# A DEADLY NUMBER

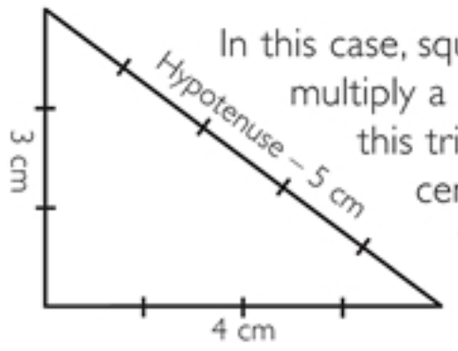
Pythagoras was a mathematician who was born in Greece in around 580 BC. He hated beans and loved triangles. Little else is known about him, except that he is famous for a theorem that he didn't, in fact, invent. However, he is still considered to be one of the most important mathematicians ever.

## Lovely Triangles

Pythagoras was especially keen on triangles. He and his followers – the Pythagoreans – associated them with numbers. The numbers, 3, 6 and 10, for example, were his particular favourites. They are known as triangular numbers, as they can be drawn out in a triangular pattern, like this:

## About That Theorem

Pythagoras' famous theorem applies to right-angled triangles – that is, triangles with one horizontal line and one vertical line. It says that if you add the squares of the lengths of the two short sides, you'll get the square of the length of the longest side – called the hypotenuse.




In this case, square means 'what you get if you multiply a number by itself'. For example, in this triangle, the sides are 3, 4 and 5 centimetres long. The squares of these numbers are 9, 16 and 25, and if you add 9 to 16, you get 25, just as the theorem says.





This theorem is very convenient, as it gives you a way to work out the length of one side of a triangle if you know the lengths of the other two. There's even a handy formula to show your workings out: $a^2 = b^2 + c^2$

## How Irrational!


See what happens if a triangle looks like this though:

The formula says the square of the length of the hypotenuse is the sum of the squares on the other two sides: $1^2 + 1^2$. However, $1^2$ is 1, so the square of the length of the longest side is 1 + 1, or 2. To find the length of the hypotenuse, all Pythagoras had to do was find the number whose square is 2. This is called the square root of 2, which can be written as $\sqrt{2}$.

Annoyingly, $\sqrt{2}$ is an endless number. It begins 1.4142… but never ends. These numbers can't be written as ratios, and ratios were another favourite of the Pythagoreans. They thought that every number could be expressed as a ratio – or rationalized. For instance, one quarter is the ratio of 1 to 4, which is written as ¼. Endless numbers can't be rationalized – they are *irrational*.

## Don't Mention It

Irrational numbers were especially tricky for Hippasus, a follower of Pythagoras. Pythagoras wanted all his followers to keep irrational numbers a deep, dark secret, but Hippasus just wouldn't listen. He kept going on about this great proof he'd discovered about them, so much so that – it is said – they put him to death.