



Soluciones

1 Dadas las matrices siguientes:

$$A = \begin{pmatrix} 3 & -5 & 1 & 0 \\ 0 & -3 & 7 & 0 \\ -1 & 4 & -1 & 1 \end{pmatrix} \quad B = \begin{pmatrix} 1 & 5 & 3 \\ 0 & -1 & 0 \\ 3 & 0 & -2 \\ 0 & 7 & 1 \end{pmatrix} \quad C = \begin{pmatrix} 4 & 4 & -2 \\ -1 & 0 & 0 \\ 0 & -3 & -1 \end{pmatrix}$$

Efectúa:

a) $A \cdot B + C$

b) $B \cdot C - A^t$

c) $B^t \cdot A^t + C \cdot C^t$

d) $B \cdot B^t \cdot A^t + B$

Resolución

$$\begin{aligned} \text{a) } A \cdot B + C &= \begin{pmatrix} 3 & -5 & 1 & 0 \\ 0 & -3 & 7 & 0 \\ -1 & 4 & -1 & 1 \end{pmatrix} \cdot \begin{pmatrix} 1 & 5 & 3 \\ 0 & -1 & 0 \\ 3 & 0 & -2 \\ 0 & 7 & 1 \end{pmatrix} + \begin{pmatrix} 4 & 4 & -2 \\ -1 & 0 & 0 \\ 0 & -3 & -1 \end{pmatrix} = \\ &= \begin{pmatrix} 6 & 20 & 7 \\ 21 & 3 & -14 \\ -4 & -2 & 0 \end{pmatrix} + \begin{pmatrix} 4 & 4 & -2 \\ -1 & 0 & 0 \\ 0 & -3 & -1 \end{pmatrix} = \begin{pmatrix} 10 & 24 & 5 \\ 20 & 3 & -14 \\ -4 & -5 & -1 \end{pmatrix} \end{aligned}$$

$$\begin{aligned} \text{b) } B \cdot C - A^t &= \begin{pmatrix} 1 & 5 & 3 \\ 0 & -1 & 0 \\ 3 & 0 & -2 \\ 0 & 7 & 1 \end{pmatrix} \cdot \begin{pmatrix} 4 & 4 & -2 \\ -1 & 0 & 0 \\ 0 & -3 & -1 \end{pmatrix} - \begin{pmatrix} 3 & 0 & -1 \\ -5 & -3 & 4 \\ 1 & 7 & -1 \\ 0 & 0 & 1 \end{pmatrix} = \\ &= \begin{pmatrix} -1 & -5 & -5 \\ 1 & 0 & 0 \\ 12 & 18 & -4 \\ -7 & -3 & -1 \end{pmatrix} - \begin{pmatrix} 3 & 0 & -1 \\ -5 & -3 & 4 \\ 1 & 7 & -1 \\ 0 & 0 & 1 \end{pmatrix} = \begin{pmatrix} -4 & -5 & -4 \\ 6 & 3 & -4 \\ 11 & 11 & -3 \\ -7 & -3 & -2 \end{pmatrix} \end{aligned}$$

$$\begin{aligned} \text{c) } B^t \cdot A^t + C \cdot C^t &= \begin{pmatrix} 1 & 0 & 3 & 0 \\ 5 & -1 & 0 & 7 \\ 3 & 0 & -2 & 1 \end{pmatrix} \cdot \begin{pmatrix} 3 & 0 & -1 \\ -5 & -3 & 4 \\ 1 & 7 & -1 \\ 0 & 0 & 1 \end{pmatrix} + \begin{pmatrix} 4 & 4 & -2 \\ -1 & 0 & 0 \\ 0 & -3 & -1 \end{pmatrix} \cdot \begin{pmatrix} 4 & -1 & 0 \\ 4 & 0 & -3 \\ -2 & 0 & -1 \end{pmatrix} = \\ &= \begin{pmatrix} 6 & 21 & -4 \\ 20 & 3 & -2 \\ 7 & -14 & 0 \end{pmatrix} + \begin{pmatrix} 36 & -4 & -10 \\ -4 & 1 & 0 \\ -10 & 0 & 10 \end{pmatrix} = \begin{pmatrix} 42 & 17 & -15 \\ 16 & 4 & -2 \\ -3 & -14 & 10 \end{pmatrix} \end{aligned}$$

$$\begin{aligned} \text{d) } B \cdot B^t \cdot A^t + B &= \begin{pmatrix} 1 & 5 & 3 \\ 0 & -1 & 0 \\ 3 & 0 & -2 \\ 0 & 7 & 1 \end{pmatrix} \cdot \begin{pmatrix} 1 & 0 & 3 & 0 \\ 5 & -1 & 0 & 7 \\ 3 & 0 & -2 & 1 \end{pmatrix} \cdot \begin{pmatrix} 3 & 0 & -1 \\ -5 & -3 & 4 \\ 1 & 7 & -1 \\ 0 & 0 & 1 \end{pmatrix} + \begin{pmatrix} 1 & 5 & 3 \\ 0 & -1 & 0 \\ 3 & 0 & -2 \\ 0 & 7 & 1 \end{pmatrix} = \\ &= \begin{pmatrix} 35 & -5 & -3 & 38 \\ -5 & 1 & 0 & -7 \\ -3 & 0 & 13 & -2 \\ 38 & -7 & -2 & 50 \end{pmatrix} \cdot \begin{pmatrix} 3 & 0 & -1 \\ -5 & -3 & 4 \\ 1 & 7 & -1 \\ 0 & 0 & 1 \end{pmatrix} + \begin{pmatrix} 1 & 5 & 3 \\ 0 & -1 & 0 \\ 3 & 0 & -2 \\ 0 & 7 & 1 \end{pmatrix} = \\ &= \begin{pmatrix} 127 & -6 & -14 \\ -20 & -3 & 2 \\ 4 & 91 & -12 \\ 147 & 7 & -14 \end{pmatrix} + \begin{pmatrix} 1 & 5 & 3 \\ 0 & -1 & 0 \\ 3 & 0 & -2 \\ 0 & 7 & 1 \end{pmatrix} = \begin{pmatrix} 128 & -1 & -11 \\ -20 & -4 & 2 \\ 7 & 91 & -14 \\ 147 & 14 & -13 \end{pmatrix} \end{aligned}$$