MATHS

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MATRICES

Example

1. Write the element (a_{23}) of $(a3 \times 3)$ matrix $(A = (a_ij))$, whose elements (a_ij) are given by $(a_ij = \frac{|i-j|}{2})$

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2. If $\begin{bmatrix} x+y & 1 \\ 2y & 5 \end{bmatrix} = \begin{bmatrix} 7 & 1 \\ 4 & 5 \end{bmatrix}$, find 'x'

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3. If $\begin{bmatrix} x-y & z \\ 2x-y & w \end{bmatrix} = \begin{bmatrix} -1 & 4 \\ 0 & 5 \end{bmatrix}$, find the value of x+y.

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4. If $A = \begin{pmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{pmatrix}$, then for what value of α is A an identity matrix?

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5. 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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6. If $\begin{bmatrix} 9 & -1 & 4 \\ -2 & 1 & 3 \end{bmatrix} = a + \begin{bmatrix} 1 & 2 & -1 \\ 0 & 4 & 9 \end{bmatrix}$, then find the matrix A

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7. If $A = \begin{bmatrix} 2 & 2 \\ -3 & 1 \\ 4 & 0 \end{bmatrix}, B = \begin{bmatrix} 6 & 2 \\ 1 & 3 \\ 0 & 4 \end{bmatrix}$, find the matrix C such that A+B+C is a zero matrix.

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8. Write the order of the product matrix:

$$\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} [2, 3, 4]$$

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9. If $[5x1]\begin{bmatrix}4\\2\\7\end{bmatrix}$ = [35], find x.

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10. If matrix $A=\begin{bmatrix}1&-1\\-1&1\end{bmatrix}$ and $A^2=kA$, then write the value of 'k'.

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11. If $\begin{pmatrix}2&3\\5&7\end{pmatrix},\begin{pmatrix}1&-3\\-2&4\end{pmatrix},=\begin{pmatrix}-4&6\\-9&x\end{pmatrix}$, find the value of 'x'.

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12. If A is a square matrix such that $A^2=I$, then find the simplified value of $(A-I)^3+(A+I)^3-7A$

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13. If A is a square matrix such that $A^2 = A$, then write the value of $7A - (I + A)^3$, where I is an identity matrix.

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14. Solve the following equations for x : $[x1]\begin{bmatrix} 1 & 0 \\ -2 & 0 \end{bmatrix} = 0$

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15. 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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16. Evaluate the following $[ab]\begin{bmatrix} c \\ d \end{bmatrix} + [abcd]\begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix}$

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17. If $A = \begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$, find a and b for which $A^2 + aA + bI = O$

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18. If $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$ and $A^3 - 6A^2 + 7A + kI_3 = O$, find k.

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19. 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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20. Let $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ -1 & 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 2 & -1 \\ 1 & 3 & 4 \\ 0 & -2 & -3 \end{bmatrix}$ Find AB and BA. Is AB = BA?

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21. If the product of two matries is a zero matrix, it is not necessary that one of the matrices is a zero matrix.

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22. Give an example of two matrices A and B such that AB =O when neither A = O nor B = O

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23. If $A = \begin{pmatrix} 0 & -1 & 2 \\ 2 & -2 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 1 \\ 1 & 0 \\ 1 & 1 \end{pmatrix}$, find a matrix C such that CAB = I = ABC, where I is the 2×2 unit matrix.

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

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25. Prove the following by the principle of Mathematical Induction: If $A = \begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}, then A^n = \begin{bmatrix} 1+2n & -4n \\ n & 1-2n \end{bmatrix}$ where n $\in$ N.

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26. If A is a matrix of order 3×4 and B is a matrix of order 4×3, find the order of the matrix (AB).

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

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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 product:

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

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31. Compute the indicated product:

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

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32. 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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33. 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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34. 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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35. If $A = \begin{bmatrix} 4 \\ 2 \\ 3 \end{bmatrix}$ and B = [1 0 2], the find the value of AB.

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36. If $P = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 2 & 1 \\ 2 & 3 & 0 \end{bmatrix}, Q = \begin{bmatrix} 1 & 2 \\ 3 & 0 \\ 4 & 1 \end{bmatrix}$, find PQ.

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37. If $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}, \begin{pmatrix} 3 & 1 \\ 2 & 5 \end{pmatrix}, = \begin{pmatrix} 7 & 11 \\ k & 23 \end{pmatrix}$, then write the value of 'k'

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38. If matrix $A = \begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$ and $A^2 = \lambda A$, then write the value of `lambda'.

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39. If A is a square matrix such that $A^2 = A$, then write the value of $(I + A)^2 - 3A$

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40. Find the values of 'a' and 'b' of which :

$$\begin{bmatrix} 1 & b \\ -a & 2b \end{bmatrix}\begin{bmatrix} 2 \\ -1 \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \end{bmatrix}$$

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41. If $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$, then find A^2

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

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43. Evaluate the following

$$\begin{bmatrix} 4 \\ 7 \end{bmatrix}\begin{bmatrix} 7 & 9 \end{bmatrix} + \begin{bmatrix} 4 & 0 \\ 0 & -5 \end{bmatrix}.$$

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44. Evaluate the following

$$[xyz]\begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}$$

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45. Evaluate the following

$$\begin{bmatrix} 1 & -1 \\ 0 & 2 \\ 2 & 3 \end{bmatrix}\left(\begin{bmatrix} 1 & 0 & 2 \\ 2 & 0 & 1 \end{bmatrix}-\begin{bmatrix} 0 & 1 & 2 \\ 1 & 0 & 2 \end{bmatrix}\right)$$

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46. Solve the matrix equations:

$$[2 \quad x \quad 3]\begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 1 & 0 & 2 \end{bmatrix}\begin{bmatrix} x \\ 3 \end{bmatrix}=O$$

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47. Find the value of 'x' such that : $[121]\begin{bmatrix}1 & 0 & 2\\ 0 & 2 & 1\\ 2 & 0 & 3\end{bmatrix}\begin{bmatrix}x\\ 4\\ 1\end{bmatrix} = O$

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48. Find x, if $\begin{bmatrix}x & -5 & -1\end{bmatrix}\begin{bmatrix}1 & 0 & 2\\ 0 & 2 & 1\\ 2 & 0 & 3\end{bmatrix}\begin{bmatrix}x\\ 4\\ 1\end{bmatrix} = 0$

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49. Find the values of 'a' and 'b' for which the following hold:

$$\begin{bmatrix}3 & 2\\ 7 & a\end{bmatrix}\begin{bmatrix}5 & -2\\ -7 & b\end{bmatrix} = \begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}.$$

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50. Let $A = \begin{bmatrix} 2 & 4 \\ 1 & -3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 & 5 \\ 0 & 2 & 6 \end{bmatrix}$ Find AB.

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51. Let $A = \begin{bmatrix} 2 & 4 \\ 1 & -3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 & 5 \\ 0 & 2 & 6 \end{bmatrix}$ Is BA defined ? Justify your answer.

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52. 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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53. Prove that AB = BA when:

$A = \begin{bmatrix} \cos\theta & \sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$ and $B = \begin{bmatrix} \cos\phi & \sin\phi \\ \sin\phi & \cos\phi \end{bmatrix}$

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54. 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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55. Show with the help of an example that AB = O, whereas BA $\neq$ O, where is a zero matrix and A,B arre both non-zero matrices.

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56. Give an example of matrices A,B and C such that AB = AC but $B \neq C, A \neq O.$

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57. If A $= \begin{bmatrix} 5 & 2 \\ -1 & 2 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ show that (A - 3I) (A - 4I) = 0

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58. If $A = \begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$, show that $A^2 - 5A - 14I$ is a scalar matrix.

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59. Consider the matrices :

$A = \begin{bmatrix} 1 & -2 \\ -1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$. If $AB = \begin{bmatrix} 2 & 9 \\ 5 & 6 \end{bmatrix}$, find the values of a,b,c and d.

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60. If $A = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 4 \\ -1 & 1 \end{bmatrix}$. Does $(A+B)^2 = A^2 + 2AB + B^2$ hold?

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

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62. 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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63. Find the matrix X so that $X\begin{bmatrix}1 & 2 & 3\\ 4 & 5 & 6\end{bmatrix}=\begin{bmatrix}-7 & -8 & -9\\ 2 & 4 & 6\end{bmatrix}$.

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64. If $A=\begin{bmatrix}1 & -2\\ -3 & 4\end{bmatrix}$, find $-A^2+5A$

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65. If $A=\begin{bmatrix}3 & 1\\ -1 & 2\end{bmatrix}$, show that $A^2-5A+7I=O$ Use this result to find A^4.

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66. If $A=\begin{bmatrix}2 & 0 & 1\\ 2 & 1 & 3\\ 1 & -1 & 0\end{bmatrix}$, then find A^2-5A6I

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

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

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69. If $M = \begin{bmatrix} 7 & 5 \\ 2 & 3 \end{bmatrix}$, then verify the equation: $M^2 - 10M + 11I_2 = O$.

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

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71. If $A = \begin{bmatrix} -1 & 2 \\ 3 & 1 \end{bmatrix}$, find f(A), where $f(x) = x^2 - 2x + 3$

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72. If $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then find k so that $A^2 = 8A + kI$

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73. If $A = \begin{bmatrix} 3 & -2 \\ 4 & -2 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then find k so that $A^2 = kA - 2I$

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74. If A $= \begin{bmatrix} 0 & 3 \\ -7 & 5 \end{bmatrix}, I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then find k so that $kA^2 = 5A + 21I$

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75. 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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76. A matrix X has a + b rows and a + 2 columns. Both matrices XY and XX exist. Find 'a' and 'b'. Can you say XY and YZ are fo the same type? Are they equal?

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77. If $A = \begin{pmatrix} -1 & -4 \\ 1 & 3 \end{pmatrix}$, 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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78. 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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79. Let $A = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin n\theta & \cos n\theta \end{bmatrix}$ for every positive integer n. Find the determinant of A.

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80. 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. 1,800

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81. 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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82. 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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83. There are two families A and B.In family A, there are 4 men, 6 women and 2 children : and in family B, there are 2 men, 2 women and 4 children. The recommended daily requirement of Calories is Men: 2400 , Women: 1900 , Children: 1800 Also daily requirement for protein is Men: 55 gm , Women:45 gm and Children:33 gm Calculate the total requirement of calories and proteins for each of the two families.

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84. Let $A = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$ and $f(x) = x^2 - 4x + 7$. Show that $f(A) = O_{2\times 2}$. Use this result to find A^5

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85. Let $A = \begin{bmatrix} 0 & -\frac{\tan(\alpha)}{2} \\ \tan(\alpha)/2 & 0 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, Find the sum of matrices.

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86. Show that the matrix: $A = \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$ is orthogonal.

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87. Matrix $A = [(0, 2b, -2), (3, 1, 3), (3a, 3-1)]$ is given to be symmetric, find values of a and b.

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88. If $A = \begin{pmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{pmatrix}$, find $'\alpha'$ satisfying $0 < alpa < \frac{\pi}{2}$ when $A + A^T = \sqrt{2}I_2$, where A^T is transpose of A.

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89. If $\begin{bmatrix} a+b & 5 \\ 2 & b \end{bmatrix} = \begin{bmatrix} 6 & 5 \\ 2 & 2 \end{bmatrix}$, then find 'a'.

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90. If $A = \begin{bmatrix} 3 & \sqrt{3} & 5 \\ 2 & 5 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 & 2 \\ 1 & 2 & 4 \end{bmatrix}$, then verify that :

(A')' = A

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91. If $A = \begin{bmatrix} 3 & \sqrt{3} & 2 \\ 4 & 2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 & 2 \\ 1 & 2 & 4 \end{bmatrix}$, then verify that :

(A+B)'=A'+B'

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92. If $A = \begin{bmatrix} 3 & \sqrt{3} & 2 \\ 4 & 2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 & 2 \\ 1 & 2 & 4 \end{bmatrix}$, then verify that :

(kB)' = kB', where k is any constant.

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93. Show that A + A' is symmetric when $A = \begin{bmatrix} 2 & 4 \\ 5 & 6 \end{bmatrix}$.

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94. Show that A-A' is skew-symmtric when $A = \begin{bmatrix} 1 & 4 \\ 3 & 7 \end{bmatrix}$

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

$(A + B)' = A' + B'$.

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96. If $A = \begin{bmatrix} 2 \\ 4 \\ 5 \end{bmatrix}$, $B = [1, 3, 6]$, then verfiy that (AB)' = B'A'.

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97. 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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98. Show that the positive odd integral powers of a kew-symmetric matrix are skew-symmetric and positive even integral powers of a skew-symmetric matrix are symmetric.

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99. Let A be a square symmetric matrix. Show that $\frac{1}{2}(A + A')$ is a symmetric matrix.

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100. Let A be a square symmetric matrix. Show that $\frac{1}{2}(A - A')$ is a skew-symmetric matrix.

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101. Prove that any square matrix can be expressed as sum of symmetric and skew symmetric matrix uniquely

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

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

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104. 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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105. 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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106. 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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107. If a matrix has 24 elements, what are the possible orders it can have? What, if it has 13 elements?

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

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109. Construct a 2×2 matrix $A = [A_{ij}]$, whose elements are given by: $a_{ij} = \frac{(i-j)^2}{2}$

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110. Construct a 2×2 matrix $A = [A_{ij}]$, whose elements are given by: $a_{ij} = -\frac{i}{j}$

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

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112. Constuct a 3×3 matrix, whose elements are given by :

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

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113. Constuct a 3×4 matrix, whose elements are given by :

$a_{ij} = 2\frac{i}{j}$

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114. Find the values of x,y and z from the following equations:

$\begin{bmatrix} 8 & 3 \\ y & 5 \end{bmatrix} = \begin{bmatrix} z & x \\ 4 & 5 \end{bmatrix}$

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115. Find the value of 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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116. 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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117. Find the values of a, b, c and d from the following equations

$$\begin{bmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$$

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118. $A = \left[a_{ij}\right]_{m \times n}$ is a square matrix, if

a. m < n

b. m > n

c. m = n

d. none of these

A. mltn

B. mgtn

C. m=n

D. None of these

Answer:

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

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

B. 2) Not possible to find

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

D. 4) $x = -\frac{1}{3}, y = -\frac{2}{3}$

Answer:

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120. 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

A. 27

B. 18

C. 81

D. 512

Answer:

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121. 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 each of the following :

2A+2B

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122. 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 each of the following :

A-B

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123. 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 each of the following :

3A+C

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124. 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 each of the following :

AC

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

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127. 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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128. 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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129. 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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130. Compute the following: : $\begin{bmatrix} a & b \\ -b & a \end{bmatrix} + \begin{bmatrix} a & b \\ b & a \end{bmatrix}$

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

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132. 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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133. 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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134. 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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135. 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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136. 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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137. 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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138. Find X and Y, if: $X + Y = \begin{bmatrix} 5 & 1 \\ 2 & 4 \end{bmatrix}$ and $X - Y = \begin{bmatrix} 3 & 2 \\ 0 & 3 \end{bmatrix}$

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

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

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141. Solve the equation for x,y,z and t, if $2\begin{bmatrix} x & z \\ y & t \end{bmatrix} + 3\begin{bmatrix} 1 & -1 \\ 0 & 2 \end{bmatrix} = 3\begin{bmatrix} 3 & 5 \\ 4 & 6 \end{bmatrix}$

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142. 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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143. 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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144. 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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145. Show that $\begin{bmatrix}4 & 1\\2 & 7\end{bmatrix}\begin{bmatrix}2 & 1\\3 & 4\end{bmatrix}\neq\begin{bmatrix}2 & 1\\3 & 4\end{bmatrix}\begin{bmatrix}4 & 1\\2 & 7\end{bmatrix}$

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146. 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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147. 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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148. 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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149. If $A = \begin{bmatrix} 3 & -2 \\ 4 & -2 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then find k so that $A^2 = kA - 2I$

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150. 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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151. 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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152. 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. 2,000

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153. 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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154. 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. Choose the correct answer in the following questions :

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

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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155. Assume X, Y, Z, W and P are matrices of order 2 × n , 3 × k , 2 × p , n × 3 and p × k respectively.If n = p, then the order of the matrix 3X - 6Z is:

A. $p \times 2$

B. $2 \times n$

C. $n \times 3$

D. $p \times n$

Answer:

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156. Find the transpose of each of the following matrices:

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

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157. Find the transpose of each of the following matrices:

$$\begin{bmatrix} 6 & -1 \\ -4 & 3 \end{bmatrix}$$

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158. Find the transpose of each of the following matrices:

$$\begin{bmatrix} -1 & 5 & 6 \\ \sqrt{3} & 5 & 6 \\ 2 & 3 & -1 \end{bmatrix}$$

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159. 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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160. 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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161. If $A' = \begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$ and $B = [(-1, 2, 1).(1, 2, 3]$, then verify that :(A+B)' = A' +B'.

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

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

$A = \begin{bmatrix} 1 \\ -4 \\ 3 \end{bmatrix}, B = [-1 \quad 2 \quad 1]$

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165. 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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166. If $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$, A'A=I.

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

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168. 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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169. For the matrix $A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$, verify that $(A + A')$ is a symmetric matrix.

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170. For the matrix $A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$, verify that $(A - A')$ is a skew symmetric matrix.

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

.

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172. 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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173. Express the following matrices as 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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174. 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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175. Express the following matrices as sum of a symmetric and a skew symmetric matrix

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

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176. If A, B are symmetric matrices of same order, then AB - BA is a :

A. Skew symmetric matrix

B. Symmetric matrix

C. Zero matrix

D. Identity matrx.

Answer:

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

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

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

C. π

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

Answer:

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178. Using elementary transformation, find the inverse of the following matrix

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

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179. 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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180. 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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181. 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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182. 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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183. 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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184. 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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185. 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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186. 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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187. Using elementary transformations find the inverse of the following matrice $\begin{bmatrix} 3 & -1 \\ -4 & 2 \end{bmatrix}$

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188. Using elementary transformations , find the inverse of the following matrice $\begin{bmatrix} 2 & -6 \\ 1 & -2 \end{bmatrix}$

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189. 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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190. Using elementary transformations , find the inverse of the following matrice $\begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$

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191. 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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192. 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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193. 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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194. Using elementary transformation, find the inverse of each of the matrices

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

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195. 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

A. AB = BA

B. AB=BA =O

C. AB=O,A=I

D. AB=BA=I

Answer:

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196. 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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197. 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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198. If A and B are symmetric matrices, prove that AB – BA is a skew symmetric matrix

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

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200. 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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201. For what value of x : $[1, 2, 3][(1, 2, 0)(2, 0, 1)(1, 0, 2)] \begin{bmatrix} 0 \\ 2 \\ x \end{bmatrix} = 0$?

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

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203. Find x, if $\begin{bmatrix} x & -5 & -1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix} \begin{bmatrix} x \\ 4 \\ 1 \end{bmatrix} = 0$

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204. Find the matrix X such that

$$X \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} = \begin{bmatrix} -7 & -8 & -9 \\ 2 & 4 & 6 \end{bmatrix}$$

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205. f A and B are square matrices of the same order such that AB = BA, then prove by 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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206. If $A = \begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ is such that $A^2 = I$, then

a. $1 + \alpha^2 + \beta\gamma = 0$

b. $1 - \alpha^2 + \beta\gamma = 0$

c. $1 - \alpha^2 - \beta\gamma = 0$

d. $1 + \alpha^2 - \beta\gamma = 0$

A. $1 + \alpha^2 + \beta\gamma = 0$

B. $1 - \alpha^2 + \beta\gamma = 0$

C. $1 - \alpha^2 - \beta\gamma = 0$

D. $1 + \alpha^2 - \beta\gamma = 0$

Answer:

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

A. A si a diagonal matrix

B. is a zero matrix

C. A is a square matrix

D. None of these

Answer:

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208. 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

A. A

B. I-A

C. I

D. 3A

Answer:

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209. Construct a matrix $A = [a_{ij}]_{2 \times 2}$ whose element a_{ij} are given by $a_{ij} = e^{2ix} \sin jx$.

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210. Show that a matrix, which is both symmetric and skew symmetric, is a zero matrix.

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211. If [2x,3] $\begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix} \begin{bmatrix} x \\ 8 \end{bmatrix} = O$, find the value of 'x'.

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212. If A 3×3 invertible matrix, then show that for any scalar 'k' (non-zero), kA is invertible and $(kA)^{-1} = \frac{1}{k} A^{-1}$

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213. Let $A = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$. Then show that $A^2 - 4A + 7I = O$.

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214. 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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215. If A and B be square matrices of the same order such that AB=BA, prove that :

$(A + B)(A - B) = A^2 - B^2$

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216. If A and B be square matrices of the same order such that AB=BA, prove that :

$(A - B)^2 = A^2 - 2AB + B^2$

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217. If A and B be square matrices of the same order such that BA=AB, prove that :

$$(A+B)^3 = A^3 + 3A^2B + 3AB^2 + B^3$$

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218. $A_\alpha = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$ then prove that

$A_\alpha . A_\beta = A_{\alpha+\beta}$

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219. Let A be a square matrix and K be a scalar. Prove that : If A is symmetric, then kA is symmetric.

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220. Let A be a square matrix and K be a scalar. Prove that : If A is skew-symmetric, then kA is Skew-symmetric.

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221. Find the values of x,y,z if the matrix $A = \begin{bmatrix} 0 & 2y & z \\ x & y & -z \\ x & -y & z \end{bmatrix}$ satisfies the equations A'A = I_3

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222. If $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & -3 \\ 2 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$ then prove that :

$AB \neq BA$

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223. If $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & -3 \\ 2 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$ then prove that :

A(BC) = (AB)C

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224. If $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & -3 \\ 2 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$ then prove that :

A(B+C) = AB+AC

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225. If $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & -3 \\ 2 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$ then prove that :

BB' = 10C

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226. If $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & -3 \\ 2 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$ then prove that :

(AB)' = B'A'

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227. If $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & -3 \\ 2 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$ then prove that :

$A^2 - 2A + I = O$

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228. A matrix is an ordered rectangular array of number or functions.

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229. A diagonal matrix is said to be ..... If its diagonal elements are equal (other than unity)

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230. Construct a 2×2 matrix whose element $a_{ij} = i + j$

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231. Compute :

$$\begin{bmatrix} p & q \\ q & p \end{bmatrix} + \begin{bmatrix} p & q \\ -q & p \end{bmatrix}$$

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232. If $A = \begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix}$, find 4A.

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233. What is the order of the product matrix?

$$\begin{bmatrix} a \\ b \\ c \end{bmatrix} [1, 2, 3]$$

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234. Compute the indicated product: $\begin{bmatrix} a & 0 \\ a & 0 \end{bmatrix} \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$.

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235. Find the transpose of $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$

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236. If $A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$, then find A + A'

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237. Let A and B be symmetric matrices of the same order. Then show that:

A +B is a symmetric matrix.

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Exercise

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

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

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3. Name the square matrix A = $[a_{ij}]$ in which $a_{ij} = 0, I \neq J.$

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4. If [5,6,7] A = [13,23], what is the order of the matrix A?

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5. Write the element a_{12} of the matrix $A = [a_{ij}]_{2 \times 2}$

$a_{ij} = e^{2ix} \sin jx.$

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6. For a 2×2 matrix, A = $[a_{ij}]$, whose elements are given by $a_{ij} = \frac{i}{j}$, write the value of a_{12}

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7. Find the value of 'x', if:

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

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8. Find the value of 'x', if:

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

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9. Find the value of 'y', if:

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

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10. Find the values of $'x'$ and $'y' when$: {:[(x+2y, 3y),(4x,2)] = [(0,-3), (8,2)]`

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11. 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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12. If A is a square matrix of order m, and if there exists another square matrx B of the same order m, such that AB = BA = I, then B is called the..... (fill in the blanks)

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13. Construct $a2 \times 2$ matrix $A = [a_{ij}]$ whose elements are given by $a_{ij} = \frac{i}{j}$

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

$a_{ij} = \frac{2i - j}{3}$

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15. find the element of a13 if $A = [a_{ij}]$ whose elements are given by:

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

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

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

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

`a_(ij) = 1/2 |2i - 3j|.

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18. Construct a 2×3 matrix whose elements in the ith row and jth column are given by $a_{ij} = \frac{(i+j)^2}{2}$

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19. Construct a 2×3 matrix whose elements in the with row and jth column are given by :

$a_{ij} = \{(i-j, \quad \text{if} \quad I \geq j), (I+j, \quad \text{if} \quad I < j)$

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20. Construct a 3×2 matrix whose elements in the ith row and jth column are given by:

$a_{ij} = \frac{i+4j}{2}$

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21. Construct a 3×2 matrix whose elements in the ith row and jth column are given by:

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

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22. Construct a 3×2 matrix whose elements in the ith row and jth column are given by:

$$a_{ij} = \frac{1}{2}|i-3j|$$

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23. Construct a 3×3 matrix whose elements a_{ij} are given by

$$a_{ij} = i + j$$

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24. Construct a 3×3 matrix whose elements a_{ij} are given by

$a_{ij} = i \times j$

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25. Construct a 3×3 matrix whose elements a_{ij} are given by

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

Watch Video Solution

26. Construct a 3×4 matrix whose elements a_{ij} are given by

$a_{ij} = 2i + j$

Watch Video Solution

27. Construct a 3×4 matrix whose elements a_{ij} are given by

$$a_{ij} = \frac{1}{2}|-3i-j|$$

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28. Find the values of 'x' and 'y' from the following matrix equation:

$$[(2x+1), 2y), (0, y^2-5y)] = \begin{bmatrix} x+3 & y^2+2 \\ 0 & -6 \end{bmatrix}$$

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29. Find the values of x,y and z from the following matrix equations:

$$\begin{bmatrix} 6 & 3 \\ x & 5 \end{bmatrix} = \begin{bmatrix} y & z \\ 2 & 5 \end{bmatrix}$$

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30. Find the values of x,y and z from the following matrix equations:

$$\begin{bmatrix} x+y & 6 \\ 5+z & xy \end{bmatrix} = \begin{bmatrix} 6 & 6 \\ 5 & 8 \end{bmatrix}$$

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31. Find the values of x,y and z from the following matrix equations:

$$\begin{bmatrix} x+y+z \\ x+z \\ y+z \end{bmatrix} = \begin{bmatrix} 11 \\ 7 \\ 9 \end{bmatrix}$$

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32. 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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33. 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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34. Compute the following:

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

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

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37. 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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38. Compute the following:

$$\begin{bmatrix} \sin(\theta+\phi) & \cos(\theta+\phi) \\ \sin(\theta-\phi) & \cos(\theta-\phi) \end{bmatrix} + \begin{bmatrix} \sin(\theta-\phi) & \cos(\theta-\phi) \\ \sin(\theta+\phi) & \cos(\theta+\phi) \end{bmatrix}$$

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39. Compute the following:

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

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40. If $A = \begin{bmatrix} 2 & -4 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & -3 \\ -1 & 2 \end{bmatrix}$, find each of the following:

2B + 3C

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41. Does the sum $\begin{bmatrix} 5 & 3 & 2 \\ 2 & 5 & 3 \\ 5 & 2 & 3 \end{bmatrix} + \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ make sense? If so, find the sum and if not, give the reason.

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42. If $A = \begin{bmatrix} 1 & -3 & 2 \\ 2 & 0 & 2 \end{bmatrix}, B = \begin{bmatrix} 2 & -1 & -1 \\ 1 & 0 & -1 \end{bmatrix}$, find the matrix C such that A +B + C is a zero matrix.

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43. Given $X = \begin{bmatrix} 2 & 0 & -2 \\ 1 & 0 & -2 \end{bmatrix}$ and $Y = \begin{bmatrix} 3 & -1 & 0 \\ -2 & 0 & -1 \end{bmatrix}$, find Z such that X+Y+Z = 0

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44. Verify associative law of matrx addition for the matrices:

$A = \begin{bmatrix} 1 & 0 \\ 2 & -1 \end{bmatrix}, B = \begin{bmatrix} 3 & 7 \\ 4 & 8 \end{bmatrix}$ and $C = \begin{bmatrix} -1 & 0 \\ 0 & 0 \end{bmatrix}$

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45. 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) = (A+B) + C

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46. If A and B are two $m \times n$ matrices and O is the null matrix of the type $m \times n$, then show that:

$A + B = 0 \Rightarrow A = -B$ and $B = -A$

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47. Find the values of x,y,z and t, if:

$$2\begin{bmatrix} x & z \\ y & t \end{bmatrix} + 3\begin{bmatrix} 1 & -1 \\ 0 & 2 \end{bmatrix} = 3\begin{bmatrix} 3 & 5 \\ 4 & 6 \end{bmatrix}$$

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48. If $x\begin{bmatrix} 2 \\ 3 \end{bmatrix} + y[-1 \quad 1] = \begin{bmatrix} 12 \\ 6 \end{bmatrix}$, write the value. Of 'x'.

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49. If $2\begin{bmatrix}3 & 4\\5 & x\end{bmatrix}+\begin{bmatrix}1 & y\\0 & 1\end{bmatrix}=\begin{bmatrix}7 & 0\\10 & 5\end{bmatrix}$, find (x-y).

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50. Find the vale of (x+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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51. If $A=\begin{bmatrix}4 & 2 & 7\\2 & 1 & 7\end{bmatrix}$ and $B=\begin{bmatrix}2 & 1 & 5\\3 & 4 & 6\end{bmatrix}$ find 2A-B.

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52. 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', of order 3×2, such that 3A + X = 2B.

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53. If A = diag. $[3, \ -5, 7]^{'}$ and B - diag. [-1,2,4], then find (2A + 3B).

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54. If $A = \begin{bmatrix} 2 & 7 \\ 9 & 8 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$, then find: (A-B).

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

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56. If $A = \begin{bmatrix} 2 & 3 \\ -1 & 4 \end{bmatrix}$, find -3A

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57. Find 'x' and 'y' if $2\begin{bmatrix} x & 5 \\ 3 & y \end{bmatrix} = \begin{bmatrix} 4 & 10 \\ 6 & 6 \end{bmatrix}$

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

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59. If $A = \begin{bmatrix} 2 & -1 \\ 4 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$, find 2A + 3B.

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60. 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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61. Find the value of (y-x) 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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62. Find the value of (x+y) from the following 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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63. If $A = \begin{bmatrix} 2/3 & 1 & 5/3 \\ 1/3 & 2/3 & 4/3 \\ 7/3 & 2 & 2/3 \end{bmatrix}$ and $B = \begin{bmatrix} 2/5 & 3/5 & 1 \\ 1/5 & 2/5 & 4/5 \\ 7/5 & 6/5 & 2/5 \end{bmatrix}$

then compute 3A + 5B.

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64. 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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65. Find the matrix '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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66. 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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67. If $x\begin{bmatrix}2\\ 3\end{bmatrix}+y\begin{bmatrix}-1\\ 1\end{bmatrix}=\begin{bmatrix}10\\ 5\end{bmatrix}$, then find the value of x and y.

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68. Find the value of (x+y) from the following 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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69. 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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70. Find the values of x,y,z and t, if:

$$2\begin{bmatrix}x & z\\ y & t\end{bmatrix}+3\begin{bmatrix}1 & -1\\ 0 & 2\end{bmatrix}=3\begin{bmatrix}3 & 5\\ 4 & 6\end{bmatrix}$$

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71. Solve the equation for x, y, z , t

$$2\begin{bmatrix} x & y \\ z & t \end{bmatrix} + 3\begin{bmatrix} 1 & -1 \\ 0 & 2 \end{bmatrix} = 3\begin{bmatrix} 3 & 5 \\ 4 & 6 \end{bmatrix}$$

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72. 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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73. If $A = \begin{bmatrix} 2 & -4 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & -3 \\ -1 & 2 \end{bmatrix}$, find each of the following:

2B + 3C

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74. If $A = \begin{bmatrix} 2 & -4 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & -3 \\ -1 & 2 \end{bmatrix}$, find each of the following:

-2A + (B+C)

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75. If $A = \begin{bmatrix} 2 & -4 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & -3 \\ -1 & 2 \end{bmatrix}$, find each of the following:

(2A - 3B) - C

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76. If $A = \begin{bmatrix} 2 & -4 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & -3 \\ -1 & 2 \end{bmatrix}$, find each of the following:

A+(2B -C)

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77. If $A = \begin{bmatrix} 2 & -4 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & -3 \\ -1 & 2 \end{bmatrix}$, find each of the following:

A+(B +C)

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78. If $A = \begin{bmatrix} 2 & -4 \\ 4 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & -3 \\ -1 & 2 \end{bmatrix}$, find each of the following:

(A+B)+C

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79. If $A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & 2 \\ 1 & -8 & -1 \end{bmatrix}, B = \begin{bmatrix} 4 & 5 & 6 \\ -1 & 0 & 1 \\ 2 & 1 & 2 \end{bmatrix}, C = \begin{bmatrix} -1 & -2 & 1 \\ -1 & 2 & 3 \\ -1 & -2 & 2 \end{bmatrix}$

find 2B - 3C

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80. If

$$A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & 2 \\ 1 & -8 & -1 \end{bmatrix}, B = \begin{bmatrix} 4 & 5 & 6 \\ -1 & 0 & 1 \\ 2 & 1 & 2 \end{bmatrix}, C = \begin{bmatrix} -1 & -2 & 1 \\ -1 & 2 & 3 \\ -1 & -2 & 2 \end{bmatrix}$$

find A - 2B + 3C

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81. If A = diag, [2,-5,9], B = diag, [-3,7,14] and C = diag [4,-6,3], find A + 2B

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82. If A = diag, [2,-5,9], B = diag, [-3,7,14] and C = diag [4,-6,3], find 2A + B - 5C

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83. Find the transpose of each of the following matriceS:

[1 - 1 i]

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84. Find the transpose of each of the following matrices:

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

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85. Find the transpose of each of the following matriceS:

$$\begin{bmatrix} 1 & 3 & 2 \\ 0 & 2 & 1 \\ 9 & 5 & 3 \end{bmatrix}$$

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86. Find 'x' if $\begin{bmatrix} 5 & 3x \\ 2y & z \end{bmatrix} = \begin{bmatrix} 5 & 4 \\ 12 & 6 \end{bmatrix}^T$

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87. For what value of 'x', is the matrix:

$A = \begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & 3 \\ x & -3 & 0 \end{bmatrix}$ a skew-symmetric matrix.

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88. If $A = \begin{bmatrix} -1 & 1 & 0 \\ 0 & -1 & 1 \\ 2 & 3 & 4 \end{bmatrix}$, verify that: $\frac{3}{4}A' = \left(\frac{3}{4}A\right)'$

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89. If matrix A = (1 2 3) , write AA', Where A' is the transpose of matrix A.

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90. Consider $a2 \times 2$ matrix $A = [a_{ij}]$, where $a_{ij} = \frac{(i+2j)^2}{2}$. Find A + A'.

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91. 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 show that $(A + B) = A' + B'$

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92. 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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93. 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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94. If $A' = \begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$ and $B = [(-1, 2, 1).(1, 2, 3]$, then verify that :(A+B)' = A' +B'.

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

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96. If X' = $\begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$ and $Y = \begin{bmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$, then find X'-Y'.

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97. If $A = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}, B = [1, 5, 7]$, verify that (AB)' = B'A'.

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

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99. If $A = \begin{bmatrix} 3 \\ -1 \\ 5 \end{bmatrix}, B = [-6, 7, 10]$, verify that : (AB)' = B'A'.

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100. 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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101. 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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102. By using properties of determinants, Show that :

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

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103. Show that $A + A^T$ is symmetric matrix, where A^T denotes the tranpose of A:

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

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104. Show that $A + A^T$ is symmetric matrix, where A^T denotes the tranpose of A:

$$\begin{bmatrix} 1 & 5 \\ -6 & 7 \end{bmatrix}$$

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105. Show that $A + A^T$ is symmetric matrix, where A^T denotes the tranpose of A:

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

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106. Show that $A - A^T$ is symmetric matrix, where A^T denotes the tranpose of A:

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

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107. A matrix denotes a number

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108. Check whether $A - A^T$ is symmetric matrix, where A^T denotes the tranpose of A:

$$A = \begin{bmatrix} 1 & 5 \\ 8 & 7 \end{bmatrix}$$

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109. Express the matrix A as sum of symmetric and skew symmetric matrix

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

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110. If

$$A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & 2 \\ 1 & -8 & -1 \end{bmatrix}, B = \begin{bmatrix} 4 & 5 & 6 \\ -1 & 0 & 1 \\ 2 & 1 & 2 \end{bmatrix}, C = \begin{bmatrix} -1 & -2 & 1 \\ -1 & 2 & 3 \\ -1 & -2 & 2 \end{bmatrix}$$

find 2B - 3C

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

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

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113. Show that (AB)' = B'A'

$$A = \begin{bmatrix} -1 & 3 & 0 \\ -7 & 2 & 8 \end{bmatrix}, B = \begin{bmatrix} -5 & 0 \\ 0 & 3 \\ 1 & -8 \end{bmatrix}$$

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114. Show that (AB)' = B'A'

$$A = \begin{bmatrix} 3 & 4 \\ 4 & 5 \end{bmatrix}, B = \begin{bmatrix} 5 & 3 \\ 2 & 1 \end{bmatrix}.$$

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115. If $A = \begin{bmatrix} -5 & 1 \\ 6 & 8 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}, C = \begin{bmatrix} 1 & 3 \\ -1 & 4 \end{bmatrix}$ verify the following:

(A')' = A

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116. 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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117. 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:

(3A)' = 3A'

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118. 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:

(3A)' = 3A'

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

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120. For a matrix A=[(3,2),(5,3)],Verify that :

A + A' is a Symmetric Matrix.

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121. Verify that :

A - A' is a Skew - symmetric Matrix. When :

$A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$. Where A, is the transpose of A.

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122. Verify that :

A - A' is a Skew - symmetric Matrix. When :

$A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$. Where A, is the transpose of A.

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123. Verify that :

A - A' is a Skew - symmetric Matrix. When :

$A = \begin{bmatrix} 2 & 5 \\ 4 & 1 \end{bmatrix}$. Where A, is the transpose of A.

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124. Verify that :

A - A' is a Skew - symmetric Matrix. When :

$A = \begin{bmatrix} 6 & 2 \\ 4 & 5 \end{bmatrix}$. Where A, is the transpose of A.

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125. For the matrix $A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$, verify that $(A + A')$ is a symmetric matrix.

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126. 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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127. If $A = \begin{bmatrix} 3 & 1 & -1 \\ 0 & 1 & 2 \end{bmatrix}$, then show that AA' is a symmetric matrix.

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

.

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129. Express $\begin{bmatrix} 3 & 5 \\ 1 & -1 \end{bmatrix}$ as a sum of symmetric and skew symmetric matrix

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130. Express $\begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}$ as the sum of symmetric and skew-symetric matrices.

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131. Show that the elements on the main diagonal of a skew-symmetric matrix are all zero.

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

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133. Let A and B be symmetric matrices of the same order. Then show that:

A +B is a symmetric matrix.

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134. Let A and B be symmetric matrices of the same order. Then show that:

AB-BA is skew-symmetric matrix.

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135. Let A and B be symmetric matrices of the same order. Then show that:

AB+BA is a symmetric matrix.

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136. Express the following matrices as 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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137. Express the following matrices as the sum of a symmetric and skew-symmetric matrix. $\begin{bmatrix} 3 & 3 & -1 \\ -2 & -2 & 1 \\ -4 & -5 & 2 \end{bmatrix}$

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138. 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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139. Express the following as the sum of symmetric and skew-symmetric matrices:

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

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140. Express the following as the sum of symmetric and skew-symmetric matrices:

$$\begin{bmatrix} 1 & 2 & -3 \\ 7 & 0 & 5 \\ -4 & 8 & 9 \end{bmatrix}$$

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141. Express the following as the sum of symmetric and skew-symmetric matrices:

$$\begin{bmatrix} 1 & 2 & 3 \\ 3 & 4 & 5 \\ 5 & 6 & 7 \end{bmatrix}$$

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142. By using elementary transformations, find the inverse of the matrix $A = \begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$.

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143. By using elementary Row Transformations, find P^{-1}, if it exists, when :

$$\begin{bmatrix} 10 & -2 \\ -5 & 1 \end{bmatrix}$$

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

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145. Find the inverse of the following, if it exists, by using elementary row (column) transformations:

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

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146. Find the inverse of the following, if it exists, by using elementary row (column) transformations:

$\begin{bmatrix} 2 & 1 \\ 7 & 4 \end{bmatrix}$

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147. Find the inverse of the following, if it exists, by using elementary row (column) transformations:

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

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148. By using elementary transformation find the inverse of the matrix : $A = \begin{bmatrix} 2 & -6 \\ 1 & -2 \end{bmatrix}$

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

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150. Using elementary transformations, find the inverse of $\begin{bmatrix} 3 & 1 \\ 5 & 2 \end{bmatrix}$.

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151. By using elementary transformation find the inverse of the matrix : $A = \begin{bmatrix} 3 & -1 \\ -4 & 2 \end{bmatrix}$

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152. By using elementary transformation find the inverse of following

$\begin{bmatrix} 3 & 10 \\ 2 & 7 \end{bmatrix}$

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153. By using elementary operations, find the inverse of the matrix

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

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154. By elementary transformation find the inverse of following

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

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155. Using elementary transformations find the inverse of the matrix

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

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

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157. Using elementary transformation, find the inverse of $\begin{bmatrix} 6 & -3 \\ -2 & 1 \end{bmatrix}$.

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158. By using elementary transformations, find the inverse of the matrix : $A = \begin{bmatrix} -5 & 4 \\ -6 & 5 \end{bmatrix}$

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159. By using elementary transformation find the inverse of following

$$\begin{bmatrix} -4 & 3 \\ -5 & 4 \end{bmatrix}$$

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160. Find the inverse of the following, if it exists, using elementary row (column) transformations:

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

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161. 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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162. Using elementary transformations find the inverse of

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

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163. Find the inverse of the following, if it exists, using elementary row (column) transformations:

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

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164. Find the determinant of the matrix

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

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165. Find the inverse of the following, if it exists, using elementary row (column) transformations:

$[(1, 2, -2,), (-1, 3, 0), (0, -2, 1)]$

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166. Find the inverse of the following, if it exists, using elementary row (column) transformations:

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

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167. Find the inverse of the following, if it exists, using elementary row (column) transformations:

$[(1, 2, -2,), (-1, 3, 0), (0, -2, 1)]$

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168. find the invese of the matraix $\begin{bmatrix} 1 & 2 & 5 \\ 2 & 3 & 1 \\ -1 & 1 & 1 \end{bmatrix}$, using elementary row operaations.

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169. If a matrix has 28 elements, what are the possible orders it can have? What if it has 13 elements?

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170. Cnstruct $a_{2\times 2}$ matrix, where $a_{ij} = |-2i + 3j|$

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171. If X and Y are 2×2 matrice, then solve the following matrix equations of X and Y:

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

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172. If A is a square matrix such that $A^2 = A$, show that $(I + A)^3 = 7A + I$.

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173. The matrix $\begin{bmatrix} 0 & 0 & 5 \\ 0 & 5 & 0 \\ 5 & 0 & 0 \end{bmatrix}$ is a scalar matrix. State true or false. If false, then what type of matrix is this?

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174. Find non-zero values of 'x', satisfying the matrix equation:

$$x\begin{bmatrix}2x & 2\\ 3 & x\end{bmatrix}+2\begin{bmatrix}8 & 5x\\ 4 & 4x\end{bmatrix}=2\begin{bmatrix}x^2+8 & 24\\ 10 & 6x\end{bmatrix}$$

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175. Express the matrix $\begin{bmatrix}1 & 4 & -6\\ 7 & 3 & 5\\ 1 & -2 & 4\end{bmatrix}$ as a sum of symmetric and a skew-symmetric matrix.

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176. $A=\left[a_{ij}\right]_{m\times n}$ is a square matrix, if

a. m < n

b. m > n

c. m = n

d. none of these

A. m < n

B. m > n

C. m=n

D. None of these

Answer:

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

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178. 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

A. 27

B. 18

C. 81

D. 512

Answer:

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179. 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. Choose the correct answer in the following questions :

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

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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180. 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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181. If A, B are symmetric matrices of same order, then AB - BA is a :

A. Skew symmetric matrix

B. Symmetric matrix

C. Zero matrix

D. Identity matrx.

Answer:

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182. If $A = \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$, then $A + A' = 1$, if the value of α is

a. π/ 6

b. π/ 3

c. π

d. 3 π/ 2

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

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

C. π

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

Answer:

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183. 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

A. AB=BA

B. AB-BA=O

C. AB=O,BA=I

D. AB=BA=I

Answer:

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

a. $1 + \alpha^2 + \beta\gamma = 0$

b. $1 - \alpha^2 + \beta\gamma = 0$

c. $1 - \alpha^2 - \beta\gamma = 0$

d. $1 + \alpha^2 - \beta\gamma = 0$

A. $1 + \alpha^2 + \beta\gamma = 0$

B. $1 + \alpha^2 + \beta\gamma = 0$

C. $1 - \alpha^2 - \beta\gamma = 0$

D. $1 + \alpha^2 - \beta\gamma = 0$

Answer:

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

a. A is diagonal matrix

b. A is a zero matrix

c. A is a square matrix

d. none of these

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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186. 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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187. The matrix $\begin{bmatrix} 0 & 0 & 5 \\ 0 & 5 & 0 \\ 5 & 0 & 0 \end{bmatrix}$ is a scalar matrix. State true or false. If false, then what type of matrix is this?

A. scalar matrix

B. diagonal matrix

C. unit matrix

D. square matrix.

Answer:

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188. If A is a matrix of order $m \times n$ and B is a matix such that AB' and B'A are both defined, then order of matrix B is

A. $m \times m$

B. $n \times n$

C. $n \times m$

D. $m \times n$

Answer:

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189. For any two matrices A and B, we have

A. AB=BA

B. $AB \neq BA$

C. AB=O

D. None of these

Answer:

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190. If AB = C , where B and C are matrices of orders 3×5, then the order of matrix A is

A. 3×5

B. 3×3

C. 5×5

D. 5×3

Answer:

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191. If AB = C, where B and C are matrices of order 3×4, then the order of matrix A is :

A. 4×4

B. 3×3

C. 5×5

D. 4×3

Answer:

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192. If A, B symmetric matrices of the same order. Then $AB - BA$ is a

a. Skew symmetric matrix

b. Symmetric matrix

c. Zero matrix

d. Identify matrix

A. Skew symmetric matrix

B. Symmetric matrix

C. Zero matrix

D. Identity matrx.

Answer:

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193. If A and B are invertible matrices , then:

A. $(AB)^{-1} = B^{-1}A^{-1}$

B. $(AB)^{-1} = A^{-1}B^{-1}$

C. $(AB)^{-1} = (BA)^{-1}$

D. None of these

Answer:

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194. If A is a non-singular matrix of ordern, then |adj A| is equal to

A. |A|

B. $|A|^n$

C. $|A|^{n-1}$

D. 3|A|

Answer:

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195. If $2\begin{bmatrix} x & z \\ 2 & 0 \end{bmatrix} + 3\begin{bmatrix} 1 & -1 \\ 0 & 2 \end{bmatrix} = \begin{bmatrix} 9 & 15 \\ 4 & 6 \end{bmatrix}$, then the values of a x and z are

A. x=3,z=9

B. x=9,z=3

C. x=0,z-0

D. None of these

Answer:

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196. If for a square matrix A,AB=BA = I, then inverse of B is

A. $\frac{1}{A}$

B. B

C. A

D. None of these

Answer:

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197. If A is of order $m \times n$, B is of order $p \times q$ such that AB is defined, then:

A. n=p

B. m=p

C. n=q

D. None of these

Answer:

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198. If $A + B = C$, where A and B are matrices of order 2×3, then order of C is :

A. 3×2

B. 2×3

C. 2×2

D. 3×3

Answer:

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

A. 81

B. 512

C. 18

D. 7

Answer:

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200. 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.

A. x=3, y = -4

B. x=2,y=3

C. x=3,y=3

D. x=3,y=0

Answer:

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201. Show that a matrix, which is both symmetric and skew symmetric, is a zero matrix.

A. Unit matrix

B. Zero matrix

C. Scalar matrix

D. Diagonal matrix.

Answer:

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202. If A be a matrix of order 3×4, then elements of A, are

A. 3

B. 4

C. 12

D. None of these

Answer:

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203. A 2×2 matrix $A = [a_{ij}]$, where $a_{ij} = (i+j)^2$ is

A. $\begin{bmatrix} 4 & 9 \\ 9 & 16 \end{bmatrix}$

B. $\begin{bmatrix} 2 & 3 \\ 3 & 2 \end{bmatrix}$

C. $\begin{bmatrix} 9 & 4 \\ 16 & 9 \end{bmatrix}$

D. None of these

Answer:

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204. If AB=C, where B and C are matrices of orders 6×5, then the order of matrix A is

A. 3×3

B. 3×5

C. 5×5

D. 5×3

Answer:

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205. If $D = [a_{ij}]_{m \times n}$ is a rectangular matrix, then

A. mgtn

B. m=n

C. mltn

D. None of these

Answer:

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

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

B. $\frac{\pi}{4}$

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

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

Answer:

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207. If A is matrix of 4×3 then each column of A contains

A. 12 elements

B. 4 elements

C. 3 elements

D. None of these

Answer:

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208. If matrix A is of order 4×3, then each row of matrix A contains elements :

A. 12

B. 4

C. 3

D. None of these

Answer:

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209. If A is matrix of a order 2×3 and B is a matrix of order 3×2, then AB is a matrix of order:

A. 2×3

B. 3×2

C. 2×2

D. 3×3

Answer:

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210. If A is a matrix of order 3×4, then each column of matrix A contains elements :

A. 12

B. 4

C. 3

D. None of these

Answer:

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

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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212. If $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ and $A^2 = aA + bI$, then (a,b)

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213. If $A = \begin{bmatrix} 2-k & 2 \\ 1 & 3-k \end{bmatrix}$ is a singular matirx, then the value of $5k - k^2$ is equal to

A. 0

B. 6

C. -6

D. 4

Answer:

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214. We define a binary relation ~ on the set of all 3×3 real matrices as A~B if and only if there exist invertible matrices P and Q such that $B = PAQ^{-1}$. The binary realtion is

A. 1) neither reflexive nor symmetric

B. 2) reflexive, and symmetric but not transitive

C. 3) symmetric and transitive but not reflexive

D. 4) all equivalence relation.

Answer:

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215. If A is a 3×4 matrix and B is a matrix such that A'B and BA' are both defined, then B is of the type

A. 1) 4×4

B. 2) 3×4

C. 3) 4×3

D. 4) 3×3

Answer:

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216. If $\begin{bmatrix} e^x & e^y \\ e^y & e^x \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, then the values of x and y are respectively

A. $-1, \ -1$

B. 1,1

C. 0,0

D. 1,0

Answer:

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217. The number of 3 x 3 non-singular matrices, with four entries as 1 and all other entries as 0, is:

A. less than 4

B. 5

C. 6

D. at least 7

Answer:

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218. The number of 3×3 matrices A whose are ether 0 or 1 and for which the system $A\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ has exactly two distinct solutions, is

A. 0

B. $2^9 - 1$

C. 168

D. 2

Answer:

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219. If $\omega \neq 1$ is the complex cube root of unity and matix $H = \begin{bmatrix} \omega & 0 \\ 0 & \omega \end{bmatrix}$, then H^{70} is equal to

A. 1) O

B. 2) $-H$

C. 3) H^2

D. 4) H

Answer:

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220. If A is a 3×3 non-singular matrix such that $AA' = A'A$ and $B = A^{-1}A'$ then BB' equals to

A. I

B. B^{-1}

C. $\left(B^{-1}\right)$

D. I+B

Answer:

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221. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ a & 2 & b \end{bmatrix}$ is a matrix satisfying the equation $AA^T = 9I$, where I is 3×3 identity matrix, then the ordered pair (a, b) is equal to

A. (2-1)

B. (-2,1)

C. (2,1)

D. (-2,-1)

Answer:

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222. If $A = \begin{bmatrix} 5a & -b \\ 3 & 2 \end{bmatrix}$ and $a\text{dj}A = AA^T$, then $5a + b$ is equal to

A. 5

B. 4

C. 13

D. -1

Answer:

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223. Let $P = \begin{bmatrix} 1 & 0 & 0 \\ 4 & 1 & 0 \\ 16 & 4 & 1 \end{bmatrix}$ and I be te identity matrix of order 3. If $Q = [q_{ij}]$ is A matrix such that P(50)-Q=I is then q31+q32/q21. The value of

A. 52

B. 103

C. 201

D. 205

Answer:

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224. Write the element a_{12} of the matrix $A = [a_{ij}]_{2 \times 2}$

$a_{ij} = e^{2ix} \sin jx.$

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225. If $A = \begin{bmatrix} 3 & -3 \\ -3 & 3 \end{bmatrix}$ and $A^2 = \lambda A$ then find lambda.

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226. For what value of 'x', is the matrix:

$A = \begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & 3 \\ x & -3 & 0 \end{bmatrix}$ a skew-symmetric matrix.

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227. If $2\begin{bmatrix} 3 & 4 \\ 5 & x \end{bmatrix} + \begin{bmatrix} 1 & y \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$, find (x-y).

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

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229. Show that A + A' is symmetric when $A = \begin{bmatrix} 2 & 4 \\ 5 & 6 \end{bmatrix}$.

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230. By using elementary transformation, find the inverse of the matrix

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

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231. If $A = \begin{pmatrix} -1 & -4 \\ 1 & 3 \end{pmatrix}$, 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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232. Express the matrix A as the sum of a symmetric and a skew-symmetric matrix, where:

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

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