IGCSE MATHEMATICS • EXERCISE SHEET

E4.6 Angles

Name: _____ Class: _____ Date: _____ **Total: 26 marks**

KEY WORDS polygon 多边形 • angles 角 • co-interior 同旁内角 • alternate 内错角 • corresponding 同位角

Objective

Build the skills to answer Extended exam questions on **angles** 角 — **angles in parallel lines** 平行线中的角, **triangle and quadrilateral** 三角形和四边形 angles, and **polygon** 多边形 angles. Always **give a reason**.

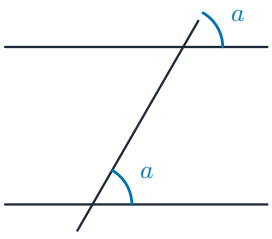
You must be able to:

- use corresponding, alternate and co-interior angles
- use the angle sums of triangles and quadrilaterals
- find interior and exterior angles of a regular polygon

1 Worked examples

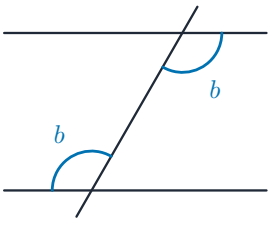
Angle facts

Corresponding (F)



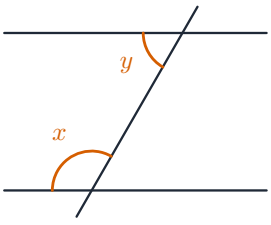
equal

Alternate (Z)



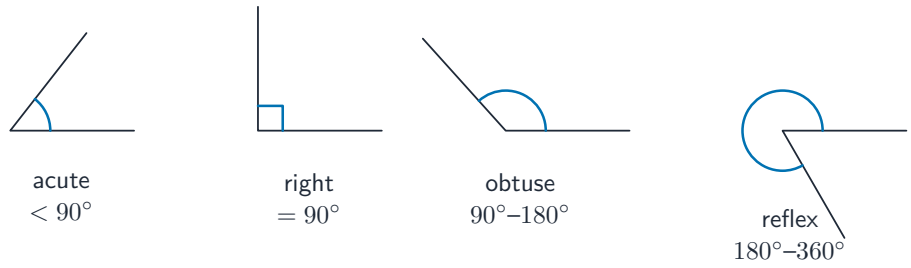
equal

Co-interior (C)



$x + y = 180°$

Give the correct reason, not just the number



The basic types of angle

- Angles on a line = 180°; at a point = 360°; **vertically opposite** 对顶角 equal.
- **Corresponding** 同位角 (F) and **alternate** 内错角 (Z) angles equal; **co-interior** 同旁内角 (C) add to 180°.
- Polygon: sum of interior angles = $(n-2)\times 180°$; exterior angles sum to 360°.
- **Worked:** regular hexagon — exterior = $\frac{360}{6} = 60°$, interior = 120°.

Answer shapes: **M1** a correct method, **A1** the correct answer.

2 Practice

2.1 Three angles on a straight line are x, 55° and 65°. Find x. [2]

2.2 A triangle has angles x, $2x$ and 60°. Find x. [2]

2.3 Find the exterior angle of a regular pentagon. [2]

3 Exam-style questions

3.1 A line crosses two parallel lines. One angle is 72°. Find the co-interior angle, giving a reason. [2]

3.2 Find the size of each interior angle of a regular octagon. [3]

3.3 The interior angle of a regular polygon is 156°. Find the number of sides. [3]

3.4 In the diagram, PQ is parallel to RS. A straight line crosses PQ at A and RS at B. The angle between the line and PQ on the upper right at A is $(3x + 10)°$, and the angle between the line and RS on the lower left at B is $(5x - 30)°$.

(a) Explain why these two angles are equal, naming the angle fact you use, and find x. [4]

(b) Find the size of each of the two angles. [2]

(c) A regular polygon has an exterior angle of 24°. Find the number of sides and the sum of its interior angles. [4]

(d) Explain why a regular polygon cannot have an interior angle of 160.5°. [2]