

Class-IX TRIANGLES

A. Introduction

Scalene triangle: All side lengths are of different measures. The interior angles are also different.

Isosceles triangle: The lengths of two sides are equal. The angles opposite the equal sides are also equal.

Equilateral triangle: All the lengths of the sides are equal. The angles are also equal, 60 degrees each.

Acute angled triangle: All the three interior angles are acute i.e, less than 90 degrees.

Obtuse angled triangle: One of the interior angles has a measure greater than 90 degrees.

Right angled triangle : One of the interior angles is 90 degrees. The side opposite to the right angle will be the longest side and is called the hypotenuse.

-- Right isosceles triangle has two equal sides with one of the interior angles being 90 degrees.

B. Congruence of Triangles

Congruent figures: The figures whose shapes and sizes are both the same. It means equal in all respects.

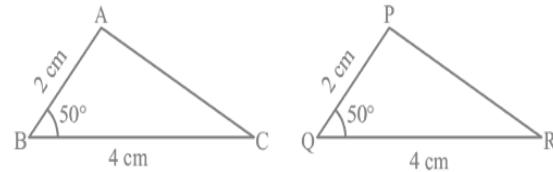
-- Two circles of the same radii are congruent. Two squares of the same sides are congruent.

-- Two triangles are congruent if the sides and angles of one triangle are equal to the corresponding sides and angles of the other triangle If two triangles ABC and PQR are congruent then symbolically, it is expressed as $\Delta ABC \cong \Delta PQR$.

-- In congruent triangles corresponding parts are equal, we write in short 'CPCT' for corresponding parts of congruent triangles.

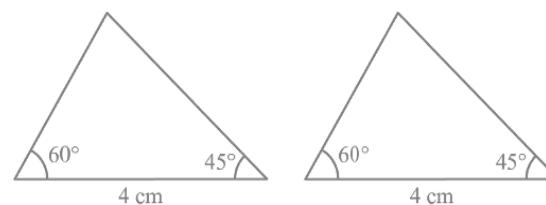
C. Criteria for Congruent Triangles

Axiom. (SAS congruence rule) : Two triangles are congruent if two sides and the included angle of one triangle are equal to the two sides and the included angle of the other triangle.



SAS congruence rule holds but not ASS or SSA rule.

Theorem (ASA congruence rule) : Two triangles are congruent if two angles and the included side of one triangle are equal to two angles and the included side of other triangle.



Also two triangles are congruent if any two pairs of angles and one pair of corresponding sides are equal. It is called AAS Congruence Rule.

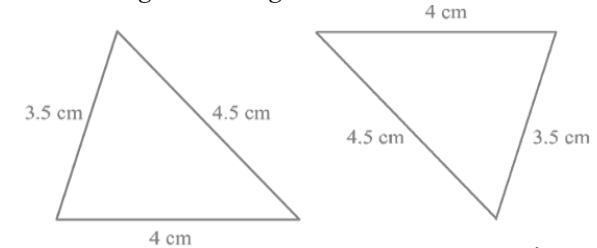
D. Some Properties of Triangle

Theorem : Angles opposite to equal sides of an isosceles triangle are equal.

Theorem : The sides opposite to equal angles of a triangle are equal.

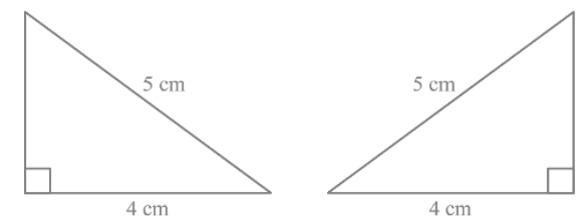
E. Some more Criteria for Congruence of Triangles

Theorem (SSS congruence rule) : If three sides of one triangle are equal to the three sides of another triangle, then the two triangles are congruent.



Theorem (RHS congruence rule) : If in two right triangles the hypotenuse and one side of one triangle are equal to the hypotenuse and one side of the other triangle, then the two triangles are congruent.

Note that RHS stands for Right angle - Hypotenuse - Side.



F. Inequalities in a Triangle

Theorem : If two sides of a triangle are unequal, the angle opposite to the longer side is larger (or greater).

Theorem : In any triangle, the side opposite to the larger (greater) angle is longer.

Theorem : The sum of any two sides of a triangle is greater than the third side.