

# Assignment 1

Aryan Sharan Reddy (BT21BTECH11002)

**Abstract**—This document contains the solution for Assignment 1 (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  $BC=7\text{cm}$ . 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.

(Angle in a semicircle is  $90^\circ$ )  
Also  $AB=AC$  (Given)

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

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

$$\Rightarrow \angle ABC + \angle ACB + \angle BCA = 180^\circ. \quad (3)$$

Equations (1) and (2),

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

$$\Rightarrow 2x + 90^\circ = 180^\circ \quad (5)$$

$$\Rightarrow 2x = 180^\circ - 90^\circ \quad (6)$$

$$\Rightarrow 2x = 90^\circ \quad (7)$$

$$\Rightarrow x = 45^\circ \quad (8)$$

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

$$\Rightarrow \angle ABC + \angle ADC = 180^\circ \quad (9)$$

Equation (8),

$$\Rightarrow 45^\circ + \angle ADC = 180^\circ \quad (10)$$

$$\Rightarrow \angle ADC = 135^\circ \quad (11)$$

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

## Solution:

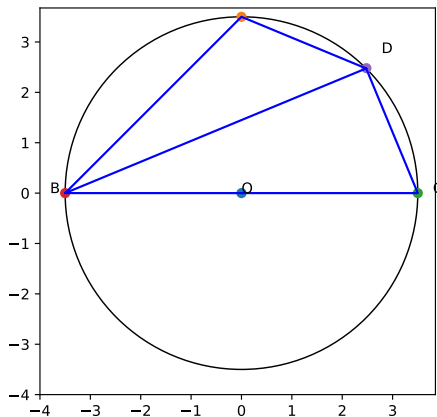


Fig. 1: figure shows the cyclic quadrilateral inscribed in the circle

Let  $O$  be the centre of the semicircle.

The diameter of the given semicircle is  $BC=7\text{cm}$ .

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  $AD$ .

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

Now, by using basic geometry, we can write,

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