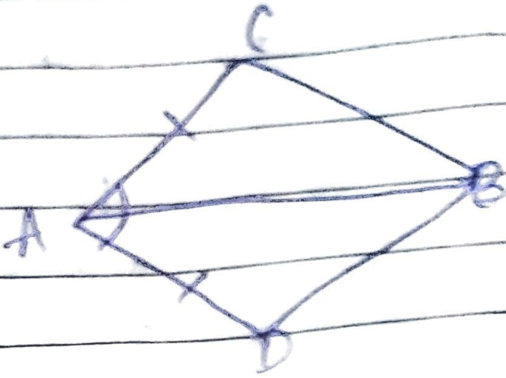
0.07.23

Ch. 7 Triangles

Exercise - 7.1

1 Ans.



Given,

AC and AD are equal and the line segment AB bisects ∠A.

Prove :- The two triangles ABC and ABD are similar i.e. $\Delta ABC \cong \Delta ABD$

Proof:- In ΔABC and ΔABD,

$AC = AD$ (given)

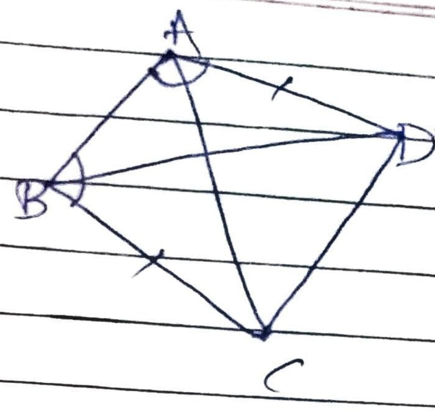
$AB = AB$ (common)

$\angle CAB = \angle DAB$ (Since AB is the bisector of ∠A)

$\Delta ABC \cong \Delta ABD$ (SAS)

BC and BD i.e. $BC = BD$ (CPCT)

Ans



Given,

$\angle DAB = \angle CBA$

and $AD = BC$

Prove :→ (i) $\triangle ABD \cong \triangle BAC$

(ii) $BD = AC$

(iii) $\angle ABD = \angle BAC$

Proof:- (i) In $\triangle ABD$ and $\triangle BAC$

$AB = BA$ (common)

$$\left.\begin{aligned} \angle DAB &= \angle CBA \\ AD &= BC \end{aligned}\right\} \text{(given)}$$

$\triangle ABD \cong \triangle BAC$ (SAS)

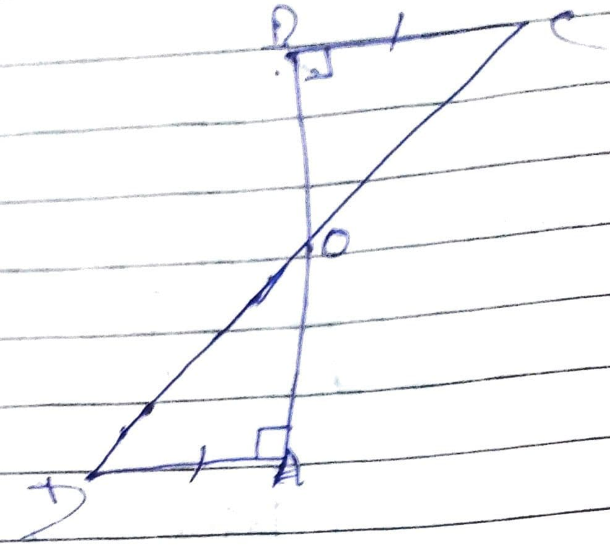
(ii) $\triangle ABD$ and $\triangle BAC$

$BD = AC$ (CPCT)

(iii) Since $\triangle ABD$ and $\triangle BAC$ so,

$\angle ABD = \angle BAC$ (CPCT)

3Ans



Given,

AD = BC are two equal perpendicular to AB.

Prove → CD is the Bisector of AB

Proof :→ In ΔAOD and ΔBOC

$\angle A = \angle B$ (perpendiculars)

$AD = BC$ (given)

$\angle AOD = \angle BOC$ (vert. opp. $\angle$s)

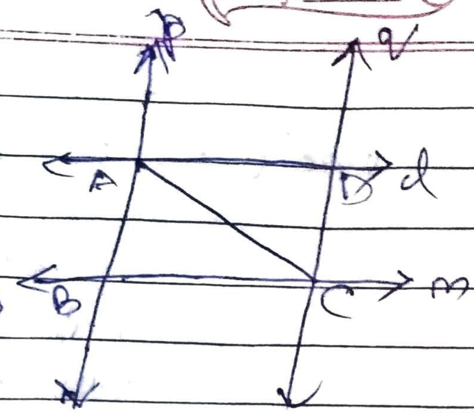
$\therefore \Delta AOD \cong \Delta BOC$ (AAS)

So, $AO = OB$ (CPCT)

Thus,

CD bisects AB

4Ans



Given,

that Pq and lm

To prove :- $\Delta ABC \cong \Delta CDA$

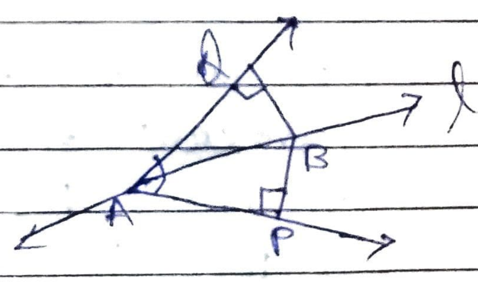
Proof:- In ΔABC and ΔCDA,

$BCA = DAC$ (alternate
$BAC = DCA$ int. ∠s)

$AC = CA$ (common)

$\Delta ABC \cong \Delta CDA$ (ASA)

5Ans



Given,

the line l is the bisector of ∠A and line segments BP and BQ are perpendiculars drawn from l.

Prove:- (i) $\Delta APB \cong \Delta AQB$
(ii) $BP = BQ$ or B is equidistant from the arms of ∠A

Proof:-

(i) In ΔAPB and ΔAQB

$\angle P$ and $\angle Q$ (The two right angles)

$AB = AB$ (common)

$\angle BAP = \angle BAQ$ (As line l is the bisector of $\angle A$)

So,

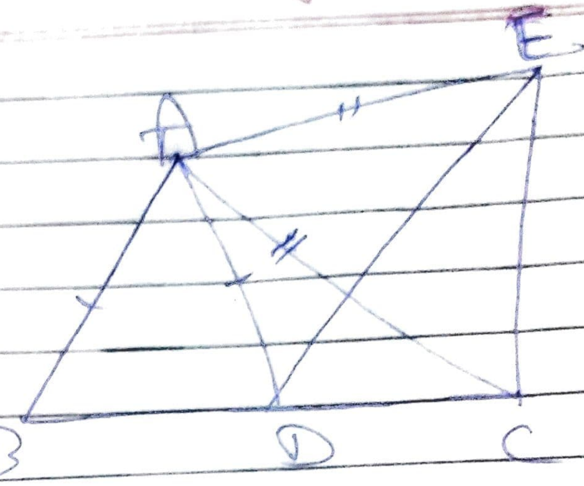
$\Delta APB \cong \Delta AQB$ (AAS)

(ii) $BP = BQ$ (CPCT)

So,

It can be said, the point B is equidistant from the arms of $\angle A$.

Ans,



Given,

AB = AD

AC = AE

$\angle BAD = \angle EAC$

To prove → BC = DE

Proof :- $\angle BAD = \angle EAC$

Now by adding $\angle DAC$ on both sides

$\angle BAD + \angle DAC = \angle EAC + \angle DAC$

$\Rightarrow \angle BAC = \angle EAD$

In $\triangle ABC$ and $\triangle ADE$

AC = AE (given)

$\angle BAC = \angle EAD$ (proved)

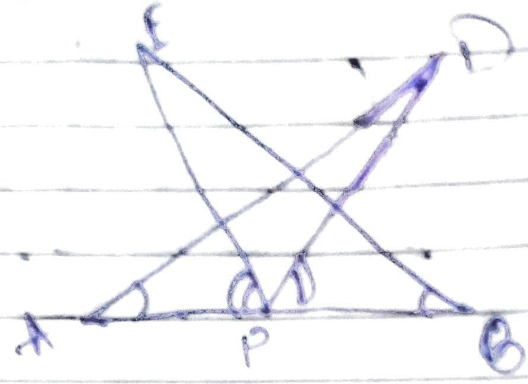
AB = AD (given)

So, $\triangle ABC \cong \triangle ADE$ (SAS)

So,

BC = DE (CPCT)

7Ans,



Given,

P is the mid-point of line-segment AB.

∠BAD ∠ABE

∠EPA = ∠DPB

To prove ⇒ (i) △DAP ≅ △EBP

(ii) AD = BE

Proof ⇒ (i) ∠EPA = ∠DPB

adding DPE adding both sides

EPA + DPE = DPB + DPE

∴ DPA = EPB (i)

P is the mid-point of AB = BP

In △DAP and △EBP

DPA = EPB

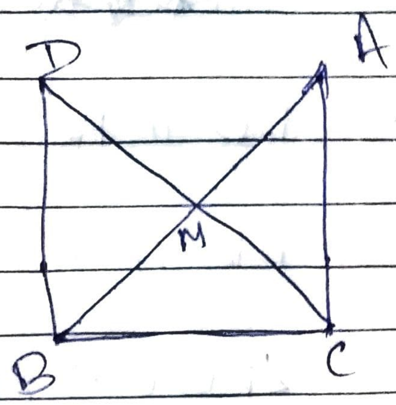
AP = BP (since P is the mid-point of line-seg)

BAD = ABE (given)

So, △DAP ≅ △EBP (ASA)

(iii) So,
AD = BE (CPCT)

8Ans →



Given,
M is the mid-point of line Segment AB,
$C = 90^\circ$
DM = CM

Prove :- (i) $\Delta AMC \cong \Delta BMD$
(ii) $\angle DBC$ is a right angle.
(iii) $\Delta DBC \cong \Delta ACB$
(iv) $CM = 1/2\, AB$

Proof :→ ① In $\Delta AMC \cong \Delta BMD$

AM = BM (Since M is the mid-point)
CM = DM (given)
CMA = DMB (Vert. Opp. Angle)

$\Delta AMC \cong \Delta BMD$ (SAS)

② $\angle ACM = \angle BDM$ (CPCT)
AC = BD (CPCT)

② BD ∥ AC ($\angle BDC = \angle ACD$ alternate ∠s)

BD ∥ AC and BC transversal

$\angle DBC + \angle ACB = 180^\circ$
(co. int ∠s is supplementary)

$\angle DBC + 90^\circ = 180^\circ$
$\angle DBC = 180^\circ - 90^\circ = 90^\circ$

③ In $\triangle DBC$ and $\triangle ACB$,

BC = CB (common)
ACB = DBC (They are right angle)
DB = AC (CPCT)

So,
$\triangle DBC \cong \triangle ACB$ (SAS)

④ DC = AB (CPCT)

$\Rightarrow \frac{1}{2} DC = \frac{1}{2} AB$

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

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