Creata
ADDING CREATIVITY TO LEARNING

Visit us at www.CreataClasses.com

Contact us: Admin@CreataClasses.com

"CLASS 10th"

TRIANGLES

FORMULA/CONCEPT LIST

1. Similarity

Two figures, having the same shape but not necessary the same size are called similar figures.

Congruent figures have same shape & same size.

All congruent figures are similar, but all similar figures are not congruent.

	Congruency	Similarity
Same Shape	✓	✓
Same Size	✓	

Geometrical figures which are always similar:

1. **Circle**: All circles are similar to each other.
2. **Square**: All squares are similar to each other.
3. **Equilateral** Triangle: All equilateral triangles are similar to each other.

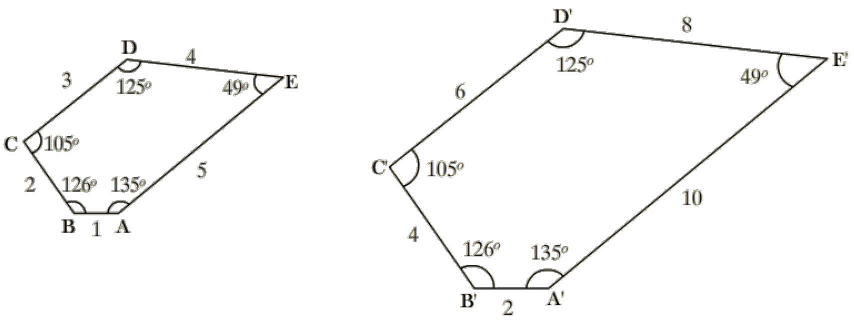
2. Similarity of Polygons

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).

Example:



Here both the figures are similar to each other because our both the conditions are satisfying.

(i) **Corresponding angles** are equal

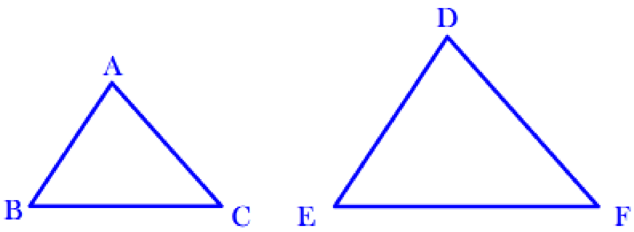
$\angle A = \angle A'$; $\angle B = \angle B'$; $\angle C = \angle C'$; $\angle D = \angle D'$; $\angle E = \angle E'$

(ii) **Corresponding sides** are in the same ratio (or proportional)

$$\frac{AB}{A'B'} = \frac{BC}{B'C'} = \frac{CD}{C'D'} = \frac{DE}{D'E'} = \frac{AE}{A'E'} = \frac{1}{2}$$

3. Similarity of Triangles

Triangles are also a type of polygons, so same condition of polygon similarities are also applicable to triangles.



Two triangles are similar, if:

(i) their **corresponding angles** are equal and

$\angle A = \angle D$; $\angle B = \angle E$; $\angle C = \angle F$

(ii) their **corresponding sides** are in the same ratio (or proportion).

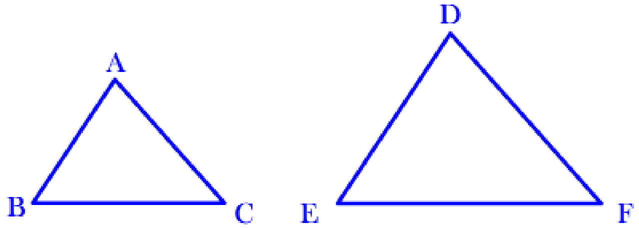
$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$

$\sim$ is the symbol of similarities.

Note: It must be noted that, as done in the case of congruency of two triangles, the similarity of two triangles should also be expressed symbolically, using correct correspondence of their vertices. For example, for the triangles ABC and DEF of the above fig, we cannot write Δ ABC ~ Δ DFE or Δ BCA ~ Δ DEF. However, we can write Δ ABC ~ Δ DEF. The corresponding vertices should match in order.

4. Criterion for similarity of triangles

Two triangles are similar if either of the following three criteria's are satisfied:



AAA similarity Criterion:

If two triangles have all three angles equal, then the triangles are similar.

If, $\angle A = \angle D$; $\angle B = \angle E$; $\angle C = \angle F$

Then, $\Delta ABC \sim \Delta DEF$

Note: If only two corresponding angles are equal, then also we can say both the triangles are similar. The third angles will automatically be equal to each other because the sum of the angles in a triangle is always 180°. This is **AA (Angle-Angle) criterion**.

SSS Similarity Criterion:

If the corresponding sides of two triangles are proportional (in the same ratio) in length, then the triangles are similar. In other words, if the ratios of the lengths of the three sides of one triangle to the corresponding sides of another triangle are equal, then the triangles are similar.

If, $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

Then, $\Delta ABC \sim \Delta DEF$

SAS Similarity Criterion:

If two sides of one triangle are proportional to two sides of another triangle, and the included angle (the angle between the two sides) is equal in both triangles, then the triangles are similar.

If, $\frac{AB}{DE} = \frac{AC}{DF}$; $\angle A = \angle D$

Then, $\Delta ABC \sim \Delta DEF$

AAA 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.*

SSS Theorem 6.4: *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.*

SAS 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.*

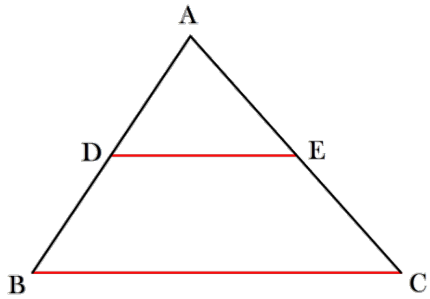
5. BPT (Basic Proportionality Theorem)

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.*

If DE || BC,

Then,

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



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.*

This is converse of BPT.

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

Then,

DE || BC

6. Check out complete chapter triangles class 10th lecture series on YouTube.

All the lectures are created using animation and visual tools, for better learning experience.

The complete series includes following lectures:

1. Introduction to Similarity: https://youtu.be/ugLnjac_fko
2. Ex 6.1: https://youtu.be/ugLnjac_fko
3. BPT Theorem & Similarity of Triangles: https://youtu.be/WbJDqPwoVYw
4. NCERT Example questions on BPT: https://youtu.be/1dGevBu_Erk
5. Ex 6.2 Q1 to Q5: https://youtu.be/f90NpOKFxt8
6. Ex 6.2 Q6 to Q10: https://youtu.be/HFo-lj1XnM4
7. Criteria for similarity of Triangles: https://youtu.be/VP2qDfZns6c

CREATA CLASSES
Admin@CreataClasses.com

8. AAA Theorem proof: https://youtu.be/nLagobeLJSs

9. SSS Theorem proof: https://youtu.be/HMSf8mLG_XE

10. SAS Theorem proof: https://youtu.be/ZqdRRqRFhNk

11. Ex 6.3 Q1 to Q5: https://youtu.be/vBwOKRajiT4

12. Ex 6.3 Q6 to Q10: https://youtu.be/YmB0IRTVpHk

13. Ex 6.3 Q11 to Q16: https://youtu.be/6dyX_gZ-dc4

14. Revision of chapter Triangle: https://youtu.be/Jh44ckk4iqI

NOTES: