Similarly, to avoid writing continually the word "some" we shall, say, delete "ome" and simply write "*s* counters," with the understanding, for the time being at least, that *s* stands for the indefinite adjective *some*. The number of counters that each boy has is now determined, and it is found that one has nine, another fourteen, another twenty-two, as the case may be, whence it is seen that "*s* counters" (*i.e.*, of course, "*some* counters") stands for varying quantities of counters.

It is desirable at this stage not to represent every unknown quantity by x, but to accustom the children to speak of p pence, m miles, etc. Simple exercises such as these will now follow:—"How many pence in 5 shillings? 60—got by mutiplying 5 by 12. Therefore, how many pence in s shillings?" "How far does a man go in 3 hours, walking at the rate of 4 miles per hour? 12 miles—got by multiplying 3 by 4. Therefore, how far does he go when he walks at the rate of m miles per hour?" Naturally such exercises would be followed immediately by simple problems leading to linear equations in one variable.

By such a method it may probably be found that the children obtain a better idea of a letter representing an indefinite quantity, than if they had been taught to regard "Let x equal ——" as the Open Sesame! to every algebraical problem.

ARCHD. MILNE.

Evaluation of Trigonometrical Ratios of Angles which are not Acute.—The following is meant as a set of working rules for applying the definitions of the trigonometrical ratios of *any* angle, where numerical evaluation is required. Let the initial arm of the angle be horizontal.

Suppose we have to find cos250°.

(*a*) What acute angle does the radius vector of 250° make with the horizontal? 70°: set it down as in equation (1).

(*b*) What ratio are we given? The cosine: set it down as in equation (1).

(*c*) In what quadrant does the radius vector of 250° lie? The third: write a small 3 over 250° in equation (1).

(*d*) Apply the mnemonic "all, sin, tan, cos" (which tells which ratios are *positive* in the four quadrants 1, 2, 3, 4 in order). Prefix the negative sign as in equation (1).

We have $\cos 2\overset{3}{5}0^\circ = -\cos 70^\circ, \ldots\ldots\ldots\ldots\ldots\ldots (1)$

$= -0{\cdot}3420$ from the Tables.

Similarly $\tan 2\overset{3}{4}0^\circ = +\tan 60^\circ$, following (*a*), (*b*), (*c*), (*d*),

$= \sqrt{3}$, without Tables

$= 1{\cdot}7321.$

The pupil should draw the corresponding diagrams till he can do without drawing them.

W. ANDERSON.

Geometrical Illustrations of Algebraic Identities.—All these identities may be proved after one method as follows:—

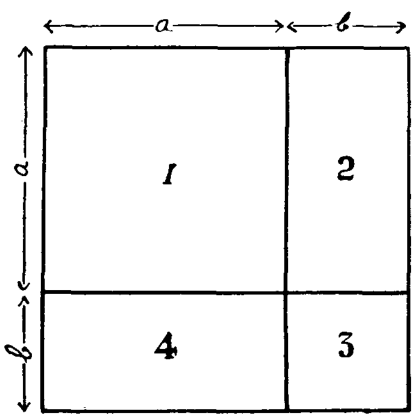
Draw two straight lines at right angles and mark off parts *a* and *b* as indicated in the figures. At the points of section draw perpendiculars to the lines. All the figures thus formed are rectangles, and therefore have their opposite sides equal. The proofs should then be obvious.

I. $(a+b)^2 =$ whole figure

$=$ fig. 1 + fig. 2 + fig. 3 + fig. 4

$= a^2 + ab + b^2 + ab$

$= a^2 + 2ab + b^2.$



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