



ex 12.1

$$\begin{aligned} \text{area of gold col. region} &= \pi r_1^2 \\ &= \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} \\ &= \frac{693}{2} \\ &= 346.5 \text{ cm}^2 \end{aligned}$$

$$\text{area of red col. region} = \pi (r_2^2 - r_1^2)$$

$$\begin{aligned} r_1 &= 10.5 \text{ cm} \\ r_2 &= 10.5 + 10.5 = 21 \text{ cm} \\ r_3 &= 21 + 10.5 = 31.5 \text{ cm} \\ r_4 &= 31.5 + 10.5 = 42 \text{ cm} \\ r_5 &= 42 + 10.5 = 52.5 \text{ cm} \end{aligned}$$

$$\begin{aligned} &= \frac{22}{7} [21^2 - 10.5^2] \\ &= \frac{22}{7} (21 - 10.5)(21 + 10.5) \\ &= \frac{22}{7} \times 10.5 \times 31.5 \\ &= 1039.5 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{area of blue region} &= \pi (r_3^2 - r_2^2) \\ &= \frac{22}{7} [31.5^2 - 21^2] \\ &= \frac{22}{7} (31.5 - 21)(31.5 + 21) \\ &= \frac{22}{7} \times 10.5 \times 52.5 \\ &= 1732.5 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{area of black region} &= \pi (r_4^2 - r_3^2) \\ &= \frac{22}{7} (42^2 - 31.5^2) \\ &= \frac{22}{7} (42 - 31.5)(42 + 31.5) \\ &= \frac{22}{7} \times 10.5 \times 73.5 \\ &= 2425.5 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{area of white region} &= \pi (r_5^2 - r_4^2) \\ &= \frac{22}{7} (52.5^2 - 42^2) \\ &= \frac{22}{7} \times 10.5 \times 94.5 \\ &= 3118.5 \text{ cm}^2 \end{aligned}$$