MATRICES

INVERSE OF A MATRIX BY ELEMENTARY OPERATIONS

EXERCISE

Q.1 Solve the following system of equations by using Matrix inversion method.

$2x - y + 3z = 9, \quad x + y + z, \quad x - y + z = 2$

Q.2 By using elementary transformation find the inverse of $A = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$

Q.3 If A is an invertible matrix of order 2, then det(A−1) is equal to

(a) |A| (b) $\frac{1}{|A|}$

(c) 1 (d) 0

Q.4 Let $A = \begin{bmatrix} 1 & -1 & -1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix}$ and $10B = \begin{bmatrix} 4 & 2 & 2 \\ -5 & 0 & \alpha \\ 1 & -2 & 3 \end{bmatrix}$, if B is the inverse of matrix A, then α i

(a) -2 (b) 1

(c) 2 (d) 5

Q.5 If A is a square matrix such that A2=I, then A−1 is equal to

(a) 1 (b) 0

(c) A (d) I + A

Q.6 If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & -2 & 4 \end{bmatrix}$, $6\ A^{-1} = A^2 + cA + dI$, then(c, d) is equal to

(a) (-6,11) (b) (-11,6)

(c) (11,6) (d) (6,11)

Q.7 Find matrix A such that $\begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -1 & -8 \\ 1 & -2 \\ 9 & 22 \end{bmatrix}$

Q.8 Find the values of x,y,z if the matrix $A = \begin{bmatrix} 0 & 2y & z \\ x & y & -z \\ x & -y & z \end{bmatrix}$ satisfy the equation A′A=I.

Q.9 Using elementary transformation find the inverse of $A = \begin{pmatrix} 1 & 3 \\ 2 & 7 \end{pmatrix}$

Q.10 Show that the matrix $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$ satisfies the equation $A^2 - 4A + I = 0$,

where I is 2×2 identity matrix and 0 is 2×2 zero matrix. Using this equation,find A−1.

ANSWER KEY

1. [x=1, y=2 & z=9].

2. $A^{-1} = \begin{bmatrix} \frac{1}{5} & \frac{2}{5} \\ \frac{2}{5} & \frac{-1}{5} \end{bmatrix}$

3. (b) $\frac{1}{|A|}$

4. (d) 5

5. (c) A

6. (a) (-6,11)

7. $A = \begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix}$

8. Thus, $x = \pm\frac{1}{\sqrt{2}}, y = \pm\frac{1}{\sqrt{6}}, z = \pm\frac{1}{\sqrt{3}}$

9. $A^{-1} = \begin{bmatrix} 1 & -3 \\ 0 & 1 \end{bmatrix}$

10. $, A^{-1} = \begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$