

(Short Answer type questions)

1. Find the value of
- x
- if

$$\begin{bmatrix} 1 & x & 1 \end{bmatrix} \begin{bmatrix} 1 & 3 & 2 \\ 2 & 5 & 1 \\ 15 & 3 & 2 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ x \end{bmatrix} = \mathbf{O}.$$

2. Show that
- $A = \begin{bmatrix} 5 & 3 \\ -1 & -2 \end{bmatrix}$
- satisfies the equation
- $A^2 - 3A - 7I = \mathbf{O}$
- and find
- A^{-1}
- .

3. If
- X
- and
- Y
- are
- 2×2
- matrices, then solve the following matrix equations for
- X
- and
- Y

$$2X + 3Y = \begin{bmatrix} 2 & 3 \\ 4 & 0 \end{bmatrix}, 3X + 2Y = \begin{bmatrix} -2 & 2 \\ 1 & -5 \end{bmatrix}.$$

4. If
- $A = \begin{bmatrix} 0 & -1 & 2 \\ 4 & 3 & -4 \end{bmatrix}$
- and
- $B = \begin{bmatrix} 4 & 0 \\ 1 & 3 \\ 2 & 6 \end{bmatrix}$
- , then verify that :

- (i) $(A')' = A$
 (ii) $(AB)' = B'A'$
 (iii) $(kA)' = (kA')$.

5. If
- $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$
- , then show that
- $A^2 = \begin{bmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$
- .

6. If
- $A = \begin{bmatrix} 1 & 0 & -1 \\ 2 & 1 & 3 \\ 0 & 1 & 1 \end{bmatrix}$
- , then verify that
- $A^2 + A = A(A + I)$
- , where
- I
- is
- 3×3
- unit matrix.

7. Show that matrix multiplication is not commutative.

9. For three Matrices
- A, B
- and
- C
- of suitable order, verify that
- $A(B+C) = AB + AC$

10. Verify that
- $AB = AC$
- need not imply
- $B = C$
- .
