

Matrices

Transpose of Matrix

Transpose of a Matrix

- **Transpose of a Matrix:** A matrix obtained by interchanging rows and columns. It is denoted by A' or A^T .

- For example: if matrix A is

- $A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}$, then transpose of matrix would be

- $A' = \begin{bmatrix} a_{11} & a_{21} & a_{31} \\ a_{12} & a_{22} & a_{32} \\ a_{13} & a_{23} & a_{33} \end{bmatrix}$

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- Similarly,
- *if*, $A = [x_1 \quad x_2 \quad x_3]$, then

- $A' = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$

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- **Example:**

- if, $A = \begin{vmatrix} 2 & 3 & 4 \\ 1 & 8 & 9 \end{vmatrix}$, then find A'

- **Solution:** Change items in rows into columns

- $A' = \begin{vmatrix} 2 & 1 \\ 3 & 8 \\ 4 & 9 \end{vmatrix}$ *Answer*

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■ Properties of Transpose of Matrix:

1. Transpose of transpose of a matrix is original matrix.

i.e. $(A')' = A$

2. Transpose of sum of matrices is the sum of the transpose of the individual matrices.

i.e. $(A + B)' = A' + B'$

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3. Transpose of a product of matrices is the product of the transposes of the matrices taken in reverse order.

i.e. $(AB)' = (B'A')$

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THANK YOU