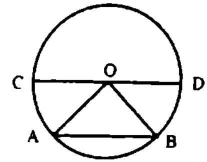
Given:

$\overline{AB}$ is a chord and $\overline{CD}$ is the diameter of a circle with centre point O.



To prove:

If $\overline{AB}$ and $\overline{CD}$ are distinct, then $m\overline{CD} = m\overline{AB}$.

Construction:

Join O with A and 0 with B then form a ΔOAB.

Proof:

Sum of two sides of a triangle is greater than its third side.

In $\Delta OAS \Rightarrow m\ \overline{OA} + m\ \overline{OB} > m\ \overline{AB}$ ... (i)

But $\overline{OA}$ and $\overline{OB}$ are the radii of the same circle with centre O.

So that $m\ \overline{OA} + m\ \overline{OB} = m\ \overline{CD}$ ... (ii)

$\Rightarrow$ Diameter $\overline{CD}$ > chord $\overline{AB}$ using (i) & (ii).

Hence, diameter CD is greater than any other chord drawn in the circle.

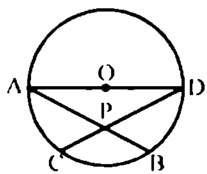
SOLVED EXERCISE 9.2

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:

In a circle with radius O, we have

$m\overline{AB} = m\overline{CD}$



To Prove:

$\overline{AB} = \overline{CD}$

Construction:

Join O to A and D

Proof:

Because $\overline{AB}$ and $\overline{CD}$ intersect each other, so $m\ \overline{AB} = \overline{AP} + \overline{BP}$

and $m\overline{CD} = m\overline{CP} + m\overline{PD}$

$\overline{AP} = m\overline{CP}$ and $m\overline{PB} = m\overline{PP}$

So $m\ \overline{AB} = m\overline{CP}$

Hence proved

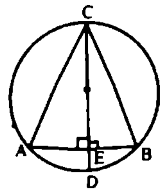
2. **AS is the chord of a circle and the diameter $\overline{CD}$ is perpendicular bisector of $\overline{AB}$.**

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:

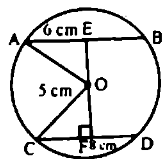
Statements	Reasons
In Δ AEC $\leftrightarrow$ Δ EBC and AE $\cong$ EB	
$\angle AEC = m\angle CEB$	Given
$\overline{CE} \cong \overline{CE}$	Right bisect
$\therefore$ $\Delta AEC \cong \Delta EBC$	Common
$\Rightarrow$ $m\overline{AC} = m\overline{BC}$	H.S $\cong$ H.S.
$mOEA \cong mOEB = 90^{\circ}$	
$\Delta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

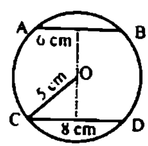
3. **As shown in the figure, find the distance between two parallel chords $\overline{AB}$ and $\overline{CD}$.**

Given:

$m\overline{AB} = 6cm$ and $m\overline{CD} = 8cm$

$m\overline{OC} = 5cm$





Required:

$m\overline{EF} = ?$

In Δ OCF

$$m\overline{OC}^2 = \overline{OF}^2 + \overline{FC}^2$$

$$5^2 = \overline{OF}^2 + 4^2$$

$$\Rightarrow \overline{OF}^2 = 25 - 16 = 9$$

$$\overline{OF} = \sqrt{9} = 3cm$$

In ΔOAE

$$\overline{OA}^2 = \overline{OE}^2 + \overline{EA}^2$$

$$5^2 = \overline{OE}^2 + 3^2$$

$$\Rightarrow \overline{OE}^2 = 25 - 9 = 16$$

$$\overline{OE} = \sqrt{16} = 4$$

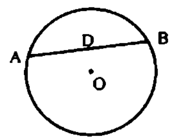
$$\therefore \overline{EF} = \overline{OE} + \overline{OF} = 4 + 3 = 7cm.$$

SOLVED MISCELLANEOUS EXERCISE 9

Q1. Multiple Choice Questions:
Four possible answers are given for the following questions.
Tick (✓) the correct answer.

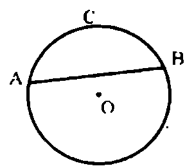
(i) In the circular figure, ADS is called

(a) an arc (b) a secant
(c) a chord (d) a diameter



(ii) In the circular figure, $A\overset{\frown}{B}C$ is called

(a) an arc (b) a secant (c) a chord
(d) a diameter



(iii) In the circular figure, AOB is called

(a) an arc (b) a secant
(c) a chord (d) a diameter:

(iv) In a circular figure, two chords AB and CD are equidistant from the centre. They will be:

(a) parallel (b) non congruent
(c) congruent (c) perpendicular