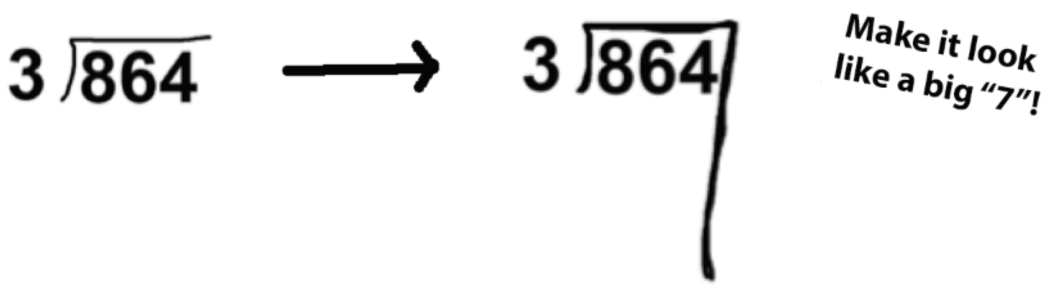
The "Big 7" Method for Division

This method is similar to the long division method we learned on p. 205, but it's set up a little differently, and we don't write anything on top until the end! Also, with the Big 7 Method, we extend the dividing house with a long line on the right, that makes the shape of a big "7"! I'm guessing that's how it got its name… We'll do the example 864 ÷ 3.



Now that we've set it up to look like a "7," there are four steps we follow. With this method, we will look at the *entire dividend* (here, 864) right from the start, instead of only looking at the biggest digits first (here, 8 or 86), and we'll chip away at the dividend until we've divided the whole thing up. Here are the 4 steps:

1. Make an estimate!

2. Find the multiple that works, and write it down!

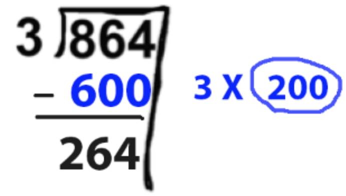
3. Subtract, and repeat the first 3 steps!

4. Add 'em up at the end!

Let's do our example **864 ÷ 3**, using these steps.

1. Make an estimate! We ask ourselves approximately how many times can 3 go into 864? For example, since 3 goes into 8 just 2 times, we might say that 3 goes into 800 approximately 200 times. Does that make sense? And then 864 isn't that much bigger, so it could still work.

2. Find the multiple that works, and write it down! In this case, we'd list:



3 X 1 = 3 (so 3 X 100 = 300)

3 X 2 = 6 (so 3 X 200 = 600)

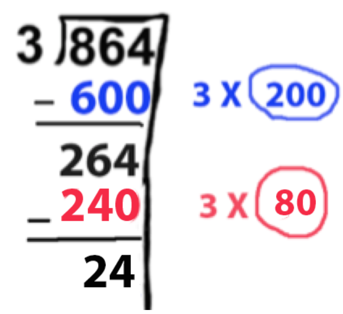
3 X 3 = 9 (so 3 X 300 = 900)

Sure enough, the 3 was too big (because 900 is bigger than 864, our dividend), so **3 X 200 =** **<u>600</u>** is the multiple we'll use. We write the 3 X 200 to the right of the "big 7," and circle the **200**.

3. Subtract, and repeat the first 3 steps! Now we subtract the 600 from the dividend to see how much is left to divide up, and we get 864 – 600 = **264**. Now **264** becomes our new dividend – we can totally forget about the 864!

Steps 1-3 (for the second time): **Make an estimate**! Now we estimate how many times 3 goes into 264. Hm, since 3 X 9 = 27, then 3 X 90 = 270, right? That's a little big, but it gives us enough information to find our **friendly multiple**. Let's list some:

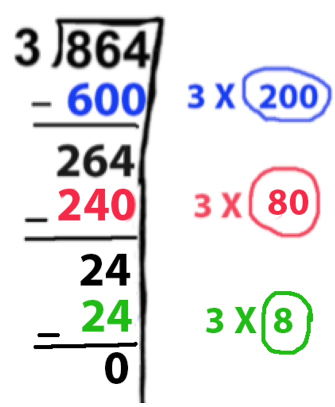
3 X 7 = 21 (so 3 X 70 = 210)



3 X 8 = 24 (so 3 X 80 = 240)

3 X 9 = 27 (so 3 X 90 = 270).

We can already see that the winner will be **3 X 80 = 240**, since 270 is bigger than 264. So we write 3 X 80 on the side, circle the **80**, and subtract 264 – 240 = **24**. And now 24 is our new dividend. (And it looks like we need to extend the "7" line longer!) Time for the steps again!



Steps 1-3 (for the third time): Make an estimate for how many times 3 goes into 24. Actually, from our multiplication facts, we know that 3 X 8 = 24, so we don't need to estimate at all! So we can go ahead and skip to step 3, where we write 3 X 8 on the side, circle the **8**, and subtract 24 – 24 = **0**

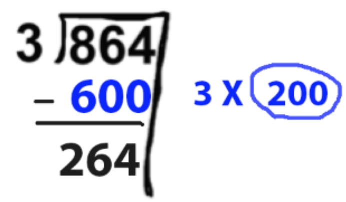
Nothing left, so we're done with the Steps 1-3!

Step 4: Add 'em up! (finally!) To get the final answer, we add up all the circled numbers: 200 + 80 + 8 = **288**. And we've learned that **864 ÷ 3 = 288**. Great job!

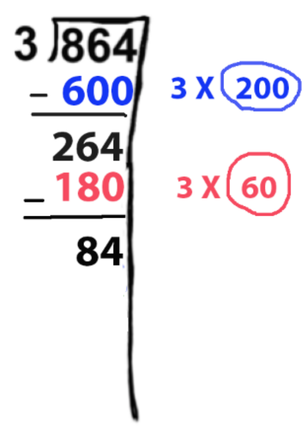
Note: If the problem had been 865 ÷ 3 instead of 864 ÷ 3, then this last subtraction would have been 25 – 24 = 1, and since 1 is smaller than the divisor (3), that means we're done dividing, right? And 1 would be our remainder, the thing that couldn't get divided up into 3 parts, make sense? So the answer would have been 865 ÷ 3 = 288 R1. Ta-da!

Guess what? THERE'S MORE THAN ONE WAY TO DO THESE!

The interesting thing about this Big 7 Method is that *you don't have to use the biggest multiple possible* at each stage. As long as you just keep grabbing chunks and dividing them up, you'll eventually divide the entire dividend. In the problem we did above, for example, at this stage…

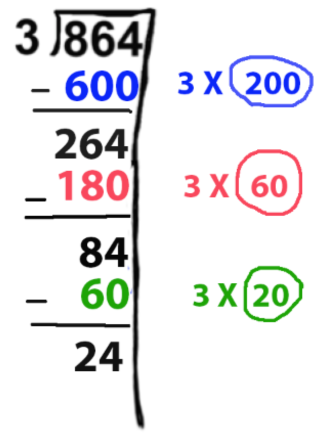


…if instead of using 3 X 80 = 240 and subtracting that from 264, what if we used 3 X 60 = 180? Let's see how the rest of the problem would go:



So we'd subtract 264 – 180 = **84**, right? And now 84 is our new dividend. Time for the steps again!

Steps 1-3 (for the third time): Make an estimate! Now we estimate how many times 3 goes into 84. Well, since 3 X 3 = 9, then 3 X 30 = 90, which is close! So let's list some nearby multiples:

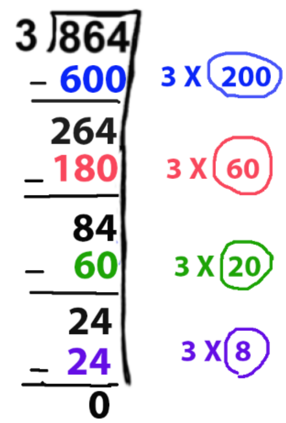


3 X 2 = 6 (so 3 X 20 = 60)

3 X 3 = 9 (so 3 X 30 = 90)

Clearly, 90 is too big, but we could use 3 X 20 = 60. We write 3 X 20 to the right of the "big 7" and subtract 84 – 60 = **24**. That's our new dividend!

Steps 1-3 (for the fourth time) Make an estimate for how many times 3 goes into 24. Actually, from our multiplication facts, we know that 3 X 8 = 24, so we don't need to estimate at all! So we can go ahead and skip to step 3, where we write 3 X 8 on the side, circle the **8**, and subtract 24 – 24 = **0.** Nothing left, so we're done with the Steps 1-3!



Step 4: Add 'em up! (finally!) To get the final answer, we add up all the circled numbers: 200 + 60 + 20 + 8 = **288**. And we've learned that **864 ÷ 3 = 288**. Great job!

It took a few extra steps when we only divided up 180 instead of 240 at that one step, but we still got the right answer because eventually, we did divide up the entire dividend – we just divided it up in 4 chunks instead of 3 chunks!

Isn't it interesting how we end up with the same correct answer, even though we split up the chunks differently? Cool, right? With this method, you have *options* as to what the chunks are that you're dividing up. As long as you eventually divide up the entire dividend, it doesn't matter how you get there!

Now try the problems on p. 214 of *The Times Machine* and see if you can get the right answers, using this method!