# 9. The standard algorithm for division

With all of our multiplying by fractions, we've actually had to split things up (divide) quite a bit.

Let's come up with an algorithm to divide something by looking at how we have done division thus far:

Mr. Potter had $53.72

He used that money to buy 4 huge bags of disgusting Takis. How much did each bag cost?

## What is going on:

We are dividing 53.72 into four equal groups. Our answer will be equal to one group, as we are figuring out how much ONE bag costs.

Set up: 53.72 is:

5 tens, 3 ones, 7 tenths, and 2 hundredths

## The Standard Algorithm

Set up:

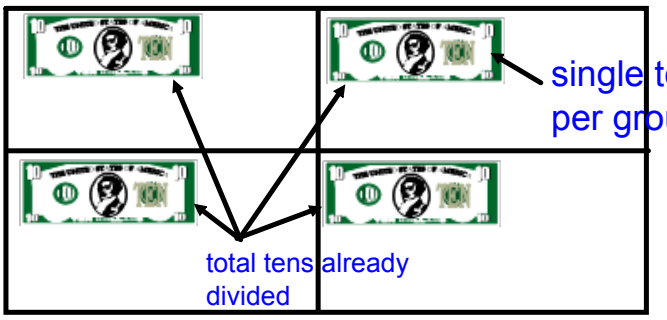
quotient will go here

$$4 \overline{)\,53.72}$$

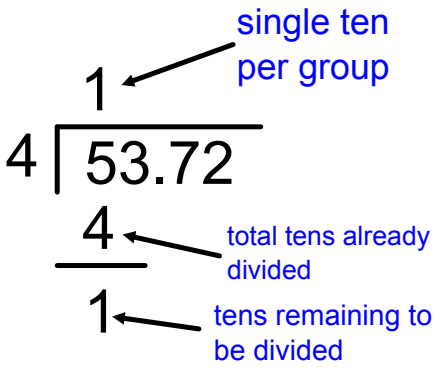
divisor

number being divided (dividend)

We will divide this into 4 equal groups:




We begin by dividing our largest place value. In this case, it is tens. We have 5 tens, so we can give each of our 4 groups a single ten.

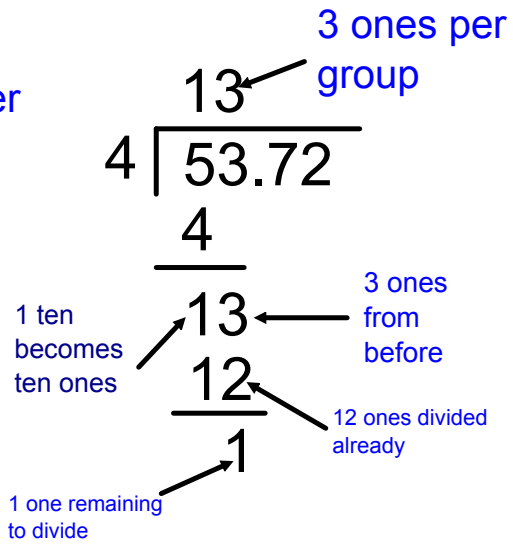




Over here we do the same thing. We assign a single ten to each group. We have handed out 4 tens, and so we have one remaining.

Next, we ungroup our remaining ten.


We will get ten ones, and we had 3 from the start, so we will now have 13 ones. This means we can put 3 in each group, and have

1 left over.

Next, we ungroup our remaining one.

We will get 10 tenths. We had 7 tenths from before, so now we will have 17 tenths. We divide this evenly into four groups, which means we can put 4 tenths in each group. 4 x 4 = 16. We will have one tenth remaining.

one tenth
remaining to divide.

$$
\begin{array}{r}
13.4 \\
4\overline{)\,53.72} \\
4 \\
\hline
13 \\
12 \\
\hline
17 \\
16 \\
\hline
1
\end{array}
$$

We put 4 tenths in each group.

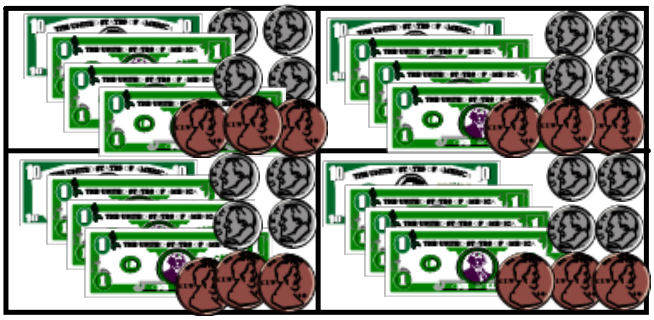
We ungrouped our remaining 1 into 10 tenths.

We had 7 tenths to start with, so now we have 17

4 tenths in each of 4 groups means we have divided 16 tenths total.

one tenth remaining to divide.

Next, we ungroup our remaining tenth.



When I ungroup a tenth, I get ten hundredths. There were 2 hundredths that we started with, so now there are 12 hundredths. We divide 12 hundredths into 4 groups, and so we can put 3 hundredths in each group.