1ª Lista de Exercícios

① $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & -1 \end{pmatrix}$, $B = \begin{pmatrix} -2 & 0 & 1 \\ 3 & 0 & 1 \end{pmatrix}$, $C = \begin{pmatrix} -1 \\ 2 \\ 4 \end{pmatrix}$, $D = (2 \quad -1)$

a) $A + B = \begin{pmatrix} -1 & 2 & 4 \\ 5 & 1 & 0 \end{pmatrix}$

b) $A \cdot C = \begin{pmatrix} -1 + 4 + 12 \\ -2 + 2 - 4 \end{pmatrix} = \begin{pmatrix} 15 \\ -4 \end{pmatrix}$

c) $B \cdot C = \begin{pmatrix} 2 + 0 + 4 \\ -3 + 0 + 4 \end{pmatrix} = \begin{pmatrix} 6 \\ 1 \end{pmatrix}$

d) $C \cdot D = \begin{pmatrix} -2 & 1 \\ 4 & -2 \\ 8 & -4 \end{pmatrix}$

e) $D \cdot A = (2 - 2 \quad 4 - 1 \quad 6 + 1) = (0 \quad 3 \quad 7)$

f) $D \cdot B = (-7 \quad 0 \quad 1)$

g) $-A = \begin{pmatrix} -1 & -2 & -3 \\ -2 & -1 & 1 \end{pmatrix}$

h) $-D = (-2 \quad 1)$

⑩ $A = \begin{pmatrix} 1 & -3 & 2 \\ 2 & 1 & -3 \\ 4 & -3 & -1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 4 & 1 & 0 \\ 2 & 1 & 1 & 1 \\ 1 & -2 & 1 & 2 \end{pmatrix}$, $C = \begin{pmatrix} 2 & 1 & -1 & -2 \\ 3 & -2 & -1 & -1 \\ 2 & -5 & -1 & 0 \end{pmatrix}$

$$AB = \begin{pmatrix} 1 - 6 + 2 & 4 - 3 - 4 & 1 - 3 + 2 & 0 - 3 + 4 \\ 2 + 2 - 3 & 8 + 1 + 6 & 2 + 1 - 3 & 0 + 1 - 6 \\ 4 - 6 - 1 & 16 - 3 + 2 & 4 - 3 - 1 & 0 - 3 - 2 \end{pmatrix} = \begin{pmatrix} -3 & -3 & 0 & 1 \\ 1 & 15 & 0 & -5 \\ -3 & 15 & 0 & -5 \end{pmatrix}$$

$$AC = \begin{pmatrix} 2 - 9 + 4 & 1 + 6 - 10 & -1 + 3 - 2 & -2 + 3 + 0 \\ 4 + 3 - 6 & 2 - 2 + 15 & -2 - 1 + 3 & -4 - 1 + 0 \\ 8 - 9 - 2 & 4 + 5 + 5 & -4 + 3 + 1 & -8 + 3 + 0 \end{pmatrix} = \begin{pmatrix} -3 & -3 & 0 & 1 \\ 1 & 15 & 0 & -5 \\ -3 & 15 & 0 & -5 \end{pmatrix}$$

Logo, $AB = AC$.

⑮

a)

	Ferro	Madeira	Vidro	Tinta	Tijolo
Moderno	25	100	80	35	85
Mediterrâneo	49	126	84	63	147
Colonial	72	300	96	60	156

b) Moderno: $15 \cdot 5 + 8 \cdot 20 + 5 \cdot 16 + 1 \cdot 7 + 10 \cdot 17 = 490$

Mediterrâneo: $15 \cdot 7 + 8 \cdot 18 + 5 \cdot 12 + 1 \cdot 9 + 10 \cdot 21 = 528$

Colonial: $15 \cdot 6 + 8 \cdot 25 + 5 \cdot 8 + 1 \cdot 5 + 10 \cdot 13 = 465$

c) $5 \cdot 490 + 7 \cdot 528 + 12 \cdot 465 = 11.726$

④
$$\begin{cases} 2x - y + 3z = 11 \\ 4x - 3y + 2z = 0 \\ x + y + z = 6 \\ 3x + y + z = 4 \end{cases}$$

$$\left(\begin{array}{ccc|c} 2 & -1 & 3 & 11 \\ 4 & -3 & 2 & 0 \\ 1 & 1 & 1 & 6 \\ 3 & 1 & 1 & 4 \end{array}\right) \quad L_1 \leftrightarrow L_3 \iff$$

$$\left(\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 4 & -3 & 2 & 0 \\ 2 & -1 & 3 & 11 \\ 3 & 1 & 1 & 4 \end{array}\right) \quad \begin{array}{l} L_2 - 4L_1 \\ \iff \\ L_3 - 2L_1 \\ L_4 - 3L_1 \end{array} \quad \left(\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 0 & -7 & -2 & -24 \\ 0 & -3 & 1 & -1 \\ 0 & -2 & -2 & -14 \end{array}\right) \iff L_4 : (-2)$$

$$\left(\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 0 & -7 & -2 & -24 \\ 0 & -3 & 1 & -1 \\ 0 & 1 & 1 & 7 \end{array}\right) \quad L_2 \leftrightarrow L_4 \iff \quad \left(\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 0 & 1 & 1 & 7 \\ 0 & -3 & 1 & -1 \\ 0 & -7 & -2 & -24 \end{array}\right) \quad \begin{array}{l} L_1 - L_2 \\ \iff \\ L_3 + 3L_2 \\ L_4 + 7L_2 \end{array}$$

$$\left(\begin{array}{ccc|c} 1 & 0 & 0 & -1 \\ 0 & 1 & 1 & 7 \\ 0 & 0 & 4 & 20 \\ 0 & 0 & 9 & 25 \end{array}\right) \rightarrow \text{não há solução}$$