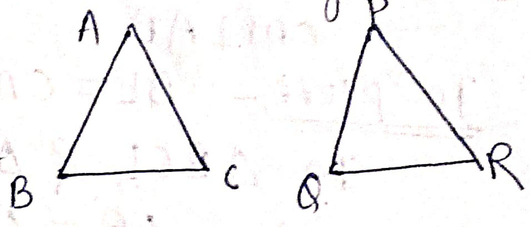
Triangles

Congruency of triangle.

⇓ Two Δ are congruent if the sides and angles of one triangle are equal to the corresponding sides and angles of the other triangle.

$$\boxed{\Delta PQR \cong \Delta ABC}$$



$PQ = AB,\ BC = QR,\ PR = AC$

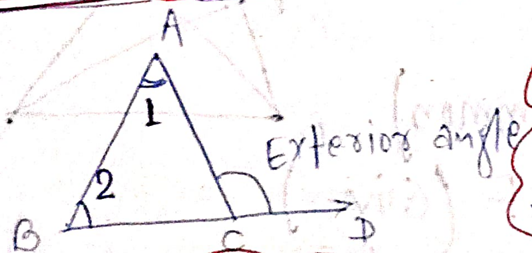
$\angle A = \angle P,\ \angle B = \angle Q,\ \angle C = \angle R.$

Note:- C.P.C.T (corresponding parts of congruents triangle).

Criteria for Congruence of Triangles

- SAS Congruency Rule
- ASA Congruency Rule
- AAS Congruency Rule
- SSS Congruency Rule.
- R.H.S Congruency Rule.

Properties of triangle.

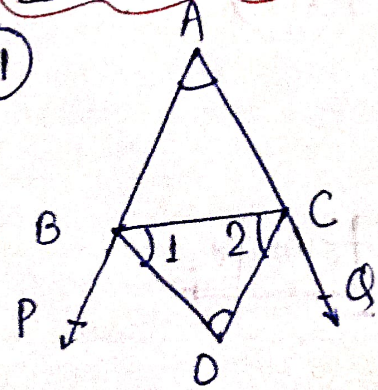


Exterior angle = Sum of two opposite Interior angle.

Sum of all angle = 180°

Important Results

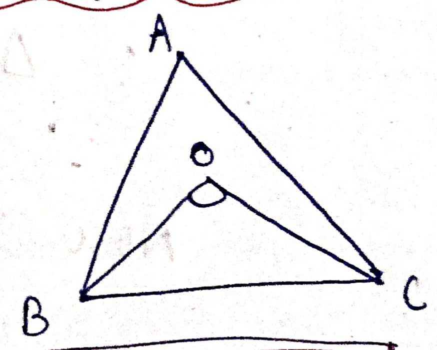
①



$$\boxed{\angle BOC = 90^\circ - \frac{1}{2}\angle A}$$

V.V.S

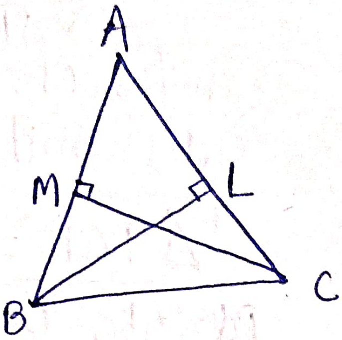
②



$$\boxed{\angle BOC = 90^\circ + \frac{1}{2}\angle A}$$

Question Based on congruency.

(1) prove that perpendiculars drawn from the vertices of equal angles of an Isosceles triangle to the opposite sides are equal.



Given- $\angle B = \angle C$, $BL \perp AC$, $CM \perp AB$

To prove- $BL = CM$

In $\triangle BCL$ & $\triangle CBM$

$\angle B = \angle C$

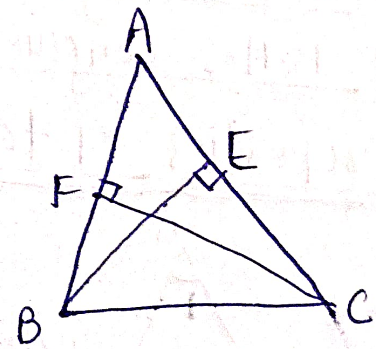
$BC = CB$ (common)

$\angle L = \angle M = 90^\circ$

By AAS criteria $\triangle BCL \cong \triangle CBM$.

By c.p.c.t $BL = CM$ prove.

(2) BE and CF are two equal altitudes of a triangle $\triangle ABC$. Using R.H.S congruence rule, prove that the $\triangle ABC$ is isosceles.



$\angle BEC = \angle CFB = 90^\circ$.

In $\triangle BEC$ & $\angle BCF$

Hypo. BC = Hypo BC (common)

side BE = side CF (Given)

$\therefore$ $\triangle BEC \cong \triangle CFB$ (RHS Congruence)

$\therefore$ $\angle BCE = \angle CBF$ (By c.p.c.t)

Now In $\triangle ABC$, $\angle B = \angle C$

$\therefore$ $AB = AC$

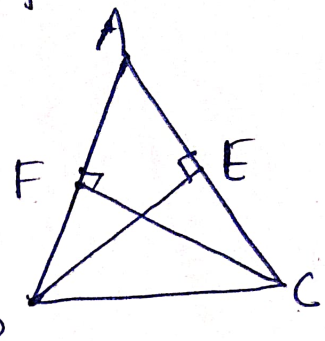
Hence $\triangle ABC$ is an Isosceles triangle.

5

(A)प्र9. ABC is a triangle in which altitudes BE and CF to sides AC and AB are equal. Show that

(1) $\Delta ABE \cong \Delta ACF$

(2) $AB = AC$, i.e. ABC is an Isosceles triangle.



<u>Solution</u>- In ΔABE & ΔACF

$BE = CF$ (Given)

$\angle BAE = \angle CAF$ (common)

$\angle BEA = \angle CEF = 90^\circ$

So, $\Delta ABE \cong \Delta ACF$ [AAS]

Also, $AB = AC$ By C.P.C.T

i.e. ABC is an Isosceles Δ.