

Triangles – Congruence Theorems

CBSE Class 9 Maths · Knowledge organiser

KEY DEFINITIONS

Congruent triangles

Triangles with all three sides and all three angles equal, so one fits exactly on the other.

SAS

Two sides and the angle between them are equal, so the triangles are congruent.

CPCT

Corresponding parts of congruent triangles are equal.

KEY FORMULAS

Congruence: SSS, SAS, ASA/AAS, RHS (not SSA, not AAA); then CPCT. $\triangle ABC \cong \triangle PQR$: $A \leftrightarrow P$, $B \leftrightarrow Q$, $C \leftrightarrow R$

Isosceles: equal sides $\Leftrightarrow$ equal opposite angles; median to the base $\perp$ base and bisects the vertex angle

"If P then Q ": converse "if Q then P "; one counterexample disproves

WORKED EXAMPLE

$\triangle ABC \cong \triangle LMN$ with $\angle A = 40^\circ$ and $\angle B = 75^\circ$. Find $\angle N$.

N corresponds to C : $\angle N = \angle C = 180^\circ - 40^\circ - 75^\circ = 65^\circ$.

YOU SHOULD BE ABLE TO...

- Match the parts of congruent triangles, name the congruence rules and write converses and counterexamples.
- Prove short results with SAS, SSS, ASA, AAS and RHS and use the isosceles-triangle theorems.
- Write complete congruence proofs and explain why a triangle is rigid.
- Explain why SSA fails, test several converses at once and repair a false converse.

COMMON MISTAKES

- ✗ Using SSA (or AAA) as a congruence condition.
- ✗ Writing the congruence in the wrong order, so CPCT pairs the wrong sides.
- ✗ Using SAS when the angle is not between the two sides.
- ✗ Assuming a converse is true because the original statement is true.