Check-Up

25

More division strategies

In a primary school, a total of 54 out of 72 pupils achieved level 4 or above in the Key Stage 2 science test one year. The following year it was 47 out of 61 pupils. To express these as percentages, a headteacher decides to calculate 5400 ÷ 72 and 4700 ÷ 61. Without a calculator, complete these calculations.

Answer to check-up 25

The answers are 75% and just over 77%. Possible methods are discussed below.

Discussion and explanation of check-up 25

Your reaction to the first calculation here was probably that this was a fairly daft way of finding this proportion as a percentage! I agree. But if you do express the calculation as 5400 ÷ 72, it is easy to get to the answer 75 mental calculations and informal settings. But the second calculation (4700 ÷ 61) is less straightforward. I will use these two examples to illustrate a written procedure for carrying out divisions. This is an alternative to the standard 'long division' method. If you can do that, then good luck! If you can't, then, sorry, but I am not going to explain it to you. The method below is easier to explain and sufficient for the divisions you would do without a calculator.

The basis of the method is that we interpret, say, '5400 ÷ 72' as 'how many 72s in 5400?'. We then subtract from the 5400 ad hoc lots of 72, using whatever numbers we can handle confidently. When completed, the two calculations here, written out tidily, might look like this:

	5400 72
50	3600
	1800
10	720
	1080
10	720
	360
5	360
75	0

	4700 61
50	3050
	1650
20	1220
	430
5	305
	125
2	122
77	3 rem

In the first example, I started by subtracting 50 lots of 72 from the 5400, because I found that easy to work out (half of 7200, i.e. 3600). I then had 1800 left, so I decided to subtract 10 lots of 72 (720). This left me with 1080, so I could subtract another 10 lots of 72. At this stage I had 360 left and I recognised this as 5 lots of 72. Once these had gone, there was nothing left. Adding

up the numbers down the left-hand column gives the total number of 72s in 5400, namely 75.

In the second example, 4700 ÷ 61, I subtracted first 50 lots of 61, then 20 lots, then 5 lots, and, finally, 2 lots of 61. This gives a total of 77 lots of 61, with a remainder of 3. Since this is much less than half of the 61 we are dividing by, the answer is 77 to the nearest whole number.

Take away from the *dividend* (i.e. the number you are dividing) whatever chunks you wish. Your choices will depend on your confidence with mentally multiplying numbers like 61 (the *divisor*). If all you can manage is to multiply by 10, 2 and 1, then that's fine. You'll get there in the end! For example, you could do 4700 ÷ 61 by subtracting 10 lots of 61 (610) repeatedly, seven times in all, leaving you with 430. Then subtract 2 lots of 61 (122), three times, leaving 64. Finally, subtract 1 more 61, to get the result 10 + 10 + 10 + 10 + 10 + 10 + 10 + 2 + 2 + 2 + 1 = 77, with remainder 3.

Summary of key ideas

- In a division, the number you are dividing is called the dividend; the number you are dividing by is called the divisor (e.g., in 682 ÷ 31, the dividend is 682, the divisor is 31).
- A written method for doing divisions, which is an alternative to 'long division', involves interpreting a division statement like '682 ÷ 31' as 'how many 31s are there in 682?'
- Answer this by subtracting ad hoc lots of the divisor from the dividend, using whatever multiplications you can handle mentally (e.g. from 682, subtract 20 lots of 31, then 2 lots of 31).
- The method also works when there is a remainder.

Further practice

25.1 Use the ad hoc subtraction method suggested in this check-up to find how many classes of 28 pupils would be needed for a school of 644 pupils.

25.2 Use the ad hoc subtraction method to find how many 42-seater coaches would be needed to transport a school party of 1550.