

# Assignment 1

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**Abstract—**This document contains the solution for Assignment 2 (ICSE Class 10 Maths 2019 Q.8(C))

**8(C) [ICSE 10 2019]:** Using a ruler and a compass only construct a semicircle with diameter BC=7cm. Locate a point A on the circumference on the semicircle such that A is equidistant from B and C. Complete the cyclic quadrilateral ABCD, such that D is equidistant from AB and BC. Measure  $\angle ADC$  and write it down.

## Solution:

figs/asgn1fig.png

Fig. 1. figure shows the cyclic quadrilateral inscribed in the circle

Let O be the centre of the semicircle.

The diameter of the given semicircle is BC=7cm.

It's radius "r" =  $\frac{7}{2} \text{cm} = 3.5 \text{cm}$ .

Clearly, A must lie on the perpendicular bisector of BC, as it is equidistant from B and C.

**Construction:** Join AB and AC.

$\therefore$  D is equidistant from AB and BC  $\implies$  D lies on the angular bisector of  $\angle ABC$ .

Now, by using basic geometry, we can write,

$$\angle BAC = 90^\circ \quad (1)$$

(Angle in a semicircle is  $90^\circ$ )

Also AB=AC (Given)

$$\implies \angle ABC = \angle ACB = x(\text{say}) \quad (2)$$

The sum of angles in a triangle is  $180^\circ$ .

$$\implies \angle ABC + \angle ACB + \angle BCA = 180^\circ.$$

Equations (1) and (2),

$$\implies x + x + 90^\circ = 180^\circ \quad (3)$$

$$\implies 2x + 90^\circ = 180^\circ \quad (4)$$

$$\implies 2x = 180^\circ - 90^\circ \quad (5)$$

$$\implies 2x = 90^\circ \quad (6)$$

$$\implies x = 45^\circ \quad (7)$$

We know that the opposite angles in a cyclic quadrilateral are supplementary.

$$\implies \angle ABC + \angle ADC = 180^\circ \quad (8)$$

Equation (7),

$$\implies 45^\circ + \angle ADC = 180^\circ \quad (9)$$

$$\implies \angle ADC = 135^\circ \quad (10)$$

$\therefore$  The measure of  $\angle ADC$  is  $135^\circ$