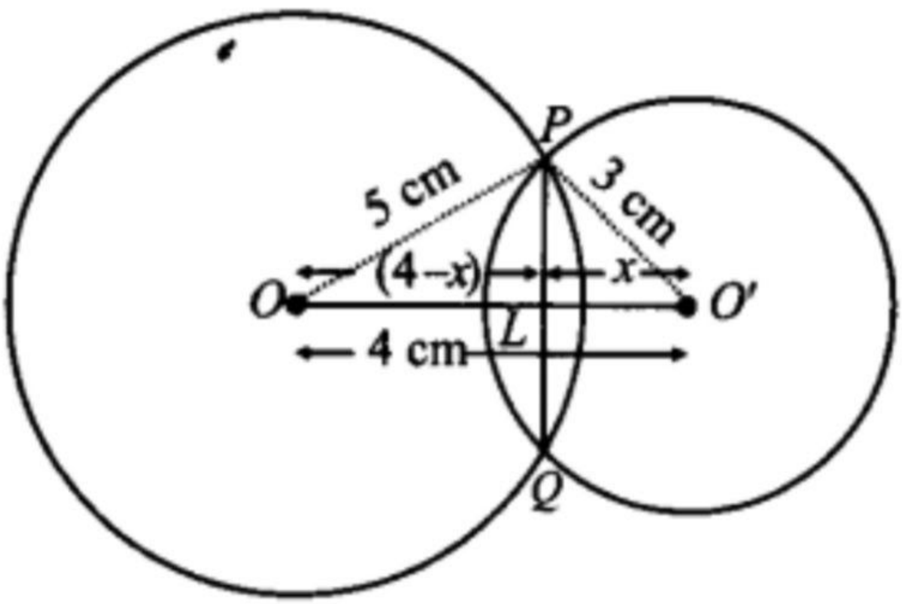
Maths class-9 circle (solved exercise) By-Ashish Jha

10.4 Class 9 Maths Question 1.

Two circles of radii 5 cm and 3 cm intersect at two points and the distance between their centres is 4 cm. Find the length of the common chord.

Solution:

We have two intersecting circles with centres at O and O’ respectively. Let PQ be the common chord.



∵ In two intersecting circles, the line joining their centres is perpendicular bisector of the common chord.

∴∠OLP = ∠OLQ = 90° and PL = LQ

Now, in right ΔOLP, we have

PL2 + OL2 = 2

⇒ PL2 + (4 – x)2 = 52

⇒ PL2 = 52 – (4 – x)2

⇒ PL2 = 25 -16 – x2 + 8x

⇒ PL2 = 9 – x2 + 8x …(i)

Again, in right ΔO’LP,

PL2 = PO‘2 – LO‘2

= 32 – x2 = 9 – x2 …(ii)

From (i) and (ii), we have

9 – x2 + 8x = 9 – x2

⇒ 8x = 0

⇒ x = 0

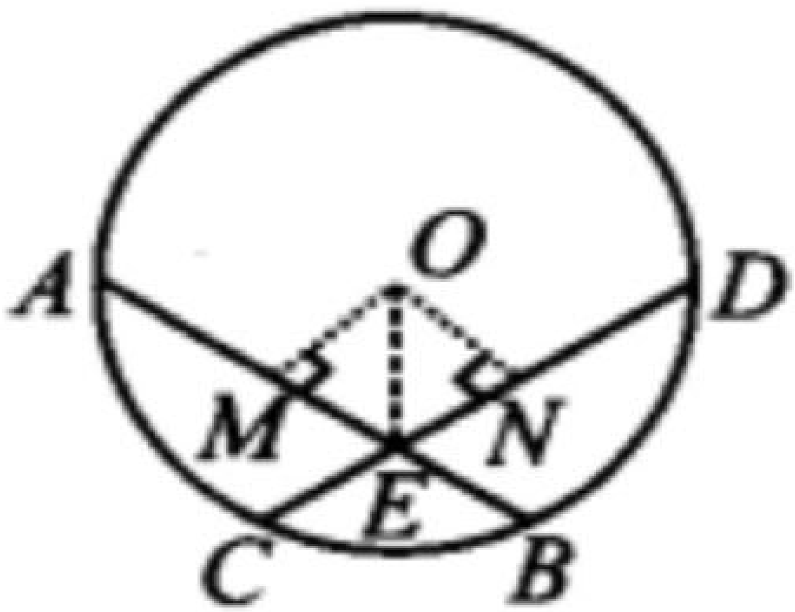
⇒ L and O’ coincide.

∴ PQ is a diameter of the smaller circle.
⇒ PL = 3 cm

But PL = LQ
∴ LQ = 3 cm
∴ PQ = PL + LQ = 3cm + 3cm = 6cm
Thus, the required length of the common chord = 6 cm.

Question 2.
If two equal chords of a circle intersect within the circle, prove that the segments of one chord are equal to corresponding segments of the other chord.
Solution:

Given: A circle with centre O and equal chords AB and CD intersect at E.
To Prove: AE = DE and CE = BE
Construction : Draw OM ⊥ AB and ON ⊥ CD.
Join OE.
Proof: Since AB = CD [Given]
∴ OM = ON [Equal chords are equidistant from the centre]
Now, in ΔOME and ΔONE, we have
∠OME = ∠ONE [Each equal to 90°]
OM = ON [Proved above]
OE = OE [Common hypotenuse]
∴ ΔOME ≅ ΔONE [By RHS congruence criteria]
⇒ ME = NE [C.P.C.T.]



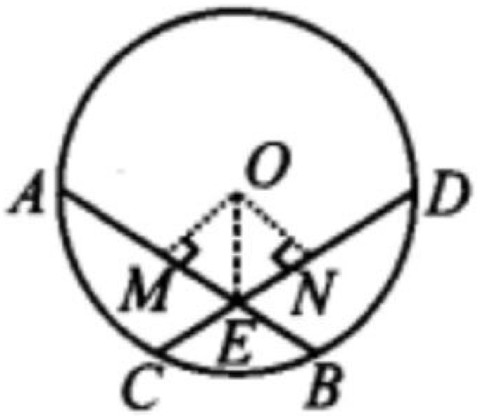
Adding AM on both sides, we get
⇒ AM + ME = AM + NE
⇒ AE = DN + NE = DE
∵ AB = CD ⇒

12
=

DC

⇒ AM = DN
⇒ AE = DE …(i)
Now, AB – AE = CD – DE
⇒ BE = CE …….(ii)
From (i) and (ii), we have
AE = DE and CE = BE

Question 3.
If two equal chords of a circle intersect within the circle, prove that the line joining the point of intersection to the centre makes equal angles with the chords.
Solution:
Given: A circle with centre O and equal chords AB and CD are intersecting at E.
To Prove : ∠OEA = ∠OED
Construction: Draw OM ⊥ AB and ON ⊥ CD.



Join OE.
Proof: In ∆OME and ∆ONE,
OM = ON
[Equal chords are equidistant from the centre]
OE = OE [Common hypotenuse]

$\angle OME = \angle ONE$ [Each equal to 90°]
$\therefore \Delta OME \cong \Delta ONE$ [By RHS congruence criteria]
$\Rightarrow \angle OEM = \angle OEN$ [C.P.C.T.]
$\Rightarrow \angle OEA = \angle OED$

Thanks… please wait for the next part….