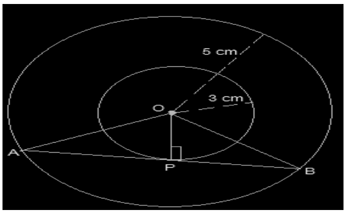
ಎಸ್‌ಎಸ್‌ಎಲ್‌ಸಿ–ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ

MATHEMATICS : *Circles*

Exercise: 10.1

7. Two concentric circles are of radii 5 cm and 3cm. Find the length of the chord of the larger circle which touches the smaller circle.

Ans: Draw two concentric circles with the centre O. Now, draw a chord AB in the larger circle, which touches the smaller circle at a point P, as shown in the figure below.



(….Contd)

AP = 4

Now, as OP ⊥ AB,

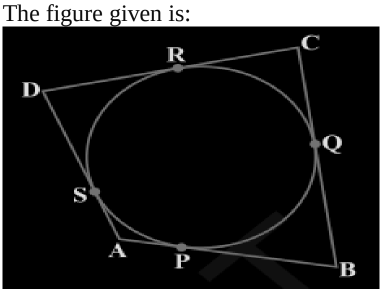
Since the perpendicular from the centre of the circle bisects the chord, AP will be equal to PB.

So, AB = 2AP = 2×4 = 8 cm

So, the length of the chord of the larger circle is8cm.

8. A quadrilateral ABCD is drawn to circumscribe a circle (see Fig. 10.12). Prove that AB + CD = AD + BC

Ans: The figure given is:



From the figure, we can conclude a few points, which are

(i) DR = DS

(ii) BP = BQ

(iii) AP = AS

(iv) CR = CQ

Since they are tangents on the circle from points D, B, A, and C, respectively.

Now, adding the LHS and RHS of the above equations, we get,

DR+BP+AP+CR = DS+BQ+AS+CQ

By rearranging them, we get,

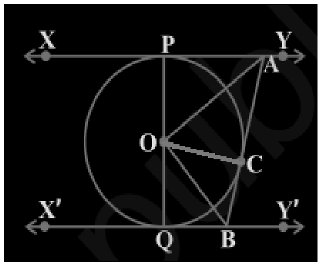
(DR+CR) + (BP+AP) = (CQ+BQ) + (DS+AS)

By simplifying,

AD+BC= CD+AB

9. In Fig. 10.13, XY and X′Y′ are two parallel tangents to a circle with centre O and another tangent AB with the point of contact C intersecting XY at A and X′Y′ at B. Prove that ∠AOB = 90°.

Ans: From the figure given in the textbook, join OC. Now, the diagram will be as



Now, the triangles △OPA and △OCA are similar using SSS congruency as

(i) OP = OC They are the radii of the same circle

(ii) AO = AO It is the common side

(iii) AP = AC These are the tangents from point A

So, △OPA ≅ △OCA

Similarly,

△OQB ≅ △OCB

So,

∠POA = ∠COA … (Equation………. i)

And, ∠QOB = ∠COB … (Equation ……ii)

Since the line POQ is a straight line, it can be considered as the diameter of the circle.

So, ∠POA +∠COA +∠COB +∠QOB = 180°

Now, from equations (i) and equation (ii), we get,

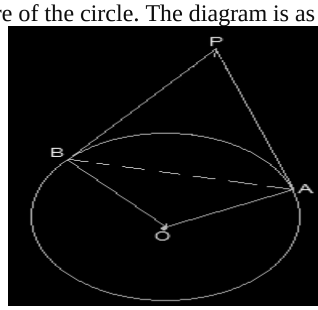
2∠COA+2∠COB = 180°

∠COA+∠COB = 90°

∴ ∠AOB = 90°

10. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segment joining the points of contact at the centre.

Ans: First, draw a circle with centre O. Choose an external point P and draw two tangents, PA and PB, at point A and point B, respectively. Now, join A and B to make AB in a way that subtends ∠AOB at the centre of the circle. The diagram is as follows:



From the above diagram, it is seen that the line segments OA and PA are perpendicular.

So, ∠OAP = 90°

In a similar way, the line segments OB ⊥ PB and so, ∠OBP = 90°

Now, in the quadrilateral OAPB,

∴ ∠APB+∠OAP +∠PBO +∠BOA = 360° (since the sum of all interior angles will be 360°)

By putting the values, we get,

∠APB + 180° + ∠BOA = 360°

So, ∠APB + ∠BOA = 180° (Hence proved).

11. Prove that the parallelogram circumscribing a circle is a rhombus.

Ans: ***(Contd…….)***