EXPLANATION

Addition of Matrices:-

If, $A = [a_{ij}]_{m \times n}$ & $B = [b_{ij}]_{m \times n}$

then $A + B = [a_{ij} + b_{ij}]_{m \times n}$.

Properties of Matrix Addition:-

1. $A + B = B + A$.
2. $(A + B) + C = A + (B + C)$
3. $A + O = A = O + A$
4. $(-A) + A = O = A + (-A)$
5. $A + X = B + X \Rightarrow A = B$
6. The equation $A + X = O$ has unique solution in the set of all $m \times n$ matrices.

Subtraction of Two Matrices:-

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

Multiplication of a Matrix by a Scalar:-

If $A = [a_{ij}]_{m \times n}$ then $Ak = kA = [kA]_{m \times n}$.

Properties of Multiplication of a Matrix by a Scalar:-

1. $k(A + B) = kA + kB$.
2. $(p + q)A = pA + qA$.
3. $p(qA) = (pq)A$.
4. $(-k)A = -(kA) = k(-A)$

EXPLANATION

Multiplication of Two Matrices :-

If $A = [a_{ij}]_{m \times n}$ $B = [b_{ij}]_{n \times p}$ then $AB = C\ [c_{ij}]_{m \times p}$

Properties of Matrix Multiplication :-

1. Multiplication of matrices is not commutative.
2. $A(BC) = (AB)C$
3. $A(B+C) = AB + AC$
4. If $AB = 0$ then it is not necessarily imply that $BA = 0$. In fact, BA may not even exist.
5. $AB = AC \Rightarrow B = C$ (If A is non-singular matrix)
6. $A^m A^n = A^{m+n}$
7. $AI_n = I_n A = A$