Angles formed when a transversal cuts two parallel lines

Understanding: Angles Formed When a Transversal Cuts Two Parallel Lines

- A transversal is a line that cuts two or more lines at different points.
- When a transversal cuts two parallel lines, it forms 8 angles.
- These angles have special relationships and names.

Types of Angles Formed

- Corresponding Angles: Lie on the same side of the transversal, one interior and one exterior, equal in measure (∠1 = ∠5, ∠2 = ∠6, ∠3 = ∠7 and ∠4 = ∠8.)
- Alternate Interior Angles: Inside the parallel lines but on opposite sides of the transversal, equal in measure (∠3 = ∠5 and ∠4 = ∠6.)
- Alternate Exterior Angles: Outside the parallel lines but on opposite sides of the transversal, equal in measure (∠1 and ∠7, ∠2 and ∠8)



 Co-Interior Angles (Consecutive Interior Angles): Inside the parallel lines on the same side of the transversal, sum = 180° (∠3 + ∠6 = 180° and ∠4 + ∠5 = 180°)

Examples with Solutions

Example

One corresponding angle is 65°. Find its matching angle

• Corresponding angles are equal → angle = 65°

Example

If one alternate interior angle is 75°, what is the value of the other alternate interior angle?

• Alternate interior angles are equal \rightarrow angle = 75°

Example

If one co-interior angle is 110°, what is the other co-interior angle?

Sum = 180° , so the other angle = $180^\circ - 110^\circ = 70^\circ$

• Co-interior angle = 70°

Example

One alternate exterior angle is 45°. Find its pair

• Alternate exterior angles are equal \rightarrow angle = 45°

Example

Two lines are cut by a transversal, and one of the vertically opposite angles is 90°. Find its opposite angle

• Vertically opposite angles are equal → angle = 90°

Summary Points

- A transversal forms 8 anglers with 2 parallel lines.
- Corresponding, alternate interior, and alternate exterior angles are equal.
- Co-interior angles are supplementary (add up to 180°).
- Vertically opposite angles are always equal.
- These angle relationships help solve many geometry problems easily.