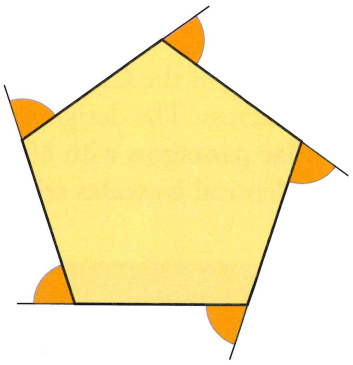
Exterior Angle of a Polygon

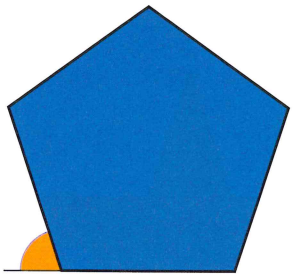


An **exterior angle** of a polygon is formed when one of its sides is extended through a vertex. The figure over shows a pentagon with an exterior angle at each of its five vertices. The five turns add up to 360°.

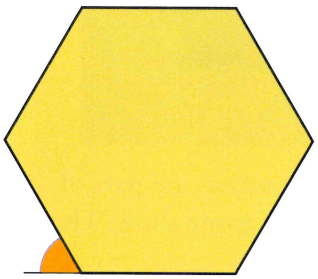
The sum of the exterior angles of any polygon is 360°. To calculate the exterior angle of any regular polygon, we use the following formula:

Exterior Angle = 360° ÷ number of sides.

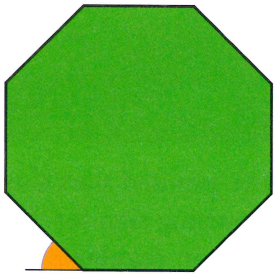
The figure below shows how to calculate the **exterior angle** for a **regular pentagon**, a **regular hexagon** and a **regular octagon**.



360° ÷ 5 = 72°



360° ÷ 6 = 60°



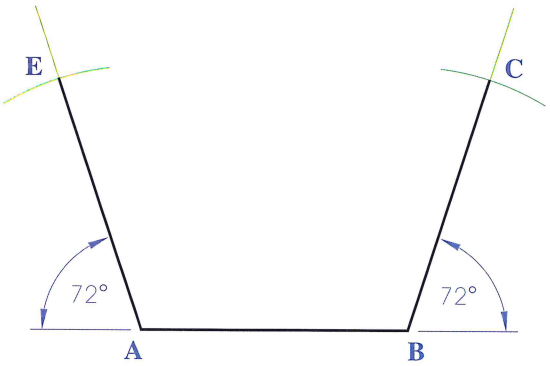
360° ÷ 8 = 45°

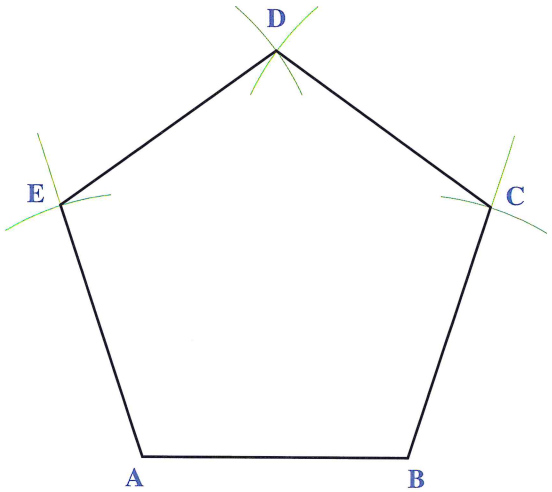
Constructing a Regular Pentagon

Example
Construct a **regular pentagon** of side 90 mm.

A **regular pentagon** has five equal sides and five equal angles.

The **exterior angle** for a regular pentagon is 360° ÷ 5 = 72°.

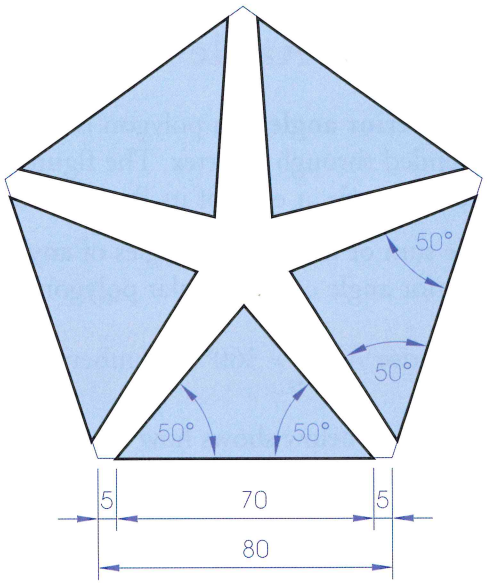




1. Draw the base AB of length 90 mm.
2. Using a protractor, draw 72° lines at A and B. Mark off the two sides AE and BC of length 90 mm from A and B, respectively.
3. Swing arcs of radius 90 mm from C and E to locate the fifth vertex D. Join CD and ED to give the remaining two sides of the regular pentagon.

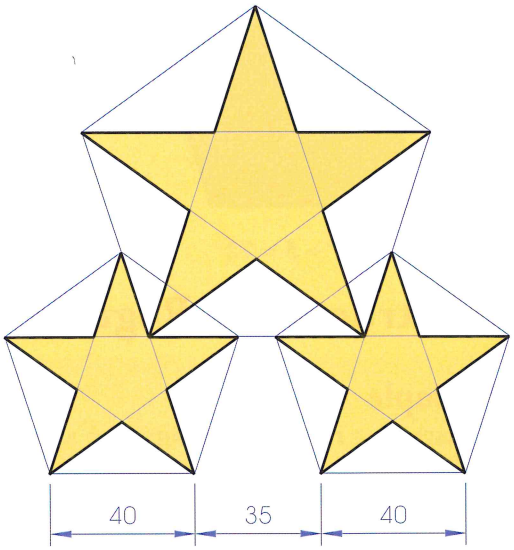
Exercises

1. A drawing of the **Chrysler Corporation** logo is shown in the figure across. The design, called a **pentastar**, is based on a **regular pentagon** with 80 mm sides. The badge also contains five identical **isosceles triangles**. Copy the drawing.



2. The five-pointed stars shown in the figure across are part of an advertising sign for the **Winning Streak** game show. They are based on **regular pentagons**.

Draw the design showing all construction lines.



3. A drawing of the **Four Star Pizza** emblem is shown in the figure below. The design is based around a **regular pentagon** of side 40 mm. Draw the sign as shown.