# IDEA 65

## CIRCULAR GEOBOARD 3

The next problem is aimed at developing students' knowledge of angle and circle theorems and for this purpose I suggest using a geoboard with an even number of pins on the circumference. This idea builds upon students knowing how to calculate the sizes of angles in triangles whose vertices lie at the circumference of the circular geoboard. Armed with this knowledge we can pose problems such as:

1 Make/draw all the triangles which have one side length that is common to each and find the size of the angle that is opposite to (or subtended from) this side (chord). This task is clearly aimed at students recognizing that angles subtended from a common chord are equal.
   - It is important to recognize that this and subsequent problems are 'only' demonstrating certain facts about angle/circle theorems; they are not proofs.
2 Make/draw some quadrilaterals whose vertices all lie on the circumference. These will be cyclic quadrilaterals and by examining the angles students can begin to recognize that opposite angles in a cyclic quadrilateral sum to 180°.
3 Make/draw some quadrilaterals where one of the vertices lies on the centre pin. This will produce two possible scenarios. If a 'chevron' shape is made then the outside angle at the centre will be twice the 'opposite' angle at the circumference. If any other quadrilateral is formed then there is another interesting connection to be found between the internal angle at the centre and the opposite angle at the circumference.



# IDEA 66

## CIRCULAR GEOBOARD 4

These problems will be best suited for either older students in the main or for high-attaining younger ones.

Returning to the triangles that have previously been made in Ideas 63, 64 and 65, one problem is to calculate and order by size the perimeter of each one. Whether (or if) students need to be reminded that it would be a 'good' idea to describe the length from the centre pin to any outside pin as unit length is clearly a decision for individual teachers to make. This problem will, however, demand that students use and apply their knowledge of trigonometry.

A further problem is to ask students to calculate the area of the triangles they have found and this will demand that students delve even deeper into their trigonometric knowledge banks.