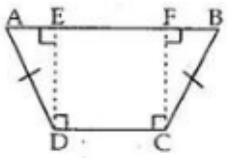
Exercise 11C

Question 24:

ABCD is a quadrilateral in which AD = BC and $\angle ADC = \angle BCD$

Draw DE $\perp$ AB and CF $\perp$ AB



Now, in ΔADE and ΔBCF, we have

$\angle AED = \angle BFC$ [each equal to 90°]

$\angle ADE = \angle ADC - 90° = \angle BCD - 90° = \angle BCF$

AD = BC [given]

Thus, by Angle-Angle-Side criterionof congruence, we have

$\therefore \quad \Delta ADE \cong \Delta BCF$ [by AAS congruence]

The corresponding parts of the congruent triangles are equal.

$\therefore \quad \angle A = \angle B$

Now, $\angle A + \angle B + \angle C + \angle D = 360°$

$\Rightarrow \quad 2\angle B + 2\angle D = 360°$

$\Rightarrow \quad 2(\angle B + \angle D) = 360°$

$\Rightarrow \quad \angle B + \angle D = \frac{360}{2} = 180°$

$\therefore$ ABCD is a cyclic quadrilateral.

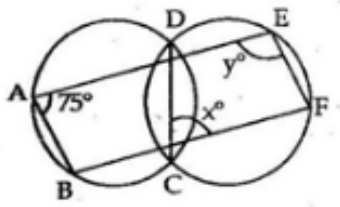
Question 25:

If one side of a cyclic quadrilateral is produced then the exterior angle is equal to the interior opposite angle.

$\Rightarrow \quad \angle BAD = \angle DCF = 75°$

$\therefore \quad \angle DCF = x = 75°$

$\therefore \quad x = 75°$



The opposite angles of the opposite angles of a cyclic quadrilateral is 180°

$\Rightarrow \quad \angle DCF + \angle DEF = 180°$

$\Rightarrow \quad 75° + \angle DEF = 180°$

$\Rightarrow \quad \angle DEF = 180° - 75° = 105°$

As $\angle DEF = y° = 105°$

$\therefore \quad x = 75°$ and $y = 105°$

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