Class 10-Mathematics

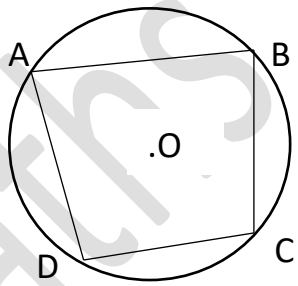
Instructions for students: The notes provided must be copied to the Maths copy and then do the homework in the same copy.

Chapter 15

Circles

Cyclic properties of circles

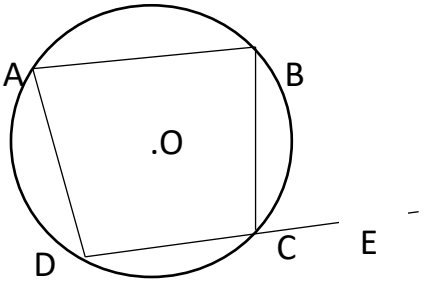
Theorem 1: The sum of each pair of opposite angles of a cyclic quadrilateral is 180^0.



$\angle ACB + \angle BAD = 180^0$

Converse: If the sum of opposite angles of a quadrilateral is 180^0 , then it is a cyclic quadrilateral.

Theorem 2: An exterior angle of a cyclic quadrilateral is equal to the interior opposite angle.



$\angle BCE = \angle BAD$

Converse: If an exterior angle of a quadrilateral is Equal to the opposite interior angle then the quadrilateral is cyclic.

Exercise 15.2

3. b) $\angle BAD = \angle BCE$ (An ext. Angle of a cyclic quad.= the int. opp. Angle)

$\angle BAD = \angle 80^0$

i) $\angle CAD = 80 - 25 = 55^0$

ii) $\angle CBD = \angle CAD = 55^0$ (Angles in the same segment)

iii) $\angle BDC = \angle BAC = 25^0$

$\angle ABD = \angle ACD = 25^0$

$\angle ADB = 180 - (\angle BAD + \angle ABD)$

$= 180 - (80 + 25) = 75^0$

$\angle ADC = \angle ADB + \angle BDC$

$= 75^0 + 25^0 = 100^0$

6. a) $r = 30^0$ (Angles in the same segment)

$q = 2r$ (Angle at the centre is double the angle at the remaining part)

$q = 60^0$

$p + r = 180^0$(Sum of opp. Angles of cyclic quadrilateral)

$p = 180 - r = 180 - 30 = 150^o$

$p = 150^o$ $q = 60^o$ $r = 30^o$

12. $\angle ABC + \angle AEC = 180^0$ (Sum of opp. Angles of cyclic quad.)

$\angle ABC = 180 - \angle AEC$

$= 180 - 50 = 130$

$\angle ABE = 90^o$ (Angle in a semicircle)

i) $\angle CBE = \angle ABC - \angle CBE$

$= 130 - 90 = 40^0$

ii) $\angle CDE + \angle CBE = 180^0$ (Sum of opp. Angles of cyclic quad.)

$\angle CDE = 180 - 40$

$= 140^o$

iii) $\angle AEB = \angle BEC = \frac{50}{2} = 25^o$ (AB = AC, Equal chords subtend equal Angles at the rem. Part of the circle)

$\angle AOB = 2$ AEB (Angle at the centre is double the angle at the Rem. Part of the circle)

$\angle AOB = 2 \times 25 = 50^o$

Home Work:

- Solve **Exercise 15.2 Questions 1,3, 5, 7,10, 14, 16** in the Maths copy.
- Practise all questions from exercise 15.2