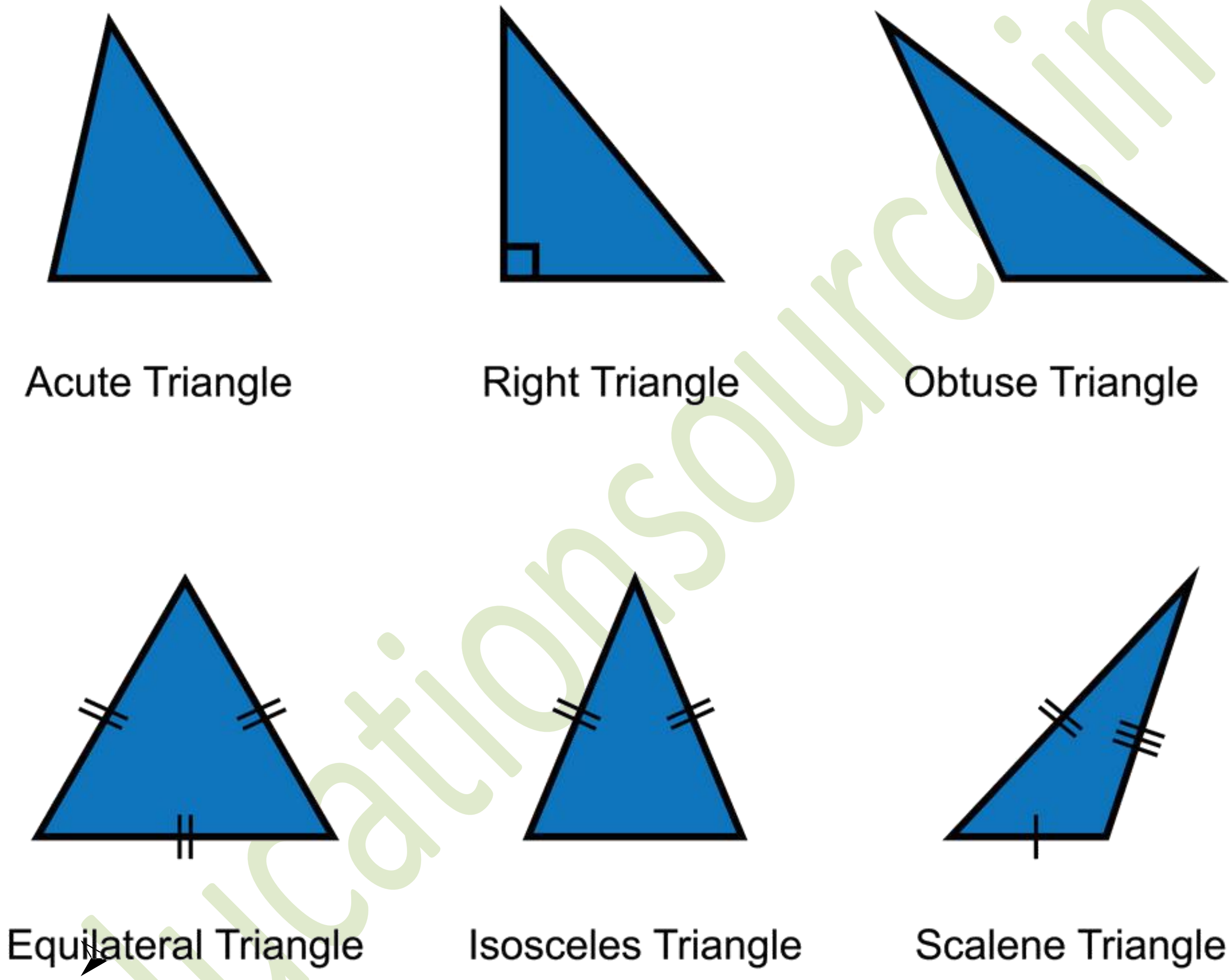
Formula
TRIANGLES
Class: - 10th

- **Type of triangles: -**

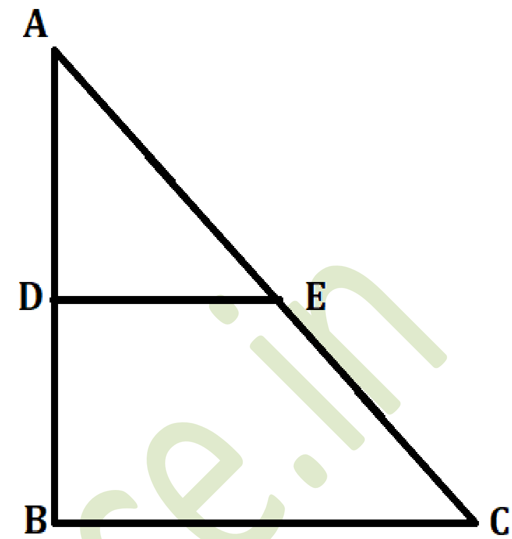


- **Similar Polygons**: - Two polygons of the same number of sides are similar, if (i) their corresponding angles are equal and (ii) their corresponding sides are in the same ratio (or proportion).

- **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).

1. **Theorem 6.1: -** 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.

$$\frac{AD}{DB} = \frac{AE}{EC}$$

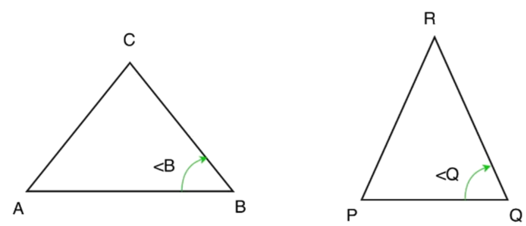


2. **Theorem 6.2: -** If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.

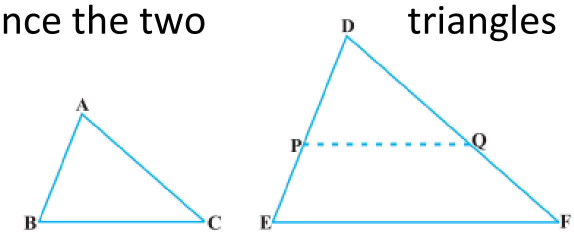
$$\frac{AD}{DB} = \frac{AE}{EC}$$

➢ **Criteria for Similarity of Triangles: -**

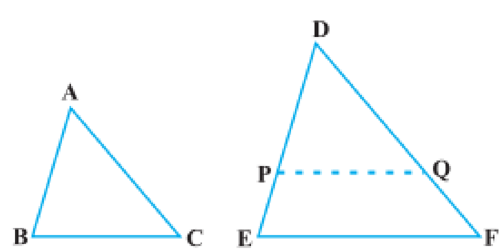
3. **Theorem 6.3: -** If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio (or proportion) and hence the two triangles are similar.
   This criterion is referred to as the AAA (Angle–Angle–Angle) criterion of similarity of two triangles.



4. **Theorem 6.4:** If in two triangles, sides of one triangle are proportional to the sides of the other triangle (i.e., in the same ratio of), then their corresponding angles are equal and hence the two triangles are similar.
   This criterion is referred to as the SSS (Side–Side–Side) similarity criterion for two triangles.

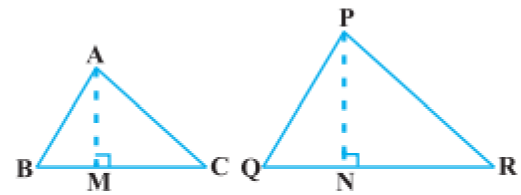


5. **Theorem 6.5:** If one angle of a triangle is equal to one angle of the other triangle and the sides including these angles are proportional, then the two triangles are similar.



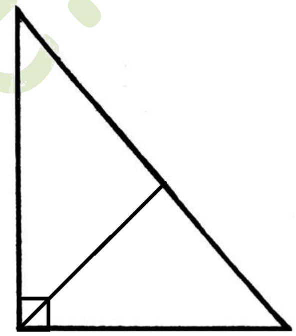
This criterion is referred to as the SAS (Side–Angle–Side) similarity criterion for two triangles.

6. **Theorem 6.6:** The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

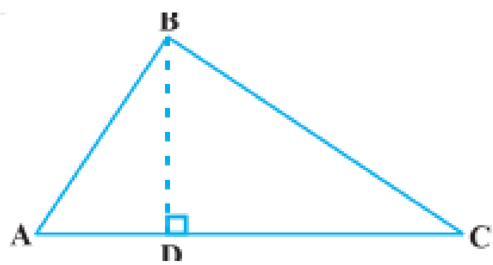


$$\frac{ar\ (ABC)}{ar\ (PQR)} = \left(\frac{AB}{PQ}\right)^2 = \left(\frac{BC}{QR}\right)^2 = \left(\frac{CA}{RP}\right)^2$$

7. **Theorem 6.7:** If a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse, then triangles on both sides of the perpendicular are similar to the whole triangle and to each other.



8. **Theorem 6.8:** In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.



$AC^2 = AB^2 + BC^2$

AC = Hypotenuse(H)

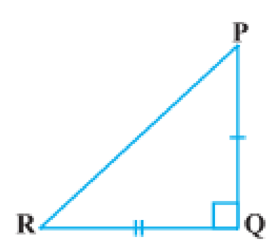
AB = Base(B)

BC = Perpendicular(P)

i.e., $(\text{Hypotenuse})^2 = (\text{Base})^2 + (\text{Perpendicular})^2$

$$(H)^2 = (B)^2 + (P)^2$$

9. **Theorem 6.9:** In a triangle, if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle.



If $(PR)^2 = (PQ)^2 + (QR)^2$

i.e., $\angle PQR = 90^o$