

Ex 7.3

1) It is given that $\triangle ABD$ & $\triangle ACD$ are two isosceles triangles.

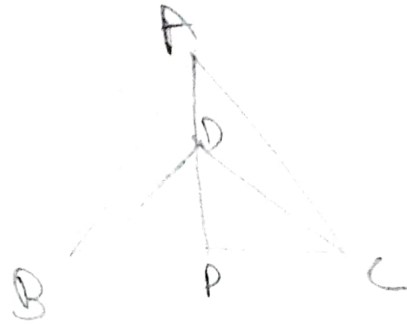
Given

To Prove that: i) $\triangle ABD \cong \triangle ACD$

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

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

iv) AP is the Perpendicular bisector of BC.



1) Prove that $\triangle ABD \cong \triangle ACD$.

S: $AD = AD$ (Common)

S: $AB = AC$ (Isosceles triangle:- two sides are of equal length)

S: $BD = CD$ (Since $\triangle DBC$ is isosceles)

$\therefore \triangle ABD \cong \triangle ACD$ (By SSS Criteria) (Proved)

ii) Prove that $\triangle ABP \cong \triangle ACP$

S: $AP = AP$ (Common)

A: $\angle PAB = \angle PAC$ (by CPCT in $\triangle ABD \cong \triangle ACD$)

S: $AB = AC$ (Since $\triangle ABC$ is isosceles triangle)

$\therefore \triangle ABP \cong \triangle ACP$ (by SAS Criteria) (Proved)

iii) $\angle PAB = \angle PAC$ by CPCT as $\triangle ABD \cong \triangle ACD$.

organisms (e.g. In multicellular organisms, the shape of cells depends upon their position in the body and their interaction with neighbouring cells. Some cells in the human body are shown below as an example of different shapes (Fig. 1.5).

Cells also vary in their dimensions. Their dimensions are expressed in micrometers (μm) and Angstroms (\AA). Human cells have a diameter from 10 to 100 μm . Small objects seen through a microscope are of a size of a few μm which are ex-

iv) $\angle BPD = \angle CPD$ (By CPCT as $\triangle BPD \cong \triangle CPD$)
 $\therefore BP = CP$ --- (i)

also, since BC is a straight line.

$$\angle BPD + \angle CPD = 180^\circ \quad (\text{Linear pair})$$

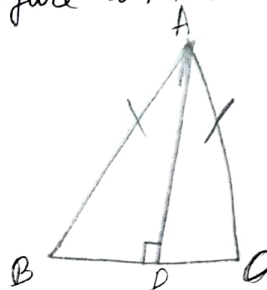
$$\Rightarrow 2 \angle BPD = 180^\circ$$

$$\Rightarrow \angle BPD = \frac{180^\circ}{2} = 90^\circ \quad \text{--- (ii)}$$

Now, from the equation (i) & (ii) we can say that AP is perpendicular to bisector of BC .

2) AD is an altitude of an isosceles triangle ABC in which $AB = AC$. (given)

(Figure will be:-



Prove that

i) AD bisects BC

ii) AD bisects $\angle A$

i) In $\triangle ABD$ & $\triangle ACD$.

R: $\angle ADB = \angle ADC$ (90° each)

H: $AB = AC$ (given)

S: $AD = AD$ (Common)

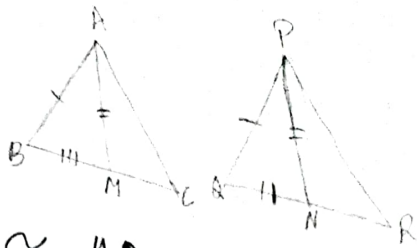
$\therefore \triangle ABD \cong \triangle ACD$ (by RHS Criteria)

$$BD = CD \quad (\text{CPCT})$$

$\therefore AD$ bisects BC . (Proved)

ii) By CPCT, $\angle BAD = \angle CAD$

$\therefore AD$ bisects $\angle A$ (Proved)



Prove that

- i) $\triangle ABM \cong \triangle PQN$
 ii) $\triangle ABC \cong \triangle PQR$.

Given :-

$$AB = PQ$$

$$BC = QR$$

$$AM = PN$$

$$\text{i) } \frac{1}{2}BC = BM \text{ \& } \frac{1}{2}QR = QN \text{ (AM \& PN are medians)}$$

$$\text{Also, } BC = QR \text{ (given)}$$

$$\Rightarrow BM = QN$$

$$\text{So, } \frac{1}{2}BC = \frac{1}{2}QR$$

$$\Rightarrow BM = QN$$

In $\triangle ABM$ & $\triangle PQN$,

$$S: AB = PQ \text{ (given)}$$

$$S: BM = QN \text{ (proved above)}$$

$$S: AM = PN \text{ (given)}$$

$$\therefore \triangle ABM \cong \triangle PQN \text{ (By SSS Criteria)}$$

ii) In $\triangle ABC$ & $\triangle PQR$

$$S: AB = PQ \text{ (given)}$$

$$A: \angle ABC = \angle PQR \text{ (By CPCT)}$$

$$S: BC = QR \text{ (given)}$$

$$\triangle ABC \cong \triangle PQR \text{ (SAS Criteria)}$$

4) $BE \perp CP =$ two equal altitudes (given)

Now, in $\triangle BEC$ & $\triangle CFB$

$BE \perp CP$

R: $\angle BEC = \angle CFB$ (90° each)

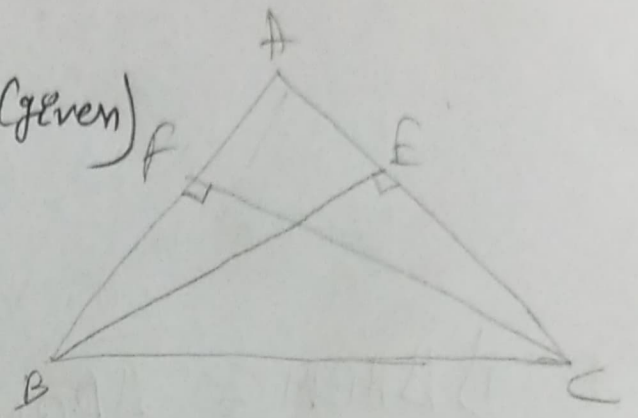
H: $BC = CB$ (common)

S: $BE = CF$ (common)

$\therefore \triangle BEC \cong \triangle CFB$ (RHS Criteria)

Also, $\angle C = \angle B$ (cpct)

So, $AB = AC$ (opposite to the equal angles is always equal)



5) Given $\rightarrow AB = AC$

$\triangle ABP$ & $\triangle ACP$ are ~~congruent~~ congruent by RHS congruency as $\angle APB = \angle APC = 90^\circ$ (AP is ~~the~~ Altitude)

R: $\angle APB = \angle APC$ (90° each)

H: $AB = AC$ (given)

S: $AP = AP$ (common)

$\therefore \triangle ABP \cong \triangle ACP$ (RHS Criteria)
 $\angle B = \angle C$ (by cpct)

