MATHS

BOOKS - KC SINHA MATHS (HINGLISH)

MATRICES - FOR BOARDS

Solved Examples

1. Find the number of matrices having 12 elements

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2. Write down the matrix $A = \left[a_{ij}\right]_{2\times 3}, where a_ij = 2i - 3j$

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3. Consider the following information regarding the number of men and women workers in three factories I, II and III. Men workers Women workersI 30 25II 25 31III 27 26Represent the above information in the form of a 3×2matrix. What does th

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4. Find $x, y,$ and z and for which: $\begin{bmatrix} x+3 & 2y+x \\ z-1 & 4a-6 \end{bmatrix} = \begin{bmatrix} 0 & -7 \\ 3 & 2a \end{bmatrix}$

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5. If $\begin{bmatrix} x^2-4x & x^2 \\ x^2 & x^3 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ -x+2 & 1 \end{bmatrix}$ (then find r.)

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6. If $\begin{bmatrix} x+3 & z+4 & 2y-7 \\ -6 & a-1 & 0 \\ b-3 & -21 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 6 & 3y-2 \\ -6 & -3 & 2c+2 \\ 2b+4 & -21 & 0 \end{bmatrix}$ Find the values of a, b, c,x,y and z

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7. If $A = \begin{bmatrix} a & b \\ -b & a \end{bmatrix}, B = \begin{bmatrix} -a & b \\ -b & -a \end{bmatrix}$ then find A+B

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8. Find the additive inverse of matrix $\begin{bmatrix} 2 & 1 \\ -3 & 0 \end{bmatrix}$

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9. Find matrix X if $X + \begin{bmatrix} 2 & 5 \\ 3 & -1 \end{bmatrix}, = \begin{bmatrix} 3 & 4 \\ 2 & 0 \end{bmatrix}$

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10. Find X and Y if $X+Y=\begin{bmatrix}7 & 0\\ 2 & 5\end{bmatrix}$ and $X-Y=\begin{bmatrix}3 & 0\\ 2 & 3\end{bmatrix}$

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11. Find a matrix X such tht $3A-2B+X=0, where A=\begin{bmatrix}4 & 2\\ 1 & 3\end{bmatrix}$, B= $\begin{bmatrix}-2 & 1\\ 3 & 2\end{bmatrix}$

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12. If $A=\begin{bmatrix}-1 & 2 & 3\\ -1 & 0 & 2\\ 1 & -3 & 1\end{bmatrix}$ and $B=\begin{bmatrix}4 & 5 & 6\\ -1 & 0 & 1\\ 2 & 1 & 2\end{bmatrix}$, find $4A-3B$`

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13. If $A=\begin{bmatrix}3 & -1 & 4\\ 2 & 3 & 1\end{bmatrix}, B=\begin{bmatrix}1 & 3 & 4\\ 2 & 1 & 0\\ -3 & 2 & 3\end{bmatrix}$ find AB

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14. If $A = \begin{bmatrix} -ab & b^2 \\ -a^2 & -ab \end{bmatrix}$ then show that $A^2 = 0$

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15. If $A = [1 \ -1 \ 23]$, $B = [2110]$, prove that $(A+B)^2 \neq A^2 + 2AB + B^2$.

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16. solve for x and y $\begin{bmatrix} 3 & -4 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 11 \end{bmatrix}$

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17. Write the following as a single matrix:

$$[1, \ -2, 3] \begin{bmatrix} 2 & -1 & 5 \\ 0 & 2 & 4 \\ -7 & 5 & 0 \end{bmatrix} - [2, \ -5, 7]$$

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18. If A, B, C are three matrices such that $A = [x, y, z], B = \begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}$ and $C = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$ verify that (AB)C=A(BC)

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19. If $A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & 2 \\ 1 & -3 & -1 \end{bmatrix}$, B= $\begin{bmatrix} 4 & 5 & 6 \\ -1 & 0 & 1 \\ 2 & 1 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} -1 & -2 & 1 \\ -1 & 2 & 3 \\ -1 & -2 & 2 \end{bmatrix}$ verify that $A(B + C) = AB + AC.$

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20. If $A = \begin{bmatrix} 0 & -\tan\left(\frac{\alpha}{2}\right) \\ \tan\left(\frac{\alpha}{2}\right) & 0 \end{bmatrix} then(I - A) \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$ =

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21. Find a 2×2 matrix B such that $B[1 - 214] = [6006]$.

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22. If $\begin{bmatrix} 4 \\ 1 \\ 3 \end{bmatrix} X = \begin{bmatrix} -4 & 8 & 4 \\ -1 & 2 & 1 \\ -3 & 6 & 3 \end{bmatrix}$, find X.

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23. Show that $A = \begin{bmatrix} -8 & 5 \\ 2 & 4 \end{bmatrix}$ satifies the equation $x^2 + 4x - 42 = 0$

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24. If $A = \begin{bmatrix} -4 & 1 \\ 3 & 2 \end{bmatrix}$ find $f(A)$ if $f(x) = x^2 - 2x + 3$

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25. If $A = |122212221|$, verifty that $A^2 - 4A - 5I = 0$

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26. Find the value of k so that $A^2 = 8A + kI$ where $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$.

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27. If $A = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$ then show that $A^n = \begin{bmatrix} \cos n\theta & -\sin n\theta \\ \sin n\theta & \cos n\theta \end{bmatrix}$

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28. Let $A = [0100]$show that $(aI + bA)^n = a^n I + na^{n-1}bA$, where I is the identitymatrix of order 2 and $n \in N$.

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29. If $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ then show that $A^n = \begin{bmatrix} 3^{n-1} & 3^{n-1} & 3^{n-1} \\ 3^{n-1} & 3^{n-1} & 3^{n-1} \\ 3^{n-1} & 3^{n-1} & 3^{n-1} \end{bmatrix}$.

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30. If A is any $m \times n$ such that AB and BA are both defined show that B is an $n \times m$ matrix.

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31. $A,\ B$ are two matrices such that AB and $A + B$ are both defined; show that $A,\ B$ are square matrices of the same order.

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32. A man buys 8 dozens of mangoes, 10 dozens of apples and 4 dozens of bananas. Mangoes cost Rs. 18 per dozen, apples Rs. 9 per dozen and

bananas Rs 6 per dozen. Represent the quantities bought by a row matrix and the prices by a column matrix and hence obtain the total cost.

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33. If $= \begin{bmatrix} 2 & 3 & 4 \\ 1 & 2 & 3 \\ 4 & -5 & 7 \end{bmatrix}, B = \begin{bmatrix} 2 & 5 & -1 \\ 3 & -1 & 2 \\ 7 & 2 & -3 \end{bmatrix}$, verify that $(A+B)' = A' + B'$

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34. If $A = \begin{bmatrix} 2 & 4 & -1 \\ -1 & 0 & 2 \end{bmatrix}, B = \begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 2 & 1 \end{bmatrix}$, Show that $(AB)' = B'A'$.

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35. If $A = \begin{bmatrix} 2 & 4 \\ 5 & 6 \end{bmatrix}$, show that $\left(A - A^T\right)$ is a skew symmetric matrix, where A^T is the transpose of matrix A.

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36. Express the following matrix as a sum of symmetric and skew-symmetric matrices. $\begin{bmatrix} 1 & 3 & 5 \\ -6 & 8 & 3 \\ -4 & 6 & 5 \end{bmatrix}$

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37. Find the inverse of the following matrices, if it exists, using elementary operation: $\begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$

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38. Using elementary transformations, find the inverse of each of the matrices $[2 - 61 - 2]$

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39. find inverse using elementary operations $\begin{bmatrix} 6 & -3 \\ -2 & 1 \end{bmatrix}$

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40. Find the inverse of the following matrix using elementary operation:

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

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41. Find the inverse of the following matrix by using elementary transformations operation: $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$

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Exercise

1. The number of matrices having 7 elements is.....

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2. The number of matrices having 7 elements is.....

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3. If a matrix has 5 elements, write all possible orders it can have.

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4. If a matrix has 8 elements, what are the possible orders it can have?

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5. If a matrix has 24 elements, what are the possible orders it can have? What, if it has 13 elements?

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6. What are the possible orders a matrix can have if it has 13 elements

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7. If a matrix has 18 elements, what are the possible orders it can have? What, if it has 5 elements?

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8. construct 2×3 matrix whose elements are given by $a_{ij} = i + 2j$

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

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10. Construct 3×3 matrix whose elements are given by : $a_{ij} = i \times j$

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11. Construct 3×3 matrix whose elements are given by : $a_{ij} = i - j$

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12. Construct 3×3 matrix whose elements are given by : $a_{ij} = 2i - 3j$

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13. Construct 3×3 matrix whose elements are given by : $a_{ij} = i + j$

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14. Construct a 2×2 matrix $A = [a_{ij}]$ whose elements a_{ij} are given by:

(i) $a_{ij} = i + j$ (ii) $a_{ij} = \frac{(i+j)^2}{2}$

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15. Construct a 2×2 matrix $A = [a_{ij}]$ whose elements are given by $a_{ij} = \frac{(i+2j)^2}{2}$.

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16. Construct $a3x4matricA = [a_{ij}]$ whose elements are given by

$a_{ij} = i + j$ (ii) $a_{ij} = i - j$

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17. Construct a 3×4 matrix $A = [a_{ij}]$ whose elements a_{ij} are given by:

(i) $a_{ij} = i + j$ (ii) $a_{ij} = 1 - j$ (iii) $a_{ij} = 2i$

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18. Construct 3×4 matrix $A = [a_{aj}]$ whose elements are: $a_{ij} = i.\, j$

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19. Construct 3×4 matrix $A = [a_{aj}]$ whose elements are: $a_{ij} = \frac{i}{j}$

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20. Construct a 3×4matrix, whose elements are given by:(i) $a_{ij} = \frac{1}{2}|-3i + j|$ (ii) $a_{ij} = 2i - j$

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21. Construct a 3×4 matrix $A = [a_{ij}]$ whose elements a_{ij} are given by:

(i) $a_{ij} = j$ (ii) $a_{ij} = \frac{1}{2}|-3i + j|$

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22. In the matrix $\begin{bmatrix} 1 & 0 & 5 \\ 2 & -3 & 4 \end{bmatrix}$ i. number of rows is.....

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23. In the matrix $\begin{bmatrix} 1 & 0 & 5 \\ 2 & -3 & 4 \end{bmatrix}$ number of columns is.....

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24. In the matrix $\begin{bmatrix} 1 & 0 & 5 \\ 2 & -3 & 4 \end{bmatrix}$ order of matrix matrix is.....

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25. In the matrix $\begin{bmatrix} 1 & 0 & 5 \\ 2 & -3 & 4 \end{bmatrix}$ the number of entries is.....

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26. If A is a row matrix as well as a column matrix then what is the order of A ?

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27. Let $A = [a_{ij}] = \begin{bmatrix} 1 & -2 & 5 \\ 3 & 4 & -6 \\ 9 & 15 & 13 \end{bmatrix}$ and $B = b_{ij} = \begin{bmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & \frac{5}{2} & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{bmatrix}$ Then: order of the matrix A is..

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28. Let $A = [a_{ij}] = \begin{bmatrix} 1 & -2 & 5 \\ 3 & 4 & -6 \\ 9 & 15 & 13 \end{bmatrix}$ and $B = b_{ij} = \begin{bmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & \frac{5}{2} & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{bmatrix}$ Then: $a_{23} \ldots$

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29. Let $A = [a_{ij}] = \begin{bmatrix} 1 & -2 & 5 \\ 3 & 4 & -6 \\ 9 & 15 & 13 \end{bmatrix}$ and $B = [b_{ij}] = \begin{bmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & \frac{5}{2} & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{bmatrix}$ Then: $a_{31} = \ldots$

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30. Let $A = [a_{ij}] = \begin{bmatrix} 1 & -2 & 5 \\ 3 & 4 & -6 \\ 9 & 15 & 13 \end{bmatrix}$ and $B = b_{ij} = \begin{bmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & \frac{5}{2} & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{bmatrix}$ Then: order of matrix B is.

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31. Let $A = [a_{ij}] = \begin{bmatrix} 1 & -2 & 5 \\ 3 & 4 & -6 \\ 9 & 15 & 13 \end{bmatrix}$ and $B = b_{ij} = \begin{bmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & \frac{5}{2} & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{bmatrix}$ Then: the number of elements in A andB is.....

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32. Let $A = [a_{ij}] = \begin{bmatrix} 1 & -2 & 5 \\ 3 & 4 & -6 \\ 9 & 15 & 13 \end{bmatrix}$ and $B = [b_{ij}] = \begin{bmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & \frac{5}{2} & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{bmatrix}$ Then: write the elements $b_{13}, b_{21}, b_{33}, b_{24}, b_{23}$

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33. If $\begin{bmatrix} x+y & 2 \\ 1 & x+y \end{bmatrix} = \begin{bmatrix} 3 & 2 \\ 1 & 7 \end{bmatrix}$ then $x = \ldots . y =$

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34. If $\begin{bmatrix} x-y & 2x-x_1 \\ 2x-y & 3x+y_1 \end{bmatrix}, = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$ and coordinats of points P and Q be (x,y) and (x_1, y_1) respectively then P,Q=?

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35. If $\begin{bmatrix} x-y & 2x+z \\ 2x-y & 3z+\omega \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$ find x, y, z, ω

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36. If $\begin{bmatrix} x-y & z \\ 2x-y & \omega \end{bmatrix} = \begin{bmatrix} -1 & 4 \\ 0 & 5 \end{bmatrix}$, find x, y, z, w

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37. If $\begin{bmatrix} x & 3x-y \\ 2x+z & 3y-w \end{bmatrix} = \begin{bmatrix} 3 & 2 \\ 4 & 7 \end{bmatrix}$, then find x, y, z, w.

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38. Find x,y,z from the following equation: $\begin{bmatrix} x+y & 2 \\ 5+z & xy \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 8 \end{bmatrix}$

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39. Find x,y,z from the following equation: $\begin{bmatrix} 4 & 3 \\ x & 5 \end{bmatrix} = \begin{bmatrix} y & z \\ 1 & 5 \end{bmatrix}$

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40. Write the values of $x-y+z$ from the following equation: $[x+y+zx+zy+z] = [957]$

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41. Find the values of a, b, c and d from the following equations: $[2a+ba-2b5c-d4c+3d] = [4-31124]$

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42. Let $A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}, C = \begin{bmatrix} -2 & 5 \\ 3 & 4 \end{bmatrix}$ find A+B+C

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43. Let $A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}, C = \begin{bmatrix} -2 & 5 \\ 3 & 4 \end{bmatrix}$ find A-B

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44. Let $A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}, C = \begin{bmatrix} -2 & 5 \\ 3 & 4 \end{bmatrix}$ find 3A-C

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45. If $= \begin{bmatrix} 1 & 4 & -1 \\ 2 & 6 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -2 & -6 \\ 2 & 0 & -7 \end{bmatrix}$, find A+B and A-B

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46. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 & 3 \\ -1 & 0 & 2 \end{bmatrix}$, then find $2A - B$.

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47. Given $A = [\sqrt{3}213 - 10]$ and $B = \left[2 - 2\sqrt{5}31\frac{1}{2}\right]$, find $A \quad + B$.

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48. Compute the following: $\begin{bmatrix} 0 & 1 & 5 \\ -3 & 2 & 1 \end{bmatrix} + \begin{bmatrix} 6 & 2 & -3 \\ -1 & 4 & 2 \end{bmatrix}$

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49. Compute the following: $\begin{bmatrix} 2 & -1 \\ 3 & 5 \end{bmatrix} + \begin{bmatrix} 4 & 3 \\ 1 & -2 \end{bmatrix}$

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50. Compute the following: $\begin{bmatrix} a & b \\ -b & a \end{bmatrix} + \begin{bmatrix} a & b \\ b & a \end{bmatrix}$

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51. Compute the following: $\begin{bmatrix} \cos^2 x & \sin^2 x \\ \sin^2 x & \cos^2 x \end{bmatrix} + \begin{bmatrix} \sin^2 x & \cos^2 x \\ \cos^2 x & \sin^2 x \end{bmatrix}$

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52. Compute the following: $\begin{bmatrix} a^2+b^2 & b^2+c^2 \\ a^2+c^2 & a^2+b^2 \end{bmatrix} + \begin{bmatrix} 2ab & 2bc \\ -2ac & -2ab \end{bmatrix}$

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53. Compute the following: $\begin{bmatrix} -1 & 4 & -6 \\ 8 & 5 & 16 \\ 2 & 8 & 5 \end{bmatrix} + \begin{bmatrix} 12 & 7 & 6 \\ 8 & 0 & 5 \\ 3 & 2 & 4 \end{bmatrix}$

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54. Compute the following: $\begin{bmatrix} 2 & 3 & 1 \\ 5 & -1 & 2 \\ 0 & 3 & 5 \end{bmatrix} + \begin{bmatrix} 1 & -2 & 3 \\ -3 & 1 & 5 \\ 6 & 2 & 0 \end{bmatrix}$

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55. If $A = \begin{bmatrix} 1 & -2 & 3 \\ 4 & 5 & -1 \\ 5 & 0 & 2 \end{bmatrix}$ find $3A$

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56. If $A = \begin{bmatrix} 2 & -1 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}, C = \begin{bmatrix} -2 & -3 \\ -1 & 2 \end{bmatrix}$, comopute the following: A+(B+C)

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57. If $A = \begin{bmatrix} 2 & -1 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}, C = \begin{bmatrix} -2 & -3 \\ -1 & 2 \end{bmatrix}$, compute the following: (A+B)+C

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58. If $A = \begin{bmatrix} 2 & -1 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}, C = \begin{bmatrix} -2 & -3 \\ -1 & 2 \end{bmatrix}$, compute the following: -2A+(B+C)

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59. If $A = \begin{bmatrix} 2 & -1 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}, C = \begin{bmatrix} -2 & -3 \\ -1 & 2 \end{bmatrix}$, compute the following: A+(2B-C)

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60. If $A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & 2 \\ 1 & -3 & - \end{bmatrix}, B = \begin{bmatrix} 4 & 5 & 6 \\ -1 & 0 & 1 \\ 2 & 1 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} -1 & -2 & 1 \\ -1 & 2 & 3 \\ -1 & -2 & 2 \end{bmatrix}$ verify that A+(B+C)=(A+B)+C

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61. Evaluate $\begin{bmatrix} \sin^2\theta & 1 \\ \cos^2\theta & 0 \end{bmatrix} + \begin{bmatrix} \cos^2\theta & 0 \\ -\cos ec^2\theta & 1 \end{bmatrix} + \begin{bmatrix} 0 & -1 \\ -1 & 0 \end{bmatrix}$

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62. From the following equation, find the values of x and y:

$$2\begin{bmatrix} x & 5 \\ 7 & y-3 \end{bmatrix} + \begin{bmatrix} 3 & 4 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 7 & 14 \\ 15 & 14 \end{bmatrix}$$

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63. Find the values of x and y satisfying the equation:

$$2\begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$$

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64. Solve the equation for x, y, z and t, if $2[xzyt] + 3[1 - 102] = 3[3546]$

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65. If $A = diag[1, 3, 2], B = diag, [0, 2, 5], C = diag[3, -2, 5]$. Find $4A - 3b$

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66. If $A = diag[1, 3, 2], B = diag, [0, 2, 5], C = diag[3, -2, 5]$. Find $A + B - 2C$

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67. FInd matrix X, if $X + \begin{bmatrix} 2 & 5 \\ 3 & 2 \end{bmatrix} = \begin{bmatrix} 4 & 0 \\ -7 & 6 \end{bmatrix}$

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68. Find a matrix X such that 2A + B + X =0 where $A = \begin{bmatrix} -1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -2 \\ 1 & 5 \end{bmatrix}$

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69. Find a matrix X such that $A + 2B + X = 0$ where $A = \begin{bmatrix} 2 & -1 \\ 3 & 5 \end{bmatrix}, B\begin{bmatrix} -1 & 1 \\ 0 & 2 \end{bmatrix}$

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70. Find a matrix X of order 3×2 such that $2A + 3X = 58B$, where $A = \begin{bmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{bmatrix}, B = \begin{bmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{bmatrix}$

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71. Find matrices X and Y, if $X + Y = [5209]$ and $X - Y = [360 - 1]$.

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72. Show that $\cos\theta \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix} + \sin\theta \begin{bmatrix} \sin\theta & -\cos\theta \\ \cos\theta & \sin\theta \end{bmatrix} = 1$

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73. If $2X + 3Y = \begin{bmatrix} 2 & 3 \\ 4 & 0 \end{bmatrix}$ and $3X + 2Y = \begin{bmatrix} -2 & 2 \\ 1 & -5 \end{bmatrix}$ find X and Y.

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74. Given $A = \begin{bmatrix} 1 & 2 & -3 \\ 5 & 0 & 2 \\ 1 & -1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 & 2 \\ 4 & 2 & 5 \\ 2 & 0 & 3 \end{bmatrix}$, find the matrix C such that A+C=B.

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75. If $A = \begin{bmatrix} 2 & 3 & 4 \\ -3 & 0 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -4 & -5 \\ 1 & 2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} 5 & -1 & 2 \\ 7 & 0 & 3 \end{bmatrix}$, find the matrix X such that $2A + 3B = X + C$

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76. If $A = \begin{bmatrix} 2 & 3 & -4 \\ 1 & 0 & 6 \\ -2 & 1 & 5 \end{bmatrix}, B = \begin{bmatrix} 5 & 1 & 2 \\ 6 & -1 & 4 \\ 5 & 3 & -4 \end{bmatrix}$, find $2A - 3B$.

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77. If $A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & 2 \\ 1 & -3 & 1 \end{bmatrix}, B = \begin{bmatrix} 4 & 5 & 6 \\ -1 & 0 & 1 \\ 2 & 1 & 2 \end{bmatrix}, C = \begin{bmatrix} -1 & -2 & 1 \\ -1 & 2 & 3 \\ -1 & -2 & 2 \end{bmatrix}$

find A-2B+3C. Also verify that (A+B)+C=A+(B+C).

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78. If $A = [2, 3, 5]$ and $B = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$, find AB

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79. If $A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & 1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 \\ 0 & 2 \\ 5 & 0 \end{bmatrix}$ find AB and BA.

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80. Evaluate the following : $\begin{bmatrix} 0 & 2 \\ 0 & 3 \end{bmatrix}\begin{bmatrix} 4 & 6 \\ 0 & 0 \end{bmatrix}$

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81. Evaluate the following : $\begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix}\begin{bmatrix} 4 \\ -1 \end{bmatrix}$

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82. Evaluate the following : $\begin{bmatrix} 2 \\ 4 \\ 6 \end{bmatrix}[1 \quad 2 \quad 3]$

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83. Evaluate the following : $[1 \quad 2 \quad 3]\begin{bmatrix} 2 \\ 4 \\ 6 \end{bmatrix}$

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84. Evaluate the following : $\begin{bmatrix} 1 & 2 & -3 \\ -2 & 1 & 7 \end{bmatrix} \begin{bmatrix} 2 & 3 & 1 \\ 5 & 4 & 2 \\ 1 & 6 & 3 \end{bmatrix}$

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85. Evaluate the following : $\begin{bmatrix} 1 & 4 & 2 \\ 5 & -2 & 3 \end{bmatrix} \begin{bmatrix} 2 & -4 \\ 1 & -3 \\ 4 & 0 \end{bmatrix}$

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86. If $A = \begin{bmatrix} 2 & 9 \\ 4 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 5 \\ 7 & 2 \end{bmatrix}$ find AB-BA

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87. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}, B = \begin{bmatrix} \cos\phi & \sin\phi \\ \sin\phi & \cos\phi \end{bmatrix}$ show that AB=BA.

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88. If $A = \begin{bmatrix} 1 & 2 \\ 5 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 0 \\ 3 & -4 \end{bmatrix}$, show that $AB \neq BA$

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89. If $A = \begin{bmatrix} 1 & 2 \\ 3 & -4 \\ 5 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 5 & 6 \\ 7 & -8 & 2 \end{bmatrix}$, is AB=BA? Also find AB and BA.

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90. If $A = \begin{bmatrix} -1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -3 \\ 5 & 1 \end{bmatrix}$ show that $AB \neq BA$

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91. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 0 \\ 1 & 1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 1 & 0 \\ 0 & -1 & 1 \\ 2 & 3 & 4 \end{bmatrix}$ show that $AB \neq BA$

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92. Evaluate the following : $\left\{\begin{bmatrix}1 & 3\\ -1 & -4\end{bmatrix}+\begin{bmatrix}3 & -2\\ -1 & 1\end{bmatrix}\right\}\begin{bmatrix}1 & 3 & 5\\ 2 & 4 & 6\end{bmatrix}$

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93. Evaluate the following : Find $\begin{bmatrix}1 & -1\\ 0 & 2\\ 2 & 3\end{bmatrix}\left(\begin{bmatrix}1 & 0 & 2\\ 2 & 0 & 1\end{bmatrix}-\begin{bmatrix}0 & 1 & 2\\ 1 & 0 & 2\end{bmatrix}\right)$

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94. Evaluate the following : $\begin{bmatrix}1 & 1 & 1\end{bmatrix}\begin{bmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ 0 & 0 & 1\end{bmatrix}\begin{bmatrix}4\\ 4\\ 4\end{bmatrix}$

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95. Evaluate : $\begin{bmatrix}1 & 3 & 5\end{bmatrix}\begin{bmatrix}1 & 0 & 3\\ 2 & 0 & 1\\ 0 & 1 & 2\end{bmatrix}\begin{bmatrix}1\\ 4\\ 6\end{bmatrix}$

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96. Evaluate the following : $\begin{bmatrix} 1 & -1 \\ 0 & 2 \\ 2 & 3 \end{bmatrix} \left(\begin{bmatrix} 1 & 0 & 2 \\ 2 & 0 & 1 \end{bmatrix} - \begin{bmatrix} 0 & 1 & 3 \\ 1 & 0 & 2 \end{bmatrix} \right)$

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97. If $P(x) = \begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$ then show that $P(x)P(y) = P(x+y) = P(y)P(x)$

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98. If $F(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$ Show that $F(x)F(y) = F(x+y)$

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99. If $A = \begin{bmatrix} 2 & 3 \\ -1 & 5 \end{bmatrix}, B = \begin{bmatrix} 3 & -1 \\ 4 & 7 \end{bmatrix}$ and $C = \begin{bmatrix} 5 & -1 \\ 0 & 3 \end{bmatrix}$, show that $A(B+C) = AB + AC$

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100. Which relation is true for $A=\begin{bmatrix}2 & -1\\ -1 & 2\end{bmatrix}$ and $B=\begin{bmatrix}1 & 4\\ -1 & 1\end{bmatrix}$ (1) $(A+B)^2=A^2+2AB+B^2$ (2) $(-B)^2=A^2-2AB+B^2$ (3) AB=BA

(4) None of these

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101. If $=\begin{bmatrix}2 & 3\\ 4 & 5\end{bmatrix}, B=\begin{bmatrix}3 & 4\\ 7 & 2\end{bmatrix}, C=\begin{bmatrix}1 & 0\\ 0 & 7\end{bmatrix}$ then verify that $(AB)C=A(BC)$

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102. If A=$\begin{bmatrix}\cos\alpha & \sin\alpha\\ -\sin\alpha & \cos\alpha\end{bmatrix}$ then show that $A^2=\begin{bmatrix}\cos 2\alpha & \sin 2\alpha\\ -\sin 2\alpha & \cos 2\alpha\end{bmatrix}$

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103. If $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}, B = \begin{bmatrix} 0 & -i \\ i & 0 \end{bmatrix}$ and $C = \begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix}$, show that $A^2 = B^2 = -C^2 = I_2$ and $AB = -BA, AC = -CA$ and $BC = -C$

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104. If $A = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}, B = \begin{bmatrix} 0 & 5 & 7 \\ 0 & 0 & 6 \\ 0 & 0 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} -1 & 3 & 5 \\ 1 & -3 & -5 \\ -1 & 3 & 5 \end{bmatrix}$,

show that $A^2 = I$

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105. If $A = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}, B = \begin{bmatrix} 0 & 5 & 7 \\ 0 & 0 & 6 \\ 0 & 0 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} -1 & 3 & 5 \\ 1 & -3 & -5 \\ -1 & 3 & 5 \end{bmatrix}$,

show that $C^2 = C$

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106. If $A = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}, B = \begin{bmatrix} 0 & 5 & 7 \\ 0 & 0 & 6 \\ 0 & 0 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} -1 & 3 & 5 \\ 1 & -3 & -5 \\ -1 & 3 & 5 \end{bmatrix}$,

show that $B^4 = O$

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

find A(BC). Hence or otherwise write down the value of (AB)C.

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108. Show that $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}^2 = \begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix}$

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109. If $A = \begin{bmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$, find A^2

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110. If $A = \begin{bmatrix} 0.8 & 0.6 \\ -0.6 & 8.0 \end{bmatrix}$ then find A^3

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111. If $A = \begin{bmatrix} \cos^2\theta & \cos\theta\sin\theta \\ \cos\theta\sin\theta & \sin^2\theta \end{bmatrix}$ and $B = \begin{bmatrix} \cos^2\phi & \cos\phi\sin\phi \\ \cos\phi\sin\phi & \sin^2\phi \end{bmatrix}$, show that AB is zero matrix if θ and ϕ differ by an odd multiple of $\frac{\pi}{2}$.

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112. Find the product of the followng two matrices: $\begin{bmatrix} 0 & c & -b \\ -c & 0 & a \\ b & -a & 0 \end{bmatrix}$ and $\begin{bmatrix} a^2 & ab & ac \\ ab & b^2 & bc \\ ac & bc & c^2 \end{bmatrix}$

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113. If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ a & b & -1 \end{bmatrix}$, find A^2

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114. If $A = \begin{bmatrix} -1 & 1 & -1 \\ 3 & -3 & 3 \\ 5 & -5 & 5 \end{bmatrix}, B = \begin{bmatrix} 0 & 4 & 3 \\ 1 & -3 & -3 \\ -1 & 4 & 4 \end{bmatrix}$. Compute $A^2 . B^2$

.

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115. If $A = \begin{bmatrix} 2 & 3 & 4 \\ 1 & 2 & 3 \\ -1 & 1 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 & 0 \\ -1 & 2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$, find AB and BA and show that $AB \neq BA$

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116. If ω is cube roots of unity, prove that

$$\left\{\begin{bmatrix}1 & \omega & \omega^2\\ \omega & \omega^2 & 1\\ \omega^2 & 1 & \omega\end{bmatrix}+\begin{bmatrix}\omega & \omega^2 & 1\\ \omega^2 & 1 & \omega\\ \omega & \omega^2 & 1\end{bmatrix}\right\}\begin{bmatrix}1\\ \omega\\ \omega^2\end{bmatrix}=\begin{bmatrix}0\\ 0\\ 0\end{bmatrix}$$

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117. If

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

verify that A(B-C)=(AB-AC)`

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118. Find x if $\begin{bmatrix}x & 1\end{bmatrix}\begin{bmatrix}1 & 0\\ -1 & -3\end{bmatrix}\begin{bmatrix}x\\ 3\end{bmatrix}=O$

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119. $\begin{bmatrix}2x & 3\end{bmatrix}\begin{bmatrix}1 & 2\\ -3 & 0\end{bmatrix}\begin{bmatrix}x\\ 3\end{bmatrix}=0$

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120. Find the values of a and b for which the following holds:

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

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121. Let $A - [2 - 134]$, $B - [5274]$, $C - [2538]$. Find a matrix D such that

$CD - AB \quad = \quad 0$

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122. Find the matrix X so that $X[123456] = [-7-8-9246]$

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123. If $\begin{bmatrix}1 & x & 1\end{bmatrix} \times \begin{bmatrix}1 & 3 & 2\\ 2 & 5 & 1\\ 15 & 3 & 2\end{bmatrix} \times \begin{bmatrix}1\\ 2\\ x\end{bmatrix} = 0$, find the value of x

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124. Find the value of x such that $[1, x, 1]\begin{bmatrix}1 & 2 & 3\\ 4 & 5 & 6\\ 3 & 2 & 5\end{bmatrix}\begin{bmatrix}1\\ -2\\ 3\end{bmatrix} = O$

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125. Find x, if $[x-5-1][102021203][x41] = O$.

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126. For what values of x : $[121][120201102][02x] = O$?

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127. If $\begin{bmatrix} x & 4 & 1 \end{bmatrix} \begin{bmatrix} 2 & -1 & 2 \\ 1 & 0 & 2 \\ 0 & 2 & -4 \end{bmatrix} \begin{bmatrix} x \\ 4 \\ 1 \end{bmatrix} = 0$ then find x

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128. If $[1, 1, x] \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} = O$ find x

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129. Find a 2×2 matrix B such that $\begin{bmatrix} 6 & 5 \\ 5 & 6 \end{bmatrix} B = \begin{bmatrix} 11 & 0 \\ 0 & 11 \end{bmatrix}$

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130. Find a 2×2 matrix B such that $\begin{bmatrix} 5 & 4 \\ 1 & 1 \end{bmatrix} B = \begin{bmatrix} 1 & -2 \\ 1 & 3 \end{bmatrix}$

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131. Without using the concept of inverse of a matrix, find the matrix $[xyzu]$ such that $[5 \quad -7 \quad -23][xyzu] = [-16 \quad -672]$.

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132. Find the matrix A such that $\begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -1 & -8 & -10 \\ 1 & -2 & -5 \\ 9 & 22 & 15 \end{bmatrix}$

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133. Find the matrix A such that $A. \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix} = \begin{bmatrix} 0 & -4 \\ 10 & 3 \end{bmatrix}$.

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134. If $A = \begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$, find $A^2 - 5A - 14I$.

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135. If the matrix $A = \begin{bmatrix} 5 & 3 \\ 12 & 7 \end{bmatrix}$, then verify that $A^2 - 12 - I = O$ where I is a unit matrix.

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136. Show that the matrix $A = [2312]$ satisfies the equation $A^3 - 4A^2 + A = O$.

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137. Find the value of k so that $A^2 = 8A + kI$ where $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$.

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138. If $A = \begin{bmatrix} 3 & -2 \\ 4 & -2 \end{bmatrix}$, find k such that $A^2 = kA - 2I_2$

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139. If $A = [10 \ -17]$, find k such that $A^2 - 8A + kI = O$.

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140. If $f(x) = x^2 - 5x + 7$ and $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$. Find $f(A)$

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141. If $A = \begin{bmatrix} 3 & 4 \\ -4 & -3 \end{bmatrix}$, find $f(A), where f(x) = x^2 - 5x + 7$

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142. If $A = [1221]$ and $f(x) = x^2 - 2x - 3$, show that $f(A) = O$.

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143. If $A = \begin{bmatrix} 2 & -1 \\ 3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 4 \\ -1 & 7 \end{bmatrix}$ then find the value of $3A^2 - 2B$

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144. Let $f(x) = x^2 - 5x + 6$. Find f(A), if $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$

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145. If $A = [1233 - 21421]$, then show that $A^3 - 23A - 401 = 0$.

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146. If $A = [102021203]$, prove that $A^3 - 6A^2 + 7A + 2I = 0$

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147. If $A=\begin{bmatrix}3 & 1\\ -1 & 2\end{bmatrix}, I=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$ and $O=\begin{bmatrix}0 & 0\\ 0 & 0\end{bmatrix}$, show that $A^2-5A+7I=0$. Hence find A^{-1}.

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148. If $A=\begin{bmatrix}1 & 1\\ 0 & 1\end{bmatrix}$, prove that $A^n=\begin{bmatrix}1 & n\\ 0 & 1\end{bmatrix}$ for all $n\varepsilon N$

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149. If $A=[3-41-1]$, then prove that $A^n=[1+2n-4\cap 1-2n]$, where n is any positive integer.

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150. If $A=diag\,(a\ b\ c)$, show that $A^n=diag\,(a^n\ b^n\ c^n)$ for all positive integer n.

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151. If $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$, prove by mathematicasl induction that, $A^n = \begin{bmatrix} \cos n\alpha & \sin n\alpha \\ -\sin n\alpha & \cos n\alpha \end{bmatrix}$ for every natural number n

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152. If $A = [\cos\theta i \sin\theta i \sin\theta \cos\theta]$, then prove by principal of mathematical induction that

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153. If A and B are square matrices of the same order such that $AB = BA$, then proveby induction that $AB^n = B^n A$. Further, prove that $(AB)^n = A^n B^n$for all $n \in N$.

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154. A trust fund has Rs. 30000 that must be invested 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 30000 among the two types of bonds. If the trust fund must obtain an annual total interest of (i) Rs 1800 (ii) 2000.

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155. A store has in stock 20 dozen shirts, 15 dozen trousers, and 25 dozen pair of socks. If the selling prices is Rs. 50 per shirt, Rs. 90 per trouser and Rs. 12 per pair of socks, then find the total amount the store owner will get after selling all the items in the stock.

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156. The cooperative stores of a particular school has 10 dozen physics books, 8 dozen chemistry books and 5 dozen mathematics books. Their

selling prices are Rs. 8.30, Rs. 3.45 and Rs. 4.50 each respectively. Find the total amount the store will receive from selling all the items.

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157. The bookshop of a particular school has 10 dozen chemistry books, 8 dozen physics books, 10 dozen economics books. Their selling prices are Rs 80, Rs 60 and Rs 40 each respectively. Find the total amount the bookshop will receive from selling all

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158. Find the transpose of the mastrix $\begin{bmatrix} 1 & 3 \\ 2 & 6 \\ 5 & -3 \end{bmatrix}$

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159. If $A = \begin{bmatrix} 3 \\ 1 \\ -2 \end{bmatrix}, B = [1 \quad 3 \quad -5]$, verify $(AB)' = B'A'$

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160. If $= \begin{bmatrix} -2 \\ 4 \\ 5 \end{bmatrix}, B = [1, 3, -5]$, verify that $(AB)' = B'A'$

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161. If $A = [-123]$ and $B = [-2 \quad -1 \quad -4]$, verify that $(AB)^T = B^T A^T$

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162. If $A = \begin{bmatrix} 3 \\ 5 \\ 2 \end{bmatrix}$ and $B = [1, 0, 4]$, verify that $(AB)' = B'A'$

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

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164. If $A = \begin{bmatrix} 1 & 4 \\ 0 & 5 \\ 6 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 & -1 \\ 1 & 0 & -7 \end{bmatrix}$, verify that $(AB)' = B'A'$

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165. If $A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & 1 & 0 \end{bmatrix}, B = \begin{bmatrix} 1 & -1 \\ 0 & 2 \\ 5 & 0 \end{bmatrix}$, verify that $(AB)' = B'A'$

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166. If $A = \begin{bmatrix} 5 & 1 \\ 6 & 7 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}, C = \begin{bmatrix} 1 & 3 \\ -1 & 4 \end{bmatrix}$, verify the following $(A + B') = A' + B'$

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167. If $A = \begin{bmatrix} 5 & 1 \\ 6 & 7 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}, C = \begin{bmatrix} 1 & 3 \\ -1 & 4 \end{bmatrix}$, verify the following $(3B)' = 3(B')'$

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168. If $A = \begin{bmatrix} 5 & 1 \\ 6 & 7 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}, C = \begin{bmatrix} 1 & 3 \\ -1 & 4 \end{bmatrix}$, verify the following $(A')' = A$

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169. If $A = \begin{bmatrix} 5 & 1 \\ 6 & 7 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}, C = \begin{bmatrix} 1 & 3 \\ -1 & 4 \end{bmatrix}$, verify the following $(AC)' = C'A'$

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170. If $A = \begin{bmatrix} 5 & 1 \\ 6 & 7 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}, C = \begin{bmatrix} 1 & 3 \\ -1 & 4 \end{bmatrix}$, verify the following $(AB)' = B'A'$

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171. If (i) $A = [\cos\alpha \sin\alpha - \sin\alpha \cos\alpha]$, then verify that $A'A = I$.

(ii) $A = [\sin\alpha \cos\alpha - \cos\alpha \sin\alpha]$, then verify that $A'A = I$.

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172. If $A = [\sin\alpha \cos\alpha - \cos\alpha \sin\alpha]$, verify that $A^T A = I_2$.

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173. Find x and y i the matrix $A = \frac{1}{3}\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ x & 2 & y \end{bmatrix}$ satisfythe condition $AA' = A'A = I_3$

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174. If $A = \begin{bmatrix} 0 & a & b \\ -a & 0 & c \\ -b & -c & 0 \end{bmatrix}$, find $\frac{1}{2}(A + A')$ and $\frac{1}{2}(A - A')$

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175. If $A = \begin{bmatrix} 3m & -4 \\ 1 & -1 \end{bmatrix}$, show that $\left(A - A^T\right)$ is skew symmetric matrix, where A^T is the transpose of matrix A.

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176. If $A = \begin{bmatrix} 3 & 4 \\ 5 & 1 \end{bmatrix}$, show that $A - A^T$ is a skew symmetric matrix, where A^T denotes the transpose of matrix A

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177. If $A = \begin{bmatrix} 4 & 1 \\ 5 & 8 \end{bmatrix}$, show that $A + A^T$ is symmetric matrix, where A^T denotes the transpose of matrix A

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178. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$, prove that $A - A^T$ is skew symmetric matrix, where A^T denotes the transpose of A.

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179. Expressing the following matrices as the sum of a symmetric and skew symmetric matrix : $\begin{bmatrix} 1 & 2 & 4 \\ 6 & 8 & 1 \\ 3 & 5 & 7 \end{bmatrix}$

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180. Expressing the following matrices as the sum of a symmetric and skew symmetric matrix : $\begin{bmatrix} 2 & 4 & -6 \\ 7 & 3 & 5 \\ 1 & -2 & 4 \end{bmatrix}$

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181. Expressing the following matrices as the sum of a symmetric and skew symmetric matrix : $\begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$

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182. Let $A = [325413067]$ Express A as sum of two matrices such that one is symmetric and the other is skew symmetric.

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183. Show that the following matrices are skew symmetric:

$$\begin{bmatrix} 0 & e & f \\ -e & 0 & g \\ -f & -f & 0 \end{bmatrix}$$

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184. Show that the following matrices are skew symmetric:

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

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185. Show that the matrix $\begin{bmatrix} 1 & -1 & 5 \\ -1 & 2 & 1 \\ 5 & 1 & 3 \end{bmatrix}$ is symmetric.

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186. Find the values of x, y, z if the matrix $A = [02yzxy - zx - yz]$ satisfy the equation $A'A = I$.

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187. If B is a square matrix and A is any square matrix of order equl to that of B, prove that B AB is symmetirc or skew symmetric according as A is symmetric or skew symmetric.

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188. If A and B are symmetric matrices of the same order, show that AB+BA is symmetric.

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189. Ussing elementary transformtions (operations), find the inverse of the following mtrices, if it exists: $\begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$

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190. Ussing elementary transformtions (operations), find the inverse of the following mtrices, if it exists: $\begin{bmatrix} 2 & 1 \\ 7 & 4 \end{bmatrix}$

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191. Ussing elementary transformtions (operations), find the inverse of the following mtrices, if it exists: $\begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix}$

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192. Using elementary transformations (operations), find the inverse of the following matrices, if it exists: $\begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$

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193. Ussing elementary transformtions (operations), find the inverse of the following mtrices, if it exists: $\begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$

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194. Using elementary transformations (operations), find the inverse of the following matrices, if it exists: $\begin{bmatrix} 4 & 5 \\ 3 & 4 \end{bmatrix}$

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195. Using elementary transformations, find the inverse of the matrix $[3 - 1 - 42]$

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196. Ussing elementary transformtions (operations), find the inverse of the following mtrices, if it exists: $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$

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197. Ussing elementary transformtions (operations), find the inverse of the following mtrices, if it exists: $\begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$

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198. Using elementary transformation, find the inverse of the matrix $\begin{bmatrix} 10 & -2 \\ -5 & 1 \end{bmatrix}$

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199. Ussing elementary transformtions (operations), find the inverse of the following mtrices, if it exists: $\begin{bmatrix} 3 & 9 \\ 1 & 3 \end{bmatrix}$

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200. Using elementary transformations, find the inverse of the matrix : $(20 - 1510013)$

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201. Using elementary transformations, find the inverse of the matrix $[2 - 332233 - 22]$

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202. Find the inverse the matrix (if it exists) given in $[2134 - 10 - 721]$

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203. Using elementary transformations (operations), find the inverse of the following matrices, if it exits $\begin{bmatrix} 2 & -1 & 3 \\ -5 & 3 & 1 \\ -3 & 2 & 3 \end{bmatrix}$

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