

Determinants

Class 12th

Short Questions

Q.1) Order 3×3 find $|A^{-1}| = ?$

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

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

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

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

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

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

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

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

$$5 = |B|$$

 Since $|B'| = |B|$

$$\Rightarrow |B'| = 5 \quad \text{Ans....}$$

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

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

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

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

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

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

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

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

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

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

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

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

$$= (5)^4 = 625 \quad \text{Ans.}$$

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 $(BA)^{-1} = A^{-1} B^{-1}$

$$|B| = 12 - 12 = 0 \quad \Rightarrow \quad B \text{ is non invertible}$$

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

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

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

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

$$\begin{aligned}
 0 &\leq y < 1 \quad \therefore [y] = 0 \\
 1 &\leq z < 2 \quad \therefore [z] = 1 \\
 \therefore \Delta &= \begin{bmatrix} -1+1 & 0 & 1 \\ -1 & 0+1 & 1 \\ -1 & 0 & 1+1 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 1 \\ -1 & 1 & 1 \\ -1 & 0 & 2 \end{bmatrix} = 1 \quad \text{Ans.....}
 \end{aligned}$$

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)