

(Q5) Find the inverse of the matrix if it exists:  $\begin{bmatrix} 2 & 1 & 3 \\ 4 & -1 & 0 \\ -7 & 2 & 1 \end{bmatrix}$

Solution: Let  $A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & -1 & 0 \\ -7 & 2 & 1 \end{bmatrix}$

We have,  $|A| = 2(-1-0) - 1(4-0) + 3(8-7) = -2 - 4 + 3 = -3$

Now,  $A_{11} = 1$

$A_{21} = -11$

$A_{31} = -6$

$\therefore \text{adj}A = \begin{bmatrix} -1 & 5 & 3 \\ -4 & 23 & 12 \\ 1 & -11 & -6 \end{bmatrix}$

$\therefore A^{-1} = \frac{1}{|A|} \text{adj}A = -\frac{1}{3} \begin{bmatrix} -1 & 5 & 3 \\ -4 & 23 & 12 \\ 1 & -11 & -6 \end{bmatrix}$