Unit 14 · Plane Figures

HARDER PRACTICE QUESTIONS

Full marks 31

Write your answers on separate paper. Show your working, and give a reason for each step. Draw a figure where it helps.

1 From one angle to the polygon [3]

Each interior angle of a regular polygon is 5 times each exterior angle.

i. Find each exterior angle.
ii. How many sides has the polygon?
iii. Find the sum of its interior angles.

2 Is it possible? [3]

Give a reason for each.

i. A regular polygon with each interior angle 100°.
ii. A polygon whose interior angles add up to 1,000°.
iii. A polygon whose interior angles add up to 1,260°.

3 One isosceles inside another [3]

In $\triangle ABC$, $AB = AC$ and $\angle BAC = 40°$. D is a point on AC with $BD = BC$. Find $\angle ABD$.

4 A rhombus with an angle of 120° [4]

Rhombus $ABCD$ has sides of 6 cm and $\angle ABC = 120°$. The diagonals cross at O.

i. What kind of triangle is ABD? Find $\angle ABD$ and BD. (Hint: the diagonals bisect the corner angles.)
ii. Find AC, to one decimal place.
iii. Find the area of the rhombus, to one decimal place.

5 Who am I? [4]

Name the quadrilateral from what its diagonals do.

i. They bisect each other at right angles, and they are equal.
ii. They bisect each other at right angles, and they are not equal.
iii. They bisect each other, not at right angles, and they are equal.
iv. They cross at right angles, and only one of them is bisected.

6 Spot the error [3]

Find the mistake and correct it.

Amisha marked a point inside a hexagon and joined it to all six corners. She wrote: “That makes 6 triangles, so the interior angles of a hexagon add up to $6 \times 180° = 1080°$.”
Why is this too big? Correct it, and check with the formula.

7 Construct it [3]

Construct a parallelogram whose diagonals are 8 cm and 6 cm, with an angle of 60° between them. Say how you started, then measure its sides.

8 In a real setting [4]

A paper kite is built on two sticks that cross at right angles. The long stick AC is 42 cm and the short stick BD is 32 cm, and AC cuts BD in half at P. The string round the edge has $AB = AD = 34$ cm. (The kite is made up for the problem.)

i. Find AP.
ii. Find BC, the other side of the kite.
iii. How much string goes round the edge?
iv. How much paper covers the kite?

9 Think [2]

Nima walks round a five-sided field, not a regular one, turning left at each corner, until he is back where he began, facing the way he started. Explain why the turns add up to 360°, whatever the shape. What does this tell you about exterior angles?

10 Make your own [2]

Make up five different whole-number angles, all less than 180°, that could be the interior angles of a pentagon. Show that they work. Then find the five exterior angles and show that they add up to 360°.