Nome: Damaris Santana Santos
Turma: CT1317

Multiplicação de matrizes: Tarefa básica 01

01) $A = \begin{bmatrix} 3 & -1 \\ 0 & 2 \end{bmatrix}_{2\times2}$ e $B = \begin{bmatrix} -1 & 2 & 0 \\ 1 & -3 & 4 \end{bmatrix}_{2\times3}$

$$AB = \begin{bmatrix} 3 & -1 \\ 0 & 2 \end{bmatrix} \cdot \begin{bmatrix} -1 & 2 & 0 \\ 1 & -3 & 4 \end{bmatrix} = \begin{bmatrix} ab_{11} & ab_{12} & ab_{13} \\ ab_{21} & ab_{22} & ab_{23} \end{bmatrix}$$

$$AB = \begin{bmatrix} -1.3 + 1.1 & 2.3+(-3).(-1) & 0.3+4.(-1) \\ -1.0 + 1.2 & 2.0+(-3).2 & 0.0+4.2 \end{bmatrix} =$$

$$AB = \begin{bmatrix} -4 & 9 & -4 \\ 2 & -6 & 8 \end{bmatrix}$$ e BA não existe

02) $A = \begin{bmatrix} 5 & 2 & -1 \\ 7 & 4 & 3 \end{bmatrix}$ e $B = \begin{bmatrix} -1 & 2 & 0 \\ 1 & -3 & 4 \end{bmatrix}$

$$AB = \begin{bmatrix} 5 & 2 & -1 \\ 7 & 4 & 3 \end{bmatrix} \times B = \begin{bmatrix} -1 & 2 & 0 \\ 1 & -3 & 4 \end{bmatrix} = \begin{bmatrix} ab_{11} & ab_{12} & ab_{13} \\ ab_{21} & ab_{22} & ab_{23} \end{bmatrix}$$

$$AB = \begin{bmatrix} 5.3+2.1+(-1).(-4) & 5.(-2)+2.(-3)+(-1).0 \\ 7.3+4.1+3.(-4) & 7.(-2)+4.(-3)+3.0 \end{bmatrix} = \begin{bmatrix} 21 & -16 \\ 13 & 26 \end{bmatrix}$$

$$BA = \begin{bmatrix} ba_{11} & ba_{12} & ba_{13} \\ ba_{21} & ba_{22} & ba_{23} \\ ba_{31} & ba_{32} & ba_{33} \end{bmatrix} = \begin{bmatrix} 5.3+7.(-2) & 2.3+4.(-2) & -1.3+3.(-2) \\ 5.1+7.(-3) & 2.1+4.(-3) & -1.1+3.(-3) \\ 5.(-4)+7.0 & 2.(-4)+(-3).0 & -1.(-4)+3.0 \end{bmatrix} =$$

$$BA = \begin{bmatrix} 1 & -2 & -9 \\ -16 & -10 & -10 \\ -20 & -8 & 4 \end{bmatrix}$$

③ (UEL)

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

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

$A \cdot A^T = \begin{bmatrix} -1 & 0 \\ 1 & 2 \end{bmatrix} \times \begin{bmatrix} -1 & 1 \\ 0 & 2 \end{bmatrix}$

$A.A^T = \begin{bmatrix} -1.(-1)+2.2 & -1.(-1)+0.2 \\ 1.(-1)+(-1).0 & 1.1+2.2 \end{bmatrix} = \begin{bmatrix} 1 & -1 \\ -1 & 5 \end{bmatrix}$

04 (FUGEST-FGV)

$A = \underset{2\times3}{\begin{bmatrix} 1 & 2 & 5 \\ 3 & 4 & 6 \end{bmatrix}}$ e $B = \underset{3\times1}{\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}}$

$A.B = \begin{bmatrix} a_{11} \\ a_{21} \end{bmatrix}$

$AB = \begin{bmatrix} 1.1+2.2+5.3 \\ 3.1+4.2+6.3 \end{bmatrix} = \begin{bmatrix} 20 \\ 29 \end{bmatrix}$

$c_{11} = 29$

05 UNIRIO

a) $\begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \end{bmatrix} = \begin{array}{c|l} \begin{bmatrix} 25 & 50 & 200 & 20 \\ 28 & 60 & 150 & 22 \end{bmatrix} & \begin{array}{l} \to \text{restaurante 1} \\ \to \text{restaurante 2} \end{array} \end{array}$

$\begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \\ b_{31} & b_{32} \\ b_{41} & b_{42} \end{bmatrix} = \begin{bmatrix} 1{,}00 & 1{,}00 \\ 8{,}00 & 10{,}00 \\ 0{,}90 & 0{,}80 \\ 1{,}50 & 1{,}00 \end{bmatrix}$

↳ fornecedor 2

↳ fornecedor 1

b) $AB = \begin{bmatrix} 25 & 50 & 200 & 20 \\ 28 & 60 & 150 & 22 \end{bmatrix} \times \begin{bmatrix} 1{,}00 & 1{,}00 \\ 8{,}00 & 10{,}00 \\ 0{,}90 & 0{,}80 \\ 1{,}50 & 1{,}00 \end{bmatrix}$

$ab_{11} = 25 \cdot 1{,}00 + 50 \cdot 8{,}00 + 200 \cdot 0{,}90 + 20 \cdot 1{,}50 = 635$

$ab_{12} = 25 \cdot 1{,}00 + 50 \cdot 10{,}00 + 200 \cdot 0{,}80 + 20 \cdot 1{,}00 = 705$

$ab_{21} = 28 \cdot 1{,}00 + 60 \cdot 8{,}00 + 150 \cdot 0{,}90 + 22 \cdot 1{,}50 = 676$

$ab_{22} = 28 \cdot 1{,}00 + 60 \cdot 10{,}00 + 150 \cdot 0{,}80 + 22 \cdot 1{,}00 = 770$

$AB = \begin{bmatrix} 635 & 705 \\ 676 & 770 \end{bmatrix}$

$635 + 676 = 1311$ e $705 + 770 = 1475$

Lucro = $1475 - 1311$ = R$ 164,00

06 (MACK)

$$\begin{bmatrix} 0 & -1 \\ \alpha & 1 \end{bmatrix} \times \begin{bmatrix} \alpha & 1 \\ -1 & 0 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$a_{11} = 0 \cdot \cancel{x} + x \cdot 1 = 1$

$\alpha = 1$

$a_{12} = 0 \cdot (-1) + x \cdot 0 = 0$

$a_{21} = -1 \cdot (-1) + 1 \cdot 1 = 0$

$a_{22} = -1 \cdot (-1) + 1 \cdot 0 = 1$

07 (UEL)

$A = m \times n$

$B = p \times q$

$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ e $B = \begin{bmatrix} A & B \\ C & D \end{bmatrix}$

$A^t = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$ e $B = \begin{bmatrix} A & C \\ B & D \end{bmatrix}$

$A^t = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ e $B = \begin{bmatrix} A & B \\ C & D \end{bmatrix}$

resposta = A) $(A^t)^t = A$ e $(B^t)^t = B$

08 (VUNESP)

a) $AB = BA$, falso porque a multiplicação ocorre na linha A. coluna B

b) Se $AB = AC$, então $B = C$, falso porque B é igual ou diferente de C.

c) Se $A^2 = O_n$ (matriz nula), então $A = O_m$, falso porque se $A = 0$, tem ordem diferente de n

d) Correto porque a ordem dos fatores não alteram o produto!

e) Falso porque $(A+B)^2 = A^2 + B^2$

D S T Q Q S S

09 (PUCCAMP-adaptado)

$$A = \begin{bmatrix} 5 & 8 & 10 \\ 9 & 6 & 14 \end{bmatrix}_{3\times2} \times \begin{bmatrix} x \\ y \\ z \end{bmatrix}_{3\times1}$$

Isso se dá porque o número de colunas da matriz A tem que ser o mesmo que o número de linhas da matriz B.

10 (UFU)

$$A_{3\times3} \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} -1 \\ 4 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} a & d & g \\ b & e & h \\ c & f & i \end{bmatrix} \cdot \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} -1 \\ 4 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} -1 \\ 4 \\ 2 \end{bmatrix}$$

Resposta: (C) 1ª linha transposta de A