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Matemática I - Lista de Exercícios

1) Dadas as matrizes $A = \begin{bmatrix} 1 & -8 \\ 4 & 11 \\ -15 & 7 \end{bmatrix}_{3\times2}$ e $B = \begin{bmatrix} 7 & 10 \\ -14 & 9 \\ 3 & 0 \end{bmatrix}_{3\times2}$ determinar:

1.1) $A - 5 \cdot B = C$

$$\begin{bmatrix} 1 & -8 \\ 4 & 11 \\ -15 & 7 \end{bmatrix} - \begin{bmatrix} (7.5) & (10.5) \\ (-14.5) & (9.5) \\ (3.5) & (0.5) \end{bmatrix} = \begin{bmatrix} 1 & -8 \\ 4 & 11 \\ -15 & 7 \end{bmatrix} - \begin{bmatrix} 35 & 50 \\ -70 & 45 \\ 15 & 0 \end{bmatrix}$$

$$= \begin{bmatrix} -34 & -58 \\ 74 & -34 \\ -30 & 7 \end{bmatrix}, \text{logo } C = \begin{bmatrix} -34 & -58 \\ 74 & -34 \\ -30 & 7 \end{bmatrix}_{3\times2}$$

1.2) $B + 7 \cdot A = C$

$$\begin{bmatrix} 7 & 10 \\ -14 & 9 \\ 3 & 0 \end{bmatrix} + \begin{bmatrix} (1.7) & (-8.7) \\ (4.7) & (11.7) \\ (-15.7) & (7.7) \end{bmatrix} = \begin{bmatrix} 7 & 10 \\ -14 & 9 \\ 3 & 0 \end{bmatrix} + \begin{bmatrix} 7 & -56 \\ 28 & 77 \\ -105 & 49 \end{bmatrix}$$

$$= \begin{bmatrix} 14 & -46 \\ 14 & 86 \\ -102 & 49 \end{bmatrix}, \text{logo } C = \begin{bmatrix} 14 & -46 \\ 14 & 86 \\ -102 & 49 \end{bmatrix}_{3\times2}$$

2) Dada a matriz $A = \begin{bmatrix} -1 & 3 & 7 \\ 9 & 5/4 & -7 \\ 5 & 2 & -2/7 \end{bmatrix}_{3\times3}$

2.1) Para $k = -7/5$, determinar: $k \cdot A$

data/fecha 21.05.21

$$K.A = \begin{bmatrix} (-1.-7/5) & (3.-7/5) & (7.-7/5) \\ (9.-7/5) & (5/4.-7/5) & (-7.-7/5) \\ (5.-7/5) & (2.-7/5) & (-2/7.-7/5) \end{bmatrix}$$

$$K.A = \begin{bmatrix} 7/5 & -21/5 & -49/5 \\ -63/5 & -35/20 & 49/5 \\ -35/5 & -14/5 & 14/35 \end{bmatrix} = \begin{bmatrix} 7/5 & -21/5 & -49/5 \\ -63/5 & -7/4 & 49/5 \\ -7 & -14/5 & \boxed{14/35} \end{bmatrix}_{3\times 3}$$

simplificar

2.2) Para $K=5$, determinar: $K.A$

$$K.A = \begin{bmatrix} (-1.5) & (3.5) & (7.5) \\ (9.5) & (5/4.5) & (-7.5) \\ (5.5) & (2.5) & (-2/7.5) \end{bmatrix} = \begin{bmatrix} -5 & 15 & 35 \\ 45 & 25/4 & -35 \\ 25 & 10 & -10/7 \end{bmatrix}_{3\times 3}$$

3) Escreva em forma de tabela a matriz A e B dadas por:

$A = (a_{ij})_{2\times 3}$, com $a_{ij} = -2.f(i) + f(j)$, com $f(x) = -x^2+3$

$B = (b_{ij})_{2\times 3}$, com $b_{ij} = -i^2 - (-j)^2$

$f(1) = -1^2+3 = -1+3 = 2$

$f(2) = -2^2+3 = -4+3 = -1$

$f(3) = -3^2+3 = -9+3 = -6$

$a_{11} = -2.2+2 = -4+2 = -2$

$a_{12} = -2.2+(-1) = -4-1 = -5$

$a_{13} = -2.2+(-6) = -4-6 = -10$

$a_{21} = -2.(-1)+2 = 2+2 = 4$

$a_{22} = -2.(-1)+(-1) = 2-1 = 1$

$a_{23} = -2.(-1)+(-6) = 2-6 = -4$

$$A = \begin{bmatrix} -2 & -5 & -10 \\ 4 & 1 & -4 \end{bmatrix}_{2\times 3}$$

$$B = \begin{bmatrix} -2 & -5 & -10 \\ -5 & -8 & -13 \end{bmatrix}_{2\times 3}$$

data 21 • 05 • 21

$b_{11} = -1^2 - (-1)^2 = -1 - 1 = -2$

$b_{12} = -1^2 - (-2)^2 = -1 - 4 = -5$

$b_{13} = -1^2 - (-3)^2 = -1 - 9 = -10$

$b_{21} = -2^2 - (-1)^2 = -4 - 1 = -5$

$b_{22} = -2^2 - (-2)^2 = -4 - 4 = -8$

$b_{23} = -2^2 - (-3)^2 = -4 - 9 = -13$ + Determinar

3.1) $A - B = C$

$$\begin{bmatrix} -2 & -5 & -10 \\ 4 & 1 & -4 \end{bmatrix} - \begin{bmatrix} -2 & -5 & -10 \\ -5 & -8 & -13 \end{bmatrix} = \begin{bmatrix} (-2+2) & (-5+5) & (-10+10) \\ (4+5) & (1+8) & (-4+13) \end{bmatrix}$$

$$= \begin{bmatrix} 0 & 0 & 0 \\ 9 & +9 & 9 \end{bmatrix}_{2\times 3}, \text{ logo } \quad C = \begin{bmatrix} 0 & 0 & 0 \\ +9 & +9 & +9 \end{bmatrix}_{2\times 3}$$

3.2) $B - A = C$

$$\begin{bmatrix} -2 & -5 & -10 \\ -5 & -8 & -13 \end{bmatrix} - \begin{bmatrix} -2 & -5 & -10 \\ 4 & 1 & -4 \end{bmatrix} = \begin{bmatrix} (-2+2) & (-5+5) & (-10+10) \\ (-5-4) & (-8-1) & (-13+4) \end{bmatrix}$$

$$= \begin{bmatrix} 0 & 0 & 0 \\ -9 & -9 & -9 \end{bmatrix}_{2\times 3}, \text{ logo } \quad C = \begin{bmatrix} 0 & 0 & 0 \\ -9 & -9 & -9 \end{bmatrix}_{2\times 3}$$

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