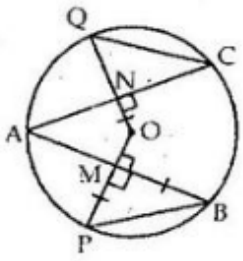
Exercise 11A

Question 17:

Given: AB and AC are chords of the circle with centre O.
$AB = AC$, $OP \perp AB$ and $OQ \perp AC$.



To Prove : $PB = QC$

Proof: $AB = AC$ [Given]

$\therefore \quad \frac{1}{2}AB = \frac{1}{2}AC$ [Divide by 2]

The perpendicular from the centre of a circle to a chord bisects the chord.

$\Rightarrow \quad MB = NC$.....(1)

Equal chords of a circle are equidistant from the centre.

$\Rightarrow \quad OM = ON$

Also, $OP = OQ$ [Radii]

$\Rightarrow \quad OP - OM = OQ - ON$

$\Rightarrow \quad PM = QN$.....(2)

Now consider the triangles, ΔMPB and ΔNQC:

$MB = NC$ [from (1)]

$\angle PMB = \angle QNC$ [right angle, given]

$PM = QN$ [from (2)]

Thus, by Side-Angle-Side criterion of congruence, we have

$\therefore \quad \Delta MPB \cong \Delta NQC$ [S.A.S]

The corresponding parts of the congruent triangles are equal.

$\therefore \quad PB = QC$ [by c.p.c.t]

Question 18:

Given: BC is a diameter of a circle with centre 0. AB and CD are two chords such that AB ∥ CD.

To Prove: AB = CD

Construction: Draw OL ⊥ AB and OM ⊥ CD.

Proof: In Δ OLB and ΔOMC

∠ OLB = ∠OMC [Perpendicular bisector, angle = 90°]

∠ OBL = ∠ OCD [AB ∥ CD, BC is a transversal, thus alternate interior angles are equal]

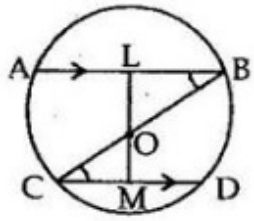
OB = OC [Radii]

Thus by Angle-Angle-Side criterion of congruence, we have

∴ Δ OLB ≅ Δ OMC [By AAS]

The corresponding parts of the congruent triangle are equal.

∴ OL = OM [C.P.C.T.]



But the chords equidistant from the centre are equal.

∴ AB = CD

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