MATHS

BOOKS - BETTER CHOICE PUBLICATION

DETERMINANTS

Solved Examples Section I Multiple Choice Questions

1. If $\left|\begin{bmatrix} 2x & 3 \\ -5 & x \end{bmatrix}\right| = \left|\begin{bmatrix} 4 & 3 \\ -5 & 8 \end{bmatrix}\right|$, then positive value of 'x' is equal to :

A. 2

B. 3

C. 4

D. -5

Answer: C

Watch Video Solution

2. If $\begin{vmatrix} x & 2 \\ 18 & x \end{vmatrix} = \begin{vmatrix} 6 & 2 \\ 18 & 6 \end{vmatrix}$, then x is equal to:

A. 6

B. ± 6

C. -6

D. $6, 6$

Answer: B

Watch Video Solution

3. Let A be a square matrix of order 3×3. Then I kA I is equal to :

A. k|A|

B. $k^2|A|$

C. $k^3|A|$

D. 3k|A|

Answer: C

Watch Video Solution

4. If area of triangle is 35 sq. units with vertices (2, - 6), (5, 4) and (k, 4). Then k is :

A. 12

B. -2

C. $-12, 2$

D. $12, \ -2$

Answer: D

Watch Video Solution

5. $\Delta = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$ and A_{ij} is cofactor of a_{ij} then value of Δ is given by

A. $a_{11}a_{31} + a_{12}A_{32} + a_{13}A_{33}$

B. $a_{11}a_{11} + a_{12}A_{21} + aB_3A_3$

C. $a_{21}A_{11} + a_{22}A_{12} + a_{23}A^{13}$

D. $a_{11}A_{11} + a_{21}A_{21} + a_{31}A^{31}$

Answer: D

Watch Video Solution

6. If A is a non-singular matrix of order 3 and |A| = 2, then | adj A| equals

A. 4

B. 6

C. 8

D. None of these

Answer: A

Watch Video Solution

7. If $A = \begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix}$, then $A(AdjA)$ equals :

A. $\begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$

B. $\begin{bmatrix} 0 & 3 \\ 3 & 0 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 3 \\ 3 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 3 & 1 \\ 1 & 3 \end{bmatrix}$

Answer: A

Watch Video Solution

8. Select the Correct Option If A is an invertible matrix of order 2, then det(A^-1) is equal to

A. $|A|$

B. $\frac{1}{|A|}$

C. 1

D. 0

Answer: B

Watch Video Solution

9. The inverse of a symmetric matrix is :

A. symmetric

B. skew-symmetric

C. diagonal matrix

D. None of these

Answer: A

Watch Video Solution

Solved Examples Section Ii Short Answer Type Questions

1. Evaluate $\begin{vmatrix} 2 & 4 \\ -1 & 2 \end{vmatrix}$

Watch Video Solution

2. Evaluate $\begin{vmatrix} 2\cos\theta & -2\sin\theta \\ \sin\theta & \cos\theta \end{vmatrix}$

Watch Video Solution

3. Find values of x, if : $\begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = \begin{vmatrix} x & 3 \\ 2x & 5 \end{vmatrix}$

Watch Video Solution

4. Find values of x for which $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$

Watch Video Solution

5. Evaluate the determinant $\triangle = \begin{vmatrix} 1 & 2 & 4 \\ -1 & 3 & 0 \\ 4 & 1 & 0 \end{vmatrix}$

Watch Video Solution

6. If $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 4 \end{bmatrix}$ then show that $|3A| = 27|A|$

Watch Video Solution

Solved Examples Section Iii

1. Without expanding, prove that the following determinant vanishes.

$$\begin{vmatrix} 2 & 7 & 65 \\ 3 & 8 & 75 \\ 5 & 9 & 86 \end{vmatrix}$$

Watch Video Solution

2. The value of the $\det.\begin{vmatrix} x+y & y+z & z+x \\ z & x & y \\ 1 & 1 & 1 \end{vmatrix}$ is

Watch Video Solution

3. Evaluate $\begin{vmatrix} x+\lambda & x & x \\ x & x+\lambda & x \\ x & x & x+\lambda \end{vmatrix}$

Watch Video Solution

4. Prove that: $\begin{vmatrix} x+4 & 2x & 2x \\ 2x & x+4 & 2x \\ 2x & 2x & x+4 \end{vmatrix} = (5x+4)(4-x)^2.$

Watch Video Solution

5. Using the property of determinants and without expanding , prove that:

$||[b+c, q+r, y+z)], [c+a, r+p, z+x], [a+b, p+q, x+y]|| = 2|[a, p,$

Watch Video Solution

6. By using properties of determinants, show that : $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$

Watch Video Solution

7. Using the properties of determinants, show that : $\left|\begin{bmatrix} x^2 & y^2 & z^2 \\ yz & zx & xy \\ x & y & z \end{bmatrix}\right| = (x-y)(y-z)(z-x)(xy+yz+zx).$

Watch Video Solution

8. Show that: $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3$

Watch Video Solution

9. By using properties of determinants, show that : $\begin{vmatrix} 1 & x & x^2 \\ x^2 & 1 & x \\ x & x^2 & 1 \end{vmatrix} = (1-x^3)^2$

Watch Video Solution

Solved Examples Section Iv

1. Find the area of the triangle whose vertices are (-2, -3), (3, 2) and (-1,-8)

Watch Video Solution

2. Show that points $A(a, b+c), B(b, c+a)$ $C(c, a+b)$ are collinear.

Watch Video Solution

3. Find equation of line joining (1, 2) and (3, 6) using determinants.

Watch Video Solution

4. If area of triangle is 35 sq. units with vertices (2, - 6), (5, 4) and (k, 4). Then k is :

Watch Video Solution

Solved Examples Section V

1. Write Minors and Cofactors of the elements of following determinant :

$$\begin{vmatrix} 1 & 0 & 4 \\ 3 & 5 & -1 \\ 0 & 1 & 2 \end{vmatrix}$$

Watch Video Solution

2. Find the adjoint of matrix $\begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$

Watch Video Solution

3. Find adjoint of the matrix: $\begin{bmatrix} 1 & -1 & 2 \\ 2 & 3 & 5 \\ -2 & 0 & 1 \end{bmatrix}$

Watch Video Solution

4. Find the inverse of the matrix (if it exists): $\begin{bmatrix} -1 & 5 \\ -3 & 2 \end{bmatrix}$

Watch Video Solution

5. Find the inverse of the matrix (if it exists): $\begin{bmatrix} 1 & 0 & 0 \\ 3 & 3 & 0 \\ 5 & 2 & -1 \end{bmatrix}$

Watch Video Solution

6. If Matrix $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, then show that $A^2 - 5A + 7I = 0$ and hence find A^{-1} from this equation.

Watch Video Solution

7. For the matrix $A = \begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$, find the numbers a and b such that $A^2 + aA + bI = O$

Watch Video Solution

8. Examine the consistency of the system of equations : $x + 3y = 5, 2x + 6y = 8$

Watch Video Solution

9. Solve the following linear equations by using matrix method :

$5x + 2y = 4$

$7x + 3y = 5$

Watch Video Solution

Solved Examples Section Vi Long Answer Type Questions

1. Using properties of determinants, show that:

$$\left|\begin{bmatrix}(b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2\end{bmatrix}\right| = 2abc(a+b+c)^3.$$

Watch Video Solution

2. If $x \neq y \neq z$ and $\left|\begin{bmatrix} x & x^2 & 1+x^3 \\ y & y^2 & 1+y^3 \\ z & z^2 & 1+z^3 \end{bmatrix}\right| = 0$ then using properties of determinants, show that xyz= -1.

Watch Video Solution

3. If $A = \begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}, B = \begin{bmatrix} 3 & 4 \\ 6 & 2 \end{bmatrix}$ verify that $(AB)^{-1} = B^{-1}A^{-1}$

View Text Solution

4. For the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{bmatrix}$ Show that $A^3 - 6A^2 + 5A + 11I = O$ Hence, find A^{-1}

Watch Video Solution

5. Compute $(AB)^{-1}$, where $A = \begin{bmatrix} 5 & 0 & 4 \\ 2 & 3 & 2 \\ 1 & 2 & 1 \end{bmatrix}, B^{-1} = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$

Watch Video Solution

6. Using matrix method, solve the equations

$2x - 3y + 4z = 4$

$3x + y - 2z = 9$

$2x + 3y - 5z = 7$

View Text Solution

7. If $A = \begin{bmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{bmatrix}$, find A^{-1} Using A^{-1} solve the system of equations.

View Text Solution

8. The cost of 4 kg onion, 3 kg wheat and 2 kg rice is Rs 60. The cost of 2 kg onion, 4 kg wheat and 6 kg rice is Rs 90. The cost of 6 kg onion, 2 kg wheat and 3 kg rice is Rs 70. Find cost of each item per kg by matrix method.

Watch Video Solution

Assignment Most Important Questions For Practice Section I Multiple Choice Questions

1. If A is a square matrix of order 3×3, then the value of |2A| is

A. 2|A|

B. 4|A|

C. 8|A|

D. None of these

Answer: C

View Text Solution

2. Let A be a square matrix of order 2×2, then the value of |kA| are

A. k|A|

B. $k^2|A|$

C. $k^3|A|$

D. None of these

Answer: B

Watch Video Solution

3. If [[x,4],[9,x]]=[[6,4],[9,6]], then x is equal to:

A. 6

B. 6,6

C. $6, \ -6$

D. -6

Answer: C

Watch Video Solution

4. Let $A = \begin{bmatrix} 1 & \sin\theta & 1 \\ -\sin\theta & 1 & \sin\theta \\ -1 & -\sin\theta & 1 \end{bmatrix}, where 0 \leq \theta \leq 2\pi$ Then :

A. $|A| = 0$

B. $|A| \in (2, \infty)$

C. $|A| \in (2, 4)$

D. $|A| \in [2, 4]$

Answer: D

Watch Video Solution

5. If A is a square matrix of order 3 and |3A| = k |A|, then value of k is

A. 3

B. 9

C. 21

D. 27

Answer: D

View Text Solution

6. If A is a square matrix of order 3 and $|A| = 7$, then $|\text{adj } A|$ equals :

A. 3

B. 9

C. 21

D. 49

Answer: D

Watch Video Solution

Assignment Most Important Questions For Practice Section Ii Short Answer Type Questions

1. Evaluate $\begin{vmatrix} \sqrt{6} & \sqrt{5} \\ \sqrt{20} & \sqrt{24} \end{vmatrix}$

Watch Video Solution

2. Evaluate $\begin{vmatrix} a+ib & c+id \\ -c+id & a-ib \end{vmatrix}$ where $i = \sqrt{-1}$

Watch Video Solution

3. Evaluate $\begin{vmatrix} \sin 30^\circ & \cos 30^\circ \\ -\sin 60^\circ & \cos 60^\circ \end{vmatrix}$

Watch Video Solution

4. If $\begin{vmatrix} x+1 & x-1 \\ x-3 & x+2 \end{vmatrix} = \begin{vmatrix} 4 & -1 \\ 1 & 3 \end{vmatrix}$ find the value of x.

Watch Video Solution

5. If $\begin{vmatrix} x & x \\ 1 & 2 \end{vmatrix} = \begin{vmatrix} 3 & 4 \\ 1 & 2 \end{vmatrix}$ then find positive value of x.

Watch Video Solution

6. If $\begin{vmatrix} 2x & 5 \\ 8 & x \end{vmatrix} = \begin{vmatrix} 6 & -2 \\ 7 & 3 \end{vmatrix}$, write the value of x.

Watch Video Solution

7. Evaluate the following Determinats

$$\begin{vmatrix} 4 & 9 & 7 \\ 3 & 5 & 7 \\ 5 & 4 & 5 \end{vmatrix}$$

Watch Video Solution

8. Evaluate the following Determinats

$$\begin{vmatrix} 0 & 2 & 0 \\ 2 & 3 & 4 \\ 4 & 5 & 6 \end{vmatrix}$$

Watch Video Solution

9. If $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 4 \end{bmatrix}$ then show that $|3A| = 27|A|$

Watch Video Solution

10. If $A = \begin{vmatrix} -1 & 6 & -2 \\ 2 & 1 & 1 \\ 4 & 1 & -3 \end{vmatrix}$ show that $|2A| = 8|A|$

Watch Video Solution

11. If $A = \begin{vmatrix} 3 & -1 & -2 \\ 0 & 0 & -1 \\ 3 & -5 & 0 \end{vmatrix}$, show that |2A| = 8|A|

Watch Video Solution

Assignment Most Important Questions For Practice Section Iii

1. Without expanding show that the following determinants vanish

$$\begin{vmatrix} 42 & 1 & 6 \\ 28 & 7 & 4 \\ 14 & 3 & 2 \end{vmatrix}$$

Watch Video Solution

2. Using the property of determinants and without expanding , prove that: $\begin{vmatrix} x & a & x+a \\ y & b & y+b \\ z & c & z+c \end{vmatrix} = 0$

Watch Video Solution

3. Without expanding show that the following determinants vanish

$$\begin{vmatrix} 4 & a & b+c \\ 4 & b & c+a \\ 4 & c & a+b \end{vmatrix}$$

Watch Video Solution

4. Without expanding show that the following determinants vanish

$$\begin{vmatrix} 3 & 1 & 6 \\ 5 & 2 & 10 \\ 7 & 4 & 14 \end{vmatrix}$$

Watch Video Solution

5. Prove that $\begin{vmatrix} 1 & a & a^2 - bc \\ 1 & b & b^2 - ca \\ 1 & c & c^2 - ab \end{vmatrix} = 0$

Watch Video Solution

6. Using the property of determinants and without expanding , prove that: : $\begin{vmatrix} 0 & a & -b \\ -a & 0 & c \\ b & c & 0 \end{vmatrix} = 0$

Watch Video Solution

7. The value of the det. $\begin{vmatrix} 2 & a & abc \\ 2 & b & bca \\ 2 & c & cab \end{vmatrix}$ is

Watch Video Solution

8. Using the property of determinants and without expanding , prove that: $\begin{vmatrix} a-b & b-c & c-a \\ b-c & c-a & a-b \\ c-a & a-b & b-c \end{vmatrix} = 0$

Watch Video Solution

9. Prove that: $\begin{vmatrix} x+y & x & x \\ 5x+4y & 4x & 2x \\ 10x+8y & 8x & 3x \end{vmatrix} = x^3.$

Watch Video Solution

10. Without expanding, prove the following

$$\begin{vmatrix} x+4 & x & x \\ x & x+4 & x \\ x & x & x+4 \end{vmatrix} = 16(3x+4)$$

Watch Video Solution

11. Evaluate $\begin{vmatrix} 1 & x & y \\ 1 & x+y & y \\ 1 & x & x+y \end{vmatrix}$

Watch Video Solution

12. Prove that $\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4abc$

Watch Video Solution

13. Prove that: $\begin{vmatrix} -a^2 & ab & ac \\ ba & -b^2 & bc \\ ca & cb & -c^2 \end{vmatrix} = 4a^2b^2c^2$

Watch Video Solution

14. Without expanding, prove the following

$$\begin{vmatrix} 0 & ab^2 & ac^2 \\ a^2b & 0 & bc^2 \\ a^2b & b^2c & 0 \end{vmatrix} = 2a^3b^3c^3$$

Watch Video Solution

15. Without expanding, prove the following

$$\begin{vmatrix} y+z & z & y \\ z & z+x & x \\ y & x & x+y \end{vmatrix} = 4xyz$$

Watch Video Solution

16. Without expanding, prove the following

$$\begin{vmatrix} a & a+b & a+2b \\ a+2b & a & a+b \\ a+b & a+2b & a \end{vmatrix} = 9(a+b)b^2$$

Watch Video Solution

17. Prove that: $\begin{vmatrix} 1 & 1+p & 1+p+q \\ 2 & 3+2p & 4+3p+2q \\ 3 & 6+3p & 10+6p+3q \end{vmatrix} = 1$

Watch Video Solution

18. Without expanding, prove the following

$$\begin{vmatrix} 1+a^2-b^2 & 2ab & -2b \\ 2ab & 1-a^2+6^2 & 2a \\ 2a & -2a & 1-a^2-b^2 \end{vmatrix} = (1+a^2+b^2)\text{^3}$$

Watch Video Solution

19. Without expanding, prove the following

$$\begin{vmatrix} x & x+y & x+2y \\ x+2y & x & x+y \\ x+y & x+2y & x \end{vmatrix} = 9y^2(x+y)$$

Watch Video Solution

20. Show that: $\begin{vmatrix} x-y-z & 2x & 2x \\ 2y & y-z-x & 2y \\ 2z & 2z & z-x-y \end{vmatrix} = (x+y+z)^3$

Watch Video Solution

21. Without expanding, prove the following

$$\begin{vmatrix} 1 & a & a^3 \\ 1 & b & b^3 \\ 1 & c & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)$$

Watch Video Solution

22. Without expanding, prove the following

$$\begin{vmatrix} x & y & z \\ x^2 & y^2 & z^2 \\ x^3 & y^3 & z^3 \end{vmatrix} = xyz(x-y)(y-z)(z-x)$$

Watch Video Solution

23. Without expanding, prove the following

$$\begin{vmatrix} 1 & 1 & 1 \\ \alpha & \beta & \gamma \\ \beta\gamma & \gamma\alpha & \alpha\beta \end{vmatrix} = (\beta-\alpha)(\gamma-\alpha)(\alpha-\beta)$$

Watch Video Solution

24. Without expanding, prove the following

$$\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ bc & ca & ab \end{vmatrix} = (a-b)(b-c)(c-a)(ab+bc+ca)$$

Watch Video Solution

25. Without expanding, prove the following

$$\begin{vmatrix} a^3+1 & a^2 & a \\ b^3+1 & b^2 & b \\ c^3+1 & c^2 & c \end{vmatrix} = -(a-b)(b-c)(c-a)(abc+1)$$

Watch Video Solution

26. Without expanding, prove the following

$$\begin{vmatrix} b+c & c+a & a+b \\ q+r & r+p & p+q \\ y+z & z+x & x+y \end{vmatrix} = 2\begin{vmatrix} a & b & c \\ p & q & r \\ x & y & z \end{vmatrix}$$

Watch Video Solution

27. Without expanding, prove the following

$$\begin{vmatrix} b+c & c+a & a+b \\ c+a & a+b & b+c \\ a+b & b+c & c+a \end{vmatrix} = 2(a+b+c)\left(ab+bc+ca-a^2-b^2-c^2\right)$$

Watch Video Solution

28. Without expanding, prove the following

$$\begin{vmatrix} a^2 & 2ab & b^2 \\ b^2 & a^2 & 2ab \\ 2ab & b^2 & a^2 \end{vmatrix} = \left(a^3+b^3\right)^2$$

Watch Video Solution

29. Without expanding, prove the following

$$\begin{vmatrix} a & b-c & c-b \\ a-c & b & c-a \\ a-b & b-a & c \end{vmatrix} = (a+b-c)(b+c-a)(c+a-b)$$

Watch Video Solution

30. Without expanding, prove the following

$$\begin{vmatrix} a & b & c \\ a-b & b-c & c-a \\ b+c & c+a & a+b \end{vmatrix} = a^3+b^3+c^3-3abc$$

Watch Video Solution

31. Solve the equation $\begin{vmatrix} 3x-8 & 3 & 3 \\ 3 & 3x-8 & 3 \\ 3 & 3 & 3x-8 \end{vmatrix} = 0$

Watch Video Solution

32. Solve the equation $\begin{vmatrix} x-2 & 2x-3 & 3x-4 \\ x-4 & 2x-9 & 3x-16 \\ x-8 & 2x-27 & 3x-64 \end{vmatrix} = 0$

Watch Video Solution

33. Solve for x: $\begin{vmatrix} x+9 & x & x \\ x & x+9 & x \\ x & x & x+9 \end{vmatrix} = 0$

Watch Video Solution

34. Solve for x: $\begin{vmatrix} a+x & a-x & a-x \\ a-x & a+x & a-x \\ a-x & a-x & a+x \end{vmatrix} = 0$

Watch Video Solution

35. Using properties of determinants , prove that

$$\begin{vmatrix} x^2+1 & xy & zx \\ xy & y^2+1 & yz \\ zx & yz & z^2+1 \end{vmatrix} = 1 + x^2 + y^2 + z^2$$

Watch Video Solution

Assignment Most Important Questions For Practice Section Iv

1. Using determinants find the area of triangle with vertices

(1,-1), (2,4),(-3,5)

Watch Video Solution

2. Using determinants find the area of triangle with vertices

(2, 7), (1, 1), (10,8)

Watch Video Solution

3. Using property of determinants, check whether the following points are collinear or not?

(11,-1), (5,5) and (-1,3)

Watch Video Solution

4. Using determinants, show that the following points are collinear

(a, b + c),(b,c+a) and (c, a + b)

Watch Video Solution

5. Find the value of k' if the area of the triangle is 4 sq. units and vertices are (-2,0),(0,4) and (0, k).

Watch Video Solution

6. Find equation of line joining (1, 2) and (3, 6) using determinants.

Watch Video Solution

7. Prove that area of the trianlge whose vertices are $(at_1^2, 2at_1)$, $(at_2^2, 2at_2)$, $(at_3^2, 2at_3)$ is $a^2(t_1 - t_2)(t_2 - t_3)(t_3 - t_1)$

Watch Video Solution

Assignment Most Important Questions For Practice Section V

1. If A is a square matrix of order 3 such that |adj A| =64, find |A|

Watch Video Solution

2. For what invertile matrix A of order 3 if |A| = 5 then find |adj A|

Watch Video Solution

3. Find the adjoint of the following matrices :

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

Watch Video Solution

4. Find adjoint of the matrix: $[[1, 2], [3, 4]$

Watch Video Solution

5. Find adjoint of the matrix: $\begin{bmatrix} 1 & -1 & 2 \\ 2 & 3 & 5 \\ -2 & 0 & 1 \end{bmatrix}$

Watch Video Solution

6. If A = $\begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$ verify that A(adj A) =1

Watch Video Solution

7. Verify $A(adjA) = (adjA).\ A = |A|.\ I : \begin{bmatrix} 2 & 3 \\ -4 & -6 \end{bmatrix}$

Watch Video Solution

8. Verify $A(adjA) = (adjA).\ A = |A|.\ I : \begin{bmatrix} 1 & -1 & 2 \\ 3 & 0 & -2 \\ 1 & 0 & 3 \end{bmatrix}$

Watch Video Solution

9. Find the inverse of the matrix (if it exists): $\begin{bmatrix} -1 & 5 \\ -3 & 2 \end{bmatrix}$

Watch Video Solution

10. Using elementary transformations find the inverse of $\begin{bmatrix} 1 & 3 & -2 \\ -3 & 0 & -1 \\ 2 & 1 & 0 \end{bmatrix}$

Watch Video Solution

11. Find the inverse of the following matrices.

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

Watch Video Solution

12. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ show that $A^2 - 7AI - 2$ =0 hence find A^{-1}

Watch Video Solution

13. If $A = \begin{bmatrix} 3 & 2 \\ 2 & 1 \end{bmatrix}$ verify that $A^2 - 4A - I = 0$. Hence find A^{-1}

Watch Video Solution

14. If $A = \begin{bmatrix} 2 & -3 \\ -4 & 7 \end{bmatrix}$ compute A^{-1} and show that $2A^{-1} + A - 9I = 0$

Watch Video Solution

15. If $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$, show that $A^{-1} = \frac{1}{19}A$

Watch Video Solution

16. For what value of x is the matrix $\begin{bmatrix} 5-x & x+1 \\ 2 & 4 \end{bmatrix}$ singular ?

Watch Video Solution

17. For what value of x is the matrix $\begin{bmatrix} 2x+4 & 4 \\ x+5 & 3 \end{bmatrix}$ a singular matrix ?

Watch Video Solution

18. If $A = \begin{bmatrix} 3 & 1 \\ 7 & 5 \end{bmatrix}$, find x and y so that $A^2 + xI - yA$=0. Hence find A^{-1}

Watch Video Solution

19. Find $(AB)^{-1}$ if $A = \begin{bmatrix} 3 & 4 \\ 1 & 1 \end{bmatrix}, B^{-1} = \begin{bmatrix} 4 & 3 \\ 2 & 1 \end{bmatrix}$

Watch Video Solution

20. Find $(AB)^{-1}$ if $A = \begin{bmatrix} 5 & 0 \\ 2 & 3 \end{bmatrix}, B^{-1} = \begin{bmatrix} 1 & 2 \\ 1 & 4 \end{bmatrix}$

Watch Video Solution

21. Find A^{-1} if $A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ and show that $A^{-1} = \dfrac{A^2 - 3I}{2}$

Watch Video Solution

Assignment Most Important Questions For Practice Section V Long Answer Type Question

1. Prove that $\begin{vmatrix} (b+c)^2 & ab & ca \\ ab & (a+c)^2 & bc \\ ac & bc & (a+b)^2 \end{vmatrix} = 2abc(a+b+c)^3$

Watch Video Solution

2. If $A = \begin{bmatrix} 1 & 2 & 5 \\ 2 & 3 & 1 \\ -1 & 1 & 1 \end{bmatrix}$ verify that $A^{-1}A = \mathrm{AA}^{-1} = I$

Watch Video Solution

3. If $A^{-1} = \begin{bmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$ find $(AB)^{-1}$ I

Watch Video Solution

4. Verify that $(AB)^{-1} = B^{-1}A^{-1}$ for the matrices A and B where $A = \begin{bmatrix} 2 & 3 \\ 1 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 \\ -1 & 3 \end{bmatrix}$

Watch Video Solution

5. Verify that $(AB)^{-1} = B^{-1}A^{-1}$ for the matrices A and B where $A = \begin{bmatrix} 3 & 2 \\ 7 & 5 \end{bmatrix}$ and $B \begin{bmatrix} 6 & 7 \\ 8 & 9 \end{bmatrix}$

Watch Video Solution

6. If $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$, Verify that $A^3 - 6A^2 + 9A - 4I = O$ and hence find A^{-1}.

Watch Video Solution

7. Use matrix method to slove the following system of equations

$x + y + z = 1$

$x - 2y + 3z = 2$

$x - 3y + 5z = 3$

Watch Video Solution

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

$x + 2y - 3z = -4, 2x + 3y + 2z = 2, 3x - 3y - 4z = 11$

Watch Video Solution

9. Use matrix method to slove the following system of equations

$y + 2z = -8$

$x + 2y + 3z = -14$

$3x + y + z = -8$

Watch Video Solution

10. Use matrix method to slove the following system of equations

$x + y = 5$

$y + z = 3$

$z + x = 4$

Watch Video Solution

11. Use matrix method to slove the following system of equations

$A = \begin{bmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{bmatrix}$ find A^{-1}

Watch Video Solution

12. The sum of three numbers-is 6. If we multiply the third number by 2 and add the first number to the result, use get 7. By adding second and third number to three times the first number, we get 12. Using matrices, find the numbers.

Watch Video Solution

Assignment Previous Year S Board Questions For Practice Multiple Choice Question

1. If $A = \begin{pmatrix} \alpha & 3 \\ 3 & \alpha \end{pmatrix}$ and $|A|^3 = -125$, then α equals

A. ± 1

B. ± 2

C. ± 3

D. ± 4

Answer: B

Watch Video Solution

2. If $A = \begin{pmatrix} \alpha & -2 \\ -2 & \alpha \end{pmatrix}$ and $|A|^3 = 125$, then α equals :

A. ± 1

B. ± 2

C. ± 3

D. ± 4

Answer: C

Watch Video Solution

3. If A is a non-singular matrix of order 3 and |A| = 3, then |Adj. A| equals

A. 9

B. 8

C. 10

D. None of these

Answer: A

Watch Video Solution

4. If A is a non-singular matrix of order 3 and |A| = 4, then |Adj. A| equals

A. 8

B. 12

C. 16

D. None of these

Answer: C

Watch Video Solution

5. If $\begin{vmatrix} 2x & -3 \\ 5 & x \end{vmatrix} = \begin{vmatrix} 4 & 3 \\ 5 & 8 \end{vmatrix}$, then positive value of x is

A. 1

B. 3

C. 4

D. 5

Answer: C

Watch Video Solution

6. If $\begin{vmatrix} 2x & 3 \\ 5 & x \end{vmatrix} = \begin{vmatrix} 4 & -3 \\ 5 & 8 \end{vmatrix}$, then positive value of x is

A. 2

B. -3

C. 4

D. 5

Answer: C

Watch Video Solution

7. The value of the det. $\begin{vmatrix} 11 & 12 & 13 \\ 12 & 13 & 14 \\ 13 & 14 & 15 \end{vmatrix}$ is

A. 1

B. 0

C. -1

D. 67

Answer: B

Watch Video Solution

8. If $A = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$, then A(adj A) equals

A. $\begin{bmatrix} 10 & 0 \\ 0 & 10 \end{bmatrix}$

B. $\begin{bmatrix} 0 & 10 \\ 10 & 0 \end{bmatrix}$

C. $\begin{bmatrix} 10 & 0 \\ 1 & 10 \end{bmatrix}$

D. None of these

Answer: A

Watch Video Solution

9. If $A\begin{bmatrix} 3 & 2 \\ 1 & 7 \end{bmatrix}$ then A(adj A) equls

A. $\begin{bmatrix} 19 & 0 \\ 0 & 19 \end{bmatrix}$

B. $\begin{bmatrix} 0 & 19 \\ 19 & 0 \end{bmatrix}$

C. $\begin{bmatrix} 19 & 1 \\ 1 & 19 \end{bmatrix}$

D. None of these

Answer: A

Watch Video Solution

10. If $A = \begin{bmatrix} 3 & 2 \\ 1 & 9 \end{bmatrix}$, the A(adjA) equals

A. $\begin{bmatrix} 25 & 0 \\ 0 & 25 \end{bmatrix}$

B. $\begin{bmatrix} 0 & 25 \\ 25 & 0 \end{bmatrix}$

C. $\begin{bmatrix} 25 & 1 \\ 1 & 25 \end{bmatrix}$

D. None of these

Answer: A

Watch Video Solution

11. If A is an invertible square matrix of order 3, then $|adj. A|$ is equal to :

A. $|A|^3$

B. $|A|^4$

C. $|A|^2$

D. $|A|$

Answer: C

Watch Video Solution

12. The value of $\left|\begin{bmatrix}1 & p & q+r\\ 1 & q & r+p\\ 1 & r & p+q\end{bmatrix}\right|$ is

A. $p+q+r$

B. 1

C. 0

D. pqr

Answer: C

Watch Video Solution

13. If A= diag (4, 2, 1) then det. A is equal to :

A. 0

B. 7

C. 8

D. None of these

Answer: C

Watch Video Solution

Assignment Previous Year S Board Questions For Practice

1. Using the properties of determinants, prove that : $\left|\begin{bmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{bmatrix}\right|$=$x^2(x+a+b+c)$

Watch Video Solution

2. Prove that: $\begin{vmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ c & a & c+a+2b \end{vmatrix} = 2(a+b+c)^3$

Watch Video Solution

3. Solve $\begin{vmatrix} x+1 & 2 & 3 \\ 3 & x+2 & 1 \\ 1 & 2 & x+3 \end{vmatrix} = 0$

Watch Video Solution

4. Solve by matrix method

$$\frac{3}{x} + \frac{4}{y} + \frac{7}{z} = 14$$
$$\frac{2}{x} - \frac{1}{y} + \frac{3}{z} = 4$$
$$\frac{1}{x} + \frac{2}{y} - \frac{3}{z} = 0$$

Watch Video Solution

5. Using the properties of determinants show that :

$$\left|\begin{bmatrix} -bc & b^2+bc & c^2+bc \\ a^2+ac & -ac & c^2+ac \\ a^2+ab & b^2+ab & -ab \end{bmatrix}\right| = (ab+bc+ca)^3$$

Watch Video Solution

6. Using the properties of determinants show that :
$$\left|\begin{bmatrix}1 & 1 & 1\\ a^2 & b^2 & c^2\\ a^3 & b^3 & c^3\end{bmatrix}\right| = (a-b)(b-c)(c-a)(ab+bc+ca).$$

Watch Video Solution

7. Using the properties of determinants show that :
$$\left|\begin{bmatrix}1 & a^2+bc & a^3\\ 1 & b^2+ac & b^3\\ 1 & c^2+ab & c^3\end{bmatrix}\right| = (a-b)(b-c)(c-a)\left(a^2+b^2+c^2\right)$$

Watch Video Solution

8. Using matrices , solve the following system of linear equations

$5x - y + 4z = 5$

$2x + 3y + 5z = 2$

$5x - 2y + 6z = -1$

Watch Video Solution

9. Solve by matrix method

$2x - y + z = -1$

$-x + 2y - z = 4$

$x - y + 2z = -3$

Watch Video Solution

10. Without expanding the determinant, show that : $\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + 1\right)$ is a factor of : $\left|\begin{bmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{bmatrix}\right|$

Watch Video Solution

11. Prove that $\left|\begin{bmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{bmatrix}\right| = abc(a-b)(b-c)(c-a)$

Watch Video Solution

12. Prove that $\left|\begin{bmatrix} x & y & z \\ x^2 & y^2 & z^2 \\ x^3 & y^3 & z^3 \end{bmatrix}\right| = xyz(x-y)(y-z)(z-x)$

Watch Video Solution

13. Solve by matrix method :

$x+y=3, y+z=4, z+x=5$

Watch Video Solution

14. Prove that: $\begin{vmatrix} -a^2 & ab & ac \\ ba & -b^2 & bc \\ ca & cb & -c^2 \end{vmatrix} = 4a^2b^2c^2$

Watch Video Solution

15. By using properties of determinants, show that :

$$\begin{vmatrix} x+y+2z & x & y \\ z & y+z+2x & y \\ z & z & z+x+2y \end{vmatrix} = 2(x+y+z)^3$$

Watch Video Solution

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

$2x + 3y + 3z = 5, x - 2y + z = -4, 3x - y - 2z = 3$

Watch Video Solution

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

$2x - 3y + 5z = 11, 3x + 2y - 4z = -5, x + y - 2z = -3$

Watch Video Solution

18. If $A = \begin{bmatrix} 4 & 1 & 1 \\ 1 & 4 & 1 \\ 1 & 1 & 4 \end{bmatrix}$, then show that $|2A| = 8|A|$.

Watch Video Solution

19. If $A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix}$, then show that $|4A| = 64|A|$.

Watch Video Solution

20. Using the properties of determinant, show that :
$$\begin{vmatrix} a^2+1 & ab & ac \\ ab & b^2+1 & bc \\ ac & bc & c^2+1 \end{vmatrix} = 1 + a^2 + b^2 + c^2$$

Watch Video Solution

21. Using the properties of determinant, show that :
$$\begin{vmatrix} 1 & a+b & a^2+b^2 \\ 1 & b+c & b^2+c^2 \\ 1 & c+a & c^2+a^2 \end{vmatrix} = (a-b)(b-c)(c-a)$$

Watch Video Solution

22. Prove that : $\begin{vmatrix} a+b+c & -c & -b \\ -c & a+b+c & -a \\ -b & -a & a+b+c \end{vmatrix} = 2(a+b)(b+c)(c+a)$

Watch Video Solution

23. Using the properties of determinant, show that : $\begin{vmatrix} 1 & x+y & x^2+y^2 \\ 1 & y+z & y^2+z^2 \\ 1 & z+x & z^2+x^2 \end{vmatrix} = (x-y)(y-z)(z-x)$

Watch Video Solution

24. Find the value of k' if the area of the triangle is 4 sq. units and vertices are (-2,0),(0,4) and (0, k).

Watch Video Solution

25. Using matrix method , solve the equations

$x - y + z = 4$

$2x + y - 3z = 0$

$x + y + z = 2$

Watch Video Solution

26. Solve by matrix method

$2x + 3y + 3z = 5$

$x - 2y + z = -4$

$3x - y - 2z = 3$

Watch Video Solution

27. Solve by matrix method : x + 2y + z = 7, x + 3z= 11, -3y + 2x = 1.

Watch Video Solution

28. Without expanding, prove the following

$$\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ bc & ca & ab \end{vmatrix} = (a-b)(b-c)(c-a)(ab+bc+ca)$$

Watch Video Solution

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

$2x - 3y + 5z = 11, 3x + 2y - 4z = -5, x + y - 2z = -3$

Watch Video Solution

30. Solve by matrix method

$3x - 2y + 3z = 8$

$2x + y - z = 1$

$4x - 3y + 2z = 4$

Watch Video Solution

31. Solve by matrix method

$2x + y + z = 1$

$x - 2y - z = 3/2$

$3y - 5z = 9$

Watch Video Solution

32. Prove that : `|[y+k,y,y],[y,y+k,y],[y,y,y+k]|=k^2(3y+k).

Watch Video Solution

33. Solve by using matrix method,

$2x - 3y + 5z = 16, 3x + 2y - 4z = -4, x + y - 2z = -3$

Watch Video Solution

34. Prove that $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix}$ =abc $\left(1 + \frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$

Watch Video Solution

35. Evaluate : $\triangle = \begin{vmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{vmatrix}$

Watch Video Solution

36. Using determinant , find the area of triangle with verticles

(1,0) , (6,0) ,(4,3)

Watch Video Solution

37. Using determinants , find the area of triangle with vertices

(0,0), (6,0), (4,3)

Are these points collinear ?

Watch Video Solution

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

$x - y + z = 4, 2x + y - 3z = 0, x + y + z = 2$

Watch Video Solution

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

$2x + 3y + 3z = 5, x - 2y + z = -4, 3x - y - 2z = 3$

Watch Video Solution

40. Solve by matrix method

$\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4, \frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1, \frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2, x, y, z \neq 0$

Watch Video Solution

41. Show that: $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3$

Watch Video Solution

42. Without expanding show that following :

$$\begin{vmatrix} a & a+b & a+b+c \\ 2a & 3a+2b & 4a+3b+2c \\ 3a & 6a+3b & 10a+6b+3c \end{vmatrix} = a^3$$

Watch Video Solution

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

$x - y + 2z = 7, 3x + 4y - 5z = -5, 2x - y + 3z = 12$

Watch Video Solution

44. Solve the following equation by Matrix Method,

$\frac{1}{x} - \frac{1}{y} + \frac{2}{z} = 7, \frac{3}{x} + \frac{4}{y} - \frac{5}{z} = -5, \frac{2}{x} - \frac{1}{y} + \frac{3}{z} = 12$

Watch Video Solution

45. By using properties of determinants, show that :

$$\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)$$

Watch Video Solution