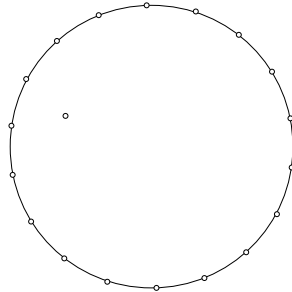


A STITCHED ELLIPSE

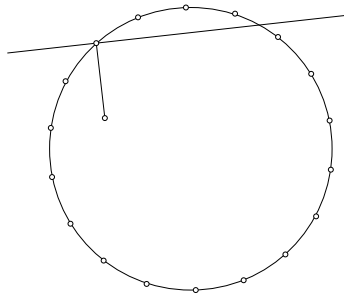
You may have drawn diagrams before that used straight lines to ‘stitch’ a curve. The same kind of effect is produced in this investigation, which is based on circles and right angles.

1. Construct a large circle by drawing two semi-circles using Geo-Pro’s protractor.

Mark points around the circumference at 20° intervals. Now mark a point anywhere inside the circle, except at the centre.



2. Rule a line segment from the ‘inside point’ to any circumference point, and use Geo-Pro’s grid lines to help rule a perpendicular line at the end of the segment.



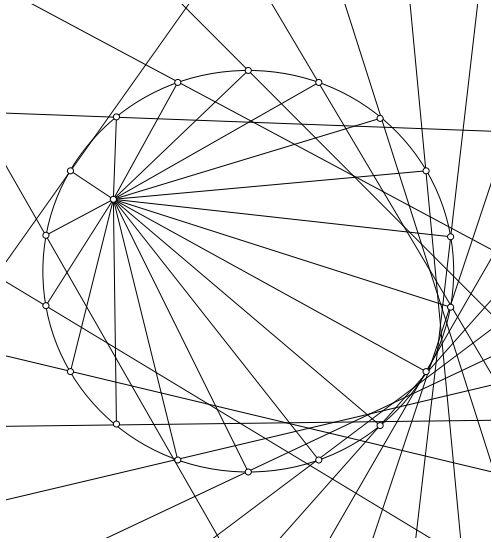
3. Repeat step 2 for the other circumference points. What shape is produced?
4. Why were you asked to avoid the centre of the circle as your inside point?
5. Alter the position of the inside point and repeat steps 1 to 3.

Extension.

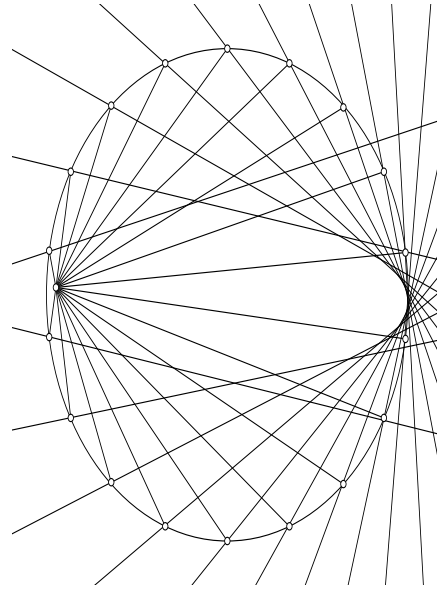
Investigate the shape stitched when the inside point is drawn outside the circle (i.e. it becomes an ‘outside point’).

Answers
A STITCHED ELLIPSE

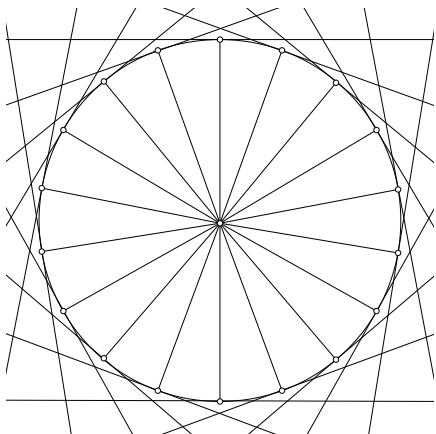
An ellipse is stitched as long as the inside point is not at the centre (diagrams A and B).
When the inside point is at the centre, a circular pattern is produced (diagram C).
When the inside point is moved to the outside, a hyperbola results (diagram D).



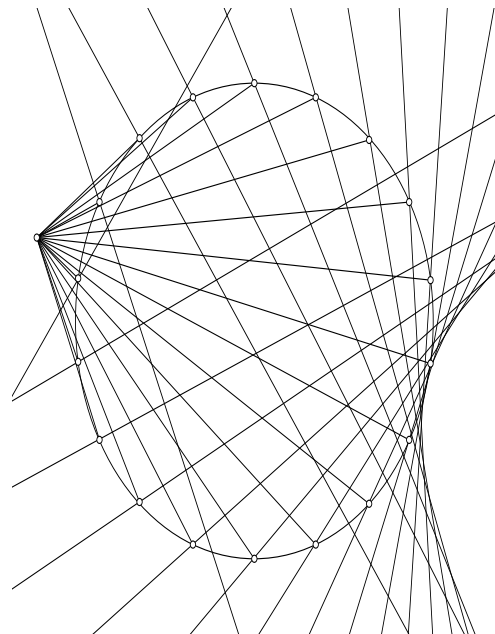
A



B



C



D