

Abbott and Costello Magic Numbers

Did you know that $7 \times 13 = 28$?

Proof:

Check #1:

$$\begin{array}{r} 13 \\ \times 7 \\ \hline 21 \\ + 7 \\ \hline 28 \end{array}$$

Check #2:

$$\begin{array}{r} 13 \\ \hline 7 \overline{)28} \\ - 7 \\ \hline 21 \\ - 21 \\ \hline 0 \end{array}$$

Check #3:

$$\begin{array}{r} 13 \\ 13 \\ 13 \\ 13 \\ 13 \\ 13 \\ + 13 \\ \hline 28 \quad (3+3+3+3+3+3) + (1+1+1+1+1+1) \end{array}$$

Check #1:

To multiply 7×13 , we can multiply 7×3 to get 21, then multiply 7×1 to get 7, and add $21 + 7$ which is 28.

Check #2:

To divide 28 by 7, we can't put the 7 into the 2 but 7 goes into 8 once. We then subtract 7 from 8 and get 1. We carry down the 2 to get 21, and 7 goes into 21 three times. Thus our answer is 13.

Check #3:

To add 13 seven times, we add $3+3+3+3+3+3+3$ to get 21 and then add $1+1+1+1+1+1+1$ to get 7. Then 21 plus 7 is 28.

1. Why is this “proof” wrong?
2. Find another set of three numbers that work this way! How did you find them?
3. Find as many Abbott and Costello magic numbers as you can.
4. How many are there? How do you know there aren't more?