ALGEBRAIC EXPRESSIONS AND IDENTITIES

ADDITION AND SUBTRACTION OF ALGEBRAIC EXPRESSIONS

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For addition or subtraction of two or more than two algebraic expressions, we first collect like terms and then find the sum or difference of coefficients of these terms.

Ex.1 Add :
$$l^2 + m^2$$
, $m^2 + n^2$, $n^2 + l^2$ and $2lm + 2mn + 2nl$
Sol Required sum
= $l^2 + m^2 + m^2 + n^2 + n^2 + l^2 + 2lm + 2mn + 2nl$
= $(l^2 + l^2) + (m^2 + m^2) + (n^2 + n^2) + 2lm + 2mn + 2nl$
(Collecting like terms)
= $2l^2 + 2m^2 + 2n^2 + 2lm + 2mn + 2nl$
= $2(l^2 + m^2 + n^2 + lm + mn + nl)$
Ex.2 Subtract : $4p^2q - 3pq + 5pq^2 - 8p + 7q - 10$ from
 $18 - 3p - 11q + 5pq - 2pq^2 + 5p^2q - (4p^2q - 3pq + 5pq^2 - 8p + 7q - 10)$
= $18 - 3p - 11q + 5pq - 2pq^2 + 5p^2q - 4p^2q + 3pq - 5pq^2 + 8p - 7q + 10$
= $(18 + 10) + (8p - 3p) + (-11q - 7q) + (5pq + 3pq) + (-2pq^2 - 5pq^2) + (5p^2q - 4p^2q)$
(Collecting like terms)
= $28 + 5p - 18q + 8pq - 7pq^2 + p^2q$
Ex.3 Subtract the sum of $3l - 4m - 7n^2$ and $2l + 3m - 4n^2$ from the sum of
 $9l + 2m - 3n^2$ and $-3l + m + 4n^2$.
Sol Sum of $3l - 4m - 7n^2$ and $2l + 3m - 4n^2$

$$= (3l + 2l) + (3m - 4m) + (-7n^{2} - 4n^{2})$$

$$= 5l - m - 11n^{2}$$

Sum of 9l + 2m - 3n^{2} and - 3l + m + 4n^{2}

$$= 9l + 2m - 3n^{2} - 3l + m + 4n^{2}$$

$$= (9l - 3l) + (2m + m) + (-3n^{2} + 4n^{2})$$

$$= 6l + 3m + n^{2}$$

Required difference

$$= 6l + 3m + n^{2} - (5l - m - 11n^{2})$$

$$= 6l + 3m + n^{2} - (5l - m - 11n^{2})$$

$$= 6l + 3m + n^{2} - 5l + m + 11n^{2}$$

$$= (6l - 5l) + (3m + m) + (n^{2} + 11n^{2})$$

$$= l + 4m + 12n^{2}.$$