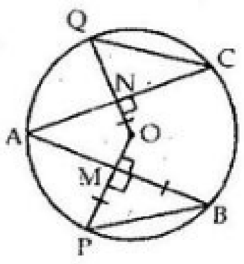
Exercise 11A

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]

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

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

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

Equal chords of a circle are equidistant from the centre.

$\Rightarrow OM = ON$

Also, $OP = OQ$ [Radii]

$\Rightarrow OP - OM = OQ - ON$

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

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

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

The corresponding parts of the congruent triangles are equal.

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

Question 18:

Given: BC is a diameter of a circle with centre O. AB and CD are two chords such that $AB \parallel CD$.

To Prove: $AB = CD$

Construction: Draw $OL \perp AB$ and $OM \perp CD$.

Proof: In $\triangle OLB$ and $\triangle OMC$

$\angle OLB = \angle OMC$ [Perpendicular bisector, angle = 90°]

$\angle OBL = \angle OCD$ [$AB \parallel CD$, BC is a transversal, thus alternate interior angles are equal]

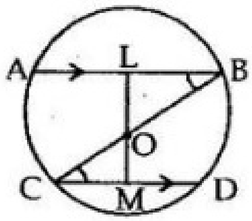
$OB = OC$ [Radii]

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

$\therefore \quad \triangle OLB \cong \triangle OMC$ [By AAS]

The corresponding parts of the congruent triangle are equal.

$\therefore \quad OL = OM$ [C.P.C.T.]



But the chords equidistant from the centre are equal.

$\therefore \quad AB = CD$

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