

E4.6 Angles

Name: _____ Class: _____ Date: _____

Total: 14 marks

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

Objective

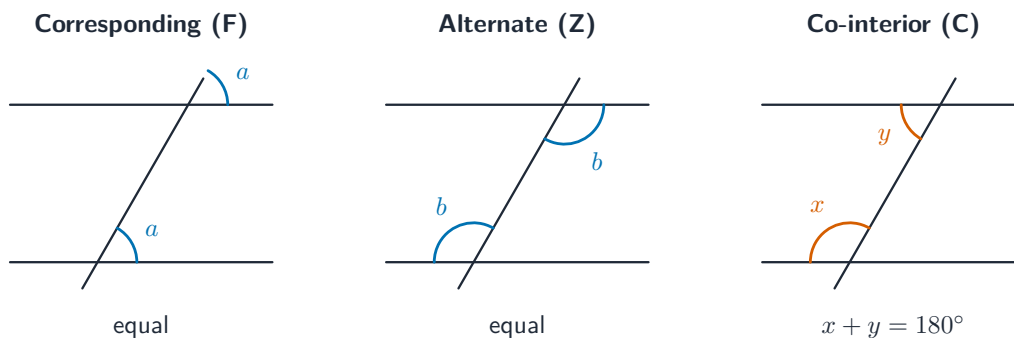
Build the skills to answer Extended exam questions on **angles** 角 — **angles in parallel lines** 平行线中的角, **triangle and quadrilateral** 三角形和四边形 angles, and **polygon** 多边形 angles. Always **give a reason**.

You must be able to:

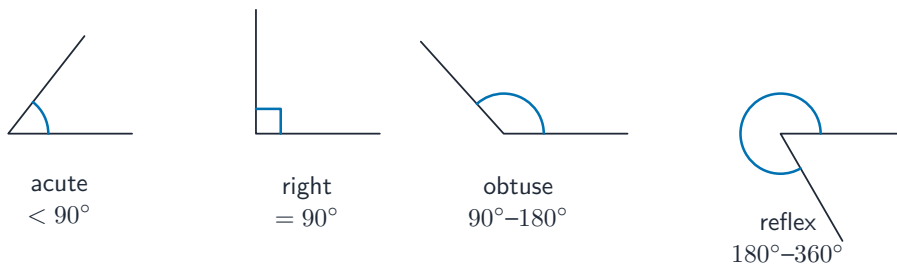
- use corresponding, alternate and co-interior angles
- use the angle sums of triangles and quadrilaterals
- find interior and exterior angles of a regular polygon

1 Worked examples

■ Angle facts



Give the correct reason, not just the number



The basic types of angle

- Angles on a line $= 180^\circ$; at a point $= 360^\circ$; **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 $= (n - 2) \times 180^\circ$; exterior angles sum to 360° .
- **Worked:** regular hexagon — exterior $= \frac{360}{6} = 60^\circ$, interior $= 120^\circ$.

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]

Solutions

Marking: **M1** a correct method, **A1** the correct answer.

2.1 $x + 55 + 65 = 180 \rightarrow x = 60^\circ$.

2.2 $x + 2x + 60 = 180 \rightarrow 3x = 120 \rightarrow x = 40^\circ$.

2.3 exterior angle $= \frac{360^\circ}{5} = 72^\circ$.

3.1 co-interior angle $= 180 - 72 = 108^\circ$ (reason: co-interior angles add to 180°).

3.2 exterior angle $= \frac{360}{8} = 45^\circ \rightarrow$ interior $= 180 - 45 = 135^\circ$.

3.3 exterior angle $= 180 - 156 = 24^\circ$; number of sides $= \frac{360}{24} = 15$.