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NST Maths Supervision 15

View a column matrix as an $n \times 1$ matrix.

When you use index notation, you should include the 1. IE $x_i = x_{i,1}$.

Ambiguity can arise and you have to be careful.

You can rearrange elements in index notation since all you have are integer multiplication.

$$x_j b_{ij} = b_{ij} x_j \longrightarrow \mathbf{B} \mathbf{x} \, x_j b_{ij} = x_{1j}^T B_{ji}^T \longrightarrow \mathbf{B} \mathbf{x}^T$$

Note that this does not mean $\mathbf{B}\mathbf{x} = \mathbf{B}\mathbf{x}^T$. It means that the ith element of the column vector $\mathbf{B}\mathbf{x}$ is equal to the ith element in the row vector $\mathbf{B}\mathbf{x}^T$.

If every element below or above the leading diagonal is zero, then the determinant is the product of the leading diagonal.

Never try to expand the determinant if it's a large matrix. You should only rearrange the columns or rows.

10. The matrix you're given is antisymmetric. It works for any antisymmetric matrix $\mathbf{M}$ such that there is a single non-zero minor diagonal.

The matrix is an antisymmetric matrix with a single non-zero minor diagonal.