

Why use this resource?

This investigation is an opportunity for students to develop a better understanding of the relative size of irrational numbers and where they can occur. It also links together a variety of mathematical concepts such as accurate construction, Pythagoras' theorem, sequences, similarity, and manipulation of surds.

Preparation

Students could be asked to construct the spiral themselves so they would require a pencil, pair of compasses and a ruler.

Possible approaches

If students can be given time to physically construct the spiral then they can gain a deeper understanding of the fact that irrational lengths cannot be constructed directly with a ruler.

Otherwise, students should come up with questions they would like to explore. There are suggestions in **Possible questions**. If there is an opportunity for different groups to work on different questions and then share their findings, then it is likely to bring out more interesting properties of the spiral than everyone working on the same problem. It would be nice to encourage students to carefully compare different spirals so that interesting and useful relationships such as writing $\sqrt{a} = b\sqrt{c}$ can be reinforced.

A version of this resource has been featured on the [NRICH website](https://nrich.maths.org/). You might like to look at some students' solutions that have been submitted there.