

ASSIGNMENT

Ch 3 Matrices

Based on NCERT Exercise 3.2

Q1. If A is a square matrix such that $A^2 = I$, then find the simplified value of $(A-I)^3 + (A+I)^3 - 7A$.

Q2. If $3A - B = \begin{bmatrix} 5 & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}$, then find the matrix A .

Q3. If $\begin{bmatrix} 2 & 1 & 3 \\ -1 & 1 & 0 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix} = A$, then write the order of matrix A .

Q4. If matrix $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ and $A^2 = kA$, then write the value of k .

Q5. If $X = \begin{bmatrix} 3 & 1 & -1 \\ 5 & -2 & -3 \end{bmatrix}$ and $Y = \begin{bmatrix} 2 & 1 & -1 \\ 7 & 2 & 4 \end{bmatrix}$, then find matrix, Z , such that $X + Y + Z$ is a zero matrix.

Q6. If $\begin{bmatrix} 2x & 3 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix} \begin{bmatrix} x \\ 3 \end{bmatrix} = O$, find x .

Q7. Find a matrix A such that $2A - 3B + 5C = 0$, where $B = \begin{bmatrix} -2 & 2 & 0 \\ 3 & 1 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & 0 & -2 \\ 7 & 1 & 6 \end{bmatrix}$.

Q8. If $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$, find $A^2 - 5A + 4I$ and hence find a matrix X such that $A^2 - 5A + 4I + X = 0$.

Q9. If $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$, then find value of $A^2 - 3A + 2I$.

Q10. If $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$, $B = \begin{bmatrix} a & 1 \\ b & -1 \end{bmatrix}$ and $(A+B)^2 = A^2 + B^2$, then find the values of a and b .

Q11. Find matrix A such that $\begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -1 & -8 \\ 1 & -2 \\ 9 & 22 \end{bmatrix}$

Q12. Find the matrix $A = \begin{bmatrix} 3 & 1 \\ 7 & 5 \end{bmatrix}$, find a and b that $A^2 + aI = bA$, where I is a 2×2 identity matrix.

Q13. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, prove that $A^3 - 5A^2 + 7A = 0$.

Q14. If $A = \begin{bmatrix} -4 & 1 \\ 3 & 2 \end{bmatrix}$, find $f(A)$ if $f(x) = x^2 - 2x + 3$.

Q15. If $A = \begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix}$, then find x and y so that $A^2 + xA - yI = 0$.

Q16. Let $A = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$, then show that $A^2 - 4A + 7I = 0$.

Q17. If $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$, find the matrix B such that $A^2 = BA - 3I$

Q18. Show that $A = \begin{bmatrix} 2 & -3 \\ 3 & 4 \end{bmatrix}$ satisfy equation $x^2 - 6x + 17 = 0$.

Q19. If $A = \begin{pmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{pmatrix}$ and $A^3 - 6A^2 + 7A + kI_3 = O$, find k .

Q20. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 3 \\ 1 & 4 & 5 \end{bmatrix}$, find the value of $A^3 - 10A^2 + 9I$ and also find a matrix B such that $A^3 - 10A^2 + 9I + B = 0$.

Answers

1. A 2. $A = \begin{bmatrix} 3 & 1 \\ 1 & 2 \end{bmatrix}$ 3. 1×1 4. $k = 2$ 5. $\begin{bmatrix} -5 & -2 & 2 \\ -12 & 0 & -1 \end{bmatrix}$ 6. $x = 0, \frac{-3}{2}$

7. $A = \begin{bmatrix} -8 & 3 & 5 \\ -13 & -1 & -9 \end{bmatrix}$ 8. $X = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & 10 \\ 5 & -4 & -2 \end{bmatrix}$ 9. $\begin{bmatrix} 1 & -1 & -1 \\ 3 & -3 & -4 \\ -3 & 2 & 0 \end{bmatrix}$ 10. $a = 1, b = 4$

11. $A = \begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix}$ 12. $a = 8, b = 8$ 14. $f(A) = \begin{bmatrix} 30 & -4 \\ -12 & 6 \end{bmatrix}$

15. $x = -7, y = -14$ 17. $B = \begin{bmatrix} 8 & -6 \\ -2 & 8 \end{bmatrix}$ 19. $k = 2$

20. $\begin{bmatrix} 5 & -20 & -30 \\ -20 & -25 & -90 \\ -10 & -280 & -35 \end{bmatrix}$