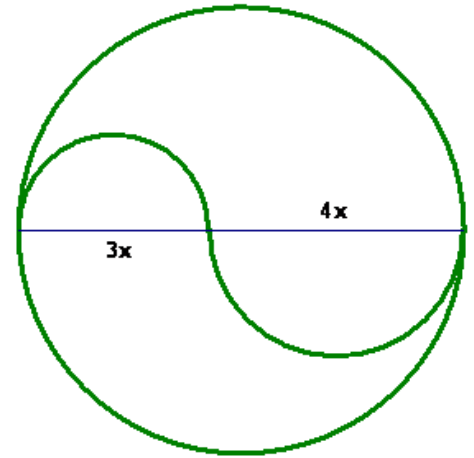


Circle's Diameter Divided into 3:4 ratio

Problem: A circle's diameter is divided in the ratio of 3 to 4, and semicircles are drawn on each segment, as shown. What is the ratio of the upper area to the lower area?



Solution: Here we have to find the ratio of the area of Upper Circle to the area of Lower Circle (i.e. $\frac{Area_{upper}}{Area_{lower}}$).

First, let's find the area of the upper circle.

$$Area_{upper} = (\text{Area of semicircle of diameter } 7) + (\text{Area of semicircle of diameter } 4) - (\text{Area of semicircle of diameter } 3)$$

$$\begin{aligned} &= \frac{1}{2}\pi\left(\frac{7}{2}\right)^2 + \frac{1}{2}\pi(4)^2 - \frac{1}{2}\pi\left(\frac{3}{2}\right)^2 \\ &= \frac{1}{2}\pi\left[\frac{49}{4} + 4 - \frac{9}{4}\right] \\ &= 7\pi \end{aligned}$$

Now, find the area of the lower circle.

$$Area_{lower} = (\text{Area of semicircle of diameter } 7) + (\text{Area of semicircle of diameter } 3) - (\text{Area of semicircle of diameter } 4)$$

$$\begin{aligned} &= \frac{1}{2}\pi\left(\frac{7}{2}\right)^2 + \frac{1}{2}\pi\left(\frac{3}{2}\right)^2 - \frac{1}{2}\pi(2)^2 \\ &= \frac{1}{2}\pi\left[\frac{49}{4} + \frac{9}{4} - 4\right] \\ &= \frac{21}{4}\pi \end{aligned}$$

$$\text{Hence, } \frac{Area_{upper}}{Area_{lower}} = \frac{7\pi}{\frac{21}{4}\pi} = \frac{4}{3}$$