📘 Chapter 6: Triangles – Easy Notes

1. What are Similar Figures?

- **Congruent figures** = Same shape and **same size**
- **Similar figures** = Same shape but **not necessarily same size**

Examples:

- All circles are similar
- All squares are similar
- All equilateral triangles are similar
- A square and a rhombus are **not** similar

2. Conditions for Similarity of Polygons

Two polygons are **similar** if:

1. Their corresponding angles are **equal**
2. Their corresponding sides are in the **same ratio**

3. Similarity of Triangles

Two triangles are similar if:

1. Their corresponding angles are equal
2. Their corresponding sides are in the same ratio

This leads to **three criteria for similarity:**

4. Criteria for Similarity of Triangles

A. **AAA or AA Criterion (Angle-Angle-Angle)**

If two angles of one triangle are equal to two angles of another triangle, the triangles are similar.

B. **SSS Criterion (Side-Side-Side)**

If all three sides of one triangle are in the same ratio as the three sides of another triangle, the triangles are similar.

C. **SAS Criterion (Side-Angle-Side)**

If one angle is equal and the sides including that angle are in the same ratio, then the triangles are similar.

5. Basic Proportionality Theorem (BPT / Thales' Theorem)

Statement:
 If a line is drawn parallel to one side of a triangle and intersects the other two sides, it divides those two sides **in the same ratio.**

Example:
 If DE || BC in triangle ABC, then:
AD / DB = AE / EC

6. Converse of BPT

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

7. Applications and Word Problems

- Use triangle similarity to:
    - Prove two triangles are similar
    - Find lengths of unknown sides
    - Solve height and shadow problems
    - Prove properties using medians, bisectors, or altitudes

8. RHS Similarity (Special Case)

In **right triangles**, if the hypotenuse and one side of one triangle are **proportional** to the hypotenuse and one side of another triangle, then the triangles are **similar** (Right angle–Hypotenuse–Side).

9. Summary for Quick Revision

Concept	Key Idea
Similar figures	Same shape, not necessarily same size
Triangle similarity	Angle–Angle, Side–Side–Side, Side–Angle–Side
BPT (Thales' Theorem)	Parallel line divides other two sides in same ratio
Converse of BPT	Equal ratio ⇒ line is parallel
RHS Similarity	In right triangles, hypotenuse & one side are in same ratio
Symbol for similarity	ΔABC ~ ΔDEF