

## NUMBER PHI

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Fibonacci is one of the most famous names in mathematics. This would come as a surprise to Leonardo Pisano, the mathematician we now know by that name. And he might have been equally surprised that he has been immortalised in the famous sequence – 0, 1, 1, 2, 3, 5, 8, 13, ... – rather than for what is considered his far greater mathematical achievement – helping to popularise our modern number system in the Latin-speaking world.

Leonardo Pisano was born late in the twelfth century in Pisa, Italy: Pisano in Italian indicated that he was from Pisa, in the same way Mancunian indicates that I am from Manchester. His father was a merchant called Guglielmo Bonaccio and it's because of his father's name that Leonardo Pisano became known as Fibonacci. Centuries later, when scholars were studying the hand written copies of *Liber Abaci* (as it was published before printing was invented), they misinterpreted part of the title – "filius Bonacci" meaning "son of Bonaccio" – as his surname, and Fibonacci was born.

One of the mathematical problems Fibonacci investigated in *Liber Abaci* was about how fast rabbits could breed in ideal circumstances. Suppose a newly-born pair of rabbits, one male, one female, are put in a field. Rabbits are able to mate at the age of one month so that at the end of its second month a female can produce another pair of rabbits. Suppose that our rabbits never die and that the female always produces one new pair (one male, one female) every month from the second month on. The puzzle that Fibonacci posed was... How many pairs will there be in one year?

Fibonacci numbers are of interest to biologists and physicists because they are frequently observed in various natural objects and phenomena. The branching patterns in trees and leaves, for example, and the distribution of seeds in a raspberry are based on Fibonacci numbers. Many buildings and artworks have the Golden Ratio in them, such as the Parthenon in Greece, but it is not really known if it was designed that way.

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