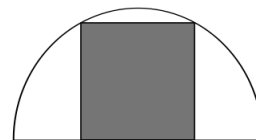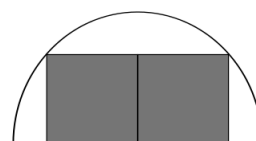## Stage 4 ★★★
Mixed Selection 1

1. One or two
The diagrams show squares placed inside two identical semicircles. In the lower diagram the two squares are identical.
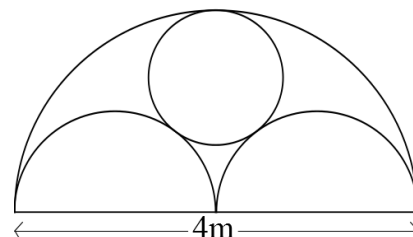
What is the ratio of the areas of the two shaded regions?
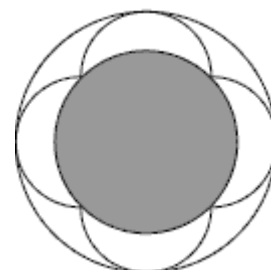
2. Salt's Mill
A window frame in Salt's Mill consists of two equal semicircles and a circle inside a large semicircle with each touching the other three as shown. The width of the frame is 4m.

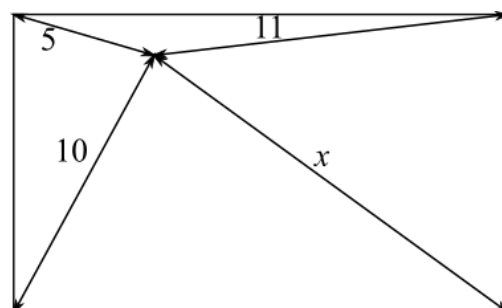What is the radius of the circle, in metres?

3. Oh so circular
The diagram shows two circles and four equal semi-circular arcs. The area of the inner shaded circle is 1.

What is the area of the outer circle?

4. Distance to the corner
A well is dug in a courtyard. The distances from the well to three of the corners are 10 metres, 5 metres and 11 metres, as shown in the diagram.

Find the distance from the well to the fourth corner.

These problems are adapted from UKMT Mathematical Challenge problems (ukmt.org.uk).