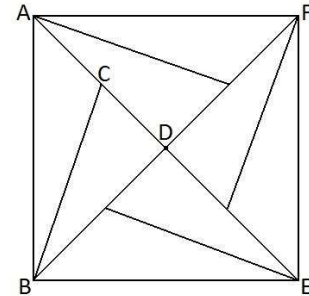


**Stage 4 ★★★**
Mixed Selection 1**1. Symmetric angles**

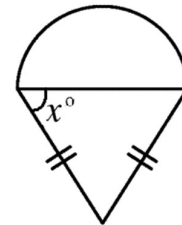
The diagram has rotational symmetry of order 4 about D .

If angle ABC is 15° and the area of $ABEF$ is 24cm^2 , what is the length of CD ?

**2. Ice cream tangent**

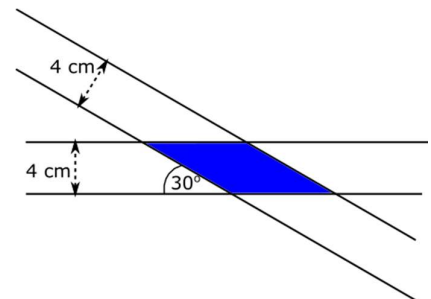
The diagram shows a semi-circle and an isosceles triangle which have equal areas.

What is the value of $\tan x$?

**3. Overlapping ribbons**

Two strips of ribbon, each of width 4 cm, are laid across each other at an angle of 30° , as shown in the diagram.

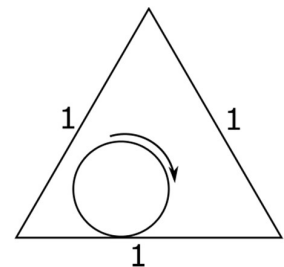
Find the exact area of the overlap.

**4. The roller and the triangle**

Clare is painting the inside of a short triangular prism with a roller.

The cross-section of the prism is an equilateral triangle with side length 1, and the cross-section of the roller is a circle with circumference 1. This is shown in the diagram.

What is the total length that Clare can paint?
Give an exact answer.



These problems are adapted from UKMT (ukmt.org.uk) and SEAMC (seamc.asia) problems.