A KEY, CONTAINING THE STATEMENTS AND SOLUTIONS OF QUESTIONS IN DAVIES' ELEMENTARY ALGEBRA: FOR THE USE OF TEACHERS ONLY

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Trieste

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IN

DAVIES' ELEMENTARY ALGEBRA;

FOR

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NEW YORK:
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1846.

PREFACE.

THE question, whether a Key to a work on mathematics facilitates the acquisition of knowledge, is one about which there is much diversity of opinion. If the business of teaching were pursued as a profession — if the teachers in our schools and seminaries looked to no other employment, and gave their entire thoughts and time to the business of instruction, they would have abundant means to prepare, in the best manner, all the exercises for their pupils.

But, as yet, the case is far different. Teaching, with most instructers, is an occasional and temporary business, and not a permanent profession. Engaged, generally, in preparing themselves for other pursuits, and at the same time giving instruction in various branches of education, they have neither the time nor opportunity for that careful preparation which is needed, and must, therefore, avail themselves of all the aids which they can command.

It was not intended, originally, to prepare a Key to the Elementary Algebra, but the urgent request of many teachers has changed that determination.

It was not thought best to work out the simple examples which are given as illustrations, nor those which are given to perfect the scholar in the mechanical part of algebra; and hence the work in the Key is limited to the questions only. These alone, it was supposed, presented difficulties in the statements, which are fully given, leaving the solution of the equations to be made by the pupil. This will obviate much of the misuse to which a Key may be applied, should it chance to fall into the hands of the student.

The large figures at the head of each page point out the corresponding page of the Algebra.

KEY

TO

DAVIES' ELEMENTARY ALGEBRA.

(Page 87.)

(13.)

Denote D's share by x. Then, by the conditions of the question,

$x+360=$ B's share,

and $2x+720-1000=$ A's share:

but $x=$ D's share,

and $360=$ C's share;

hence $4x+440=2520$, the whole estate, from which equation we find $x=520$.

(14.)

Let $x=$ the share of each daughter. Then, by the conditions of the question,

$2x=$ the share of each son.

Also, since there are three daughters and two sons,

$3x=$ the amount received by the daughters,

and $4x=$ the amount received by the sons;

Also, $7x+500=$ the amount received by the widow;
and $14x+500=7500$, the whole estate; and from this last equation the value of x is readily found, equal to 500.

(15.)

Let $x=$ the number of women. Then, by the conditions of the question,

$x+8=$ the number of men,
and $2x+8+20=$ children:
but x = women; hence
$4x+36=180$, the whole number; from which we find $x=36$.

(16.)

Let $x=$ the share of the youngest brother.
Then $x+40=$ 2d son's share,
$x+80=$ 3d son's share,
$x+120=$ 4th son's share,
$x+160=$ 5th son's share,
and $5x+400=2000$, the whole estate; from which we find $x=320$.

(17.)

Let the share of A be denoted by x. Then, since A's share is to be to B's as 6 to 11, it follows that B's share will be $\frac{11}{6}$ of A's. Hence

$\frac{11}{6}x=$ B's share,

and $x+\frac{11}{6}x+300=$ C's share.

Hence $2x+\frac{22}{6}x+300=2850$, the whole estate;

from which equation we find $x=450$.

(18.)

Let x denote the number of paces taken by the first person, from the time of starting till the distance between them is 300 feet. Then, the number of paces taken by the second will be represented by $5x$. But since the paces of the first are 3 feet, and those of the second $1\frac{1}{2}$ or $\frac{3}{2}$ feet, the distances travelled will be

$3x=$ the *distance* travelled by first,

and $\frac{3}{2}\times 5x=\frac{15}{2}x=$ the *distance* travelled by second;

hence $\frac{15}{2}x-3x=300$, their distance apart; from which we find $x=66\frac{2}{3}$; that is, the person who steps the longest will have made $66\frac{2}{3}$ paces; and since each pace is 3 feet, he will have travelled

$$66\tfrac{2}{3}\times 3=200 \text{ feet.}$$

If, instead of subtracting $3x$ from $\frac{15}{3}x$, we had written the equation

$$3x-\frac{15}{2}x=300,$$

we should have found

$$x=-66\tfrac{2}{3},$$

which would have shown that the second person travelled farther than the first; which is indeed proved when the distance travelled by the second, minus the distance travelled by the first, is positive.

(19.)

Let x denote the number of days which they worked.

Then, $2x$= the number of dollars earned by carpenters,

$\frac{24x}{2}=12x$, the amount earned by journeymen,

$\frac{8}{4}x=2x$, the amount earned by the apprentices.

Hence, $16x=144$, the whole sum earned; whence we find $x=9$.

(20.)

Let the sum at interest be denoted by x.

Then, $\frac{4}{5}x$= what bears an interest of 4 per cent.,

and $\frac{1}{5}x$= what draws 5 per cent.

Then, since the interest which accrues on any sum for a year, is equal to the sum, multiplied by the rate, divided by 100, we shall have

$\frac{4}{5}x\times\frac{4}{100}=\frac{4}{125}x$, what the first produced.

and $\frac{1}{5}x\times\frac{5}{100}=\frac{1}{100}x$, what the second produced.