Question.

If the chords of a circle are 12cm and 6cm and the distance between them is 3cm. Find the radius of the circle.
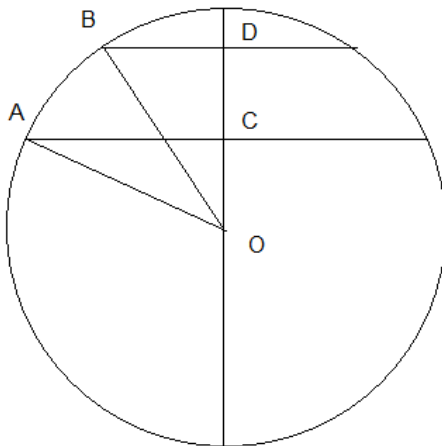
We have: $AC = 12/2 = 6$, $BD = 6/2 = 3$, $CD = 3$, $OA = OB = r$.

Solution.

Let $OC = x$, then $OD = x + CD = x + 3$.

From right triangle OAC: $OA^2 = AC^2 + OC^2 \rightarrow r^2 = 36 + x^2$.

From right triangle OBD: $OB^2 = BD^2 + OD^2 \rightarrow r^2 = 9 + (x + 3)^2$.

So, $36 + x^2 = 9 + (x + 3)^2 \rightarrow 36 + x^2 = 9 + x^2 + 6x + 9 \rightarrow x = 3$,

$r^2 = 36 + x^2 = 36 + 9 = 45 \rightarrow r = \sqrt{45} = 3\sqrt{5}$.

Answer: $r = \sqrt{45} = 3\sqrt{5}\ cm \approx 6.71\ cm.$