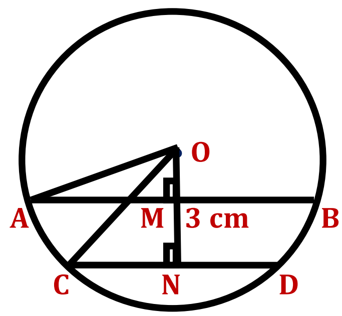
General directions for students: whatever be the notes provided, everything must be copied in the Maths copy and then do the HOME WORK in the same copy.

EXERCISE – 15.1

9. AB and CD are two parallel chords of a circle of 10 cm and 4 cm respectively. If the chords lie on the same side of centre and the distance between them is 3 cm, find the diameter of the circle.



Solution: Here, $AB = 10\text{ cm} \Rightarrow AM = 5\text{ cm}$

$CD = 4\text{ cm} \Rightarrow CN = 2\text{ cm}$

$MN = 3\text{ cm}$

Let $OM = x\text{ cm}$

In ΔOAM, $OA^2 = OM^2 + AM^2$ [$OM \perp AB$]

$\Rightarrow OA^2 = x^2 + 5^2 = x^2 + 25 \ldots\ldots\ldots\ldots\ldots\ldots\ldots..(i)$

In ΔOCN, $OC^2 = ON^2 + CN^2$ [$ON \perp CD$]

$\Rightarrow OC^2 = (x+3)^2 + 2^2 = x^2 + 2(x)(3) + 3^2 + 4$

$= x^2 + 6x + 9 + 4 = x^2 + 6x + 13 \ldots\ldots\ldots\ldots\ldots\ldots..(ii)$

$OA^2 = OC^2$ [$OA = OC = \text{radii}$]

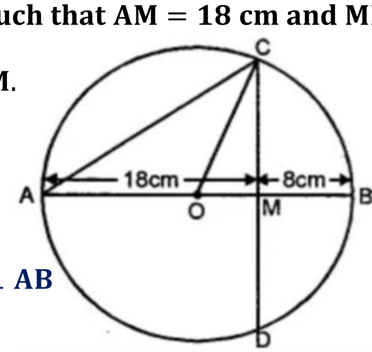
$\Rightarrow x^2 + 25 = x^2 + 6x + 13$

$\Rightarrow 25 = 6x + 13 \Rightarrow 6x = 25 - 13 = 12 \Rightarrow x = 2\text{ cm}$

From (i), $OA^2 = 2^2 + 25 \Rightarrow 4 + 25 = 29 \Rightarrow OA = \sqrt{29}\text{ cm}$

Now, Diameter $= 2 \times \sqrt{29} = 2\sqrt{29}\text{ cm}$ **Ans.**

12. AB is a diameter of a circle. M is a point in AB such that AM = 18 cm and MB = 8 cm. Find the length of the shortest chord through M.



Solution: $AB = 18 + 8 = 26\text{ cm}$

Radius $OA = OB = OC = 13\text{ cm}$

CD is the shortest chord through M $\therefore CD \perp AB$

We join OC

$OM = AM - OA = 18 - 13 = 5$ cm

In Δ OMC, $OC^2 = OM^2 + CM^2$

$\Rightarrow \quad 13^2 = 5^2 + CM^2$ [OC = 13 cm]

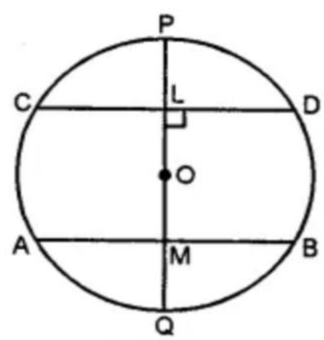
$\Rightarrow \quad 169 - 25 = CM^2 \Rightarrow CM^2 = 144 \Rightarrow CM = 12$ cm

$\therefore \quad CD = 2 \times 12 = 24$ cm [M is the mid point of CD] Ans.

16. If a diameter of a circle is perpendicular to one of two parallel chords of the circle, prove that it is perpendicular to the other and bisects it.

Solution: $AB \parallel CD$ and diameter $PQ \perp AB$

To prove: $PQ \perp CD$



Proof: $\angle AMO = 90^\circ$ [$\because$ $PQ \perp AB$]

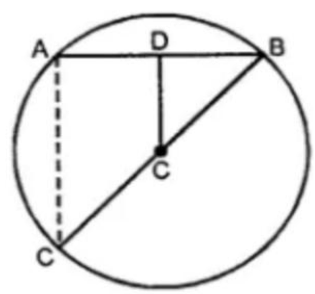
$\therefore$ PQ bisects AB

$\angle OLD = 90^\circ$ [$\because AB \parallel CD$] Alt. int. $\angle$s

$\therefore$ $OL \perp CD$

Hence, PQ bisects CD Proved.

18. (a) In the figure, OD is perpendicular to the chord AB of a circle whose centre is O. If BC is a diameter, show that CA = 2 OD.



Solution: Given $OD \perp AB$ and BOC is the diameter.

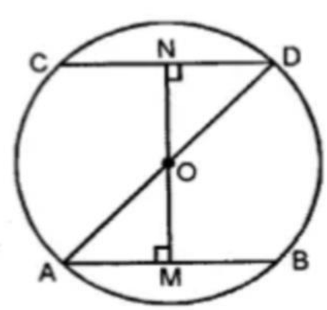
To show : CA = 2 OD

Proof: D and O are mid point of AB and BC respectively.

In Δ ABC, $OD \parallel AC$ and $OD = \frac{1}{2} AC$ [Mid point theorem]

$\therefore$ AC = 2 OD Proved.

20. (a) In the figure, AD is a diameter of a circle with centre O. If $AB \parallel CD$, prove that AB = CD



Solution:

To prove: AB = CD

Construction: Draw $OM \perp AB$ and $ON \perp CD$

Proof: In $\Delta\, OMA$ and $\Delta\, OND$, $\angle OMA = \angle OND$ [By construction]

$\angle AOM = \angle DON$ [Vert. opp. ∠s]

$OA = OD$ [radii]

$\Delta\, OMA \cong \Delta\, OND$ [AAS Congruency Rule]

$OM = ON$ [CPCT]

But $OM \perp AB$ and $ON \perp CD$

$\therefore\ AB = CD$ [Chords which are equidistant from the centre are equal] Proved.

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HOMEWORK

EXERCISE – 15.1

QUESTION NUMBERS: 11, 14, 15, 19(a) and 20(b)

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