MATHS

BOOKS - PSEB

MATRICES

Example

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

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

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

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4. Find the values of a, b, c and d from the following equation :

$$\begin{bmatrix} 2a+b & a-2b \\ 5c-d & 4c+3d \end{bmatrix} = \begin{bmatrix} 4 & -3 \\ 11 & 24 \end{bmatrix}.$$

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5. Given $A = \begin{bmatrix} \sqrt{3} & 1 & -1 \\ 2 & 3 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & \sqrt{5} & 1 \\ -2 & 3 & \frac{1}{2} \end{bmatrix}$ find A + B

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6. 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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7. If $A = \begin{bmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{bmatrix}$, then find the matrix X, such that $2A + 3X = 5B$

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8. Find matrices X and Y if : $X+Y=\begin{bmatrix}5 & 2\\ 0 & 9\end{bmatrix}$ and $X-Y=\begin{bmatrix}3 & 6\\ 0 & -1\end{bmatrix}$.

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9. Find the values of x and y from the following equation:

$$2\begin{bmatrix}x & 5\\ 7 & y-3\end{bmatrix}+\begin{bmatrix}3 & -4\\ 1 & 2\end{bmatrix}=\begin{bmatrix}7 & 6\\ 15 & 14\end{bmatrix}$$

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10. Find the values of x and y from the following equation:

$$2\begin{bmatrix}x & 2\\ 6 & y-2\end{bmatrix}+\begin{bmatrix}-4 & 3\\ 2 & 1\end{bmatrix}=\begin{bmatrix}6 & 7\\ 14 & 15\end{bmatrix}$$

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11. Find AB, if $A = \begin{bmatrix} 6 & 9 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 6 & 0 \\ 7 & 9 & 8 \end{bmatrix}$

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

Show that $AB \neq BA$

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13. If $A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then $AB = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ and $BA = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$. Clearly $AB \neq BA$ Thus matrix multiplication is not commutative.

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14. Find AB, if $A = \begin{bmatrix} 0 & -1 \\ 0 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 5 \\ 0 & 0 \end{bmatrix}$

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15. If $A = \begin{bmatrix} 1 & 1 & -1 \\ 2 & 0 & 3 \\ 3 & -1 & 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 \\ 0 & 2 \\ -1 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 2 & 3 & -4 \\ 2 & 0 & -2 & 1 \end{bmatrix}$, find $A(BC)$, $(AB)C$ and show that $(AB)C = A(BC)$

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16. If $A = \begin{bmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{bmatrix}, B = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{bmatrix}, C = \begin{bmatrix} 2 \\ -2 \\ 3 \end{bmatrix}$ Calculate AC, BC and $(A + B)C$. Also, verify that $(A + B)C = AC + BC$

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17. If $A = ' \begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$, then find $A^2 - 23A - 40I$ where I is Identify Matrix.

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18. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$, then show that $A^3 - 23A - 40I = O$

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19. If $A = \left[[3, \sqrt{3}, 2], [4, 2, 0] \text{ and } B = \begin{bmatrix} 2 & -1 & 2 \\ 1 & 2 & 4 \end{bmatrix} \right.$, verify that : $(A')' = A$

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20. If $A = \left[[3, \sqrt{3}, 2], [4, 2, 0]\right.$ and $B = \begin{bmatrix} 2 & -1 & 2 \\ 1 & 2 & 4 \end{bmatrix}$, verify that : $(A + B)' = A' + B'$

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21. If $A = \left[[3, \sqrt{3}, 2], [4, 2, 0]\right.$ and $B = \begin{bmatrix} 2 & -1 & 2 \\ 1 & 2 & 4 \end{bmatrix}$, verify that : $(A')' = A$

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

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23. Express 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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24. By using elementary operations, find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$

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

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26. Find P^{-1}, if it exists, given $P = \begin{bmatrix} 10 & -2 \\ -5 & 1 \end{bmatrix}$

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

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28. If A and B are symmetric matrices of the same order, then show that AB is symmetric if and only if A and B commute, that is AB = BA.

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29. Let $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix}, C = \begin{bmatrix} 2 & 5 \\ 3 & 8 \end{bmatrix}$ Find a matrix D such that CD – AB = O.

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Exercise

1. In the matrix $A = \begin{bmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & \frac{5}{2} & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{bmatrix}$, write: The order of the matrix.

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2. In the matrix $A = \begin{bmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & \frac{5}{2} & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{bmatrix}$, write:The number of elements.

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3. In the matrix $A = \begin{bmatrix} 2 & 5 & 19 & -7 \\ 35 & -2 & \frac{5}{2} & 12 \\ \sqrt{3} & 1 & -5 & 17 \end{bmatrix}$, write: write the elements $a_{13}, a_{21}, a_{33}, a_{24}, a_{23}$

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

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

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6. Construct a 2×2 matrix, $A = [a_ij]$ whose elements are given by:: $a_ij = \frac{(i+j)^2}{2}$

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7. Construct 2×2 matrix $A = [a_ij]$ whose elements are given by $a_ij = \frac{i}{j}$.

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8. Construct a 2×2 matrix, $A = [a_ij]$ whose elements are given by:: $a_ij = \frac{(i + 2j)^2}{2}$

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9. Construct a 3×4 matrix, whose elements are given by: $a_ij = \frac{1}{2}| - 3i + j|$

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10. Construct a 3×4 matrix, whose elements are given by: $a_ij = 2i - j$

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11. Find the values of x, y and 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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12. Find the values of x, y and 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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13. Find the values of x, y and z from the following equation:

$$\begin{bmatrix} x+y+z \\ x+z \\ y+z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}$$

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14. Find the values of a, b, c and d from the equation : $\begin{bmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$ and write correct answer from the following:

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15. $A = [a_ij]_m \times n$ is a square matrix, if:

A. $m < n$

B. $m > n$

C. $m = n$

D. None of these

Answer:

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16. Which of the given values of x and y make the following pair of matrices equal: $\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix}, \begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$

A. $x = -\frac{1}{3}, y = 7$

B. Not possible to find

C. $y = 7, x = -\frac{2}{3}$

D. $x = -\frac{1}{3}, y = -\frac{2}{3}$

Answer:

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17. The number of all possible matrices of order 3×3 with each entry 0 or 1 is:

A. 27

B. 18

C. 81

D. 512

Answer:

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18. 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 the following: $A + B$

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19. 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 the following: $A - B$

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20. 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 the following: $3A - C$

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21. 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 the following: AB

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22. 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 the following: BA

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

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24. 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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25. Compute the following: :

$$\begin{bmatrix} -1 & 4 & -6 \\ 8 & 5 & 16 \\ 2 & 8 & 5 \end{bmatrix} + [[12, 7, 6], [8, 0, 5], [3, 2, 4]$$

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26. 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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27. Compute the indicated products: $\begin{bmatrix} a & b \\ -b & a \end{bmatrix}\begin{bmatrix} a & -b \\ b & a \end{bmatrix}$

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28. Compute the indicated products: $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}[2 \quad 3 \quad 4]$

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29. Compute the indicated products: $\begin{bmatrix} 1 & -2 \\ 2 & 3 \end{bmatrix}\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \end{bmatrix}$

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30. Compute the indicated products: $\begin{bmatrix} 2 & 3 & 4 \\ 3 & 4 & 5 \\ 4 & 5 & 6 \end{bmatrix} \begin{bmatrix} 1 & -3 & 5 \\ 0 & 2 & 4 \\ 3 & 0 & 5 \end{bmatrix}$

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31. Compute the indicated products: $\begin{bmatrix} 2 & 1 \\ 3 & 2 \\ -1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 1 \\ -1 & 2 & 1 \end{bmatrix}$

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32. Compute the indicated products: $\begin{bmatrix} 3 & -1 & 3 \\ -1 & 0 & 2 \end{bmatrix} \begin{bmatrix} 2 & -3 \\ 1 & 0 \\ 3 & 1 \end{bmatrix}$

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

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34. If $A = \begin{bmatrix} \frac{2}{3} & 1 & \frac{5}{3} \\ \frac{1}{3} & \frac{2}{3} & \frac{4}{3} \\ \frac{7}{3} & 2 & \frac{2}{3} \end{bmatrix}$ and $B = \begin{bmatrix} \frac{2}{5} & \frac{3}{5} & 1 \\ \frac{1}{5} & \frac{2}{5} & \frac{4}{5} \\ \frac{7}{5} & \frac{6}{5} & \frac{2}{5} \end{bmatrix}$, then compute $3A - 5B$

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35. Simplify, $\cos\theta \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix} + \sin\theta \begin{bmatrix} \sin\theta & -\cos\theta \\ \cos\theta & \sin\theta \end{bmatrix}$

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

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

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38. Find X , if $Y = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$ and $2X + Y = \begin{bmatrix} 1 & 0 \\ -3 & 2 \end{bmatrix}$

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39. Find x and y, if $2\begin{bmatrix}1 & 3\\0 & x\end{bmatrix}+\begin{bmatrix}y & 0\\1 & 2\end{bmatrix}=\begin{bmatrix}5 & 6\\1 & 8\end{bmatrix}$

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40. If $x\begin{bmatrix}2\\3\end{bmatrix}+y\begin{bmatrix}-1\\1\end{bmatrix}=\begin{bmatrix}10\\5\end{bmatrix}$, find the values of x and y.

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41. Given$3\begin{bmatrix}x & y\\z & w\end{bmatrix}=\begin{bmatrix}x & 6\\-1 & 2w\end{bmatrix}+\begin{bmatrix}4 & x+y\\z+w & 3\end{bmatrix}$, find the values of x, y, z and w.

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42. 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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43. Show that: $\begin{bmatrix} 5 & -1 \\ 6 & 7 \end{bmatrix}\begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix} \neq \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}\begin{bmatrix} 5 & -1 \\ 6 & 7 \end{bmatrix}$

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44. Show that:

$$\begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 0 \\ 1 & 1 & 0 \end{bmatrix}\begin{bmatrix} -1 & 1 & 0 \\ 0 & -1 & 1 \\ 2 & 3 & 4 \end{bmatrix} \neq \begin{bmatrix} -1 & 1 & 0 \\ 0 & -1 & 1 \\ 2 & 3 & 4 \end{bmatrix}\begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 0 \\ 1 & 1 & 0 \end{bmatrix}$$

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45. If $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$ then find $A^2 - 5A + 6I$.

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46. If $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$, prove that $A^3 - 6A^2 + 7A + 2I = 0$

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47. If $(A = \begin{bmatrix} 3 & -2 \\ 4 & -2 \end{bmatrix})$, find K such that $(A^2 = KA - 2I_2)$.

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48. If $A = \begin{bmatrix} 0 & -\frac{\tan\alpha}{2} \\ \frac{\tan\alpha}{2} & 0 \end{bmatrix}$ and I is the identity matrix of order 2, show that $I + A = (I - A)\begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$

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49. A trust fund has Rs. 30,000 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.30,000 among the two types of bonds. If the trust fund must obtain an annual total interest of: Rs.1800

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50. A trust fund has Rs. 30,000 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.30,000 among

the two types of bonds. If the trust fund must obtain an annual total interest of: Rs.2000

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51. The book shop of a particular school has 10 dozen Chemistry books, 8 dozen Physics books, 10 dozen Economics books. The selling prices are Rs 80, Rs 60 and Rs 40 each respectively. Find rhe total amount the book-shop will receive from selling all the books, using matrix algebra.

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52. Assume X, Y, Z, W and P are matrices of order $2 \times n, 3 \times k, 2 \times p, n \times 3$ and $p \times k$ respectively. The restriction on n, k and p so that PY + WY will be defined are:

A. $k = 3, p = n$

B. k is arbitrary, p = 2

C. p is arbitrary, k = 3

D. k = 2, p = 3

Answer:

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53. Assume X, Y, Z, W and P are matrices of order $2 \times n, 3 \times k, 2 \times p, n \times 3$ and $p \times k$ respectively.If n = p, then the order of the matrix $7X - 5Z$is:

A. $p \times 2$

B. $2 \times n$

C. $n \times 3$

D. $p \times n$

Answer:

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54. Find the transpose of the following matrix: $\begin{bmatrix} 5 \\ \frac{1}{2} \\ -1 \end{bmatrix}$

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55. Find the transpose of the following matrix : $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$

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56. Find the transpose of the following matrix: $\begin{bmatrix} -1 & 5 & 6 \\ \sqrt{3} & 5 & 6 \\ 2 & 3 & -1 \end{bmatrix}$

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57. If $A = \begin{bmatrix} -1 & 2 & 3 \\ 5 & 7 & 9 \\ -2 & 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -4 & 1 & -5 \\ 1 & 2 & 0 \\ 1 & 3 & 1 \end{bmatrix}$, then verify that $(A + B)' = A' + B'$

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58. If $A = \begin{bmatrix} -1 & 2 & 3 \\ 5 & 7 & 9 \\ -2 & 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -4 & 1 & -5 \\ 1 & 2 & 0 \\ 1 & 3 & 1 \end{bmatrix}$, then verify that $(A - B)' = A' - B'$

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59. If A' = [[3,4],[-1,2],[0,1]] and B = [[-1,2,3],[1,2,3]] , *thenver* if *yt*ˆ(A + B)' = A' + B'`

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

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61. If $A = \begin{bmatrix} -2 & 3 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 0 \\ 1 & 2 \end{bmatrix}$, then find $(A + 2B)'$

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62. For the matrices A and B, verify that $(AB)' = B'A'$, where

: $A = \begin{bmatrix} 1 \\ -4 \\ 3 \end{bmatrix}, B = \begin{bmatrix} -1 & 2 & 1 \end{bmatrix}$

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63. For the matrices A and B, verify that $(AB)' = B'A'$, where

: $A = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}, B = \begin{bmatrix} 1 & 5 & 7 \end{bmatrix}$

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64. If $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$, then verify that $A'A = I$

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65. If $A = \begin{bmatrix} \sin\alpha & \cos\alpha \\ -\cos\alpha & \sin\alpha \end{bmatrix}$, then verify that $A'A = I$

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

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67. Show that the matrix $A = \begin{bmatrix} 0 & 1 & -1 \\ -1 & 0 & 1 \\ 1 & -1 & 0 \end{bmatrix}$ is a skew symmetric matrix.

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68. For the matrix $A = \begin{pmatrix} 1 & 5 \\ 6 & 7 \end{pmatrix}$, verify that : A + A' is a Symmetric Matrix

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69. For the matrix $A = \begin{pmatrix} 1 & 5 \\ 6 & 7 \end{pmatrix}$, verify that : A - A' is a Skew-Symmetric Matrix

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70. Find 1/2 (A + A') and (A-A')$when$A = [[0,a,b],[-a,0,c],[-b,-c,0]]

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

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72. Express the following matrices as the sum of a symmetric and a skew symmetric matrix: : $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$

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

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74. Express the following matrices as the sum of a symmetric and a skew symmetric matrix: : $\begin{bmatrix} 1 & 5 \\ -1 & 2 \end{bmatrix}$

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75. If A and B are symmetric matrices of same order then $AB - BA$ is a :

A. Skew symmetric matrix

B. Symmetric matrix

C. Zero matrix

D. Identity matrix

Answer:

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76. If $A = \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$ and $A + A' = I$, then the value of α is:

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. π

D. $3\frac{\pi}{2}$

Answer:

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77. Using elementary transformations find the inverse of matrix $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$

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78. Using elementary transformations, find the inverse of each of the matrix, if it exists: $\begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix}$

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79. Using elementary transformations, find the inverse of each of the matrix, if it exists: $\begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$

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80. Using elementary transformations, find the inverse of each of the matrix, if it exists: $\begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$

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81. Using elementary transformations, find the inverse of each of the matrix, if it exists: $\begin{bmatrix} 2 & 1 \\ 7 & 4 \end{bmatrix}$

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82. Using elementary transformations, find the inverse of each of the matrix, if it exists: $\begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$

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83. Using elementary transformations, find the inverse of each of the matrix, if it exists: $\begin{bmatrix} 3 & 1 \\ 5 & 2 \end{bmatrix}$

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84. Using elementary transformations, find the inverse of each of the matrix, if it exists: $\begin{bmatrix} 4 & 5 \\ 3 & 4 \end{bmatrix}$

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85. Using elementary transformations, find the inverse of each of the matrix, if it exists: $\begin{bmatrix} 3 & 10 \\ 2 & 7 \end{bmatrix}$

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86. By using elementary transformations, find the inverse of the matrix : $A = [[3, \ -1][-4, 2]]$

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87. By using elementary transformations, find the inverse of the matrix : $A = [[2, -6][1, -2]]$

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88. Using elementary transformations, find the inverse of each of the matrix, if it exists: $\begin{bmatrix} 6 & -3 \\ -2 & 1 \end{bmatrix}$

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89. Using elementary transformations find the inverse of matrix $A = \begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$

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90. Using elementary transformations, find the inverse of each of the matrix, if it exists: $\begin{bmatrix} 2 & 1 \\ 4 & 2 \end{bmatrix}$

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91. Using elementary transformations, find the inverse of each of the matrix, if it exists: $\begin{bmatrix} 2 & -3 & 3 \\ 2 & 2 & 3 \\ 3 & -2 & 2 \end{bmatrix}$

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92. Using elementary transformations find the inverse of the matrix. $\begin{bmatrix} 1 & 3 & -2 \\ -3 & 0 & -5 \\ 2 & 5 & 0 \end{bmatrix}$

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93. Matrices A and B will be inverse of each other only if:

A. AB = BA

B. AB = BA = 0

C. AB = 0, BA = I

D. AB = BA = I

Answer:

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94. Let $A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$, show that $(aI + bA)^n = a^n I + na^{n-1} bA$, where I is the identity matrix of order 2 and $n \in N$

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95. If $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$, prove that $A^n = \begin{bmatrix} 3^{n-1} & 3^{n-1} & 3^{n-1} \\ 3^{n-1} & 3^{n-1} & 3^{n-1} \\ 3^{n-1} & 3^{n-1} & 3^{n-1} \end{bmatrix}, n \in N$

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96. If $A = \begin{pmatrix} 3 & -4 \\ 1 & -1 \end{pmatrix}$, then prove by Mathematical Induction that : $A^n = \begin{pmatrix} 1+2n & -4n \\ n & 1-2n \end{pmatrix}$, where $n \in N$

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97. If A and B are symmetric matrices, prove that AB – BA is a skew symmetric matrix

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98. Show that the matrix B`AB) is symmetric or skew symmetric according as A is symmetric or skew symmetric.

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99. Find the values of x, y, z if the matrix $A = \begin{bmatrix} 0 & 2y & z \\ x & y & -z \\ x & -y & z \end{bmatrix}$ satisfy the equation $A'A = I$

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100. For what values of x : $\begin{bmatrix} 1 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 1 & 0 & 2 \end{bmatrix} \begin{bmatrix} 0 \\ 2 \\ x \end{bmatrix} = O$

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

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102. ਜੇਕਰ $\begin{bmatrix} x & -5 & -1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix} \begin{bmatrix} x \\ 4 \\ 1 \end{bmatrix} = O$ ਹੈ ਤਾਂ x ਦਾ ਮੁੱਲ ਪਤਾ ਕਰੋ।

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103. ਮੈਟ੍ਰਿਕਸ X ਪਤਾ ਕਰੋ ਜੇਕਰ $X \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} = \begin{bmatrix} -7 & -8 & -9 \\ 2 & 4 & 6 \end{bmatrix}$ ਹੈ।

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104. f A and B are square matrices of the same order such that AB = BA, then prove by induction that $AB^n = B^nA$ Further, prove that $(AB)^n = A^nB^n$ for all $n \in N$

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105. . If $A = \begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ is such that $A^2 = I$, then:

A. $I + \alpha^2 + \beta\gamma = 0$

B. $I - \alpha^2 + \beta\gamma = 0$

C. $I - \alpha^2 - \beta\gamma = 0$

D. $I + \alpha^2 - \beta\gamma = 0$

Answer:

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106. If the matrix A is both symmetric and skew symmetric, then :

A. A is a diagonal matrix

B. A is a zero matrix

C. A is a square matrix

D. None of these

Answer:

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107. If A is square matrix such that $A^2 = A$,then $(I + A)^3 - 7A$ is equal to:

A. A

B. I-A

C. I

D. 3A

Answer:

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