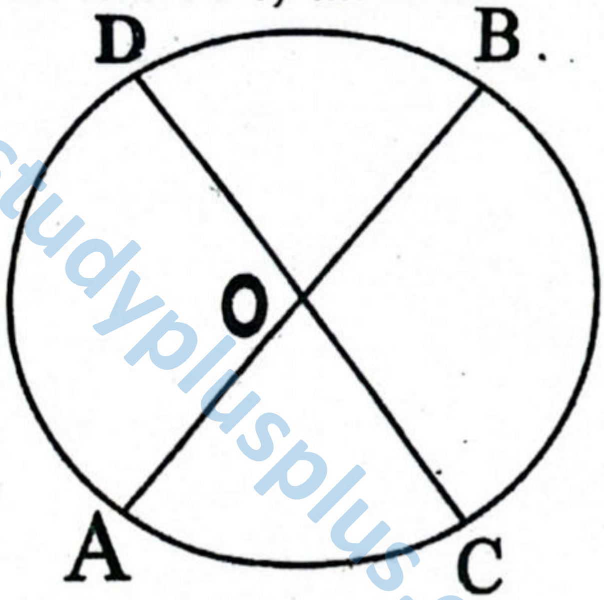
Q.1 **Prove that; the diameters of a circle bisect each other.**

Given:

A circle with centre O and having $\overline{AB}, \overline{CD}$, that pass through the centre O of the circle.



To prove:

$\overline{AB}$ and $\overline{CD}$ diameters bisect each other.

Proof:

Statements	Reasons
$\overline{AB}$ is diameter that passes through O of three circle.	
$\therefore \quad m\overline{OA} = m\overline{OB} \quad (i)$	
Similarly $m\overline{OC} = m\overline{OD} \quad (ii)$	
Now $m\overline{OA} = m\overline{OC} \quad (iii)$	
From i, ii, iii	
$mOA = m\overline{OB} = m\overline{OC} = m\overline{OD}$	

i.e; $\overline{AB}$ and CD are intersecting chords which bisect each other.

Q.2 **Two chords of a circle do not pass through the centre. Prove that they cannot bisect each other.**

Given:

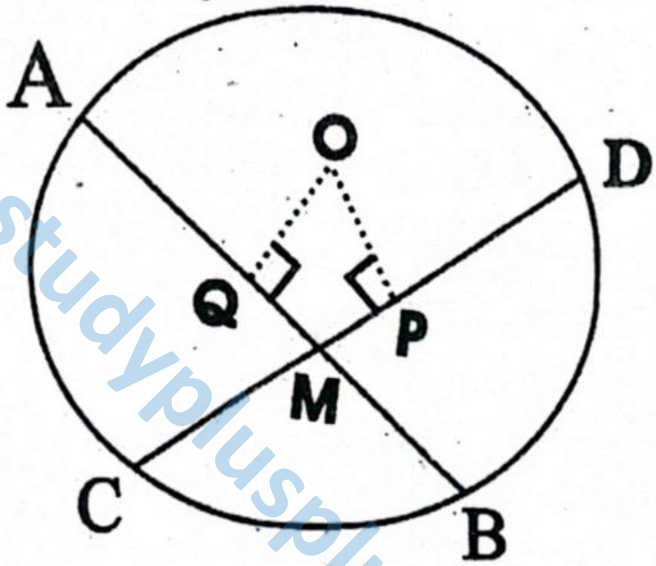
A circle with centre O, has $\overline{AB}, \overline{CD}$ *chords that intersect each other at point M.*

To prove:

M is not the mid – point of $\overline{AB}, \overline{CD}$

Construction:

Draw $\overline{OP} \perp \overline{CD}, \overline{OQ} \perp AB.$



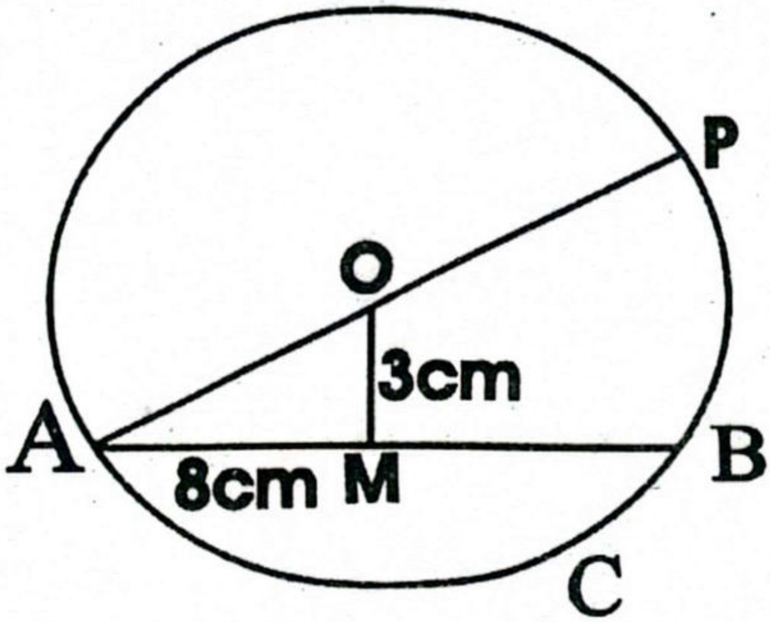
Proof:

Statements	Reasons
O is centre of circle $\overline{OP} \perp \overline{CD}$ *Thus,* $m\overline{CP} = m\overline{DP}$ *Now point M lies between C and P Therefore M is not mid – point of* $\overline{CD}$ *Similarly M is not mid – point of* $\overline{AB}$ *Hence,* $\overline{AB}$ *and* $\overline{CD}$ *cannot bisect each other*	*Construct Theorem*

Q.3 **If length of the chord** $\overline{AB} = 8cm$**. Its distance from the centre is** $3cm$**, then find the diameter of such circle.**

Given:

O is the centre of a circle $\overline{AB}$ *is chord of the circle that* $m\overline{AB} = 8cm.$ $\overline{OM} \perp \overline{AB}$ *that* $m\overline{OM} = 3cm.$



Required:

- *To find the length of the diameter of a circle i.e; to find* $m\overline{AP}$

Construction:

Join A to O and produce it to meet the circle at P.

Calculation:

M is the mid – point of $\overline{AB}$ *(theorem)*

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

Now, In right angled triangle OAM by pythagorean theorem.

$(m\overline{AO})^2 = (m\overline{AM})^2 + (m\overline{OM})^2$

$= (4)^2 + (3)^2$

$= 16 + 9$

$(m\overline{AO})^2 = 25$

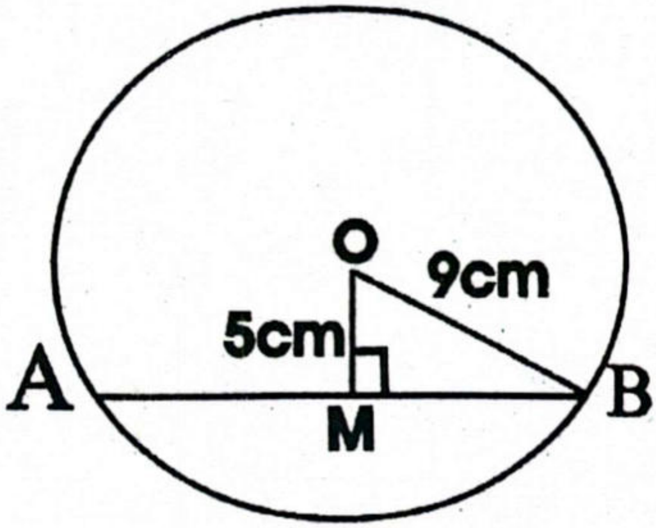
$\therefore \quad mOA = \sqrt{25}$

$= 5\ cm.$

Now $\quad m\overline{AP} = 2m\overline{AO}$

$= 2 \times 5 = 10\ cm.$

Q.4 **Calculate the length of a chord which stands at a distance 5cm from the centre of a circle whose radius is 9cm.**



Given:

O is centre of a circle in which

(i) $\overline{AB}$ is its chord.

(ii) $\overline{OM} \perp \overline{AB}$

(iii) $m\overline{OM} = 5\ cm$

(iv) $m\overline{OB} = 9\ cm$ (radius)

Required:

To find $m\overline{AB}$

Calculation:

$\Delta\overline{OMB}$ is a right – angled triangle at M.

By pythagoren theorem.

$$(m\overline{MB})^2 = (m\overline{OB})^2 - (m\overline{OM})^2$$
$$= (9)^2 - (5)^2$$
$$= 81 - 25$$
$$(m\overline{MB})^2 = 56$$
$$\therefore \quad m\overline{MB} = \sqrt{56}$$
$$= 7.48\ cm.$$
$$m\overline{AB} = 2 \times 7.48$$
$$= 14.96\ cm.$$