MATHS

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MATRICES

Exercise

1. Find the inverse of the matrix $A = \begin{bmatrix} 2 & 1 \\ 7 & 4 \end{bmatrix}$ using column transformation.

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

Find AB

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

If C is the matrix obtained from A by the transformation $R_1 \to 2R_1$, find CB

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4. If $A = \begin{bmatrix} 1 & 2 \\ 4 & -3 \end{bmatrix}$ Find A^2 and 4A.

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5. If $f(x) = x^2 + 4x - 5$ and $A = \begin{bmatrix} 1 & 2 \\ 4 & -3 \end{bmatrix}$, then $f(A)$ is equal to a) $\begin{bmatrix} 0 & -4 \\ 8 & 8 \end{bmatrix}$ b) $\begin{bmatrix} 2 & 1 \\ 2 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 8 & 4 \\ 8 & 0 \end{bmatrix}$

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6. The co-operative store of a particular school has 10 dozen physics books, 8 dozen chemistry books and 5 dozen mathematics books. Their selling prices are Rs.65.70, Rs. 43.20 and Rs 76.50 respectively. Find by

matrix method, the total amount of the store will receive from selling all these items.

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7. Find the values of x,y,z respectively, if

$$\begin{bmatrix} x \\ -y+z \\ x-y-z \end{bmatrix} = \begin{bmatrix} 3 \\ 5 \\ 0 \end{bmatrix}$$

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8. Find the value of a,b and c 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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9. 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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10. If $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \\ 1 & 0 \end{bmatrix}, B = \begin{bmatrix} -1 & 3 \\ 5 & 0 \\ 2 & -2 \end{bmatrix}$

$C = \begin{bmatrix} 3 & 1 & -2 \\ 2 & 0 & 5 \end{bmatrix}$, then Find A+B.

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11. If $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \\ 1 & 0 \end{bmatrix}, B = \begin{bmatrix} -1 & 3 \\ 5 & 0 \\ 2 & -2 \end{bmatrix}$ $C = \begin{bmatrix} 3 & 1 & -2 \\ 2 & 0 & 5 \end{bmatrix}$, then Find (A+B)C.

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12. Using elementry transformation, find the inverse of the matrices.

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

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13. 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) $1 + \alpha^2 - \beta\gamma = 0$

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14. Consider the matrix $A = \begin{bmatrix} 2 & 3 & -1 \\ -1 & 4 & 2 \\ 6 & 0 & 8 \end{bmatrix}$ Find $A + A^T$ and show that it is symmetric.

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15. Consider the matrix $A = \begin{bmatrix} 2 & 3 & -1 \\ -1 & 4 & 2 \\ 6 & 0 & 8 \end{bmatrix}$ Find $A - A^T$ and show that it is skew symmetric.

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16. Consider the matrix $A = \begin{bmatrix} 2 & 3 & -1 \\ -1 & 4 & 2 \\ 6 & 0 & 8 \end{bmatrix}$ Express A as the sum of a symmetric and skew-symmetric matrics.

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17. Use matrix multiplication to divide Rs 30,000 in two parts such that the total annual interest at 9% on the first part and at 11% on the second part amounts to Rs 3060.

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18. If $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}, B = \begin{bmatrix} a & 1 \\ b & -1 \end{bmatrix}$. If $(A+B)^2 = A^2 + B^2$, Prove that BA+AB=0.

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19. If $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}, B = \begin{bmatrix} a & 1 \\ b & -1 \end{bmatrix}$ and $(A+B)^2 = A^2 + B^2$ .Find a and b.

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20. If $A = \begin{bmatrix} -1 \\ 2 \\ 3 \end{bmatrix}$ and $B = [-2 \; -1 \; -4]$ Find out the product AB.

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21. If $A = \begin{bmatrix} -1 \\ 2 \\ 3 \end{bmatrix}$ and $B = [-2 -1 -4]$ Find A^T and B^T.

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22. If $A = \begin{bmatrix} -1 \\ 2 \\ 3 \end{bmatrix}$ and $B = [-2 -1 -4]$ Verify that $(AB)^T = B^T . A^T$

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23. Consider the matrices $A = [1, x, 1]$, $B = \begin{bmatrix} 1 & 3 & 2 \\ 2 & 5 & 1 \\ 15 & 3 & 2 \end{bmatrix}, C = \begin{bmatrix} 1 \\ 2 \\ x \end{bmatrix}$ Find AB.

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24. Consider

$A = \begin{bmatrix} 1 & x & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & 3 & 2 \\ 2 & 5 & 1 \\ 15 & 3 & 2 \end{bmatrix}, C = \begin{bmatrix} 1 \\ 2 \\ x \end{bmatrix}$

Find x if ABC=0.

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25. A is a third order square matrix and

$$a_{ij} = \begin{cases} -i + 2j & \text{if } i = j \\ i \times j & \text{if } i \neq j \end{cases}$$

Construct the matrix A .

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26. A is a third order square matrix and

$$a_{ij} = \begin{cases} -i + 2j & \text{if } i = j \\ i \times j & \text{if } i \neq j \end{cases}$$ and

$$B = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 5 \\ 1 & 5 & 2 \end{bmatrix}$$

Interpret the matrix A .

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27. Let A is a third order square matrix given by $a_{ij} = \begin{cases} -i+2j & i=j \\ i \times j & i \neq j \end{cases}$ If $B = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 5 \\ 1 & 5 & 2 \end{bmatrix}$ then find AB-BA.

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28. A is a third order square matrix and $a_{ij} = \begin{cases} -i + 2j & \text{if } i = j \\ i \times j & \text{if } i \neq j \end{cases}$ and $B = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 5 \\ 1 & 5 & 2 \end{bmatrix}$

Interpret the matrix $AB - BA$.

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29. Find the inverse of matrices $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$

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30. if $A = \begin{bmatrix} 3 & -4 \\ 1 & (-1) \end{bmatrix}$, then prove that $A^n = \begin{bmatrix} 1+2n & -4n \\ n & 1-2n \end{bmatrix}$

where n is any positive integer.

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

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

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33. Let $A = \begin{bmatrix} 0 & -\tan x/2 \\ \tan x/2 & 0 \end{bmatrix}$ Find out I+A and I-A.

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34. If $A = \begin{bmatrix} 0 & -\tan\left(\frac{\alpha}{2}\right) \\ \tan\left(\frac{\alpha}{2}\right) & 0 \end{bmatrix}$ 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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35. A is a third order square matrix and

$$a_{ij} = \begin{cases} -i + 2j & \text{if } i = j \\ i \times j & \text{if } i \neq j \end{cases}$$

Construct the matrix A.

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36. A is a third order square matrix and

$$a_{ij} = \begin{cases} -i + 2j & \text{if } i = j \\ i \times j & \text{if } i \neq j \end{cases}$$ and

$$B = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 5 \\ 1 & 5 & 2 \end{bmatrix}$$

Interpret the matrix A .

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37. Let A is a third order square matrix given by

$$a_{ij} = \begin{cases} -i + 2j & i = j \\ i \times j & i \neq j \end{cases}$$ If $B = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 5 \\ 1 & 5 & 2 \end{bmatrix}$ then find

AB-BA.

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38. A is a third order square matrix and

$$a_{ij} = \begin{cases} -i + 2j & \text{if } i = j \\ i \times j & \text{if } i \neq j \end{cases}$$ and

$$B = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 5 \\ 1 & 5 & 2 \end{bmatrix}$$

Interpret the matrix $AB - BA$.

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39. If $\begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -1 & -8 & -10 \\ 1 & -2 & -5 \\ 9 & 22 & 15 \end{bmatrix}$ Find the order of matrix A.

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40. If $\begin{bmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -1 & -8 & -10 \\ 1 & -2 & -5 \\ 9 & 22 & 15 \end{bmatrix}$ Find the matrix A, using the idea of equality of matrices.

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41. Find the inverse of matrices $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$

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42. $\sin^{-1}(1-x) - 2\sin^{-1} x = \frac{\pi}{2}$,then find x

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43. 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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44. If $\begin{bmatrix}x-y-z\\ -y+z\\ z\end{bmatrix}=\begin{bmatrix}0\\ 5\\ 3\end{bmatrix}$, then the values of x, y and z are respectively

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45. If $B=\begin{bmatrix}2 & 3\\ 1 & 0\end{bmatrix}$ find B^2

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46. If $A = \begin{bmatrix} x & 1 \\ 1 & 0 \end{bmatrix}$ ifA^2 is the identity matrix, then find x.

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47. If U=[2 -3 4],$V = \begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix}$ X=[0 2 3],$Y = \begin{bmatrix} 2 \\ 2 \\ 4 \end{bmatrix}$ then find UV,XY,UV+XY.

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48. What must be the matrix X if $2X + \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 3 & 8 \\ 7 & 2 \end{bmatrix}$

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49. If $\begin{bmatrix}1 & x & 1\end{bmatrix}\begin{bmatrix}1 & 2 & 3\\ 0 & 5 & 1\\ 0 & 3 & 2\end{bmatrix}\begin{bmatrix}x\\ 1\\ -2\end{bmatrix} = 0$ then find the value of x.

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50. If $A = [a_{ij}]_{2\times 2}$ where $a_{ij} = i + j$, then A is equal to a) $\begin{bmatrix}1 & 1\\ 2 & 2\end{bmatrix}$ b) $\begin{bmatrix}1 & 2\\ 1 & 2\end{bmatrix}$ c) $\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$ d) $\begin{bmatrix}2 & 3\\ 3 & 4\end{bmatrix}$

A. $\begin{bmatrix}1 & 1\\ 2 & 2\end{bmatrix}$

B. $\begin{bmatrix}1 & 2\\ 1 & 2\end{bmatrix}$

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

D. $\begin{bmatrix} 2 & 3 \\ 3 & 4 \end{bmatrix}$

Answer:

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51. $\begin{bmatrix} 2 & 3 \\ 3 & 4 \end{bmatrix}$ is a a)Symmetric matrix b)Skew-symmetric matrix c)null matrix d)identity matrix

A. Symmetric matrix

B. Skew-symmetric matrix

C. null matrix

D. identify matrix

Answer:

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52. If $A = \begin{bmatrix} 3 & -2 \\ 2 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 8 \\ -6 & 3 \end{bmatrix}$ then A+B is equal to-

A. $\begin{bmatrix} 21 & -16 \\ -12 & 15 \end{bmatrix}$

B. $\begin{bmatrix} 10 & 6 \\ -4 & 8 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$

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

Answer:

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53. If $A = \begin{bmatrix} 10 & 6 \\ -4 & 8 \end{bmatrix}$ and $I_2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then AI_2 is equal to

a) $\begin{bmatrix} 10 & 6 \\ -4 & 8 \end{bmatrix}$ b) $\begin{bmatrix} 21 & -16 \\ -12 & 15 \end{bmatrix}$

c) $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ d) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

A. $\begin{bmatrix} 10 & 6 \\ -4 & 8 \end{bmatrix}$

B. $\begin{bmatrix} 21 & -16 \\ -12 & 15 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$

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

Answer:

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54. If A is square matrix, A', is its transpose, then $\frac{1}{2}(A - A')$ is

a)a Symmetric matric b)a skew-symmetrix matrix

c)a unit matrix d)a null matrix

A. A Symmetric matric

B. a skew-symmetrix matrix

C. a unit matrix

D. a null matrix

Answer:

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55. Let A and B be two symmetric matrices of same order. Then show that AB-BA is a skew-symmetric matrix.

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56. $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, then

Find $4A$ and A^2

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57. $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, then show that $A^2 - 4A = 5I_3$

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58. If $A = \begin{bmatrix} \cos^2\alpha & \cos\alpha\sin\alpha \\ \cos\alpha\sin\alpha & \sin^2\alpha \end{bmatrix}$ and $B = \begin{bmatrix} \cos^2\beta & \cos\beta\sin\beta \\ \cos\beta\sin\beta & \sin^2\beta \end{bmatrix}$. Show that $AB = \begin{bmatrix} \cos\alpha\cos\beta\cos(\alpha-\beta) & \sin\beta\cos\alpha\cos(\alpha-\beta) \\ \cos\beta\sin\alpha\cos(\alpha-\beta) & \sin\beta\sin\alpha\cos(\alpha-\beta) \end{bmatrix}$

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59. Let $A = \begin{bmatrix} 0 & a \\ b & 0 \end{bmatrix}$ Find A^2

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60. Let $A = \begin{bmatrix} 0 & a \\ b & 0 \end{bmatrix}$ If $A^4 = I_2$ then show that ab=1.

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61. Of the matrices $A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & 1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 \\ 0 & 2 \\ 5 & 0 \end{bmatrix}$ Find $AB, B^T, (AB)^T$

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

Show that $(AB)^T = B^T A^T$

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63. If a matrix has 5 elements, write all possible order it can have.

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64. Consider the matrix $A = \begin{bmatrix} 3 & 10 \\ 2 & 7 \end{bmatrix}$ Express the matrix as A=IA.

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65. Consider the matrix $A = \begin{bmatrix} 3 & 10 \\ 2 & 7 \end{bmatrix}$ Find A^{-1} using elementary row transformations.

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

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67. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ Find A^2

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

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

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

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72. Write two non-zero matrices A and B for which $AB = 0$.

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73. Express $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ as the sum of a symmetric matrix and a skew symmetric matrix.

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74. Let $A = [a_{ij}]_{2 \times 3}$ where $a_{ij} = i + j$. construct A.

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75. For any square matrix A,prove that `A+A' is symmetric.

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76. If A is a skew symmetric matrix of order 3. Then prove that it's determinant is zero. (without using examples).

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77. Given $\begin{vmatrix} 2+x & 3 & 4 \\ 1 & -1 & 2 \\ x & 1 & 5 \end{vmatrix}$ is a singular matrix. Find the value of x

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78. Given A and B are square matrices of order 2 such that $|A| = -1, |B| = 3$. Find $|3AB|$.

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79. For the symmetric matrix $A = \begin{bmatrix} 2 & x & 4 \\ 5 & 3 & 8 \\ 4 & y & 9 \end{bmatrix}$.Find the value of x and y .

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80. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$. Show that $A^2 - 5A + 7I = 0$ Hence find A^4 and A^{-1}.

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81. Using elementary row operations, find the inverse of the matrix

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

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82. Find x and y if

$$x\begin{bmatrix} 2 \\ 3 \end{bmatrix} + y\begin{bmatrix} -1 \\ 1 \end{bmatrix} = \begin{bmatrix} 10 \\ 5 \end{bmatrix}$$

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83. Express the matrix

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

as the sum of a symmetric and a skew symmetric matrices.

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84. The value of k such that matrix $\begin{bmatrix} 1 & k \\ -k & 1 \end{bmatrix}$ is symmetric if

A. 0

B. 1

C. -1

D. 2

Answer:

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85. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ then prove that $A^2 = \begin{bmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$

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86. If $A = \begin{bmatrix} 1 & 3 \\ 4 & 1 \end{bmatrix}$, then find $\left|3A^T\right|$

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87. If A=$\begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$,B=$\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$, then BA=

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

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

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

D. $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

Answer:

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88. Write $A = \begin{bmatrix} 3 & 5 \\ 1 & -1 \end{bmatrix}$ as the sum of a symmetric and a skew symmetric matrix.

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89. Find the inverse of $A = \begin{bmatrix} 2 & -6 \\ 1 & -2 \end{bmatrix}$

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90. Choose the correct statement related to the matrices $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

A. $A^3 = A, B^3 \neq B$

B. $A^3 \neq A, B^3 = B$

C. $A^3 = A, B^3 = B$

D. $A^3 \neq A, B^3 \neq B$

Answer:

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91. If $M = \begin{bmatrix} 7 & 5 \\ 2 & 3 \end{bmatrix}$, then verify the equation

$M^2 - 10M + 11I_2 = 0$

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92. 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,d

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93. 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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94. 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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95. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then

Find A^2

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96. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then

Hence show that $A^2 - 5A + 7I = 0$

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97. If A is a square matrix such that $A^2 = A$, then

(I+A)^2-3A 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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98. Find $A^2 - 5A + 6I$ if $A = \begin{bmatrix} 2 & 5 & 8 \\ 6 & 0 & 5 \\ 0 & -2 & 0 \end{bmatrix}$

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99. Consider the matrices $A = \begin{bmatrix} 2 & 1 & 3 \\ 2 & 3 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 2 & 3 \\ -2 & 3 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ Find A+B.

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100. Consider the matrix

$$A = \begin{bmatrix} 2 & 1 & 3 \\ 2 & 3 & 1 \\ 1 & 1 & 1 \end{bmatrix} \quad B = \begin{bmatrix} -1 & 2 & 3 \\ -2 & 3 & 1 \\ -1 & 1 & 1 \end{bmatrix}$$

Find $(A + B)(A - B)$

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101. Let $A = \begin{bmatrix} 0 & 2\beta & \gamma \\ \alpha & \beta & -\gamma \\ \alpha & -\beta & \gamma \end{bmatrix}$ be 3×3 matrix Find

A^T

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102. Let $A = \begin{bmatrix} 0 & 2\beta & \gamma \\ \alpha & \beta & -\gamma \\ \alpha & -\beta & \gamma \end{bmatrix}$ be 3×3 matrix If $A^T . A = 6I$, *then*alpha,beta and gamma`is -

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103. Let $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$

Show that $A^2 - 5A + 7I = 0$

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104. If A and B are symmetric matrices, prove that $AB - BA$ is a skew symmetric matrix.

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105. Find a 2×2 matrix A where $a_{ij} = i + j$

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106. If $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 3 & 1 \\ 2 & 5 \end{bmatrix} = \begin{bmatrix} 7 & 11 \\ k & 23 \end{bmatrix}$, then find the value of k.

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107. Find the inverse of the following matrix using elementary operations $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$

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