1. The following is a chart of marks obtained by three students in an examination

	Eng	Maths	Hindi	Phy	Chem
Shekhar	62	85	57	73	69
Ayush	70	98	68	86	79
Suman	43	59	51	86	79

Display this information in the form of a 3 x 5 matrix and also a 5 x 3 matrix.

2. The results of the Hockey matches played in a tournament are as follows:
The team A beats the teams C and D
The team B beats the teams A, C and D.
The team C beats the team D.
The team D beats none.
Display the above information by a suitable matrix.

3. For the matrix A = $\begin{bmatrix} 6 & 13 & -1 \\ -3 & -2 & 3 \\ 4 & 0 & 8 \end{bmatrix}$

4. Construct a 2 x 2 matrix C = $[c_{ij}]$ whose elements are given by $c_{ij} = 3i - j$
5. If a matrix has 10 elements, find the possible orders of the matrix.
6. Classify the following matrices:

a. A = $\begin{bmatrix} 1 & 4 \\ -0 & 5 \\ 2 & -7 \end{bmatrix}$

b. B = $[3 \quad 0 \quad 4]$

c. D= $\begin{bmatrix} -12 \\ 10 \\ 13 \\ 4 \end{bmatrix}$

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

e. E = $\begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$

7. Find a, b,c and d if $\begin{bmatrix} a+b & 3a-b \\ 4c+d & 2b-d \end{bmatrix} = \begin{bmatrix} 2 & 2 \\ 12 & -6 \end{bmatrix}$

8. Solve: X + $\begin{bmatrix} 2 & 7 \\ -3 & 4 \end{bmatrix} = \begin{bmatrix} 1 & -5 \\ 6 & -9 \end{bmatrix}$ for the 2 x 2 matrix.

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

10. Find the matrix X such that –A + 3B + X =0 , When A $\begin{bmatrix}-2 & 6\\ 5 & 8\end{bmatrix}$ and B= $\begin{bmatrix}1 & 2\\ -2 & 3\end{bmatrix}$

11. If A = $\begin{bmatrix}4 & 2\\ -6 & -2\end{bmatrix}$, B= $\begin{bmatrix}4 & -3\\ 0 & 5\end{bmatrix}$ and C= $\begin{bmatrix}-2 & 0\\ 0 & 4\end{bmatrix}$; Find the marks X such that C+ 2x+= 4B - A

12. Find the matrix X and Y if, X – Y = $\begin{bmatrix}-3 & 1\\ 1 & 2\end{bmatrix}$ and X + Y = $\begin{bmatrix}5 & 7\\ -6 & -8\end{bmatrix}$.

13. If A = $\begin{bmatrix}3 & 2\\ 2 & -1\end{bmatrix}$ and B = $\begin{bmatrix}1 & 2\\ 3 & 0\end{bmatrix}$, and AB and BA.

14. If A =$\begin{bmatrix}4 & 3\\ -5 & 7\end{bmatrix}$, show that $AI_2 = I_2A$.

15. If A= $\begin{bmatrix}-1 & 2\\ 3 & 1\end{bmatrix}$, find (i) A^2, (ii) A^3.

16. Simplify : $\begin{bmatrix}-2sin30° & 2\\ \tan 45° & \cos 0°\end{bmatrix} \times \begin{bmatrix}\cot 45° & sin90°\\ 2\sec 0° & \sec 60°\end{bmatrix} \times \begin{bmatrix}cosec\ 90°\\ 2\cos 60°\end{bmatrix}$

17. If X = $\begin{bmatrix}4 & 1\\ -1 & 2\end{bmatrix}$, show that $6X - X^2 = 9I$, where I is the unit matrix.

18. Find a and b if $\begin{bmatrix}a & -b\\ 3a & 2b\end{bmatrix}\begin{bmatrix}3\\ 2\end{bmatrix} = \begin{matrix}2\\ 11\end{matrix}$

19. Find the matrix X of order 2 x 2 which satisfies the equation:

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

20. Let A = $\begin{bmatrix}5 & 2\\ 3 & -1\end{bmatrix}$ and B =$\begin{bmatrix}-13\\ 1\end{bmatrix}$, find the matrix X such that AX = B.

21. If A = $\begin{bmatrix}-1 & 2\\ 2 & -1\end{bmatrix}$, B = $\begin{bmatrix}1 & 3\\ 3 & 1\end{bmatrix}$ and C = $\begin{bmatrix}2 & 5\\ 5 & 2\end{bmatrix}$, find A(BC) and (AB) C and show that A(BC) = (AB) C.

22. If A =$\begin{bmatrix}3 & 2\\ x & 4\end{bmatrix}$ *and B* $\begin{bmatrix}1 & 2\\ x & 2\end{bmatrix}$, find the value of x if A^2 7B.

23. State with reason, whether the following are true or false. A, B, C are matrices of order 2 x 2.

    a. A . B = B . A

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

    c. $(A + B)^2 = A^2 + 2A . B + B^2$

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

1. Find the values of x, y, a and b, if:

$$\begin{bmatrix} x-2 & y \\ a/2 & b+1 \end{bmatrix} = \begin{bmatrix} 0 & 3 \\ 1 & 5 \end{bmatrix}$$

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) ?

In each case, write the conclusion (if any) that you can draw.

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.

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. $B + B^t$

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.

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.

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.

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).

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 from the result obtained.

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.

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

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.

13. Let 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 $(A + B)\ (A - B) = A^2 - B^2$?

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.

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.

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

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