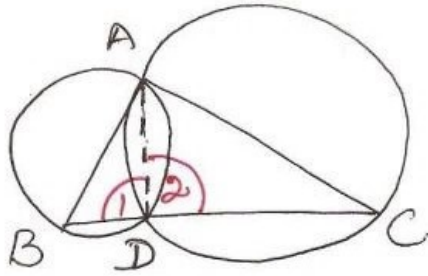


10



to prove D lies on BC  
 Const - join AD

proof

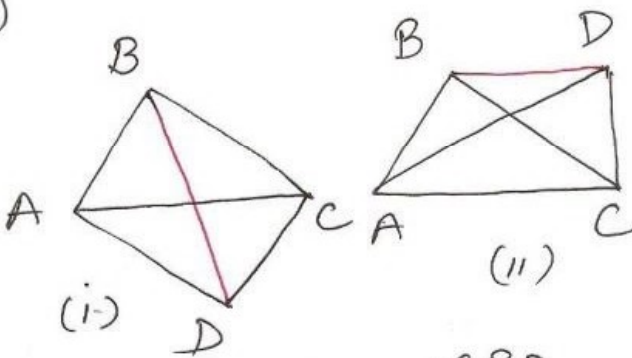
$$\angle 1 = 90^\circ \quad (\text{angles in same circle})$$

$$\angle 2 = 90^\circ$$

$$\therefore \angle 1 + \angle 2 = 90^\circ + 90^\circ = 180^\circ$$

$\therefore$  Pts B, D, C are collinear  
 D lies on BC

11



to prove  $\angle CAD = \angle CBD$

proof fig ①

$$\angle B + \angle D = 90^\circ + 90^\circ = 180^\circ$$

$\therefore \square ABCD$  is cyclic

$$\angle CAD = \angle CBD \quad (\text{angles in same seg.})$$

fig ②

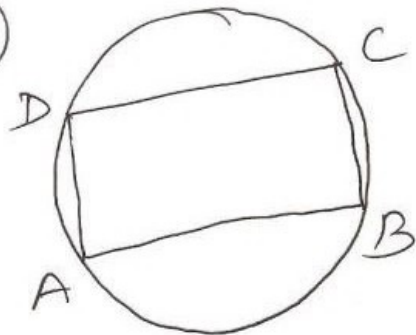
AC subtends  $\angle B$  and  $\angle D$  on same side and

$$\angle B = \angle D \quad (\text{each } 90^\circ)$$

$\therefore$  Points A, B, D, C are concyclic

$$\therefore \angle CAD = \angle CBD \quad (\text{angles in same segment})$$

12



to prove  $\square ABCD$  is a rect.

proof

$$\angle A + \angle C = 180^\circ \quad (\text{opp. angles of } \square)$$

$$\text{But } \angle A = \angle C \quad (\text{all } \square)$$

$$\angle A + \angle A = 180^\circ$$

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

$$\Rightarrow \angle A = 90^\circ$$

$\therefore \square ABCD$  is a rect.