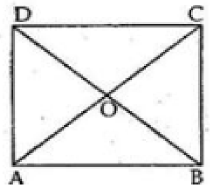
Exercise 11C

Question 21:

ABCD is a rectangle.

Let O be the point of intersection of the diagonals AC and BD of rectangle ABCD.



Since the diagonals of a rectangle are equal and bisect each other.

$\therefore OA = OB = OC = OD$

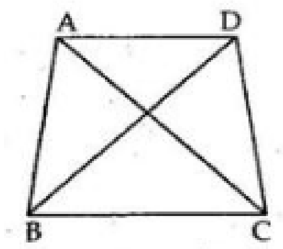
Thus, O is the centre of the circle through A, B, C, D.

Question 22:

Let A, B, C be the given points.

With B as centre and radius equal to AC draw an arc.

With C as centre and AB as radius draw another arc, which cuts the previous arc at D.



Then D is the required point BD and CD.

In ΔABC and ΔDCB

$AB = DC$

$AC = DB$

$BC = CB$ [common]

$\therefore \quad \Delta ABC \cong \Delta DCB$ [by SSS]

$\Rightarrow \quad \angle BAC = \angle CDB$ [CPCT]

Thus, BC subtends equal angles, $\angle BAC$ and $\angle CDB$ on the same side of it.

$\therefore$ Points A, B, C, D are concyclic.

Question 23:

ABCD is a cydic quadrilateral

$$\angle B - \angle D = 60^\circ \qquad \ldots\ldots(i)$$

and $$\angle B + \angle D = 180^\circ \qquad \ldots\ldots.(ii)$$

Adding (i) and (ii) we get,

$$2\angle B = 240^\circ$$

$$\therefore \qquad \angle B = \frac{240}{2} = 120^\circ$$

Substituting the value of $\angle B = 120^\circ$ in (i) we get

$$120^\circ - \angle D = 60^\circ$$

$$\Rightarrow \qquad \angle D = 120^\circ - 60^\circ = 60^\circ$$

The smaller of the two angles i.e. $\angle D = 60^\circ$

*********** END *********