

## Chapter 17 - Calculations with Decimals

### **Division with Decimal Answers 6 minutes and 34 seconds**

When the answer to a division calculation like this one doesn't work out as an exact whole number, sometimes, we give the result with a remainder. Other times though, we will continue dividing beyond the decimal point and give the answer as a decimal number. Which we do depends upon the context that gave rise to the calculation. Let's have a look at this one. Two hundred and fifty-eight divided by twelve I'm going to do by short division, we have two hundredths, that's not enough to divide by twelve so we look at the twenty-five tens, two twelves in twenty-five, that's twenty four carry the one. So we carry a one into that uhh...unit's position so we have eighteen now to divide by twelve, that's one twelve in the unit's position and we have six remaining. Now as I say, we could give the answer as twenty one remainder six if that's appropriate but here I'm going to continue dividing beyond the decimal point, so we write in zero here, zero tenths of course and we carry the six that was left over from the units position into that tenths position and we now have sixty tenths to divide by twelve. Five twelves are sixty so there's the final result, twenty point...twenty one point five. The calculation is complete.

Now whether we give the answer like that or with a remainder depends on the question that gave rise to the calculation. If for example, we were answering this question how many groups of twelve children can be formed from a total of two hundred and fifty-eight children, well I would use the answer with a remainder. Twenty-one groups, with six children not in group. But if this had been the question-cut two hundred and fifty eight metres of rope into twelve equal pieces, how long would each piece be? Well it would be quite appropriate here to give the answer in decimal form, twenty one point five, indicating twenty one point five metres. We can't have twenty-one point five children, but we can have twenty-one point five metres. So it's the context that determines the appropriate form of answer.

Well assuming this calculation has arisen in a context where a decimal answer is appropriate, let's have a look at this one using long division. One thousand, two seventy-four divided by thirty-five I have one thousand that's not enough to divide by thirty-five. Twelve hundreds, that's not enough, so we look at a hundred and twenty-seven tens. How many thirty-fives in a hundred and twenty-seven umm....three thirty-fives make a hundred and five. That leaves us with twenty-two tens still to be dealt with sorry, so what we do now is we move into the unit's position and bring down the four units so we have two hundred and twenty-four units to divide by thirty-five. Six thirty-fives are two hundred and ten, subtract that from the two twenty-four we have fourteen units remaining and we could give that as the answer, thirty-six remainder fourteen or we're going to continue beyond the decimal point. So I write in a zero here, zero tenths bring that zero down to join the fourteen units we have left over and we now have a hundred and forty tenths to divide by thirty-five. A hundred and forty divided by thirty-five, well that's exactly four. Four thirty-fives are a hundred and forty, the calculation is complete and the answer is thirty-six point four.

One last example, two fifty-eight divided by nine, there's the two hundred and fifty-eight, I'm going to divide it by nine using short division. Two divided by nine, that's not enough so let's look at twenty-five tens, divided by nine. Two nine's are eighteen so umm...that's a remainder of seven. If we carry the seven over into the units position. Seventy-eight divided by nine, eight nines are seventy-two so we have six remaining to carry into the tenths position. Nine is now divided into sixty, sixty tenths. Sixty divided by nine well let's see. Six nines are fifty-four, so fifty-four, that leaves me another six still to be dealt with. So I have to carry those into the hundredths position, writing in another zero and once again, I have sixty divided by nine which is six remainder six to be carried into the thousandths position. So that's another six with another six to be carried into the next position and it's pretty obvious that this is going to carry on. Six, six, six, six forever now with the same thing recurring. The answer to this calculation, is twenty-eight point six, six, six, six with the six recurring. It's a recurring decimal. Well, depending on the context, we would then round the answer to an appropriate number of decimal places. I'm going to give it rounding to two decimal places which is twenty-eight point six

seven. So that's how you give the answer to a division calculation which doesn't work out exactly as a whole number, that's how you give it as a decimal answer by continuing the division beyond the decimal place.