Dr Oliver Mathematics
Worked Examples
Radius of a Circle 1

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1. In this circle, the two chords (the blue line is vertical and the red line is horizontal) are perpendicular to each other, as shown in Figure 1.

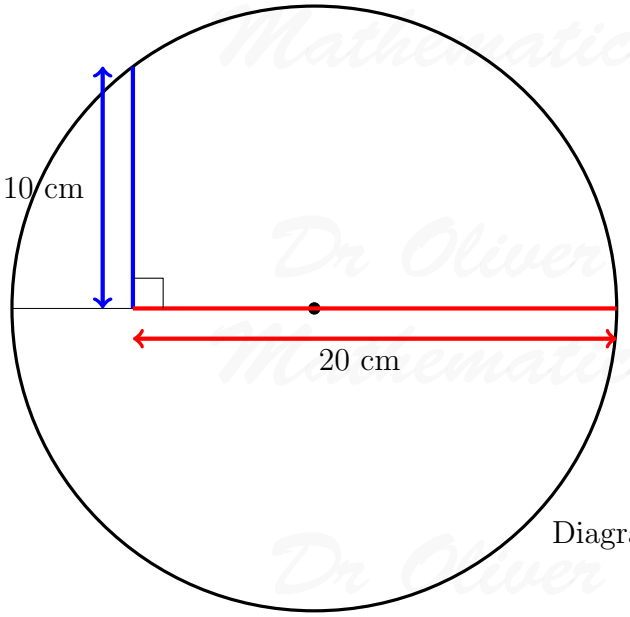


Diagram is not to scale

Figure 1: a circle

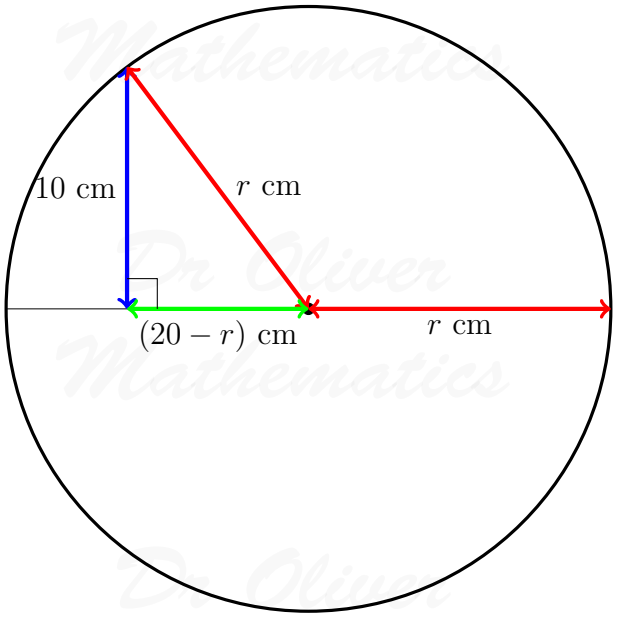
The horizontal chord passes through the centre of the circle.

The lengths of the horizontal and the vertical chords are respectively 20 units and 10 units.

Find the length of the radius of the circle.

Solution

Let the radius be r cm.



Pythagoras' Theorem:

$\times$	20	$-r$
20	400	$-20r$
$-r$	$-20r$	$+r^2$

Now,

$$\begin{aligned} 10^2 + (20-r)^2 = r^2 &\Rightarrow 100 + (400 - 40r + r^2) = r^2 \\ &\Rightarrow 500 - 40r = 0 \\ &\Rightarrow 40r = 500 \\ &\Rightarrow r = 12.5; \end{aligned}$$

hence, the radius is

$$\underline{\underline{12.5 \text{ cm}}}.$$