Chapter 8 - Mental Strategies for Addition and Subtraction

Numberline Subtraction 6 minutes and 19 seconds

Let's have a look at some examples of subtraction done using an empty number line. Here's my first example, four hundred and eighty-six subtract a hundred and twenty-seven. So let's err…think of this on the number line there's four hundred and eight-six on the right hand end and we're going to think first of all that subtraction can mean counting back. So we're going to count back from four hundred and eighty-six along the number line and we can do that in two steps we can first of all count back by a hundred, subtracting a hundred and then we can count back a further twenty-seven subtracting twenty-seven. Well counting back a hundred is very easy, that takes us down to three hundred and eighty-six. Now subtracting twenty-seven from that is a little bit tricky so I'm going to break that down into two steps in my mind, first of all a step of twenty and then a step of seven. So counting back by twenty that's fairly easy. Three eighty-six subtract twenty takes me back to three hundred and sixty-six now I've got to subtract seven and just to make that really easy, I'm going to do that in two steps, first of all, counting back six, to three hundred and sixty and then the final one needed to get me to the answer which is three hundred and fifty-nine. So there we've counted back from four eighty-six by a hundred and twenty seven, by doing it in four simple steps: one hundred, twenty, six and one. And the number line supports the mental strategy of subtracting.

Well let's have a look of another way of doing the same calculation, four hundred and eighty-six subtract a hundred and twenty seven, there's the four hundred and eighty six but now I'm going to think of the subtraction as meaning finding the difference between these two numbers. So I put a hundred and twenty seven as far as I can over on the left, and what we have to do, is to find some way of finding the gap between these two numbers. How large is that gap? And very often the best way to do this is to start at the smaller number and to keep adding on easy bits until you reach the four hundred and eighty-six, filling the gap as you go along. So, starting at the hundred and twenty-seven, the most obvious thing to do is to add three to get to a nice easy number, a hundred and thirty. That's err…got us started now a nice big jump to get us closer to four hundred and eighty-six we'll jump forward by three hundred, that gets us up to four hundred and thirty. Now let's get

closer still, I'm going to jump forward by fifty, that gets me up to four hundred and eighty, I'm nearly there, one last jump of six add six onto this and I've made it. So I'm thinking to myself now. I've filled this gap. I've found the difference between a hundred and twenty seven and four hundred and eighty-six and you fill that gap by adding three and three hundred and fifty and six. And I could jot those down if I was doing it mentally and the total of those four steps, three hundred and fifty-nine, that's the answer to the subtraction.

Now let's have a look at a much trickier one, well, this would be tricky if you were doing it by decomposition by a formal written method. In a later video, I…I use this actual example and you'll see that when you do it by decomposition, it is really very complicated. On the empty number line though, as is often the case, the calculations of the most difficult by formal methods are very simple done informally.

So, let's have a look at this one, there's the five thousand and five, and again, we're going to look at the difference between four hundred and eighty-seven and five thousand and five. What do we have to add? And to fill that gap, we're going to use the most obvious stepping stones. The first one I'm going to do is to aim for five hundred. To do that I need to add a…a thirteen. Now, if you like you could have done that in two steps. Maybe adding three and then adding ten. Now from five hundred, I'm going to head for a thousand, that needs another five hundred to be added. From a thousand, I can head right up to five thousand by adding another four thousand and we're almost there now, we just need to add that final five and we've got to our target and we filled the gap there with a thirteen and a five hundred and a four thousand and another five, which is a total of four thousand, five hundred and eighteen and there's the answer to the subtraction. Try that one formally and you'll see how complicated it is, do it on the empty number line, you can understand it better and it's actually much easier as well.