

Chapter 12 - Written Methods for Multiplication and Division

Long Division 5 minutes and 48 seconds

Long division, is a standard written algorithm for dividing a number by a two digit or say a three digit number. I'm going to take this as an example, five thousand one hundred and eighty four divided by twenty-four and we set it up as we would with short division, with the number we're dividing five thousand, one eighty-four, inside the bus shelter, labelling the thousands hundreds, tens and units so we keep track of where we are and then put in the twenty-four that we're dividing by outside the shelter. Now because we're dividing by twenty-four we're going to have to be able to work out two twenty-fours, three twenty-fours, four twenty-fours, five twenty-fours and so on. And probably best to be able to do that mentally. So quite a lot of skill in mental multiplication is needed if you're going to be able to do long division successfully. We'll see that as we go along.

I'm going to use a piece of card again, so we can focus on the particular part of the calculation we're doing, because this is long division you'll notice we need a longer piece of card. So we'll place the card there, we'll look at the thousands, five thousands divided by twenty-four, we can't get any twenty-fours out of five so we move along to the hundreds,. How many twenty-fours can we get from fifty-one hundreds? Well, two twenty-fours are forty-eight, that's as close as we can get, so we have two hundred lots of twenty-four two twenty-fours are forty-eight. Subtract those forty-eight hundreds from the fifty-one hundreds and we have three hundreds still to be dealt with. Now we move the card along and look at the tens now if we...if we were doing this by short division, we would take that three and write it next to the eight and then we would talk about having thirty-eight tens. The only difference in long division, is that you bring the eight down and there are the thirty-eight tens to be divided by twenty-four. Well clearly, you can get one twenty-four from thirty eight. Here we are, subtract that twenty-four and we have fourteen still left to be dealt with, that's fourteen tens. Now we bring down the four units that we haven't dealt with yet, and altogether, when we combine those four units with the fourteen tens, we have a hundred and forty four units to divide by

twenty-four. Err....one twenty four, two twenty-fours, forty-eight, three twenty-fours, seventy-two err...four twenty-fours, ninety-six. Five twenty-fours, a hundred and twenty, six twenty fours are a hundred and forty-four, that's what we need. Six, a hundred and forty-four we've dealt with everything that has to be divided up, nothing left, so there's the result, five thousand one hundred and eight four divided by twenty-four is two hundred and sixteen.

Here's a slightly trickier example, seven thousand, nine hundred and twenty-seven divided by thirty-nine, set that up bring in the piece of card and let's start by looking at the thousands. We haven't got enough thousands to divide that by thirty-nine, so we think of it as seventy-nine hundreds. Next to be dealt with, two thirty-nines are seventy-eight, that's pretty close, so we'll have two lots of thirty-nine that's seventy-eight hundreds there, to be subtracted, leaving us with one hundred still to be dealt with. So, so far, we have two hundreds in our answer, now we move along to the tens position and as before, we bring down these two tens to go with the one hundreds so altogether, we have twelve tens. That's not enough to get thirty nine out of so we have to write zero in the tens position and move along to the units bring down the seven units so we now have a hundred and twenty seven units to divide by thirty-nine. How good are you at multiplying by thirty-nine? Two thirty-nines are seventy-eight, I think I can get more than that let's try three thirty-nines, err....three thirties are a hundred and twenty so this will be three less than that, a hundred and seventeen, that's probably as many as I can get. Three thirty-nines, a hundred and seventeen subtract that from the hundred and twenty-seven and we have ten left over, ten units, we can't go any further with this calculation, here is the result. We have ten remainder, two hundred and three, remainder ten. That's long division.