n	p	p + c	p + 2k	p + c + 2k
4	4! = 24	5! = 120	6! = 720	7! = 5040
6	6! = 720	7! = 5040	8! = 40,320	9! = 362,880
8	8! = 40,320	9! = 362,880	10! = 3,628,800	11! = 39,916,800

n - number of spark plug wires.
p - number of cyclic permutations of the spark plug wire connections to the distributor cap (including rotations of the wires).
c - center connection on the distributor cap.
k - clip points of the distributor cap.

Solving Simple Equations

by *Howard L. Larson*

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Much classroom teaching is confusing for students until they are forced to learn without understanding for the sake of self-preservation. A good example of that type of teaching is the method usually, or often, offered to the student for finding the solution of equations.

An example of this is found in solving 3N = 12.

To solve for "N" we divide both sides by 3 (or multiply by 1/3: the choice is irrelevant to the discussion following). When we do this we get N=4. Simple isn't it! Why not subtract 3 from both sides and get N=9? Well, why not indeed? Many of your students will have this question in mind and may even dare to ask it.

The basic problem stems from the fact that we assume too much at the beginning levels. Here, for example, we assume that the student understands that 3N means 3•N or that 3 and N are factors. Again, we assume that the student understands that when we divide 3N by 3 the threes disappear in thin air! We neglect to teach that the meaning of identity and inverse or 3/3 = 1 have some operational principles which require conscious teaching.

Le us examine a more rational approach.

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If 3x4 = 12 then 12÷3 = 4 or 12÷4 = 3. With a little practice, the truth of this statement becomes self-evident to the student and he can be expected to rewrite many product equations in the form of a quotient by stressing the ffp language with an understanding of what he is doing.

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If 2xN = 10 then 10÷N = 2 or 10÷2 = N. Having introduced an unknown factor in this sequence comes as no mystery to the student. He has only to make a choice regarding which option is most productive for his use, but it is now a simple choice to make.

Let us try another inverse situation to illustrate our approach.

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If 3+4 = 7 then 7-4 = 3 or 7-3 = 4. Again, using the language of aas the student can learn to rewrite all the addition facts or equations in their inverse form.

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If 3+N = 8 then 8-3 = N or 8-N =3. The student can easily decide which of the equivalent forms is most useful for him and of course arrive at the solution N = 5 without difficulty. We have not added or subtracted from either side. This latter procedure or technique is a cause of considerable difficulty for students in junior high and/or senior high.

Suppose next we wish to solve a problem combining both of the above

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forms. Our example is 3N+5 = 14. The inverse forms are 14-5 = 3N or 14-3N =5 The student's choice for finding a solution will be 14-5 = 3N. The result is 9 = 3N. This equation will be rewritten in the form 9÷3 = N and 3 = N is the student's solution.

If the student is given this kind of background in whole numbers he will be able to adapt readily to other number systems.

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For example, if 3-N = 7 then N+7 = 3 and 3-7 = N. Note that the inverse form can work both ways. Since 3-7 is an impossible operation in the set of whole numbers, we use the set of integers for a solution ($^+3 - {}^+7$=N). At this time we have assumed the student has been taught to subtract any pair of numerals in set 1. Our solution then becomes $^+3 + {}^-7$ = N or $^-4$ = N. This latter step of course comes at the conclusion of the teaching sequence and can be readily understood at this juncture.

If 2/3N = 6, then 6÷2/3 = N or 6÷N = 2/3. Assuming now that the student has learned to divide fractions the rest will be readily self-evident.

The next step will be to add the rational numerals. For example,

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3/4 x N + 3 = 6. The inverse form for the first step is 6 - 3 = 3/4 x N, and

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rewritten becomes 3 = 3/4N. This problem is then rewritten 3÷ $^-$3/4 = N.

We suggest this method of teaching begin at the elementary level so that the mystery of solving equations at the junior high level disappears.