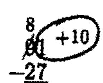
A NEW TWIST TO TEACHING SUBTRACTION

Karen Klein
Lancaster City Schools
Lancaster, OH 43130

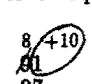
A group of my students still had not mastered the skill of subtraction when the subtrahend in the one's place was larger than the minuend. Using the problem 91–27 = as an example, along with counters, a place value mat, and paper, I proceeded to reteach this skill. The standard method has the student regroup the 9 tens into 8 tens and 10 ones, cross out the 9, and add the 10 to the existing 1 all in one step. This results in an 11 which the student is then instructed to put immediately above the 1. When the difference of this 11 and the 7 remaining in the one's column is found, this phase is complete.

It seemed as I transferred to the paper the steps taken using the counters, one very logical and critical step was being entirely disregarded. I refer to the step in the above paragraph which instructs the student to regroup the 9 and add the 10 to the existing 1, thus producing the new number 11.

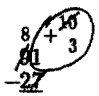
After the 9 was regrouped on the mat, 10 counters were transferred to the one's column, not yet combined with the top 1 counter. When this transaction was put on paper, the 10 and the 1 were not immediately combined. Instead, I simply put a small plus sign to the right of the 1 (to indicate the process) and the number 10. I circled all for clarity.



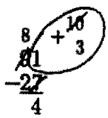
The next manipulation was to take the bottom 7 counters from the largest group of counters at the top. This was the group of 10 transferred counters. This resulted in a group of 3 counters and the original 1 counter, which when now combined equalled 4 counters. On paper we now had the following:

1) 

The 9 is crossed out and regrouped into 8 tens and 10 ones. A plus sign and the 10 are now written slightly to the right of the 1.

2) 

The bottom 7 is then subtracted from the circled 10. The resulting 3 is placed to the right of the plus sign.

3) 

This 3 is then added to the remaining 1 and 4 then becomes the answer. It is placed at the bottom in the one's column.

The reason for this method's success is that students need only nine basic memorized subtraction facts to quickly and accurately complete the problem. As students become more confident, they will no doubt complete the process mentally. After regrouping merely subtract the 7 from the 10, add the 1 and continue to complete the problem using the same algorithm.

An adaption can be applied to intermediate lessons involving subtraction of mixed numbers.

1)
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  6  2/7
 -3  4/7
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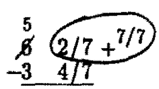
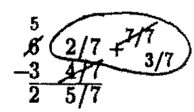
2) 

3) 

I recommend teaching this subtraction algorithm in conjunction with some form of manipulatives. The algorithm should be introduced at the primary level when this type of subtraction generally is first taught. It can be learned easily using only ten basic subtraction facts. Later, it can be of benefit as an intervention lesson for the student who can't perform the standard algorithm due to an identified learning difficulty or due to lack of memorized facts. An adaptation of the algorithm can be used to introduce subtraction of mixed numbers.

It was exciting to witness the looks on those students' faces when after all the standard methods had been employed, they finally became successful. Students worked problem after problem and enjoyed doing them as they had not done so before.