YEAR 8 · GEOMETRY

Interior and Exterior Angles of Polygons

Calculate angle sums and missing angles in regular and irregular polygons.

Name: _____ Date: _____

Useful facts for your working

Interior angle sum **$(n - 2) \times 180°$**

Regular polygon: **sum ÷ number of sides**

Exterior angles total **360°**
Interior + exterior = **180°**

1 Angle sums

Work out the sum of the interior angles. Show your calculation.

a) A heptagon (7 sides)

b) A decagon (10 sides)

2 Regular polygons

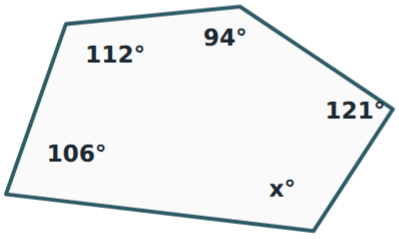
a) A regular octagon: calculate each interior angle, then its exterior angle.

b) A regular 12-sided polygon: calculate each exterior angle.

3 Find the missing interior angle

The diagram shows an irregular pentagon. Find **x**.

Diagram not to scale.



Working:

4 Exterior angles in an irregular polygon

One exterior angle at each vertex of an irregular hexagon is shown below.

58°, 71°, 64°, 49°, 82°, x°

a) Use the exterior angle sum to find **x**.

b) Find the interior angle at the vertex with exterior angle **x**.

5 Work backwards

Each interior angle of a regular polygon is **156°**.

a) Calculate each exterior angle.

b) How many sides does the polygon have?

6 Another regular polygon

A regular polygon has 18 sides. Calculate each exterior angle and each interior angle.

Exterior angle: _____

Interior angle: _____

Show your working:

☐ Final check: have you shown your working and included the degree symbol (°) with every angle?