

A different lay-out) for division ??

Anyone who has taught students to convert common fractions to decimals by dividing the top by the bottom has probably seen students do things like the following.

To convert $\frac{4}{5}$ to a decimal, do 4 divided by 5, that is, do

$$4 \overline{)5}$$

Of course the answer comes out to 1.25 – not what we had hoped for!

The problem is that in saying ‘4 divided by 5’, the 4 is pronounced before the 5, but the 5 gets written to the left of the 4. This is contrary to the way we normally sequence writing on paper.

One way around this problem is to use a different layout for division – one where the divisor is not placed before the dividend. Traditionally we lay out multiplication like this:

$$\begin{array}{r} 1\ 3\ 6\ 8 \\ \times 5 \\ \hline 6\ 8\ 4\ 0 \end{array}$$

Why does division have to be so different? Maybe it doesn't. Let's try it the same way.

$$\begin{array}{r} 1\ 3\ 6\ 8 \\ \div 5 \\ \hline \hline \end{array}$$

We can now work from left to right. Imagine sharing \$1368 in \$1000, \$100, \$10 and \$1 notes between 5 people. Sharing the one thousand between 5, we don't get any each. The thousand has to be changed for hundreds, giving 10 hundreds, making a total of 13 hundreds:

$$\begin{array}{r} 1\ 13\ 6\ 8 \\ \div 5 \\ \hline 0 \end{array}$$

Now we share the 13 hundreds. This gives our 5 people 2 each with 3 left over:

$$\begin{array}{r} 1\ 13\ 36\ 8 \\ \div 5 \\ \hline 0\ 2 \end{array}$$

And so on until we have:

$$\begin{array}{r} 1\ 13\ 36\ 18.\ 30 \\ \div 5 \\ \hline 0\ 2\ 7\ 3.\ 6 \end{array}$$

If anyone prefers long division, this is easily adapted.

$$\begin{array}{r} 1\ 3\ 6\ 8.\ 0 \\ \div 5 \\ \hline 0\ 2\ 7\ 3.\ 6 \\ 1 \\ 0 \\ \hline 1\ 3 \\ 1\ 0 \\ \hline 3\ 6 \\ 3\ 5 \\ \hline 1\ 8 \\ 1\ 5 \\ \hline 3\ 0 \end{array}$$

[Sorry about the long lines – that was the best I could do with the equation editor.]

As with any layout for division, this one would follow on naturally from physically sharing money in \$1000, \$100, \$10 and \$1 notes between students in a group where they are allowed to change notes which will not go around for smaller denominations before sharing.

What do you think?