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# CLASS – 9

## MATHEMATICS

## Chapter – 7

## Triangles

Part –8

Exercise 7.2 (1 to 3)

Vikas Saini

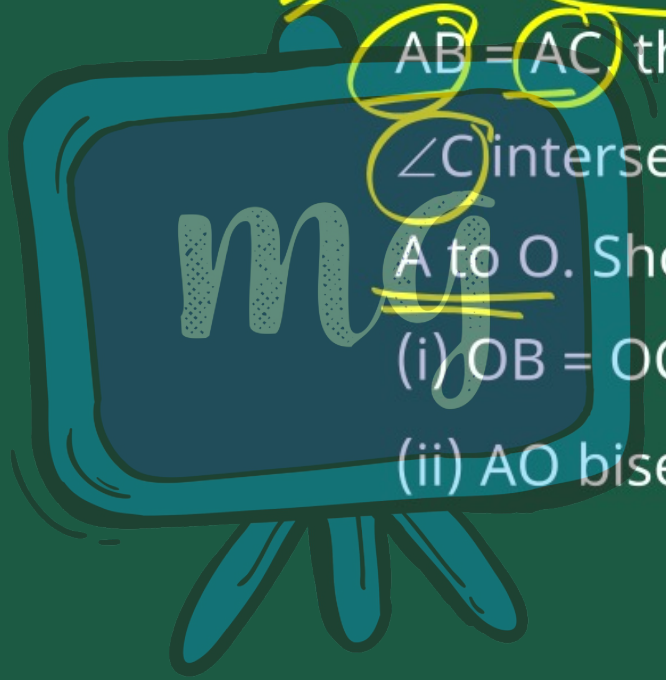
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1. In an isosceles triangle ABC, with AB = AC, the bisectors of ∠B and ∠C intersect each other at O. Join A to O. Show that :

   (i) OB = OC

   (ii) AO bisects ∠A

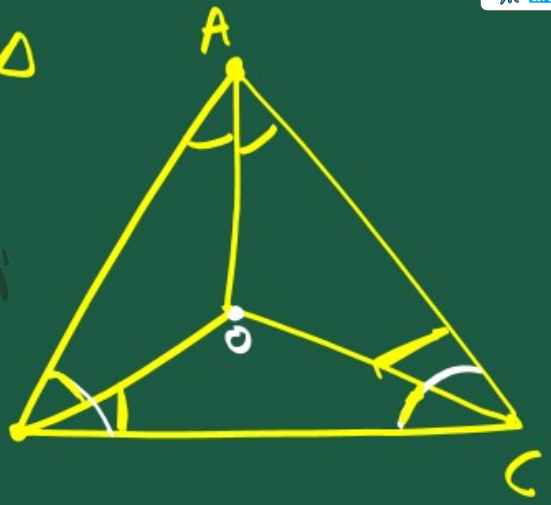


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Given: $\Delta ABC$ is isosceles $\Delta$

where $AB = AC$




$OB$ is bisector of $\angle B$

$\angle ABO = \angle OBC = \frac{\angle B}{2}$

$OC$ is bisector of $\angle C$

$\angle ACO = \angle OCB = \frac{\angle C}{2}$

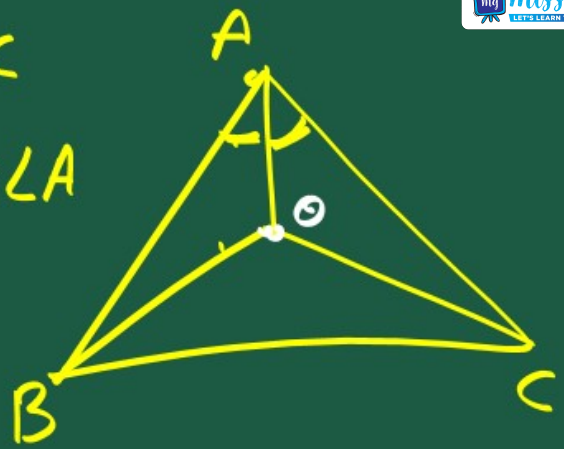
$\therefore$

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To prove :→ (i) $OB = OC$

(ii) AO bisects $\angle A$




Soln :→ Since $\triangle ABC$ is isosceles $\Delta$

$AB = AC$ [Given]

$\angle C = \angle B$

[∵ opp. sides are equal then angles opp. them are also equal]




$\angle OAB = \angle OAC$

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$\angle C = \angle B$

$\frac{1}{2}$ multiply both side

$\frac{\angle C}{2} = \frac{\angle B}{2}$

$\therefore \quad \angle OCB = \angle OBC = \angle ABO = \angle ACO$

$$\left[\begin{array}{l} \frac{\angle C}{2} = \angle OCB = \angle ACO \\ \\ \frac{\angle B}{2} = \angle OBC = \angle ABO \end{array}\right]$$

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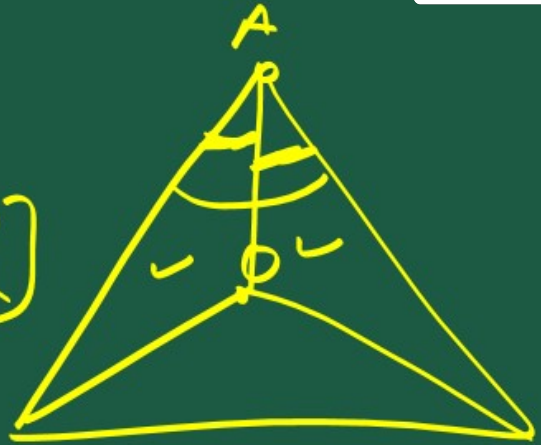
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In $\triangle OBC$,

$\angle OBC = \angle OCB$ [Proved above]

If opp. angles are equal then opp. sides Regarding are also equal

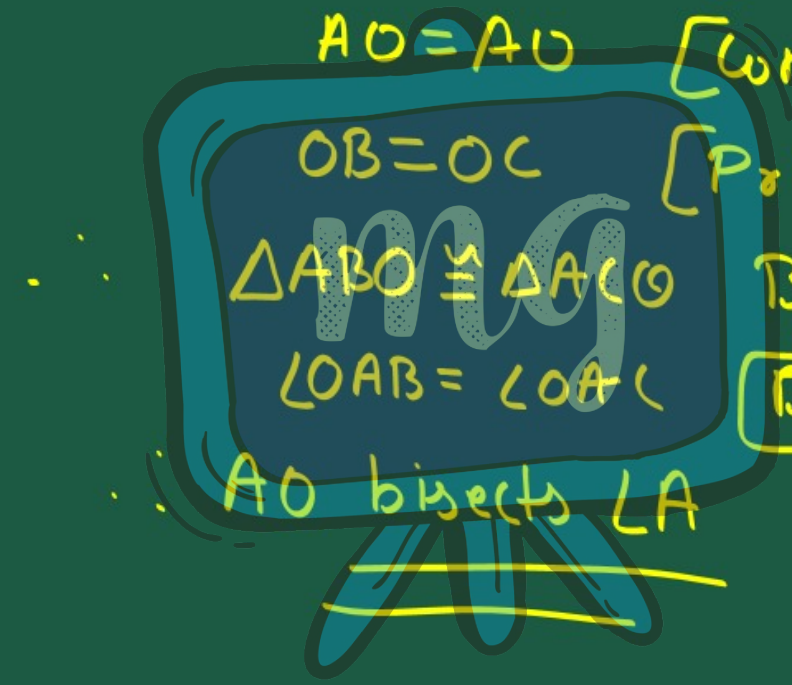
$\therefore OB = OC$






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In $\triangle ABO$ & $\triangle ACO$

$AB = AC$ [Given]

$AO = AO$ [Common]

$OB = OC$ [Proved above]

$\therefore \triangle ABO \cong \triangle ACO$ By SSS Rule

$\angle OAB = \angle OAC$ By C.P.C.T

$\therefore$ AO bisects $\angle A$

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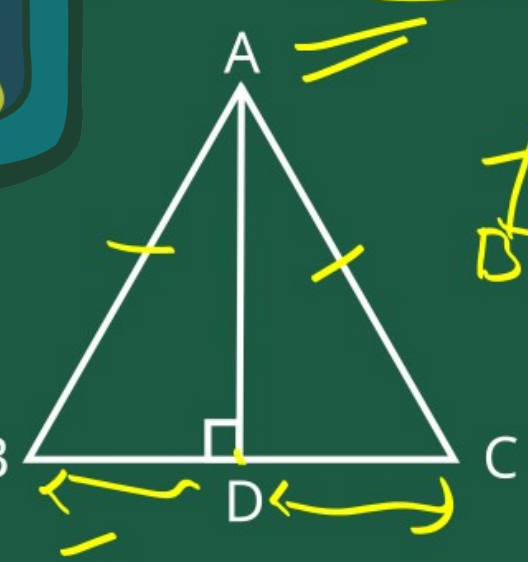
2. In △ABC, AD is the perpendicular bisector of BC (see Figure). Show that Δ ABC is an isosceles triangle in which AB = AC.

Given: ABC is triangle in which AD ⊥ BC at D

∴ ∠ADB = ∠ADC = 90°

BD = CD

To prove: ΔABC is isosceles such AB = AC

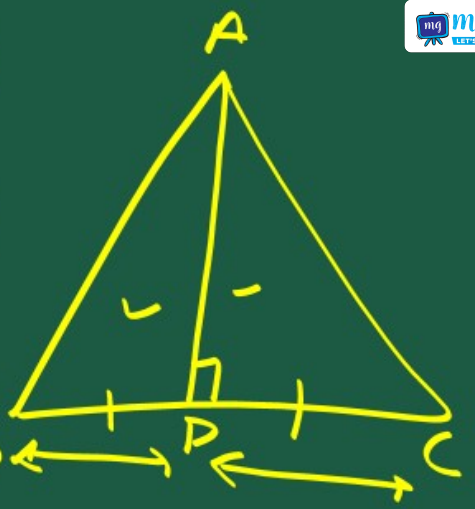





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Soln :→ In △ ABD & △ ACD




$\angle ADB = \angle ADC = 90^\circ$

$BD = CD$

$AD = AD$ [common]

$\therefore \triangle ABD \cong \triangle ACD$ By SAS Rule

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

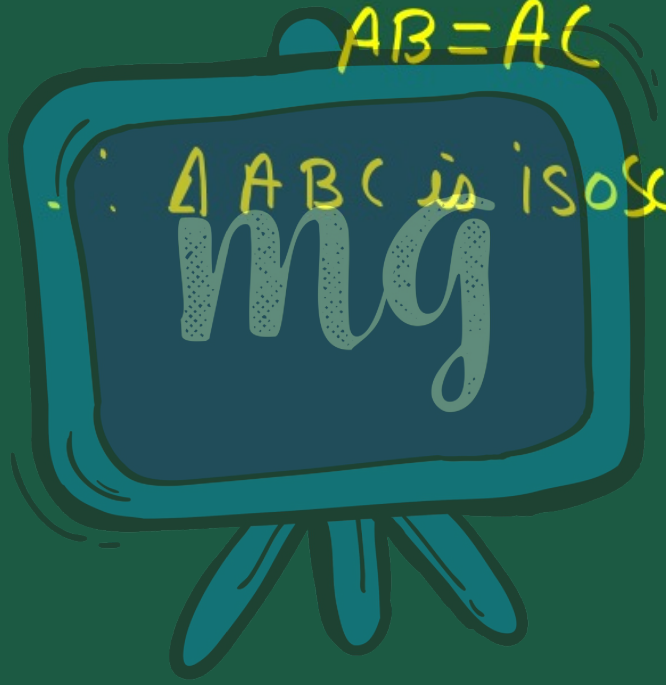
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In $\triangle ABC$,

$AB = AC$

$\therefore \triangle ABC$ is isosceles $\triangle$.



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3. ABC is an isosceles triangle in which altitudes BE and CF are drawn to equal sides AC and AB respectively. Show that these altitudes are equal.

Given :-

$\Delta ABC$ is isosceles

In which $AB = AC$

& $BE \perp AC$

$CF \perp AB$

To prove :- $BE = CF$



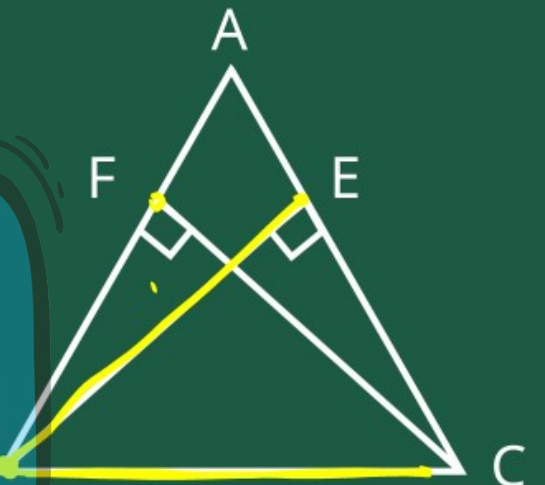
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Soln: In $\triangle ABC$

$AB = AC$ [Given]

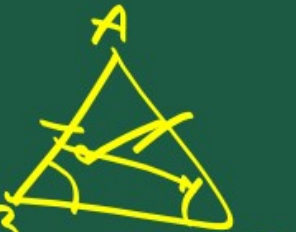
$\angle B = \angle C$ [opp sides are equal then angles opp. to them are also equal]




Now In $\triangle BEC$ & $\triangle CFB$

$\angle BFC = \angle CFB = 90°$ [Given]

$BC = CB$ [common]



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In $\triangle BFC$ & $\triangle CFB$

$\angle BFC = \angle CFB = 90^\circ$ [Given]

$BC = CB$ [common]

$\angle C = \angle B$ [Proved above]

$\therefore \triangle BEC \cong \triangle CFB$ By ASA Rule

$BE = CF$ By C.P.C.T

