

4.1 Angles, parallel lines and polygons

Name: _____ Class: _____ Date: _____ **Total: 23 marks**

KEY WORDS corresponding angles • regular polygon

Angles, parallel lines and polygons

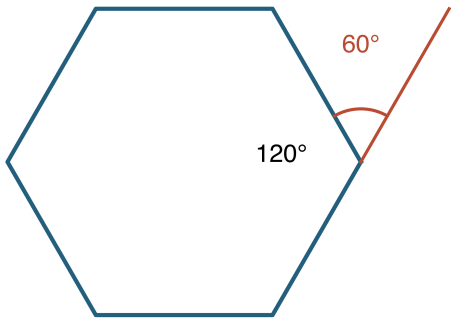
Objective

Use angle facts at a point, on a line and between parallel lines with stated reasons, and derive and use polygon angle sums, including regular polygons (rows G1–G3).

1 Key knowledge and worked examples

Angle facts and polygons. Angles at a point sum to 360° , on a line 180° ; vertically opposite angles are equal; with parallel lines, corresponding and alternate angles are equal and co-interior angles sum to 180° . A triangle sums to 180° ; an n -sided polygon splits into $n - 2$ triangles, so its interior sum is $(n - 2) \times 180^\circ$ and each exterior turn of a regular polygon is $\frac{360^\circ}{n}$.

Regular hexagon: interior 120° , exterior 60°



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 Two angles on a straight line: one is 112° . Find the other, and state the size of the angle vertically opposite the 112° one. [2]

2.2 With parallel lines, one corresponding angle is 68° . Write down the other, naming the angle fact used. [2]

2.3 Show that the interior angle sum of a pentagon is 540° . [2]

2.4 Find the interior angle of a regular hexagon. [2]

2.5 A regular polygon has an exterior angle of 45° . How many sides has it? [3]

2.6 A triangle has angles 54° and 61° . Find the third angle. [2]

3 Exam-style questions

3.1 (Original.) Two parallel lines are cut by a transversal; one angle is 74° . Find the other three angles at the crossing, giving a reason for each. [4]

3.2 (Original.) The interior angle of a regular polygon is 156° . Work out the number of sides. [3]

3.3 (Original.) Three angles around a point are in the ratio $2 : 3 : 4$. Find the size of the largest angle. [3]