 & 2 \end{bmatrix}$

$$\underset{2\times 3}{A} \cdot \underset{3\times 2}{B} \qquad \underset{2\times 2}{A \cdot B}$$

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

$$A = \begin{bmatrix} 2 & 0 & -1 \\ -1 & 1 & 0 \end{bmatrix} = \begin{bmatrix} 2+0+0 & -2+0-2 \\ -1-1+0 & 1+1+0 \end{bmatrix} = \begin{bmatrix} 2 & -4 \\ -2 & 2 \end{bmatrix}$$

$$A \cdot B = \begin{bmatrix} 2 & -4 \\ -2 & 2 \end{bmatrix} \longrightarrow \det = 4 - 8 = -4$$

8

4

alternativa D)