

C4.6 Angles

Name: _____ Class: _____ Date: _____ **Total: 20 marks**

KEY WORDS vertically opposite angles 对顶角 • parallel 平行 • quadrilateral 四边形
• triangle 三角形 • polygon 多边形

Objective

Use angles to solve Core IGCSE Mathematics problems.

You must be able to:

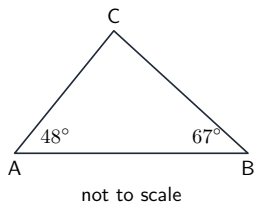
- Use angle sums and straight-line or point facts
- Recognise corresponding, alternate and co-interior angles
- Find regular polygon angles and give geometrical reasons

1 Key knowledge and worked examples

■ **Key knowledge: Angles**

Angles on a straight line sum to 180° ; at a point, 360° . Vertically opposite angles are equal. A triangle sums to 180° , a quadrilateral to 360° . With parallel lines, corresponding and alternate angles are equal; co-interior angles sum to 180° . Give the geometric reason with each result. For an n -gon, interior sum is $(n - 2)180^\circ$; regular exterior angle is $360^\circ/n$.

■ **Worked example: Angles**



A triangle has angles 48° and 67° .

- Triangle sum: $C = 180 - 48 - 67 = 65^\circ$.
- Its adjacent exterior angle: $E = 180 - 65 = 115^\circ$, using a straight line.
- A regular hexagon has $e = 360/6 = 60^\circ$ and interior $i = 180 - 60 = 120^\circ$.
- A co-interior partner of 72° is $b = 180 - 72 = 108^\circ$.

■ **Method check**

Name the angle fact that connects the unknown to the given angle. Parallel-line rules apply only when the lines are known to be parallel.

2 Practice

2.1 An angle on a straight line is 124° . Find the adjacent angle and give a reason. [2]

2.2 Three angles at a point are $95^\circ, 140^\circ, x$. Find x with a reason. [2]

2.3 Parallel lines have co-interior angles 68° and y . Find y with a reason. [2]

2.4 Find each interior angle of a regular decagon. [2]

3 Exam-style questions

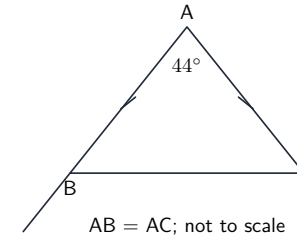
3.1 Apply the angles methods below. Show working and include units where appropriate.

(a) A regular polygon has exterior angle 45° . Find its number of sides. [2]

(b) Find each interior angle. [2]

(c) Find its total interior angle sum and show that this agrees with the individual angles. [2]

3.2 Triangle ABC is isosceles with $AB = AC$ and angle $BAC = 44^\circ$.



(a) Find angles ABC and ACB. Find the exterior angle at B formed by extending AB past B, giving reasons. [3]

(b) On a separate diagram two parallel lines are cut by a transversal. One angle is 68° . Find an alternate angle and its co-interior partner, naming the facts. [3]
