Foundation

PARISHRAM 2025

Mathematics

DPP: 2

Determinants

Q1 The minor of a_{23} of the matrix A

$$A = \begin{bmatrix} 5 & -2 & -8 \\ 1 & -3 & 1 \\ 6 & 7 & 0 \end{bmatrix}$$

(A) 47 (B) 48
(C) 42 (D) 46

Q2 The cofactor of a_{21} of the matrix A

$$A = \begin{bmatrix} -5 & 0 & 4 \\ 2 & 1 & 5 \\ -1 & 3 & 6 \end{bmatrix}$$

(A) -11 (B) 12
(C) -12 (D) 10

Q3 The value of cofactor of a_{23} of matrix $A = \begin{bmatrix} 1 & -6 & 1 \\ 5 & 2 & 5 \\ 7 & 3 & 0 \end{bmatrix}$ is equal to

(A) -45 (B) 45
(C) 47 (D) -47

Q4 The adjoint of matrix $A = \begin{bmatrix} 1 & -7 \\ 5 & 6 \end{bmatrix}$ is

(A) $\begin{bmatrix} 6 & 7 \\ -5 & 1 \end{bmatrix}$
(B) $\begin{bmatrix} 6 & -5 \\ 7 & 1 \end{bmatrix}$
(C) $\begin{bmatrix} 6 & 5 \\ 1 & 7 \end{bmatrix}$
(D) $\begin{bmatrix} -6 & -5 \\ -1 & -7 \end{bmatrix}$

Q5 If A is the square matrix of $\text{order}\, n$, then $|\operatorname{adj} A|$ is equal to
(A) $|A|^{n-1}$
(B) $|A|^{n+1}$
(C) $|A|^{n^2}$
(D) $|A|^{n}$

Q6 The values of k for which matrix $A = \begin{bmatrix} k & 2 & 3 \\ -1 & 0 & 5 \\ 3 & 1 & 1 \end{bmatrix}$ is invertible, is
(A) $k \neq \frac{29}{5}$
(B) $k \neq \frac{27}{5}$
(C) $k \neq \frac{23}{5}$
(D) $k \neq \frac{21}{5}$

Q7 If $|A| = 5$ of matrix A of order 3 then the value of $|\text{adj}A|$ is equal to
(A) 5 (B) 125
(C) 25 (D) 625

Q8 If A is a 3×3 matrix such that $|5 \text{ adj } A| = 5$, then $|\mathrm{A}|$ is equal to:
(A) $\pm\frac{1}{5}$
(B) ± 5
(C) ± 1
(D) $\pm\frac{1}{25}$

Q9 If $A = \begin{bmatrix} 5a & -b \\ 3 & 2 \end{bmatrix}$ and $A \text{ adj } A = AA^T$, then $5a + b$ is equal to:
(A) 13 (B) -1

(C) 5 (D) 4

Q10 If A is 3×3 matrix and $|A| = 4$, then $\left|A^{-1}\right|$ is equal to

(A) $\frac{1}{4}$

(B) $\frac{1}{16}$

(C) 4

(D) 2

Q11 If $A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$ then A^{-1} is equal to

(A) $\begin{bmatrix} 7 & -3 & -3 \\ 0 & 1 & 0 \\ -1 & 0 & 5 \end{bmatrix}$

(B) $\begin{bmatrix} 7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 7 & -3 & -3 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$

(D) None of these

Q12 Find the minors of the matrix $A = \begin{bmatrix} 5 & -6 & 8 \\ 1 & -2 & 1 \\ 2 & 7 & 0 \end{bmatrix}$.

Q13 Find the cofactors of the matrix $A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & -2 & 4 \\ -1 & 0 & 7 \end{bmatrix}$.

Q14 Find the adjoint of the matrix $X = \begin{bmatrix} 1 & -3 & 5 \\ -7 & 4 & 1 \\ 2 & 3 & 0 \end{bmatrix}$.

Q15 Find the inverse of $A = \begin{bmatrix} 1 & 2 & 4 \\ -1 & 3 & 0 \\ 0 & -3 & 1 \end{bmatrix}$.

Answer Key

Q1 (A)

Q2 (B)

Q3 (A)

Q4 (A)

Q5 (A)

Q6 (A)

Q7 (C)

Q8 (A)

Q9 (C)

Q10 (A)

Q11 (B)

Q12 $M_{11} = -7,\ M_{12} = -2,\ M_{13} = 11$
$M_{11} = -56,\ M_{12} = -16,\ M_{13} = 47$
$M_{11} = 10,\ M_{12} = -3,\ M_{13} = -4$

Q13 $C_{11} = -14,\ C_{12} = -4,\ C_{13} = -2$
$C_{21} = -14,\ C_{22} = 4,\ C_{23} = -2$
$C_{31} = 2,\ C_{32} = -4,\ C_{33} = -2$

Q14 $\text{adj}X = \begin{bmatrix} -3 & 15 & -23 \\ 2 & -10 & -36 \\ = 29 & -9 & -17 \end{bmatrix}$

Q15 $A^{-1} = \begin{bmatrix} \frac{3}{17} & \frac{-14}{17} & \frac{-12}{17} \\ \frac{1}{17} & \frac{1}{17} & -\frac{4}{17} \\ \frac{3}{17} & \frac{3}{17} & \frac{5}{17} \end{bmatrix}$