

IMPORTANT CONCEPT EX.

Ex. find rank of matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 5 & 7 \end{bmatrix}$

Solⁿ

$$\begin{aligned} R_2 &\rightarrow R_2 - 2R_1 \\ R_3 &\rightarrow R_3 - 3R_1 \end{aligned} \quad A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & -2 \\ 0 & -1 & -2 \end{bmatrix}$$

$$R_3 \rightarrow R_3 - R_2 \quad A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & -2 \\ 0 & 0 & 0 \end{bmatrix}$$

NO. of non-zero rows = 2.

Hence $\text{Rank}(A) = 2$

Ex. find rank of matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

Solⁿ

$$\begin{aligned} R_2 &\rightarrow R_2 - R_1 \\ R_3 &\rightarrow R_3 - R_1 \end{aligned} \quad A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

number of non-zero rows = 1

Hence $\text{Rank}(A) = 1$