The four operations: wrapping it up

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Mathematical games and puzzles have gained tremendous popularity and support in today's "hands-on" approach to classroom instruction. Manipulatives can be useful both as learning devices and as a means to drill. However, many middle school students feel the need for written drill work. The trend is to let the student do drill work on his own. Too often, such drill is never checked or perhaps never even done.

In an effort to develop meaningful drill work that reinforces several skills in the process, I came up with the idea described here. It requires a bare minimum of materials, namely pencil and paper. At first students should be provided with paper ruled as shown in figure 1. As the format becomes more familiar, the students can rule their own paper. The only other thing needed is two numbers, one to be placed to the left, the other to the right of the

$$\begin{bmatrix} + \\ - \\ \times \\ \div \end{bmatrix}$$

at the top of the drill sheet.

The following skills can be included in this drill work:

(1) writing fractions as equivalent decimals;
(2) writing decimals as equivalent fractions;
(3) addition, subtraction, multiplication, and division of
   (*a*) two whole numbers,
   (*b*) two fractions,
   (*c*) two mixed numbers,
   (*d*) two decimals,
   (*e*) two mixed decimals.

$\begin{pmatrix} + \\ - \\ \times \\ \div \end{pmatrix}$	NAME
FRACTIONS	DECIMALS
(+)	(+)
(−)	(−)
(×)	(×)
(÷)	(÷)

Fig. 1

The addition of fractions and mixed numbers can be with or without common denominators. The subtraction of fractions and mixed numbers can be with or without common denominators and with or without regrouping. The multiplication of fractions and mixed numbers can be with or without cancellation. (See fig. 2.) The degree of difficulty of the drill depends on the numbers given. Repeating decimals and their equivalent fractions, however, should be avoided.

The ideas involved in this drill sheet are by no means new. I think its value lies in its organization; it provides the student with a systematic means of checking his work and a clear means of comparing the algorithms of the four basic operations. As the student becomes more familiar with the exercise, he tends to rely less on the teacher and more on himself for success. Since no "answer key" is necessary, the student is able to proceed from operation

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to operation with growing confidence. There seems to be, somehow, a built-in motivational force that impels the student to complete the exercise successfully. As one eighth grade student put it: "This sheet kinda wraps it all up!"

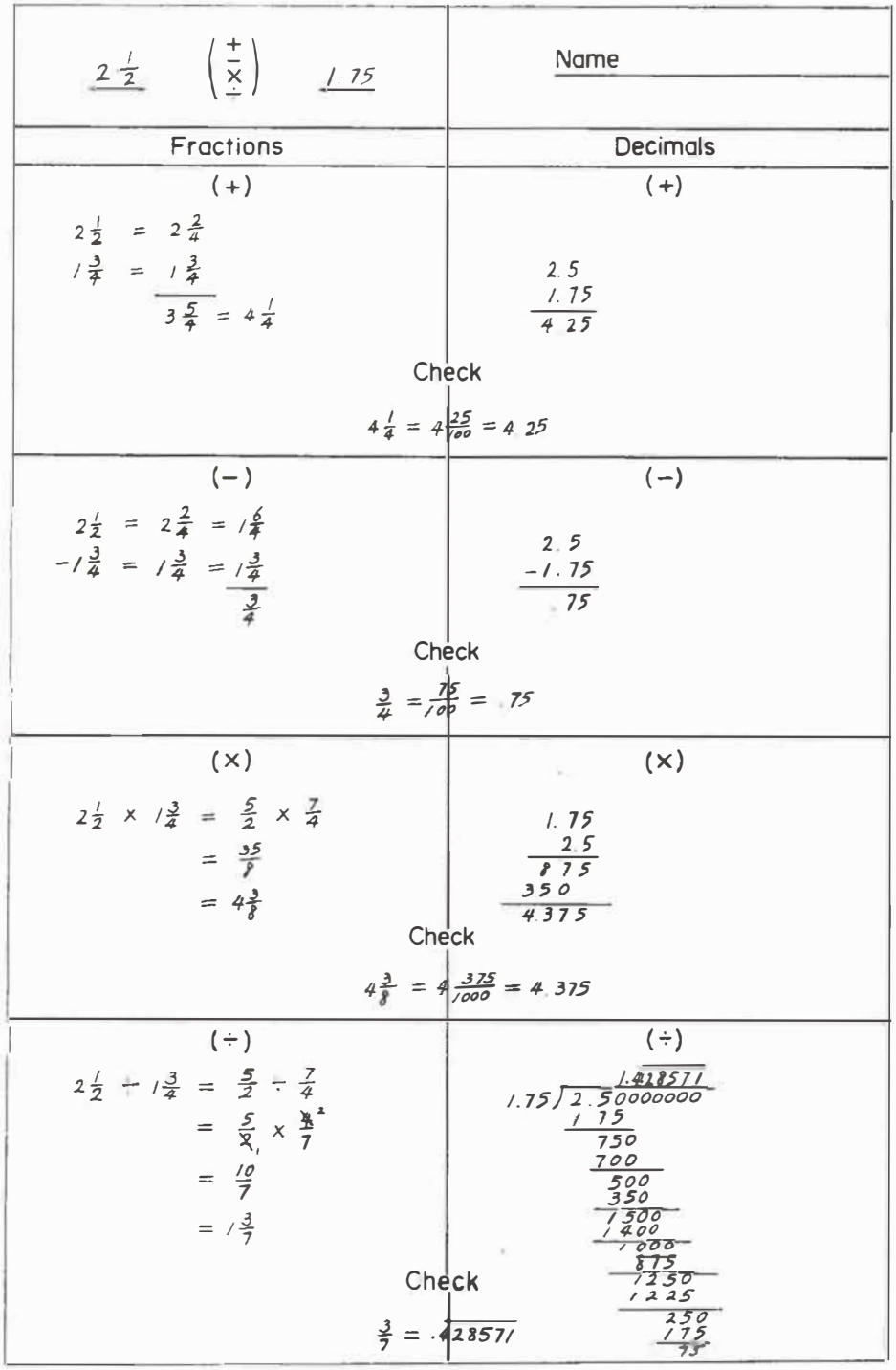

Fig. 2. Sample work sheet