

Properties of Geometrical Figures – Worked Examples

Key Facts & Angle Rules

- Angle sum on a straight line = 180° ; around a point = 360° .
- Vertically opposite angles are equal.
- In parallel-line diagrams *corresponding*, *alternate* angles equal; co-interior (allied) angles sum to 180° .
- Triangle interior sum = 180° ; exterior angle = sum of two remote interior angles.
- Isosceles triangle: base angles equal; sides opposite equal angles.
- Quadrilateral interior sum = 360° .
- Regular n -gon interior angle = $\frac{(n-2)180^\circ}{n}$.

Example 1 Complementary / Supplementary

Angles forming a straight line are x° and 52° .

$$x + 52 = 180 \Rightarrow x = \boxed{128^\circ}$$

Example 2 Vertically Opposite

Two intersecting lines give one angle 68° . Opposite angle = $\boxed{68^\circ}$.

Example 3 Parallel Lines – Corresponding

Transversal cuts parallel lines. If the top corresponding angle is 41° , then all corresponding angles equal \rightarrow bottom corresponding angle = $\boxed{41^\circ}$.

Example 4 Alternate Interior

In the same diagram, co-interior angle on the inside is x .

$$x + 41 = 180 \Rightarrow x = \boxed{139^\circ}$$

Example 5 Triangle Angle Sum

Triangle with angles 45° , 58° , y .

$$y = 180 - (45 + 58) = \boxed{77^\circ}$$

Example 6 Exterior Angle of Triangle

At vertex C exterior angle 120° ; interior opposite $A = 47^\circ$. Third interior $B = 120 - 47 = \boxed{73^\circ}$.

Example 7 Isosceles Triangle

Triangle ABC with $AB = AC$ and $\angle B = 64^\circ$. Base angles equal $\angle C = 64^\circ$. $\angle A = 180 - 64 - 64 = \boxed{52^\circ}$.

Example 8 Quadrilateral Angle Sum

Quadrilateral has angles $92^\circ, 110^\circ, 88^\circ, x$.

$$x = 360 - (92 + 110 + 88) = \boxed{70^\circ}$$

Example 9 Regular Pentagon Interior Angle

$$n = 5: \frac{(5 - 2)180^\circ}{5} = 108^\circ \boxed{108^\circ}.$$

Example 10 Interior Angle of a Regular n -gon Given Exterior

$$\text{Exterior angle} = 24^\circ \Rightarrow n = \frac{360}{24} = 15. \text{ Interior} = 180 - 24 = \boxed{156^\circ}.$$