Matrix arithmetic

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. Find $A - B$ for $A = \begin{pmatrix} 2 & -1 \\ 3 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 5 & 2 \\ -2 & 1 \end{pmatrix}$. [2 marks]

Subtract matching entries.

$3 - (-2) = 5$.

Answer: $\begin{pmatrix} -3 & -3 \\ 5 & 3 \end{pmatrix}$.

2. Find $2A - B$ for $A = \begin{pmatrix} 2 & -1 \\ 3 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 5 & 2 \\ -2 & 1 \end{pmatrix}$. [2 marks]

$2A = \begin{pmatrix} 4 & -2 \\ 6 & 8 \end{pmatrix}$.

Subtract B entry by entry.

Answer: $\begin{pmatrix} -1 & -4 \\ 8 & 7 \end{pmatrix}$.

3. Calculate $3\begin{pmatrix} 1 & 0 \\ -2 & 4 \end{pmatrix}$. [2 marks]

Multiply every entry by 3.

The zero remains zero.

Answer: $\begin{pmatrix} 3 & 0 \\ -6 & 12 \end{pmatrix}$.

4. Why cannot a 2×3 matrix be added to a 3×2 matrix? [2 marks]

The rows and columns do not match.

Addition requires corresponding positions.

Answer: Their orders differ.

5. Find X if $A + X = B$, $A = \begin{pmatrix} 1 & 3 \\ 2 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 6 & 5 \\ 1 & 9 \end{pmatrix}$. [2 marks]

Use $X = B - A$.

Subtract matching entries.

Answer: $X = \begin{pmatrix} 5 & 2 \\ -1 & 5 \end{pmatrix}$.

6. Should a ticket-count matrix be added to a same-order price matrix to find revenue? [2 marks]

Counts and prices have different units.

Multiply appropriate counts by prices, then total.

Answer: No.