Matrix multiplication

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

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

$2(4) + 3(5) = 8 + 15$.

The one-entry result is 23.

Answer: 23.

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

Row 1 gives 4.

Row 2 gives 10.

Answer: $\begin{pmatrix}4\\10\end{pmatrix}$.

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

First row gives 2 and 8.

Second gives $1 + 6 = 7$ and $4 - 3 = 1$.

Answer: $\begin{pmatrix}2 & 8\\7 & 1\end{pmatrix}$.

4. Does a 2×4 matrix multiply a 3×2 matrix? [2 marks]

The inside dimensions are 4 and 3.

They must agree.

Answer: No.

5. Find x if $\begin{pmatrix} x & 2 \end{pmatrix}\begin{pmatrix} 3 \\ 4 \end{pmatrix} = 23$. [2 marks]

$3x + 8 = 23$.

$3x = 15$.

Answer: $x = 5$.

6. If A is 2×3 and AB is 2×1, what order is B? [2 marks]

It needs 3 matching rows.

One column creates one output column.

Answer: 3×1.