

Chapter-06

Triangles

- **Similar Triangles:** Two triangles are said to be similar if their corresponding angles are equal and their corresponding sides are proportional.
- All congruent figures are similar but the converse is not true.
- Two polygons with same number of sides are similar, if
 - (i) Their corresponding angles are equal and
 - (ii) Their corresponding sides are in the same ratio (i.e., proportion).
- Criteria for Similarity: in $\triangle ABC$ and $\triangle DEF$
 - (i) **AAA Similarity:** $\triangle ABC \sim \triangle DEF$ When $\angle A = \angle D$, $\angle B = \angle E$ and $\angle C = \angle F$
 - (ii) **SAS Similarity:** $\triangle ABC \sim \triangle DEF$ when $\frac{AB}{DE} = \frac{AC}{EF}$ and $\angle B = \angle E$
 - (iii) **SSS Similarity:** $\triangle ABC \sim \triangle DEF$, $\frac{AB}{DE} = \frac{AC}{DF} = \frac{BC}{EF}$
- The proof of the following theorems can be asked in the examination:
 - (i) **Basic Proportionality Theorem:** If a line is drawn parallel to one side of a triangle to intersect the other sides in distinct points, the other two sides are divided in the same ratio.
 - (ii) The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.
 - (iii) **Pythagoras Theorem:** In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.
 - (iv) **Converse of Pythagoras Theorem:** In a triangle, if the square of one side is equal to the sum of the squares of the other two sides then the angle opposite to the first side is a right angle.
- **Right Angled Triangle:**

Key Notes

- (i) If a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse, then the triangles on both sides of the perpendicular are similar to the Whole triangle and also to each other.
- (ii) In the right triangle, the square of the hypotenuse is equal to the sum of the square of the other two sides (Pythagoras Theorem).
- (iii) If in a triangle, square of one side is equal to the sum of the squares of the other two sides, then the angle opposite to the first side is a right angle.
- **Thales Theorem:** If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio (Basic Proportionality Theorem or Thales Theorem).
- If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.

