The second solution does not exist.

A, a, b given to find B. Ex. (5). Given $A = 163° 24'$, $a = 42$, $b = 53·004$.

$$L \sin B = \log b + \operatorname{colog} a + L \sin A - 10.$$

$$\begin{array}{lr} b = 53·004; & \log b,\ 1·72431 \\ a = 42 \quad ; & \operatorname{colog} a,\ 8·37675 \\ A = 163°24'; & L \sin A,\ 9·45589 \\ \hline \begin{cases} B_1 = 21° 08'; \\ B_2 = 158° 52'; \end{cases} & L \sin B,\ 9·55695 \end{array}$$

C. $C_1 = 180° - (A + B_1)$ $\qquad$ $C_2 = 180° - (A + B_2)$

$$\begin{array}{ll} A = 163°\ 24' & A = 163°\ 24' \\ B_1 = \ \ 21°\ 08' & B_2 = 158°\ 52' \\ \hline C_1 = 180° - 184°\ 32' & C_2 = 180° - 322\ \ 16 \\ = - & = - \end{array}$$

No solution. No solution exists.

42. Expressions for the area of a triangle.

The area of a triangle. It is proved by Euclid (*B* I. prop. 41) that the area of a triangle is half that of a rectangle having the same base and height. Now the number of square units in the area of a rectangle is equal to the product of the numbers of linear units in the base and height respectively, which is briefly expressed by saying that the area of a rectangle is the product of the base and height. Hence the area of a triangle is half the product of its base and height.

Fig. 6, 7. In fig. 6, 7, area of triangle $A\ B\ C$

$$= \tfrac{1}{2} A\,B.\ \ C\,D,$$
$$= \tfrac{1}{2}\, c\, b \sin A$$
$$= \tfrac{1}{2}\, b\, c \sin A.$$

Again

$\sin A = 2 \sin \tfrac{1}{2} A \cos \tfrac{1}{2} A$ ....from (7)