

21. We may now proceed to give rules for the Addition and Subtraction of algebraical expressions.

Suppose we have to *add* to the expression $a+b-c$ the expression $d-e+f$.

$$\begin{aligned}\text{The Sum} &= a+b-c+(d-e+f) \\ &= a+b-c+d-e+f \text{ (by Art. 19, Rule I).}\end{aligned}$$

Also, if we have to *subtract* from the expression $a+b-c$ the expression $d-e+f$.

$$\begin{aligned}\text{The Difference} &= a+b-c-(d-e+f) \\ &= a+b-c-d+e-f \text{ (by Art. 19, Rule II).}\end{aligned}$$

We might arrange the expressions in each case under each other as in Arithmetic: thus

$$\begin{array}{r} \text{To } a+b-c \\ \text{Add } d-e+f. \\ \hline \end{array}$$

$$\begin{array}{r} \text{From } a+b-c \\ \text{Take } d-e+f \\ \hline \end{array}$$

$$\text{Sum } a+b-c+d-e+f \quad \text{Difference } a+b-c-d+e-f$$

and then the rules may be thus stated.

I. In Addition attach the lower line to the upper with the signs of both lines unchanged.

II. In Subtraction attach the lower line to the upper with the signs of the lower line changed, the signs of the upper line being unchanged.

The following are examples.

$$\begin{array}{r} (1) \quad \text{To } a+b+9 \\ \text{Add } a-b-6 \\ \hline \text{Sum } a+b+9+a-b-6 \end{array}$$

$$\begin{aligned}\text{and this sum} &= a+a+b-b+9-6 \\ &= 2a+3.\end{aligned}$$

For it has been shown, Art. 9, that $a+a=2a$,
and, Art. 13, that $b-b=0$.

$$\begin{array}{r} (2) \quad \text{From } a+b+9 \\ \text{Take } a-b-6 \\ \hline \text{Remainder } a+b+9-a+b+6 \end{array}$$

$$\text{and this remainder} = 2b+15.$$