

Exercise walk-through

Angles ■ E4.6

eXercise

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

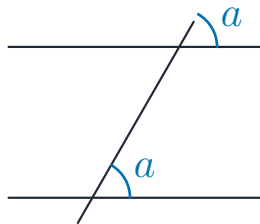
Method — Angle facts

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

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

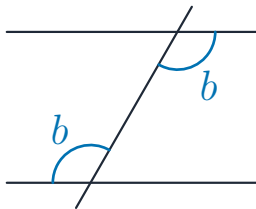
Method — Angle facts

Corresponding (F)



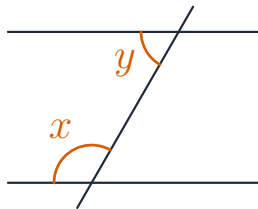
equal

Alternate (Z)



equal

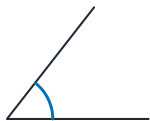
Co-interior (C)



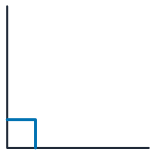
$$x + y = 180^\circ$$

Corresponding (F) and alternate (Z) angles are equal; co-interior (C) add to 180°

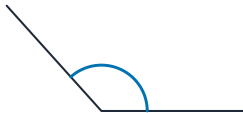
Method — Angle facts



acute
 $< 90^\circ$



right
 $= 90^\circ$



obtuse
 $90^\circ - 180^\circ$



reflex
 $180^\circ - 360^\circ$

The basic types of angle

Practice 2.1 ■ 2 marks

Three angles on a straight line are x , 55° and 65° . Find x .

Solution 2.1

Method: Angle facts

Worked steps

$$x + 55 + 65 = 180 \rightarrow x = 60^\circ$$
 M1 **A1** *for the equation; for 60° .*

Practice 2.2 ■ 2 marks

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

Solution 2.2

Method: Angle facts

Worked steps

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

M1 **A1** for $3x = 120$; for 40° .

Practice 2.3 ■ 2 marks

Find the exterior angle of a regular pentagon.

Solution 2.3

Method: Angle facts

Worked steps

$$\text{exterior angle} = \frac{360^\circ}{5} = 72^\circ \quad \text{M1} \quad \text{A1} \quad \text{for } \frac{360}{5}; \text{ for } 72^\circ.$$

Exam-style 3.1 ■ 2 marks

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

Solution 3.1

Method: Angle facts

Worked steps

co-interior angle $= 180 - 72 = 108^\circ$ (reason: co-interior angles add to 180°) **M1** **A1**
for $180 - 72$; for 108° with reason.

Exam-style 3.2 ■ 3 marks

Find the size of each interior angle of a regular octagon.

Solution 3.2

Method: Angle facts

Worked steps

exterior angle = $\frac{360}{8} = 45^\circ \rightarrow$ interior = $180 - 45 = 135^\circ$ **M1** **M1** **A1** for $\frac{360}{8}$; for $180 - \text{exterior}$; for 135° .

Exam-style 3.3 ■ 3 marks

The interior angle of a regular polygon is 156° . Find the number of sides.

Solution 3.3

Method: Angle facts

Worked steps

exterior angle = $180 - 156 = 24^\circ$; number of sides = $\frac{360}{24} = 15$ **M1** **M1** **A1** *for the exterior angle; for $\frac{360}{24}$; for 15.*