HELPING PROSPECTIVE ELEMENTARY TEACHERS LEARN THE ALGEBRA IN MENTAL MATH STRATEGIES

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In order to prepare their students to learn algebra, elementary teachers should know connections between the arithmetic of elementary school and algebra. One such connection is with mental arithmetic strategies. Any calculation strategy with numbers must rely ultimately on the properties of arithmetic.

Therefore, given any mental calculation strategy, it is always possible to write a coherent sequence of equations that use properties of arithmetic to get from one step to the next, and that correspond to the mental strategy. Such a sequence of equations consists of traditional \algebraic manipulations," except that only numbers are used, not variables.

Descriptions of children's thinking in the experimental curriculum of Moss and Case (1999) provide prospective elementary teachers with excellent opportunities to translate mental strategies into algebra.

Experimenter: What is 65% of 160?

Experimental S1:   Fifty percent [of 160] is 80. So I figure
10%, which would be 16. Then I divided by 2,
which is 8 [5%] then 16 plus 8 um … 24
Then I do 80 plus 24, which would be 104.

(Moss & Case, 1999, p. 135).

The following coherent sequence of equations corresponds to this mental arithmetic:

$$65\% \times 160 = (50\% + 10\% + 5\%) \times 160 = 50\% \times 160 + 10\% \times 160 + 5\% \times 160$$

$$= 80 + 16 + (\tfrac{1}{2} \times 10\%) \times 160 = 80 + 16 + \tfrac{1}{2} \times (10\% \times 160)$$

$$= 80 + 16 + \tfrac{1}{2} \times 16 = 80 + (16 + 8) = 80 + 24 = 104$$

My poster will show examples of problems that ask students to make connections between mental math and algebra and examples of prospective elementary teachers' work on these problems.

Reference

Moss, J, and Case. R. (1999). Developing Children's Understanding of the Rational Numbers: A New Model of an Experimental Curriculum. *Journal for Research in Mathematics Education, 30,* 124–148.