MATHS

BOOKS - PSEB

DETERMINANTS

Example

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

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

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

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4. Evaluate $\triangle = \begin{vmatrix} 0 & \sin\alpha & -\cos\alpha \\ -\sin\alpha & 0 & \sin\beta \\ \cos\alpha & -\sin\beta & 0 \end{vmatrix}$

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

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6. Verify Property 1 for $\triangle = \begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$

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7. Verify Property 2 for $\triangle = \begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$

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8. Evaluate $\triangle = \begin{vmatrix} 3 & 2 & 3 \\ 2 & 2 & 3 \\ 3 & 2 & 3 \end{vmatrix}$

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9. Evaluate $\begin{vmatrix} 102 & 18 & 36 \\ 1 & 3 & 4 \\ 17 & 3 & 6 \end{vmatrix}$

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10. ਦਰਸਾਓ ਕਿ $\begin{vmatrix} a & b & c \\ a+2x & b+2y & c+2z \\ x & y & z \end{vmatrix} = 0$

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11. Without expanding show that following : $\begin{vmatrix} a & a+b & a+b+c \\ 2a & 3a+2b & 4a+3b+2c \\ 3a & 6a+3b & 10a+6b+3c \end{vmatrix} = a^3$

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

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

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

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15. 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.

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16. Show that

$$\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc\left(1+\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right) = abc+bc+ca+ab$$

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17. Find the area of the triangle whose vertices are (3, 8), (– 4, 2) and (5, 1).

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18. Find the equation of the line joining A(1, 3) and B (0, 0) using determinants and find k if D(k, 0) is a point such that area of $\triangle ABD$ is 3sq units.

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19. Find the minor of element 6 in the determinant $\triangle = \begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$

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20. Find minors and cofactors of all the elements of the determinant $\begin{vmatrix} 1 & -2 \\ 4 & 3 \end{vmatrix}$

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21. Find minors and cofactors of the elements a_{11} and a_{21} in the determinant $\triangle = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$

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22. Find minors and cofactors of the elements of the determinant $\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$ and verify that $a_{11}A_{31} + a_{12}A32 + a_{13}A_{33} = 0$

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23. Find adj A for $A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$

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24. If $A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$, then verify that $A.\ adjA = |A|I.\ Alsof \in dA^{-1}.$

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

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26. Show that the matrix $A = [[2, 3], [1, 2]$satisfies the equation $A^2 - 4A + I = O$, where I is 2×2 identity matrix and O is, 2×2 zero matrix. Using this equation, find A^{-1}.

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27. Solve the system of equations: $2x + 5y = 1, 3x + 2y = 7$

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

$3x - 2y + 3z = 8, 2x + y - z = 1, 4x - 3y + 2z = 4$

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29. The sum of three numbers is 6. If we multiply third number by 3 and add second number to it, we get 11. By adding first and third numbers, we get double of the second number. Represent it algebraically and find the numbers using matrix method.

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30. If a, b, c are positive and unequal, show that value of the determinant

$\triangle = \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$ is negative.

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31. If a, b, c, are in A.P, find value of $\triangle = \begin{vmatrix} 2y+4 & 5y+7 & 8y+a \\ 3y+5 & 6y+8 & 9y+b \\ 4y+6 & 7y+9 & 10y+c \end{vmatrix}$

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32. Show that

$$\triangle = \begin{vmatrix} (y+z)^2 & xy & zx \\ xy & (x+z)^2 & yz \\ xz & yz & (x+y)^2 \end{vmatrix} = 2xyz(x+y+z)^3$$

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33. Use product $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}\begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$ to solve the system of equations$x - y + 2z = 1, 2y - 3z = 1, 3x - 2y + 4z = 2$

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34. Prove that $\triangle = \begin{vmatrix} a+bx & c+dx & p+qx \\ ax+b & cx+d & px+q \\ u & v & w \end{vmatrix} = (1-x^2)\begin{vmatrix} a & c & p \\ b & d & q \\ u & v & w \end{vmatrix}$

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Exercise

1. Evaluate the determinant : $\begin{vmatrix} 2 & 4 \\ -5 & -1 \end{vmatrix}$

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

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3. Evaluate the determinant : $\begin{vmatrix} x^2-x+1 & x+1 \\ x+1 & x+1 \end{vmatrix}$

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

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

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6. Evaluate the determinant : $\begin{vmatrix} 3 & -1 & -2 \\ 0 & 0 & -1 \\ 3 & -5 & 0 \end{vmatrix}$

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7. Evaluate the determinant : $\begin{vmatrix} 3 & -4 & 5 \\ 1 & 1 & -2 \\ 2 & 3 & 1 \end{vmatrix}$

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8. Evaluate the determinant : $\begin{vmatrix} 0 & 1 & 2 \\ -1 & 0 & -3 \\ -2 & 3 & 0 \end{vmatrix}$

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9. Evaluate the determinant : $\begin{vmatrix} 2 & -1 & -2 \\ 0 & 2 & -1 \\ 3 & -5 & 0 \end{vmatrix}$

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

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11. Find values of x, if : $\begin{vmatrix} 2 & 4 \\ 5 & 1 \end{vmatrix} = \begin{vmatrix} 2x & 4 \\ 6 & x \end{vmatrix}$

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

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13. 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. 0

Answer:

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

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

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16. Using the property of determinants and without expanding , prove that: $\begin{vmatrix} 2 & 7 & 65 \\ 3 & 8 & 75 \\ 5 & 9 & 86 \end{vmatrix} = 0$

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17. Using the property of determinants and without expanding , prove that: $|[1, bc, a(b+c)], [1, ca, b(c+a)], [1, ab, c(a+b] \mid \; = 0$

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

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

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

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

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21. By using properties of determinants, show that :

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

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22. By using properties of determinants, show that :

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

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23. By using properties of determinants, show that :

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

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24. Prove that: $\begin{vmatrix} x & x^2 & yz \\ y & y^2 & zx \\ z & z^2 & xy \end{vmatrix} = (x-y)(y-z)(z-x)(xy+yz+zx)$

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

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

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27. By using properties of determinants, show that :

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

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28. By using properties of determinants, show that :

$$\begin{vmatrix} 1 & x & x^2 \\ x^2 & 1 & x \\ x & x^2 & 1 \end{vmatrix} = \left(1-x^3\right)^2$$

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29. Using the properties of determinant, show that :

$$\begin{vmatrix} a^2+1 & ab & ac \\ ab & b^2+1 & bc \\ ac & bc & c^2+1 \end{vmatrix} = 1+a^2+b^2+c^2$$

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30. 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:

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31. Which of the following is correct

A. Determinant is a square matrix.

B. Determinant is a number associated to a matrix.

C. Determinant is a number associated to a square matrix.

D. None of these

Answer:

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32. Find area of the triangle with vertices at the point given in the following : $(1, 0), (6, 0), (4, 3)$

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33. Find area of the triangle with vertices at the point given in the following : $(2, 7), (1, 1), (10, 8)$

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34. Find area of the triangle with vertices at the point given in the following : $(-2, -3), (3, 2), (-1, -8)$

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

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36. Find the value of k if the area of the triangle is 4 sq. units whose vertices are : (k, 0), (4, 0), (0, 2).

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37. If area of triangle is 4 sq. units with vertices (-2, 0), (0, 4) and (0, k) then k is :

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

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39. Find equation of line joining (3, 1) and (9, 3) using determinants.

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40. 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:

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

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

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42. Write Minors and Cofactors of the elements of following determinant

$$: \begin{vmatrix} a & c \\ b & d \end{vmatrix}$$

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43. Write Minors and Cofactors of the elements of following determinant

$$: \begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix}$$

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44. Write Minors and Cofactors of the elements of following determinant : $\begin{vmatrix} 1 & 0 & 4 \\ 3 & 5 & -1 \\ 0 & 1 & 2 \end{vmatrix}$

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45. Using Cofactors of elements of second row, evaluate $\triangle = \begin{vmatrix} 5 & 3 & 8 \\ 2 & 0 & 1 \\ 1 & 2 & 3 \end{vmatrix}$

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46. Using Cofactors of elements of third column, evaluate $\triangle - \begin{vmatrix} 1 & x & yz \\ 1 & y & zx \\ 1 & z & xy \end{vmatrix}$

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47. If $\triangle = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$ and A_ij is Cofactors of a_ij, then value of $\triangle$ is given by :

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

B. $a_{11}A_{11} + a_{12}A_{21} + a_{13}A_{31}$

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:

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

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

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

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

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

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

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54. Find the inverse of the matrix (if it exists): $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 4 \\ 0 & 0 & 5 \end{bmatrix}$

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

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56. Find the inverse of the matrix (if it exists): $\begin{bmatrix} 2 & 1 & 3 \\ 4 & -1 & 0 \\ -7 & 2 & 1 \end{bmatrix}$

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57. Find the inverse of the matrix (if it exists): $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$

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58. Find the inverse of the matrix (if it exists): $\begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\alpha & \sin\alpha \\ 0 & \sin\alpha & -\cos\alpha \end{bmatrix}$

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

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60. 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.

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

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62. 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}

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63. 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}.

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64. Let A be a non-singular matrix of order 3×3. Then I adj. A I is equal to

:`

A. |A|

B. $|A|^2$

C. $|A|^3$

D. 3|A|

Answer:

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

A. det(A)

B. $\frac{1}{\det(A)}$

C. 1

D. 0

Answer:

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

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67. Examine the consistency of the system of equations : $2x - y = 5, x + y = 4$

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

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69. Examine the consistency of the system of equations : $x + y + z = 1, 2x + 3y + 2z = 2, ax + ay + 2az = 4$

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70. Examine the consistency of the system of equations : $3x - y - 2z = 2, 2y - 2z = -1, 3x - 5y = 3$

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71. Examine the consistency of the system of equations : $5x - y + 4z = 5, 2x + 3y + 5z = 2, 5x - 2y + 6z = -1$

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72. Solve system of linear equations, using matrix method:

$5x + 2y = 4, 7x + 3y = 5$

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73. Solve system of linear equations, using matrix method:

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

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74. Solve system of linear equations, using matrix method:

$4x - 3y = 3, 3x - 5y = 7$

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75. Solve system of linear equations, using matrix method:

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

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76. Solve system of linear equations, using matrix method:

$2x + y + z = 1, x - 2y - z = \frac{3}{2}, 3y - 5z = 9$

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

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

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

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

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79. Solve by matrix method $x - y + 2z = 7$ $3x + 4y - 5z = -5$ $2x - y + 3z = 12$

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80. 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 $2x - 3y + 5z = 11, 3x + 2y - 4z = -5, x + y - 2z = -3$

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81. 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 $2x - 3y + 5z = 11, 3x + 2y - 4z = -5, x + y - 2z = -3$

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82. Prove that the determinant $\begin{vmatrix} x & \sin\theta & \cos\theta \\ -\sin\theta & -x & 1 \\ \cos\theta & 1 & x \end{vmatrix}$, is independent of θ

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83. Without expanding the determinant, prove that $\begin{vmatrix} a & a^2 & bc \\ b & b^2 & ca \\ c & c^2 & ab \end{vmatrix} = \begin{vmatrix} 1 & a^2 & a^3 \\ 1 & b^2 & b^3 \\ 1 & c^2 & c^3 \end{vmatrix}$

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84. Evaluate $\begin{vmatrix} \cos\alpha\cos\beta & \cos\alpha\sin\beta & -\sin\alpha \\ -\sin\beta & \cos\beta & 0 \\ \sin alph\cos\beta & \sin\alpha\sin\beta & \cos\alpha \end{vmatrix}$

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85. If a, b and c are real numbers, and $\triangle = \begin{vmatrix} b+c & c+a & a+b \\ c+a & a+b & b+c \\ a+b & b+c & c+a \end{vmatrix} = 0$

Show that either a+b+c = 0 or a=b=c

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86. Solve the equation $\begin{vmatrix} x+a & x & x \\ x & x+a & x \\ x & x & x+a \end{vmatrix} = 0 \, a \neq 0$

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87. Prove that: $\begin{vmatrix} a^2 & bc & ac+c^2 \\ a^2+ab & b^2 & ac \\ ab & b^2+bc & c^2 \end{vmatrix} = 4a^2b^2c^2$

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88. 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

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89. Let $A = \begin{bmatrix} 1 & -2 & 1 \\ -2 & 3 & 1 \\ 1 & 1 & 5 \end{bmatrix}$ Verify that $[adjA]^{-1} = adj(A^{-1})$

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90. Let $A = \begin{bmatrix} 1 & -2 & 1 \\ -2 & 3 & 1 \\ 1 & 1 & 5 \end{bmatrix}$ Verify that $[adjA]^{-1} = adj(A^{-1})$

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

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

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93. Using properties of determinants, prove that: $\begin{vmatrix} \alpha & \alpha^2 & \beta+\gamma \\ \beta & \beta^2 & \gamma+\alpha \\ \gamma & \gamma^2 & \alpha+\beta \end{vmatrix} = (\beta-\gamma)(\gamma-\alpha)(\alpha-\beta)(\alpha+\beta+\gamma)$

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94. Using properties of determinants, prove that: $\begin{vmatrix} x & x^2 & 1+px^3 \\ y & y^2 & 1+py^3 \\ z & z^2 & 1+pz^3 \end{vmatrix} = (1+pxyz)(x-y)(y-z)(z-x)$

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95. Using properties of determinants, prove that:
$$\begin{vmatrix} 3a & -a+b & -a+c \\ -b+a & 3b & -b+c \\ -c+a & -c+b & 3c \end{vmatrix} = 3(a+b+c)(ab+bc+ca)$$

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

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97. Using properties of determinants, prove that:
$$\begin{vmatrix} \sin\alpha & \cos\alpha & \cos(\alpha+\delta) \\ \sin\beta & \cos\beta & \cos(\beta+\delta) \\ \sin\gamma & \cos\gamma & \cos(\gamma+\delta) \end{vmatrix} = 0$$

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98. Solve the system of equations:
$$\frac{2}{x}+\frac{3}{y}+\frac{10}{z}=4,\ \frac{4}{x}-\frac{6}{y}+\frac{5}{z}=1,\ \frac{6}{x}+\frac{9}{y}-\frac{20}{z}=2$$

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99. If a, b, c, are in A.P, then the determinant $\begin{vmatrix} x+2 & x+3 & x+2a \\ x+3 & x+4 & x+2b \\ x+4 & x+5 & x+2c \end{vmatrix}$ is:

A. 0

B. 1

C. x

D. 2x

Answer:

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100. If x. y, z are non- real number", then the inverse of matrix $A = \begin{bmatrix} x & 0 & 0 \\ 0 & y & 0 \\ 0 & 0 & z \end{bmatrix}$ is

A. $\begin{bmatrix} x^{-1} & 0 & 0 \\ 0 & y^{-1} & 0 \\ 0 & 0 & z^{-1} \end{bmatrix}$

B. $xyz \begin{bmatrix} x^{-1} & 0 & 0 \\ 0 & y^{-1} & 0 \\ 0 & 0 & z^{-1} \end{bmatrix}$

C. $\frac{1}{x} yz \begin{bmatrix} x & 0 & 0 \\ 0 & y & 0 \\ 0 & 0 & z \end{bmatrix}$

D. $\frac{1}{x} yz \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Answer:

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101. 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. $\det(A) = 0$

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

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

D. $\det(A) \in [2, 4]$

Answer:

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