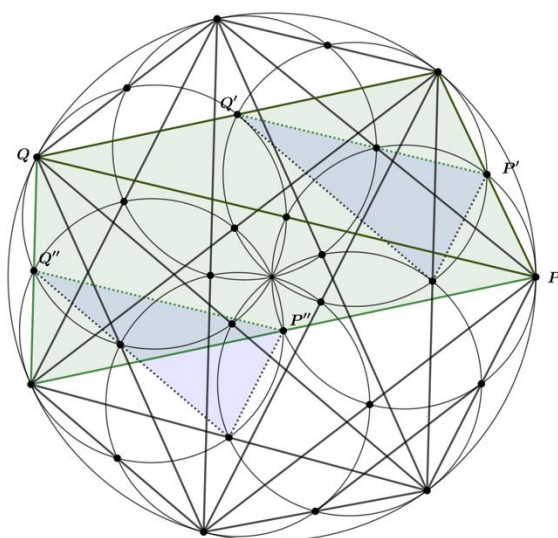
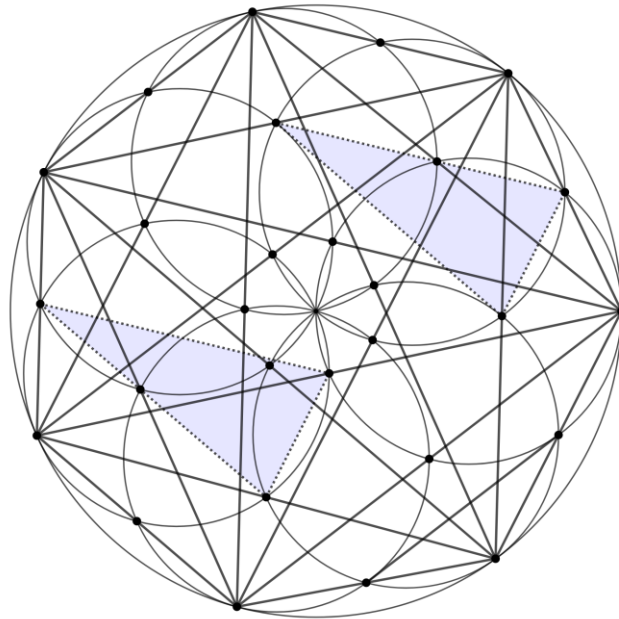


### 5.2.5 Locating congruent polygons among the midpoints of regular polygon diagonals

We take as example an  $n$ -gon where  $n$  is odd. In these cases the diagonal midpoints do not coincide with diagonal intersections.

7 equal circles pass through a single point and are disposed symmetrically about it. Their other intersections are marked with bold points. Show that the two lilac triangles are congruent.



By the reflective symmetry of the whole figure the bold points are midpoints of the bold lines.

By similar triangles  $P'Q' \parallel PQ$  and of half the length. Likewise  $P''Q''$ .  
 $P'Q', P''Q''$  are therefore equal and parallel.

*Treat the other two sides in the same way, thus establishing congruence.*

A simpler observation is that the sides are corresponding diagonals in equal 7-gons.

*Investigate the congruent polygons which are possible by joining diagonal midpoints in a regular polygon.*

