

$$\text{Equation for } A^{-1} = \frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$$

Example : Find the inverse of $A = \begin{pmatrix} 2 & 3 \\ 5 & 6 \end{pmatrix}$.

Solution: Given that $A = \begin{pmatrix} 2 & 3 \\ 5 & 6 \end{pmatrix}$

$$\text{Determinant of } A = |A| = (6 \times 2) - (5 \times 3) = 12 - 15 = -3$$

Hence A is non-singular matrix and A^{-1} exists.

Interchange the principal diagonal elements and changing the sign of the other two elements in A .

$$\text{We get, } \begin{pmatrix} 6 & -3 \\ -5 & 2 \end{pmatrix}$$

Multiplying the resultant matrix with scalar $\frac{1}{|A|}$, we get

$$\Rightarrow \frac{1}{-3} \begin{pmatrix} 6 & -3 \\ -5 & 2 \end{pmatrix} \Rightarrow \begin{pmatrix} \frac{6}{-3} & \frac{-3}{-3} \\ \frac{-5}{-3} & \frac{2}{3} \end{pmatrix}$$

$$\Rightarrow \begin{pmatrix} -2 & 1 \\ \frac{5}{3} & \frac{2}{3} \end{pmatrix}$$