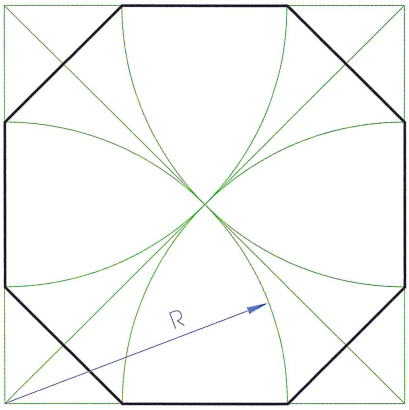
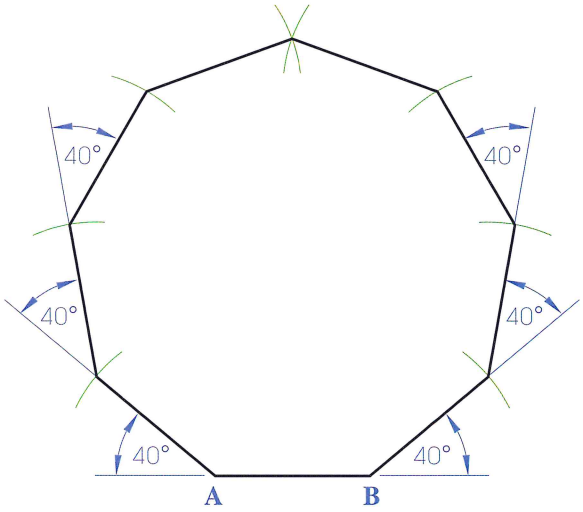
Constructing a Regular Octagon in a Given Square



Example
Construct a **regular octagon** in a square of side 90 mm.

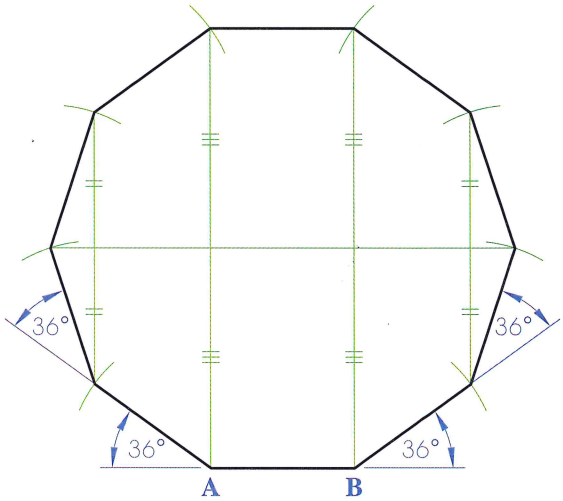
1. Construct the square of side 90 mm and draw the diagonals.
2. Using each vertex of the square as centre and half the diagonal as radius, draw the four arcs as shown in the figure over.
3. Join the points where the arcs intersect the sides of the square to obtain the required octagon.

Constructing a Regular Nonagon and a Regular Decagon



Example 1
Construct a **regular nonagon** of side 35 mm.

1. Draw the base AB of length 35 mm.
2. The **exterior angle** of a regular nonagon is 360° ÷ 9 = 40°. Using the protractor, draw 40° lines from A and B. Mark off the two sides of length 35 mm.
3. Extend these two sides. Construct exterior angles of 40° as shown. Draw these two inclined sides of length 35 mm.
4. Complete the nonagon using the protractor to draw the next two inclined sides, and the compass to locate the final vertex.



Example 2
Construct a **regular decagon** of side 32 mm.

1. Draw the base AB of length 32 mm.
2. The exterior angle of a regular decagon is 360° ÷ 10 = 36°. Using the protractor, draw 36° lines from A and B. Mark off the two sides of length 32 mm.
3. Extend these two sides. Construct exterior angles of 36° as shown. Draw these two inclined sides of length 32 mm.
4. Complete the decagon using the protractor to draw the remaining inclined sides, or by means of an **axial symmetry** (see page 151).

Answer Worksheet 6A