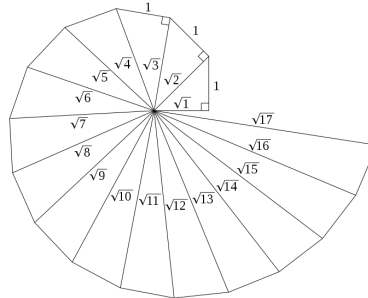# Spiral of Theodorus Making Kit

What is it?

The Spiral of Theodorus is a series of right triangles formed together in a spiral. The triangles in the spiral have one side length of 1 unit long and two irrational side lengths in the form of consecutive square root numbers.

The first starter piece is a 1 x 1 square cut on the diagonal to make the first triangle. In other words, this is an isosceles right triangle with the legs as 1 unit long.
Each triangle after has the diagonal from the previous piece as a base. Use the corner of the original 1 x 1 starter piece to get a perpendicular and measure a height 1, then draw the new diagonal.
The Pythagorean Theorem tells us the length of the resulting diagonals. $a + b^2 = c^2$
1 x 1 has hypotenuse of length $\sqrt{2}$
1 x $\sqrt{2}$ has hypotenuse of length $\sqrt{3}$
1 x $\sqrt{3}$ has hypotenuse of length $\sqrt{4}$ and so on ...

What do we learn by making it?

We start with the Pythagorean Theorem. From this first definition of $\sqrt{2}$ as the diagonal of a 1 x 1, we can show that every natural number has a square root and that we can construct them physically even though the value is an irrational number. Like Pi, which is in every circle, $\sqrt{2}$ is in every square.

What's fun?

The spiral is made using an iterative process that makes different triangles at each step. The final spiral can then be used as a drawstart in creative ways. Depending on the context, you can lightly or heavily explore the mathematical concepts of the Spiral of Theodorus.

Search for "Spiral of Theodorus Design" online to find examples.

Please view the associated blog entry at the link below to:
- access a Spanish video demonstration of making the Spiral of Theodorus and
- to gain an electronic version of this document.

https://www.mathhappens.org/spiral-of-theodorus-relax-with-math/

We hope you and the students have fun trying this out and getting creative!