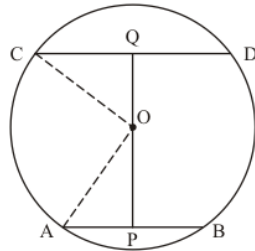




Circles Ex 16.2 Q14

Answer :

Let AB and CD be two parallel chord of the circle with centre O such that $AB = 5$ cm, $CD = 11$ cm and $PQ = 6$ cm. Let the radius of the circle be r cm.



Draw $OP \perp AB$ and $OQ \perp CD$ as well as point O , Q , and P are collinear.

Clearly, $PQ = 6$ cm

Let $OQ = x$ cm then

$$OP = 6 - x$$

Join OA and OC , then

$$OA = OC = r$$

Now $OP \perp AB$ and $OQ \perp CD$

$$\text{So, } AP = \frac{5}{2} \text{ cm and } CQ = \frac{11}{2} \text{ cm}$$

In $\triangle OAP$ and $\triangle OCQ$ we have

$$OA^2 = OP^2 + AP^2$$

$$\Rightarrow r^2 = x^2 + \left(\frac{5}{2}\right)^2 \dots\dots (1)$$

And

$$OC^2 = OQ^2 + CQ^2$$

$$\Rightarrow r^2 = (6-x)^2 + \left(\frac{11}{2}\right)^2 \dots\dots (2)$$

From (1) and (2) we get

$$x^2 + \left(\frac{5}{2}\right)^2 = (6-x)^2 + \left(\frac{11}{2}\right)^2$$

$$\Rightarrow x^2 + \frac{25}{4} = 36 - 12x + x^2 + \frac{121}{4}$$

$$12x = \left(36 + \frac{121}{4}\right) - \frac{25}{4}$$

$$12x = \frac{144 + 121}{4} - \frac{25}{4}$$

$$= \frac{265 - 25}{4}$$

$$= \frac{240}{4}$$

$$= 60$$

$$x = \frac{60}{12}$$
$$= 5$$

Putting the value of x in (1) we get,

$$r^2 = (5)^2 + \left(\frac{5}{2}\right)^2$$

$$= 25 + \frac{25}{4}$$

$$= \frac{100 + 25}{4}$$

$$r = \sqrt{\frac{125}{4}}$$

$$= \boxed{\frac{5\sqrt{5}}{2} \text{ cm}}$$

***** END *****