MATHS

BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

MATRICES

Very Short Answer Type Questions

1. IF $\begin{bmatrix} x-2 & 2y-8 \\ z+2 & 6 \end{bmatrix} = \begin{bmatrix} 5 & 2 \\ -2 & a-4 \end{bmatrix}$ then find the values of z,y,z and a.

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2. If $\begin{bmatrix} x-1 & 2 & 5-y \\ 0 & z-1 & 7 \\ 1 & 0 & a-5 \end{bmatrix} = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 4 & 7 \\ 1 & 0 & 0 \end{bmatrix}$ then find the values of x,y,z and a.

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3. IF $A = \begin{bmatrix} -1 & 3 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 3 & -5 \end{bmatrix}, X = \begin{bmatrix} x_1 & x_2 \\ x_3 & x_4 \end{bmatrix}$ and A+B=X, the find the values of x_1, x_2, x_3, x_4.

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4. IF $A = \begin{bmatrix} 2 & 3 & 1 \\ 6 & -1 & 5 \end{bmatrix}, B = \begin{bmatrix} 1 & 2 & -1 \\ 0 & -1 & 3 \end{bmatrix}$ then find the matrix X such that A+B+X=0. What is the order of the matrix X?

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5. IF $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{bmatrix}$, and $B = \begin{bmatrix} 3 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$ find 3B-2A.

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6. IF $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, and $B = \begin{bmatrix} 3 & 8 \\ 7 & 2 \end{bmatrix}$ and 2X+A+B then find X.

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7. Find the trace of $\begin{bmatrix} 1 & 3 & -5 \\ 2 & -1 & 5 \\ 2 & 0 & 1 \end{bmatrix}$.

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8. Construct a 3×2 matrix whose elements are defined by $a_{ij} = \frac{1}{2}|i - 3j|$.

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9. A certain book shop has 10 dozen chemistry books, 8 dozen physics books, 10 dozen economics books. Their selling prices are Rs.80, Rs.60, Rs.40, each respectively. Using matrix algebra. Find the total value of the books in the shop.

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10. IF $A = \begin{bmatrix} i & 0 \\ 0 & -1 \end{bmatrix}$ then show that $A^2 = \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$.

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11. IF $A = \begin{bmatrix} 2 & 4 \\ -1 & k \end{bmatrix}$ and $A^2 = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ then find the value of k.

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12. IF $A = \begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 2 & 0 \\ 1 & 0 & 4 \end{bmatrix}$, then find AB. Find BA if it exists.

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13. If $A = \begin{bmatrix} 1 & -2 & 3 \\ -4 & 2 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \\ 2 & 1 \end{bmatrix}$ do AB and BA exist? If they exist, find them.

Do A and B commute with respect to multiplication?

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14. Given example of two square matrices A and B of the same order for which AB=O, but $BA \neq O$.

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15. IF $A = \begin{bmatrix} -2 & 1 & 0 \\ 3 & 4 & -5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 4 & 3 \\ -1 & 5 \end{bmatrix}$ then find A+B'.

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16. IF $A = \begin{bmatrix} 2 & -4 \\ -5 & 3 \end{bmatrix}$ then find A+A' and AA'.

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17. IF $A = \begin{bmatrix} -2 & 1 \\ 5 & 0 \\ -1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 & 1 \\ 4 & 0 & 2 \end{bmatrix}$ then find 2A+B' and 3B'-A.

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18. IF $A = \begin{bmatrix} 2 & 0 & 1 \\ -1 & 1 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 1 & 0 \\ 0 & 1 & -2 \end{bmatrix}$ then find (AB')'

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19. IF $A = \begin{bmatrix} 2 & -1 & 2 \\ 1 & 3 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 \\ -3 & 0 \\ 5 & 4 \end{bmatrix}$ then verify that (AB)'=B'A'.

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20. IF $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$, then show that AA'=A'A

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21. Is $A = \begin{bmatrix} 0 & 1 & 4 \\ -1 & 0 & 7 \\ -4 & -7 & 0 \end{bmatrix}$ symmetric or skew symmetric?

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22. IF $A = \begin{bmatrix} -1 & 2 & 3 \\ 2 & 5 & 6 \\ 3 & x & 7 \end{bmatrix}$ is symmetric, find the value of x

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23. IF $\begin{bmatrix} 0 & 2 & 1 \\ -2 & 0 & -2 \\ -1 & x & 0 \end{bmatrix}$ is a skew symmetric matrix then find the value of x.

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24. If $\begin{bmatrix} 0 & 4 & -2 \\ -4 & 0 & 8 \\ 2 & -8 & x \end{bmatrix}$ is a skew symmetric matrix then find the value of x.

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25. Find the minors of -1 and 3 in the matrix $\begin{bmatrix} 2 & -1 & 4 \\ 0 & -2 & 5 \\ -3 & 1 & 3 \end{bmatrix}$

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26. Find the cofactors of 2 and -5 in the matrix $\begin{bmatrix} -1 & 0 & 5 \\ 1 & 2 & -2 \\ -4 & -5 & 3 \end{bmatrix}$

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27. IF $A = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 3 & 4 \\ 5 & -6 & x \end{bmatrix}$ and det A=45 then find x.

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28. Find the determinant of the matrix

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

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29. Find the determinant of the matrix

$$\begin{bmatrix} 1^2 & 2^2 & 3^2 \\ 2^2 & 3^2 & 4^2 \\ 3^2 & 4^2 & 5^2 \end{bmatrix}$$

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30. If ω is complex cube root of 1 then S.T $\begin{bmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{bmatrix} = 0$

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31. P.T the determinant of skew symmetric matrix of order 3 is zero.

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32. Find the adjoint and Inverse of the matrix $A = \begin{bmatrix} 2 & -3 \\ 4 & 6 \end{bmatrix}$

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33. Find the adjoint and inverse of the matrix $\begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$

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34. IF $A = \begin{bmatrix} a+ib & c+id \\ -c+id & a-ib \end{bmatrix}$

$a^2 + b^2 + c^2 + d^2 = 1$, then find the inverse of A.

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35. Find the rank of $\begin{bmatrix} 1 & 4 & -1 \\ 2 & 3 & 0 \\ 0 & 1 & 2 \end{bmatrix}$

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36. Find the rank of $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$

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37. Find the rank of $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

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38. IF $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ then show that $A^2 = 4A - 5I = O.$

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Short Answer Type Questions

1. IF $A = \begin{bmatrix} 1 & -2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{bmatrix}$ then show that $A^3 - 3A^2 - A - 31 = O$

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2. IF $A = \begin{bmatrix} 3 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 3 \end{bmatrix}$, then find A^4.

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3. If $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $E = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$ then show that $(aI + bE)^3 = a^3 I + 3a^2 bE$ where I is identify matrix of order 2.

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4. IF $\theta - \phi = \frac{\pi}{2}$, then show that $\begin{bmatrix} \cos^2\theta & \cos\theta\sin\theta \\ \cos\theta\sin\theta & \sin^2\theta \end{bmatrix} \begin{bmatrix} \cos^2\phi & \cos\phi\sin\phi \\ \cos\phi\sin\phi & \sin^2\phi \end{bmatrix} = O$

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5. 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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6. Show that $\begin{vmatrix} bc & b-c & 1 \\ ca & c+a & 1 \\ ab & a+b & 1 \end{vmatrix} = (a-b)(b-c)(c-a)$

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7. Show that

$|(b+c, c+a, a+b), (a+b, b+c, c+a)(a, b, c)| = a^3 + b^3 + c^3 - 3abc$

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8. Prove that $\begin{vmatrix} y+z & x & x \\ y & z+x & y \\ z & z & x+y \end{vmatrix} = 4xyz$

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9. IF $\begin{vmatrix} a & a^2 & 1+a^3 \\ b & b^2 & 1+b^3 \\ c & c^2 & 1+c^3 \end{vmatrix} = 0$, then show that abc=1

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10. 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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11. Without expanding the determinant , prove that

$$\begin{vmatrix} ax & by & cz \\ x^2 & y^2 & z^2 \\ 1 & 1 & 1 \end{vmatrix} = \begin{vmatrix} a & b & c \\ x & y & z \\ yz & zx & xy \end{vmatrix}$$

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12. Without expanding the determinant, prove that

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

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13. Show 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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14. Show that $\begin{vmatrix} 1 & a & a^2 - bc \\ 1 & b & b^2 - ca \\ 1 & c & c^2 - ab \end{vmatrix} = 0$

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15. Let A and B be invertible matrices then prove that $(AB)^{-1} = B^{-1}A^{-1}$.

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

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17. Show that the matrix $A = \begin{bmatrix} 1 & 2 & 1 \\ 3 & 2 & 3 \\ 1 & 1 & 2 \end{bmatrix}$ is non-singular and find A^{-1}.

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18. IF $abc \neq 0$, find the inverse of $\begin{bmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$

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19. IF $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ then show that adj $A = 3A^T$. Also find A^{-1}.

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20. IF $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$ then show that $A^{-1} = A^3$.

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21. IF $3A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ -2 & 2 & -1 \end{bmatrix}$ then show that $A^{-1} = A'$.

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22. Find the rank of $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 2 & 1 \end{bmatrix}$ using elementary transformations.

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23. Find the rank of $A = \begin{bmatrix} 1 & 2 & 0 & -1 \\ 3 & 4 & 1 & 2 \\ -2 & 3 & 2 & 5 \end{bmatrix}$ using elementary transformations.

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24. If A is a non-singular matrix then prove that $A^{-1} = \frac{adjA}{|A|}$.

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

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

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

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28. 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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29. Show that

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

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30. Show that $\begin{vmatrix} b+c & c+a & a+b \\ c+a & a+b & b+c \\ a+b & b+c & c+a \end{vmatrix} = 2\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$

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31. By Cramer's rule solve the system of equations $3x + 4y + 5z = 18, 2x + y + 8z = 13, 5x - 2y + 7z = 20.$

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32. Solve the equations $3x + 4y + 5z = 18, 2x + y + 8z = 13, 5x - 2y + 7z = 20$ by matrix inversion method.

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33. Solve the system of equations by Matrix inverse method, $2x - y + 3z = 8, \ -x + 2y + z = 4, 3x + y - 4z = 0$

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34. Solve the equations $3x + 4y + 5z = 18, 2x - y + 8z = 13, 5x - 2y + 7z = 20$ by Gauss-Jordan method.

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35. Solve the equations $x+y+z=9, 2x+5y+7z=52, 2x+y-z=0,$ by Gauss-Jordan Method.

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36. Solve the system of equations $2x-y+3z=9, x+y+z=6, x-y+z=2$ using Gauss Jordan method.

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37. Solve the system of equations $x+y+z=3, 2x+2y-z=3, x+y-z=1$ by Gauss Jordan method.

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38. Solve the system of equations $2x + 4y - z = 0, x + 2y + 2z = 5, 3x + 6y - 7z = 2$ by Gauss Jordan Method.

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39. Solve the system of equations by Matrix inverse method, $2x - y + 3z = 8, \ -x + 2y + z = 4, 3x + y - 4z = 0$

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40. Apply the test of rank to examine whether the equations $x + y + z = 6, x - y + z = 2, 2x - y + 3z = 9$ is consistent or inconsistent and if consistent find the complete solution.

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41. Examine the consistency of the following systems of equations $x - 3y - 8z = 10, 3x + y - 4z = 0, 2x + 5y + 6z = 13,$ and if consistent find the complete solutions.

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42. Find the non-trivial solutions, if any, for the system of homogeneous equations $2x + 5y + 6z = 0, x - 3y - 8z = 0, 3x + 4y - 4z = 0$

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43. IF $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ then show that for all the positive integers, $A^n = \begin{bmatrix} \cos n\theta & \sin n\theta \\ -\sin n\theta & \cos n\theta \end{bmatrix}$

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44. IF $A = \begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}$ then show that $A^n = \begin{bmatrix} 1+2n & -4n \\ n & 1-2n \end{bmatrix}$, for any integer $n \geq 1$.

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45. If $diagA = [a_1, a_2, a_3]$, then for any integer $n \geq 1$ show that $A^n = diag[a_1^n, a_2^n, a_3^n]$

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Ii Vsaq Saq Laq

1. A trust fund has to invest Rs 30,000 in two different types of bonds. The first bond pays 5% interest per year, and the second bond pays 7% interest per year. Using matrix multiplication, determine how to divide Rs.30,000 among the two types of bonds, if the trust fund must obtain an annual total interest of (a) Rs.1800(b) Rs.2000.

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2. Show that $\begin{vmatrix} a^2+2a & 2a+1 & 1 \\ 2a+1 & a+2 & 1 \\ 3 & 3 & 1 \end{vmatrix} = (a-1)^3$

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

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

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5. IF

$$\Delta_1 = \begin{vmatrix} a_1^2 + b_1 + c_1 & a_1a_2 + b_2 + c_2 & a_1a_3 + b_3 + c_3 \\ b_1b_2 + c_1 & b_2^2 + c_2 & b_2b_3 + c_1 \\ c_3c_1 & c_3c_2 & c_3^2 \end{vmatrix}, \Delta_2 \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$$

then find the value of $\frac{\Delta_1}{\Delta_2}$

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6. IF $\Delta_1 = \begin{vmatrix} 1 & \cos\alpha & \cos\beta \\ \cos\alpha & 1 & coy\gamma \\ \cos\beta & \cos\gamma & 1 \end{vmatrix}, \Delta_2 \begin{vmatrix} 0 & \cos\alpha & \cos\beta \\ \cos\alpha & 0 & \cos\gamma \\ \cos\beta & \cos\gamma & 0 \end{vmatrix}$ and $\Delta_1 = \Delta_2$

then show that $\cos^2\alpha + \cos^2\beta + \cos^2\gamma = 1$

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7. If $S = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}, A = \frac{1}{2}\begin{bmatrix} b+c & c-a & b-a \\ c-b & c+a & a-b \\ b-c & a-c & a+b \end{bmatrix}$, then $SAS^{-1} =$

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8. Show that $A = \begin{vmatrix} -2a & a+b & c+a \\ a+b & -2b & b+c \\ c+a & c+b & -2c \end{vmatrix} = 4(a+b)(b+c)(c+a)$

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9. If AB = I or BA= I, then prove that A is invertible and $B = A^{-1}$.

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10. For any square matrix A, show that AA' is symmetric.

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11. Define trace of a matrix.

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12. Define a diagonal matrix.

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13. Define a scalar matrix.

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Miscellaneous

1. Define symmetric and skew symmetric matrix and give an example to each.

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2. Define triangular Matrix.

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3. Rank of a Matrix

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4. Where are elementary on a matrix.

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5. Write $\begin{bmatrix} 2 & 1 & 3 \end{bmatrix} + \begin{bmatrix} 0 & 0 & 0 \end{bmatrix}$ as a single matrix.

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6. Write $\begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix} + \begin{bmatrix} -1 \\ 1 \\ 0 \end{bmatrix}$ as a single matrix.

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7. Write $\begin{bmatrix} 3 & 9 & 0 \\ 1 & 8 & 2 \end{bmatrix} + \begin{bmatrix} 4 & 0 & 2 \\ 7 & 1 & 4 \end{bmatrix}$ as a single matrix.

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8. Write $\begin{bmatrix} -1 & 2 \\ 1 & -2 \\ 3 & -1 \end{bmatrix} + \begin{bmatrix} 0 & 1 \\ -1 & 0 \\ -2 & 1 \end{bmatrix}$ as a single matrix

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9. Find the product $\begin{bmatrix} -1 & 4 & 2 \end{bmatrix} \begin{bmatrix} 5 \\ 1 \\ 3 \end{bmatrix}$

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10. Find the product $\begin{bmatrix} 2 & 1 & 4 \\ 6 & -2 & 3 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}$

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11. Find the product $\begin{bmatrix} 3 & -2 \\ 1 & 6 \end{bmatrix} \begin{bmatrix} 4 & -1 \\ 2 & 5 \end{bmatrix}$

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12. Find the product $\begin{bmatrix} 2 & 2 & 1 \\ 1 & 0 & 2 \\ 2 & 1 & 2 \end{bmatrix} \begin{bmatrix} -2 & -3 & 4 \\ 2 & 2 & -3 \\ 1 & 2 & -2 \end{bmatrix}$

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13. Find the product $\begin{bmatrix} 3 & 4 & 9 \\ 0 & -1 & 5 \\ 2 & 6 & 12 \end{bmatrix} \begin{bmatrix} 13 & -2 & 0 \\ 0 & 4 & 1 \end{bmatrix}$

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14. Find the product $\begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix} \begin{bmatrix} 2 & 1 & 4 \\ 6 & -2 & 3 \end{bmatrix}$

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15. Find the product $\begin{bmatrix} -1 & -1 \\ -1 & 1 \end{bmatrix}\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$

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16. Find the product $\begin{bmatrix} 0 & c & -b \\ -c & 0 & a \\ n & -a & 0 \end{bmatrix}\begin{bmatrix} a^2 & ab & ac \\ ab & b^2 & bc \\ ac & bc & c^2 \end{bmatrix}$

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17. $A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}, B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}, C = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ అయితే $A^2 = B^2 = C^2 = -I$

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18. IF $A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}, B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ and 1 is the unit matrix of order 2. then show that AB=-BA=-C

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19. IF

$$A = \begin{bmatrix} -1 & -2 & 3 \\ 1 & 2 & 4 \\ 2 & -1 & 3 \end{bmatrix}, B = \begin{bmatrix} 1 & -2 & 5 \\ 0 & -2 & 2 \\ 1 & 2 & -3 \end{bmatrix} \text{ and } C = \begin{bmatrix} -2 & 1 & 2 \\ 1 & 1 & 2 \\ 2 & 0 & 1 \end{bmatrix}$$

then find A+B+C.

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20. IF $A = \begin{bmatrix} 3 & 2 & -1 \\ 2 & -2 & 0 \\ 1 & 3 & 1 \end{bmatrix}, B = \begin{bmatrix} 3 & -1 & 0 \\ 2 & 1 & 3 \\ 4 & -1 & 2 \end{bmatrix}$ and X=A+B then find X.

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21. IF $A = \begin{bmatrix} 0 & 1 & 2 \\ 2 & 3 & 4 \\ 4 & 5 & 6 \end{bmatrix}, B = \begin{bmatrix} 1 & -2 & 0 \\ 0 & 1 & -1 \\ -1 & 0 & 3 \end{bmatrix}$ then find A-B and 4B-3A.

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22. IF $A = \begin{bmatrix} 1 & 5 & 3 \\ 2 & 4 & 0 \\ 3 & -1 & -5 \end{bmatrix}, B = \begin{bmatrix} 2 & -1 & 0 \\ 0 & -2 & 5 \\ 1 & 2 & 0 \end{bmatrix}$ then find 3A-4B'.

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23. Find the adjoint and inverse of the matrix $A = \begin{bmatrix} 1 & 0 & 2 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{bmatrix}$

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24. Find the rank of $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$

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25. Find the rank of $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

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26. Find the rank of $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$

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27. Find the rank of $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$

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28. Find the rank of $\begin{bmatrix} 1 & 0 & -4 \\ 2 & -1 & 3 \end{bmatrix}$

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29. Solve the following system of homogenous equations $x + y + z = 0, x + 2y - z = 0, 2x + y + 3z = 0.$

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Sapar Paper Questions

1. IF $A = \begin{bmatrix} -1 & 2 \\ 0 & 1 \end{bmatrix}$ then find AA'. Do A and A' commute with respect to mulitplication of matrices?

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2. IF $A = \begin{bmatrix} 7 & -2 \\ -1 & 2 \\ 5 & 3 \end{bmatrix}, B = \begin{bmatrix} -2 & -1 \\ 4 & 2 \\ -1 & 0 \end{bmatrix}$ then find AB' and BA'

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3. Find the determinant of the matrix

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

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4. Find the inverse of $A = \begin{bmatrix} 2 & -3 \\ 4 & 6 \end{bmatrix}$

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5. Find the rank of $\begin{bmatrix} 1 & 2 & 6 \\ 2 & 4 & 3 \end{bmatrix}$

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6. IF $A = \begin{bmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{bmatrix}$ then find A^3.

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7. IF $A = \begin{bmatrix} 1 & -2 & 3 \\ 0 & -1 & 4 \\ -2 & 2 & 1 \end{bmatrix}$ then find $(A')^{-1}$.

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8. Find the rank of $A = \begin{bmatrix} 0 & 1 & 1 & -2 \\ 4 & 0 & 2 & 5 \\ 2 & 1 & 3 & 1 \end{bmatrix}$ using elementary transformation.

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9. By using Cramer's rule solve $2x - y + 3z = 9, x + y + z = 6, x + y + z = 2.$

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10. Solve the following system of equations by using Cramer's rule.

$x - y + 3z = 5, 4x + 2y - z = 0, x + 3y + z = 5.$

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11. By using Cramer's rule solve

$2x - y + 3z = 9, \ -x + 2y + z = 4, 3x + y - 4z = 0.$

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12. By using Cramer's solve

$5x - 6y + 4z = 15, 7z + 4y - 3z = 19, 2x + y + 6z = 46.$

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13. By using Cramer's solve

$x + y + z = 1, 2x + 2y + 3z = 6, x + 4y + 9z = 3$

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14. By using Cramer's solve

$x + y + z = 9, 2x + 5y + 7z = 52, 2x + y - z = 0$

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15. Solve the following equations by using Matrix inversion method.

$2x - y + 3z = 9, x + y + z = 6, x - y + z = 2.$

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16. Solve the equations $x + y + 3z = 5, 4x + 2y - z = 0, \ -x + 3y + z = 5$ by matrix inversion method.

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17. $x + y + z = 1, 2x + 2y + 3z = 6, z + 4y + 9z = 3,$ by Gauss-Jordan method.

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18. Solve the equations $x - 3y - 8z = -10, 3x + y - 4z = 0, 2x + 5y + 6z = 13$, by Gauss - Jordan method.

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19. Solve $2x + 6y + 11 = 0, 6x + 20y - 6z + 3 = 0, 6y - 18z + 1 = 0$, by Gauss -Jordan method.

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20. Examine the consistency of the following systems of equations $x + y + z = 1, 2x + y + z = 2, x + 2y + 2z = 1$ and if consistent find the complete solutions.

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21. Examine the consistency of the following systems of equations $x + y + z = 4, 2x + 5y - 2z = 3, x + 7y - 7z = 5,$ and if consistent find the complete solutions.

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22. Examine the consistency of the following systems of equations $x + y + z = 9, 2x + 5y + 7z = 52, 2x + y - z = 0$ and if consistent find the complete solutions.

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23. Examine the consistency of the following systems of equations $x + y + z = 6, x + 2y + 3z = 10, x + 2y + 4z = 1$ and if consistent find the complete solutions.

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24. Examine the consistency of the following systems of equations $2x + 3y + z = 9, x + 2y + 3z = 6, 3x + y + 2z = 8$ and if consistent find the complete solutions.

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25. Examine the consistency of the following systems of equations $x + y + 4z = 6, 3x + 2y - 2z = 9, 5x + y + 2z = 13$ and if consistent find the complete solutions.

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26. Examine the consistency of the following systems of equations $x + y + z = 3, 2x + 2y - z = 3, x + y + z = 1$ are consistent and if consistent solve it completely.

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27. Solve the system of homogenous equations $x + y - z = 0, x - 2y + z = 0, 3x + 6y - 5z = 0.$

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28. Solve the system of homogenous equations $2x + 3y - z = 0, x - y - 2z = 0, 3x + y + 3z = 0$

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29. Solve the system of homogenous equations $3x + y - 2z = 0, x + y + z = 0, x - 2y + z = 0$

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30. Solve the system of homogenous equations $x + y - 2z = 0, 2x + y - 3z = 0, 5x + 4y - 9z = 0$

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31. Solve the system of homogenous equations $x + y - z = 0, 3x + 6y - 5z = 0, x - 2y + z = 0$

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32. Find the adjoint and inverse of the matrix $\begin{bmatrix} 2 & 1 & 2 \\ 1 & 0 & 1 \\ 2 & 2 & 1 \end{bmatrix}$

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