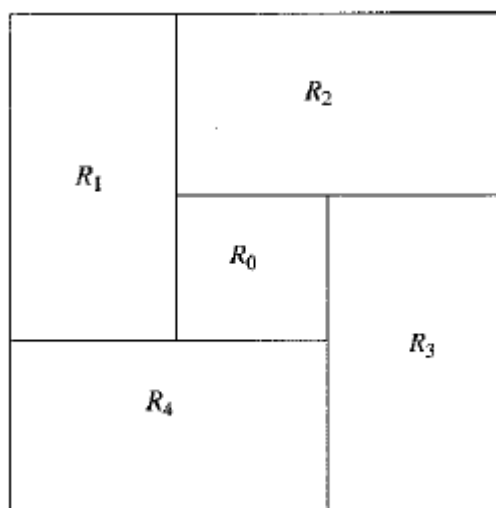# Further Maths Questions – Due first lesson back in September.

Please hand in solutions or your attempts at them with all workings in on the first lesson back. Time will then be spent discussing problem solving approaches and techniques.

1) A square is divided into five rectangles as shown below. The outer rectangles R_1, R_2, R_3, R_4 all have the same area. Prove that the inner rectangle R_0 is a square.

2) A group of n people are captured and buried so that they are all in a line, one behind each other, such that each person can only see the people directly in front of them (i.e. their heads cannot turn). A hat is placed on each of them, each hat is coloured in one of k different colours. If a person correctly calls out the colour of their hat they are spared, otherwise they are executed.

   Assuming that (strangely) the group of n people know that all of this is about to happen to them and can plan a strategy, what is the largest number of people that can be guaranteed to stay alive?

3) A triangle has its lengths in an arithmetic progression with difference d. The area of the triangle is t. Find the lengths and angles of the triangle.