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CLASS – 9

MATHEMATICS

Chapter – 7

Triangles

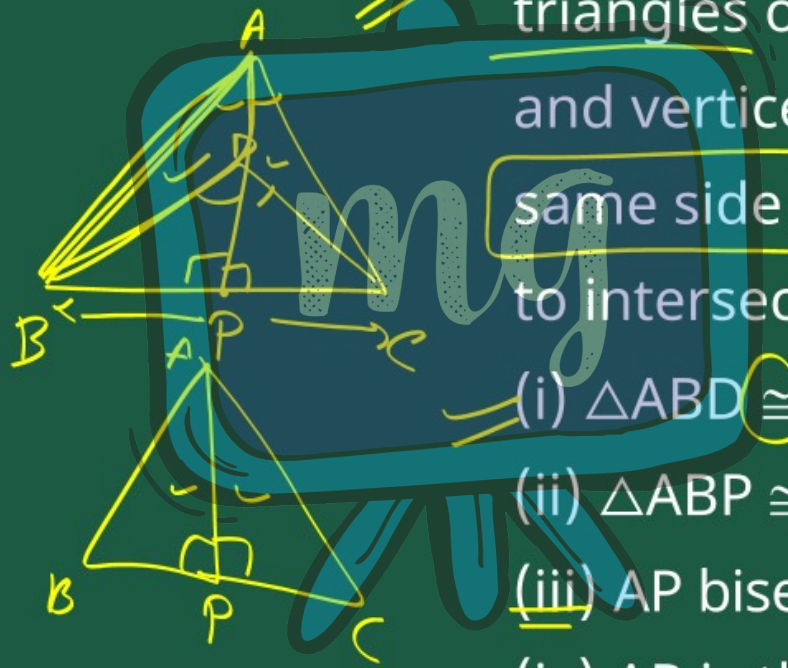
Part –12

Exercise 7.3 (1 to 2)

Vikas Saini

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1. △ABC and △DBC are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC. If AD is extended to intersect BC at P, show that

(i) △ABD ≅ △ACD

(ii) △ABP ≅ △ACP

(iii) AP bisects ∠A as well as ∠D.

(iv) AP is the perpendicular bisector of BC.

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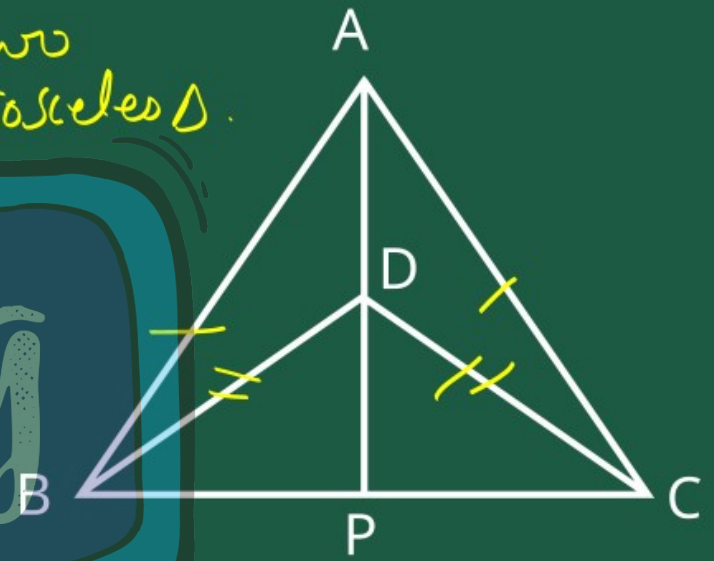
Given :- $\triangle ABC$ and $\triangle DBC$ are two isosceles $\triangle$.

where $AB = AC$

$DB = DC$

AD is produced

BC intersect at P



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In $\triangle ABD$ & $\triangle ACD$

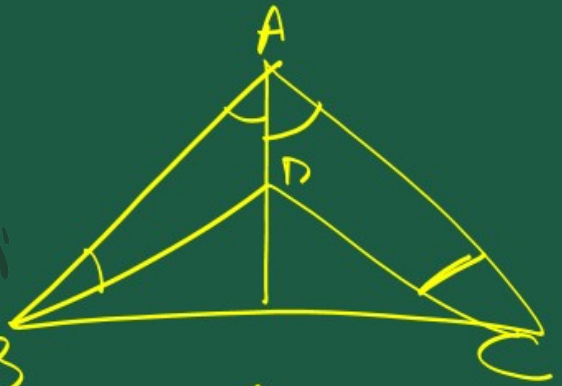
$AB = AC$ [Given]

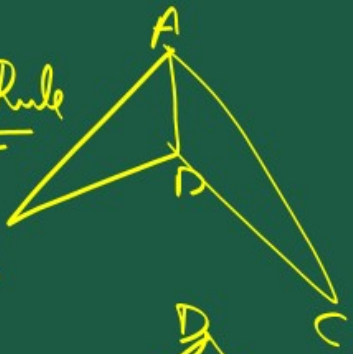
$AD = AD$ [Common]

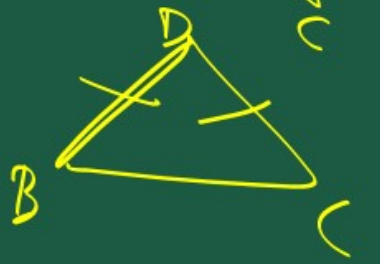
$DB = DC$ [Given]

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

$\angle ABD = \angle ACD$ [By C.P.C.T]







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(ii) $\triangle ABP \cong \triangle ACP$

In $\triangle ABP$ & $\triangle ACP$

$AB = AC$ [Given]

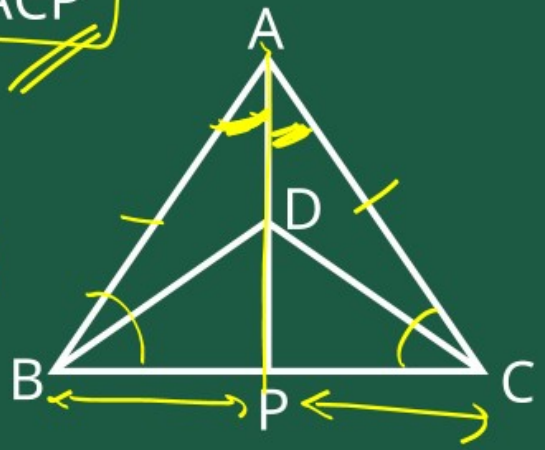
$AP = AP$ [Common]

$\angle PAB = \angle PAC$

$\therefore \triangle ABP \cong \triangle ACP$ [By SAS Rule]

$BP = CP$ [By C.P.C.T.]

$\angle PBA = \angle PCA$



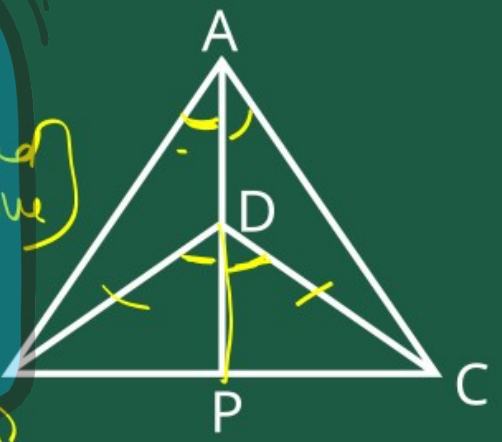
$\therefore \triangle ABD \cong \triangle ACD$

$\angle DAB = \angle DAC$

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(iii) AP bisects $\angle A$ as well as $\angle D$.



Since $\angle PAB = \angle PAC$ [Proved above]

Now, In $\triangle BPD$ & $\triangle CPD$

$BP = CP$ [Proved above]

$DB = DC$ [Given]

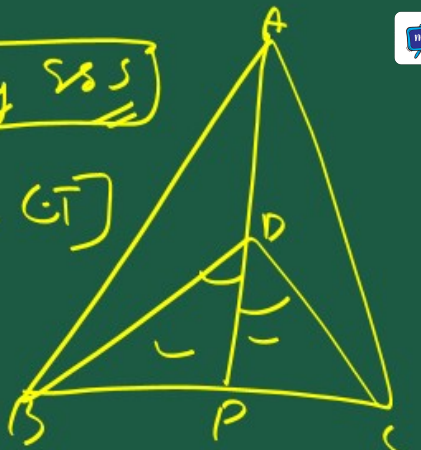
$DP = DP$ [Common]

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$\therefore \triangle BPD \cong \triangle CPD$ By SAS

$\angle PDB = \angle PDC$ [C.P.C.T]

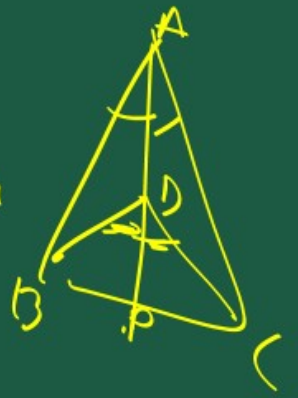


Note In $\triangle ABC$, AP line intersect BC

$\angle PAB = \angle PAC$

In $\triangle DBC$, AP bisects $\angle D$ also

$\angle PDB = \angle PDC$



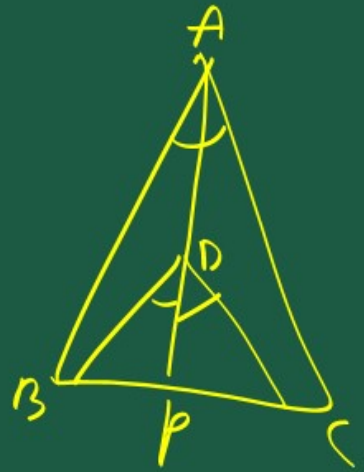
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AP bisects ∠A as well as ∠D

∠PAB = ∠PAC

∠PDB = ∠PDC



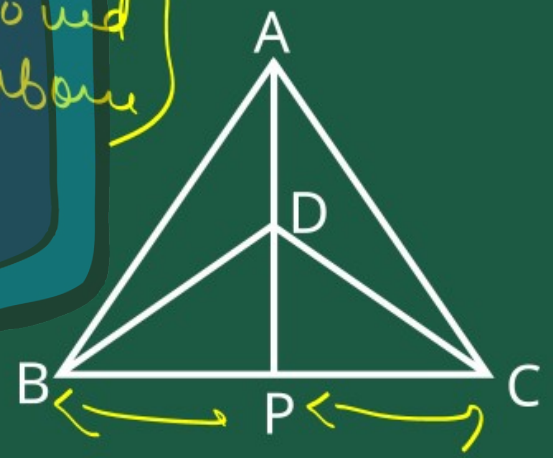
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(iv) AP is the perpendicular bisector of BC.

Since BP = CP [Proved above]

AP is bisector of BC at B.

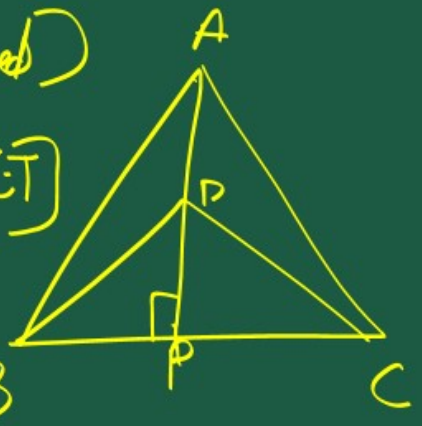


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$\therefore$ In $\triangle ABP \cong \triangle ACP$ [Proved]

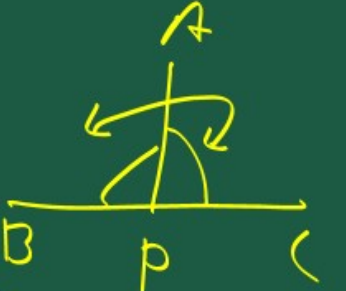
$\angle APB = \angle APC$ [By C.P.C.T] — (1)



Now

BC is st. line

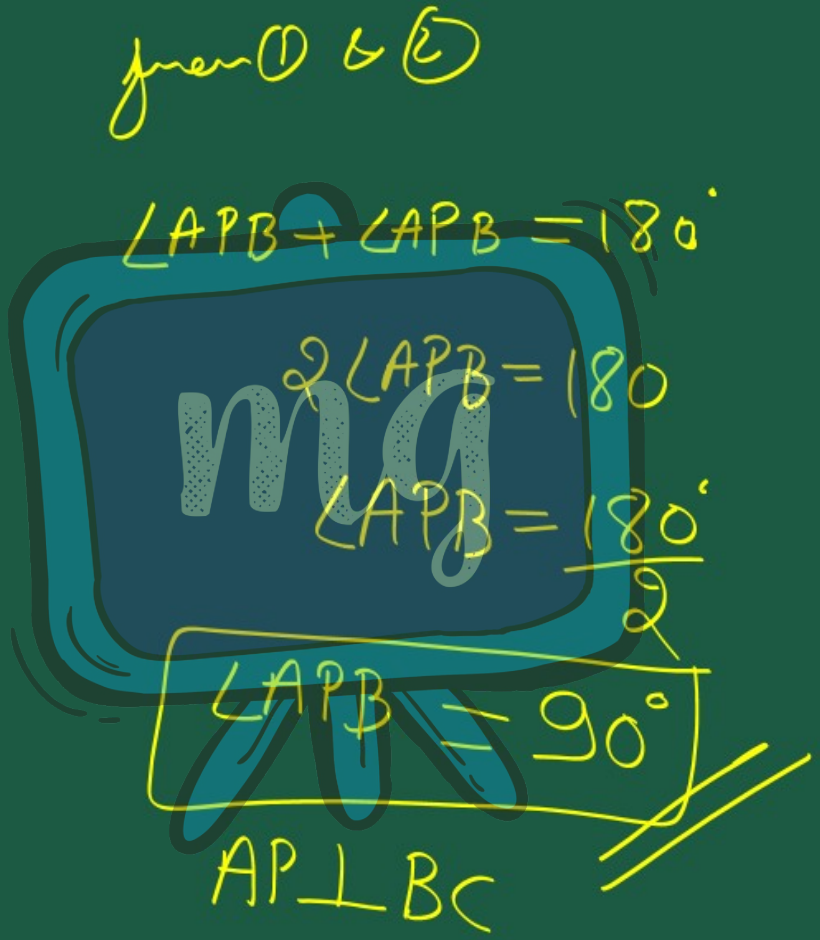
P is midpoint



$\angle APB + \angle APC = 180$ [linear pair] — (2)

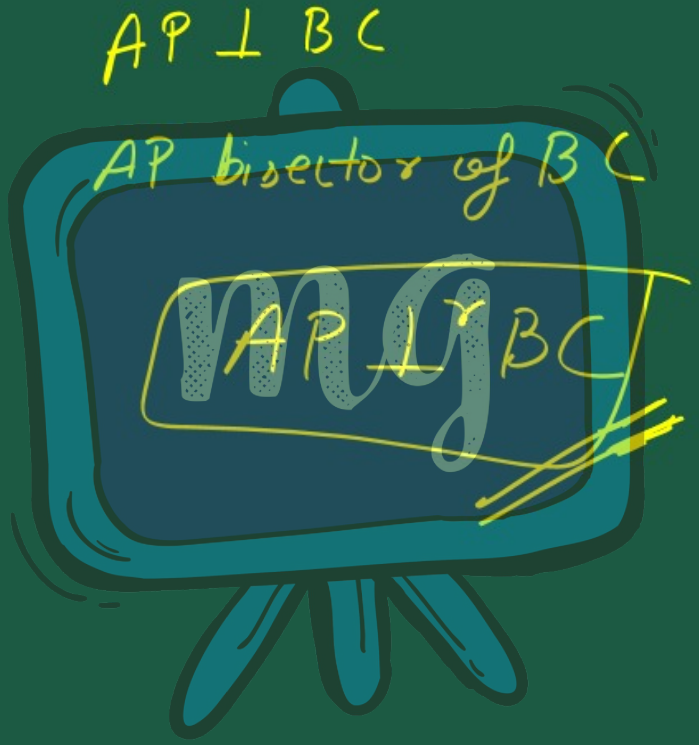
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2. AD is an altitude of an isosceles triangle ABC in which AB = AC.

Show that

(i) AD bisects BC

(ii) AD bisects ∠A.

Given:

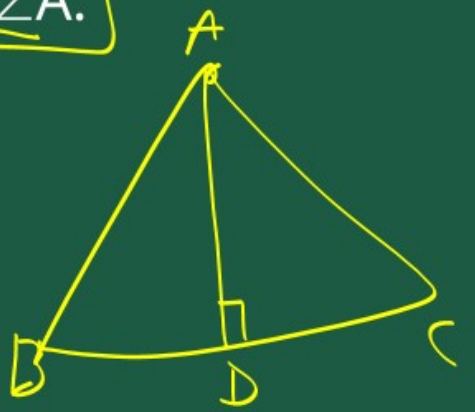
ABC is isosceles

S.t. AB = AC

AD is altitude on BC

AD ⊥ BC

To prove



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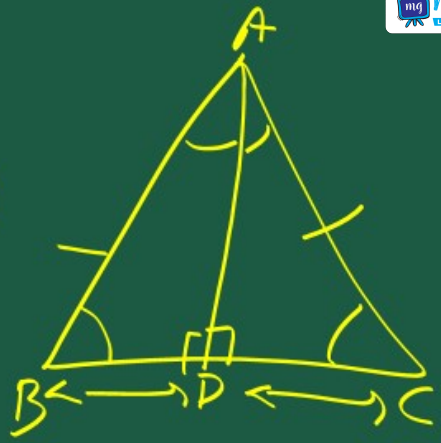
Soln

In $\triangle ABC$,

$AB = AC$ [Given]

$\angle B = \angle C$

[∵ opp. Sides are equal then angle opp to them are also equal]



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In $\triangle ABD$ & $\triangle ACD$

$AB = AC$ [Given]

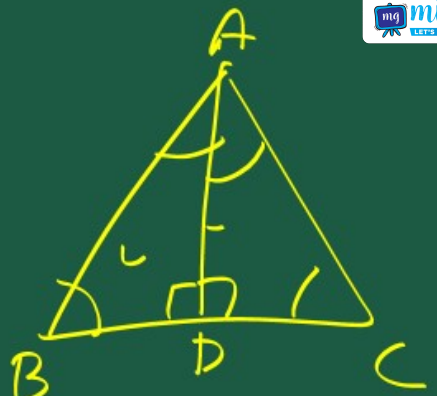
$\angle ADB = \angle ADC = 90^\circ$ [Given] $AD \perp BC$

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

$\triangle ABD \cong \triangle ACD$ By AAS Rule

$BD = CD$ [C.P.C.T]

$\angle BAD = \angle CAD$



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