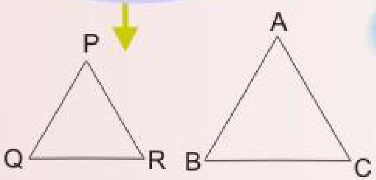
Similar Triangles

Similarity Means 'Same shape'
e.g. All circles are similar.
All squares are similar.

Criteria



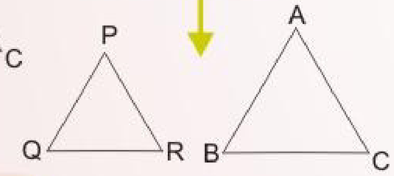
AA criterion :
If $\angle A = \angle P$ and $\angle B = \angle Q$ then $\Delta ABC \sim \Delta PQR$.

SSS criterion :
If $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR}$
then
$\Delta ABC \sim \Delta PQR$

SAS criterion :
If $\frac{AB}{PQ} = \frac{BC}{QR}$ and

$\angle B = \angle Q$ then
$\Delta ABC \sim \Delta PQR$

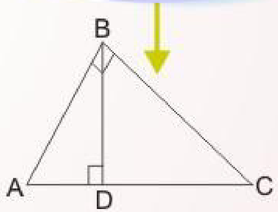
Area theorem



If $\Delta ABC \sim \Delta PQR$:

$$\frac{Area(\Delta ABC)}{Area(\Delta PQR)} = \left(\frac{AB}{PQ}\right)^2 = \left(\frac{AC}{PR}\right)^2 = \left(\frac{BC}{QR}\right)^2$$

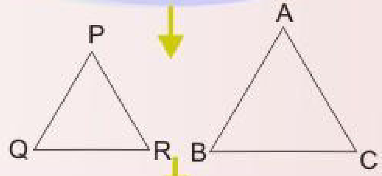
Pythagoras theorem



ΔABC is right angled Δ ($\angle B = 90°$)
$\Delta ABC \sim \Delta BDC \sim \Delta ADB$:
$BC^2 = CD \times AC$ ...(i)
$AB^2 = CA \times AD$ ...(ii)
Add eq. (i) and (ii)
$AB^2 + BC^2 = CA \times AD + CD \times AC$
$AB^2 + BC^2 = AC^2$

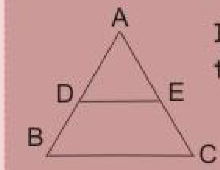
If Δs are similar

Then :



$\frac{AB}{PQ} = \frac{AC}{PR} = \frac{BC}{QR}$ and
$\angle A = \angle P$
$\angle B = \angle Q$
$\angle C = \angle R$

Basic
Proportionality theorem
(THALES THEOREM)



If DE | | BC
then,
$\frac{AD}{DB} = \frac{AE}{EC}$

Converse of B.P.T. :

If $\frac{AD}{DB} = \frac{AE}{EC}$ then
DE | | BC.

Some Important Results

1. The internal bisector of an angle of a triangle divides the opposite side internally in the ratio of the sides containing the angle.
2. The diagonals of a trapezium divide each other proportionally.
3. Any line parallel to the parallel sides of a trapezium divides the non-parallel sides proportionally.
4. If three or more parallel lines are intersected by two transversals, then the intercepts made by them on the transversals are proportional.
5. In any triangle, the sum of the squares of any two sides is equal to twice the square of half of the third side together with twice the square of the median which bisects the third side.
6. Three times the sum of the squares of the sides of a triangle is equal to four times the sum of the squares of the medians of the triangle.