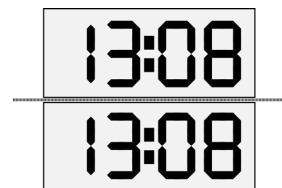## Age 14+ Level ★★
Worksheet 1

1. **Back in Time**

   Beatrix has a 24-hour digital clock on a glass table-top next to her desk.
   When she looked at the clock at 13:08, she noticed that the reflected display also read 13:08, as shown.

   How many times in a 24-hour period do the display and its reflection give the same time?

2. **Similar Perimeter**

   The lengths of the sides of a triangle A are 3, 4, and 6.
   Triangle B is similar to triangle A.
   One of the sides of triangle B has length 12.

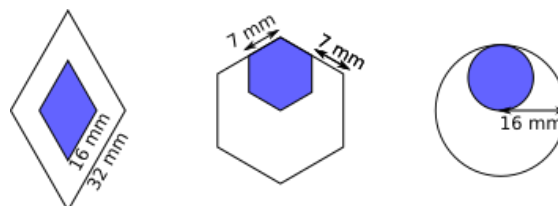   What are the possible perimeters that triangle B could have?

3. **Rotation and Area**

   A has coordinates (4,4) and B is obtained by rotating A about the origin O through an angle of 135º anti-clockwise.

   Calculate the area of triangle AOB.

4. **Pendants**

   These designs are going to be made into pendants.

   The diamond shape is a rhombus, the hexagon is regular, and the radius of the large circle is 16mm long. For each pendant, the blue shape is a smaller version of the whole pendant.

   What proportion of each pendant will be blue?

5. **Climbing Ropes**

   Climbers use ropes of different diameters.
   A 50m rope which is 9mm in diameter weighs about 2.7kg.

   Roughly what would a 100m rope of the same material, but of diameter 11mm weigh?

These problems are adapted from UKMT (ukmt.org.uk) and WMC (competition.ac) problems.