

CHAPTER : 6 TRIANGLES

MIND MAPS LEARNING MADE SIMPLE

In $\triangle ABC$, let $DE \parallel BC$. Then,

(i) $\frac{AD}{DB} = \frac{AE}{EC}$

(ii) $\frac{AB}{DB} = \frac{AC}{EC}$

(iii) $\frac{AD}{AB} = \frac{AE}{AC}$



Summary

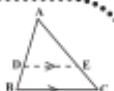
1. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

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

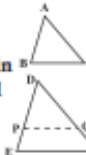


2. If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side. then, $DE \parallel BC$

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

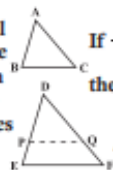


3. If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio (or proportion) and hence the two triangles are similar. (AAA criterion)



If $\angle A = \angle D$, $\angle B = \angle E$,
 $\angle C = \angle F$
then, $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$
 $\triangle ABC \sim \triangle DEF$

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. (SSS criterion)



If $\frac{AB}{DE} = \frac{BC}{EF} = \frac{CA}{FD}$
then, $\angle A = \angle D$, $\angle B = \angle E$,
 $\angle C = \angle F$
 $\triangle ABC \sim \triangle DEF$

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. (SAS criterion)



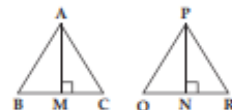
If $\frac{AB}{DE} = \frac{AC}{DF}$ & $\angle A = \angle D$
then, $\triangle ABC \sim \triangle DEF$

Theorems

Triangles

Area of Similar Triangles

The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides

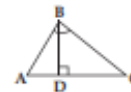


Here $\triangle ABC \sim \triangle PQR$

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

Right angled triangle theorem Pythagoras

1. 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.



In right $\triangle ABC$, $BD \perp AC$,
then, $\triangle ADB \sim \triangle ABC$
 $\triangle BDC \sim \triangle ABC$
 $\triangle ADB \sim \triangle BDC$

2. In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.



In right $\triangle ABC$,
 $BC^2 = AB^2 + AC^2$

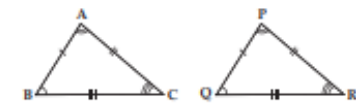
3. In a triangle, if square of one side is equal to the sum of the squares of other two sides, then the angle opposite the first side is a right angle.



If $AC^2 = AB^2 + BC^2$
then, $\angle B = 90^\circ$

Similarity

(i) Corresponding angles are equal
(ii) Corresponding sides are in the same ratio



$\triangle ABC \sim \triangle PQR$