Addition/subtraction/scalar multiplication

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

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

Add corresponding entries: $1+3=4$, $4-2=2$.

Answer: $\begin{pmatrix}4 & 2\end{pmatrix}$.

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

Multiply all four entries by -3.

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

3. Calculate $\begin{pmatrix}5 & 2\\-1 & 7\end{pmatrix}-\begin{pmatrix}2 & -3\\4 & 1\end{pmatrix}$. [2 marks]

Subtract entries in matching positions.

In particular, $2-(-3)=5$ and $-1-4=-5$.

Answer: $\begin{pmatrix}3 & 5\\-5 & 6\end{pmatrix}$.

4. Find X if $X+\begin{pmatrix}2 & 0\\1 & 3\end{pmatrix}=\begin{pmatrix}5 & 4\\-2 & 8\end{pmatrix}$. [2 marks]

Subtract the known matrix from the right side.

Answer: $X=\begin{pmatrix}3 & 4\\-3 & 5\end{pmatrix}$.

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

Half of A is $(2,1)$.

Twice B is $(-2,6)$; add to obtain $(0,7)$.

Answer: $\begin{pmatrix}0 & 7\end{pmatrix}$.

6. Explain why a 2×2 matrix and a 2×3 matrix cannot be added. [2 marks]

The first matrix has no third-column entries to match the second matrix.

Answer: The orders differ.