

Class 10 Maths

Chapter 6: Triangles

1. Congruent vs. Similar Figures

- **Congruent Figures:** Two figures are said to be congruent if they have the same shape and the same size.
- **Similar Figures:** Two figures are said to be similar if they have the same shape, but not necessarily the same size. (Note: All congruent figures are similar, but the similar figures need not be congruent.)
 - Examples of similar figures: All circles are similar, all squares are similar, all equilateral triangles are similar.

2. Similarity of Polygons and Triangles

Two polygons of the same number of sides are similar, if:

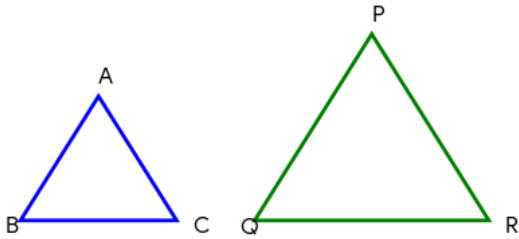
- (i) their corresponding angles are equal, and
- (ii) their corresponding sides are in the same ratio (or proportion).

3. Similarity of Triangles

Two triangles are similar if:

- (i) their corresponding angles are equal, and
- (ii) their corresponding sides are in the same ratio (or proportion).

Similar Triangles: $\triangle ABC \sim \triangle PQR$

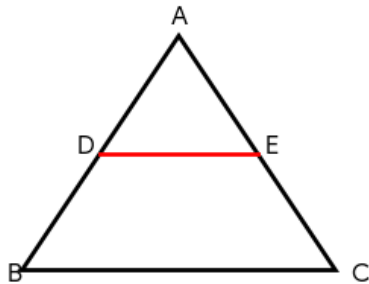


In the figure above, $\triangle ABC$ and $\triangle PQR$ have the same shape (equal angles) but different sizes. Therefore, they are similar.

3. Basic Proportionality Theorem (BPT) / Thales Theorem

Statement: If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

Basic Proportionality Theorem (Thales Theorem)



In $\triangle ABC$, if a line DE is parallel to BC and intersects AB at D and AC at E , then:

$$AD / DB = AE / EC$$

4. Converse of Basic Proportionality Theorem

Statement: If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.

5. Criteria for Similarity of Triangles

1. AAA (Angle-Angle-Angle) Similarity:

If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio (or proportion) and hence the two triangles are similar.

Note (AA Similarity): If two angles of one triangle are respectively equal to two angles of another triangle, then the two triangles are similar.

2. SSS (Side-Side-Side) Similarity:

If in two triangles, sides of one triangle are proportional to (i.e., in the same ratio of) the sides of the other triangle, then their corresponding angles are equal and hence the two triangles are similar.

3. SAS (Side-Angle-Side) Similarity:

If one angle of a triangle is equal to one angle of the other triangle and the sides including these angles are proportional, then the two triangles are similar.