EXERCISE-I

Types of matrices, Algebra of matrices till addition of matrices

1. If $\begin{bmatrix} 2 & -3 \\ 4 & 0 \end{bmatrix} - \begin{bmatrix} a & c \\ b & d \end{bmatrix} = \begin{bmatrix} 1 & 4 \\ 2 & -5 \end{bmatrix}$, then $(a, b, c, d) =$

(A) $(1, 6, 2, 5)$ (B) (1, 2, 7, 5)

(C) (1, 2, –7, 5) (D) (–1, –2, 7, –5)

2. If $A = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 2 & 3 & 0 & 0 \\ 4 & 5 & 6 & 0 \\ 7 & 8 & 9 & 10 \end{bmatrix}$, then A is

(A) An upper triangular matrix

(B) A null matrix

(C) A lower triangular matrix

(D) None of these

3. Square matrix $[a_{ij}]_{n \times n}$ will be an upper triangular matrix, if

(A) $a_{ij} \neq 0$, for $i > j$ (B) $a_{ij} \neq$, for $i > j$

(C) $a_{ij} = 0$, for $i < j$ (D) None of these

4. If A and B are square matrices of same order, then

(A) $A + B = B + A$ (B) $A + B = A - B$

(C) $A - B = B - A$ (D) $AB = BA$

5. If $A = \begin{bmatrix} 1 & -2 \\ 3 & 0 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 4 \\ 2 & 3 \end{bmatrix}$, $C = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$, then $5A - 3B - 2C =$

(A) $\begin{bmatrix} 8 & 20 \\ 7 & 9 \end{bmatrix}$ (B) $\begin{bmatrix} 8 & -20 \\ 7 & -9 \end{bmatrix}$

(C) $\begin{bmatrix} -8 & 20 \\ -7 & 9 \end{bmatrix}$ (D) $\begin{bmatrix} 8 & 7 \\ -20 & -9 \end{bmatrix}$

6. The matrix $\begin{bmatrix} 2 & 5 & -7 \\ 0 & 3 & 11 \\ 0 & 0 & 9 \end{bmatrix}$ is known as

(A) Symmetric matrix

(B) Diagonal matrix

(C) Upper triangular matrix

(D) Skew symmetric matrix

7. If two matrices A and B are of order $p \times q$ and $r \times s$ respectively, can be subtracted only, if

(A) $p = q$ (B) $p = q, r = s$

(C) $p = r, q = s$ (D) None of these

8. If $a_{ij} = \frac{1}{2}(3i - 2j)$ and $A = [a_{ij}]_{2 \times 2}$, then A is equal to

(A) $\begin{bmatrix} 1/2 & 2 \\ -1/2 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 1/2 & -1/2 \\ 2 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 2 & 2 \\ 1/2 & -1/2 \end{bmatrix}$ (D) None of these

9. If $2X - \begin{bmatrix} 1 & 2 \\ 7 & 4 \end{bmatrix} = \begin{bmatrix} 3 & 2 \\ 0 & -2 \end{bmatrix}$, then X is equal to

(A) $\begin{bmatrix} 2 & 2 \\ 7 & 4 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 2 \\ 7/2 & 2 \end{bmatrix}$

(C) $\begin{bmatrix} 2 & 2 \\ 7/2 & 1 \end{bmatrix}$ (D) None of these

10. If $\begin{bmatrix} x + y & 2x + z \\ x - y & 2z + w \end{bmatrix} = \begin{bmatrix} 4 & 7 \\ 0 & 10 \end{bmatrix}$, then values of x, y, z, w are

(A) 2, 2, 3, 4 (B) 2, 3, 1, 2

(C) 3, 3, 0, 1 (D) None of these

11. The value of a for which the matrix $A = \begin{pmatrix} a & 2 \\ 2 & 4 \end{pmatrix}$ is singular if

(A) $a \neq 1$ (B) $a = 1$

(C) $a = 0$ (D) $a = -1$

12. If I is a unit matrix of order 10, then the determinant of I is equal to

(A) 10 (B) 1

(C) 1/10 (D) 9

Multiplication of matrices & special types of matrices

13. If A is a $m\times n$ matrix and B is a matrix such that both AB and BA are defined, then the order of B is

(A) $m\times n$ (B) $n\times m$
(C) $m\times m$ (D) $n\times n$

14. If $A=\begin{bmatrix}-1&0&0\\0&-1&0\\0&0&-1\end{bmatrix}$, then A^2 is

(A) Null matrix (B) Unit matrix
(C) A (D) $2A$

15. If $A=\begin{bmatrix}0&2&0\\0&0&3\\-2&2&0\end{bmatrix}$ and $B=\begin{bmatrix}1&2&3\\3&4&5\\5&-4&0\end{bmatrix}$, then the element of 3rd row and third column in AB will be

(A) – 18 (B) 4
(C) – 12 (D) None of these

16. If $A=\begin{bmatrix}2&0&0\\0&2&0\\0&0&2\end{bmatrix}$, then $A^5=$

(A) $5A$ (B) $10A$
(C) $16A$ (D) $32A$

17. If $A=\begin{bmatrix}0&1\\0&0\end{bmatrix}$ and $AB=O$, then $B=$

(A) $\begin{bmatrix}1&1\\1&1\end{bmatrix}$ (B) $\begin{bmatrix}0&1\\-1&0\end{bmatrix}$
(C) $\begin{bmatrix}0&-1\\1&0\end{bmatrix}$ (D) $\begin{bmatrix}-1&0\\0&0\end{bmatrix}$

18. If A and B are square matrices of order 2, then $(A+B)^2=$

(A) $A^2+2AB+B^2$ (B) $A^2+2AB+B^2$
(C) $A^2+2BA+B^2$ (D) None of these

19. If $X=\begin{bmatrix}3&-4\\1&-1\end{bmatrix}$, then the value of X^n is

(A) $\begin{bmatrix}3n&-4n\\n&-n\end{bmatrix}$ (B) $\begin{bmatrix}2+n&5-n\\n&-n\end{bmatrix}$
(C) $\begin{bmatrix}3^n&(-4)^n\\1^n&(-1)^n\end{bmatrix}$ (D) None of these

20. If $A=\begin{bmatrix}i&0\\0&i\end{bmatrix}$, then $A^2=$

(A) $\begin{bmatrix}1&0\\0&-1\end{bmatrix}$ (B) $\begin{bmatrix}-1&0\\0&-1\end{bmatrix}$
(C) $\begin{bmatrix}1&0\\0&1\end{bmatrix}$ (D) $\begin{bmatrix}-1&0\\0&1\end{bmatrix}$

21. If $A=\begin{bmatrix}0&1\\1&0\end{bmatrix}$, then $A^4=$

(A) $\begin{bmatrix}1&0\\0&1\end{bmatrix}$ (B) $\begin{bmatrix}1&1\\0&0\end{bmatrix}$
(C) $\begin{bmatrix}0&0\\1&1\end{bmatrix}$ (D) $\begin{bmatrix}0&1\\1&0\end{bmatrix}$

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

(A) $\begin{bmatrix}8&-5\\-5&3\end{bmatrix}$ (B) $\begin{bmatrix}8&-5\\5&3\end{bmatrix}$
(C) $\begin{bmatrix}8&-5\\-5&-3\end{bmatrix}$ (D) $\begin{bmatrix}8&5\\-5&3\end{bmatrix}$

23. If A and B are two matrices such that $A+B$ and AB are both defined, then

(A) A and B are two matrices not necessarily of same order
(B) A and B are square matrices of same order
(C) Number of columns of A = Number of rows of B
(D) None of these

24. If $A=\begin{bmatrix}1&3&0\\-1&2&1\\0&0&2\end{bmatrix}$, $B=\begin{bmatrix}2&3&4\\1&2&3\\-1&1&2\end{bmatrix}$, then $AB=$

(A) $\begin{bmatrix}5&9&13\\-1&2&4\\-1&2&4\end{bmatrix}$ (B) $\begin{bmatrix}5&9&13\\-1&2&4\\-2&2&4\end{bmatrix}$
(C) $\begin{bmatrix}1&2&4\\-1&2&4\\-2&2&4\end{bmatrix}$ (D) None of these

25. If $A=\begin{bmatrix}1&1\\0&1\end{bmatrix}$, $B=\begin{bmatrix}0&1\\1&0\end{bmatrix}$, then $AB=$

(A) $\begin{bmatrix}0&0\\0&0\end{bmatrix}$ (B) $\begin{bmatrix}1&1\\1&0\end{bmatrix}$

(C) $\begin{bmatrix}1&0\\0&1\end{bmatrix}$ (D) $\begin{bmatrix}1&0\\0&1\end{bmatrix}$

26. If $A=\begin{bmatrix}i&0\\0&i\end{bmatrix}$ and $B=\begin{bmatrix}0&-i\\-i&0\end{bmatrix}$, then $(A+B)(A-B)$ is equal to

(A) A^2-B^2 (B) A^2+B^2

(C) $A^2-B^2+BA+AB$ (D) None of these

27. If $A=\begin{bmatrix}1&0\\2&0\end{bmatrix}$, $B=\begin{bmatrix}0&0\\1&12\end{bmatrix}$, then

(A) $AB=O, BA=O$ (B) $AB=O, BA\neq O$

(C) $AB\neq O, BA=O$ (D) $AB\neq O, BA\neq O$

28. If $A=\begin{pmatrix}i&1\\0&i\end{pmatrix}$, then A^4 equals

(A) $\begin{pmatrix}1&-4i\\0&1\end{pmatrix}$ (B) $\begin{pmatrix}-1&-4i\\0&-1\end{pmatrix}$

(C) $\begin{pmatrix}-i&4\\0&i\end{pmatrix}$ (D) $\begin{pmatrix}1&4\\0&1\end{pmatrix}$

29. $\begin{bmatrix}1\\-1\\2\end{bmatrix}[2\quad 1\quad -1]=$

(A) $[-1]$ (B) $\begin{bmatrix}2\\-1\\-2\end{bmatrix}$

(C) $\begin{bmatrix}2&1&-1\\-2&-1&1\\4&2&-2\end{bmatrix}$ (D) Not defined

30. If $A=\begin{bmatrix}1&3\\2&1\end{bmatrix}$, then determinant of A^2-2A is

(A) 5 (B) 25

(C) –5 (D) –25

31. If the matrix $AB=O$, then

(A) $A=O$ or $B=O$

(B) $A=O$ and $B=O$

(C) It is not necessary that either $A=O$ or $B=O$

(D) $A\neq O, B\neq O$

32. If $A=\begin{bmatrix}1&2\\0&1\end{bmatrix}$, then $A^n=$

(A) $\begin{bmatrix}1&2n\\0&1\end{bmatrix}$ (B) $\begin{bmatrix}2&n\\0&1\end{bmatrix}$

(C) $\begin{bmatrix}1&2n\\0&-1\end{bmatrix}$ (D) $\begin{bmatrix}1&2n\\0&1\end{bmatrix}$

33. If $A=\begin{pmatrix}2&-1\\-1&2\end{pmatrix}$ and I is the unit matrix of order 2, then A^2 equals

(A) $4A-3I$ (B) $3A-AI$

(C) $A-I$ (D) $A+I$

34. If $P=\begin{pmatrix}i&0&-i\\0&-i&i\\-i&i&0\end{pmatrix}$ and $Q=\begin{pmatrix}-i&i\\0&0\\i&-i\end{pmatrix}$, then PQ is equal to

(A) $\begin{pmatrix}-2&2\\1&-1\\1&-1\end{pmatrix}$ (B) $\begin{pmatrix}2&-2\\-1&1\\-1&1\end{pmatrix}$

(C) $\begin{pmatrix}2&-2\\-1&1\end{pmatrix}$ (D) $\begin{pmatrix}1&0&0\\0&1&0\\0&0&1\end{pmatrix}$

35. Assuming that the sums and products given below are defined, which of the following is not true for matrices

(A) $A+B=B+A$

(B) $AB=AC$ does not imply $B=C$

(C) $AB=O$ implies $A=O$ or $B=O$

(D) $(AB)'=B'A'$

36. If $A=\begin{bmatrix}1 & 2 & -1\\ 3 & 0 & 2\\ 4 & 5 & 0\end{bmatrix}$, $B=\begin{bmatrix}1 & 0 & 0\\ 2 & 1 & 0\\ 0 & 1 & 3\end{bmatrix}$, then AB is

(A) $\begin{bmatrix}5 & 1 & -3\\ 3 & 2 & 6\\ 14 & 5 & 0\end{bmatrix}$ (B) $\begin{bmatrix}11 & 4 & 3\\ 1 & 2 & 3\\ 0 & 3 & 3\end{bmatrix}$

(C) $\begin{bmatrix}1 & 8 & 4\\ 2 & 9 & 6\\ 0 & 2 & 0\end{bmatrix}$ (D) $\begin{bmatrix}0 & 1 & 2\\ 5 & 4 & 3\\ 1 & 8 & 2\end{bmatrix}$

37. If $A=\begin{bmatrix}\alpha & 0\\ 1 & 1\end{bmatrix}$ and $B=\begin{bmatrix}1 & 0\\ 5 & 1\end{bmatrix}$, then value of α for which $A^2=B$, is

(A) 1 (B) –1
(C) 4 (D) No real values

38. If $A\neq O$ and $B\neq O$ are $n\times n$ matrix such that $AB=O$, then

(A) $Det(A)=0$ or $Det(B)=0$

(B) $Det(A)=0$ and $Det(B)=0$

(C) $Det(A)=Det(B)\neq 0$

(D) $A^{-1}=B^{-1}$

39. If A and B are 3×3 matrices such that $AB=A$ and $BA=B$, then

(A) $A^2=A$ and $B^2\neq B$

(B) $A^2\neq A$ and $B^2=B$

(C) $A^2=A$ and $B^2=B$

(D) $A^2\neq A$ and $B^2\neq B$

Transpose of a matrix

40. If $A=\begin{bmatrix}1\\ 2\\ 3\end{bmatrix}$, then $AA'=$

(A) 14 (B) $\begin{bmatrix}1\\ 4\\ 3\end{bmatrix}$

(C) $\begin{bmatrix}1 & 2 & 3\\ 2 & 4 & 6\\ 3 & 6 & 9\end{bmatrix}$ (D) None of these

41. If $A=\begin{bmatrix}1 & -2\\ 5 & 3\end{bmatrix}$, then $A+A^T$ equals

(A) $\begin{bmatrix}2 & 3\\ 3 & 6\end{bmatrix}$ (B) $\begin{bmatrix}2 & -4\\ 10 & 6\end{bmatrix}$

(C) $\begin{bmatrix}2 & 4\\ -10 & 6\end{bmatrix}$ (D) None of these

42. If $A=\begin{pmatrix}1 & -2 & 1\\ 2 & 1 & 3\end{pmatrix}$ and $B=\begin{pmatrix}2 & 1\\ 3 & 2\\ 1 & 1\end{pmatrix}$, then $(AB)^T$ is equal to

(A) $\begin{pmatrix}-3 & -2\\ 10 & 7\end{pmatrix}$ (B) $\begin{pmatrix}-3 & 10\\ -2 & 7\end{pmatrix}$

(C) $\begin{pmatrix}-3 & 7\\ 10 & 2\end{pmatrix}$ (D) None of these

43. If $P=\begin{bmatrix}\frac{\sqrt{3}}{2} & \frac{1}{2}\\ -\frac{1}{2} & \frac{\sqrt{3}}{2}\end{bmatrix}$, $A=\begin{bmatrix}1 & 1\\ 0 & 1\end{bmatrix}$ and $Q=PAP^T$, then $P(Q^{2005})P^T$ equal to

(A) $\begin{bmatrix}1 & 2005\\ 0 & 1\end{bmatrix}$ (B) $\begin{bmatrix}\sqrt{3}/2 & 2005\\ 1 & 0\end{bmatrix}$

(C) $\begin{bmatrix}1 & 2005\\ \sqrt{3}/2 & 1\end{bmatrix}$ (D) $\begin{bmatrix}1 & \sqrt{3}/2\\ 0 & 2005\end{bmatrix}$

Symmetric & Skew- Symmetric matrices

44. The inverse of a symmetric matrix is

(A) Symmetric (B) Skew symmetric
(C) Diagonal matrix (D) None of these

45. If A is a symmetric matrix and $n\in N$, then A^n is

(A) Symmetric (B) Skew symmetric
(C) A Diagonal matrix (D) None of these

46. If A is a skew symmetric matrix and n is a positive integer, then A^n is

(A) A symmetric matrix
(B) Skew-symmetric matrix
(C) Diagonal matrix
(D) None of these

47. If $A=\begin{bmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{bmatrix}$ is symmetric, then $x=$

(A) 3 (B) 5
(C) 2 (D) 4

48. Matrix $\begin{bmatrix} 0 & -4 & 1 \\ 4 & 0 & -5 \\ -1 & 5 & 0 \end{bmatrix}$ is

(A) Orthogonal (B) Idempotent
(C) Skew- symmetric (D) Symmetric

49. For any square matrix A, AA^T is a

(A) Unit matrix
(B) Symmetric matrix
(C) Skew symmetric matrix
(D) Diagonal matrix

50. The matrix $\begin{bmatrix} 0 & 5 & -7 \\ -5 & 0 & 11 \\ 7 & -11 & 0 \end{bmatrix}$ is known as

(A) Upper triangular matrix
(B) Skew symmetric matrix
(C) Symmetric matrix
(D) Diagonal matrix

Adjoint of a matrix

51. The adjoint of $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{bmatrix}$ is

(A) $\begin{bmatrix} 3 & -9 & -5 \\ -4 & 1 & 3 \\ -5 & 4 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 3 & -4 & -5 \\ -9 & 1 & 4 \\ -5 & 3 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} -3 & 4 & 5 \\ 9 & -1 & -4 \\ 5 & -3 & -1 \end{bmatrix}$ (D) None of these

52. If d is the determinant of a square matrix A of order n, then the determinant of its adjoint is

(A) d^n (B) d^{n-1}
(C) d^{n+1} (D) d

53. If A and B are non-singular square matrices of same order, then $adj(AB)$ is equal to

(A) $(adj\,A)(adj\,B)$ (B) $(adj\,B)(adj\,A)$
(C) $(adj\,B^{-1})(adj\,A^{-1})$ (D) $(adj\,A^{-1})(adj\,B^{-1})$

54. If $A=\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$, then $adj\,A$ is equal to

(A) $\begin{bmatrix} -3 & -1 \\ 2 & -1 \end{bmatrix}$ (B) $\begin{bmatrix} 3 & 1 \\ -2 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 3 & -2 \\ 1 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 3 & -1 \\ -2 & 1 \end{bmatrix}$

55. If $A=\begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$, then $A.\,(adj(A))=$

(A) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

(C) $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$ (D) $\begin{bmatrix} -2 & 0 \\ 0 & -2 \end{bmatrix}$

56. If $A=\begin{bmatrix} -2 & 6 \\ -5 & 7 \end{bmatrix}$, then adj (A)

(A) $\begin{bmatrix} 7 & -6 \\ 5 & -2 \end{bmatrix}$ (B) $\begin{bmatrix} 2 & -6 \\ 5 & -7 \end{bmatrix}$

(C) $\begin{bmatrix} 7 & -5 \\ 6 & -2 \end{bmatrix}$ (D) None of these

57. If $A=\begin{bmatrix} 3 & 4 \\ 5 & 7 \end{bmatrix}$, then $A(adj\,A)=$

(A) I (B) $|A|$
(C) $|A|I$ (D) None of these

58. If $X=\begin{bmatrix} -x & -y \\ z & t \end{bmatrix}$ then transpose of $adj\,X$ is

(A) $\begin{bmatrix} t & z \\ -y & -x \end{bmatrix}$ (B) $\begin{bmatrix} t & y \\ -z & -x \end{bmatrix}$

(C) $\begin{bmatrix} t & -z \\ y & -x \end{bmatrix}$ (D) None of these

59. If $A=\begin{bmatrix}1 & -1 & 1\\ 0 & 2 & -3\\ 2 & 1 & 0\end{bmatrix}$ and $B=(adj\ A)$, and $C=5A$, then $\frac{|adjB|}{|C|}=$

(A) 5 (B) 25
(C) –1 (D)1

Inverse of a matrix

60. Matrix $A=\begin{bmatrix}1 & 0 & -k\\ 2 & 1 & 3\\ k & 0 & 1\end{bmatrix}$ is invertible for

(A) $k=1$ (B) $k=-1$
(C) $k=0$ (D) All real k

61. $\begin{bmatrix}-6 & 5\\ -7 & 6\end{bmatrix}^{-1}=$

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

62. If $A=\begin{bmatrix}5 & 2\\ 3 & 1\end{bmatrix}$, then $A^{-1}=$

(A) $\begin{bmatrix}1 & -2\\ -3 & 5\end{bmatrix}$ (B) $\begin{bmatrix}-1 & 2\\ 3 & -5\end{bmatrix}$
(C) $\begin{bmatrix}-1 & -2\\ -3 & -5\end{bmatrix}$ (D) $\begin{bmatrix}1 & 2\\ 3 & 5\end{bmatrix}$

63. The inverse of the matrix $\begin{bmatrix}3 & -2\\ 1 & 4\end{bmatrix}$ is

(A) $\begin{bmatrix}\frac{4}{14} & \frac{2}{14}\\ \frac{-1}{14} & \frac{3}{14}\end{bmatrix}$ (B) $\begin{bmatrix}\frac{3}{14} & \frac{-2}{14}\\ \frac{1}{14} & \frac{4}{14}\end{bmatrix}$
(C) $\begin{bmatrix}\frac{4}{14} & \frac{-2}{14}\\ \frac{1}{14} & \frac{3}{14}\end{bmatrix}$ (D) $\begin{bmatrix}\frac{3}{14} & \frac{2}{14}\\ \frac{1}{14} & \frac{4}{14}\end{bmatrix}$

64. The element in the first row and third column of the inverse of the matrix $\begin{bmatrix}1 & 2 & -3\\ 0 & 1 & 2\\ 0 & 0 & 1\end{bmatrix}$ is

(A) – 2 (B) 0
(C) 1 (D) 7

65. The matrix $\begin{bmatrix}\lambda & -1 & 4\\ -3 & 0 & 1\\ -1 & 1 & 2\end{bmatrix}$ is invertible, if

(A) $\lambda\neq-15$ (B) $\lambda\neq-17$
(C) $\lambda\neq-16$ (D) $\lambda\neq-18$

66. If I_3 is the identity matrix of order 3, then I_3^{-1} is

(A) 0 (B) $3I_3$
(C) I_3 (D) Does not exist

67. Which of the following is true for matrix AB

(A) $(AB)^{-1}=A^{-1}B^{-1}$ (B) $(AB)^{-1}=B^{-1}A^{-1}$
(C) $AB=BA$ (D) All of these

68. The inverse matrix of $\begin{bmatrix}0 & 1 & 2\\ 1 & 2 & 3\\ 3 & 1 & 1\end{bmatrix}$, is

(A) $\begin{bmatrix}\frac{1}{2} & -\frac{1}{2} & \frac{1}{2}\\ -4 & 3 & -1\\ \frac{5}{2} & \frac{-3}{2} & \frac{1}{2}\end{bmatrix}$ (B) $\begin{bmatrix}\frac{1}{2} & -4 & \frac{5}{2}\\ 1 & -6 & 3\\ 1 & 2 & -1\end{bmatrix}$

(C) $\frac{1}{2}\begin{bmatrix}1 & 2 & 3\\ 3 & 2 & 1\\ 4 & 2 & 3\end{bmatrix}$ (D) $\frac{1}{2}\begin{bmatrix}1 & -1 & -1\\ -8 & 6 & -2\\ 5 & -3 & 1\end{bmatrix}$

69. The multiplicative inverse of matrix $\begin{bmatrix}2 & 1\\ 7 & 4\end{bmatrix}$ is

(A) $\begin{bmatrix}4 & -1\\ -7 & -2\end{bmatrix}$ (B) $\begin{bmatrix}-4 & -1\\ 7 & -2\end{bmatrix}$
(C) $\begin{bmatrix}4 & -7\\ 7 & 2\end{bmatrix}$ (D) $\begin{bmatrix}4 & -1\\ -7 & 2\end{bmatrix}$

70. If matrix $A=\begin{bmatrix}3 & 2 & 4\\1 & 2 & -1\\0 & 1 & 1\end{bmatrix}$ and $A^{-1}=\frac{1}{K}adj(A)$, then K is

(A) 7 (B) –7

(C) $\frac{1}{7}$ (D) 11

71. If for the matrix A, $A^3=I$, then $A^{-1}=$

(A) A^2 (B) A^3

(C) A (D) None of these

72. If $A=\begin{bmatrix}0 & 0 & 1\\0 & 1 & 0\\1 & 0 & 0\end{bmatrix}$, then $A^{-1}=$

(A) I (B) $-I$

(C) $-A$ (D) A

73. Inverse of the matrix $\begin{pmatrix}1 & -2\\3 & 4\end{pmatrix}$ is

(A) $\frac{1}{10}\begin{pmatrix}4 & 2\\-3 & 1\end{pmatrix}$ (B) $\frac{1}{10}\begin{pmatrix}1 & -2\\3 & 4\end{pmatrix}$

(C) $\frac{1}{10}\begin{pmatrix}4 & 2\\-3 & 1\end{pmatrix}$ (D) $\begin{pmatrix}4 & 2\\-3 & 1\end{pmatrix}$

74. The inverse of the matrix $\begin{bmatrix}5 & -2\\3 & 1\end{bmatrix}$ is

(A) $\frac{1}{11}\begin{bmatrix}1 & 2\\-3 & 5\end{bmatrix}$ (B) $\begin{bmatrix}1 & 2\\-3 & 5\end{bmatrix}$

(C) $\frac{1}{13}\begin{bmatrix}-2 & 5\\1 & 3\end{bmatrix}$ (D) $\begin{bmatrix}1 & 3\\-2 & 5\end{bmatrix}$

75. $A=\begin{bmatrix}1 & 0 & 0\\0 & 1 & 1\\0 & -2 & 4\end{bmatrix}$; $I=\begin{bmatrix}1 & 0 & 0\\0 & 1 & 0\\0 & 0 & 1\end{bmatrix}$

$A^{-1}=\frac{1}{6}[A^2+cA+dI]$ where $c,d\in R$, then pair of values (c,d)

(A) (6, 11) (B) (6, –11)

(C) (–6, 11) (D) (–6, –11)

Solving a system of equations

76. If $\begin{bmatrix}1 & 1 & 1\\1 & -2 & -2\\1 & 3 & 1\end{bmatrix}\begin{bmatrix}x\\y\\z\end{bmatrix}=\begin{bmatrix}0\\3\\4\end{bmatrix}$, then $\begin{bmatrix}x\\y\\z\end{bmatrix}$ is equal to

(A) $\begin{bmatrix}1\\1\\1\end{bmatrix}$ (B) $\begin{bmatrix}1\\-2\\3\end{bmatrix}$

(C) $\begin{bmatrix}1\\-2\\1\end{bmatrix}$ (D) $\begin{bmatrix}1\\2\\-3\end{bmatrix}$

77. Let a,b,c be positive real numbers. The following system of equations in x, y and z

$\frac{x^2}{a^2}+\frac{y^2}{b^2}-\frac{z^2}{c^2}=1$, $\frac{x^2}{a^2}-\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$, $-\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$ has

(A) No solution

(B) Unique solution

(C) Infinitely many solutions

(D) Finitely many solutions