MATHS

BOOKS - PRADEEP PUBLICATION

DETERMINANTS

Example

1. Consider the matrix $A = \begin{bmatrix} -3 & 5 \\ 6 & 11 \end{bmatrix}$. Write the following A_{12}

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2. Consider the matrix $A = \begin{bmatrix} -3 & 5 \\ 6 & 11 \end{bmatrix}$. Write the following A_{22}

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3. Consider the matrix $A = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$. Write the submatrix of A obtained by deleting second and third columns and the second row.

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4. Consider the matrix $A = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$. Write the submatrix of A obtained by deleting First and second rows and the corresponding columns.

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5. Consider the matrix $A = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$. Write the submatrix of A obtained by deleting first row and the first column.

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6. Find the minors and cofactors of all the elements of the matrix

$$A = \begin{bmatrix} 2 & 6 \\ 10 & 4 \end{bmatrix}$$

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7. Find the minors and the cofactors of each entry of the third row of the matrix A and hence evaluate det A where

$$A = \begin{bmatrix} 6 & -7 & 8 \\ 1 & -3 & 1 \\ 2 & 1 & -4 \end{bmatrix}$$

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8. Find the minors and cofactors of the elements of the matrix

$$A = \begin{bmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{bmatrix}$$

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9. Evaluate the determinant $\begin{vmatrix} \log_3 512 & \log_4 3 \\ \log_3 8 & \log_4 9 \end{vmatrix}$

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10. Evaluate $\begin{vmatrix} 3 & -2 & 4 \\ 2 & 0 & 1 \\ 1 & 2 & 3 \end{vmatrix}$ by two different methods.

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

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12. Evaluate $\begin{vmatrix} a & l & m & n \\ 0 & b & p & q \\ 0 & 0 & c & r \\ 0 & 0 & 0 & d \end{vmatrix}$

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

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14. Find the value of x for which det A vanishes, where $A = \begin{bmatrix} x+1 & -1 & 0 \\ 2 & x+4 & 0 \\ 0 & 0 & x \end{bmatrix}$

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15. Evaluate $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix}$

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16. Evaluate the following determinants:

$$\begin{vmatrix} \sin x & \cos x & \sin x + \cos x \\ \sin y & \cos x & \sin y + \cos x \\ \sin z & \cos x & \sin z + \cos x \end{vmatrix}$$

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17. 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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18. Prove that

$|(a, a+b, a+b+c), (2a, 3a+2b, 4a+3b+2c), (3a, 6a+3b, 10a, 6b+3$

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19. Using the properties of determinants, prove that :

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

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20. Evaluate $\begin{vmatrix} 265 & 240 & 219 \\ 240 & 225 & 198 \\ 219 & 198 & 181 \end{vmatrix}$

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21. Evaluate $\begin{vmatrix} \sqrt{23}+\sqrt{3} & \sqrt{5} & \sqrt{5} \\ \sqrt{15}+\sqrt{46} & 5 & \sqrt{10} \\ 3+\sqrt{115} & \sqrt{15} & 5 \end{vmatrix}$

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22. Evaluate $\begin{vmatrix} 1 & 3 & 9 & 27 \\ 3 & 9 & 27 & 1 \\ 9 & 27 & 1 & 3 \\ 27 & 1 & 3 & 9 \end{vmatrix}$

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

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24. Prove that:

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

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25. 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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26. 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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27. 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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28. 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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29. Value of $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$ is zero, where ω, ω^2 are imaginary cube roots of unity.

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30. Without expanding , show that $\begin{vmatrix} a & b & c \\ a+2x & b+2y & c+2z \\ x & y & z \end{vmatrix} = 0.$

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31. 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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32. Without expanding show that $\begin{vmatrix} 0 & \sin\alpha & -\cos\alpha \\ -\sin\alpha & 0 & \sin\beta \\ \cos\alpha & -\sin\beta & 0 \end{vmatrix} = 0$

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33. Without expanding prove that $\begin{vmatrix} a & b & c \\ x & y & z \\ p & q & r \end{vmatrix} = \begin{vmatrix} y & b & q \\ x & a & p \\ z & c & r \end{vmatrix}$

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34. Prove that $\begin{vmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{vmatrix} = (x-y)(y-z)(z-x)$

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35. Prove that:

$$\begin{vmatrix} 1 & x & x^3 \\ 1 & y & y^3 \\ 1 & z & z^3 \end{vmatrix} = (x-y)(y-z)(z-x)(x+y+z)$$

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36. Show that $\begin{vmatrix} 1 & x^2 & x^3 \\ 1 & y^2 & y^3 \\ 1 & z^2 & z^3 \end{vmatrix} = (x-y),(y-z)(z-x)(xy+yz+zx)$

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37. Prove that determinant of a skew symmetric matrix of odd order is always 0.

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38. Find the area of the triangle whose vertices are (2,7),(1,1),(10,8).

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39. Find the area of the triangle whose vertices are $A\left(at_!^2, 2at_1\right), B\left(at_2^2, 2at_2\right)$ and $C\left(at_3^2, 2at_3\right)$

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40. Find x if the points (2,-5), (-4,5) and (x,15) are collinear.

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41. 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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42. Prove that the points (a,b), (a'b'), (a-a',b-b') are collinear iff ab' = a'b.

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43. Find the equation of the line containing the points (1,2), (3,8)

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44. Find the antiderivative of $\sin 2x + 3x$

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45. If $A = \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, verify that ad (AB) = adjB) (adjA)

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

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47. Find the adjoint of the matrix $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ and hence show that $A(AdjA) = |A|I_3$

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48. Find the adjoint of the matrix $A = \begin{bmatrix} 4 & -6 & 1 \\ -1 & -1 & 1 \\ -4 & 11 & -1 \end{bmatrix}$ and verify that A(adj A) = (adj A) A = |A | I_3

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49. 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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50. If $A = \begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}$ and $B^{-1} = \begin{bmatrix} 4 & 5 \\ 3 & 4 \end{bmatrix}$, compute $(AB)^{-1}$

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51. Find the inverse of the matrix $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$. Given that ad - bc $\neq$ 0

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52. Find the inverse of $A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & -1 & 0 \\ -7 & 2 & 1 \end{bmatrix}$ and verify that $A^{-1}A = I_3 = AA^{-1}$.

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53. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 4 \\ 2 & 2 & 1 \end{bmatrix}$, find $(A')^{-1}$

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54. If $F(\theta) = \begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$ and $G(\alpha) = \begin{bmatrix} \cos\alpha & 0 & \sin\alpha \\ 0 & 1 & 0 \\ -\sin\alpha & 0 & \cos\alpha \end{bmatrix}$, show that $[F(\theta)G(\alpha)]^{-1} = G(-\alpha)F(-\theta)$

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55. Show that the matrix $A = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$ satisfies the equations $A^2 - 4A + I = O$. Hence find A^{-1}

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56. 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}

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57. For the matrix $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$, show that $A^3 = A^{-1}$

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58. Find the matrix X satisfying the matrix equation :

$$\begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix} X \begin{bmatrix} 4 & 7 \\ 3 & 5 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

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59. If A $= \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, find at det (A adj A)

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60. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, find adj (adj A)

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61. Solve the equations $x + 2y = 4, 2x + 5y = 9$ by matrix method.

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62. Using matrix inverse, solve the equations 5x-7y = 2, 7x - 5y = 3

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63. Using matrix method, solve the following system of linear equations:

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

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64. Solve using matrices, for x,y and z: 2x-y-z = 7, 3x+y - z = 7, x + y - z = 3.

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65. Solve by Cramer's rule the following system of equations: 3x-5y = 21 and 5x + y = 7

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66. Solve the Cramer's rule the following system of equations:

$(x + y - 5z = 26), (x + 2y + z = -4), (x + 3y + 6z = -29)$

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67. Discuss the consistency of each of the following system of equations:

$\begin{pmatrix} x + 2y = 3 \\ 2x + 4y = 6 \end{pmatrix}$

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68. Discuss the consistency of each of the following system of equations:

$\begin{pmatrix} x - 3y = 5 \\ 3x - 9y = 10 \end{pmatrix}$ in case the system is consistent, find its solutions.

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69. Which of the following equations are consistent? And if consistent solve them:

$3x - y + 2z = 3, 2x + y + 3z = 5, x - 2y - z = 1$

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70. Which of the following equations are consistent? And if consistent solve them:

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

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71. Discuss the consistency of the following system of equations

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

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72. Find all integers λ for which the system of equations $x + 2y - 3z = 1, 2x - \lambda y - 3z = 2x + 2y + \lambda z = 3$ has a unique solution.

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73. Find λ and μ so that the simultaneous equations

$x + y + z = 6, x + 2y + 3z = 10, x + 2y + \lambda z = \mu$ have a unique solution

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74. Find λ and μ so that the simultaneous equations $x + y + z = 6, x + 2y + 3z = 10, x + 2y + \lambda z = \mu$ have infinite number of solutions.

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75. Find λ and μ so that the simultaneous equations x+y+z= 6, x + 2y + 3z = 10, x + 2y + λ z =μ have no solution.

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76. Find the values of p,q, so that the system of equations 2x + py + 6z = 8, x + 2y + qz = 5, x + y + 3 z = 4` may have a unique solution.

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77. Find the values of p,q, so that the system of equations 2x + py + 6z = 8, x + 2y + qz = 5, x + y + 3 z = 4` may have infinitely many solutions.

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78. Find the values of p,q, so that the system of equations 2x + py + 6z = 8, x + 2y + qz = 5, x + y + 3 z = 4` may have no solution.

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79. Given that $A = \begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$. Find AB. Use this to solve the following system of equations:

x-y+z=4,x-2y-2z=9,2x+y+3z=1.

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80. 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.

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81. 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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82. Two schools A and B want to award their selected students on the values of sincerity, truthfulness and helpfulness. The school A wants to award Rs. X and Rs y each and Rs Z each of the three respective values to 3,2 and 1 students respectively with a total award money of Rs 1600. School B wants to spend Rs 2300 to award its 4,1 and 3 students on respective values (b giving the same award money for the three values as before). If the total amount of award for one prize on each value is $Rs900$, using matrices find the award money for each value. Apart from these three values, suggest one more value which should be considered for award.

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83. Which of the following systems has non-trivial solutions ? If so, find them

$$2x - 3y = 0$$
$$3x + 5y = 0$$

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84. Which of the following systems has non-trivial solutions ? If so, find them

$$3x + 4y = 0$$
$$6x + 8y = 0$$

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85. Which of the following systems has non-trvials solutions? If so, find these solutions.

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

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86. Which of the following systems has non-trvials solutions? If so, find these solutions.

$$3x + 2y + 7z = 0$$
$$4x - 3y - 2z = 0$$
$$5x + 9y + 23z = 0$$

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87. Find the value of λ for whih the homogenous system of equations: 2x+3y - 2z = 0,2x-y+3z=9,7x+λy-z=0 has non-trivial solution.

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88. Consider the system of equations in x, y, z as $x \sin 3\theta - y + z = 0$, $x \cos 2\theta + 4y + 3z = 0$, 2x + 7y + 7z = 0. If this system has a non-trival solution, then for integer n, values of θ are given by :

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89. Given x = cy+bz, y = az + cx, z = b x + ay where, x,y,z are not all zero prove that $a^2 + b^2 + c^2 + 2abc = 1$.

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Exercise

1. If $A = \begin{bmatrix} 13 & -10 \\ 7 & 87 \end{bmatrix}$, write the following submatrices of A. A_{12}

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2. If $A = \begin{bmatrix} 13 & -10 \\ 7 & 87 \end{bmatrix}$, write the following submatrices of A. A_{22}

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3. If $A = \begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}$, find the submatrix of A obtained by deleting. Second row and third column

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4. If $A = \begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}$, find the submatrix of A obtained by deleting. Third row.

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5. If $A = \begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}$, find the submatrix of A obtained by deleting. First and second rows and third column

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6. If $A = \begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}$, find the submatrix of A obtained by deleting. First and third rows and also the corresponding columns.

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7. Find the minors and cofactos of each entry of the first column of the matrix A ad hence find the value of the determinant in each case:

$A = \begin{bmatrix} 5 & 20 \\ 0 & -1 \end{bmatrix}$

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8. Find the minors and cofactos of each entry of the first column of the matrix A ad hence find the value of the determinant in each case:

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

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9. Find the minors and cofactos of each entry of the first column of the matrix A ad hence find the value of the determinant in each case:

$$A = \begin{bmatrix} 0 & 2 & 6 \\ 1 & 5 & 0 \\ 3 & 7 & 1 \end{bmatrix}$$

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10. Find the minors and cofactos of each entry of the first column of the matrix A ad hence find the value of the determinant in each case:

$$A = \begin{bmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{bmatrix}$$

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11. Evaluate the following determinants:

$$\begin{vmatrix} -2 & 3 \\ 4 & -9 \end{vmatrix}$$

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12. Evalate the following determinants:

$$\begin{vmatrix} 1/2 & 8 \\ 4 & 2 \end{vmatrix}$$

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13. Evaluate the following determinants:

$$\begin{vmatrix} a+ib & -c+id \\ c+id & a-ib \end{vmatrix}$$

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14. Evaluate the following determinants:

$$\begin{vmatrix} 3x & x-7 \\ x+1 & 5x+1 \end{vmatrix}$$

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15. Show that |(sin 10°, - cos10^@),(sin80^@, cos80^@)| = 1`

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16. Show that $\begin{vmatrix} \cos 15^\circ, \sin 15^\circ \\ \sin 75^\circ, \cos 75^\circ \end{vmatrix} = 0$

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

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18. Evaluate the following determinants:

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

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19. Evaluate the following determinants:

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

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20. Evaluate the following determinants:

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

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21. Evaluate the following determinants:

$$\begin{vmatrix} 1 & -3 & 1 \\ 6 & -7 & 8 \\ 2 & 1 & -4 \end{vmatrix}$$

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22. Evaluate the following determinants:

$$\begin{vmatrix} 3 & 2 & 3 \\ 2 & 2 & 3 \\ 3 & 2 & 3 \end{vmatrix}$$

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23. Evaluate the following determinants:

$$\begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix}$$

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24. If $A = \begin{bmatrix} 2 & 5 \\ 3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & -1 \\ 1 & 3 \end{bmatrix}$, verify that det AB =(det A) (det B).

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25. Evaluate : $\begin{vmatrix} a & 0 & 0 & 0 \\ 0 & b & 0 & 0 \\ 0 & 0 & c & 0 \\ 0 & 0 & 0 & d \end{vmatrix}$

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26. Evaluate det A where $A = \begin{bmatrix} 2 & 0 & 0 & 1 \\ -3 & 0 & 1 & 0 \\ 1 & 1 & -1 & 1 \\ 2 & 0 & 5 & 0 \end{bmatrix}$

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27. If $\begin{vmatrix} 3x & 7 \\ -2 & 3 \end{vmatrix} = \begin{vmatrix} 8 & 7 \\ -2 & 3 \end{vmatrix}$ find x.

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28. Find x if det A = 0 where $A = \begin{bmatrix} x+1 & -3 & 4 \\ -5 & x+2 & 2 \\ 4 & 1 & x-6 \end{bmatrix}$

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29. 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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30. Evaluate the following determinants:

$$\begin{vmatrix} 1 & 3 & 9 \\ 3 & 9 & 1 \\ 9 & 1 & 3 \end{vmatrix}$$

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31. Evaluate the following determinants:

$$\begin{vmatrix} 2 & 3 & 7 \\ 13 & 17 & 5 \\ 15 & 20 & 12 \end{vmatrix}$$

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32. Evaluate the following determinants:

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

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33. Evaluate the following determinants:

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

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34. Evaluate the following determinants:

$$\begin{vmatrix} 219 & 117 & 345 \\ 19 & 9 & 34 \\ 7 & 3 & 5 \end{vmatrix}$$

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35. Evaluate the following determinants :

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

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

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37. Evaluate the determinant $\begin{vmatrix} 1^2 & 2^2 & 3^2 & 4^2 \\ 2^2 & 3^2 & 4^2 & 5^2 \\ 3^2 & 4^2 & 5^2 & 6^2 \\ 4^2 & 5^2 & 6^2 & 7^2 \end{vmatrix}$

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38. Without expanding, prove that

$|(6, 2, 3), (9, 3, 5), (12, 4, 7) = 0$

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39. Use properties of determinants ot evaluate:

$\begin{vmatrix} x+y & y+z & z+x \\ z & x & y \\ 1 & 1 & 1 \end{vmatrix}$

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40. Evaluate the following determinants:

$$\begin{vmatrix} 0 & c & b \\ c & 0 & a \\ -b & -a & 0 \end{vmatrix}$$

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41. By using determinants, find the area of the triangle whose vertices are (0,0), (6,0), (4,2)

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42. By using determinants, find the area of the triangle whose vertices are (3,8),(-4,2),(5,-1)

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

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44. By using determinants, find the area of the triangle whose vertices are (a,0),(0,b),(0,0)

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45. By using determinants, find the area of the triangle whose vertices are (-2,4),(2,-6), (5,4)

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46. Find the value of $'x'$ if the area of triangle is 35 square cm. With vertices (x,4),(2,-6) and (5,4).

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47. With the help of determinants, prove that the following points are collinear : (1,2),(3,8),(7,20)

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48. With the help of determinants, prove that the following points are collinear : (3,-2),(8,8),(5,2)

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49. With the help of determinants, prove that the following points are collinear : (1,-1),(2,1),(4,5)

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50. Find k so that the points (3,-2), (k,2), (8,8) are collinear.

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51. Find k if the points (2,-3), (k , 1) and (0,4) are collinear.

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52. If the points (x,y),(a,0) and (0,b) are collinear, prove that $\frac{x}{a}+\frac{y}{b}=1, ab \neq 0$

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53. Prove that the points $(a, 0), (0, b)$ and $(1, 1)$ are collinear if, $\frac{1}{a}+\frac{1}{b}=1$

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54. If the points $(x_1, y_1), (x_2, y_2)$ and (x_1+x_2, y_1+y_2) are collinear, prove that $x_1y_2 = x_2y_1$

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55. Find p if the points (p+1,1), (2p + 1,3) and (2p + 2, 2p) are collinear.

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56. For what value of k the points $(k, 2-2k), (-k+1, 2k)$ and $(-4-k, 6-2k)$ are collinear ?

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57. Show that the points (a+5, a-4), (a-2, a +3) and (a,a) do not lie on a striaght line for any a.

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58. If the vertices of an equilateral triangle are $A(x_1, y_1), B(x_2, y_2)$ and $C(x_3, y_3)$ then show that $\begin{vmatrix} x_1 & y_1 & 2 \\ x_2 & y_2 & 2 \\ x_3 & y_3 & 2 \end{vmatrix}^2 = 3a^4$, 'a' being the length of each side of the triangle.

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59. Find the adjoint of each of the following matrices: $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

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60. Find the adjoint of the following matrices:

$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$

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61. Find the adjoint of each of the following matrices: $\begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$

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62. Find the adjoint of each of the following matrices: $\begin{bmatrix} 1 & \tan(\theta/2) \\ -\tan(\theta/2) & 1 \end{bmatrix}$

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63. Find the adjoint of the following matrices: $\begin{bmatrix} 3 & 4 \\ 5 & 7 \end{bmatrix}$

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64. Find the adjoint of each of the following matrices: $\begin{bmatrix} 2 & 3 \\ 5 & 1 \end{bmatrix}$ verify that (adj A) A = |A | I = A (adj A) for the above matrices.

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65. Find the adjoint of the following matrices: $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 2 \\ 3 & 3 & 4 \end{bmatrix}$

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66. Find the adjoint of the following matrices: $\begin{bmatrix} 1 & -1 & 2 \\ 3 & 1 & -2 \\ 1 & 0 & 3 \end{bmatrix}$

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67. Find the adjoint of the following matrices: $\begin{bmatrix} 6 & -7 & 8 \\ 1 & -3 & 1 \\ 2 & 1 & -4 \end{bmatrix}$

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68. Find the adjoint of the following matrices: $\begin{bmatrix} 1 & -1 & 2 \\ 3 & 0 & -2 \\ 1 & 0 & 3 \end{bmatrix}$

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69. Find the adjoint of the following matrices: $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & 3 & 0 \\ 18 & 2 & 10 \end{bmatrix}$

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70. For the matrix $A = \begin{bmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$,

verify that A (adj A) = |A| I.

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71. Find the inverse of each of the folowing matrices:

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

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72. Find the inverse of each of the folowing matrices:

$$\begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$$

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73. Find the inverse of each of the folowing matrices:

$$\begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$$

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74. Find the inverse of each of the folowing matrices:

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

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75. Find the inverse of each of the folowing matrices:

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

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76. Find the inverse of each of the folowing matrices:

$$\begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$$

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77. Find the inverse of $A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$ and verify that $A^{-1}A = I_3$

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78. If $A = \begin{bmatrix} 11 & -20 & 17 \\ 6 & -40 & 2 \\ 7 & -20 & -11 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & -7 & 8 \\ 1 & -3 & 1 \\ 2 & 1 & -4 \end{bmatrix}$, compute AB and hence find A^{-1}

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79. If $A = \frac{1}{9}\begin{bmatrix} -8 & 1 & 4 \\ 4 & 4 & 7 \\ 1 & -8 & 4 \end{bmatrix}$, show that $A^{-1} = A'$

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80. If $A = \begin{bmatrix} -1 & 2 & 0 \\ -1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}$, show that $A^2 = A^{-1}$

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81. If $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & -1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 3 & 2 \\ 1 & 1 & 1 \\ 2 & -3 & -1 \end{bmatrix}$, verify that $(AB)^{-1} = B^{-1}A^{-1}$

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

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83. Show that $\begin{bmatrix} 1 & -\frac{\tan\theta}{2} \\ \frac{\tan\theta}{2} & 1 \end{bmatrix} \begin{bmatrix} 1 & \frac{\tan\theta}{2} \\ -\frac{\tan\theta}{2} & 1 \end{bmatrix}^{-1} = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$

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84. Find the inverse of the matrix $A = \begin{bmatrix} a & b \\ c & \frac{1+bc}{a} \end{bmatrix}$ and show that : $aA^{-1} = (a^2 + bc + 1)I - aA$

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85. For the matrix $A = \begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$, find the numbers a and b such that $A^2 + aA + bI = 0$. Hence find A^{-1}.

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

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

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88. Show that $A = \begin{bmatrix} -8 & 5 \\ 2 & 4 \end{bmatrix}$ satsfies the equation $x^2 + 4x - 42 = 0$. Hence find A^{-1}

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89. If $A = \begin{bmatrix} 2 & 3 & 3 \\ 3 & 2 & 3 \\ 3 & 3 & 2 \end{bmatrix}$, then show that $A^2 - 7A - 8I = O$

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90. Find the matrix X satisfying $X \begin{bmatrix} 5 & 3 \\ -1 & -2 \end{bmatrix} = \begin{bmatrix} 14 & 7 \\ 7 & 7 \end{bmatrix}$

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91. Find the matrix X satisfying.

$$\begin{bmatrix} 3 & 2 \\ 7 & 5 \end{bmatrix} X \begin{bmatrix} -1 & 1 \\ -2 & 1 \end{bmatrix} = \begin{bmatrix} 2 & -1 \\ 0 & 4 \end{bmatrix}$$

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92. Find the matrix X satisfying.

$$\begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix} X \begin{bmatrix} 5 & 3 \\ 3 & 2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

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93. Find the matrix X satisfying.

$$\left[(2,1),(3,2)X\begin{bmatrix}-3 & 2\\ 5 & -3\end{bmatrix}\right]=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$$

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94. If $A=\begin{bmatrix}6 & -7 & 8\\ 1 & -3 & 1\\ 2 & 1 & -4\end{bmatrix}$, compute det (adj A).

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95. If $A=\begin{bmatrix}3 & 2 & 2\\ 2 & 3 & 2\\ 2 & 2 & 3\end{bmatrix}$, find adj (Adj A)

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96. If $A=\begin{bmatrix}1 & 0 & 2\\ 0 & 2 & 1\\ 2 & 0 & 3\end{bmatrix}$, find A (adj A)

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97. Prove that $\begin{vmatrix} bc-a^2 & ca-b^2 & ab-c^2 \\ ca-b^2 & ab-c^2 & bc-a^2 \\ ab-c^2 & bc-a^2 & ca-b^2 \end{vmatrix}$ is divisible by a+b+c. Also find the value of the quotient.

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98. Using matrix method solve the following systems of equations:

`(3x + 2y = 5),(5x + 2y = 3)

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99. Using matrix method solve the following systems of equations:

$3x + 7y = 4$
$x + 2y = 1$

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100. Using matrix method solve the following systems of equations:

$2x + 5y = 1$
$3x + 2y = 7$

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101. Using Cramers, rule solve the following system of equations:

$5x + 7y = -2$
$4x + 6y = -3$

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102. Using Cramers, rule solve the following system of equations:

$(3x + ay = 4), (2x + ay = 2, a \neq 0)$

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103. Using Cramers, rule solve the following system of equations:

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

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104. Solve the following equations by matrix method.

$5x + 3y + z = 16$
$2x + y + 3z = 19$
$x + 2y + 4z = 25$

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105. Solve the following equations (by matrix method) :

$2x + 8y + 5z = 5, x + y + z = -2, x + 2y - z = 2$

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106. Find A^{-1} if $A = \begin{bmatrix} -1 & 2 & 5 \\ 2 & -3 & 1 \\ -1 & 1 & 1 \end{bmatrix}$ and hence, solve the system of linear equations:

$-x + 2y + 5z = 2, 2x - 3y + z = 15, -x + y + z = 3$

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107. Find A^{-1}, $A = \begin{bmatrix} 1 & 2 & -3 \\ 2 & 3 & 2 \\ 3 & -3 & -4 \end{bmatrix}$ Hence, solve the following system of linear equations:

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

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

$2x - y + 3z = 13, x + 3y + 2z = 1, 3x - 4y - z = 8.$

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109. 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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110. If $A = \begin{bmatrix} 1 & 2 & 0 \\ -2 & -1 & -2 \\ 0 & -1 & 1 \end{bmatrix}$, find A^{-1} using A^{-1} solve the equations.

X-2y = 10, 2x - y - z = 8, -2 y + z = 7`

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111. Given that $A = \begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$. Find AB. Use this to solve the following system of equations:

x-y+z=4,x-2y-2z=9,2x+y+3z=1.

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

$x + 2y + z = 6, 2x + y + 2z = 6, x - y - z = 2$

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113. Use matrix methocd to solve the following system of equations:

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

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114. Use matrix methocd to solve the following system of equations:

$$4x + 2y + 3z = 2$$
$$x + y + z = 1$$
$$3x + y - 2z = 5$$

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115. Use matrix methocd to solve the following system of equations:

$$6x - 9y - 20z = -4$$
$$4x - 15y + 10z = -1$$
$$2x - 3y - 5z = -1$$

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116. Use matrix methocd to solve the following system of equations:

$$x - 4y - z = 11$$
$$2x - 5y + 2z = 39$$
$$-3x + 2y + z = 11$$

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117. Which of the following equations are consistent? If consistent, find the solutions:

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

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118. Use matrix methocd to solve the following system of equations:

$$x + y = 1$$
$$3x + 3y = 3$$

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119. Use matrix methocd to solve the following system of equations:

$$4x - 3y = 5$$
$$8x - 6y = 9$$

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120. Which of the following equations are consistent? If consistent, find their solutions.

$$x - 3y - 8z = -10$$
$$3x + y - 4z = 0$$
$$2x + 5y + 6z = 13$$

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121. Classify the following system of equations as consistent or inconsistent:

$$3x - y - 2z = 2$$
$$2y - z = -1$$
$$3x - 5y = 3$$

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122. Which of the following equations are consistent? If consistent, find their solutions.

$$x - 3y - 8z = -10$$
$$3x + y - 4z = 0$$
$$2x + 5y + 6z = 13$$

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123. For what values of t, will the system tx + 3y - z = 1, x + 2 y + z = 2, - t x + y + 2 z = -1 fails to have a unique solution? Will it have any solution for this value of t?

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124. For what values of t, will the system tx + 3y - z = 1, x + 2 y + z = 2, - t x + y + 2 z = -1 fails to have a unique solution? Will it have any solution for this value of t?

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125. Show that the system of eqations 3x - y + 4z = 3, x + 2y - 3z = -2, 6x + 5y + λ z = -3 has atleast one solution for every real λ, Find the set of solutions when λ = -5

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126. Find a quadratic function defined by the equation: $f(x) = ax^2 + bx + c$ if f(1) =0,f(2)=-2and f(3)=-6

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127. The sum of three numbers is 20. Three times the first number added to the sum of second and third is 46. Twice the third number added to the first is 23. Find the numbers using matrices.

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128. 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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129. A school wants to award its students for regularity and hard work with a total cash award of Rs. 6,000. If three times the award money for hard work added to that given for regularity amounts to Rs. 11,000, represent the above situation algebraically and find the award money for each value, using matrix method.

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130. Two schools P and Q want to award their selected students on the values of Discipline. Politeness and Punctuality. The school P wants to award Rs x each, Rs y each and Rs z each for the three respective values to its 3,2, and 1 students with a total award money of Rs 1000. School Q

wants to spend Rs 1500 to award its 4, 1 and 3 students on the respective values (by giving the same award money for the three values as by school P). If the total amount of award for one prize on each value is Rs. 600. using matrices, find the award money for each value. Apart from above three values, suggest one value of awards.

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131. km and the cost of refreshment is Rs.4280.Find :

The amount which has to be taken from each person if two teahers are also to go with them.

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132. Two factories decided to award their employees for three values of (a) adaptable to new techniques (b) careful and alert in difficult situations keeping calm in tense situations. At the rate of `Rs, x, Rs, y, and Rs z per person respectivley. The first factory decided to honour respectively 2,4, and 3 employees with a total prize money of Rs. 29000. the second

factory decided to honour respectively 5,2 and 3 employees with the prize money of Rs 30500. If the three prizes per person together cost Rs 9500, then solve these equations using matrices.

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133. Two factories decided to award their employees for three values of (a) adaptable to new techniques (b) careful and alert in difficult situations keeping calm in tense situations. At the rate of `Rs, x, Rs, y, and Rs z per person respectivley. The first factory decided to honour respectively 2,4, and 3 employees with a total prize money of Rs. 29000. the second factory decided to honour respectively 5,2 and 3 employees with the prize money of Rs 30500. If the three prizes per person together cost Rs 9500, then solve these equations using matrices.

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134. Two factories decided to award their employees for three values of (a) adaptable to new techniques (b) careful and alert in difficult situations

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135. Solve the following systems of homogenous equations:

$$9x - 5y = 0$$
$$3x + 4y = 0$$

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136. Solve the following systems of homogenous equations:

$$x\cos\theta - y\sin\theta = 0$$
$$x\sin\theta + y\cos\theta = 0$$

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137. Solve the following systems of homogenous equations:

$$x + 2y = 0$$
$$3x + 6y = 0$$

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138. Solve the following systems of homogeneous linear equations:

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

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139. Solve the following systems of homogenous equations:

$$6x - 7y + 8z = 0$$
$$x - 3y + z = 0$$
$$2x + y - 4z = 0$$

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140. Solve the following systems of homogenous equations :

$$x + y - z = 0$$
$$x - 2y + z = 0$$
$$3x + 6y - 5z = 0$$

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141. Solve the following systems of homogenous equations:

$$x + y + z = 0$$
$$x - y - 5z = 0$$
$$x + 2y + 4z = 0$$

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142. Solve the following systems of homogenous equations:

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

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143. Solve the following systems of homogenous equations:

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

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144. Find the value of λ for whih the homogenous system of equations:

2x+3y - 2z = 0,2x-y+3z=9,7x+λy-z=0 has non-trivial solution.

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145. The values of $k \in R$ for which the system of equations

$x + ky + 3z = 0, kx + 2y + 2z = 0, 2x + 3y + 4z = 0$ has nontrivial solution are

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146. Determine k so that the system of equations x + 2y + kz = 0,3x + 5y - 2z = 0 and 5x + 6y - kz = 0 may have a non-zero solution. Find all the real solutions for that value of k.

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147. Find $\begin{vmatrix} 1+i & 1-i \\ 1-i & 1+i \end{vmatrix}$

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148. Evaluate $\det \begin{bmatrix} a+ib & c+id \\ -c+id & a-ib \end{bmatrix}$

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149. Evaluate $\begin{vmatrix} a_1 & 0 & 0 \\ 0 & a_2 & 0 \\ 0 & 0 & a_3 \end{vmatrix}$

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150. Evaluate $\begin{vmatrix} -1 & 0 & 0 \\ 2 & 3 & 0 \\ -6 & -4 & 5 \end{vmatrix}$

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151. Evaluate $\begin{vmatrix} 2 & -3 & 4 \\ 0 & -7 & 0 \\ 0 & 0 & i \end{vmatrix}$

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152. Evaluate $\begin{vmatrix} 1 & 2 & 2^2 \\ 1 & 3 & 3^2 \\ 1 & 4 & 4^2 \end{vmatrix}$

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153. Find x if $|(2x, , 5), (8, x)| = \begin{vmatrix} 6 & -2 \\ 7 & 3 \end{vmatrix}$

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154. If A is a skew symmetric matrix of order 3, then write the value of det A.

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155. Find the cofactor of (2,3)th entry in the matrix $\begin{bmatrix} 1 & -2 & 0 \\ 0 & 3 & 6 \\ 5 & 1 & 7 \end{bmatrix}$

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156. Write the value of det $(2I_3)$

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157. If A and B are symmetric matrices of the same order, then

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158. If det A = -3 and A is of order 2×2 find the value of det (-6A)

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159. Write the value of $\begin{vmatrix} \sin 10^\circ & -\cos 10^\circ \\ \sin 80^\circ & \cos 80^\circ \end{vmatrix}$

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160. If A of order $n \times n$ and det A = k, then find det (adj A).

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161. The value of $\left|\begin{bmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{bmatrix}\right|$ is

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162. If $\omega = \frac{-1+\sqrt{3}i}{2}$, find the value of $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$

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163. Compute $\begin{vmatrix} 2 & a & 3 \\ 4 & b & 6 \\ 6 & c & 9 \end{vmatrix}$

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164. Find the area of the triangle whose vertices are (0,0),(a,0) and (0,b)

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165. For what x, are the points (1,x), (2,2x), (3,3x) collinear?

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166. Write down the adjoint of the matrix $\begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix}$

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167. If $A^{-1} = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ and $B^{-1} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, find $(AB)^{-1}$

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168. Is the following system of equations consistent? 2x - 3y = 4, 3x + 2 y = 1.

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169. Find the number of solutions of the system of equations. 3x + 2y = 5, 6x + 4y = 3

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170. If A is a scalar matrix of order 3×3 such that $a_{22} = 5$, then find det A.

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171. If A is of order 5×5 and det A = 1, find det (-A)

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172. Find A^{-1} if $A = \begin{bmatrix} 2 & 0 \\ 0 & 3 \end{bmatrix}$

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173. If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, find adj (adj A)

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174. If $|A| = -5$, find A (adj A).

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175. Write the value of the determinant $\begin{vmatrix} 0 & a-b & a-c \\ b-a & 0 & b-c \\ c-a & c-b & 0 \end{vmatrix}$

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176. Find x if $\begin{vmatrix} 2x & 5 \\ 3 & x \end{vmatrix} = \begin{vmatrix} 16 & 5 \\ 3 & 2 \end{vmatrix}$

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177. Without expanding, show that :

$$\Delta = \begin{vmatrix} \cos ec^2\theta & \cot^2\theta & 1 \\ \cot^2\theta & \cos ec^2\theta & -1 \\ 42 & 40 & 2 \end{vmatrix} = 0$$

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178. Evaluate the following determinants:

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

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179. True or False statements :

If and B are invertible matrices such that AB = BA, then $(AB)^{-1} = A^{-1}B^{-1}$

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180. If A and B are two square matrices of the same order, then AB=BA .

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181. If $\Delta = \begin{vmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{vmatrix}$ and $\Delta_1 = \begin{vmatrix} 1 & 1 & 1 \\ yz & zx & xy \\ x & y & z \end{vmatrix}$ then prove that $\Delta + \Delta_1 = 0$

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182. If A is a square matrix of order 3 and |3A| = k|A|, then write the value of 'k'.

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

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184. Find the minor of a_{23} in $\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$

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

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186. 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.

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187. Write the value of $\Delta = \begin{vmatrix} x+y & y+z & z+x \\ z & x & y \\ -3 & -3 & -3 \end{vmatrix}$

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188. If A is a 3×3 matrix and |3A | = k |A|, then write the value of k.

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189. For what value of 'k', the system of linear equations :

x+y+z=2,2x+y-z=3 and 3x+2y+kz=4 has a unique solution.

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190. Evaluate the determinants in exercises 1 to 2.

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

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191. Evaluate the determinants in exercises 1 to 2.

$$|(\cos\theta, -\sin\theta), (\sin\theta, \cos\theta)]$$

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192. Evaluate the following determinants:

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

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

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194. 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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195. Evaluate the following determinants:

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

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

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

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

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

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200. 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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201. Find the value of x, if $\begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = \begin{vmatrix} x & 3 \\ 2x & 5 \end{vmatrix}$.

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202. 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:

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203. 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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204. 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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205. 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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206. Using the property of determinants and without expanding , prove that: $|[1, bc, a(b+c)], [1, ca, b(c+a)], [1, ab, c(a+b]\ | \ = 0$

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

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

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208. By using properties of determinants, Show that :

$$\begin{vmatrix} 0 & a & -b \\ -a & 0 & -c \\ b & c & 0 \end{vmatrix} = 0$$

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209. 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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210. 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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211. 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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212. 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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213. Prove 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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214. using properties of determinant, prove that $\begin{vmatrix} y+k & y & y \\ y & y+k & y \\ y & y & y+k \end{vmatrix} = k^2(3y+k)$

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215. Prove 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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216. 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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217. 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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218. Prove that:

$$\begin{vmatrix} 1+a^2-b^2 & 2ab & -2b \\ 2ab & 1-a^2+b^2 & 2a \\ 2b & -2a & 1-a^2-b^2 \end{vmatrix}$$

Watch Video Solution

219. 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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220. 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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221. 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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222. Find area of the triangle with vertices at the point given in the following : $(1, 0), (6, 0), (4, 3)$

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

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

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

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226. 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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227. 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).

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

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

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

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232. Write Minors and Cofactors of the elements of following determinant : $\begin{vmatrix} a & c \\ b & d \end{vmatrix}$

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233. 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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234. 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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235. 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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236. 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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237. $\Delta = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$ 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. $a_{11}A_{11} + a_{12}A_{21} + a_{13}A_{31}$

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

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

Answer:

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

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239. Find the adjoint of the following matrices:

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

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

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

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

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243. Find the inverse of each of the following matrices:

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

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244. 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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245. 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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246. 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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247. 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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248. 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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249. 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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250. 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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251. 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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252. 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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253. 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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254. Let A be a non-singular square matrix of order 3×3. Then abs(adjA) is

A. |A|

B. $|A|^2$

C. $|A|^3$

D. 3|A|

Answer:

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255. 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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256. Classify the following systems of equations as consistent or inconsistent:

$x + 2y = 2$
$2x + 3y = 3$

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257. Solve by matrix method

$2x + y + z = 1$

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

$3y - 5z = 9$

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258. Classify the following systems of equations as consistent or inconsistent:

$2x - y = 5$
$x + y = 4$

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259. Classify the following systems of equations as consistent or inconsistent:

$x + 3y = 5$
$2x + 6y = 8$

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260. Classify the following system of equations as consistent or inconsistent:

$x + y + z = 1$
$2x + 3y + 2z = 2$
$ax + ay + 2ax = 4$

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261. Classify the following system of equations as consistent or inconsistent:

$$3x - y - 2z = 2$$
$$2y - z = -1$$
$$3x - 5y = 3$$

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262. Classify the following system of equations as consistent or inconsistent:

$$5x - y + 4z = 5$$
$$2x + 3y + 5z = 2$$
$$5x - 2y + 6z = -1$$

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263. Use matrix methocd to solve the following system of equations:

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

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264. Solve by matrix method

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

$x - 2y + z = -4$

$3x - y - 2z = 3$

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

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

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

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

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267. Solve system of linear equations, using matrix method: $2x - y = -2, 3x + 4y = 3$

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268. Solve system of linear equations, using matrix method: $4x - 3y = 3, 3x - 5y = 7$

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269. Solve system of linear equations, using matrix method: $5x + 2y = 3, 3x + 2y = 5$

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270. 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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271. 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.

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272. 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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273. 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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274. 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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275. 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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276. 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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277. 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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278. 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 $(AB)^{-1}$ |

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279. 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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280. Let $A = \begin{bmatrix} 1 & -2 & 1 \\ -2 & 3 & 1 \\ 1 & 1 & 5 \end{bmatrix}$ Verify that $(A^{-1})^{-1} = A$

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

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

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283. 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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284. 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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285. Solve by matrix method

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

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286. 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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287. 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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288. Fill in the blanks :

If $A = \begin{bmatrix} 1 & a & 3 \\ 2 & b & 6 \\ 3 & c & 9 \end{bmatrix}$, then det A is equal to.....

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289. Fill in the blanks :

If $\cos 2\theta = 0, then \begin{vmatrix} 0 & \cos\theta & \sin\theta \\ \cos\theta & \sin\theta & 0 \\ \sin\theta & 0 & \cos\theta \end{vmatrix}^2$ =.....

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290. Fill in the blanks :

Determinant of a skew symmetric matrix of order 3 is always.....

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

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292. Fill in the blanks :

If A is an invertible square matrix, then $(A)^{-1}$ is equal to ..... .

Watch Video Solution

293. If A is matrix of order 3×3, then $\left(A^2\right)^{-1}$=.....

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294. Fill in the blanks :

The determinant of a diagonal matrix is equal to the product of its.....

.

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295. The sum of the products of elements of any row with the co-factors of corresponding elements is equal to .....

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296. If A is matrix of order 3×3, then $|3A| = \ldots\ldots\ldots$

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297. Fill in the blanks :

If A is a square matrix of order n then det (adj A) is equal to ..... .

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298. Fill in the blanks :

The determinant of a triangular matrix is equal to the product of its ..... .

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299. Find the area of the triangle whose vertices are (0,0),(a,0) and (0,b)

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300. If A,B,C are the angles of a triangle, then

$$\Delta = \begin{vmatrix} \sin^2 A & \cot A & 1 \\ \sin^2 B & \cot B & 1 \\ \sin^2 C & \cot C & 1 \end{vmatrix} = \ldots\ldots\ldots$$

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301. Fill in the blanks :

If A is an invertible matrix of order $n \times n (n \geq 2)$. Then adj (adj A) is equal to ..... .

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302. The sum of the products of elements of any row with the co-factors of corresponding elements is equal to .....

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303. Fill in the blanks :

If A is a matrix of order 3×3, then the number of minors in determinant of A is ..... .

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304. Fill in the blanks :

If $f(x) = \begin{vmatrix} 0 & x-1 & x-2 \\ x+1 & 0 & x-3 \\ x+2 & x+3 & 0 \end{vmatrix}$, then the value of f(0) is equal to ..... .

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

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306. Fill in the blanks :

If k is a non-zero real number and A is an invertible square matrix, then $(kA)^{-1}$ is equal to ..... .

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307. Fill in the blanks :

If A and B are invertible matrices of the same order, the inverse of AB ..... .

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308. Fill in the blanks :

The minimum value of $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+\sin\theta & 1 \\ 1 & 1 & 1+\cos\theta \end{vmatrix}$ is ..... .

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309. True or False :

It is possible to find determinant of a matirx of order 2×3

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310. True or False :

The determinant of a skew-symmetric matrix is always 0.

Watch Video Solution

311. True or False :

If A is a square matrix and |A| $\neq$ 0, then $\left(A^3\right)^{-1} = \left(A^{-1}\right)^3$

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312. True or False :

If A is a square matrix of order 2, then |adj A| = $|A|^2$

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313. True or False :

If A is any matrix of order 2×2, then adj (adj A) = A.

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314. True or False :

If A any matrix of order $n \times n(n \geq 2)$, then adj (Adj A) = $|A|^{n-2} A$

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315. $\left|A^{-1}\right| \neq |A|^{-1}$, where A is non-singular matrix.

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316. True or False :

If A and B are square matrices of order 3,|A| = 5 and |B| = 3, then |3 AB| = $27 \times 5 \times 3 = 405$

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317. True or False :

Determinant of a diagonal matrix is equal to the sum of its diagonal entries.

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318. True or False :

If A and B are square matrices of the same order, then det (A+B) = det A+det B.

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319. True or False :

If A and B are square matrices of the same order then AB is non-singular if and only if both A and B are non-singular.

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320. True or False :

If A and B are square marices of the same order, then det (AB) = det A det B.

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321. True or False :

If A is any square matrix, then det $(A^n) = (\det A)^n$ where n is any natural number.

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322. True or False :

If A and B are square matrices of the same order, then det (A+B) = det A+det B.

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323. If the determiant $\begin{vmatrix} x+a & p+u & l+f \\ y+b & q+v & m+g \\ z+c & r+w & n+h \end{vmatrix}$ splits into exactly K determinants of order 3, each element of which contains only one term, then the value of K is 8.

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324. True or False :

Let A be a square matrix of order $n \geq 2$ and B be the matrix obtained from A by interchanging two of its rows then det B = det A.

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325. True or False :

The determinant of an identity matrix is always 1.

326. True or False :

If A is a square matrix of order 1×1 then adj A = O

327. Determinant of the 1×1 matrix [-3] is

A. 3

B. -3

C. 0

D. None of these

Answer:

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328. Determinant of the matrix A = [1,3,-5] is

A. $1 + 3 + (- 5)$

B. $1 \times 3 \times (- 5)$

C. not defined

D. None of these

Answer:

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329. The value of det $\begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ is equal to

A. $\cos 2\theta$

B. 1

C. 0

D. None of these

Answer:

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330. If A and B are invertible matrices of the same order, then $(AB)^{-1}$ is equal to

A. $A^{-1}B^{-1}$

B. $A^{-1}B$

C. AB^{-1}

D. $B^{-1}A^{-1}$

Answer:

Watch Video Solution

331. A square matrix A invertible iff det A is equal to

A. 0

B. 1

C. non-zero

D. -1

Answer:

Watch Video Solution

332. If A is any of square matrix of order n, then A (adj A) is equal to

A. 1

B. $|A|I_n$

C. 0

D. $|A|^n$

Answer:

Watch Video Solution

333. Prove that $\begin{vmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{vmatrix} = (x-y)(y-z)(z-x)$

A. (x-y)(y-z)(z-x)

B. 2xyz

C. $(x+y+z)^2$

D. None of these

Answer:

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334. If A is a square matrix of order n, then det $|\lambda A|$ is equal to (λ being a scalar)

A. $\lambda \det A$

B. $|\lambda|^n \det A$

C. $\lambda^n \det A$

D. None of these

Answer:

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335. If A is square matrix such that $A^2 = I, then A^{-1}$ is equal to

A. I

B. O

C. A

D. I+A

Answer:

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336. If A is a square matrix of order 2, then det (adj A) is equal to

A. 1

B. det A

C. $(\det A)^2$

D. None of these

Answer:

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337. If A is a square matrix of order 2, then adj (adj A)

A. I

B. |A|I

C. A

D. (det A) A

Answer:

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338. If A,B,C are three square matrices of the same order such that A= B +C, then det A is equal to

A. det B + det C

B. det B

C. det C

D. none of these

Answer:

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339. If A = diag $(d_1, d_2, d_3, \ldots . d_n)$ then det A is equal to

A. 0

B. $d_1 + d_2 + d_3 \ldots . + d_n$

C. $d_1 d_2 d_3 \ldots . d_n$

D. None of these

Answer:

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340. The area of a triangle with vertices (-3,0),(3,0) and (0,k) is 9 sq. units. The value of 'k' will be

A. 9

B. 3

C. -9

D. 6

Answer:

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341. The equations $\begin{matrix} x+y+2=0 \\ 2x+2y=3 \end{matrix}$ have

A. no solution

B. a unique solution

C. finitely many more than one solutions

D. infinitely many solutions.

Answer:

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342. For what value of λ, the following system of equations

$$\begin{matrix} x+y+z=6 \\ 4x+\lambda y-\lambda z=0 \\ 3x+2y-4z=-5 \end{matrix}$$ does not have a unique solution?

A. 3

B. -3

C. 1

D. 0

Answer:

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