Class 10-Mathematics

Instructions for students: The notes provided must be copied to the Maths copy and then do the homework in the same copy.

Chapter 15

Circles

Angle properties of circles

<u>Theorem 1</u>: The angle subtended by an arc of a circle at the centre is double the angle subtended by it at any point on the remaining part of the circle.

<u>Theorem 2</u>: Angles in the same segment of a circle are equal.

<u>Theorem 3</u>(Converse of theorem 2): If a line segment joining two points subtends equal angles at two other points lying on the same side of the line containing the line segment, then the four points lie on the same circle. (i.e. they are concyclic)

<u>Theorem 4:</u> Angle in a semicircle is a right angle.

<u>Theorem 5</u>(Converse of theorem 4): If an arc of a circle subtends right angle at any point on the remaining part of a circle, then the arc is a semicircle.

Exercise 15.1(Refer the diagrams from textbook carefully and solve the problems)

1. v) $\angle$DPD = 180 -120 = 60^0 (Linear pair)

   $\angle$ABD = 70^0 (Angles in the same segment)

   x = 180 – ($\angle$ DPD + $\angle$ABD) (Angle sum property)

   = 180 – (60+70) = 50^0

3. b) Reflex $\angle$AOC = 360 – 130

   = 230^0 = 2 $\angle$ABC (The angle subtended at the centre is double the angle subtended on the remaining part of the circle)

   $\angle$ ABC = $\frac{230}{2}$ = 115^0

5. b) Reflex $\angle$AOB = 360 - 140

   = 220^0

   $\angle$ACB = $\frac{220}{2}$ = 110^0((The angle subtended at the centre is double the angle subtended on the remaining part of the circle)

$\angle OBC = 360 - (\angle OAC + \angle AOB + \angle ACB)$

$= 360^0 - (50^0 + 140^0 + 110^0)$

$= 360 - 300 = 60^0$

Now, Join AB

$\angle OAB = \angle OBA = \frac{180-140}{2}$ (OA = OB, property of isosceles triangle.)

$= 20^0$

$\angle CBA = \angle OBC - \angle OBA$

$= 60^0 - 20^0 = 40^0$

Ans. i) $\angle ACB = 110^0$ ii) $\angle OBC = 60^0$

iii) $\angle OAB = 20^0$ iv) $\angle CBA = 40^0$

20. b) i) To prove PAD = PCB

BAD = BCD…(i) (Angles in the same segment)

PAD = 180 - BAD … (ii)

PCB = 180 - BCD…(iii)

∴ PAD = PCB (From i, ii and iii)

Hence proved.

ii) To prove PA×PB= PC×PD

In ΔPBC and ΔPDA

PBC = PDA (Angles in the same segment)

PCB = PAD(From the statement proved above)

ΔPBC ~ ΔPDA (AA criteria of similarity)

$\frac{PB}{PC} = \frac{PD}{PA}$ (Property of similar Δs)

⇒PA×PB= PC×PD Hence proved.

<u>Home Work:</u>

- Solve **Exercise 15.1 Questions 4, 5, 7, 8, 10, 15 and 19** in the Maths copy.
- Practise all questions from exercise 15.1