



MATHS

BOOKS - KC SINHA ENGLISH

MATRICES - FOR COMPETITION

Solved Examples

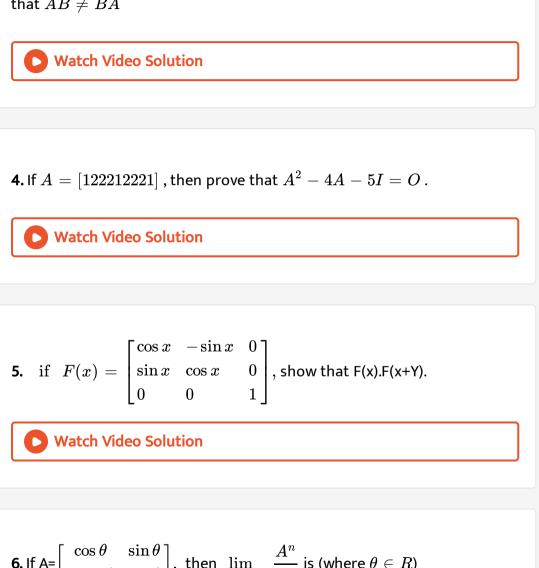
1. Product of more than two Matrices :

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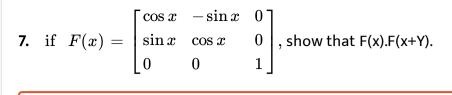
2. Find X if Y = [3, 2, 1, 4] and 2X + Y = [1, 0, -3, 2] .

3. If
$$A = \begin{bmatrix} 1 & -2 & 3 \\ -4 & 2 & 5 \end{bmatrix}$$
 and $B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \\ 2 & 1 \end{bmatrix}$, find AB and BA and show

that $AB \neq BA$



If A=
$$\begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$$
, then $\lim_{n \to \infty} \frac{A^n}{n}$ is (where $\theta \in R$)



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8. If D_1 and D_2 are diagonal matices of order 3×3 then (A) D_1^n is a diagonal matrix (B) $D_1D_2 = D_2D_1$ (C) $D_1^2 + D_2^2$ is diagonal matrix (D) D_1D_2 is a diagonal matrix

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9. For a matrix A of order 3×3 where $A = \begin{bmatrix} 1 & 4 & 5 \\ k & 8 & 8k - 6 \\ 1 + k^2 & 8k + 4 & 2k + 21 \end{bmatrix}$

(A) rank of A = 2f or k = -1(B)rankofA=1 for k=-1(C)rankofA=2 for

k=2(D)rankofA = 1f or k = 2

Exercise

1. Given
$$A = \begin{bmatrix} 1 & 2 & -3 \\ 5 & 0 & \\ 1 & -1 & 1 \end{bmatrix}$$
 and $B = [[3, -1, 2], [4, 25], [2, 0, 3]],$

find the matrix C such that A+C=B.

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2. If
$$P(x) = [(\cos x, \sin x), (-\sin x, \cos x):]]$$
, then show that

$$P(x). P(y) = P(x + y) = P(y). P(x).$$

3. Find the product of the following two matrices
$$\begin{bmatrix} 0 & c & -b \\ c & 0 & a \\ b & -a & 0 \end{bmatrix} \text{ and } \begin{bmatrix} a^2 & ab & ac \\ ab & b^2 & bc \\ ac & bc & c^2 \end{bmatrix}.$$
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4. Let $A = \left[0 - \tan(lpha/2) \tan(lpha/2) 0\right]$ and I be the identity matrix of

order 2. Show that $I + A = (I - A)[\cos \alpha - \sin \alpha \sin \alpha \cos \alpha]$.

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5. if
$$A = \begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}$$
, then prove that $a^n = \begin{bmatrix} 1+2n & -4n \\ n & 1-2n \end{bmatrix}$,

where n is any posttive interger.

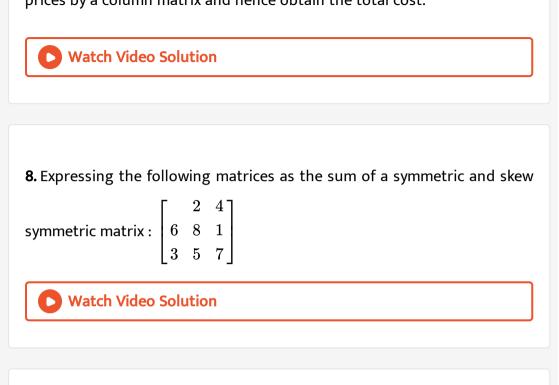
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6. Let A=[0100] show that $(aI+bA)^n=a^nI+na^{n-1}bA$, where I is the identitymatrix of order 2 and $n\in N.$

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7. A man buys 8 dozens of masngeos, 10 dozensof apples and 4 diozens of bannas. Mngoes cost Rs. 18 per dozen, apples Rs. 9 per dozen and banans

Rs 6 per dozen. Represent the quantities bought by a row matrix and the prices by a column matrix and hence obtain the total cost.



9. Solve the following system of linear equations by matrix method:

3x - 2y = 7, 5x + 3y = 1

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10. Use matrix method to solve the following system of equations:

$$5x - 7y = 2, \ 7x - 5y = 3$$

11. Solve the following system of linear equations by matrix method:

2x + 3y + 3z = 1, 2x + 2y + 3z = 2, x - 2y + 2z = 3

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12. Solve the following system of linear equations by matrix method:

$$x + y + z = 3, 2x - y + z = 2, x - 2y + 3z = 2$$

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13. If A is an invertible symmetric matrix the A^{-1} is

- A. a diagonal matrix
- B. symmetric
- C. skew symmetric
- D. none of these

14. If A is a skew-symmetric matrix and n is odd positive integer, then A^n is a skew-symmetric matrix a symmetric matrix a diagonal matrix none of these



15. Which of the following is no true?

- (A) (A')' = A
- (B) (A I)(A + I) = 0 such that $A^2 = I$

(C) $(AB)^n = A^n B^n where n \in N$ and AB = BA

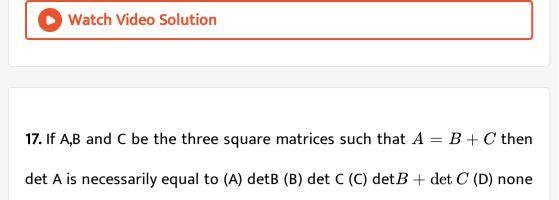
(D) $(A + B)(A - B) = A^2 - B^2$, A and B being square matrices of

the same type

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16. A square matrix A is invertible if det(A) is equal to (A) -1 (B) 0 (C) 1 (D)

none of these



of these

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18. A square matix A is called idempotent if (A) $A^2=0$ (B) $A^2=I$ (C)

$$A^2=A$$
 (D) $2A=I$

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19. The value of det $\begin{vmatrix} a & 0 & 0 & 0 \\ 2 & b & 0 & 0 \\ 4 & 6 & c & 0 \\ 6 & 8 & 10 & d \end{vmatrix}$ is(A)0(B)a+b+c+d(C)abcd`(D) none

of these

20. If A and B are any two square matrices of the same order then (A) $(AB)^T = A^T B^T$ (B) $(AB)^T = B^T A^T$ (C) Adj(AB) = adj(A)adj(B)(D) $AB = 0 \rightarrow A = 0$ or B = 0

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21. A square matix A is a called singular if det A is (A) negative (B) zero (C)

positive (D) non-zero

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22. Let A by any m imes n matrix then A^2 can be found only when (A) m < n

(B) m=n (C) m>n (D) none of these

23. The matrix of the transformation reflection in the line x + y = 0 is (A)

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

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24. Rank of a non zero matrix is always (A) 0 (B) 1 (C) $\, > 1$ (D) $\, > 0$

25. The values of x for which the matrix
$$\begin{bmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{bmatrix}$$
 is non-
singular are (A) $R - \{0\}$ (B) $R - \{-(a+b+c)\}$ (C) $R - \{0, -(a+b+c)\}$ (D) none of these
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26. If
$$A = \begin{bmatrix} 1 & 1 & 2 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{bmatrix}$$
 then A is (A) nilpotent (B) idempotent (C)

symmetric (D) none of these

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27. If
$$A = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix}$$
 then (A) $A^2 = I$ (B) $A^2 = 0$ (C) $A^3 = 0$ (D)

none of these

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28. If A and B are square matrices of order 3 then (A) $AB = 0 \rightarrow |A| = 0$ or |B| = 0 (B) $AB = 0 \rightarrow |A| = 0$ and |B| = 0(C) Adj(AB) = AdjAAdjB (D) $(A + B)^{-1} = A^{-1} + B^{-1}$

29. If A a non singular matrix an A^T denotes the transpose of A then (A) $|AA^T| \neq |A^2|$ (B) $|A^TA| \neq |A^T|^2$ (C) $|A| + |A^T| \neq 0$ (D) $|A| \neq |A^T|$

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30. If A and B are square matrices of the same order then $(A+B)^2 = A^2 + 2AB + B^2$ implies

A. (A) AB=0

B. (B) AB + BA = 0

C. (C) AB = BA

D. (D) none of these

Answer: null

31. If
$$A = \begin{bmatrix} 0 & 2 & -3 \\ -2 & 0 & -1 \\ 3 & 1 & 0 \end{bmatrix}$$
 then A is (A) diagonal matrix (B) symmetric

matix (C) skew symmetric matrix (D) none of these

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32. If
$$A = \begin{bmatrix} 2 & -4 \\ 1 & -1 \end{bmatrix}$$
 the value of A^n is (A) $\begin{bmatrix} 3^n & (-4)^n \\ 1 & (-1)^n \end{bmatrix}$ (B) $\begin{bmatrix} 3n & -4n \\ n & n \end{bmatrix}$ (C) $\begin{bmatrix} 2+n & 5-n \\ n & -n \end{bmatrix}$ (D) none of these

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33. For a non singular matrix A of order n the rank of A is (A) less than n

(B) equal to n (C) greater than n (D) none of these



34. Inverse of diagonal matrix is (A) a diagonal matrix (B) symmetric (C)

skew symmetric (D) none of these



35. IF
$$A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$$
 then for all natural numbers $n A^n$ is equal to (A)
 $\begin{bmatrix} 1 & 0 \\ 1 & n \end{bmatrix}$ (B) $\begin{bmatrix} n & 0 \\ 1 & 1 \end{bmatrix}$ (C) $\begin{bmatrix} 1 & 0 \\ n & 1 \end{bmatrix}$ (D) none of these

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36. Prove that the product of matrices $\left[\cos^2\theta\cos\theta\sin\theta\sin\theta\sin^2\theta\right]$

and $\left[\cos^2\varphi\cos\varphi\sin\varphi\cos\varphi\sin\varphi\sin\varphi\sin^2\varphi\right]$ is the null matrix, when θ and φ differ by an odd multiple of $\frac{\pi}{2}$.

37. For an invertible square matrix of order 3 with real entries $A^{-1} = A^2$

then det A= (A) 1/3 (B) 3 (C) 0 (D) 1



38. if
$$\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix} A \begin{bmatrix} -3 & 2 \\ 5 & -3 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$
, then $A = ?$

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39. The roots of the equation det
$$\begin{bmatrix} 1 - x & 2 & 3 \\ 0 & 2 - x & 0 \\ 0 & 2 & 3 - x \end{bmatrix} = 0$$
 are (A) 1

and 2 (B) 1 and 3 (C) 2 and 3 (D) 1,2, and 3

40. If
$$A = \begin{bmatrix} 1 & 2 & 0 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$$
 then $\det(Adj(AdjA)) =$ (A) 13 (B) 13^2 (C)

 13^4 (D) none of these

41. The transformation due of reflection of (x, y) through the origin is described by the matrix (A) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (C) $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ (D) $\begin{bmatrix} 0 & -1 \\ -1 & 0 \end{bmatrix}$

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42. If $A = [a_{ij}]_{m \times n}$ and $B = [b_{ij}]_{n \times p}$ then (AB)' is equal to (A) BA'(B) B'A (C) A'B' (D) B'A'

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43. If A is a skew-symmetric matrix and n is odd positive integer, then A^n is a skew-symmetric matrix a symmetric matrix a diagonal matrix none of

these

44. If A is a skew-symmetric matrix and n is odd positive integer, then A^n is a skew-symmetric matrix a symmetric matrix a diagonal matrix none of these

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45. if A and B are two symmetric matrices of the same order , prove that

(AB+BA)is also a symmetric matrix.

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46. I
$$A = [x, y, z], B = \begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}$$
 and $C = [x, y, z]^T$, then ABC is

(A) not defined (B) a 1 imes 1 matrix (C) a 3 imes 3 matrix (D) none of these

47. If for a square matrix $A, A^2 = Athen|A|$ is equal to (A) -3 or 3 (B)

 $-\,2\,\,\,{
m or}\,\,\,2$ (C) $0\,\,\,{
m or}\,\,\,1$ (D) none of these



48. For a matrix A of rank r (A) rank (A') < r (B) rank (A') = r. (C) rank

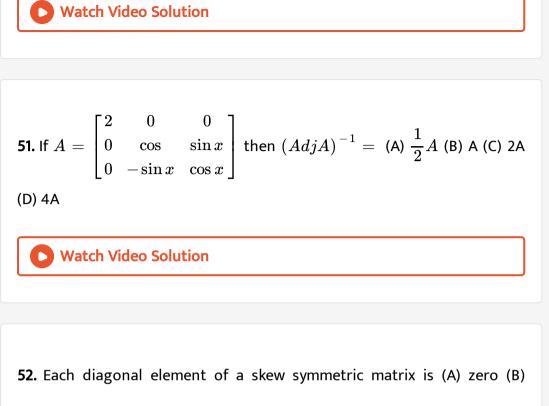
 $(A^{\,\prime})>r$ (D) none of these

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49. If A=
$$\begin{bmatrix} 1 & 3 & 9 & 27 \\ 3 & 9 & 27 & 1 \\ 9 & 27 & 1 & 3 \\ 27 & 1 & 3 & 9 \end{bmatrix}$$
 then det A= (A) 0 (B) - (80³) (C) (80³)27 (D)

 81^3

50. If
$$A = egin{bmatrix} ab & b^2 \ -a^2 & -ab \end{bmatrix}$$
 , show that $A^2 = O$.



negative (C) positive (D) non real

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53. If A is a non singular square matrix then |adj. A| is equal to (A) |A| (B)

$$\left|A
ight|^{n-2}$$
 (C) $\left|A
ight|^{n-1}$ (D) $\left|A
ight|^{n}$

54. If
$$\begin{bmatrix} 1 & -\tan\theta \\ \tan\theta & 1 \end{bmatrix} \begin{bmatrix} 1 & \tan\theta \\ -\tan\theta & 1 \end{bmatrix}^{-1} = \begin{bmatrix} a & -b \\ b & a \end{bmatrix}$$
, then $a = 1, \ b = 0$ (b) $a = \cos 2\theta, \ b = \sin 2\theta$ (c) $a = \sin 2\theta, \ b = \cos 2\theta$ (d)

none of these

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55. If
$$A = \begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$$
 and $A. (adjA) = k \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then the value of k is



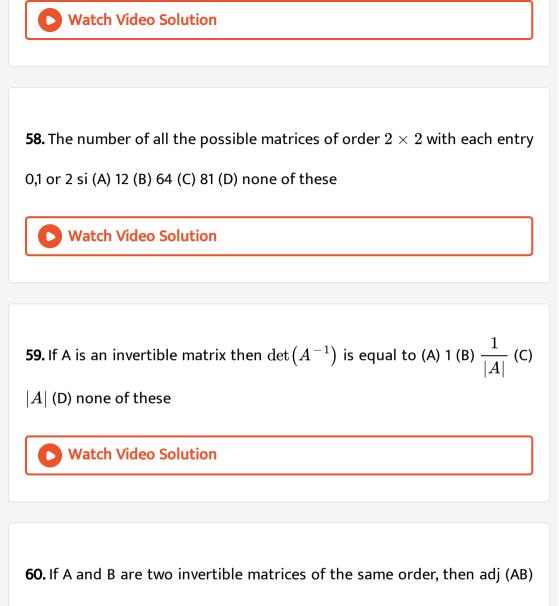
56. If I_n is the identity matrix of order n then $\left(I_n\right)^{-1}$ (A) does not exist (B)

$$I=0$$
 (C) $I=I_n$ (D) $I=nI_n$

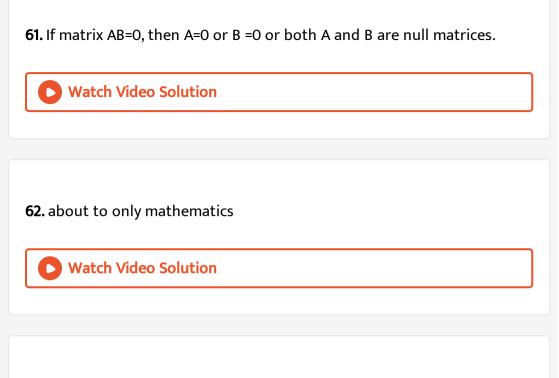
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57. The number of all possible matrices of order 3 imes 3 with each entry 0 or

1 is:(a) 27 (b) 18 (c) 81 (d) 512



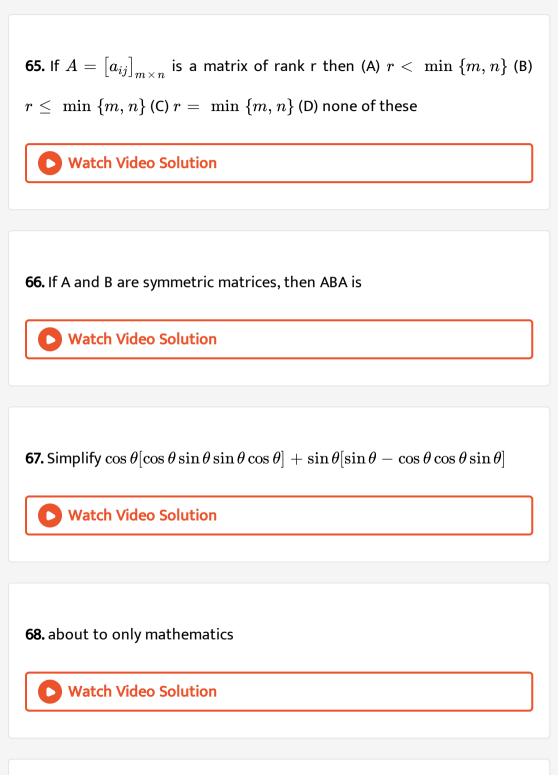
is equal to



63. If A is a square matrix which of the following is not as symmetric matrix? (A) A - A' (B) A + A' (C) AA' (D) A + B

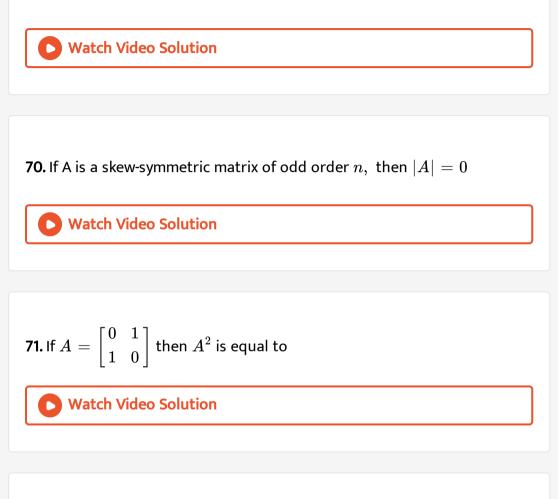
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64. If A is an invertible matrix, then which of the following is not true $(A^2) - 1 = (A^{-1})^2$ (b) $|A^{-1}| = |A|^{-1}$ (c) $(A^T)^{-1} = (A^{-1})^T$ (d) $|A| \neq 0$

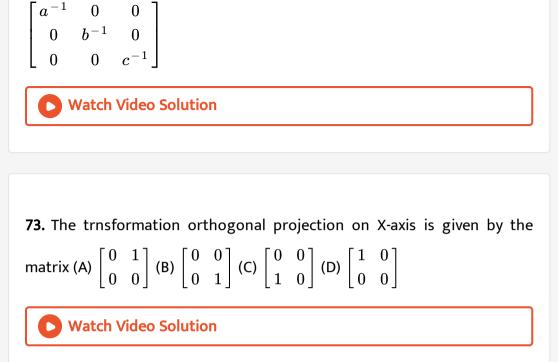


69. If A is any mxn matrix and B is a matrix such that AB and BA are both

defined, then B is a matrix of order



72. If
$$A = \begin{bmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$$
 and a,b,c are non zero real numbers, then A^{-1} is
(A) $\frac{1}{abc} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ (B) $\frac{1}{abc} \begin{bmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & c & 0 \end{bmatrix}$ (C) $\frac{1}{abc} \begin{bmatrix} a^{-1} & 0 & 0 \\ 0 & b^{-1} & 0 \\ 0 & c^{-1} & 1 \end{bmatrix}$ (D)



74. If
$$A = \begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$$
 and $n \varepsilon N$ then A^n is equal to (A) $2^{n-1}A$ (B) $2^n A$ (C)

nA (D) none of these

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75. If
$$A = \begin{bmatrix} 1 & 0 \\ \frac{1}{2} & 1 \end{bmatrix}$$
 then A^{50} is (A) $\begin{bmatrix} 1 & 25 \\ 0 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 0 \\ 25 & 1 \end{bmatrix}$ (C) $\begin{bmatrix} 1 & 0 \\ 0 & 50 \end{bmatrix}$
(D) $\begin{bmatrix} 1 & 0 \\ 50 & 1 \end{bmatrix}$

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76. If $\begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ is to be square root of two-rowed unit matrix, then α, β and γ should satisfy the relation. a. $1 - \alpha^2 + \beta\gamma = 0$ b. $\alpha^2 + \beta\gamma = 0$ c. $1 + \alpha^2 + \beta\gamma = 0$ d. $1 - \alpha^2 - \beta\gamma = 0$

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77. if the following system of equations is consistent

$$(a+1)^3x + (a+2)^3y = (a+3)^3$$

 $(a+1)x + (a+2)y = a+3$
 $x+y = 1$

then find the value of a.

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78. Let $A=ig[a_{ij}ig]_{n imes n}$ be a square matrix and let c_{ij} be cofactor of a_{ij} in A. If C= $ig[C_{ij}ig]$, then 79. Let $F(\alpha) = [\cos \alpha - \sin \alpha 0 \sin \alpha \cos \alpha 0001]$ and $G(\beta) = [\cos \beta 0 \sin \beta 010 - \sin \beta 0 \cos \beta]$. Show that $[F(\alpha)]^{-1} = F(-\alpha)$ (ii) $[G(\beta)]^{-1} = G(-\beta)$ (iii) $[F(\alpha)G(\beta)]^{-1} = G(-\beta)F(-\alpha)$.

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80. If A is a square matrix of order n imes n and λ is a scalar then $|\lambda A|$ is (A) $\lambda|A|$ (B) $\lambda^n|A|$ (C) $|\lambda||A|$ (D) none of these

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81. If
$$A = \begin{bmatrix} \cos^2 \alpha & \cos \alpha \sin \alpha \\ \cos \alpha \sin \alpha & \sin^2 \alpha \end{bmatrix}$$
 and $B = \begin{bmatrix} \cos^2 \beta & \cos \beta \sin \beta \\ \cos \beta \sin \beta & \sin^2 \beta \end{bmatrix}$

are two matrices such that AB is the null matrix, then



82. If A and B are two matrices such that AB=A, BA=B, then A^{25} is equal to

(A)
$$A^{-1}$$
 (B) A (C) $B^{-1}(D)$ B
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83.
$$IfA = egin{bmatrix} \cos heta & \sin heta \ -\sin heta & \cos heta \end{bmatrix}, then \lim_{x_{>}\infty} \; rac{1}{n} A^n$$
 is

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84. If
$$A = \begin{bmatrix} a & b & c \\ x & y & z \\ p & q & r \end{bmatrix}$$
, $B = \begin{bmatrix} q & -b & y \\ -p & a & -x \\ r & -c & z \end{bmatrix}$ and if A is invertible,

then which of the following is not true? (a) |A| = |B| (b) |A| = -|B|

(c) $\left|adjA
ight|=\left|adjB
ight|$ (d) A is invertible if and only if B is invertible

85. The number of different mastrices which can be formed using 12 different real numbers is (A) 6(12)! (B) 3(12)! (C) 2(10)! (D) 4(10)!



86. Which of the following is a non singular matrix? (A) $\begin{bmatrix} 1 & a & b + c \\ 1 & b & c + a \\ 1 & c & a + b \end{bmatrix}$ (B) $\begin{bmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{bmatrix}$ where omega is non real and $\omega^3 = 1$ (C) $\begin{bmatrix} 1^2 & 2^2 & 3^2 \\ 2^2 & 3^2 & 4^2 \\ 3^2 & 4^2 & 5^2 \end{bmatrix}$ (D) $\begin{bmatrix} 0 & 2 & -3 \\ -2 & 0 & 5 \\ 3 & -5 & 0 \end{bmatrix}$ Watch Video Solution

87. If A and B are two n imes n matrices such that |A| = |B| then (A) A' = A (B) A = B (C) A' = B' (D) none of these



88. If $A = \left[a_{ij}
ight]$ is a square matrix of order 3 and A_{ij} denote cofactor of

the element a_{ij} in |A| then the value of |A| is given by



89. If for matrix $A, A^2 + l = 0$, where I is the identity matrix, then A equals

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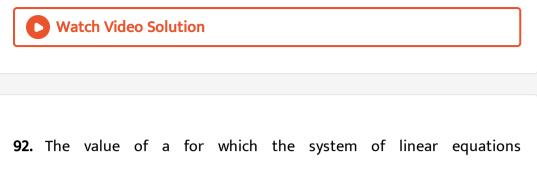
90. The system of linear equations ax + by = 0, cx + dy = 0 has a non trivial solution if (A) ad + bc = 0 (B) ad - bc = 0 (C) ad - bc, 0 (D) ad - bc.0



91. The equation 2x + y + z = 0, x + y + z = 1, 4x + 3y + 3z = 2

have (A) no solution (B) only one solution (C) infinitely many solutions (D)

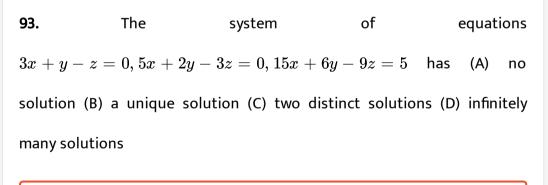
none of these



ax+y+z=0, ay+z=0, x+y+z=0 possesses non-trivial

solution is





94. If
$$A = egin{bmatrix} 1 & 2 \ 2 & 1 \end{bmatrix}$$
 then adj A=

95. If I=[1001] , J=[01-10] and $B=[\cos heta \sin heta - \sin heta \cos heta]$, then

B equals $I\cos\theta + J\sin\theta$ (b) $I\sin\theta + J\cos\theta$ (c) $I\cos\theta - J\sin\theta$ (d)

 $I\cos heta+J\sin heta$

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96. If A = [(1, 0, 0), (0, 1, 0), (1, b, 0] then A^2 is equal is (A) unit matrix

(B) null matrix (C) A (D) -A

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97. A, B are two matrices such that AB and A + B are both defined; show that A, B are square matrices of the same order.



98. If A and B are symmetric matrices of order $n(A \neq B)$ then (A) A+B is skew symmetric (B) A+B is symmetric (C) A+B is a diagonal matrix (D) A+B is a zero matrix

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99. If
$$A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$$
, $B = \begin{bmatrix} -5 & 4 & 0 \\ 0 & 2 & -1 \\ 1 & -3 & 2 \end{bmatrix}$ then (A) $AB = \begin{bmatrix} -2 \\ -1 \\ 4 \end{bmatrix}$ (B)
 $AB = \begin{bmatrix} -2 \\ -1 \\ 4 \end{bmatrix}$ (C) $AB = \begin{bmatrix} 4, -1, 2 \end{bmatrix}$ (D) $AB = \begin{bmatrix} -5 & 4 & 0 \\ 0 & 4 & -2 \\ 3 & -9 & 6 \end{bmatrix}$

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100. If A and B are square matrices of order 2, then det(A + B) = 0 is possible only when det(A) = 0 or det(B) = 0 (b) det(A) + det(B) = 0(c) det(A) = 0 and det(B) = 0 (d) A + B = O

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101. From the matrix equation AB=AC, we conclude B=C provided.
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102. If each element of a 3×3 matrix A is multiplied by 3 then the determinant of the newly formed matrix is (A) $3 \det A$ (B) $9 \det A$ (C) $(\det A)^3$ (D) $27 \det A$

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103. If A and B are two nonzero square matrices of the same order such

that the product AB = O, then



104. about to only mathematics

105.Thesystemoflinearequationsx + y + z = 2, 2x + y - z = 3, 3x + 2y + kz = 4hasauniquesolution if (A) $k \neq 0$ (B) -1 < k < 1 (C) -2 < k < 2 (D) k = 0

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106. If
$$A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$
 then A^A4= (A) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 1 \\ 0 & 10 \end{bmatrix}$ (C) $\begin{bmatrix} 0 & 0 \\ 1 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

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107. The order of
$$[x, y, z]$$
, $\begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}$, $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$ is (A) $3x1$ (B) 1×1 (C)

1 imes 3 (D) 3 imes 3

108.
$$\begin{bmatrix} 1 & 3 \\ 3 & 10 \end{bmatrix}^{-1} =$$
 (A) $\begin{bmatrix} 10 & 3 \\ 3 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 10 & -3 \\ -3 & 1 \end{bmatrix}$ (C) $\begin{bmatrix} 1 & 3 \\ 3 & 10 \end{bmatrix}$ (D) $\begin{bmatrix} -1 & -3 \\ -3 & -10 \end{bmatrix}$

109. If
$$A + B = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$$
 and $A - 2B = \begin{bmatrix} -1 & 1 \\ 0 & -1 \end{bmatrix}$, then A is equal to

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110. 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) $\begin{bmatrix} 8 & 5 \\ -5 & 3 \end{bmatrix}$

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111. The inverse of the matrix $\begin{bmatrix} 2 & 3 \\ -4 & 7 \end{bmatrix}$ is (A) $\begin{bmatrix} -2 & -3 \\ 4 & -7 \end{bmatrix}$ (B) $\frac{1}{26} \begin{bmatrix} 7 & -3 \\ 4 & 2 \end{bmatrix}$ (C) $\begin{bmatrix} 7 & 4 \\ -3 & 2 \end{bmatrix}$ (D) $\begin{bmatrix} 7 & -3 \\ 4 & 2 \end{bmatrix}$ 112. the order of the single matrix obtained from $\begin{bmatrix}
1 & -1 \\
0 & 2 \\
2 & 3
\end{bmatrix}
\left\{
\begin{bmatrix}
-1 & 0 & 2 \\
2 & 0 & 1
\end{bmatrix}
\begin{bmatrix}
0 & 1 & 23 \\
1 & 0 & 21
\end{bmatrix}
\right\}$ is $(A) 2 \times 3 (B) 2 \times 2 (C) 3 \times 2 (D) 3 \times 3$

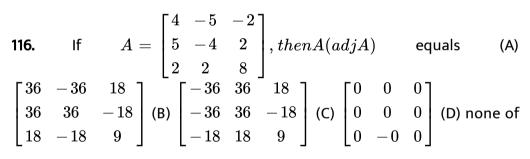
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113. The inverse of the matrix
$$\begin{bmatrix} 1 & 0 & 0 \\ a & 1 & 0 \\ b & c & 1 \end{bmatrix}$$
 is (A)
$$\begin{bmatrix} 1 & 0 & 0 \\ -a & 1 & 0 \\ b & c & 1 \end{bmatrix}$$
 (B)
$$\begin{bmatrix} 1 & 0 & 0 \\ -a & 1 & 0 \\ ac & b & 1 \end{bmatrix}$$
 (C)
$$\begin{bmatrix} 1 & -a & ac - b \\ -0 & 1 & -c \\ 0 & 0 & 1 \end{bmatrix}$$
 (D)
$$\begin{bmatrix} 1 & 0 & 0 \\ -a & 1 & 0 \\ ac - b & -c & 1 \end{bmatrix}$$
 (B) **Watch Video Solution**

114. If the matrix A is both symmetric and skew symmetric, then (A) A is a diagonal matrix (B) A is a zero matrix (C) A is a square matrix (D) None of these

115. If A is a non singular matrix of order 3 then |adj(adjA)| equals (A) $|A|^4$ (B) $|A|^6$ (C) $|A|^3$ (D) none of these





these

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117. If
$$A = \begin{bmatrix} 1 & 2 \\ 4 & 1 \end{bmatrix}$$
, then $A^{-1} = (A) \begin{bmatrix} -1 & -2 \\ 4 & 1 \end{bmatrix}$ (B) $-\frac{1}{7} \begin{bmatrix} 1 & 2 \\ -4 & -1 \end{bmatrix}$
(C) $\frac{1}{7} \begin{bmatrix} -1 & -2 \\ 4 & 1 \end{bmatrix}$ (D) $\frac{1}{9} \begin{bmatrix} 1 & 2 \\ 4 & 1 \end{bmatrix}$

118. Value of
$$\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix}$$
 is (A) $(a-b)(b-c)(c-a)$ (B)
 $(a^2-b^2)(b^2-c^2)(c^2-a^2)$ (C) $(a-b+c)(b-c+a)(c+a-b)$ (D)

none of these

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119.
$$\begin{bmatrix} 7 & 1 & 2 \\ 9 & 2 & 1 \end{bmatrix} \begin{bmatrix} 3 \\ 4 \\ 5 \end{bmatrix} + 2 \begin{bmatrix} 4 \\ 2 \end{bmatrix}$$
 is equal to

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120. Multiplicative inverse of the matrix
$$\begin{bmatrix} 2 & 1 \\ 7 & 4 \end{bmatrix}$$
 is

121. If
$$f(x) = x^2 + 4x - 5$$
 and $A = \begin{bmatrix} 1 & 2 \\ 4 & -3 \end{bmatrix}$, then f(A) is equal to

122. The inverse of the matrix
$$\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$$
 is (A)
$$\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$$
 (B)
$$\begin{bmatrix} 0 & 0 & -1 \\ 0 & -1 & 0 \\ -1 & 0 & 0 \end{bmatrix}$$
 (C)
$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$
 (D)
$$\begin{bmatrix} \frac{1}{2} & 0 & 0 \\ 0 & \frac{1}{2} & 0 \\ 0 & 0 & \frac{1}{2} \end{bmatrix}$$

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$$\begin{bmatrix} 0 & 1 & 2 \end{bmatrix}$$

$$\begin{bmatrix} 1/2 & -1/2 & 1/2 \end{bmatrix}$$

123. If
$$A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & a & 1 \end{bmatrix}$$
 and $A^{-1} \begin{bmatrix} 1/2 & 1/2 & 1/2 \\ -4 & 3 & b \\ 5/2 & -3/2 & 1/2 \end{bmatrix}$ then

124. If
$$A = \begin{bmatrix} 0 & -1 & 2 \\ 1 & 0 & 3 \\ -2 & -3 & 0 \end{bmatrix}$$
, $then A + 2A^t$ equals (A) A (B) $-A^t$ (C) A^t (D)

 $2A^2$

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125. The adjoint of the matrix
$$\begin{bmatrix} 2 & 5 \\ 3 & 1 \end{bmatrix}$$
 is (A) $\begin{bmatrix} 2 & 5 \\ 3 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & -5 \\ -3 & 2 \end{bmatrix}$ (C) $\begin{bmatrix} 1 & -3 \\ -5 & 2 \end{bmatrix}$ (D) $\begin{bmatrix} -1 & 3 \\ 5 & -2 \end{bmatrix}$

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126. If A is a square matrix, then A - A' is a

A. diagonal matrix

B. skew symmetric matrix

C. symmetric matrix

D. none of these

Answer: A



127. If
$$A=egin{bmatrix}2&3\\5&-2\end{bmatrix}$$
 then $19A^{-1}$ is equal to (A) A ' (B) 2A (C) $rac{1}{2}A$ (D) A

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128. The matrix X in the equation
$$AX = B$$
, such that $A = \begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix}$ is given by (A) $\begin{bmatrix} 1 & 0 \\ -3 & 1 \end{bmatrix}$ (B) $[(1, -4), 0, 1)]$ (C) $\begin{bmatrix} 1 & -3 \\ 0 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 0 & -1 \\ -3 & 1 \end{bmatrix}$

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129. If $\begin{bmatrix} 1 & a & 2 \\ 1 & 2 & 5 \\ 2 & 1 & 1 \end{bmatrix}$ is non invertible then a= (A) 2 (B) 1 (C) 0 (D) -1

130. Using properties of determinant, if $\begin{vmatrix} -a^2 & ab & ac \\ ab & -b^2 & bc \\ ac & bc & -c^2 \end{vmatrix} = \mu a^2 b^2 c^2$,

find μ

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131. If
$$A = \begin{bmatrix} 1 & \tan\left(\frac{\theta}{2}\right) \\ -\tan\left(\frac{\theta}{2}\right) & 1 \end{bmatrix}$$
 and $AB = I$, $thenB =$ (A)
 $\left\{\cos^{2}\left(\frac{\theta}{2}\right)\right\}A$ (B) $\left\{\cos^{2}\left(\frac{\theta}{2}\right)\right\}A$ ' (C) $\left\{\cos^{2}\left(\frac{\theta}{2}\right)\right\}I$ (D) none of these

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132. I
$$A = \begin{bmatrix} 0 & 5 \\ 0 & 0 \end{bmatrix}$$
 and $f(x) = 1 + x + x^2 + \ldots + x^{16}$, then $f(A) = (A) 0 (B) \begin{bmatrix} 1 & 5 \\ 0 & 1 \end{bmatrix} (C) \begin{bmatrix} 1 & 5 \\ 0 & 0 \end{bmatrix} (D) \begin{bmatrix} 0 & 5 \\ 1 & 1 \end{bmatrix}$

133. If A is a non singular square matrix 3 then $\left|adj(A^3)\right|$ equals (A) $|A|^8$ (B) $|A|^6$ (C) $|A|^9$ (D) $|A|^{12}$



134. If A is a square matrix of order n imes n and k is a scalar, then adj(kA)

is equal to (1) kadjA (2) k^nadjA (3) $k^{n-1}adjA$ (4) $k^{n+1}adjA$

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135. If
$$A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$$
 , then the trace of the matrix $Adj(AdjA)$ is

136. If
$$A = \begin{bmatrix} 1 & 0 \\ 2 & 0 \end{bmatrix}$$
 and $B = \begin{bmatrix} 0 & 0 \\ 1 & 12 \end{bmatrix}$ then= (A) $AB = 0, BA = 0$ (B)
 $AB = 0, BA \neq 0$ (C) $AB \neq 0, BA = 0$ (D) $AB \neq 0, BA \neq 0$

137. The value of a for which system of equations , $a^3x + (a+1)^3y + (a+2)^3z = 0$, ax + (a+1)y + (a+2)z = 0, x + y + bas a non-zero solution is:

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138. 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

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139. If matrix AB=0, then A=0 or B =0 or both A and B are null matrices.

140. The matrix [05 - 7 - 50117 - 110] is (a) a skew-symmetric matrix (b)

a symmetric matrix (c) a diagonal matrix (d) an upper triangular matrix



141.
$$A = ig[a_{ij}ig]_{m imes n}$$
 is a square matrix , if :

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142. If
$$A = \begin{bmatrix} 2 & 2 \\ -3 & 2 \end{bmatrix}$$
 and $B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ then $(B^{-1}A^{-1})^{-1} =$
(A) $\begin{bmatrix} 2 & -2 \\ 2 & 3 \end{bmatrix}$ (B) $\begin{bmatrix} 3 & -2 \\ 2 & 3 \end{bmatrix}$ (C) $\frac{1}{10} \begin{bmatrix} 2 & 2 \\ -2 & 3 \end{bmatrix}$ (D) $\frac{1}{10} \begin{bmatrix} 3 & -2 \\ -2 & 2 \end{bmatrix}$

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143. If A = [023 - 4] and kA = [03a2b24], then the values of k, a, b, are respectively (a) -6, -12, -18 (b) -6, 4, 9 (c) -6, -4, -9 (d) -6, 12, 18

144. 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) $\begin{bmatrix} 1 & n \\ 0 & 1 \end{bmatrix}$

145. For the matrix
$$A = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 2 & 1 \\ 2 & 1 & 0 \end{bmatrix}$$
 which of the following is correct?
(A) $A^3 + 3A^2 - I = 0$ (B) $A^3 - 3A^2 - I = 0$ (C) $A^3 + 2A^2 - I = 0$ (D) $A^3 - A^2 + I = 0$

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146. If $A^2 - A + I = 0$, then the inverse of A is

147. If
$$\begin{bmatrix} 2+x & 3 & 4\\ 1 & -1 & 2\\ x & 1 & -5 \end{bmatrix}$$
 is a singular matrix then x is
(A) $\frac{13}{25}$ (B) $-\frac{25}{13}$ (C) $\frac{5}{13}$ (D) $\frac{25}{13}$

148. If
$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ a & b & -1 \end{bmatrix}$$
 then A^2 is equal to

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149. If
$$A = \begin{bmatrix} 1 & 2 \\ 3 & -5 \end{bmatrix}$$
 then A^{-1} is
A. $\begin{bmatrix} -5 & -2 \\ -3 & 1 \end{bmatrix}$
B. $\begin{bmatrix} \frac{5}{11} & \frac{2}{11} \\ \frac{3}{11} & -\frac{1}{11} \end{bmatrix}$
C. $\begin{bmatrix} -\frac{5}{11} & -\frac{2}{11} \\ -\frac{3}{11} & -\frac{1}{11} \end{bmatrix}$
D. $\begin{bmatrix} 5 & 2 \\ 3 & -1 \end{bmatrix}$

150. If A and B are two square matrices of the same order then $(A - B)^2$ is (A) $A^2 - AB - BA + B^2$ (B) $A^2 - 2AB + B^2$ (C) $A^2 - 2BA + B^2$ (D) $A^2 - B^2$

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151. If $A = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$ and I is the identity matrix of order 2, then show that $A^2 = 4A - 3I$ Hence find A^{-1} .

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152. If
$$P = \begin{bmatrix} i & 0 & -i \\ 0 & -i & i \\ -i & i & 0 \end{bmatrix}$$
 and $Q = \begin{bmatrix} -i & i \\ 0 & 0 \\ i & -i \end{bmatrix}$ then PQ is equal to
(A) $\begin{bmatrix} -2 & 2 \\ 1 & -1 \\ 1 & -1 \end{bmatrix}$ (B) $\begin{bmatrix} 2 & -2 \\ -1 & 1 \\ -1 & 1 \end{bmatrix}$ (C) $\begin{bmatrix} 2 & 2 \\ -1 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

153. Let R be a square matrix of order greater than 1 such that R is upper triangular matrix .Further suppose that none of the diagonal elements of the square matrix R vanishes. Then (A) R must be non singular (B) R^{-1} does not exist (C) R^{-1} is an upper triangular matrix (D) R^{-1} is a lower triangular matrix

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

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155. Let
$$A = egin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$$
 , then

156. Which of the following is a triangular matrix? (A) a scalar matrix (B) a lower triangular matrix (C) an upper triangular matrix (D) a diagonal matrix

157. If A and B are square matrices of the same order such that AB=BA, then (A) $(A - B)(A + B) = A^2 - B^2$ (B) $(A + B)^2 = A^2 + 2AB + B^2$ (C) $(A + B)^3 = A^3A^2B + 3AB^2 + B^3$ (D) $(AB)^2 = A^2B^2$

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158. The homogeneous system AX=) of n linear equation in n variables has (A) a unique solutions if $|A| \neq 0$ (B) infinitely many solution if |A| = 0 (C) no solution (D) none of these

159. The homogeneous system AX=Oof n linear equation in n variables has (A) a unique solutions if $|A| \neq 0$ (B) infinitely many solution if |A| = 0 (C) no solution (D) none of these

160. Let A,B,C be 2×2 matrices with entries from the set of real numbers. Define operations \'*\' as follows $A \cdot B = \frac{1}{2}(AB + BA)$ then (A) $A \cdot I = A$ (B) $A \cdot A = A^2$ (C) $A \cdot B = B \cdot A$ (D) $A \cdot (B + C) = A \cdot B + A \cdot C$

161. If
$$A = \begin{bmatrix} 0 & \sin \alpha & \sin \alpha \sin \beta \\ -\sin \alpha & 0 & \cos \alpha \cos \beta \\ -\sin \alpha \sin \beta & -\cos \alpha \cos \beta & 0 \end{bmatrix}$$
 then
(A) $|A|$ is independent of α and β (B) A^{-1} depends only on beta (C)
 A^{-1} does not exist (D) none of these

162. Let
$$A = egin{bmatrix} 1 & \sin heta & 1 \ -\sin heta & 1 & \sin heta \ -1 & -\sin heta & 1 \ \end{pmatrix},$$
 where $0 \le heta \le 2\pi.$ Then

163. If
$$A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$$
 then (A) $A^{-n} = \begin{bmatrix} 1 & 0 \\ -n & 1 \end{bmatrix}$, $n \in N$ (B)
$$\lim_{n \to 00} \frac{1}{n^2} A^{-n} = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$
 (C) $\lim_{n \to \infty} \frac{1}{n} A^{-n} = \begin{bmatrix} 0 & 0 \\ -1 & 0 \end{bmatrix}$ (D) none of

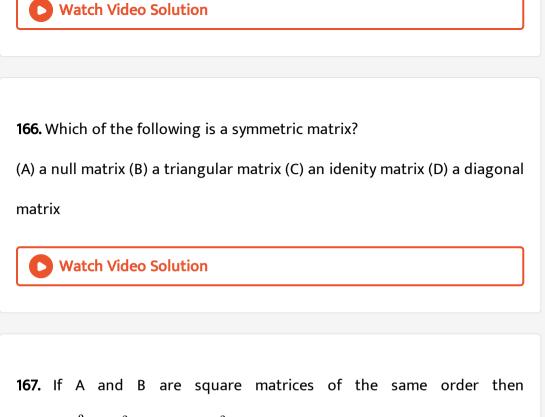
these

164. If A and B are symmetric matrices of same order, then AB - BA is a



165. Let A and B are two matrices such that AB = BA, then

for every $n \in N$

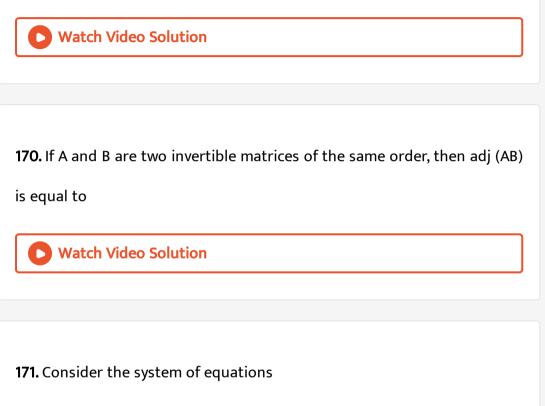


$$(A+B)^2 = A^2 + 2AB + B^2$$
 implies

168. If A is an invertible matrix of order $n \times n$, $(n \ge 2)$, then(A)A is symmetric (B) adjA is invertible (C) $Adj(AdjA) = |A|^{n-2}A$ (D) none of these

169. If A is an invertible matrix then which of the following are true? (A)

A
eq 0 (B) |A|
eq 0 (C) adjA
eq 0 (D) $A^{-1} = |A|adjA$



x+y+z=6

x + 2y + 3z = 10

 $x + 2y + \lambda z = \mu$

the system has unique solution if (a) $\lambda
eq 3$ (b) $\lambda = 3, \mu = 10$ (c)

 $\lambda=3, \mu
eq 10$ (d) none of these

172. If A is a square matrix of order 2×2 and $B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, such that AB = BA, then A can be



173. A square matrix A is said to be orthogonal if $A^T A = I$ If A is a square matrix of order n and k is a scalar, then $|kA| = K^n |A| A lso |A^T| = |A|$ and for any two square matrix A d B of same order AB| = |A| |B| On the basis of above information answer the following question: IF A is a 3×3 orthogonal matrix such that |A| = 1, then |A - I| = (A) 1 (B) -1 (C) 0 (D) none of these

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174. A square matrix A is said to be orthogonal if $A^T A = I$ If A is a square matrix of order n and k is a scalar, then $|kA| = K^n |A| A lso |A^T| = |A|$ and for any two square matrix A d B of

same order AB| = |A| |B| On the basis of abov einformation answer the following question: If A is an orthogonal matrix then (A) A^T is an orthogonal matrix but A^{-1} is not an orthogonal matrix (B) A^T is not an orthogonal mastrix but A^{-1} is an orthogonal matrix (C) Neither A^T nor A^{-1} is an orthogonal matrix (D) Both A^T and A^{-1} are orthogonal matrices.

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175. A square matrix A is said to be orthogonal if $A^{T}A = I$ If A is a sqaure matrix of order n and k is a scalar, then $|kA| = K^{n}|A|Also|A^{T}| = |A|$ and for any two square matrix A d B of same order AB| = |A| |B| On the basis of abov einformation answer the following question: If $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ and P is a orthogonal matrix and $B = PAP^{T}, P^{T}B^{2009}P = (A) \begin{bmatrix} 1 & 2009 \\ 0 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 2009 \\ 2009 & 1 \end{bmatrix}$ (C) $\begin{bmatrix} 1 & 0 \\ 2009 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

176. If A is a square matrix of any order then |A - x| = 0 is called the characteristic equation of matrix A and every square matrix satisfies its characteristic equation. For example if $A = \begin{vmatrix} 1 & 2 \\ 1 & 5 \end{vmatrix}$, Then $[(A - xI)], = \begin{bmatrix} 1 & 2 \\ 1 & 5 \end{bmatrix} - \begin{bmatrix} x & 0 \\ 0 & x \end{bmatrix} = \begin{bmatrix} 1 - x & 2 \\ 1 - 0 & 5 - u \end{bmatrix} = \begin{bmatrix} 1 - x & 2 \\ 1 & 5 - x \end{bmatrix}$ Characteristic equation of matri A is $igg| egin{array}{ccc} 1-x & 2 \ 1 & 5-x \end{array} igg| = 0 \, \, {
m or} \, \, (1-x)(5-x0-2=0 \, \, \, {
m or} \, \, \, x^2-6x+3=0. \end{array}$ Matrix A will satisfy this equation ie. $A^2-6A+3I=0$ then A^{-1} can be determined by multiplying both sides of this equation let $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & -2 & 4 \end{bmatrix}$ On the basis fo above information answer the following questions: If $6A^{-1} = A^2 + aA + bI, then(a,b)$ is (A) (-6,11) (B) (-11,60 (C) (11,6) (D) (6,11)

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177. If A is a square matrix of any order then |A - x| = 0 is called the chracteristic equation of matrix A and every square matrix satisfies its chatacteristic equation. For example if $A = \begin{bmatrix} 1 & 2 \\ 1 & 5 \end{bmatrix}$, Then

 $[(A - xI)], = \begin{bmatrix} 1 & 2 \\ 1 & 5 \end{bmatrix} - \begin{bmatrix} x & 0 \\ 0 & x \end{bmatrix} = \begin{bmatrix} 1 - x & 2 \\ 1 - 0 & 5 - x \end{bmatrix} = \begin{bmatrix} 1 - x & 2 \\ 1 & 5 - x \end{bmatrix}$ Characteristic equation of matrix A is $\begin{vmatrix} 1 - x & 2 \\ 1 & 5 - x \end{vmatrix} = 0$ or (1 - x)(5 - x)(0 - 2) = 0 or $x^2 - 6x + 3 = 0$ Matrix A will satisfy this equation ie. $A^2 - 6A + 3I = 0$. A^{-1} can be determined by multiplying both sides of this equation. Let $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & -2 & 4 \end{bmatrix}$ On the basis for above information answer the following questions: Sum of elements of A^{-1} is (A) 2 (B) -2 (C) 6 (D) none

of these

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178. I
$$A = \begin{bmatrix} 0 & 5 \\ 0 & 0 \end{bmatrix}$$
 and $f(x) = 1 + x + x^2 + \ldots + x^{16}$, then $f(A) = (A) \ 0 \ (B) \begin{bmatrix} 1 & 5 \\ 0 & 1 \end{bmatrix}$ (C) $\begin{bmatrix} 1 & 5 \\ 0 & 0 \end{bmatrix}$ (D) $\begin{bmatrix} 0 & 5 \\ 1 & 1 \end{bmatrix}$

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179. If the matrix $\begin{bmatrix} 1 & 3 & \lambda+2\\ 2 & 4 & 8\\ 3 & 5 & 10 \end{bmatrix}$ is singular then find λ

180. If
$$A = \begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix}$$
 and $A^2 - xA - I = 0$ then find x.

181. For a 3 imes 3 matrix A if |A|=4, then find |AdjA|

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182. Assertion: |M| = 0, Reason: Determinant of a skew symmetric matrix is 0. (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

183. Assertion: $|AA^{T}| = 0$, Reason : A is a skew symmetric matrix (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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184. Assertion : A^{-1} exists, Reason: |A| = 0 (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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185. Assertion: |AadjA| = -1, Reason : If A is a non singular square matrix of order n then $|adjA| = |A|^{n-1}$ (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te

correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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186. Assertion: adj A is a no singular matrix., Reason: A is a no singular matix. (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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187. Assertion: If $|A^2| = 25$ then $A = \pm \frac{1}{5}$, Reason: |AB| = |A||B| (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

188. Asertion: The system of equations has unique solution for $\lambda = -5$,

Reason: The determinant $\begin{vmatrix} 3 & -1 & 4 \\ 1 & 2 & -3 \\ 6 & 5 & \lambda \end{vmatrix}
eq 0f \text{ or } \lambda \neq -5$ (A) Both A

and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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189. If M is a 3×3 matrix, where det $M = 1 and M M^T = 1, where I$ is

an identity matrix, prove theat det (M - I) = 0.

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190. about to only mathematics

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

192. Let
$$A = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{bmatrix}$$
 and U_1, U_2, U_3 be column matrices satisfying
 $AU_1 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, AU_2 = \begin{bmatrix} 2 \\ 3 \\ 6 \end{bmatrix}, AU_3 = \begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix}$. If U is 3×3 matrix whose

columns are $U_1, U_2, U_3, \hspace{0.2cm} ext{then} \hspace{0.2cm} |U| =$

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193. If
$$A = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{pmatrix}$$
, U_1, U_2 , and U_3 are column matrices
satisfying $AU_1 = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$, $AU_2 = \begin{pmatrix} 2 \\ 3 \\ 0 \end{pmatrix}$ and $AU_3 = \begin{pmatrix} 2 \\ 3 \\ 1 \end{pmatrix}$ and

U is 3 imes 3 matrix when columns are U_1, U_2, U_3 then

answer the following questions

The sum of the elements of U^{-1} is

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194. Let
$$A = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{bmatrix}$$
 and U_1, U_2, U_3 be column matrices satisfying
 $AU_1 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, AU_2 = \begin{bmatrix} 2 \\ 3 \\ 6 \end{bmatrix}, AU_3 = \begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix}$. If U is 3×3 matrix whose

columns are U_1, U_2, U_3 , then |U| =

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195. Consider the system of equations

x-2y+3z=-1

-x+y-2z=k

x-3y+4z=1

Statement -1 The system of equation has no solutions for k
eq 3.

statement -2 The determinant
$$egin{array}{ccc} 1 & 3 & -1 \ -1 & -2 & k \ 1 & 4 & 1 \ \end{array}
onumber
onumber
eq 0, for $k
eq 3.$$$

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196. Let A be the set of all 3 imes 3 symmetric matrices all of whose either 0

or 1. Five of these entries are 1 and four of them are 0.

The number of matrices in A is

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