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Mathematics (Code-241)

Worksheet on Matrix

Summer vacation Homework

1. Let A = $\begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$, B = $\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix}$ and C = $\begin{bmatrix} 1 & 3 \\ 3 & 1 \end{bmatrix}$

(i) Find the matrix C (B – A).

(ii) Find A (B + C).

(iii) Prove that A (B + C) = AB + AC.

2. If X = $\begin{bmatrix} 4 & 1 \\ -1 & 2 \end{bmatrix}$, show that $6X - X^2 = 9I$, where I is the unit matrix.

3. Find A + B if A = $\begin{bmatrix} 3 & -4 & 2 \\ 9 & -3 & -2 \end{bmatrix}$ and B = $\begin{bmatrix} -3 & -14 & -2 \\ 9 & -30 & 12 \end{bmatrix}$

4.

State the dimensions of each matrix.

a $\begin{bmatrix} 6 & -1 & 5 \\ -2 & 3 & -4 \end{bmatrix}$ b $\begin{bmatrix} 7 \\ 8 \\ 9 \end{bmatrix}$ c $\begin{bmatrix} 0 & 0 & 8 \\ 6 & 2 & 4 \\ 1 & 3 & 6 \\ 5 & 9 & 2 \end{bmatrix}$

d $\begin{bmatrix} -3 & 17 & -22 \\ 9 & 31 & 16 \\ 20 & -15 & 4 \end{bmatrix}$ e $\begin{bmatrix} 17 & -2 & 8 & -9 & 6 \\ 5 & 11 & 20 & -1 & 4 \end{bmatrix}$ f $\begin{bmatrix} 16 & 8 \\ 10 & 5 \\ 0 & 0 \end{bmatrix}$

5. .

Solve each equation.

a $[4x \quad 3y] = [12 \quad -1]$

b $\begin{bmatrix} 4x \\ 5 \end{bmatrix} = \begin{bmatrix} 15 + x \\ 2y - 1 \end{bmatrix}$

c $\begin{bmatrix} 2x + y \\ x - 3y \end{bmatrix} = \begin{bmatrix} 5 \\ 13 \end{bmatrix}$

d $[2x \quad 3 \quad 3z] = [5 \quad 3y \quad 9]$

e $\begin{bmatrix} x + 3y \\ 3x + y \end{bmatrix} = \begin{bmatrix} -13 \\ 1 \end{bmatrix}$

f $\begin{bmatrix} 4x - 3 & 3y \\ 7 & 13 \end{bmatrix} = \begin{bmatrix} 9 & -15 \\ 7 & 2z + 1 \end{bmatrix}$

6. Solve

If $A = \begin{bmatrix} 7 & 3 \\ -4 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 9 & 6 \\ 3 & 10 \end{bmatrix}$, find $5A - 2B$.

If $A = \begin{bmatrix} 4 & -2 \\ 5 & -9 \end{bmatrix}$ and $B = \begin{bmatrix} 8 & 2 \\ -1 & -3 \end{bmatrix}$, find $6A - 3B$.

7. .

Use matrices A, B, C, and D to find the following.

$A = \begin{bmatrix} 2 & 3 \\ 5 & 6 \end{bmatrix}$ $B = \begin{bmatrix} -1 & 7 \\ 0 & -4 \end{bmatrix}$ $C = \begin{bmatrix} 9 & -4 \\ -6 & 5 \end{bmatrix}$ $D = [2 \quad -5]$

$A + B + C$

$3B - 2C$

$4A + 2B - C$

$B + 2C + D$

8.

If $A = [2 \ -3 \ 4]$, $B = \begin{bmatrix} 3 \\ 2 \\ 2 \end{bmatrix}$, $X = [1 \ 2 \ 3]$ and $Y = \begin{bmatrix} 2 \\ 3 \\ 4 \end{bmatrix}$,

then $AB + XY$ equals

(A) [28] (B) [24]

(C) 28 (D) 24

9. .

Assume X, Y, Z, W and P are matrices of order $2 \times n$, $3 \times k$, $2 \times p$, $n \times 3$ and $p \times k$, respectively. The restriction on n, k and p so that $PY + WY$ will be defined are :

(A) $k = 3, p = n$ (B) k is arbitrary, $p = 2$

(C) p is arbitrary, $k = 3$ (D) $k = 2, p = 3$

10. .

If $[2x \quad 3] \begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix} \begin{bmatrix} x \\ 8 \end{bmatrix} = O$, find the value of x.

11. Express the matrix A as the sum of a symmetric and a skew symmetric matrix, where

$$\begin{bmatrix} 2 & 4 & -6 \\ 7 & 3 & 5 \\ 1 & -2 & 4 \end{bmatrix}$$

12. If A = $\begin{bmatrix} 1 & 3 & 2 \\ 2 & 0 & -1 \\ 1 & 2 & 3 \end{bmatrix}$ **then show that** $A^3 - 4A^2 - 3A + 11I = 0$ also find the A^{-1} and A^5

13.

If $A = \begin{bmatrix} 2 & 3 \\ 1 & 0 \end{bmatrix} = P + Q$ where P is symmetric and Q is skew-symmetric matrix, then find the matrix Q.

14. Solve the following

Find the value of $\begin{vmatrix} a + ib & c + id \\ -c + id & a - ib \end{vmatrix}$

If $\begin{vmatrix} 2x + 5 & 3 \\ 5x + 2 & 9 \end{vmatrix} = 0$, find x.

For what value of K, the matrix $\begin{bmatrix} k & 2 \\ 3 & 4 \end{bmatrix}$ has no inverse.

15. .

Find the cofactor of a_{12} in $\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$.

Find the minor of a_{23} in $\begin{vmatrix} 1 & 3 & -2 \\ 4 & -5 & 6 \\ 3 & 5 & 2 \end{vmatrix}$.

Find the value of P, such that the matrix $\begin{bmatrix} -1 & 2 \\ 4 & P \end{bmatrix}$ is singular.

16. (Solve all the three problems)

If A is a square matrix of order 3 and $|A| = -2$, find the value of $|-3A|$.

If $A = 2B$ where A and B are of square matrices of order 3×3 and $|B| = 5$. What is $|A|$?

What is the condition that a system of equation $AX = B$ has no solution.

17.

Given a square matrix A of order 3×3 such that $|A| = 12$ find the value of $|A \ adj \ A|$.

18.

If A is a square matrix of order 3 such that $|adj \ A| = 8$ find $|A|$.

Let A be a non-singular square matrix of order 3×3 find $|adj \ A|$ if $|A| = 10$.

19. .

If $A = \begin{bmatrix} p & q \\ -q & p \end{bmatrix}, B = \begin{bmatrix} r & s \\ -s & r \end{bmatrix}$ then

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

(C) $AB = -BA$ (D) None of these

Which of the following is correct

(A) Determinant is square matrix

(B) Determinant is number associated to matrix

(C) Determinant is number associated to square matrix

(D) None of these

20. .

If $A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$ and a and b are arbitrary constants then "$(aI + bA)^2 =$

(A) $a^2I + abA$ (B) $a^2I + 2abA$

(C) $a^2I + b^2A$ (D) None of these

If $A = \begin{bmatrix} 1 & -2 \\ 5 & 3 \end{bmatrix}, B = \begin{bmatrix} 1 & -3 \\ 4 & -7 \end{bmatrix}$, then find the matrix $A - 2B + 6I$, where I is the unit matrix of order 2. Find sum of all the elements ??

(A) 29 (B) 30

(C) 31 (D) 28

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

21. .

If A is a square matrix then $A + A^T$ will be ....matrix.

(A) Symmetric (B) Skew symmetric
(C) Scalar (D) Identity

If A is a skew symmetric matrix and n is an even +ve integer then A^n is

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

22. .

If $A = \begin{pmatrix} 0 & 1 & -2 \\ 1 & 0 & 3 \\ 2 & -3 & 0 \end{pmatrix}$ then $A + A^T =$

(A) $\begin{pmatrix} 0 & 2 & 0 \\ 2 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$ (B) $\begin{pmatrix} 0 & 0 & 2 \\ 2 & 0 & 0 \\ 0 & 0 & 2 \end{pmatrix}$

(C) 0 (D) I

If $A = \begin{bmatrix} -2 & 1 \\ 0 & 3 \end{bmatrix}$ and $f(x) = 2x^2 - 3x$, then $f(A) = \cdots$

(A) $\begin{bmatrix} 14 & 1 \\ 0 & -9 \end{bmatrix}$ (B) $\begin{bmatrix} -14 & 1 \\ 0 & 9 \end{bmatrix}$

(C) $\begin{bmatrix} 14 & -1 \\ 0 & 9 \end{bmatrix}$ (D) $\begin{bmatrix} -14 & -1 \\ 0 & -9 \end{bmatrix}$

If $A + B = \begin{bmatrix} 7 & 4 \\ 8 & 9 \end{bmatrix}$ and $A - B = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$ then the value of A is

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

(C) $\begin{bmatrix} 6 & 2 \\ 8 & 6 \end{bmatrix}$ (D) $\begin{bmatrix} 7 & 6 \\ 8 & 12 \end{bmatrix}$

23.

If $\begin{bmatrix} 5 & 7 \\ x & 1 \\ 2 & 6 \end{bmatrix} - \begin{bmatrix} 1 & 2 \\ -3 & 5 \\ 2 & y \end{bmatrix} = \begin{bmatrix} 4 & 5 \\ 4 & -4 \\ 0 & 4 \end{bmatrix}$ then

(A) $x = 1, y = -2$ (B) $x = -1, y = 2$

(C) $x = 1, y = 2$ (D) $x = -1, y = -2$

If A is a skew-symmetric matrix and n is a positive integer then A^n is

(A) Symmetric matrix

(B) Skew symmetric matrix

(C) Identity matrix

(D) Symmetric or skew symmetric matrix

Total number of possible matrices order 3×3 with each entry 2 or 0 is

(A) 9 (B) 27

(C) 512 (D) 81

24.

The matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 4 \end{bmatrix}$ is a

(A) Identity matrix (B) Symmetric matrix

(C) Skew- symmetric matrix (D) None of these

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 $B^2 \neq B$

If $A = \begin{bmatrix} ab & b^2 \\ -a^2 & -ab \end{bmatrix}$, then A^2 is

(A) Idempotent matrix (B) Involuntary matrix

(C) Nilpotent matrix (D) Scalar matrix

25.

Given $A = \begin{bmatrix} 1 & 3 \\ 2 & 2 \end{bmatrix}, I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ if $A - \lambda I$ is a singular matrix then

(A) $\lambda = 0$ (B) $\lambda^2 - 3\lambda - 4 = 0$

(C) $\lambda^2 + 3 - 4 = 0$ (D) $\lambda^2 - 3\lambda - 6 = 0$

If A and B are two matrices of the order $3 \times m$ and $3 \times n$, respectively, and m=n, then the order of matrix (5A-2B) is

(A) $m \times 3$ (B) 3×3

(C) $m \times n$ (D) $3 \times n$

For any two matrices A and B, we have

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

(C) AB=0 (D) None of the above

If A is a square matrix such that $A^2 = I$, then $(A - I)^3 + (A + I)^3 - 7A$ is equal to

(A) A (B) I-A

(C) I+A (D) 3A

26. .

If $A = \begin{pmatrix} i & 0 \\ 0 & -i \end{pmatrix}$ then $AA^T =$

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

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

If $A = \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$ and $n \in N$ then $A^n =$

(A) $2^{n-1}A$ (B) $2^n A$

(C) nA (D) $2n\,A$

If $A = (1\ 2\ 3)$, $B = \begin{pmatrix} 2 \\ 3 \\ -1 \end{pmatrix}$ then $(A + B^T)^T =$

(A) $(3 \quad 2 \quad 5)$ (B) $\begin{pmatrix} 3 \\ 5 \\ 2 \end{pmatrix}$

(C) $\begin{pmatrix} 3 \\ 2 \\ 5 \end{pmatrix}$ (D) $\begin{pmatrix} -3 \\ 5 \\ 2 \end{pmatrix}$

27.

If $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$, then A^5 is equal to

(A) 16 A (B) 10 A

(C) 5 A (D) 42 A

If A is a square matrix $A + A^T$ is symmetric matrix, then $A - A^T =$

(A) Unit matrix (B) Symmetrix matrix

(C) Skew Symmetrix matrix (D) Zero matrix

28.

If A is a symmetric matrix, then matrix M'AM is

(A) Symmetric (B) Skew-symmetric

(C) Hermitian (D) Skew-Hermitian

If A is a square matrix for which $a_{ij} = i^2 - j^2$, then A is

(A) Zero matrix (B) Unitmatrix

(C) Symmetric matrix (D) Skew symmetric matrix

Find a, b, c if $\begin{bmatrix} 1 & \frac{3}{5} & a \\ b & -5 & -7 \\ -4 & c & 0 \end{bmatrix}$ is a symmetric matrix.

(A) -4, 3/5, -8 (B) -4, 3/5, -7

(C) -4, 3/5, -9 (D) -2, 3/5, -7

29.

The matrix $\begin{bmatrix} 0 & -5 & 8 \\ 5 & 0 & 12 \\ -8 & -12 & 0 \end{bmatrix}$ is a

(A) Diagonal matrix (B) Symmetric matrix

(C) Skew symmetric matrix (D) Scalar matrix

The solution of the equation $\begin{bmatrix} 1 & 0 & 1 \\ -1 & 1 & 0 \\ 0 & -1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix}$ is

(A) $x = 1, y = 1, z = 1$ (B) $x = -1, y = 0, z = 2$

(C) $x = -1, y = 2, z = 2$ (D) $x = 0, y = -1, z = 2$

Find x, y if $\left\{-1 \begin{bmatrix} 1 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix} + 3 \begin{bmatrix} 2 & -3 & 7 \\ 1 & -1 & 3 \end{bmatrix}\right\} \begin{bmatrix} 5 \\ 0 \\ -1 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$

(A) 5,-1 (B) 5,-2

(C) 5,-3 (D) 5,-4

30.

If A and B are two matrices such that AB and BA are both defined then A and B are.

(A) Square matrices of the same order
(B) Square matrices of different order
(C) Rectangular matrices of same order
(D) Null matrices

If $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$, and $A^2 - 8A - kI = 0$, where I is a unit matrix and 0 is a null matrix of order 2. Then find the value of k?

(A) -1 (B) -3
(C) -5 (D) -7

The matrix P $\begin{bmatrix} 0 & 0 & 4 \\ 0 & 4 & 0 \\ 4 & 0 & 0 \end{bmatrix}$ is

(A) Square matrix (B) Diagonal matrix
(C) Unit matrix (D) None

31.

If A is 3×4 matrix and B is a matrix such that $A'B$ and BA' are both defined. Then B is of the type

(A) 3×4 (B) 3×3
(C) 4×4 (D) 4×4

If $\begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ is square root of identity matrix of order 2 then,

(A) $1 + \alpha^2 + \beta y = 0$ (B) $1 + \alpha^2 - \beta\gamma = 0$
(C) $1 - \alpha^2 + \beta\gamma = 0$ (D) $\alpha^2 + \beta y = 1$

If A and B are symmetric matrices of the same order, then. which one of the following is not true

(A) A + B is symmetric (B) A − B is symmetric
(C) AB + BA is symmetric (D) AB − BA is symmetric

32.

The system of linear equations

$x + y + z = 2,$

$2x + y - z = 3,$

$3x + 2y + kz = 4$

has a unique solution, is

(A) $k \neq 0$ (B) $-1 < k < 1$

(C) $-2 < k < 2$ (D) $k = 0$

If a square matrix A is such that $AA^T = I = A^T A$ then $|A|$ is equal to

(A) 0 (B) ± 1

(C) ± 2 (D) None of these

33.

If $a \neq b \neq c$, the value of x which satisfies the equation

$$\begin{vmatrix} 0 & x-a & x-b \\ x+a & 0 & x-c \\ x+b & x+c & 0 \end{vmatrix} = 0 \text{ is}$$

(A) $x = 0$ (B) $x = a$

(C) $x = b$ (D) $x = c$

The solutions of the equation $\begin{vmatrix} x & 2 & -1 \\ 2 & 5 & x \\ -1 & 2 & x \end{vmatrix} = 0$, are

(A) $3, -1$ (B) $-3, 1$

(C) $3, 1$ (D) $-3, -1$

34.

If a ≠ b ≠ c, the value of x which satisfies the equation

$\begin{vmatrix} 0 & x-a & x-b \\ x+a & 0 & x-c \\ x+b & x+c & 0 \end{vmatrix} = 0$, is

(A) $x = 0$ (B) $x = a$

(C) $x = b$ (D) $x = c$

35.

The value of the determinant $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1-x & 1 \\ 1 & 1 & 1+y \end{vmatrix}$ is equal to

(A) $3 - x + y$ (B) $(1-x)(1+y)$

(C) xy (D) $-xy$

If $\begin{vmatrix} 1 & 2 & 3 \\ 2 & x & 3 \\ 3 & 4 & 5 \end{vmatrix} = 0$, then $x =$

(A) -5/2 (B) -2/5

(C) 5/2 (D) 2/5

36.

If the following matrix is singular:

$\begin{bmatrix} 7 & 3 \\ -2 & k \end{bmatrix}$

(A) 3 (B) -6

(C) $\frac{-6}{7}$ (D) 7

If matrix $\begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & 3 \\ \lambda & -3 & 0 \end{bmatrix}$ is singular, then λ is equal to

(A) -2 (B) -1

(C) 1 (D) 2

37.

Evaluate $\begin{vmatrix} 2 & -5 & 7 \\ 5 & 2 & 1 \\ 9 & 0 & 2 \end{vmatrix}$

(A) -109 (B) -111

(C) -113 (D) -115

Determinant $\begin{vmatrix} b^2+c^2 & a^2 & a^2 \\ b^2 & c^2+a^2 & b^2 \\ c^2 & c^2 & a^2+b^2 \end{vmatrix}$ is equal to

(A) abc (B) 4 abc

(C) $4a^2b^2c^2$ (D) $a^2b^2c^2$

If $\begin{vmatrix} 1 & 1 & 0 \\ 2 & 0 & 3 \\ 5 & -6 & x \end{vmatrix} = 29$, then x is

(A) 1 (B) 2

(C) 3 (D) 4

38.

The value of the following determinant is $\Delta = \begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix}$

(A) $(a-b)(b-c)(c-a)(a+b+c)$ (B) $abc(a+b)(b+c)(c+a)$

(C) $(a-b)(b-c)(c-a)$ (D) None of the above

Let A be a skew-symmetric matrix of odd order, then $|A|$ is equal to

(A) 0 (B) 1

(C) -1 (D) None of these

39.

If -9 is a root of the equation $\begin{vmatrix} x & 3 & 7 \\ 2 & x & 2 \\ 7 & 6 & x \end{vmatrix} = 0$, then the other two roots are

(A) 2, 7 (B) −2, 7

(C) 2, −7 (D) −2, −7

The value of x if $\begin{vmatrix} x & -1 & 2 \\ 2x & 1 & -3 \\ 3 & -4 & 5 \end{vmatrix} = 29$

(A) −1 (B) −2

(C) −3 (D) −4

One root of the equation $\begin{vmatrix} 3x-8 & 3 & 3 \\ 3 & 3x-8 & 3 \\ 3 & 3 & 3x-8 \end{vmatrix} =$

(A) 8/3 (B) 2/3

(C) 1/3 (D) 16/3

40.

Solve the following systems of linear equations.

$2x - y + 3z = 8$

$-x + 2y + z = 4$

$3x + y - 4z = 0$

(A) x = 2, y = 2 and z = -2 (B) x = -2, y = 2 and z = -2

(C) x = -2, y = -2 and z = -2 (D) None of these

The system $3x - y + 4z = 3$, $x + 2y - 3z = -2$ and $6x + 5y + \lambda z = -3$ has at least one Solution when

(A) $\lambda = -5$ (B) $\lambda = 5$

(C) $\lambda = 3$ (D) $\lambda = -12$

Find the value of k if the following equation are consistent:

$(k-2)x + (k-1)y = 17$, $(k-1)x + (k-2)y = 18$ and $x + y = 5$

(A) 1 (B) 3

(C) 5 (D) 7

41.

For suitable matrices A, B, the false statement is

(A) $(AB)^T = A^T B^T$ (B) $(A^T)^T = A$

(C) $(A - B)^T = A^T - B^T$ (D) $(A + B)^T = A^T + B^T$

Evaluate : $[2 \quad -1 \quad 3]\begin{bmatrix}4\\3\\1\end{bmatrix}$

(A) 2 (B) 4

(C) 6 (D) 8

A person has to be invest Rs.20,000 into two types of different deposits. First deposit pays 5% interest per year and second deposit pays 7% interest per year. Using matrix multiplication determine total annual interest if the invest 5,000 and 15,000 respectively.

(A) 1200 (B) 1300

(C) 1330 (D) 4000

42.

If $A = \begin{pmatrix}1 & 2 & 3\\2 & 4 & 5\\x & 5 & 6\end{pmatrix}$ and $A^T = A$ then x =

(A) -3 (B) 3

(C) 2 (D) -2

$$\Delta = \begin{vmatrix}1/a & 1 & bc\\1/b & 1 & ca\\1/c & 1 & ab\end{vmatrix} =$$

(A) 0 (B) abc

(C) $\frac{1}{abc}$ (D) None of these

43.

If a, b and c are all different from zero and $\Delta = \begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = 0$,

then the value of $\frac{1}{a} + \frac{1}{b} + \frac{1}{c}$ is

(A) abc (B) $\frac{1}{abc}$

(C) $-a - b - c$ (D) -1

If $A = \begin{bmatrix} 3 & 2 & 4 \\ 1 & 2 & 1 \\ 3 & 2 & 6 \end{bmatrix}$ and A_{ij} are the cofactors of a_{ij},

then $a_{11}A_{11} + a_{12}A + a_{13}A_{13}$ is equal to

(A) 8 (B) 6

(C) 4 (D) 0

44.

The system of equations

$kx + y + z = 1$,

$x + ky + z = k$,

$x + y + kz = k^2$

have no solution, if k equals

(A) 0 (B) 1

(C) -1 (D) -2

Let $A = \begin{pmatrix} 0 & 0 & -1 \\ 0 & -1 & 0 \\ -1 & 0 & 0 \end{pmatrix}$. The only correct. Statement about the matrix A is

(A) A is a zero matrix (B) $A^2 = I$

(C) A^{-1} does not exist (D) A = (-1)I, where I is a unit matrix

If $= \begin{bmatrix} 2a+b & 3a-b \\ c+2d & 2c-d \end{bmatrix} = \begin{bmatrix} 2 & 3 \\ 4 & -1 \end{bmatrix}$, find a + b + c + d.

(A) 2 (B) 16/5

(C) -2 (D) -16/2

45.

Let $A = \begin{pmatrix} 1 & 2 \\ -2 & 1 \end{pmatrix}, B = \begin{pmatrix} 4 & -3 \\ -5 & 6 \\ 0 & 1 \end{pmatrix}$ then

(A) AB exists (B) AB and BA exist

(C) Neither AB nor BA exist (D) BA exists but AB does not exist

If $A = \begin{pmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{pmatrix}$ then A^3 is

(A) I (B) 0

(C) A (D) 2A

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) $\begin{bmatrix} 3 & -2 \\ 2 & 2 \end{bmatrix}$

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

46.

The value of the determinant $\begin{vmatrix} x & a & b+c \\ x & b & c+a \\ x & c & a+b \end{vmatrix} = 0$, if

(A) $x = a$ (B) $x = b$

(C) $x = c$ (D) x has any value

$\begin{vmatrix} 1 & a & a^2-bc \\ 1 & b & b^2-ac \\ 1 & c & c^2-ab \end{vmatrix}$ is equal to

(A) 0 (B) $a^3+b^3+c^3-3abc$

(C) 3abc (D) $(a+b+c)^3$

Determinant $\begin{vmatrix} 1/a & a^2 & bc \\ 1/b & b^2 & ca \\ 1/c & c^2 & ab \end{vmatrix}$ is equal to

(A) abc (B) $\frac{1}{abc}$

(C) $ab + bc + ca$ (D) 0

47.

If $\begin{vmatrix} 1 & k & 3 \\ 3 & k & -2 \\ 2 & 3 & -1 \end{vmatrix} = 0$, then the value of k is

(A) -1 (B) 0

(C) 1 (D) None of these

If one root of determinant $\begin{vmatrix} x & 3 & 7 \\ 2 & x & 2 \\ 7 & 6 & x \end{vmatrix} = 0$ is -9, then the other two roots are

(A) 2,7 (B) $2, -7$

(C) $-2,7$ (D) $-2, -7$

The value of determinant expanding along third column $\begin{vmatrix} -1 & 1 & 2 \\ -2 & 3 & -4 \\ -3 & 4 & 0 \end{vmatrix}$

(A) -2 (B) -4

(C) -6 (D) -8

48.

The value of x if $\begin{vmatrix} 1 & 2x & 4x \\ 1 & 4 & 16 \\ 1 & 1 & 1 \end{vmatrix} = 0$

(A) $\frac{1}{3}$ (B) $\frac{2}{3}$

(C) 1 (D) None of these

If the equations $2x + 3y + 1 = 0, 3x + y - 2 = 0$ and $ax + 2y - b = 0$ are consistent, then

(A) $a - b = 2$ (B) $a + b + 1 = 0$

(C) $a + b = 3$ (D) $a - b - 8 = 0$

The value of determinant:

$\begin{vmatrix} 2i & 3 \\ 4 & -i \end{vmatrix}$

(A) -10 (B) -12

(C) -14 (D) -16

49.

Find the value of x if $\begin{vmatrix} x^2 - x + 1 & x + 1 \\ x + 1 & x + 1 \end{vmatrix} = 0$

(A) 1 , 0 , 2 (B) -1,0,-2

(C) 1 , 0 ,-2 (D) -1 , 0 ,2

The value of determinant: $\begin{vmatrix} 2 & -4 \\ 7 & -15 \end{vmatrix}$

(A) -1 (B) -2

(C) -3 (D) -4

$\begin{vmatrix} 19 & 17 & 15 \\ 9 & 8 & 7 \\ 1 & 1 & 1 \end{vmatrix} =$

(A) 0 (B) 187

(C) 354 (D) 154

50. .

Find the value of k : If area of triangle is 4 square unit and vertices are P(k, 0), Q(4,0), R(0,2)

(A) 2,8 (B) 3,8

(C) 1,8 (D) 0,8

The value of $\begin{vmatrix} b + c & a & a \\ b & c + a & b \\ c & c & a + b \end{vmatrix}$, is

(A) 6 abc (B) a + b + c

(C) 4 abc (D) abc

If $a \neq b \neq c$, the value of x which satisfies the equation $\begin{vmatrix} 0 & x - a & x - b \\ x + a & 0 & x - c \\ x + b & x + c & 0 \end{vmatrix} = 0$, is

(A) x= 0 (B) x= a

(C) x= b (D) x= c