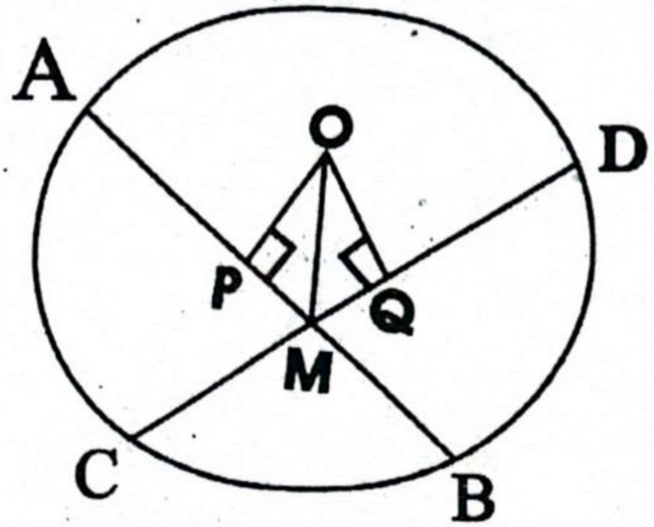
Exercise 9.2

Q.1. Two equal chords of a circle intersect, show that *the segments of the one are equal corresponding* to the segments of the other.

Given

A circle with centre O, in which $m\overline{AB} = m\overline{CD}$, $\overline{AD}$ and $\overline{CD}$ intersect at point M.



Required:

$m\overline{MD} = m\overline{MA}$

$m\overline{MC} = m\overline{MB}$

Construction:

$\overline{OQ} \perp \overline{CD}$

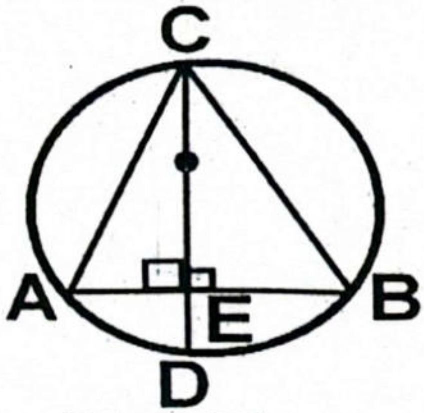
$\overline{OP} \perp \overline{AB}$

Proof:

Statements	Reasons
In Δ^s OPM and OQM.	
$m\overline{OP} = m\overline{OQ}$	Theorem
$m\overline{OM} = m\overline{OM}$ (hype).	Common
$\therefore\ \Delta OPM = \Delta OQM$	
Thus $m\overline{PM} = m\overline{QM}$ (i)	
Now $m\overline{CQ} = m\overline{QD}$	Theorem
and $m\overline{AP} = m\overline{BP}$	
Since $m\overline{AB} = m\overline{CD}$	Given
$\therefore \frac{1}{2} m\overline{AB} = \frac{1}{2} m\overline{CD}$	
Thus $m\overline{AP} = m\overline{DQ}$	
$m\overline{AP} + m\overline{PM} = m\overline{DQ} + m\overline{OM}$	
$\Rightarrow m\overline{DM} = m\overline{AM}$ proved	Proved.
Now $m\overline{CD} - m\overline{MD} = m\overline{AB} - m\overline{AM}$	
Thus $m\overline{CM} = m\overline{BM}$	Proved

Q.2. AB **is the chord of a circle and the diameter** CD **is perpendicular bisector of** AB**.**
Prove that $m\overline{AC} = m\overline{BC}$.

Given *In a circle.*
$AB \perp CD$ *and* $AE \cong EB$



To Prove: $m\overline{AC} = m\overline{BC}$

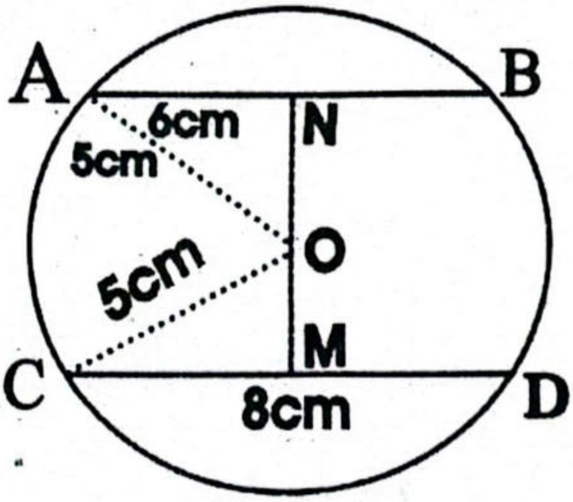
Proof:

Statements	Reasons
In $\Delta AEC \leftrightarrow \Delta EBC$ and $AE \cong EB$.	
$\angle AEC = m\angle CEB$.	Given
$\overline{CE} \cong \overline{CE}$.	Right bisect
$\therefore \Delta AEC \cong \Delta EBC$	Common
$\Rightarrow m\overline{AC} = m\overline{BC}$	$H.S \cong H.S$
$mOEA \cong mOEB = 90^o$	
$\Delta OAE \cong \Delta OED$	
$\overline{AE} = \overline{AB}$	

Q.3 **As shown in the figure, find the distance between two parallel chords** AB **and** CD**.**

Given:

In the given figure.
$m\overline{AB} = 6\ cm$
$m\overline{CD} = 8\ cm$
$m\overline{OC} = 5\ cm$
$\overline{OM} \perp \overline{CD}. \overline{ON} \perp \overline{MN}$



Required:

$To\ find\ in\ \overline{MN}$

$\overline{OM} \perp CD$

$\therefore \quad m\overline{CM} = \frac{8}{2} = 4\ cm$

$In\ right\ Angled\ triagle\ OCM.$

$(m\overline{OM})^2 = (m\overline{CO})^2 - (m\overline{CM})^2$

$= (5)^2 - (4)^2$

$= 25 - 16$

$(m\overline{OM})^2 = 9$

$\therefore \quad mOM = \sqrt{9}$

$= 3\ cm \qquad (i)$

$Similarly\ in\ right\ Angled\ triangle\ OAN$

$(m\overline{ON})^2 = (m\overline{OA})^2 - (m\overline{AN})^2$

$= (5)^2 - (3)^2$

$= 25 - 9$

$(m\overline{ON})^2 = 16$

$\therefore \quad m\overline{ON} = \sqrt{16}$

$= 4\ cm. \qquad (ii)$

$m\overline{OM} + m\overline{ON} = 3 + 4 = 7\ cm$

$Thus\ distance\ between\ \overline{AB}, \overline{CD} = 7\ cm.$