Stage 3 ★
Mixed Selection 3

1. Cuboid faces

The faces of a cuboid have areas of 12, 18 and 24 square centimetres.

What is the volume of the cuboid?

2. Strawberries and peas

Yasmin has beds for peas and strawberries in her garden, as shown in the diagram on the right.

This year, Yasmin moved the boundary. She decided to change the rectangular pea bed into a square, by lengthening one of its sides by 3m. As a result of this, the area of the strawberry patch was reduced by 15m^2.

What was the original area of the pea bed, before the change in the boundary?

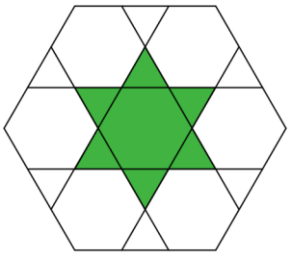
3. Giant Rubik's cube

A Rubik's cube is made of 3 by 3 by 3 smaller cubes – so 27 in total – but only 26 of them are visible.

How many cubes would be visible in a 12 by 12 by 12 Rubik's cube?

4. Star in a hexagon

The diagram shows a design formed by drawing six lines in a regular hexagon. The lines divide each edge of the hexagon into three equal parts.



What fraction of the hexagon is shaded?

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