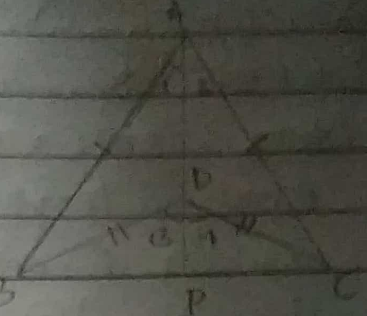
Ex - 7.3



Given: AB = AC, DB = DC

To prove: (i) $\triangle ABD \cong \triangle ACD$

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

(iii) AP bisects $\angle A$ and $\angle D$

(iv) AP is the perpendicular bisector of BC

Proof:- In $\triangle ABD$ and $\triangle ACD$

AB = AC (given)

AD = DA [Common]

DB = DC

$\triangle ABD \cong \triangle ACD$ (SSS)

$\angle 1 = \angle 2$ [CPCT] —— ①

In $\triangle ABP$ and $\triangle ACP$

AB = AC (given)

AP = PA (Common)

$\angle 1 = \angle 2$ (proved earlier)

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

PB = PC (CPCT)

$\angle APB = \angle APC$ (CPCT)

$\angle APB + \angle APC = 180^\circ$ [Linear Pair]

$\angle APB = \angle APC = \frac{180^\circ}{2} = 90^\circ$

AP is perpendicular bisector of BC

In ΔBDP and ΔCDP

$BD = CD$ (given)

$DP = PD$ (common)

$\angle DPB = \angle DPC = 90°$ [~~BAS~~]

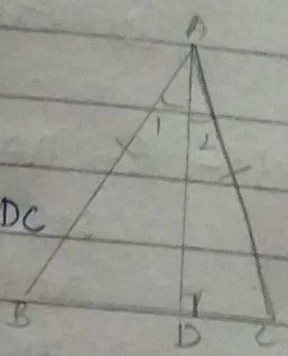
$\Delta BDP \cong \Delta CDP$ [RHS]

$\angle 3 = \angle 4$ (CPCT) — (2)

From (1) and (2) AP bisects $\angle A$ as well as $\angle D$

2— Given: In ΔABC, $AB = AC$

$AD \perp BC$



To prove: (i) AD bisects BC — $DB = DC$

(ii) AD bisects $\angle A$

$\angle 1 = \angle 2$

Proof: In ΔABD and ΔACD

$AD = DA$ (common)

$AB = AC$ [given]

$\angle ADB = \angle ADC = 90°$

$\Delta ABD \cong \Delta ACD$ (RHS)

$DB = DC$ (CPCT)

$\angle 1 = \angle 2$ (CPCT)

AD bisects $\angle A$