

## Problem Sheet 1

The following questions are all intended to help you to develop your problem-solving skills. It is not necessary to work through the problems in order; instead, choose the problems that appeal to you most, and tackle those first.

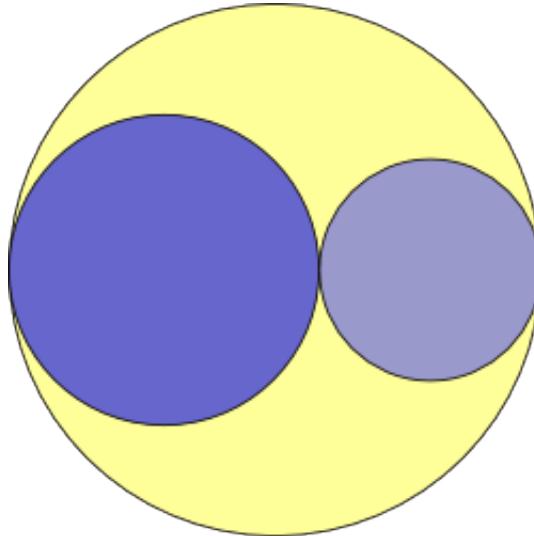
1. On my last birthday, my friend said to me: “In 15 years’ time, your age will be the square of your age 15 years ago!” Can you work out how old I am?

2. For which values of  $n$  is

$$(1 + \frac{1}{2})(1 + \frac{1}{3})(1 + \frac{1}{4}) \dots (1 + \frac{1}{n})$$

an integer?

3. If the area shaded yellow is equal to the area of the larger of the two circles that are shaded blue, what is the relationship between the radii of the three circles?



4. What is the smallest perfect square that ends with the four digits 9009?
5. The positive whole numbers  $a$ ,  $b$  and  $c$  are all different and  $a^2 + b^2 + c^2 = 121$ . What is the value of  $a + b + c$ ?
6. Using each of the digits 1 to 9 once and once only, find two whole numbers one of which is double the other.