

# Multiplicação de matrizes - Tarefa Básica

01 - obter os produtos  $AB$  e  $BA$ , se possível.

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

$$B = \begin{pmatrix} -1 & 2 & 0 \\ 1 & -3 & 4 \end{pmatrix}$$

$$2 \times 2 = 2 \times 3$$

É possível ✓

$$B = \begin{pmatrix} -1 & 2 & 0 \\ 1 & -3 & 4 \end{pmatrix}$$

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

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

$$B \quad A$$

$$2 \times 3 \neq 2 \times 2$$

Não é possível

$$BA = \text{[impossível]}$$

02 - obter os produtos  $AB$  e  $BA$ , se possível.

$$A = \begin{bmatrix} 5 & 2 & -1 \\ 7 & 4 & 3 \end{bmatrix}$$

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

$$AB = \begin{bmatrix} 21 & -16 \\ 13 & -26 \end{bmatrix}$$

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

$A$	$B$	$B$	$A$
$2 \times 3$	$3 \times 2$	$3 \times 2$	$2 \times 3$
<u>=</u> ✓		<u>=</u> ✓	



03-

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

2x2

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

2x2

$$A \cdot A^t = \begin{bmatrix} 1 & -1 \\ -1 & 5 \end{bmatrix}$$

(B)

04-

$$A = \begin{bmatrix} 1 & 2 & 5 \\ 3 & 4 & 6 \end{bmatrix}$$

2x3

$$B = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$$

3x1

$$C = A \cdot B = \begin{bmatrix} 20 \\ 29 \end{bmatrix}$$

$$C_{11} = 20$$

$$C_{21} = 29$$

(A)

05) A)  $\begin{bmatrix} F_{11} & F_{12} & F_{13} & F_{14} \\ F_{21} & F_{22} & F_{23} & F_{24} \end{bmatrix}$

$$F_{11} = 25$$

$$F_{12} = 50$$

$$F_{13} = 200$$

$$F_{14} = 20$$

$$F_{21} = 28$$

$$F_{22} = 60$$

$$F_{23} = 150$$

$$F_{24} = 22$$

$$\begin{bmatrix} 25 & 50 & 200 & 20 \\ 28 & 60 & 150 & 22 \end{bmatrix}$$

$$P_{11} \quad P_{12}$$

$$P_{11} = R\$ 1,00$$

$$P_{21} \quad P_{22}$$

$$P_{12} = R\$ 1,00$$

$$P_{31} \quad P_{32}$$

$$P_{21} = R\$ 8,00$$

$$P_{41} \quad P_{42}$$

$$P_{22} = R\$ 10,00$$

$$P_{31} = R\$ 0,90$$

$$P_{32} = R\$ 0,80$$

$$P_{41} = R\$ 1,50$$

$$P_{42} = R\$ 1,00$$

$$1,00 \quad 1,00$$

$$8,00 \quad 10,00$$

$$0,90 \quad 0,80$$

$$1,50 \quad 1,00$$



B)

$$F = \begin{bmatrix} 25 & 50 & 200 & 20 \\ 28 & 60 & 150 & 22 \end{bmatrix}$$

2 x 4

=

4 x 2

$$P = \begin{bmatrix} 1,00 & 1,00 \\ 2,00 & 10,00 \\ 0,90 & 0,80 \\ 1,50 & 1,00 \end{bmatrix}$$

$$F \cdot P = \begin{bmatrix} 635 & 705 \\ 676 & 770 \end{bmatrix}$$

$$\begin{array}{r} 635 \\ -635 \\ \hline 070 \end{array} \quad \begin{array}{r} 770 \\ -676 \\ \hline 094 \end{array}$$

$$94 + 70 = R\$ 164,00$$

06 -

$$\begin{bmatrix} 0 & -1 \\ a & 1 \end{bmatrix} \cdot \begin{bmatrix} a & 1 \\ -1 & 0 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$a \cdot -1 = 0$$

$$a = 1$$

(E)



# Particularidades sobre Produto Matricial - Tabela Básica

01-  $\begin{matrix} A & B \\ m \times n & p \times q \\ \hline \end{matrix} = \begin{matrix} B & A^T \\ p \times q & n \times m \end{matrix}$

$(A+B)$  não é possível, pois não se sabe os valores de linha e coluna para ambos.

(A) ~~(B)~~ ~~(C)~~ ~~(D)~~ ~~(E)~~

$(A^T)^T = A$ , transpor 2 vezes.

$(B^T)^T = B$ , transpor 2 vezes.

(A)

02-

$A, B \text{ e } C = 3 \times 3$

(A) (B) (C) ~~(D)~~ (E)

$\begin{matrix} AB & C \\ \begin{bmatrix} AB & AB & AB \\ AB & AB & AB \\ AB & AB & AB \end{bmatrix} & \begin{bmatrix} C & C & C \\ C & C & C \\ C & C & C \end{bmatrix} \end{matrix} = \begin{matrix} = ABC \\ \begin{bmatrix} ABC & ABC & ABC \\ ABC & ABC & ABC \\ ABC & ABC & ABC \end{bmatrix} \end{matrix}$

$\begin{matrix} A & BC \\ \begin{bmatrix} A & A & A \\ A & A & A \\ A & A & A \end{bmatrix} & \begin{bmatrix} BC & BC & BC \\ BC & BC & BC \\ BC & BC & BC \end{bmatrix} \end{matrix} = \begin{matrix} ABC \\ \begin{bmatrix} ABC & ABC & ABC \\ ABC & ABC & ABC \\ ABC & ABC & ABC \end{bmatrix} \end{matrix}$

= (D)

03-

$\begin{matrix} D=AX & C=AX \\ A=5q & A=9q \\ B=8q & B=6q \\ C=10q & C=4q \end{matrix} \quad \begin{matrix} DC=AX \\ \begin{bmatrix} 5 & 8 & 10 \\ 9 & 6 & 4 \end{bmatrix} \end{matrix} \times \begin{bmatrix} x \\ y \\ z \end{bmatrix} = C$

(B)



04-

$$A \begin{matrix} B \\ \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \end{matrix} = \begin{matrix} C \\ \begin{bmatrix} -1 \\ 4 \\ 2 \end{bmatrix} \end{matrix}$$

$$A = \begin{bmatrix} A & D & G \\ B & E & H \\ C & F & I \end{bmatrix}$$

$A$   $B$   
 $3 \times 3$   $3 \times 1$   
 $\underline{=}$   
 $C$

$$A^t \begin{bmatrix} A & B & C \\ D & E & F \\ G & H & I \end{bmatrix}$$

$$AB \begin{bmatrix} A \\ B \\ C \end{bmatrix} = \begin{matrix} C \\ \begin{bmatrix} -1 \\ 4 \\ 2 \end{bmatrix} \end{matrix}$$

$$C$$