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CLASS – 9

MATHEMATICS

Class – 7

Triangles

Part –5

Exercise 7.1 (7 to 8)

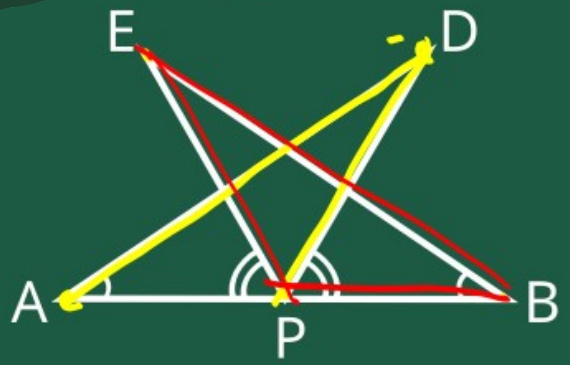
Vikas Saini

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7. AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that $\angle BAD = \angle ABE$ and $\angle EPA = \angle DPB$. Show that

(i) $\triangle DAP \cong \triangle EBP$



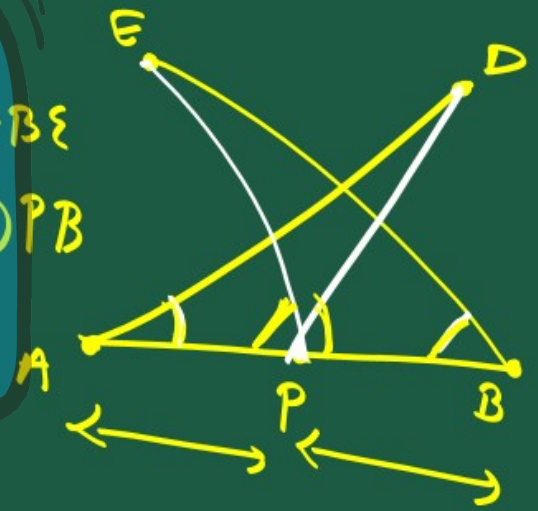
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(ii) AD = BE

$\angle BAD = \angle ABE$

$\angle EPA = \angle DPB$



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Theorem :→ AB is line segment

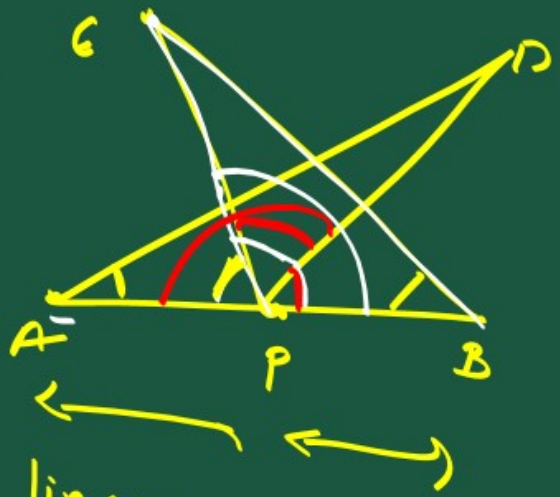
& P is mid point of AB

$AP = BP$

& D & E are two points lie on Same Side of line segment AB

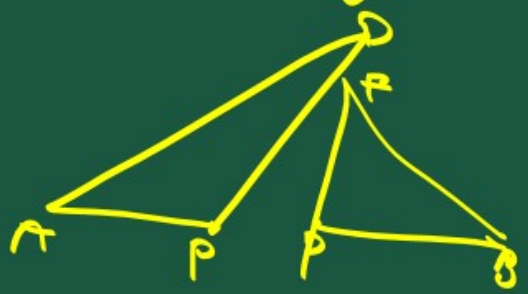
S.t $\angle ABE = \angle BAD$

$\angle EPA = \angle DPB$



To prove :→ $\triangle DAP \cong \triangle EBP$

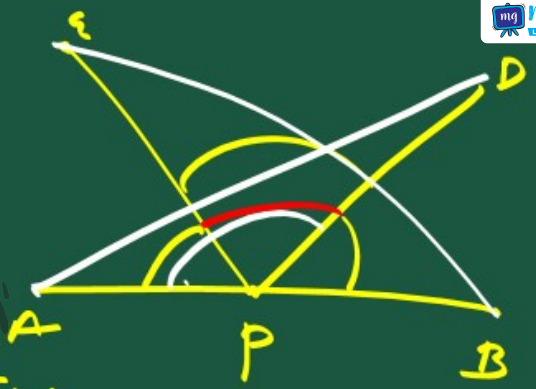
$AD = BE$



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Soln:→ Since,



$\angle EPA = \angle DPB$ [Given]

Adding $\angle EPD$ to Both Side

$\angle EPA + \angle EPD = \angle DPB + \angle EPD$

$\angle DPA = \angle EPB$

mg

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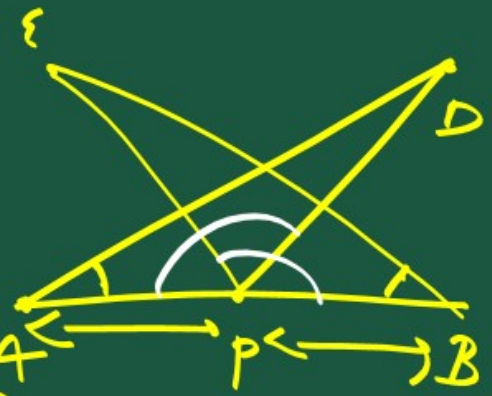
Now

In $\triangle DAP \cong \triangle EBP$

$\angle DAP = \angle EBP$ [Given]

$\angle DPA = \angle EPB$ [Proved above]

$AP = BP$ [Given]

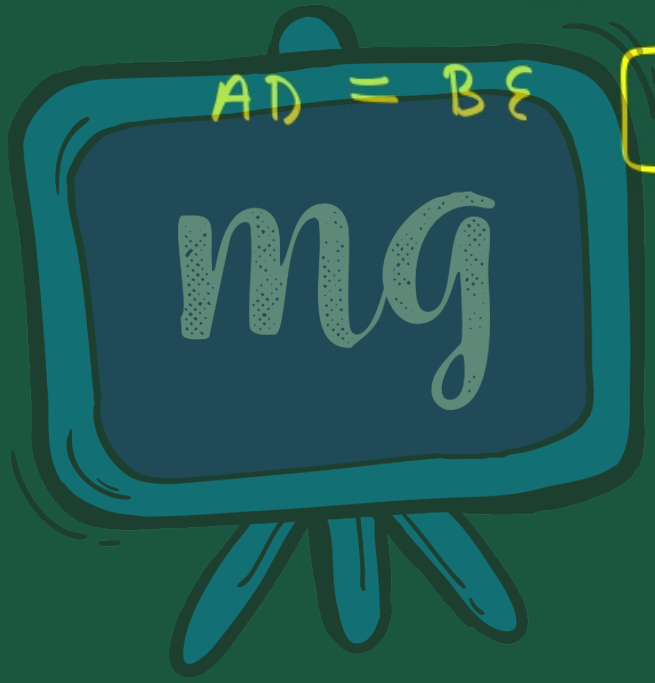


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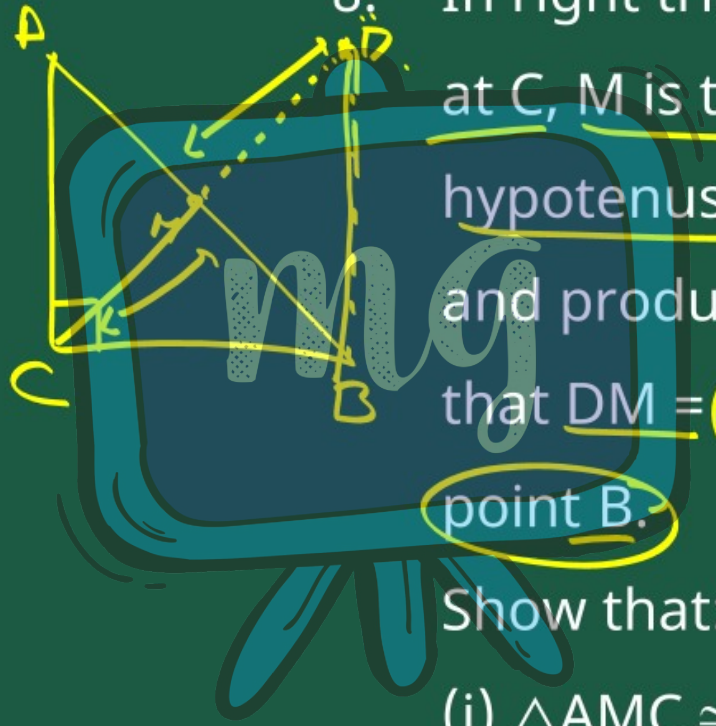
Now, $\triangle DAP \cong \triangle EBP$ By ASA Rule

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



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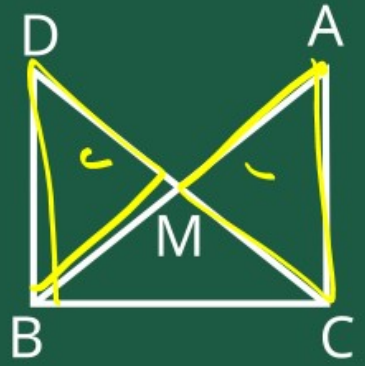
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8. In right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B.

Show that:

(i) $\triangle AMC \cong \triangle BMD$



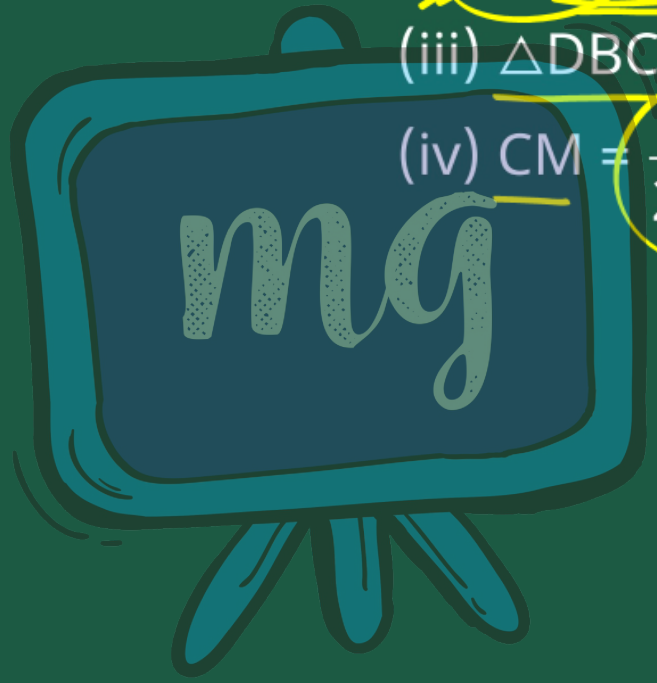
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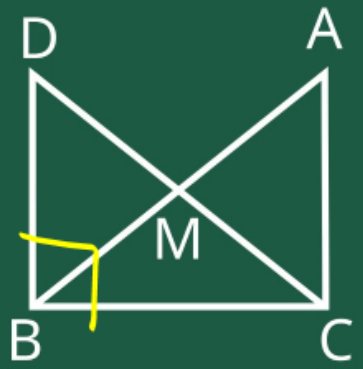
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(ii) $\angle DBC$ is a right angle.

(iii) $\triangle DBC \cong \triangle ACB$

(iv) $CM = \frac{1}{2} AB$





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Given: ΔABC is Right angle Δ at C.

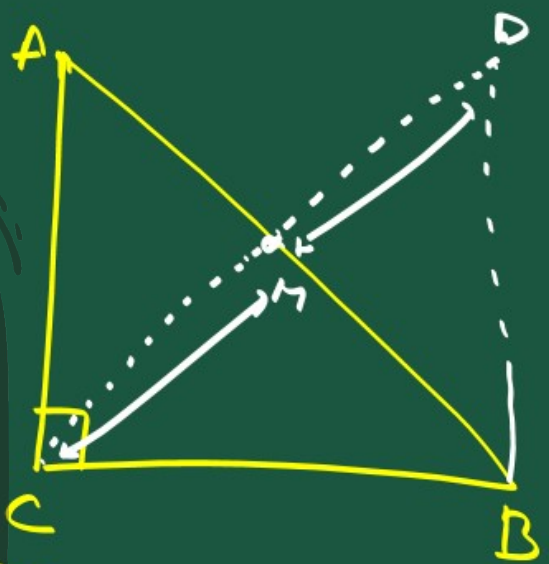
$\angle ACB = 90^\circ$

& M is midpoint AB

$AM = BM = \frac{AB}{2}$ (i)

& $CM = DM$

⇒ To prove:



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Now, In $\triangle AMC$ & $\triangle BMD$

$AM = BM$ [Given]

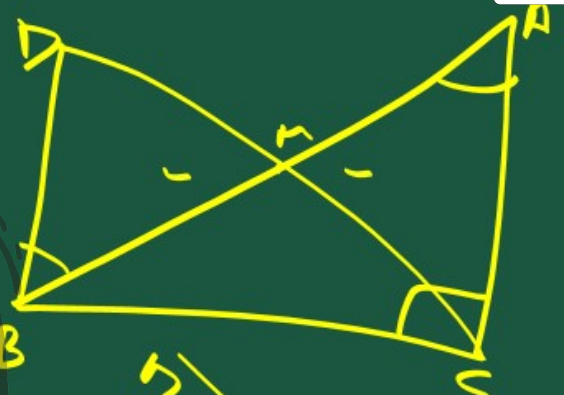
$CM = DM$ [Given]

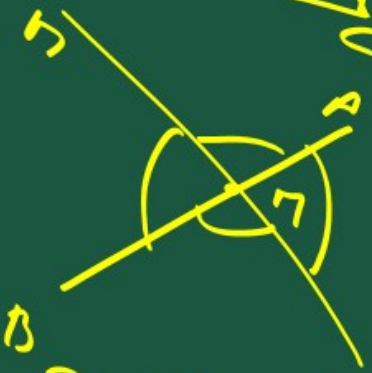
$\angle AMC = \angle BMD$ [V.O.A]

So, $\triangle AMC \cong \triangle BMD$

$\angle AM = \angle DBM$

$AC = BD$





By SAS Rule

[By C.P.C.T.] — (1)

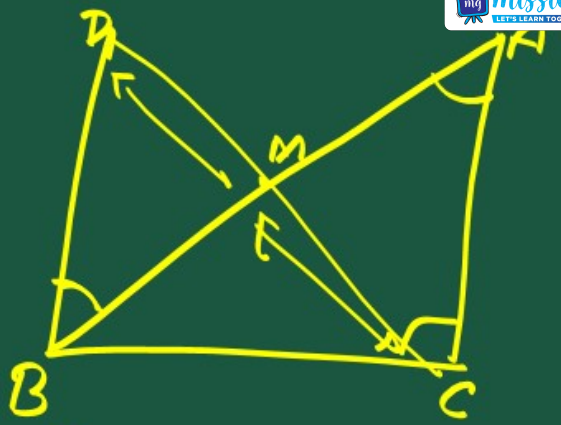
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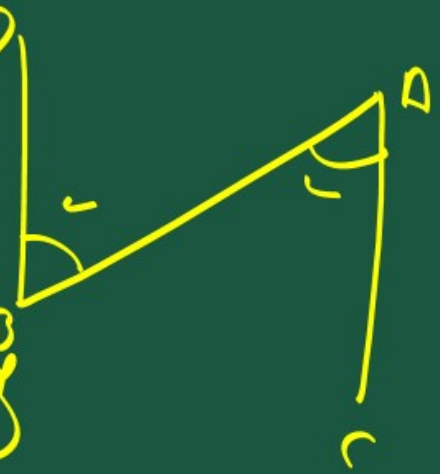
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DB & AC are two lines intersected by a third AB line at two distinct points A & B

∴ AB is traversal for DB & AC

& ∠DBA = ∠CAM [Proved in eq (1)]





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Since Alternate interior Angles of transversal are equal

then those are parallel

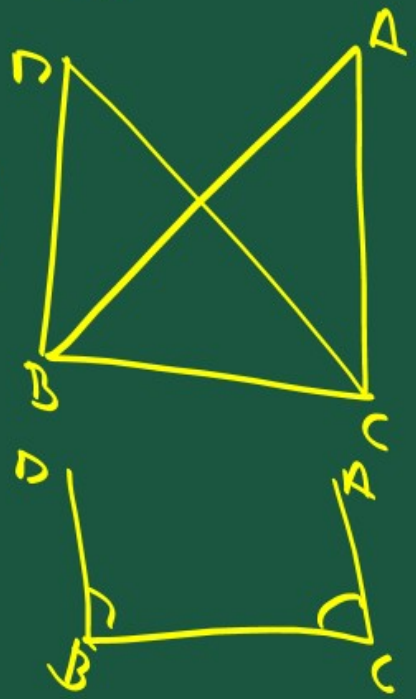
$\therefore$ $BD \parallel AC$

$\angle DBC + \angle ACB = 180$ [co-interior]

$\angle DBC + 90 = 180$

$\angle DBC = 180 - 90$

$\angle DBC = 90°$



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Now In $\triangle DBC$ & $\triangle ACB$

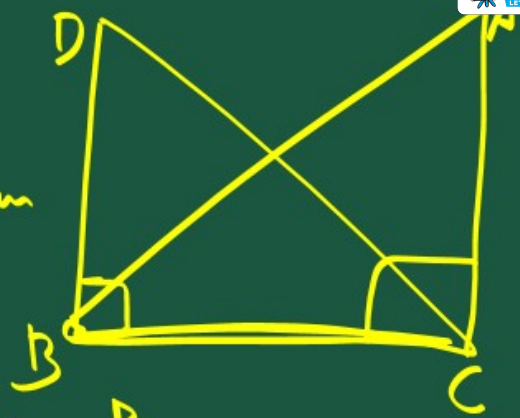
$\angle DBC = \angle ACB = 90^\circ$ [Given]

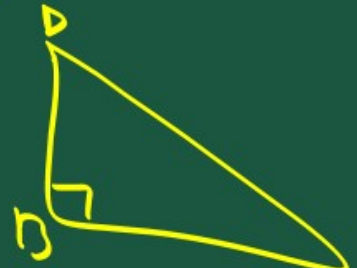
$BC = CB$ [Common]

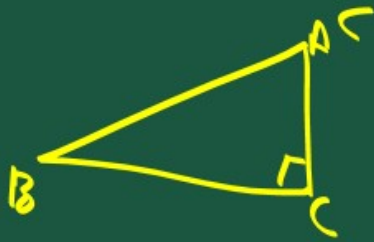
$BD = AC$ [Proved above]

$\triangle DBC \cong \triangle ACB$ By SAS

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



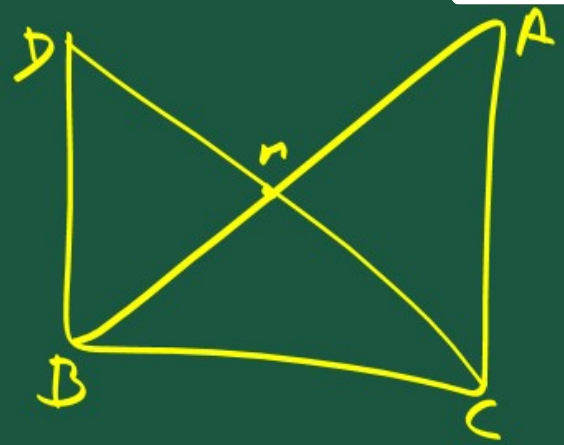




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$AB = CD$ — (2)



Since $CM = DM$

Also, $CM + DM = CD$

$CM + CM = CD$

$2CM = CD$

$CM = \frac{1}{2}CD$ — (3)

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$AB = CD$

$\frac{1}{2}$ multiply Both Side

$\frac{1}{2} \times AB = \frac{1}{2} \times CD$

$\frac{1}{2} AB = CM$

from eq (3)