Determinants
Class 12th

Short Questions

Q.1) Order 3×3 find $|A^{-1}| = ?$

Sol.1) We have $|A^{-1}| = \left|\frac{1}{|A|} . \text{Adj } A\right|$

$= \frac{1}{|A|^3} |\text{Adj } A|$

$= \frac{1}{|A|^3} . |A|^{3-1} = \frac{1}{|A|^3} . |A|^2$

$\therefore \ |A^{-1}| = \frac{1}{|A|}$ Ans.

Q.2) Order 3×3 ; $|A| = 3$and $|2 AB| = 120$ find $|B'| = ?$

Sol.2) We have $|2AB| = 2^3 |AB|$

$120 = 2^3 |A| |B|$

$120 = 8 \times 3 \times |B|$

$5 = |B|$

Since $|B'| = |B|$

$\Rightarrow$ $|B'| = 5$ Ans.....

Q.3) Order 2×2 ; $Adj\ A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$ and Adj B $= \begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix}$ find Adj(AB) =?

Sol.3) We have $Adj\ (AB) = (Adj\ B)\ (Adj\ A)$

$= \begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix} \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 8 & 7 \\ 21 & 17 \end{bmatrix}$ Ans....

Q.4). Order 2×2 ; $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ find $A(\text{Adj A})$ without finding Adj A.

Sol.4) We have, $A|\text{Adj A}| = |A|\ I$

$= \begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix} \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

$= (-2) \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

$A(\text{Adj A}) = \begin{bmatrix} -2 & 0 \\ 0 & -2 \end{bmatrix}$ Ans....

Q.5). If n = 3×3 find $|\text{Adj(Adj A)}|$ and $|A| = 5$

Sol.5) We have $|\text{Adj(Adj A)}| = |A|^{n-1}$

$= |\text{Adj A}|^2$

$= (|A|^{3-1})^2 = |A|^4$

$= (5)^4 = 625$ Ans.

Q.6) If A = $\begin{bmatrix} 1 & 2 \\ -1 & 4 \end{bmatrix}$ find $(BA)^{-1}$ and $B^{-1} \begin{bmatrix} 2 & 4 \\ 3 & 6 \end{bmatrix}$

Sol.6) We know $(BA)^{-1} = A^{-1}\, B^{-1}$

$|B| = 12 - 12 = 0$ $\Rightarrow$ B is non invertible

$\therefore (BA)^{-1}$ not possible

Q7). If $-1 \le x < 0$; $0 \le y < 1$ and $1 \le z < 2$

Find $\Delta = \begin{vmatrix} [x]+1 & [y] & [z] \\ [x] & [y]+1 & [z] \\ [x] & [y] & [z]+1 \end{vmatrix}$

Sol.7) Since $-1 \le x < 0 \ \therefore \ [x] = -1$

$0 \leq y < 1 \quad \therefore \quad [y] = 0$

$1 \leq z < 2 \quad \therefore \quad [z] = 1$

$\therefore \quad \Delta = \begin{bmatrix} -1+1 & 0 & 1 \\ -1 & 0+1 & 1 \\ -1 & 0 & 1+1 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 1 \\ -1 & 1 & 1 \\ -1 & 0 & 2 \end{bmatrix} = 1$ Ans.....

Q.8). $A = \begin{bmatrix} 2 & -1 & 3 \\ 4 & 5 & 5 \\ 3 & -1 & 4 \end{bmatrix}$ find M_{32} and C_{23}

Sol.8) $M_{32} = 10 - 12 = -12$

$C_{23} = 8 - 9 = (-1) = +1$ ans.

(sign change)