Being Naturally Mathematical at Easter time: Middle Primary Solutions

These solutions show how mathematical problem solving can be enhanced by the use of spreadsheets. The spreadsheet 2018 Middle Solutions.xls gives the full solutions; this document discusses how the spreadsheets were put together.

Question 3

It helps if we follow the hint and find the total of all the numbers, which is 1 + 2 + … + 7 = 28.

With four rings to fill, we have four totals to make and, in the diagram of the problem, the numbers 7, 5, 4 and 6 appear in only one ring while the numbers 2, 3 and 1 appear in two rings. So the total to share between the four rings is 28 + 2 + 3 + 1 = 34, and 34 is not divisible by 4. We need to ensure that the numbers that are repeated add to a multiple of 4 (because 28 is itself a multiple of 4). We can't find three numbers that will add to 4, so the next to try is 8, which can be made with 1 + 3 + 4 or 1 + 5 + 2.

There is another feature that makes our work easier. We know that 28 + 8 = 36 and so the total that should be in each ring is 36 ÷ 4 = 9. It turns out that the 1 + 3 + 4 doesn't work because:

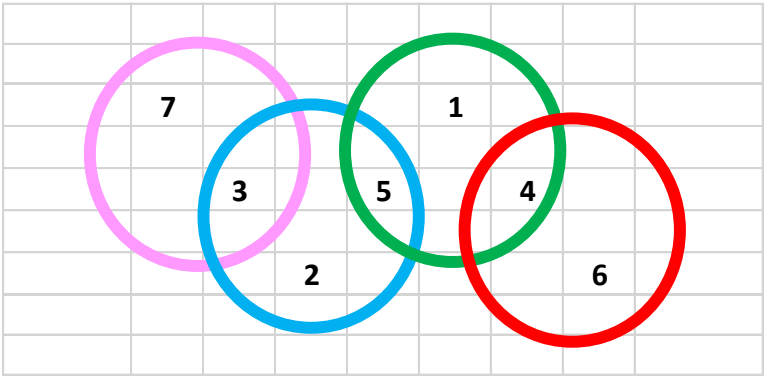
- 1 has to be in the centre position because you would need an 8 if it were in an outside position and so
- 1 will be in the centre position and in a circle that also has 4 and that's impossible as the third number in that circle would have to be 4 as well.

But the 1 + 2 + 5 combination does work:

Pink Circle	9			4				6											
Blue Circle	9																		
Green Circle	9				5		1		2			Repeated numbers add to							8
Red Circle	9																		
						3				7									

I also found solutions when the repeated numbers add to 12 and 16.

This problem also allows you to show that you can also use diagrams in an Excel spreadsheet:



Yes, Excel has many features that go beyond its ability to calculate.