



UNITED KINGDOM MATHEMATICS TRUST

Open Ended (Picture) Tasks

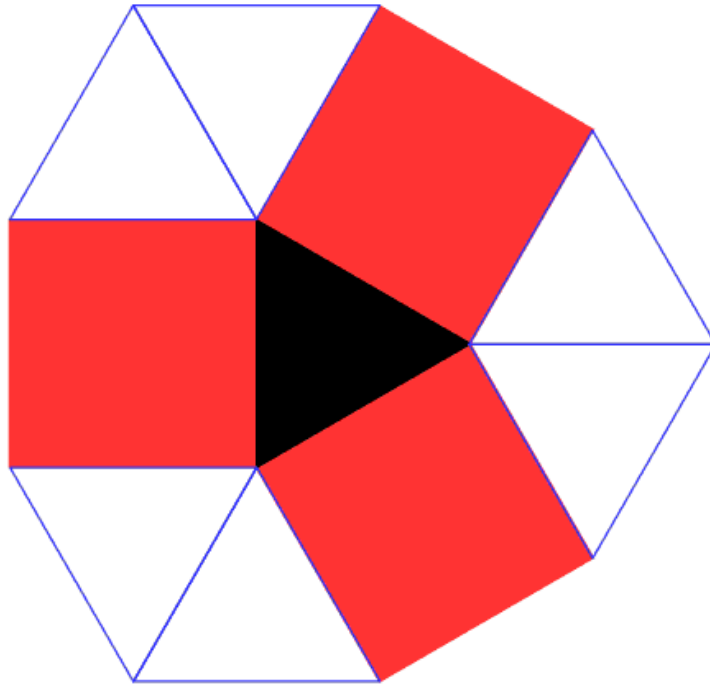
These are open ended questions and are not intended for use in a competition format.

It is expected that these will be used in the classroom with groups of pupils and would foster research on the part of the pupils (and maybe the teacher!).

Some guidelines are given but the intention is for the pupils to do some research by whatever means is appropriate, other than simply asking someone else.

Task One

Patchwork tiling



You have lots of equilateral triangles and squares. Their side lengths are the same.

Working in pairs discuss what you think will be the next layer of tiles that can be laid starting with the pattern you see above?

The rules are: the squares and triangles must tessellate (you may have to find out what that means!);
 the sides of a square must be joined to the side of a triangle.

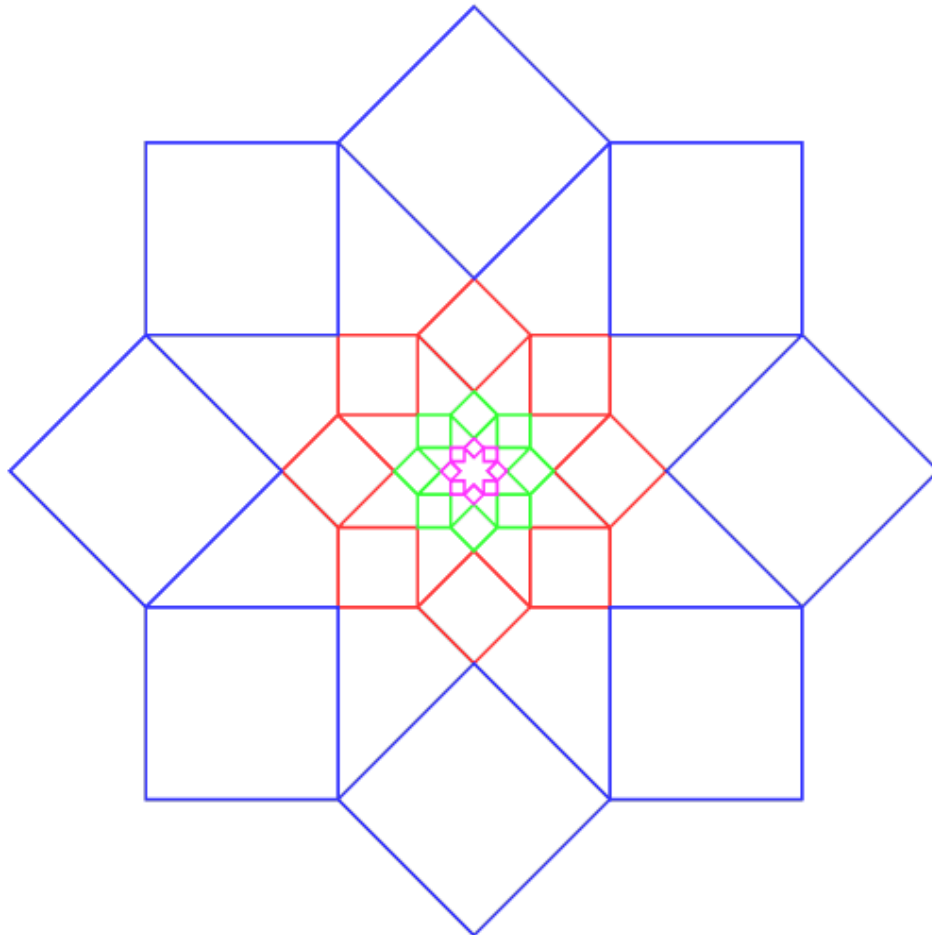
What could be the next layer around? And the next layer?

Now lay the tiles – were you right?

What else do you notice?

Task Two

Nesting squares



What do you notice in this poster called “rings of squares”?

Working in pairs, describe exactly what you see.

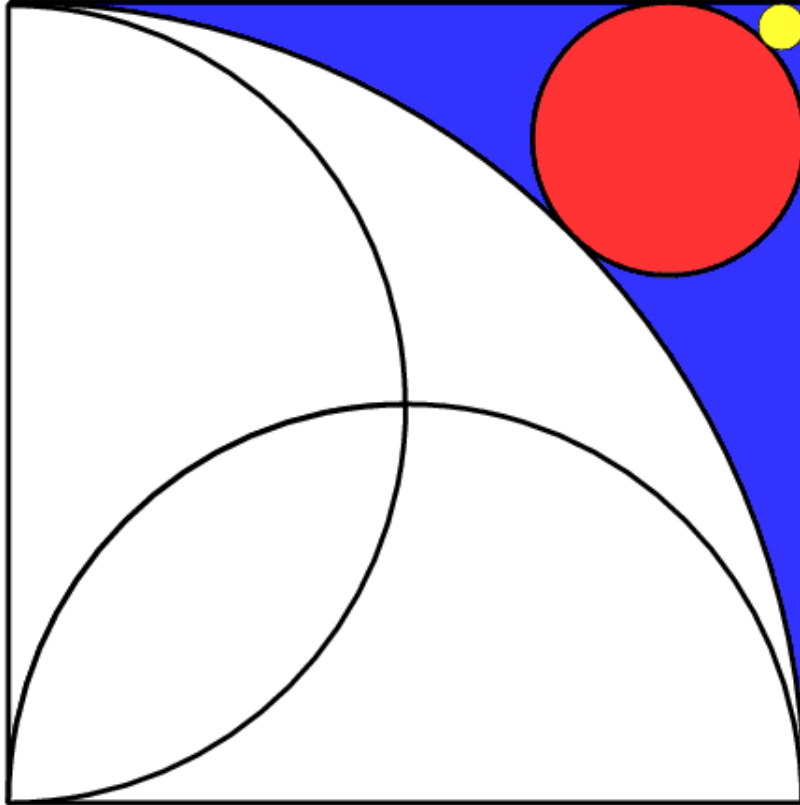
What geometrical facts can you deduce?

How much larger is a blue square with respect to a green square?

What are the sizes of the other coloured squares (the red and the purple)?

Task Three

Circles in the square



Inside the unit square there are two circles filled with red and yellow, two semi-circles and one-quarter circle.

Working in pairs, discuss what else you notice.

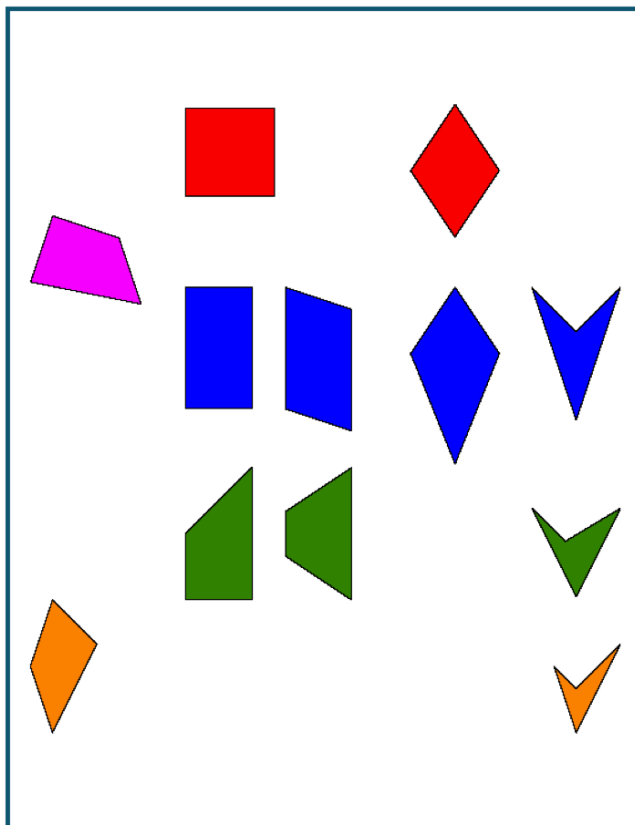
What is the area enclosed by the two semi-circles?

What is the circumference of the circle coloured in red?

What is the ratio of the area of the quarter-circle, to the area of the circle coloured in yellow?

Task Four

The family of quadrilaterals



Working in pairs study the poster carefully. Explain to each other what it is you see.

Can you explain what you see in more than one way? Are there any other quadrilaterals that could be put into the poster?

Looking across the rows of shapes, what do you notice?

How significant is the colour scheme? Could you change the colour scheme? Explain your reasoning?

Could you draw a similar scheme for all triangles? (Some people think there are seven different types of triangle, others think only two and others think differently. Have a look at Task Two in the 2014 non-picture "Open Ended Tasks").