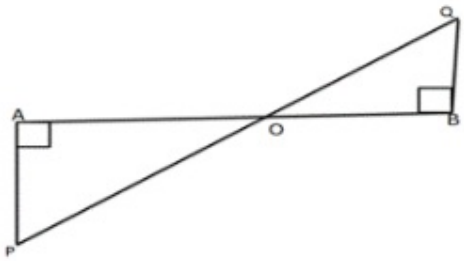
Exercise 5A

Question 9:

Given: PA ⊥ AB, QB ⊥ AB, and PA = QB
To Prove: AO = OB and PO = OQ



Proof: In △APO and △BPO,

∠PAO = ∠QBO = 90° [Given]

PA = QB [Given]

∠PAO = ∠QBO [Since PA ⊥ AB, and QB ⊥ AB, PA || QB, and thus PQ is a transversal, therefore, alternate angles are equal]

So, by Angle−Side−Angle criterion of congruence, we have

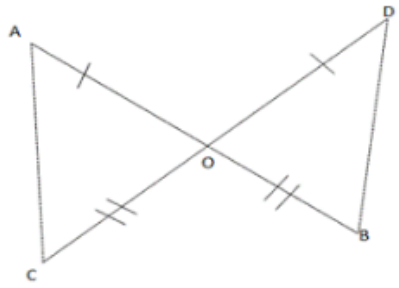
△APO ≅ △BPO

⇒ AO = OB and PO = OQ [Since corresponding parts of congruent triangles are equal]

Thus, we have
O is the midpoint of AB and PQ.

Question 10:

Given: Line segments AB and CD intersect at O such that OA = OD and OB =OC.



To prove: AC = BD

Proof: In $\triangle AOC$ and $\triangle BOD$, we have

AO = OD [Given]

$\angle AOC = \angle BOD$ [Vertically opposite angles are equal]

OC = OB [Given]

So, by Side−Angle−Side criterion of congruence, we have,

$\Rightarrow \triangle AOC \cong \triangle BOD$

$\Rightarrow$ AC = BD [Since the corresponding parts of the congruent triangles are equal]

$\Rightarrow \angle CAO = \angle BDO$ [by c.p.c.t]

Thus, we have, AC = BD

In case $\angle ODB = \angle OBD$, then $\angle CAO = \angle OBD$ which means alternate angles made by lines AC and BD with transversal AB are equal and then lines AC and BD will be parallel.

********** END **********