

4.1.2 Angle Reasoning

Name: _____ Class: _____ Date: _____

KEY WORDS corresponding angles

<!-- Session 2 native-skill companion -->

Objective

Practise angle reasoning within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Angle facts and polygon reasoning · Foundation

Angles around one point sum to 360° ; angles on a straight line sum to 180° ; vertically opposite angles are equal. When the crossed lines are parallel, corresponding and alternate angles are equal and co-interior angles sum to 180° . A triangle has angle sum 180° . Split an n -sided polygon into $n-2$ triangles to derive its interior sum $(n-2) \times 180^\circ$.

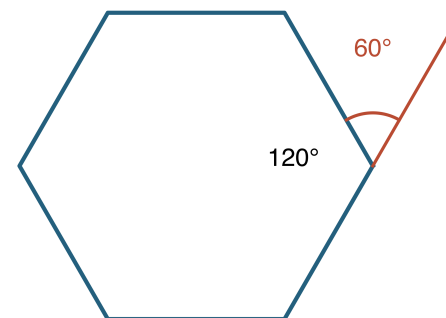
$$S_n = (n - 2)180^\circ, \quad E_{\text{regular}} = \frac{360^\circ}{n}$$

If a straight-line angle is 68° , its neighbour is 112° ; its vertically opposite angle is 68° . A parallel-line corresponding angle is also 68° , with the reason named. Drawing a line through a triangle vertex parallel to the opposite side transfers its two base angles by alternate-angle equality; the three angles then form a straight line and sum to 180° . A pentagon splits into three triangles, giving 540° . A regular hexagon has total 720° , each interior angle 120° and each exterior turn 60° . Exterior turns of a convex polygon sum to one full turn, 360° ; a regular polygon with turn 45° has eight sides.

Corresponding/alternate equalities require parallel lines. Name the theorem rather than using informal letter-shape labels. An interior angle is not the same as an exterior turning angle.

AQA G3/G6 expects reasons and derivations. Mark the given parallelism, identify the angle positions and build a chain of justified equalities rather than reading angles from a sketch.

Regular hexagon: interior 120° , exterior 60°



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

2 Practice

2.1 (Foundation) Find the straight-line neighbour of 68° .

2.2 (Foundation) Find the interior-angle sum of a pentagon.

2.3 (Foundation) Find one exterior angle of a regular hexagon.

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: Corresponding angles are equal even when the crossed lines are not parallel.

Solutions

2.1 $180-68=112^\circ$.

2.2 $(5-2)\times 180=540^\circ$.

2.3 $360/6=60^\circ$.

3.1 False. A horizontal transversal can meet one line at 60° and a second at 70° . Corresponding angles differ; parallelism is required for the equality theorem.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.