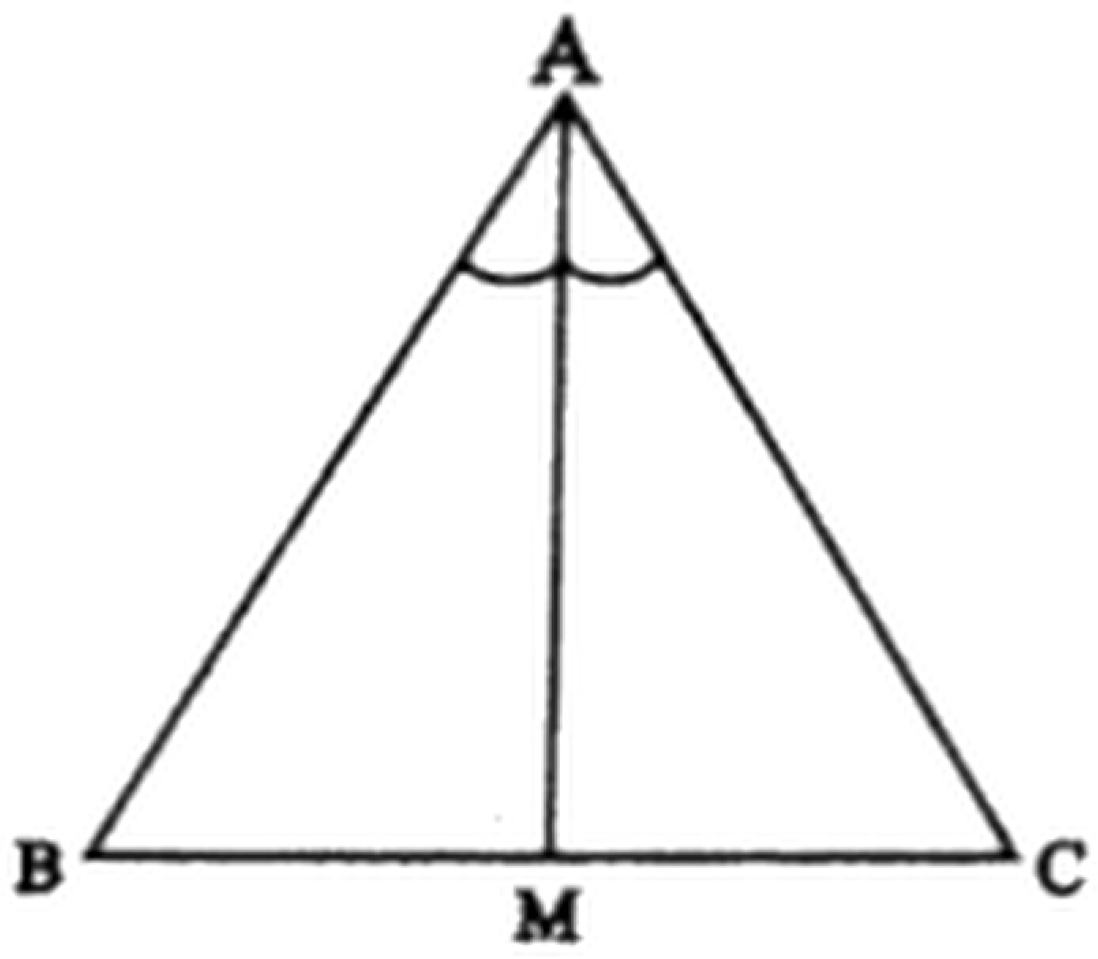
Exercise 10.2

Q1. Prove that any two medians of an equilateral triangle are equal in measure.

Solution:



Given:

In ΔABC, $\overline{AB} \cong \overline{AC}$ and M is mid point of BC.

To prove:

AM bisects ∠A and $\overline{AM}$ is perpendicular to $\overline{BC}$

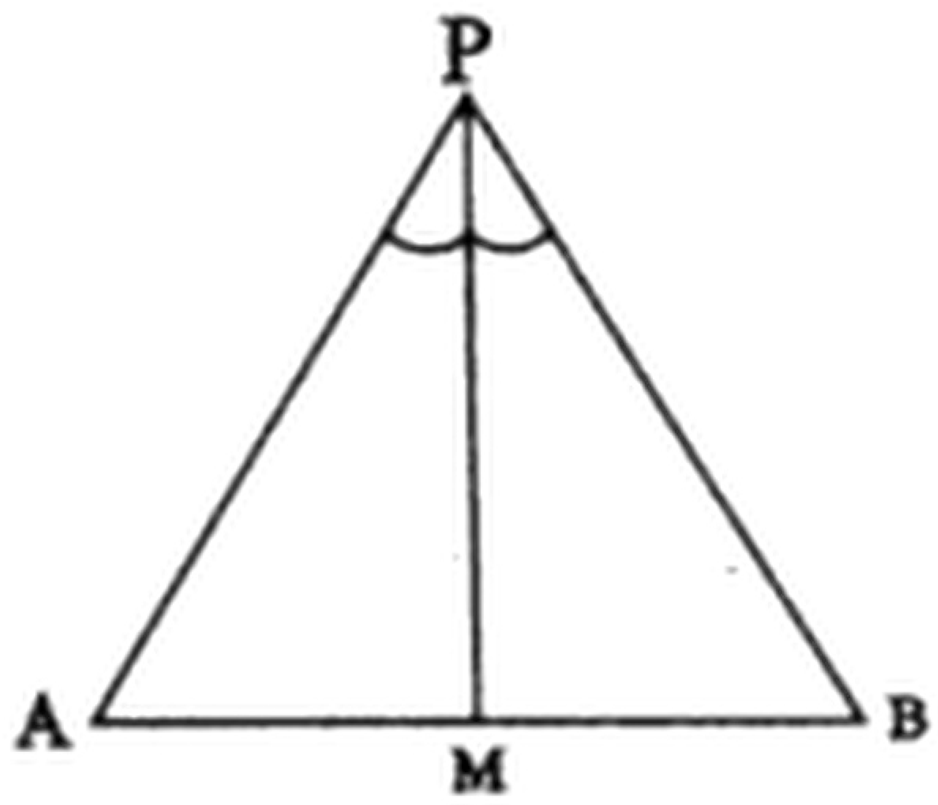
Proof:

Statements	Reasons
In ΔABM ↔ ΔACM	
$\overline{AB} \cong \overline{AC}$	Given
$\overline{BM} \cong \overline{CM}$	Given M is mid point of BC.
$\overline{BM} \cong \overline{AM}$	Common
∴ ΔABM ≅ ΔACM	S. S. S. ≅ S. S. S.
So ∠BAM ≅ ∠CAM	Corresponding sides of ≅ Δ's.

$\therefore$ AM bisects $\angle A$	Corresponding sides of $\cong$ Δ's.
Also $\angle AMB \cong \angle AMC$	
but $m\angle AMB \cong \angle AMC = 180°$	$\overline{BC}$ is a straight line.
$\therefore$ $m\angle AMB = \angle AMC = 90°$	
I. e. AM is perpendicular to BC.	

Q2. Prove that a point, which is equidistant from the end points of a line segment, is on the right bisector of the line segment.

Solution:



Given:

$\overline{AB}$ is a line segment and P is a point such that

$\overline{PA} \cong \overline{PB}$

To prove:

P is on right bisector of $\overline{AB}$

Construction:

Draw $\overline{PM}$ bisector of $\angle P$ meeting $\overline{AB}$ at M.

Proof:

Statements	Reasons
In $\Delta APM \leftrightarrow \Delta BPM$	
$\overline{PA} \cong \overline{PB}$	Given
$\angle APM \cong \angle BPM$	Construction.
$\overline{PM} \cong \overline{PM}$	Common
$\therefore\ \Delta APM \cong \Delta BPM$	S. S. S. ≅ S. S. S.
So $\overline{AM} \cong \overline{BM}$	Corresponding sides of ≅ Δ's.
$\angle PMA \cong \angle PMB$	
but $m\angle PMA \cong \angle PMB = 180°$	$\overline{BC}$ is a straight line.
$\therefore$ $m\angle PMA = \angle PMB = 90°$	
So PM is right bisector of AB.	
or P is on right bisector of AB.	