# Dr Oliver Mathematics
# Worked Examples
# Find the Area of the Yellow Region 2

**From:** LoveMath., 11 April 2023

1. In Figure 1, two concentric half-circles are shown.

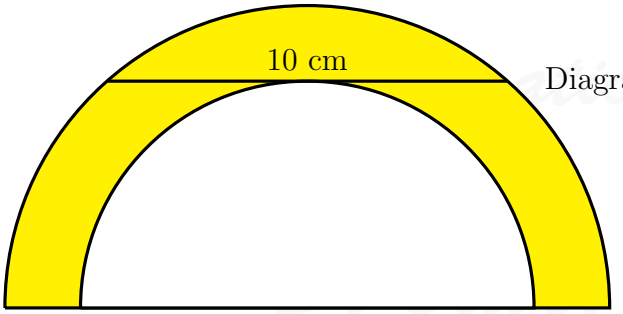


Diagram is not to scale

Figure 1: two concentric half-circles

The length of the horizontal chord of the bigger half-circle is tangent to the smaller half-circle is 10 cm.

Find the shaded area in yellow.

**Solution**

Let $R$ cm be the radius of the bigger half-circle and let $r$ cm be the radius of the smaller half-circle:

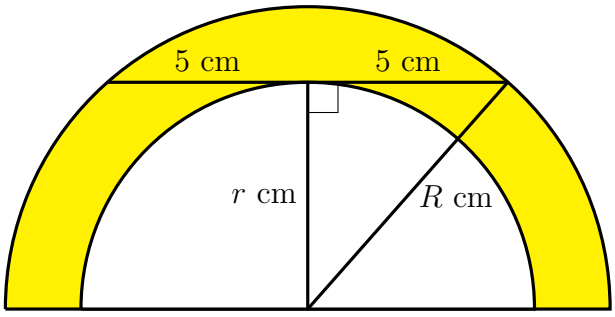


Figure 2: $R$ and $r$

Pythagoras' theorem:

$$\begin{aligned} r^2 + 5^2 = R^2 &\Rightarrow 5^2 = R^2 - r^2 \\ &\Rightarrow 25 = R^2 - r^2. \end{aligned}$$

Now,

$$\begin{aligned} \text{area} &= \tfrac{1}{2}\pi R^2 - \tfrac{1}{2}\pi r^2 \\ &= \tfrac{1}{2}\pi(R^2 - r^2) \\ &= \tfrac{1}{2}\pi \times 25 \\ &= \underline{\underline{\tfrac{25}{2}\pi \text{ cm}^2}}. \end{aligned}$$