

The fact that not all numbers can be written as fractions might be surprising when you first come across it. We hope, however, that your reaction is not quite as rash as that of a particular group of ancient Greeks. The *Pythagoreans* were a secret brotherhood named after their founder, the famous [Pythagoras of Samos](#) (around 570BC–495BC). The Pythagorean code of ethics pervaded all parts of life, including diet: Pythagoreans had to be vegetarians and they were not allowed to eat beans. The practice of mathematics was regarded as a pillar of morally sound behaviour. Indeed the very word “mathematics”, which translates as “that which is learned”, has been attributed to Pythagoras.

The Pythagoreans were fond of numbers, whole numbers to be precise. They believed that everything in the Universe could be expressed in terms of whole numbers and the ratios between them, the fractions. It was one unfortunate Pythagorean, Hippasus of Metapontum, who discovered that this is not the case. In fact, even the simplest of geometrical objects, the length of the diagonal of a square of side length 1, is an irrational number, namely  $\sqrt{2}$ .

Historical evidence is conflicting, but it seems that the Pythagoreans punished Hippasus severely for his discovery. According to some sources he was expelled from the cult and had a tombstone erected for him, as if he was dead. According to others, he was sent to his certain death at sea, on a shipwreck. There haven't been many people in history who died for mathematics.