7.3

1\. (i) In ΔABD and ΔDBC, we have

$AB = AC$ (From (1))
$BD = DC$ (From (2))
$AD = AD$ (common)

$\Delta AB \cong \Delta ACD$ (SSS congruence rule)

(ii) From part (i)

$\Delta ABD \cong \Delta ACD$

So, $\angle BAP = \angle PAC$ (CPCT) ...(1)

In ΔABP and ΔACP

$AB = AC$ (Given)

$\angle BAP = \angle PAC$ (From (1))

$AP = AP$ (Common)

$\Delta ABP \cong \Delta ACP$ (SAS congruence rule)

(iii) $\angle BAD = \angle CAD$ & $\angle BDP = \angle CDP$

Proof.

From part (i) $\triangle ABD \cong \triangle ACD$

So, $\angle BAD = \angle CAD$

Hence AD bisects $\angle A$

For $\angle BDP = \angle CDP$,

we will first prove $\triangle BDP \cong \triangle CDP$

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

$BP = CP$ ... (i)

(iv) From part (ii), $\triangle ABP \cong \triangle ACP$

$BP = CP$ (CPCT)

$\angle APB = \angle APC$

Since BC is a line,

$\therefore \angle APB + \angle APC = 180$

$\angle APB + \angle APB = 180$

$2\angle APB = 180$

In ΔADB and ΔADC

2) (i) In ΔABD and ΔACD we have,

$\angle ADB = \angle ADC$ [Each 90°]
$AB = AC$ [Given]
$AD = AD$ (Common)
$\therefore \Delta ABD \cong \Delta ACD$ [RHS congruence]
$\therefore BD = CD$ [CPCT]

Hence AD bisects BC

(ii) Also $\angle BAD = \angle CAD$
Hence AD bisects $\angle A$.