

**GRADE XII**  
**Question Bank (MATHEMATICS)**  
**Chapter-3 Matrices**

**1 Marks:**

1. The matrix  $\begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & -7 \\ 2 & 7 & 0 \end{bmatrix}$  is a **[BOARD 2025]**
- a) Diagonal matrix c) skew-symmetric matrix  
b) Symmetric matrix d) scalar matrix
2. If a matrix has 36 elements, the number of possible orders it can have, is **[BOARD 2024]**
- a) A) 13 b) 3 c) 5 d) 9
3. If  $X, Y$  and  $XY$  are matrices of order  $2 \times 3, m \times n$  and  $2 \times 5$  respectively, then the number of elements in matrix  $Y$  is **[BOARD 2024]**
- a) 6 b) 10 c) 15 d) 35
4. If the sum of all the elements of a  $3 \times 3$  scalar matrix is 9, then the product of all its elements is **[BOARD 2024]**
- a) 0 b) 9 c) 27 d) 729
5. Let  $A = \begin{bmatrix} 1 & -2 & -1 \\ 0 & 4 & -1 \\ -3 & 2 & 1 \end{bmatrix}, B = \begin{bmatrix} -2 \\ -5 \\ -7 \end{bmatrix}, C = [9 \ 8 \ 7]$  which of the following is defined? **[BOARD 2025]**
- a) Only  $AB$  b) only  $AC$  c) Only  $BA$  d) All  $AB, AC$  &  $BA$
6. The number of all scalar matrices of order 3 with each entry  $-1, 0, 1$ , is **[BOARD 2024]**
- a) 1 b) 3 c) 2 d)  $3^9$
7. What is the total number of possible matrices of order  $3 \times 3$  with each entry as  $\sqrt{2}$  or  $\sqrt{3}$ ? **[BOARD 2025]**
- a) 9 b) 512 c) 615 d) 64
8. The product of matrix  $P$  and  $Q$  is equal to a diagonal matrix. If the order of matrix  $Q$  is  $3 \times 2$  then the order of matrix  $P$  is **[BOARD 2024]**
- a)  $2 \times 2$  b)  $3 \times 3$  c)  $2 \times 3$  d)  $3 \times 2$

9. If  $A = \begin{bmatrix} 5 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$  then  $A^3$  is **[BOARD 2025]**

- a)  $3 \begin{bmatrix} 5 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$       b)  $\begin{bmatrix} 125 & 0 & 0 \\ 0 & 125 & 0 \\ 0 & 0 & 125 \end{bmatrix}$       c)  $\begin{bmatrix} 15 & 0 & 0 \\ 0 & 15 & 0 \\ 0 & 0 & 15 \end{bmatrix}$       d)  $\begin{bmatrix} 5^3 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$

10. If  $A = \begin{bmatrix} 7 & 0 & x \\ 0 & 7 & 0 \\ 0 & 0 & y \end{bmatrix}$  is a scalar matrix then  $y^x$  is equal to **[BOARD 2025]**

- a) 0                                  b) 1                                  c) 7                                  d)  $\pm 7$

11. If  $x \begin{bmatrix} 1 \\ 2 \end{bmatrix} + y \begin{bmatrix} 2 \\ 5 \end{bmatrix} = \begin{bmatrix} 4 \\ 9 \end{bmatrix}$  then **[BOARD 2023]**

- a)  $x = 1, y = 2$                   b)  $x = 2, y = 1$                   c)  $x = 1, y = -1$                   d)  $x = 3, y = 2$

12. The product  $\begin{bmatrix} a & b \\ -b & a \end{bmatrix} \begin{bmatrix} a & -b \\ b & a \end{bmatrix}$  is equal to **[BOARD 2023]**

- a)  $\begin{bmatrix} a^2 + b^2 & 0 \\ 0 & a^2 + b^2 \end{bmatrix}$                                   c)  $\begin{bmatrix} a^2 + b^2 & 0 \\ a^2 + b^2 & 0 \end{bmatrix}$   
 b)  $\begin{bmatrix} (a+b)^2 & 0 \\ (a+b)^2 & 0 \end{bmatrix}$                                   d)  $\begin{bmatrix} a & 0 \\ 0 & b \end{bmatrix}$

13. If  $A = [a_{ij}]$  is an identity matrix then which of the following is true?

**[BOARD 2024]**

- a)  $a_{ij} = \begin{cases} 0, & \text{if } i = j \\ 1, & \text{if } i \neq j \end{cases}$                                   c)  $a_{ij} = 0, \forall i, j$   
 b)  $a_{ij} = 1, \forall i, j$                                   d)  $a_{ij} = \begin{cases} 0, & \text{if } i \neq j \\ 1, & \text{if } i = j \end{cases}$

14. If  $A = [a_{ij}]$  be a  $3 \times 3$  matrix, where  $a_{ij} = i - 3j$ , then which of the following is false? **[BOARD 2024]**

- a)  $a_{11} < 0$                           b)  $a_{12} + a_{21} = -6$                   c)  $a_{13} > a_{31}$                           d)  $a_{31} = 0$

15. Let  $A = [a_{ij}]$  be a square matrix of order 3 such that  $a_{ij} = j - 2i$ . Then which of the following is true? **[BOARD 2025]**

- a)  $a_{12} > 0$                           b) all  $a_{ij} < 0$                           c)  $a_{13} + a_{31} = -6$                   d)  $a_{23} > a_{32}$

16. If  $A = [a_{ij}]$  is a square matrix of order 2 such that  $a_{ij} = \begin{cases} 1, & \text{when } i \neq j \\ 0, & \text{when } i = j \end{cases}$  then  $A^2$  is  
**[BOARD 2023]**

- a)  $\begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$       b)  $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$       c)  $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$       d)  $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

17. Find the matrix  $A^2$ , where  $A = [a_{ij}]$  is a  $2 \times 2$  matrix whose elements are given by  
 $a_{ij} = \text{maximum}(i, j) - \text{minimum}(i, j)$   
**[BOARD 2024]**

- a)  $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$       b)  $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$       c)  $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$       d)  $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$

18. If  $A = \begin{bmatrix} 3 & 4 \\ 5 & 2 \end{bmatrix}$  and  $2A + B$  is a null matrix then B is equal to  
**[BOARD 2023]**

- a)  $\begin{bmatrix} 6 & 8 \\ 10 & 4 \end{bmatrix}$       b)  $\begin{bmatrix} -6 & -8 \\ -10 & -4 \end{bmatrix}$       c)  $\begin{bmatrix} 5 & 8 \\ 10 & 3 \end{bmatrix}$       d)  $\begin{bmatrix} -5 & -8 \\ -10 & -3 \end{bmatrix}$

19. If  $A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$  then  $A^{2023}$  is equal to  
**[BOARD 2023]**

- a)  $\begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$       b)  $\begin{bmatrix} 0 & 2023 \\ 0 & 0 \end{bmatrix}$       c)  $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$       d)  $\begin{bmatrix} 2023 & 0 \\ 0 & 2023 \end{bmatrix}$

20. If matrix  $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$  and  $A^2 = kA$  then the value of k is  
**[BOARD 2023]**

- a) 1      b) -2      c) 2      d) -1

21. It is given that  $X \begin{bmatrix} 3 & 2 \\ 1 & -1 \end{bmatrix} = \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$  then the matrix X is  
**[BOARD 2023]**

- a)  $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$       b)  $\begin{bmatrix} 0 & -1 \\ 1 & 1 \end{bmatrix}$       c)  $\begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$       d)  $\begin{bmatrix} 1 & -1 \\ 1 & -1 \end{bmatrix}$

22. If  $\begin{bmatrix} 3 & 2 \\ 1 & x \end{bmatrix} \begin{bmatrix} x \\ 1 \end{bmatrix} = \begin{bmatrix} 14 \\ 8 \end{bmatrix}$  then x is  
**[BOARD 2023]**

- a)  $\frac{16}{3}$       b) -3      c) -4      d) 4

23. If  $A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$ ,  $B = \begin{bmatrix} x & 0 \\ 1 & 1 \end{bmatrix}$  and  $A = B^2$  then x equals  
**[BOARD 2023 & 2024]**

- a)  $\pm 1$       b) -1      c) 1      d) 2

24. If  $\begin{bmatrix} x+y & 3y \\ 3x & x+3 \end{bmatrix} = \begin{bmatrix} 9 & 4x+y \\ x+6 & y \end{bmatrix}$  then  $x - y$ ?  
**[BOARD 2025]**

- a) -7      b) -3      c) 3      d) 7

25. If  $\begin{bmatrix} x+y & 2 \\ 5 & xy \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 8 \end{bmatrix}$  then the value of  $\frac{24}{x} + \frac{24}{y}$  is **[BOARD 2024]**

- a) 7                                      b) 6                                      c) 8                                      d) 18

26. Given that  $[1 \ x] \begin{bmatrix} 4 & 0 \\ -2 & 0 \end{bmatrix} = 0$ , the value of x is **[BOARD 2024]**

- a) -4                                      b) -2                                      c) 2                                      d) 4

27. If  $[x \ 2 \ 0] \begin{bmatrix} 5 \\ -1 \\ x \end{bmatrix} = [3 \ 1] \begin{bmatrix} -2 \\ x \end{bmatrix}$  then value of x is **[BOARD 2024]**

- a) -1                                      b) 0                                      c) 1                                      d) 2

28. In the matrix equation  $\begin{bmatrix} x+y+z \\ x+z \\ y+2z \end{bmatrix} = \begin{bmatrix} 3 \\ 2 \\ -1 \end{bmatrix}$  the value of z is **[BOARD 2023]**

- a) 1                                      b) 2                                      c) -1                                      d) -2

29. If  $\begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 6 \\ 3 \\ 2 \end{bmatrix}$  then the value of  $2x + y - z$  is **[BOARD 2023]**

- a) 1                                      b) 2                                      c) 3                                      d) 5

30. If for a square matrix A,  $A^2 - A + I = O$  then  $A^{-1}$  equals **[BOARD 2023]**

- a) A                                      b) A + I                                      c) I - A                                      d) A - I

31. If A is a square matrix and  $A^2 = A$  then  $(I + A)^2 - 3A$  is equal to **[BOARD 2023]**

- a) I                                      b) A                                      c) 2A                                      d) 3I

32. If for a square matrix A,  $A^2 - 3A + I = 0$  and  $A^{-1} = xA + yI$ , then the value of  $x + y$  is **[BOARD 2023]**

- a) -2                                      b) 2                                      c) 3                                      d) -3

33. If  $A = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$  and  $(3I + 4A)(3I - 4A) = x^2I$  then the value(s) x is/are **[BOARD 2023]**

- a)  $\pm\sqrt{7}$                                       b) 0                                      c)  $\pm 5$                                       d) 25

34. If  $A = \begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix}$  and  $A^2 - kA - 5I = O$  then the value of k is **[BOARD 2024]**

- a) 3                                      b) 5                                      c) 7                                      d) 9

35. If  $A = \begin{bmatrix} 2 & 1 \\ -4 & -2 \end{bmatrix}$  then the value of  $I - A + A^2 - A^3 + \dots$  is **[BOARD 2024]**

- a)  $\begin{bmatrix} -1 & -1 \\ 4 & 3 \end{bmatrix}$                                       b)  $\begin{bmatrix} 3 & 1 \\ -4 & -1 \end{bmatrix}$                                       c)  $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$                                       d)  $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

36. Let  $A = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$  and  $B = \frac{1}{3} \begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & \lambda \end{bmatrix}$ . If  $AB = I$  then the value of  $\lambda$  is

[BOARD 2024]

- a)  $\frac{-9}{4}$                       b)  $-2$                       c)  $\frac{-3}{2}$                       d)  $0$

37. If  $F(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$  and  $[F(x)]^2 = F(kx)$  then the value of  $k$  is

[BOARD 2024]

- a)  $1$                       b)  $2$                       c)  $0$                       d)  $-2$

38. Which of the following can be both a symmetric and skew symmetric matrix?

[BOARD 2025]

- a) Unit matrix              b) diagonal matrix              c) null matrix              d) row matrix

39. Sum of two skew-symmetric matrices of same order is always a [BOARD 2025]

- a) Skew-symmetric matrix              c) null matrix  
b) Symmetric matrix              d) identity matrix

40. If  $A$  and  $B$  are two skew symmetric matrices then  $AB + BA$  is [BOARD 2024]

- a) Skew symmetric              c) null matrix  
b) Symmetric matrix              d) identity matrix

41. If  $A$  and  $B$  are square matrices of same order then  $AB^T - BA^T$  is a

[BOARD 2025]

- a) Symmetric matrix              c) null matrix  
b) Skew-symmetric matrix              d) unit matrix

42. Let  $A$  be a matrix of order  $m \times n$  and  $B$  is a matrix such that  $A^T B$  and  $BA^T$  are defined. Then the order of  $B$  is [BOARD 2025]

- a)  $m \times m$               b)  $n \times n$               c)  $m \times n$               d)  $n \times m$

43. If  $A$  is a  $3 \times 4$  matrix and  $B$  is a matrix such that  $A'B$  and  $AB'$  are both defined, then the order of the matrix  $B$  is [BOARD 2023 & 2025]

- a)  $3 \times 4$               b)  $3 \times 3$               c)  $4 \times 4$               d)  $4 \times 3$

44. If matrices  $A$  and  $B$  are of order  $1 \times 3$  and  $3 \times 1$  respectively, then the order of  $A'B'$  is [BOARD 2024]

- a)  $1 \times 1$               b)  $3 \times 1$               c)  $1 \times 3$               d)  $3 \times 3$

45. If  $A = \begin{bmatrix} 5 & x \\ y & 0 \end{bmatrix}$  and  $A = A^T$ , where  $A^T$  is the transpose of the matrix A, then

[BOARD 2023]

- a)  $x = 0, y = 5$       b)  $x = y$       c)  $x + y = 5$       d)  $x = 5, y = 0$

46. For what value of  $x \in \left[0, \frac{\pi}{2}\right]$  is  $A + A' = \sqrt{3}I$ , where  $A = \begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$ ?

[BOARD 2023 & 2024]

- a)  $\frac{\pi}{3}$       b)  $\frac{\pi}{6}$       c) 0      d)  $\frac{\pi}{2}$

47. If  $A = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$  then  $B'A'$  is equal to

[BOARD 2023]

- a)  $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$       b)  $\begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$       c)  $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$       d)  $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

48. If a matrix  $A = [1 \ 2 \ 3]$  then the matrix  $AA'$  (where  $A'$  is the transpose of A) is

[BOARD 2023]

- a) 14      b)  $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$       c)  $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \\ 3 & 1 & 2 \end{bmatrix}$       d) [14]

49. A and B are skew-symmetric matrices of same order. AB is symmetric if

[BOARD 2023]

- a)  $AB = 0$       b)  $AB = -BA$       c)  $AB = BA$       d)  $BA = 0$

50. If  $\begin{bmatrix} a & c & 0 \\ b & d & 0 \\ 0 & 0 & 5 \end{bmatrix}$  is a scalar matrix then the value of  $a + 2b + 3c + 4d$  is [BOARD 2024]

- a) 0      b) 5      c) 10      d) 25

51. If  $A = \begin{bmatrix} 1 & 12 & 4y \\ 6x & 5 & 2x \\ 8x & 4 & 6 \end{bmatrix}$  is a symmetric matrix then  $2x + y$  is

[BOARD 2025]

- a) -8      b) 0      c) 6      d) 8

52. If  $A = \begin{bmatrix} 1 & 4 & x \\ z & 2 & y \\ -3 & -1 & 3 \end{bmatrix}$  is a symmetric matrix then the value of  $x + y + z$  is

[BOARD 2023]

- a) 10      b) 6      c) 8      d) 0

53. If  $A = \begin{bmatrix} a & c & -1 \\ b & 0 & 5 \\ 1 & -5 & 0 \end{bmatrix}$  is a skew symmetric matrix then the value of  $2a - (b + c)$  is

[BOARD 2024]

- a) 0      b) 1      c) -10      d) 10

54. If  $\begin{bmatrix} 2 & 0 \\ 5 & 4 \end{bmatrix} = P + Q$ , where P is a symmetric and Q is a skew symmetric matrix, then Q is equal to **[BOARD 2023]**

- a)  $\begin{bmatrix} 2 & 5/2 \\ 5/2 & 4 \end{bmatrix}$       b)  $\begin{bmatrix} 0 & -5/2 \\ 5/2 & 0 \end{bmatrix}$       c)  $\begin{bmatrix} 0 & 5/2 \\ -5/2 & 0 \end{bmatrix}$       d)  $\begin{bmatrix} 2 & -5/2 \\ 5/2 & 4 \end{bmatrix}$

55. Let A be a skew-symmetric matrix of order 3. If  $|A| = x$ , then  $2023^x$  is equal to

**[BOARD 2023]**

- a) 2023      b)  $\frac{1}{2023}$       c)  $2023^2$       d) 1

56. If A and B are invertible matrices then which of the following is not correct?

**[BOARD 2025]**

- a)  $(A + B)^{-1} = B^{-1} + A^{-1}$       c)  $adj(A) = |A|A^{-1}$   
 b)  $(AB)^{-1} = B^{-1}A^{-1}$       d)  $|A|^{-1} = |A^{-1}|$

57. Let A and B be two matrices of suitable orders. Then which of the following is not correct? **[BOARD 2025]**

- a)  $(A')' = A$       b)  $(kA)' = kA'$       c)  $(A' + B')' = A + B$       d)  $(AB)' = A'B'$

58. For two matrices A and B given that  $A^{-1} = \frac{1}{4}B$  then inverse of 4A is

**[BOARD 2024]**

- a) 4B      b) B      c)  $\frac{1}{4}B$       d)  $\frac{1}{16}B$

59. For the matrix  $A = \begin{bmatrix} 2 & -1 & 1 \\ \lambda & 2 & 0 \\ 1 & -2 & 3 \end{bmatrix}$  to be invertible the value of  $\lambda$  is **[BOARD 2024]**

- a) 0      b) 10      c)  $R - \{0\}$       d)  $R - \{-10\}$

60. Four friends Abhay, Bina, Chhaya and Devesh were asked to simplify

$4AB + 3(AB + BA) - 4BA$  where A and B are both matrices of order  $2 \times 2$ . It is known that  $A \neq B \neq I$  and  $A^{-1} \neq B$ .

Their answers are given as:

- Abhay :  $6AB$   
 Bina :  $7AB - BA$   
 Chhaya :  $8AB$   
 Devesh :  $7AB - AB$

Who answered it correctly?

**[BOARD 2025]**

- a) Abhay      b) Bina      c) Chhaya      d) Devesh

61. If A and B are square matrices of same order such that  $AB = A$  and  $BA = B$  then  $A^2 + B^2$  is equal to **[BOARD 2025]**

- a)  $A + B$                       b)  $BA$                       c)  $2(A + B)$                       d)  $2BA$

62. If A and B are square matrices of order m such that  $A^2 - B^2 = (A - B)(A + B)$  then which of the following is always correct? **[BOARD 2025]**

- a)  $A = B$                       b)  $AB = BA$                       c)  $A = O$  or  $B = O$                       d)  $A = I$  or  $B = I$

63. If A and B are square matrices of the same order the  $(A + B)(A - B)$  is equal to **[BOARD 2025]**

- a)  $A^2 - AB + BA - B^2$                       c)  $A^2 - AB - BA - B^2$   
b)  $A^2 + AB - BA - B^2$                       d)  $A^2 - B^2 + AB + BA$

**Options for Assertion and Reasoning Questions:**

- a) Both assertion(A) and reason(R) are true and reason(R) is the correct explanation of assertion(A)  
b) Both assertion(A) and reason(R) are true but reason(R) is not the correct explanation of assertion(A)  
c) Assertion (A) is true but reason (R) is false  
d) Assertion (A) is false but reason (R) is true

64. **Assertion (A):** For any symmetric matrix A,  $B'AB$  is a skew-symmetric matrix.

**Reason (R):** A square matrix P is skew-symmetric if  $P' = -P$ . **[BOARD 2024]**

65. **Assertion (A):** Every scalar matrix is a diagonal matrix. **[BOARD 2024]**

**Reason (R):** In a diagonal matrix, all the diagonal elements are zero.

66. **Assertion (A):**  $A = \text{diag} [3 \ 5 \ 2]$  is a scalar matrix of order  $3 \times 3$ .

**Reason (R):** If a diagonal matrix has all non-zero elements equal, it is known as a scalar matrix. **[BOARD 2025]**

**2 Marks:**

1. Let A and B are two square matrices of order 3 such that  $|A| = 3$  and  $|B| = -4$ . Find the value of  $|-6AB|$ . **[BOARD 2025]**

2. If  $A = \begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$  and  $A^2 = kA$ , then find the value of k. **[BOARD 2025]**

3. If  $A = \begin{bmatrix} 1 & 0 \\ -1 & 5 \end{bmatrix}$  then find the value of k if  $A^2 = 6A + kI_2$ , where  $I_2$  is an identity matrix. **[BOARD 2025]**
4. If  $\begin{bmatrix} 3 & -1 \\ 0 & 1 \\ 2 & -3 \end{bmatrix} A = \begin{bmatrix} 2 \\ -5 \\ -17 \end{bmatrix}$  then find matrix A? **[BOARD 2025]**
5. If  $A = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$  then show that  $A^2 - 4A + 7I = O$ . **[BOARD 2025]**

**3 Marks:**

1. Find a matrix A such that  $A \begin{bmatrix} 4 & 0 \\ -1 & -2 \end{bmatrix} = \begin{bmatrix} 17 & 10 \\ 0 & -16 \end{bmatrix}$ . Also, find  $A^{-1}$ .
2. Given a square matrix A of order 3 such that  $A^2 = \begin{bmatrix} 3 & -4 & 4 \\ 0 & -1 & 0 \\ -2 & 2 & -3 \end{bmatrix}$  show that  $A^3 = A^{-1}$ . **[BOARD 2024]**
3. Let  $A = \begin{bmatrix} 1 \\ 4 \\ -2 \end{bmatrix}$  and  $C = \begin{bmatrix} 3 & 4 & 2 \\ 12 & 16 & 8 \\ -6 & -8 & -4 \end{bmatrix}$  be two matrices. Then find the matrix B if  $AB = C$ . **[BOARD 2025]**
4. If  $A = \begin{bmatrix} 1 & -1 & 0 \end{bmatrix}$ ,  $B = \begin{bmatrix} 2 & 0 & 1 \\ -1 & 3 & 4 \\ 0 & 5 & 1 \end{bmatrix}$  and  $C = \begin{bmatrix} 2 \\ 3 \\ 4 \end{bmatrix}$  are three matrices then find  $ABC$ . **[BOARD 2025]**
5. Find the value of x, if  $\begin{bmatrix} 1 & x & 1 \end{bmatrix} \begin{bmatrix} 1 & 3 & 2 \\ 2 & 5 & 1 \\ 15 & 3 & 2 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ x \end{bmatrix} = O$ . **[BOARD 2025]**
6. If  $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$  then show that  $A^3 - 23A - 40I = O$ . **[BOARD 2023]**

**5 Marks:**

1. If  $f(\alpha) = \begin{bmatrix} \cos \alpha & -\sin \alpha & 0 \\ \sin \alpha & \cos \alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$  prove that  $f(\alpha) \cdot f(-\beta) = f(\alpha - \beta)$ . **[BOARD 2023]**
2. If  $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$  then show that  $A^3 - 6A^2 + 7A + 2I = O$ . **[BOARD 2023]**