MATHS

BOOKS - A N EXCEL PUBLICATION

MATRICES

Question Bank

1. Consider the following information regarding the purchase of pens and penciles by the three students Ravi, Twinkle and Lal from a shop.

	Number of pens purchased	Number of pencils purchased
Ravi	5	10
Twinkle	3	7
Lal	6	12

Represent the above data in the form of a 3×2 matrix. What does the entry in the $2^n d$ row and in the first column represent?

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2. Construct a 2×2 matrix $A = [a_i j]$, whose $(i, j)^t h$ element is given by

$$a_i j = i - \frac{j}{2}$$

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3. Given that a matrix A contains 15 elements

what are the possible orders of A?

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4. Given that a matrix A contains 15 elements. Can A be a matrix with

the number of rows=the number of columns ? Explain.

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

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6. 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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7. 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 this matrix

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8. 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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9. 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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10. If a matrix has 24 elements, What are the possible orders it can have? What, if it has 13 elements?

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

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12. Consider a 2×2 matrix $A = [a_{ij}]$, where $A_{ij} = \frac{(i+2j)^2}{2}$

Write A

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13. Construct a 2×2 matrix, $A = [a_i j]$, whose elements are given by:

$a_i j = \frac{i}{j}$

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14. Consider a 2×2 matrix $A = [a_{ij}]$, where $a_{ij} = \frac{(i+2j)^2}{2}$

Find $A + A^T$

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15. Find the value of x,y and z from the equation:

$$\begin{bmatrix} 4 & 3 \\ x & 5 \end{bmatrix} = \begin{bmatrix} y & z \\ 1 & 5 \end{bmatrix}$$

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16. Find the value of x,y and z from the equation:

$$\begin{bmatrix} 4 & 3 \\ x & 5 \end{bmatrix} = \begin{bmatrix} y & z \\ 1 & 5 \end{bmatrix}$$

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17. Find the value of x,y and z from the equation:

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

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18. $A = [aij]_{m \times n}$ 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: C

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19. The number of all possible 2×2 matrices with entries 0 or 1 is

A. 27

B. 18

C. 81

D. 512

Answer: D

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20. Find x, y, z and w if

$$\begin{bmatrix} x-y & 2x+z \\ 2x-y & 3z+w \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$$

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21. Which of the given values of x and y make the following pair of matrices equal

$$\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix}, \begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$$

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

B. Not possible to find

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

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

Answer: B

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22. Find a matrix X such that

2A + B +3X = 0 where

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

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23. If $X - Y = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ and $X + Y = \begin{bmatrix} 3 & 5 & 1 \\ -1 & 1 & 4 \\ 11 & 8 & 0 \end{bmatrix}$ find X and Y ?

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24. Find x and y satisfying the matrix equation

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

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25. Consider $p(x) = 4x^3 - 5x^2 + 10x + 4$ and $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$. Find p(A)

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26. Consider $A = \begin{bmatrix} 4 & 5 & 6 & 9 \\ 2 & -1 & 6 & 5 \end{bmatrix}$ Find 2A

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27. Consider $A = \begin{bmatrix} 4 & 5 & 6 & 9 \\ 2 & -1 & 6 & 5 \end{bmatrix}$ Find 3A

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28. Consider $A = \begin{bmatrix} 4 & 5 & 6 & 9 \\ 2 & -1 & 6 & 5 \end{bmatrix}$ Find 2A

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29. Write two matrices A and B for which AB exists but BA does't exist

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30. Write two matrices A and B for which neither AB nor BA exists

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

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32. Write two matrices A and B for which AB = 0 but $BA \neq 0$

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33. Let A and B be two 3x2 matrices, where $a_{ij} = i + j$ and $b_{ij} = i - j$ Construct A and B

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34. Let A and B be two (3x2) matrices, where $a_{ij} = i + j$ and $b_{ij} = i - j$ Does A + B exist ? Why ?

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35. Let A and B be two matrices,of order 3*2 where $a_{ij} = i + j$ and $b_{ij} = i - j$ Does AB exists ? If yes, find AB

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36. Given $A = \begin{bmatrix} 3 & 2 & 0 \\ 1 & 4 & 0 \\ 0 & 0 & 5 \end{bmatrix}$ Find A^2

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37. Given $A = \begin{bmatrix} 3 & 2 & 0 \\ 1 & 4 & 0 \\ 0 & 0 & 5 \end{bmatrix}$ Prove that $A^2 - 7A + 10I_3 = 0$

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38. Given $A = \begin{bmatrix} 3 & 2 & 0 \\ 1 & 4 & 0 \\ 0 & 0 & 5 \end{bmatrix}$ Find A^2

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39. Consider the following statement

$P(n) : A^n = \begin{bmatrix} \cos n\theta & \sin n\theta \\ -\sin n\theta & \cos n\theta \end{bmatrix}$ for all $n \in N$

If $P(k)$ is true then show that $P(k+1)$ is true

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40. Consider the following statement

$$P(n): A^n = \begin{bmatrix} \cos n\theta & \sin n\theta \\ -\sin n\theta & \cos n\theta \end{bmatrix} \text{ for all } n \in N$$

If $P(k)$ is true then show that $P(k+1)$ is true

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41. Consider the following statement

$$P(n): A^n = \begin{bmatrix} \cos n\theta & \sin n\theta \\ -\sin n\theta & \cos n\theta \end{bmatrix} \text{ for all } n \in N$$

Write $P(1)$.

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

Find each of the folowing

$A + B, A - B$

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

Find each of the folowing

$A + B, A - B$

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

Find each of the folowing

$3A - C$

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45. 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 folowing

AB

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46. 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 folowing

BA

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47. Compute the following:

$$\begin{bmatrix} a & b \\ -b & a \end{bmatrix} + \begin{bmatrix} a & b \\ b & a \end{bmatrix}$$

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48. 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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49. 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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50. 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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51. Compute the following:

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

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52. Compute the following:

$$[1\ 2\ 3] + [2\ 3\ 4]$$

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53. Compute the following:

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

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54. Compute the following:

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

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55. Compute the following:

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

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56. 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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57. Let $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}, C = \begin{bmatrix} 1 & -1 \\ 0 & 2 \end{bmatrix}$

Show that $(A + B) + C = A + (B + C)$

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

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59. 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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60. Find X and Y if

$$X + Y = \begin{bmatrix} 7 & 0 \\ 2 & 5 \end{bmatrix} \text{ and } X - Y = \begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$$

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61. Find X and Y if

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

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62. Find X if

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

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

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64. 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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65. 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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66. 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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67. If $f(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$

Find $f(-x)$

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68. Show that

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

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69. 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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70. Find $A^2 - 5A + 6I$, if $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$

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71. Consider the matrices $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$

Prove that $A^2 - 7A - 2I = 0$

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

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73. 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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74. 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 seconnd 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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75. 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 seconnd 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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76. The bookshop of a particular school has 10 dozen chemistry books, 8 dozen physics books, 10 dozen economics books. Their selling prices are Rs. 80, Rs. 60

and Rs. 40 each respectively. Find the total amount the book-shop will receive from selling all the books using matrix algebra.

77. Assume that 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

cases. 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=n

C. p is arbitrary, k=3

D. k=2, p=3

Answer: A

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78. Assume that 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 cases. 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: B

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79. Consider $A = \begin{bmatrix} 4 & 0 & -1 \\ 0 & 8 & 4 \\ -1 & 4 & 9 \end{bmatrix}$ Find `A^T

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80. Express $A = \begin{bmatrix} 7 & 3 & -5 \\ 0 & 1 & 5 \\ -2 & 7 & 3 \end{bmatrix}$ as the sum of a symmetric and a skew symmetric matrix .

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81. Consider the matrix

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

Find A^T

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82. Consider the matrix

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

Find AA^T and hence prove that AA^T is symmetric.

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83. Consider the matrix

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

Find AA^T and hence prove that AA^T is symmetric.

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84. Suppose A and B are two symmetric matrices.

Prove that $(AB)^T = BA$

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85. Suppose A and B are two symmetric matrices.

If AB is symmetric, prove that AB =BA

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86. Suppose A and B are two symmetric matrices.

If AB is symmetric, prove that AB =BA

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87. Find the transpose of each of each of the following matrics:

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

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88. Find the transpose of each of each of the following matrics:

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

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89. Find the transpose of each of each of the following matrics:

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

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90. 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

$(A+B)^T = A^T + B^T$

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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 verify that

$(A - B)^T = A^T - B^T$

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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

$(A + B)^T = A^T + B^T$

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93. If $A^T = \begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$ then verify that

$(A - B)^T = A^T - B^T$

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

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95. For matrics A and B, verify that $(AB)^T = B^T . A^T$, where

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

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96. For matrics A and B, verify that $(AB)^T = B^T . A^T$, where

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

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97. If $A^T = \begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$,Verify that $A^T A = I$

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98. if $A = \begin{bmatrix} \sin\alpha & \cos\alpha \\ -\cos\alpha & \sin\alpha \end{bmatrix}$, then verify $A^T A = I$

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99. 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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100. 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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101. For the matrix $A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$, verify that

$A + A^T$ is a symmetric matrix

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102. For the matrix $A = \begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$, verify that

$A - A^T$ is a skew symmetric matrix

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103. Find $\frac{1}{2}(A + A^T)$ and $\frac{1}{2}(A - A^T)$ where $A = \begin{bmatrix} 0 & a & b \\ -a & 0 & c \\ -b & -c & 0 \end{bmatrix}$

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104. 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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105. Express the following matrices as the sum of a Symmetric and a Skew Symmetric matrix.

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

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106. 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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107. Express the following matrics as the sum of a symmetrics and a skew symmetrics matrix

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

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108. If A,B are symmetric matrices of same order then $AB - BA$ is always a ..... .

A. Skew-symmetric matrix

B. Symmetric matrix

C. Zero matrix

D. Identify matrix

Answer: A

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

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

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

C. π

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

Answer: B

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110. Find P^{-1}, if it exists, given

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

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

Consider $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ Write A=IA

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112. Using elementary transformation find the inverse of the matrix $\begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix}$

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

$$A = \begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$$

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114. Find the inverse of the following using elementary transformations. $A = \begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$

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115. Find the inverse of the following using elementary transformations. $A = \begin{bmatrix} 2 & 1 \\ 7 & 4 \end{bmatrix}$

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116. Find the inverse of the following using elementary transformations. $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$

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117. Find the inverse of the following using elementary transformations. $A = \begin{bmatrix} 3 & 1 \\ 5 & 2 \end{bmatrix}$

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

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

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

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

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

$$A = \begin{bmatrix} 1 & \frac{1}{2} \\ 2 & \frac{3}{2} \end{bmatrix}$$

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

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

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

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

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123. Given $P = \begin{bmatrix} 2 & -3 \\ -1 & 2 \end{bmatrix}$. Find the inverse of P by elementary row operation.

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

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

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125. Find the inverse of the following

$$A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & -1 & 0 \\ -7 & 2 & 1 \end{bmatrix}$$

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126. Find the inverse of the following

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

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127. Find the inverse of the following

$$A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & -1 & 0 \\ -7 & 2 & 1 \end{bmatrix}$$

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128. Matrix A and B will be inverse of each other only if

A. AB = BA

B. AB = BA = 0

C. AB = 0, BA = I

D. AB = BA = I

Answer: D

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