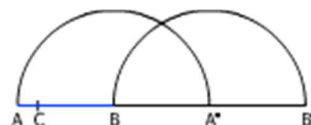


Stage 4 ★

Mixed Selection 1

1. Pencil turning

A pencil AB lying on a table is given a half turn about the end B (so that A moves to A*) and then a half turn about A* (so that B moves to B*). The point C on the pencil is one third of the way from A to B.



What is the ratio of the total distances moved by A and by C?

2. 3-sided

Jack's teacher asked him to draw a triangle of area 7cm^2 . Two sides are to be of length 6cm and 8cm. How many possibilities are there for the length of the third side of the triangle?

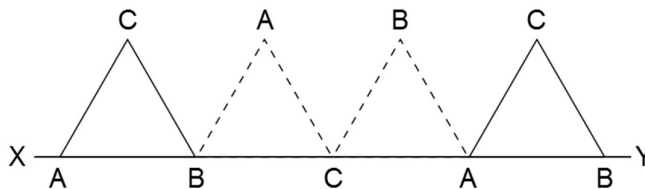
3. Snail's pace

A snail is at one corner of the top face of a cube with side length 1m. The snail can crawl at a speed of 1m per hour.

What proportion of the cube's surface is made up of points which the snail could reach within one hour?

4. Triangular wheel

The equilateral triangle ABC has sides of length 1 unit and AB lies on the line XY. The triangle is rotated clockwise around B until BC lies on the line XY. It is then rotated similarly around C and then about A as shown in the diagram. What is the length of the path traced out by point C during this sequence of rotations?



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