MATHS

BOOKS - SELINA MATHS (ENGLISH)

MATRICES

Questions

1. Find the values of x,y,a and b, if : $\begin{bmatrix} x-2 & y \\ a/2 & b+1 \end{bmatrix} = \begin{bmatrix} 0 & 3 \\ 1 & 5 \end{bmatrix}$

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

(i) A+B and B+A (ii) (A+B)+C and A+(B+C)

(iii) Is A+B=B+A? (iv) Is (A+B) +C=A+(B+C)?

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

(i) A+C (ii) B-A (iii) A+B-C

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4. If matrix $A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & -3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -2 \\ 7 & 4 \end{bmatrix}$, find transpose matrices A^t and B^t. If possible, find (i) $A + A^t$ (ii) $B + B^t$

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5. If $A = \begin{bmatrix} 8 & 6 \\ -2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 5 \\ 1 & 0 \end{bmatrix}$ then solve for 2×2 matrix X such that

(i) A+X=B

(ii) X-B=A

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6. Given $A = \begin{bmatrix} 1 & 2 \\ -2 & 3 \end{bmatrix}, B = \begin{bmatrix} -2 & -1 \\ 1 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} 0 & 3 \\ 2 & -1 \end{bmatrix}$, find A+2B-3C.

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7. Given matrix $A = \begin{bmatrix} 5 \\ -3 \end{bmatrix}$ and matrix $B = \begin{bmatrix} -1 \\ 7 \end{bmatrix}$ find matrix X such that : A+2X=B.

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8. If $A = \begin{bmatrix} -2 & 3 \\ 4 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix}$, find (i) AB (ii) BA

(iii) Is AB=BA?

(iv) Write the conclusion that you draw from the result obtained above in (iii).

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9. Let $A = \begin{bmatrix} -3 & 3 \\ 2 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 6 \\ 4 & 6 \end{bmatrix}$, find the matrix AB. Write the conclusion, if any, that you can draw the result obtained.

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10. If $A = \begin{bmatrix} 4 & -4 \\ -3 & 3 \end{bmatrix}, B = \begin{bmatrix} 6 & 5 \\ 3 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & 3 \\ -1 & -2 \end{bmatrix}$ show that AB=AC. Write the conclusion, if any, that you can draw from the result obtained above.

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11. If $A = \begin{bmatrix} 2 & -1 \\ -1 & 3 \end{bmatrix}$ evaluate $A^2 - 3A + 3I$, where I is a unit matrix of order 2.

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12. If $A = \begin{bmatrix} 3 & 5 \\ 4 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 \\ 4 \end{bmatrix}$ is the product AB possible?. Give a reason, if yes, find AB.

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13. If $A = \begin{bmatrix} 3 & 2 \\ 0 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix}$, find :

(i) (A+B) (A-B) (ii) $A^2 - B^2$ (iii) $Is(A+B)(A-B) = A^2 - B^2$?

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14. Given $\begin{bmatrix} 3 & -8 \\ 9 & 4 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -2 \\ 8 \end{bmatrix}$, find x and y.

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15. If B and C are two matrices such that $B = \begin{bmatrix} 1 & 3 \\ -2 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 17 & 7 \\ -4 & -8 \end{bmatrix}$, find the matrix M so that BM=C.

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16. Find the matrix M, such that $M \times \begin{bmatrix} 3 & 6 \\ -2 & -8 \end{bmatrix} = [-2, 16]$

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17. State with reason, whether the following are true or false, A,B, and C are matrices of order 2×2

(i) A.B=B.A (ii) A. (B.C)=(A.B).C

(iii) $(A+B)^2 = A^2 + 2AB + B^2$ (iv) $A.(B+C) = A.B + A.C$

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Exercise 9 A

1. State whether the following statements are true of false. If false, give a reason.

If A and B are two matrices of orders 3×2 and 2×3 respectively, then their sum A+B is possible.

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2. State whether the following statements are true of false. If false, give a reason.

The matrices $A_{2 \times 3}$ and $B_{2 \times 3}$ are conformable for substraction.

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3. State whether the following statements are true of false. If false, give a reason.

Transpose of a 2×1 matrix is a 2×1 matrix.

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4. State whether the following statements are true of false. If false, give a reason.

Transpose of a square matrix is a square matrix.

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5. State whether the following statements are true of false. If false, give a reason.

A column matrix has many columns and only one row.

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6. Given $\begin{bmatrix} x & y+2 \\ 3 & z-1 \end{bmatrix} = \begin{bmatrix} 3 & 1 \\ 3 & 2 \end{bmatrix}$ find x,y and z.

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7. Solve for a,b and c, if,

(i) $\begin{bmatrix} -4 & a+5 \\ 3 & 2 \end{bmatrix} = \begin{bmatrix} b+4 & 2 \\ 3 & c-1 \end{bmatrix}$

(ii) $\begin{bmatrix} a & a-b \\ b+c & 0 \end{bmatrix} = \begin{bmatrix} 3 & -1 \\ 2 & 0 \end{bmatrix}$

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8. If $A = [8, -3]$ and $B = [4, -5]$ find, (i) A+B (ii) B-A

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9. If $A = \begin{bmatrix} 2 \\ 5 \end{bmatrix}, B = \begin{bmatrix} 1 \\ 4 \end{bmatrix}$ and $C = \begin{bmatrix} 6 \\ -2 \end{bmatrix}$, find

(i) B+C (ii) A-C

(iii) A+B-C (iv) A-B+C

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10. Wherever possible write each of the following as a single matrix.

(i) $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} + \begin{bmatrix} -1 & -2 \\ 1 & -7 \end{bmatrix}$

(ii) $\begin{bmatrix} 2 & 3 & 4 \\ 5 & 6 & 7 \end{bmatrix} - \begin{bmatrix} 0 & 2 & 3 \\ 6 & -1 & 0 \end{bmatrix}$

(iii) $\begin{bmatrix} 0 & 1 & 2 \\ 4 & 6 & 7 \end{bmatrix} + \begin{bmatrix} 3 & 4 \\ 6 & 8 \end{bmatrix}$

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11. Find x and y from the following equations:

(i) $\begin{bmatrix} 5 & 2 \\ -1 & y-1 \end{bmatrix} - \begin{bmatrix} 1 & x-1 \\ 2 & -3 \end{bmatrix} = \begin{bmatrix} 4 & 7 \\ -3 & 2 \end{bmatrix}$

(ii) $[-8, x] + [y-2] = [-3, 2]$

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12. Given : $M = \begin{bmatrix} 5 & -3 \\ -2 & 4 \end{bmatrix}$ find its transpose matrix M'. If possible, find :

(i) M+M^t (ii) $M^t - M$

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13. Write the additive inverse of matrices A,B, and C

where $A = [6, -5], B = \begin{bmatrix} -2 & 0 \\ 4 & -1 \end{bmatrix}$ and $C = \begin{bmatrix} -7 \\ 4 \end{bmatrix}$

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14. Given A=$\begin{bmatrix} 2 \\ -3 \end{bmatrix}$, B=$\begin{bmatrix} 0 \\ 2 \end{bmatrix}$ and C=$\begin{bmatrix} -1 \\ 4 \end{bmatrix}$, find the matrix X in each of the following:

(i) X+B=C-A

(ii) A-X=B+C

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15. Given $A = \begin{bmatrix} -1 & 0 \\ 2 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -3 \\ -2 & 0 \end{bmatrix}$ find the matrix X in each of the following

(i) A+X=B

(ii) A-X=B

(iii) X-B=A

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Exercise 9 B

1. Evaluate:

(i) $3\begin{bmatrix} 5 \\ -2 \end{bmatrix}$

(ii) $7\begin{bmatrix} -1 & 2 \\ 0 & 1 \end{bmatrix}$

(iii) $2\begin{bmatrix} -1 & 0 \\ 2 & -3 \end{bmatrix} + \begin{bmatrix} 3 & 3 \\ 5 & 0 \end{bmatrix}$

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2. Find x and y if:

(i) $3\begin{bmatrix} 4 \\ x \end{bmatrix} + 2\begin{bmatrix} y \\ -3 \end{bmatrix} = \begin{bmatrix} 10 \\ 0 \end{bmatrix}$

(ii) $x\begin{bmatrix} -1 \\ 2 \end{bmatrix} - 4\begin{bmatrix} -2 \\ -y \end{bmatrix} = \begin{bmatrix} 7 \\ -8 \end{bmatrix}$

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

(i) 2A-3B+C (ii) A+2C-B

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

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

(i) find the matrix 2A+B.

(ii) find a matrix C such that : $C + B = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

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6. If $2\begin{bmatrix} 3 & x \\ 0 & 1 \end{bmatrix} + 3\begin{bmatrix} 1 & 3 \\ y & 2 \end{bmatrix} = \begin{bmatrix} z & -7 \\ 15 & 8 \end{bmatrix}$, find the values of x, y and z.

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7. Given $A = \begin{bmatrix} -3 & 6 \\ 0 & -9 \end{bmatrix}$ and A^t is it transpose matrix. Find :

(i) $2A + 3A^t$ (ii) $2A^t - 3A$

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8. Given $A = \begin{bmatrix} 1 & 1 \\ -2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 \\ 1 & 1 \end{bmatrix}$ Solve for matrix X:

(i) X+2A=B (ii) 3A+B+2X=0

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9. If $M = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ and $N = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ show that $3M + 5N = \begin{bmatrix} 5 \\ 3 \end{bmatrix}$

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10. If I is the unit matrix of order 2×2 find the matrix M, such that

(i) $M - 2I = 3\begin{bmatrix} -1 & 0 \\ 4 & 1 \end{bmatrix}$

(ii) $5M + 3I = 4\begin{bmatrix} 2 & -5 \\ 0 & -3 \end{bmatrix}$

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11. If $\begin{bmatrix} 1 & 4 \\ -2 & 3 \end{bmatrix} + 2M = 3\begin{bmatrix} 3 & 2 \\ 0 & -3 \end{bmatrix}$ find the matrix M.

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Exercise 9 C

1. Evaluate : if possible

(i) $[3, 2]\begin{bmatrix} 2 \\ 0 \end{bmatrix}$ (ii) $[1, -2]\begin{bmatrix} -2 & 3 \\ -1 & 4 \end{bmatrix}$

(iii) $\begin{bmatrix} 6 & 4 \\ 3 & -1 \end{bmatrix}\begin{bmatrix} -1 \\ 3 \end{bmatrix}$ (iv) $\begin{bmatrix} 6 & 4 \\ 3 & -1 \end{bmatrix}\begin{bmatrix} -1 \\ 3 \end{bmatrix}$

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2. If $A = \begin{bmatrix} 0 & 2 \\ 5 & -2 \end{bmatrix}, B = \begin{bmatrix} 1 & -1 \\ 3 & 2 \end{bmatrix}$ and is a unit matrix of order 2×2 find :

(i) AB (ii) BA (iii) AI

(Iv) A^2 (v) B^2A

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3. If $A = \begin{bmatrix} 3 & x \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 9 & 16 \\ 0 & -y \end{bmatrix}$ find x and y when $A^2 = B$.

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4. Find x and y, if :

(i) $\begin{bmatrix} 4 & 3x \\ x & -2 \end{bmatrix}\begin{bmatrix} 5 \\ 1 \end{bmatrix} = \begin{bmatrix} y & 8 \end{bmatrix}$

(ii) $\begin{bmatrix} x & 0 \\ -3 & 1 \end{bmatrix}\begin{bmatrix} 1 & 1 \\ 0 & y \end{bmatrix} = \begin{bmatrix} 2 & 2 \\ -3 & -2 \end{bmatrix}$

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

(i) (AB) C (ii) A (BC)

Is $A(BC) = (AB)C$?

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6. Given $A = \begin{bmatrix} 0 & 4 & 6 \\ 3 & 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 \\ -1 & 2 \\ -5 & -6 \end{bmatrix}$, is the following possible

(i) AB (ii) BA (iii) A^2.

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7. Let $A = \begin{bmatrix} 2 & 1 \\ 0 & -2 \end{bmatrix}, B = \begin{bmatrix} 4 & 1 \\ -3 & -2 \end{bmatrix}$ and $C = \begin{bmatrix} -3 & 2 \\ -1 & 4 \end{bmatrix}$. Find $A^2 + AC - 5B$.

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8. If $M = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ and I is a unit matrix of the same order as that of M, show that $M^2 = 2M + 3I$

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9. If $A = \begin{bmatrix} a & 0 \\ 0 & 2 \end{bmatrix}, B = \begin{bmatrix} 0 & -b \\ 1 & 0 \end{bmatrix}, M = \begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}$ and $BA = M^2$, find the values of a and b.

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10. Given $A = \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ -2 & 01 \end{bmatrix}$, Find

(i) A-B (ii) A^2

(iii) AB (iv) $A^2 - AB + 2B$

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

$(A+B)^2$

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12. Find the matrix A, if $B = \begin{bmatrix} 2 & 1 \\ 0 & 1 \end{bmatrix}$ and $B^2 = B + \frac{1}{2}A$.

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

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14. If $A = \begin{bmatrix} 2 & 1 \\ 0 & 0 \end{bmatrix}, B = \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 4 \\ 0 & 2 \end{bmatrix}$ then show that

$(i) A(B+C) = AB + AC$

(ii) $(B-A)C = BC - AC.$

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15. If $A = \begin{bmatrix} 1 & 4 \\ 2 & 1 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$ simplify : $A^2 + BC$.

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16. Solve for x and y

(i) $\begin{bmatrix} 2 & 5 \\ 5 & 2 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -7 \\ 14 \end{bmatrix}$

(ii) $[x + y, x - 4]\begin{bmatrix} -1 & -2 \\ 2 & 2 \end{bmatrix} = [-7, -11]$

(iii) $\begin{bmatrix} -2 & 0 \\ 3 & 1 \end{bmatrix}\begin{bmatrix} -1 \\ 2x \end{bmatrix} + 3\begin{bmatrix} -2 \\ 1 \end{bmatrix} = 2\begin{bmatrix} y \\ 3 \end{bmatrix}$.

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17. In each case given below, find :

the order of matrix M,

(i) $M \times \begin{bmatrix} 1 & 1 \\ 0 & 2 \end{bmatrix} = [1, 2]$

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18. If $A = \begin{bmatrix} 2 & x \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 36 \\ 0 & 1 \end{bmatrix}$, find the value of x, given that $A^2 = B$

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19. If $A = \begin{bmatrix} 3 & 7 \\ 2 & 4 \end{bmatrix}, B = \begin{bmatrix} 0 & 2 \\ 5 & 3 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -5 \\ -4 & 6 \end{bmatrix}$ Find AB-5C.

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20. If A and B are any two 2×2 matrices such that AB=BA=B and B is not a zero matrix, what can you say about the matrix A ?

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21. Given $A = \begin{bmatrix} 3 & 0 \\ 0 & 4 \end{bmatrix}, B = \begin{bmatrix} a & b \\ 0 & c \end{bmatrix}$ and AB=A+B, find the values of a,b and c.

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22. If $P = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$ and $Q = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$ then compute :

(i) $P^2 - Q^2$ (ii) $(P+Q)(P-Q)$

Is (P+Q) (P-Q) $= P^2 - Q^2$ true for matrix algebra?

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23. Give the matrices :

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

(i) ABC (ii) ACB.

State whether ABC=ACB.

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24. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} 6 & 1 \\ 1 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & -3 \\ 0 & 1 \end{bmatrix}$. Find each of the following and state if they are equal:

(i) CA+B (ii) A+CB

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25. If $A = \begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 \\ -11 \end{bmatrix}$. find the matrix X such that AX=B.

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26. If $A = \begin{bmatrix} 4 & 2 \\ 1 & 1 \end{bmatrix}$, find $(A - 2I)(A - 3I)$.

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27. If $A = \begin{bmatrix} 2 & 1 & -1 \\ 0 & 1 & -2 \end{bmatrix}$ find:

(i) $A^t . A$ (ii) $A . A^t$

where A^t is the transpose of matrix A.

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28. If $M = \begin{bmatrix} 4 & 1 \\ -1 & 2 \end{bmatrix}$ show that $6M - M^2 = 9I$, where I is a 2×2 unit matrix.

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29. If $P = \begin{bmatrix} 2 & 6 \\ 3 & 9 \end{bmatrix}$ and $Q = \begin{bmatrix} 3 & x \\ y & 2 \end{bmatrix}$. find x and y such that PQ=null matrix.

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30. Evalutate:

$$\begin{bmatrix} 2\cos 60^\circ, & -2\sin 30^\circ \\ -\tan 45^\circ, & \cos 0^\circ \end{bmatrix} \begin{bmatrix} \cot 45^\circ, & \cos ec30^\circ \\ \sec 60^\circ, & \sin 90^\circ \end{bmatrix}$$

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31. State with reason, whether the following are true of false. A, B and C are matrices of order 2×2.

A+B=B+A

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32. State with reason, whether the following are true of false. A, B and C are matrices of order 2×2.

A-B=B-A

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33. State with reason, whether the following are true of false. A, B and C are matrices of order 2×2.

(B.C).A=B.(C.A)

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34. State with reason, whether the following are true of false. A, B and C are matrices of order 2×2.

(A+B).C=A.C+B.C

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35. State with reason, whether the following are true of false. A, B and C are matrices of order 2×2.

A.(B-C)=A.B-A.C

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36. State with reason, whether the following are true of false. A, B and C are matrices of order 2×2.

(A-B).C=A.C-B.C

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37. State with reason, whether the following are true of false. A, B and C are matrices of order 2×2.

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

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38. State with reason, whether the following are true of false. A, B and C are matrices of order 2×2.

$(A - B)^2 = A^2 - 2A.\, B + B^2.$

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Exercise 9 D

1. Find x and y if

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

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2. Find x and y, if :

$$[3x8]\begin{bmatrix} 1 & 4 \\ 3 & 7 \end{bmatrix} - 3[2 - 7] = 5[3, 2y]$$

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3. If $[x, y]\begin{bmatrix} x \\ y \end{bmatrix} = [25]$ and $[-x, y]\begin{bmatrix} 2x \\ y \end{bmatrix} = [-2,]2$ find x and y if:

(i) $x, y \in W$ (whole numbers)

(ii) $x, y \in Z$ (integers)

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4. Given $\begin{bmatrix} 2 & 1 \\ -3 & 4 \end{bmatrix} . X = \begin{bmatrix} 7 \\ 6 \end{bmatrix}$. Write :

(i) the order of the matrix X.

(ii) the matrix X.

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5. Evaluate :

$$\begin{bmatrix} \cos 45^\circ, \sin 30^\circ \\ \sqrt{2}\cos 0^\circ, \sin 0^\circ \end{bmatrix} \begin{bmatrix} \sin 45^\circ, \cos 90^\circ \\ \sin 90^\circ, \cot 45^\circ \end{bmatrix}$$

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

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7. If $\begin{bmatrix} a & 3 \\ 4 & 1 \end{bmatrix} + \begin{bmatrix} 2 & b \\ 1 & -2 \end{bmatrix} - \begin{bmatrix} 1 & 1 \\ -2 & c \end{bmatrix} = \begin{bmatrix} 5 & 0 \\ 7 & 3 \end{bmatrix}$

find the values of a,b and c.

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8. If $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$ find :

(i) A(BA) (ii) (AB) B.

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9. Find x and y, if : $\begin{bmatrix} x & 3x \\ y & 4y \end{bmatrix}\begin{bmatrix} 2 \\ 1 \end{bmatrix} = \begin{bmatrix} 5 \\ 12 \end{bmatrix}$

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10. If matrix $X = \begin{bmatrix} -3 & 4 \\ 2 & -3 \end{bmatrix}\begin{bmatrix} 2 \\ -2 \end{bmatrix}$ and $2X - 3Y = \begin{bmatrix} 10 \\ -8 \end{bmatrix}$ find the matrix 'X' and matrix Y.

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

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12. Find the value of x, given that: $A^2 = B, A = \begin{bmatrix} 2 & 12 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & x \\ 0 & 1 \end{bmatrix}$

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13. If $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}, B = \begin{bmatrix} 4 & -2 \\ -1 & 3 \end{bmatrix}$ and I is the identify matric of the same order and A^t is the transpose of matrix A, find $A^tB + BI$.

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14. Given $A = \begin{bmatrix} 2 & -6 \\ 2 & 0 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 4 & 0 \\ 0 & 2 \end{bmatrix}$. Find the matrix X such that A+2X=2B+C.

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15. Let $A = \begin{bmatrix} 4 & -2 \\ 6 & -3 \end{bmatrix}, B = \begin{bmatrix} 0 & 2 \\ 1 & -1 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & 3 \\ 1 & -1 \end{bmatrix}$.

Find $A^2 - A + BC$.

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16. Let $A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}, B = \begin{bmatrix} 2 & 3 \\ -1 & 0 \end{bmatrix}$. Find $A^2 + AB + B^2$

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17. If $A = \begin{bmatrix} 3 & a \\ -4 & 8 \end{bmatrix}, B = \begin{bmatrix} c & 4 \\ -3 & 0 \end{bmatrix}, C = \begin{bmatrix} -1 & 4 \\ 3 & b \end{bmatrix}$ and 3A-2C=6B. Find the values of a,b and c.

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18. Given $A = \begin{bmatrix} p & 0 \\ 0 & 2 \end{bmatrix}, B = \begin{bmatrix} 0 & -q \\ 1 & 0 \end{bmatrix}, C = \begin{bmatrix} 2 & -2 \\ 2 & 2 \end{bmatrix}$ and $BA = C^2$.

Find the values of p and q.

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19. Given $A = \begin{bmatrix} 3 & -2 \\ -1 & 4 \end{bmatrix}, B = \begin{bmatrix} 6 \\ 1 \end{bmatrix}, C = \begin{bmatrix} -4 \\ -5 \end{bmatrix}$ and $D = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$. Find AB+2C-4D

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20. Evaluate : $\begin{bmatrix} 4\sin 30^\circ & 2\cos 60^\circ \\ \sin 90^\circ & 2\cos 0^\circ \end{bmatrix} \begin{bmatrix} 4 & 5 \\ 5 & 4 \end{bmatrix}$

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

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22. Given $A = \begin{bmatrix} 2 & 0 \\ -1 & 7 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $A^2 = 9A + mI$.

Find m.

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23. Given matrix $A = \begin{bmatrix} 4\sin 30^\circ \cos 0^\circ \\ \cos 0^\circ 4\sin 30^\circ \end{bmatrix}$ and $B = \begin{bmatrix} 4 \\ 5 \end{bmatrix}$. If AX=B.

write the order of matrix X.

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24. If $A = \begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} -2 & 1 \\ -3 & 2 \end{bmatrix}$ and $A^2 - 5B^2 = 5C$. find matrix

C where C is a 2 by 2 matrix.

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25. Given matrix $B = \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix}$. Find the matrix X if, $X = B^2 - 4B$. Hence, solve for a and b given $X\begin{bmatrix} a \\ b \end{bmatrix} = \begin{bmatrix} 5 \\ 50 \end{bmatrix}$.

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Multiple Choice Questions

1. If a matrix has 4 elements, then which of the following connot be the order of the matrix ?

A. 2×2

B. 1×4

C. 2×3

D. 4×1

Answer: C

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2. The number of elements in a matrix of order 2×3 is :

A. 2

B. 3

C. 5

D. 6

Answer: D

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3. Which of the following is a row matrix ?

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

B. $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$

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

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

Answer: A

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4. A matrix which has only one column is called a :

A. row matrix

B. column matrix

C. square matrix

D. identity matrix

Answer: B

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5. The matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is known as :

A. row matrix

B. column matrix

C. square matrix

D. identity matrix

Answer: C

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6. If $\begin{bmatrix} x+2 & y+3 \\ 9 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 3 \\ 9 & 2 \end{bmatrix}$, then the value of (x + y) is :

A. 11

B. 5

C. 8

D. 3

Answer: D

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7. If $A = \begin{bmatrix} 5 \\ 4 \end{bmatrix}, B = \begin{bmatrix} 2 \\ 0 \end{bmatrix}$ and matrix $C = 2A + B$, then matrix C is :

A. $\begin{bmatrix} 12 \\ 8 \end{bmatrix}$

B. $\begin{bmatrix} 12 \\ 4 \end{bmatrix}$

C. $\begin{bmatrix} 7 \\ 4 \end{bmatrix}$

D. $\begin{bmatrix} 8 \\ 8 \end{bmatrix}$

Answer: A

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8. Given $A = \begin{bmatrix} -1 & 0 \\ 2 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -3 \\ -2 & 0 \end{bmatrix}$ The 2 by 2 matrix X such that $A + X = B$ is :

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

B. $\begin{bmatrix} 3 & -3 \\ -4 & 4 \end{bmatrix}$

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

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

Answer: B

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9. If $x = \begin{bmatrix} -1 \\ 2 \end{bmatrix} + 4\begin{bmatrix} 2 \\ -y \end{bmatrix} = \begin{bmatrix} 7 \\ -8 \end{bmatrix}$, then the respective values of x and y, are :

A. $-1, \frac{3}{2}$

B. $15, \frac{19}{2}$

C. $1, \frac{5}{2}$

D. $-1, \frac{5}{2}$

Answer: C

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10. If $A = [0 \quad 1]$ and $B = [1 \quad 0]$, then the value of $3A + 2B$ is :

A. $[2 \quad 3]$

B. $[3 \quad 2]$

C. $[2 \quad 2]$

D. $[3 \quad 3]$

Answer: A

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11. If $\begin{bmatrix} 1 & 4 \\ -2 & 3 \end{bmatrix} + 2M = 3\begin{bmatrix} 3 & 2 \\ 0 & -3 \end{bmatrix}$, then the matrix M is :

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

B. $\begin{bmatrix} 8 & 2 \\ 2 & 12 \end{bmatrix}$

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

D. $\begin{bmatrix} 8 & 2 \\ 2 & -12 \end{bmatrix}$

Answer: A

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12. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, then the matrix BA is :

A. $\begin{bmatrix} 11 & 16 \\ 10 & 16 \end{bmatrix}$

B. $\begin{bmatrix} 10 & 7 \\ 7 & 17 \end{bmatrix}$

C. $\begin{bmatrix} 11 & 10 \\ 16 & 16 \end{bmatrix}$

D. $\begin{bmatrix} 10 & 7 \\ 22 & 17 \end{bmatrix}$

Answer: D

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13. If $A = \begin{bmatrix} 2 & 3 \\ 7 & 5 \end{bmatrix}$ then $A^2 =$

A. $\begin{bmatrix} 4 & 6 \\ 14 & 10 \end{bmatrix}$

B. $\begin{bmatrix} 25 & 21 \\ 49 & 46 \end{bmatrix}$

C. $\begin{bmatrix} 4 & 9 \\ 49 & 25 \end{bmatrix}$

D. $\begin{bmatrix} 25 & 49 \\ 15 & 46 \end{bmatrix}$

Answer: B

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14. If $\begin{bmatrix} 1 & 2 \\ 2 & 9 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 20 \\ 90 \end{bmatrix}$, then the value of x and y are :

A. $x = 10, y = 0$

B. $x = 5, y = 4$

C. $x = 0, y = 10$

D. $x = 4, y = 5$

Answer: C

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15. If $\begin{bmatrix} 9 & 2 \\ 7 & 1 \end{bmatrix} M = \begin{bmatrix} 2 \\ 5 \end{bmatrix}$, then the order of matrix M is :

A. 1×2

B. 2×1

C. 2×2

D. 1×1

Answer: B

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16. If $A = \begin{bmatrix} -1 & 1 \\ a & b \end{bmatrix}$ and $A^2 = I_2$, then the values of a and b are :

A. $a = b = 1$

B. $a = 1, b = 0$

C. $a = b = 0$

D. $a = 0, b = 1$

Answer: D

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17. If $A = \begin{bmatrix} 2 & x \\ 0 & 1 \end{bmatrix}, B = \begin{bmatrix} 4 & 36 \\ 0 & 1 \end{bmatrix}$ and $A^2 = B$ then the value of x is :

A. 12

B. 6

C. 36

D. -6

Answer: A

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18. If $P = \begin{bmatrix} 2 & 6 \\ 3 & 9 \end{bmatrix}, Q = \begin{bmatrix} 3 & x \\ y & 2 \end{bmatrix}$ and PQ is a null matrix, then the value of x and y are :

A. $x = -6, y = -1$

B. $x = -6, y = 1$

C. $x = 6, y = -1$

D. $x = 6, y = 1$

Answer: A

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19. The simplified from of

$$\begin{bmatrix} \cos 45^\circ, \sin 30^\circ \\ \sqrt{2}\cos 0^\circ, \sin 0^\circ \end{bmatrix} \begin{bmatrix} \sin 45^\circ, \cos 90^\circ \\ \sin 90^\circ, \cot 45^\circ \end{bmatrix}$$ is :

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

B. $\begin{bmatrix} 1 & \frac{1}{2} \\ 1 & 0 \end{bmatrix}$

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

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

Answer: B

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20. If $A = \begin{bmatrix} 3 & 9 \\ 7 & 2 \end{bmatrix}$ and I is an identity matrix of order 2, then the value of A + 5 I is :

A. $\begin{bmatrix} 3 & 14 \\ 12 & 2 \end{bmatrix}$

B. $\begin{bmatrix} 3 & 9 \\ 7a & 2 \end{bmatrix}$

C. $\begin{bmatrix} 8 & 9 \\ 7 & 7 \end{bmatrix}$

D. $\begin{bmatrix} 8 & 14 \\ 12 & 7 \end{bmatrix}$

Answer: C

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21. If $A = \begin{bmatrix} -2 & 3 \\ 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 2 \\ -7 & 3 \end{bmatrix}$, then the matrix C such that $A + BC = O$ is :

A. $\begin{bmatrix} 3 & 5 \\ -3 & 8 \end{bmatrix}$

B. $\begin{bmatrix} -3 & 5 \\ 3 & -8 \end{bmatrix}$

C. $\begin{bmatrix} -11 & -2 \\ -11 & -2 \end{bmatrix}$

D. $\begin{bmatrix} 3 & -8 \\ 3 & -8 \end{bmatrix}$

Answer: A

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22. If $2\begin{bmatrix} 3 & 4 \\ 5 & x \end{bmatrix}\begin{bmatrix} 1 & y \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$, then the values of x and y are :

A. $x = 4, y = -4$

B. $x = 2, y = -8$

C. $x = 2, y = -4$

D. $x = 4, y = -8$

Answer: B

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23. If $M = [1 \quad 2]$ and $N = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$, then the order matrix MN is :

A. 1×2

B. 2×1

C. 2×2

D. 1×1

Answer: D

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24. If $A = \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix}$, then $A^2 - 4A =$

A. $\begin{bmatrix} -3 & -3 \\ 60 & 5 \end{bmatrix}$

B. $\begin{bmatrix} -3 & -3 \\ 8 & 3 \end{bmatrix}$

C. $\begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$

D. $\begin{bmatrix} 8 & 3 \\ 24 & 14 \end{bmatrix}$

Answer: C

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25. If $\begin{bmatrix} -3 & 2 \\ 0 & -5 \end{bmatrix}\begin{bmatrix} x \\ 2 \end{bmatrix} = \begin{bmatrix} -5 \\ y \end{bmatrix}$ then the values of x and y are :

A. $x = 3, y = -10$

B. $x = -3, y = -10$

C. $x = -3, y = 10$

D. $x = 3, y = 10$

Answer: A

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26. The order of the matrix $\begin{bmatrix} 1 & 9 & 7 & 3 \\ 5 & 4 & -2 & 11 \\ 2 & -1 & -8 & 6 \end{bmatrix}$ is :

A. 3×4

B. 4×3

C. 3×3

D. 4×3

Answer: A

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27. The number of elements in the matrix

$$\begin{bmatrix} 2 & 5 & 19 \\ 35 & 12 & \frac{1}{2} \\ -\sqrt{2} & 1 & 7 \\ -1 & 2 & 3 \end{bmatrix}$$ is :

A. 8

B. 12

C. 15

D. 9

Answer: B

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28. The diagonal elements in the $\begin{bmatrix} 0 & 0 & 4 \\ 0 & 4 & 0 \\ 4 & 0 & 0 \end{bmatrix}$ are :

A. $0, 0, 4$

B. $4, 0, 0$

C. $0, 4, 0$

D. $4, 4, 4$

Answer: C

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29. The matrix $[P]_{m \times n}$ is a square matirx, then which of the following is correct ?

A. $m = n$

B. $m > n$

C. $m < n$

D. None of these

Answer: A

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30. If $= \begin{bmatrix} 4 & -1 \\ 2 & 1 \end{bmatrix}$, then $(A + 2I)(A - 3I)$ is equal to :

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

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

C. $\begin{bmatrix} -4 & 4 \\ -8 & 8 \end{bmatrix}$

D. $\begin{bmatrix} -4 & 4 \\ 8 & -8 \end{bmatrix}$

Answer: A

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31. If $A = \begin{bmatrix} 1 & -3 \\ -8 & 8 \end{bmatrix}$ and $A^2 - 5A + 10I = 0$, then the value of k is :

A. -6

B. -4

C. 4

D. 6

Answer: C

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32. If $A = \begin{bmatrix} 3 & 1 \\ 7 & 5 \end{bmatrix}$ and $A^2 + xI = yA$, then the value of x is :

A. -8

B. -4

C. 4

D. 8

Answer: D

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33. If $\begin{bmatrix} x & 1 \end{bmatrix}\begin{bmatrix} 1 & 0 \\ -2 & 0 \end{bmatrix} = 0,$ then the value of x is :

A. 0

B. 1

C. 2

D. -1

Answer: C

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34. If $A = \begin{bmatrix} 5 & -1 \\ 6 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix},$ then which of the following is correct ?

A. $AB = \begin{bmatrix} 7 & -1 \\ 9 & 22 \end{bmatrix}$

B. $BA = \begin{bmatrix} 16 & -5 \\ 39 & 25 \end{bmatrix}$

C. $AB = BA$

D. $AB \neq BA$

Answer: D

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35. If $A = \begin{bmatrix} 7 & 3 \\ 5 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 5 \\ 4 & 5 \end{bmatrix}$, then the matrix C such that $2A + 3C = 8B$, is :

A. $\begin{bmatrix} 2 & 24 \\ 22 & 36 \end{bmatrix}$

B. $\begin{bmatrix} \frac{2}{3} & \frac{34}{3} \\ \frac{22}{3} & \frac{36}{3} \end{bmatrix}$

C. $\begin{bmatrix} \frac{2}{3} & \frac{22}{3} \\ \frac{36}{3} & \frac{34}{3} \end{bmatrix}$

D. $\begin{bmatrix} 1 & 17 \\ 11 & 18 \end{bmatrix}$

Answer: B

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36. If $\begin{bmatrix} xy & 4 \\ z+6 & x+y \end{bmatrix} = \begin{bmatrix} 8 & w \\ 0 & 6 \end{bmatrix}$ then the value of $(x+y+z+w)$ is :

A. 0

B. 4

C. 6

D. 8

Answer: B

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Multiple Choice Questions Fill In The Blanks

1. Given $\begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix} M = 7I. \, If I$ is matrix of order $2 \times 2,$ then the order of matrix M is .....

A. 2×2

B. 2×1

C. 2×3

D. 3×3

Answer: A

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2. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 4 & 5 \\ 3 & 6 \end{bmatrix}$, then AB is .....

A. 2×2 matrix

B. 3×2 matrix

C. Not possible

D. 2×3 matrix

Answer: C

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3. The simplifed from of $\begin{bmatrix} 4\sin 30^\circ, 2\cos 60^\circ \\ \sin 90^\circ, 2\cos 0^\circ \end{bmatrix} \begin{bmatrix} 4 & 5 \\ 5 & 4 \end{bmatrix}$ is .....

A. $\begin{bmatrix} 14 & 13 \\ 12 & 14 \end{bmatrix}$

B. $\begin{bmatrix} 13 & 14 \\ 14 & 13 \end{bmatrix}$

C. $\begin{bmatrix} 14 & 14 \\ 13 & 13 \end{bmatrix}$

D. $\begin{bmatrix} 13 & 13 \\ 14 & 14 \end{bmatrix}$

Answer: B

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

A. $\begin{bmatrix} 23 & 10 \\ 10 & 13 \end{bmatrix}$

B. $\begin{bmatrix} 10 & 23 \\ 13 & 10 \end{bmatrix}$

C. $\begin{bmatrix} 23 & 10 \\ 10 & 23 \end{bmatrix}$

D. $\begin{bmatrix} 23 & 10 \\ -10 & 13 \end{bmatrix}$

Answer: D

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5. If $A = \begin{bmatrix} 2 & 12 \\ 0 & 1 \end{bmatrix}, B = \begin{bmatrix} 4 & x \\ 0 & 1 \end{bmatrix}$ and $A^2 = B$, then the value of x is .....

A. 26

B. 30

C. 36

D. 40

Answer: C

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Multiple Choice Questions Assertion And Reason Based Questions

1. Assertion Let $A = \begin{bmatrix} p & 0 \\ 0 & 2 \end{bmatrix}, B = \begin{bmatrix} 0 & -q \\ 2 & 0 \end{bmatrix}$ and $C \begin{bmatrix} 2 & -2 \\ 2 & 2 \end{bmatrix} If A + B = C,$ then the value of p and q are 2 and 2 respectively.

A. Both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion.

C. Assertion is correct but reason is notcorrect.

D. Assertion is incorrect but reason is correct.

Answer: C

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2. Assertion Let $A = \begin{bmatrix} 2 & 3 \\ 7 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} m-n & 6 \\ 14 & m+n \end{bmatrix}. If 2A = B,$ then m = 7 and n = 3.

Two equal matrices have the same order and their corresponding elements are also equal.

A. Both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion.

C. Assertion is correct but reason is notcorrect.

D. Assertion is incorrect but reason is correct.

Answer: A

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3. Assertion : $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ is a row matrix and $\begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$ is a column matrix.

Reason : Matrix having only one row is called row matrix and matrix having only one column is is called column matrix.

A. Both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion.

C. Assertion is correct but reason is notcorrect.

D. Assertion is incorrect but reason is correct.

Answer: D

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4. Assertion : If $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} X = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$, then the order of matrix X is 1×2.

Reason : The product AB of two matrices A and B is possible if number of columns in A is equal to the number of rows in B. Also, the order of the product matrix AB is number of rows in AX number of columns in B.

A. Both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion.

C. Assertion is correct but reason is notcorrect.

D. Assertion is incorrect but reason is correct.

Answer: D

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5. Assertion : If A , B and C are square matrices of order 2, then $(A+B)+C=A+(B+C)$.

Reason : Addition of matrices is commutative.

A. Both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion.

C. Assertion is correct but reason is notcorrect.

D. Assertion is incorrect but reason is correct.

Answer: A

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6. Assertion : If A and B are square matrices of order 2, then AB = BA is not always true.

Reason : Matrix multiplication is associative.

A. Both assertion and reason are correct and reason is the correct explanation of assertion.

B. Both assertion and reason are correct but reason is not the correct explanation of assertion.

C. Assertion is correct but reason is notcorrect.

D. Assertion is incorrect but reason is correct.

Answer: B

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Multiple Choice Questions Competency Based Questions

1. Three friends decided to study the chapter matrices in a group. For this, they wrote three different matrices of the same order $2x2$ and learn to perform different matrix opertions to understand its consept. The three matrices written understand its concept. The three matrices written by them are $A = \begin{bmatrix} 2 & -1 \\ 2 & 0 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$

On the basis of above information, answer the following :

If a matrix X of order 2×2 is such that $X = A + B - C,$ then X =

A. $\begin{bmatrix} 0 & 1 \\ 6 & 2 \end{bmatrix}$

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

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

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

Answer: C

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2. Three friends decided to study the chapter matrices in a group. For this, they wrote three different matrices of the same order $2x2$ and learn to perform different matrix opertions to understand its consept. The three matrices written understand its concept. The three matrices written by them are $A = \begin{bmatrix} 2 & -1 \\ 2 & 0 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$

On the basis of above information, answer the following :

If Y is square matrix of order 2 such that $Y = 2B^2$, then Y =

A. $\begin{bmatrix} 34 & -12 \\ -24 & 16 \end{bmatrix}$

B. $\begin{bmatrix} 18 & 8 \\ 32 & 0 \end{bmatrix}$

C. $\begin{bmatrix} 9 & 84 \\ 16 & 0 \end{bmatrix}$

D. $\begin{bmatrix} 17 & -6 \\ 12 & 8 \end{bmatrix}$

Answer: A

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3. Three friends decided to study the chapter matrices in a group. For this, they wrote three different matrices of the same order $2x2$ and learn to perform different matrix opertions to understand its consept. The three matrices written understand its concept. The three matrices written by them are $A = \begin{bmatrix} 2 & -1 \\ 2 & 0 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$

On the basis of above information, answer the following :

If $Z = 3A - 4C,$ then Z =

A. $\begin{bmatrix} 2 & 3 \\ 6 & 8 \end{bmatrix}$

B. $\begin{bmatrix} 2 & -3 \\ 6 & -8 \end{bmatrix}$

C. $\begin{bmatrix} -2 & 3 \\ -6 & 8 \end{bmatrix}$

D. $\begin{bmatrix} -2 & 3 \\ 6 & -8 \end{bmatrix}$

Answer: B

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4. Three friends decided to study the chapter matrices in a group. For this, they wrote three different matrices of the same order $2x2$ and learn to perform different matrix opertions to understand its consept. The three matrices written understand its concept. The three matrices written by them are $A = \begin{bmatrix} 2 & -1 \\ 2 & 0 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$

On the basis of above information, answer the following :

If $M = A^2 - 2I,$ then M =

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

B. $\begin{bmatrix} 2 & -4 \\ 4 & -4 \end{bmatrix}$

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

D. $\begin{bmatrix} 0 & -2 \\ 4 & -4 \end{bmatrix}$

Answer: D

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5. Three friends decided to study the chapter matrices in a group. For this, they wrote three different matrices of the same order $2x2$ and learn to perform different matrix opertions to understand its consept. The three matrices written understand its concept. The three matrices written by them are $A = \begin{bmatrix} 2 & -1 \\ 2 & 0 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$

On the basis of above information, answer the following :

If N is matrix of order 2 such that $8 + 2N = 3C,$ then N =

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

B. $\begin{bmatrix} 6 & -2 \\ -4 & 6 \end{bmatrix}$

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

D. $\begin{bmatrix} 0 & -2 \\ -4 & 6 \end{bmatrix}$

Answer: A

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6. While taking revision class of mathemeatics on the chapter matrices, a teachter wrote the following matrices on the board.

$$A = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, B = [7 \quad 6 \quad 3], C = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, D = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}, E = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}, F$$

After writing these matrices on the board, the teacher asked the following questions :

Which of the following matrices is a row matrix ?

A. A

B. B

C. C

D. F

Answer: B

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7. While taking revision class of mathemeatics on the chapter matrices, a teachter wrote the following matrices on the board.

$$A = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, B = [7 \quad 6 \quad 3], C = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, D = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}, E = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}, F$$

After writing these matrices on the board, the teacher asked the following questions :

Which of the following matrices is a column matrix ?

A. A

B. B

C. C

D. F

Answer: A

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8. While taking revision class of mathemeatics on the chapter matrices, a teachter wrote the following matrices on the board.

$$A = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, B = [7 \quad 6 \quad 3], C = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, D = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}, E = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}, F$$

After writing these matrices on the board, the teacher asked the following questions :

Which of the following matrices is an identity matrix ?

A. G

B. D

C. C

D. E

Answer: C

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9. While taking revision class of mathemeatics on the chapter matrices, a teachter wrote the following matrices on the board.

$$A = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, B = [7 \quad 6 \quad 3], C = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, D = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}, E = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}, F$$

After writing these matrices on the board, the teacher asked the following questions :

Which of the following matrices is a rull matrix ?

A. A

B. B

C. C

D. E

Answer: D

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10. While taking revision class of mathemeatics on the chapter matrices, a teachter wrote the following matrices on the board.

$$A = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, B = [7 \quad 6 \quad 3], C = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, D = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}, E = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}, F$$

After writing these matrices on the board, the teacher asked the following questions :

Which of the following matrices is square matrix ?

A. A

B. B

C. D

D. F

Answer: D

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11. A matrix is an ordered rectangular array of elements (numbers). The plural of matrix is matrices. The elemnts in a matrix are arranged in rows and columns. Consider the following matrices :

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} -2 & 7 \\ 9 & \end{bmatrix}, C = \begin{bmatrix} 1 & -2 & 3 \\ 7 & 6 & 4 \end{bmatrix},$$

$$D = \begin{bmatrix} -1 & 2 \\ 0 & 4 \\ 3 & 1 \end{bmatrix}, E = \begin{bmatrix} 1 & 0 \\ 0 & 3 \end{bmatrix}, F = \begin{bmatrix} 2 \\ 1 \end{bmatrix}, G = [0 \quad 1]$$

Now, answer the following question

The addition of whcih of the following matrices is possible ?

A. A, B and E

B. A and B only

C. C and D

D. F and G

Answer: A

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12. A matrix is an ordered rectangular array of elements (numbers). The plural of matrix is matrices. The elemnts in a matrix are arranged in rows and columns. Consider the following matrices :

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} -2 & 7 \\ 9 & \end{bmatrix}, C = \begin{bmatrix} 1 & -2 & 3 \\ 7 & 6 & 4 \end{bmatrix},$$

$$D = \begin{bmatrix} -1 & 2 \\ 0 & 4 \\ 3 & 1 \end{bmatrix}, E = \begin{bmatrix} 1 & 0 \\ 0 & 3 \end{bmatrix}, F = \begin{bmatrix} 2 \\ 1 \end{bmatrix}, G = [0 \quad 1]$$

Now, answer the following question

Which of the following multiplication of matrices is not possible ?

A. AB

B. CD

C. FG

D. EG

Answer: D

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13. A matrix is an ordered rectangular array of elements (numbers). The plural of matrix is matrices. The elemnts in a matrix are arranged in rows and columns. Consider the following matrices :

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} -2 & 7 \\ 9 & \end{bmatrix}, C = \begin{bmatrix} 1 & -2 & 3 \\ 7 & 6 & 4 \end{bmatrix},$$

$$D = \begin{bmatrix} -1 & 2 \\ 0 & 4 \\ 3 & 1 \end{bmatrix}, E = \begin{bmatrix} 1 & 0 \\ 0 & 3 \end{bmatrix}, F = \begin{bmatrix} 2 \\ 1 \end{bmatrix}, G = [0 \quad 1]$$

Now, answer the following question

Which of the following matrices is possible ?

A. F^2

B. G^2

C. A^2

D. C^2

Answer: C

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14. A matrix is an ordered rectangular array of elements (numbers). The plural of matrix is matrices. The elemnts in a matrix are arranged in rows and columns. Consider the following matrices :

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} -2 & 7 \\ 9 & \end{bmatrix}, C = \begin{bmatrix} 1 & -2 & 3 \\ 7 & 6 & 4 \end{bmatrix},$$

$$D = \begin{bmatrix} -1 & 2 \\ 0 & 4 \\ 3 & 1 \end{bmatrix}, E = \begin{bmatrix} 1 & 0 \\ 0 & 3 \end{bmatrix}, F = \begin{bmatrix} 2 \\ 1 \end{bmatrix}, G = [0 \quad 1]$$

Now, answer the following question

If $A = \begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$ and $A^2 = xA$, where x is any number, then the value of x is :

A. -4

B. -2

C. 2

D. 4

Answer: D

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15. A matrix is an ordered rectangular array of elements (numbers). The plural of matrix is matrices. The elemnts in a matrix are arranged in rows and columns. Consider the following matrices :

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} -2 & 7 \\ 9 & \end{bmatrix}, C = \begin{bmatrix} 1 & -2 & 3 \\ 7 & 6 & 4 \end{bmatrix},$$

$$D = \begin{bmatrix} -1 & 2 \\ 0 & 4 \\ 3 & 1 \end{bmatrix}, E = \begin{bmatrix} 1 & 0 \\ 0 & 3 \end{bmatrix}, F = \begin{bmatrix} 2 \\ 1 \end{bmatrix}, G = \begin{bmatrix} 0 & 1 \end{bmatrix}$$

Now, answer the following question

If $P + Q = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$ and $P - Q = \begin{bmatrix} 4 & 4 \\ 4 & 4 \end{bmatrix}$, then matrix P =

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

B. $\begin{bmatrix} 2 & 4 \\ 4 & 2 \end{bmatrix}$

C. $\begin{bmatrix} 6 & 4 \\ 4 & 6 \end{bmatrix}$

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

Answer: A

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