# FIBONACCI

c. 1170 - 1240

Let me tell you about an Italian mathematician called Leonardo de Pisa (as in Leaning Tower of…). To start with, he thought that his name was a bit of a mouthful, so he gave himself the rather catchy nickname of ‘Fibonacci’. Well, he was Italian I suppose. Leonardo was fortunate that he came from a very wealthy family and he didn’t have to get a job. Instead he travelled the world to investigate the mathematics of other cultures. He was particularly keen on Arabic countries, and one of the Islamic ideas he found has had huge implications for us today. But more of that later.

Fibonacci is best known for his great book – Liber Abaci. It was published 800 years ago – in 1202, and was really just a big book of mathematical puzzles. Some were quite hard, but one of these puzzles has such an incredible answer that everyone should know about it. It goes something like this:

‘*If you put a male and a female rabbit in an enclosed space, how many rabbits will you have at the end of a year?*’

As you can see, even in 1202, rabbits had something of a proliferation reputation. The answer can be found using a mathematical model (no, not Carol Vorderman) and it turns out that the number of pairs of rabbits at the end of each month follows this pattern:

1, 1, 2, 3, 5, 8, 13, 21, 34, …

There is a great rule here – can you see it? It turns out that there were 144 pairs at the end of the year, and all the numbers in this sequence were christened Fibonacci numbers in his honour. Now that daft nickname makes sense doesn’t it? The really fantastic thing about these numbers is that they appear left, right and centre all over the place in nature. If you have the inclination and you don’t believe me just count bumps on the spirals of pineapples, daisies and pine-cones, or work out the family tree for male bees and cows (if you have any idea how to do this without asking, well … erm, congratulations). It gets even better when you take two big consecutive Fibonacci numbers and divide the second by the first. You get the number 1.618… (which goes on forever rather like π). This number can also be found by working out (1 + √5)/2, and is called the ‘Golden Ratio’, which appears even more often – in snail shells, seashells and in every one of us several times over. It can also be found by looking at the Pyramids in Egypt, most Roman architecture and Renaissance paintings – probably because it is the most visually pleasing proportion that exists. Amazing!

Just in case I lost you in my excitement about the Golden Ratio and Fibonacci numbers, bear in mind this about the great Leonardo de Pisa. Without him we would still be counting with Roman numerals – I, II, III, IV, V, VI, VII, VIII, IX, X and so on. Whilst wandering in foreign parts he happened upon a new number system used in Islamic countries – 1, 2, 3, 4, 5, … They were much more useful for doing maths, so in the same book as the multiplying rabbits problem, he proposed that Europe should use these numbers. They are still called Arabic numerals to this day.