

2B-7

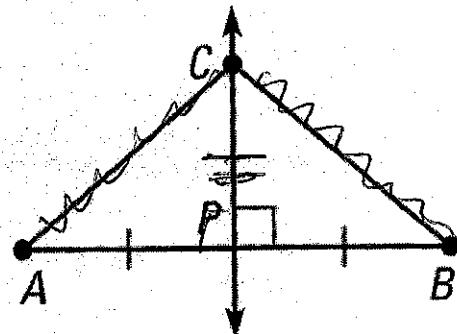
2B-6

**Perpendicular Bisector Theorem:** If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.

Point C is on the perpendicular bisector. Prove that C is equidistant from the endpoints of AB.

Given:  $\overline{CP} \perp \overline{AB}$ ;  $\overline{CP}$  bisects  $\overline{AB}$  at P

Prove:  $\overline{AC} \cong \overline{BC}$



Statements	Reasons
1. $\overline{CP} \perp \overline{AB}$ ; $\overline{CP}$ bisects $\overline{AB}$ at P	1. Given
2. $\angle CPA \cong \angle CPB$ rt. $\angle$ 's	2. Def. of $\perp$
3. $\angle CPA \cong \angle CPB$	3. All rt. $\angle$ 's $\cong$
4. $\overline{AP} \cong \overline{BP}$	4. Def. of bisect.
5. $\overline{CP} \cong \overline{CP}$	5. Reflexive Prop.
6. $\triangle CPA \cong \triangle CPB$	6. SAS
7. $\overline{AC} \cong \overline{BC}$	7. CPCTC
8.	8.

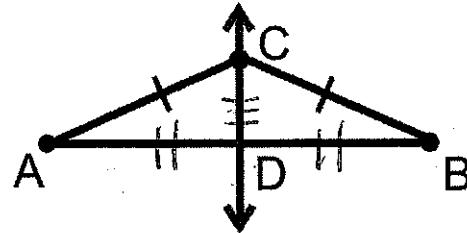
**Converse of Perpendicular Bisector Theorem:** If a point is equidistant from the endpoints of a segment, then the point is on the perpendicular bisector of the segment

**Proof of the Converse of Perpendicular Bisector Theorem:**

Given:  $\overline{AC} \cong \overline{CB}$

$D$  is the midpoint of  $\overline{AB}$

Prove:  $\overline{CD}$  is the perpendicular bisector of  $\overline{AB}$



Statements	Reasons
1. $\overline{AC} \cong \overline{CB}$ $D$ is the midpoint of $\overline{AB}$	1. Given
2. $\overline{AD} \cong \overline{DB}$	2. Def. of Midpoint
3. $\overline{CD} \cong \overline{CD}$	3. Reflexive Prop.
4. $\triangle ACD \cong \triangle BCD$	4. SSS
5. $\angle CDA \cong \angle CDB$	5. CPCTC
6. $\angle CDA \text{ & } \angle CDB \text{ rt } \angle$	6. If two angles are supplementary and congruent, then they are right angles.
7. $\overline{CD}$ is $\perp$ bis. of $\overline{AB}$	7. Def. of Perpendicular Bisector

Steps 2 and 6 are both needed for  
the Def. of  $\perp$  bis

- Bisector (congruent segments)
- $\text{rt } \angle$  is  $\perp$ .