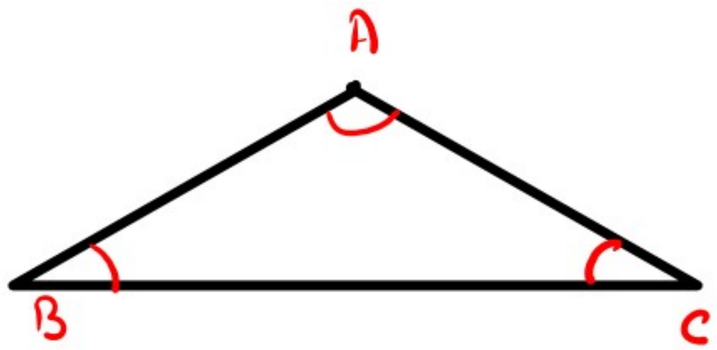
TRIANGLES

A triangle is a three sided closed figure.



3 Sides – AB , BC and CA

3 Vertices – A , B and C

3 angles – ∠ABC , ∠BCA and ∠CAB

Types of Triangles

Based on length of its sides

(i)

Equilateral triangle
(All sides are equal)

(ii)

Isosceles triangle
(Any two sides are equal)

(iii)

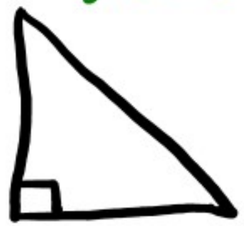
Scalene triangle
(All sides are of different length)

Based on measurment of its angles

(i)

Acute angled triangle
(All 3 angles are acute)

(ii)



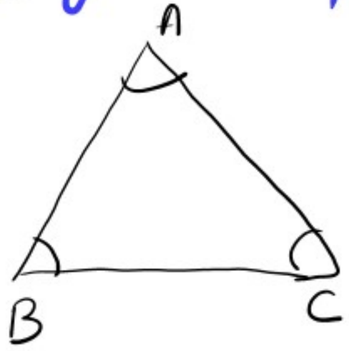
Right angled triangle
(One angle is of 90°)

(iii)

Obtuse angled triangle
(One angle is an obtuse angle)

Properties of triangle:-

(i.) Angle sum property of a triangle – The sum of interior angles of a triangle is 180°.

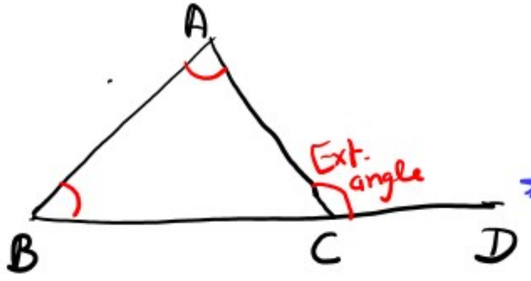


$$\angle ABC + \angle BCA + \angle CAB = 180^\circ$$

(ii.) Exterior angle of a triangle and its property –

If we produce any side of a △ then we'll get an exterior angle.

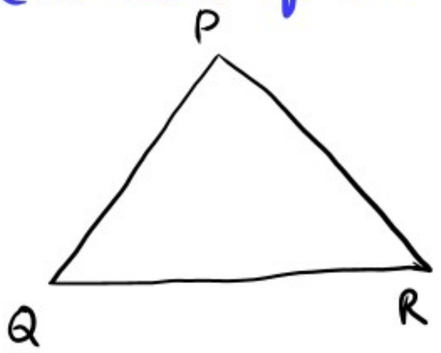
In fig. If BC produced to D then ∠ACD obtained is called exterior angle.



★ Exterior angle property of a △ states that, the measure of ext. angle is equal to sum of its opposite interior angles.

i.e. $\angle ACD = \angle ABC + \angle CAB$

(iii.) Sum of two sides of a triangle is always greater than the 3rd side.



From fig, In $\triangle PQR$;

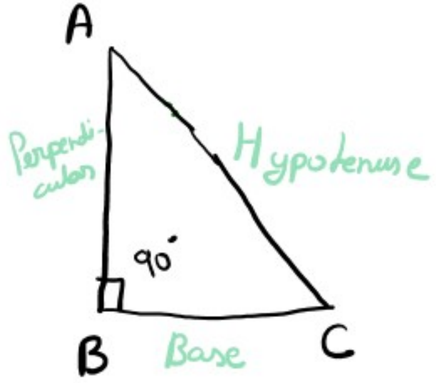
$$PQ + QR > PR$$
$$QR + PR > PQ$$
$$PR + PQ > QR$$

(iv.) Pythagoras Property of a Right angled triangle.

Pythagoras Property is also known as Pythagoras theorem, it states that.

In a right angled $\triangle$, the sum of square of Base and perpendicular is equal to square of its hypotenuse.

(ie) $(\text{Hypotenuse})^2 = (\text{Base})^2 + (\text{Perpendicular})^2$

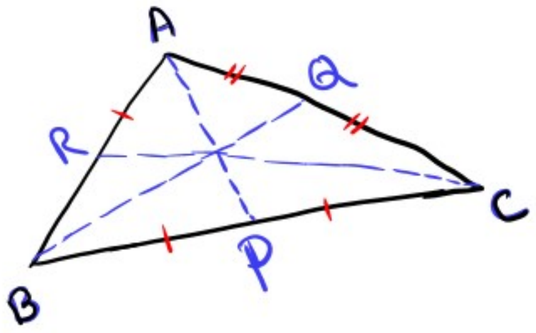


In rt. $\triangle ABC$; $AC^2 = AB^2 + BC^2$

Note:- The longest side or the side opposite to 90° is called the hypotenuse in a right angled $\triangle$.

Median of a triangle -

A line segment that join the vertex of a triangle to the mid point of its opposite side, is called the median of a triangle.

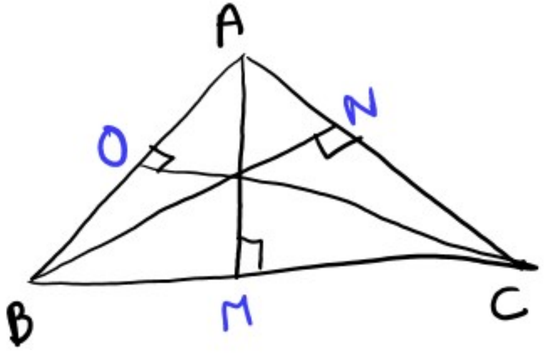


From fig; $\triangle ABC$ has 3 medians, named as AP, BQ and CR

Note:- A triangle has 3 medians, which always lies inside the interior of that $\triangle$. and intersect at a point, which is called incentre.

Altitude of a triangle -

A perpendicular drawn from a vertex of a $\triangle$, to its opposite side is called, Altitude of a triangle.



In fig; $\triangle ABC$ has 3 altitudes i.e. AM, BN and OC.

Note:- A $\triangle$ has 3 altitudes, which can be drawn from the three vertices of the $\triangle$. All the 3 altitudes intersect each at a point, which is called the orthocentre.