

Comedians Majorie Main and Percy Kilbride star in the 1951 movie *Ma and Pa Kettle Back on the Farm*. Given the task of dividing 25% of an amount of money equally between five people, Ma and Pa claim that each individual will receive 14% of the money. Ma and Pa demonstrate in three ways that  $5 \times 14 = 25$ .

<p><b>Method 1:</b> Pa divides 25 by 5 and gets 14. He states, 5 won't go into 2, so divide 5 into 5 one time. Subtract and get 20. Now divide 5 into 20.</p> $\begin{array}{r} 14 \\ 5 \overline{) 25} \\ \underline{-5} \\ 20 \\ \underline{-20} \end{array}$	<p><b>Method 2:</b> Ma multiplies <math>5 \times 4</math> and gets 20. She then multiplies <math>5 \times 1</math> and gets 5. Adding these two results, she gets 25.</p> $\begin{array}{r} 14 \\ \times 5 \\ \hline 20 \\ +5 \\ \hline 25 \end{array}$	<p><b>Method 3:</b> Checking by addition. Pa adds all of the 5's together, then adds all of the 1's together and gets 25.</p> $\begin{array}{r} 14 \\ 14 \\ 14 \\ 14 \\ 14 \\ \hline +14 \\ \hline 25 \end{array}$ <p style="text-align: right;">(4+4+4+4+4) + (1+1+1+1+1) = 25</p>
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1. Explain why Ma and Pa's techniques are not yielding correct results. An answer such as "he/she multiplied wrong" is not sufficient. Be mathematically specific, please.

**Method 1:**

**Method 2:**

**Method 3:**

2. Find another example that would illustrate Ma and Pa's unique interpretation of mathematics.

3. *a.* Using Algebra, represent Ma's multiplication process using a two digit number multiplied by a one digit number, as shown below.

$$\begin{array}{r} ab \\ \times d \\ \hline \end{array}$$

*b.* Now, represent the actual answer of the multiplication listed in part *a.*

*c.* Set these two answers equal to each other and see what happens. When will they be equal?

4. Under what conditions will Ma and Pa's mathematical techniques be true?