Have a sine

Teacher notes

Why use this resource?

If students need to practise applying trigonometry to find missing lengths and angles then the diagram in this resource is particularly rich. This problem is accessible to any student with a basic understanding of trigonometry in right-angled triangles. The process of "chasing" the angles and side-lengths in this diagram is very instructive, not just for the "trigonometry" component but also for getting students to realise how little information about a diagram they require to be able to solve a problem.

Preparation

There is a printable copy of the image which could be printed on A3 if students tackle the problem in groups.

Key questions

- How many right-angled triangles can you find in this diagram?
- What will happen if θ varies?
- What if θ is obtuse or reflex?

Possible extension

The historical context of this problem is an interesting read and that problem itself (Lost but lovely: the haversine) could be used as a lesson starter or revision exercise for more confident students.

A version of this resource has been featured on the NRICH website. You might like to look at some students' solutions that have been submitted there.