

CHAPTER 09

Area of Plane Figures

Area of annulus or Circular ring:

Let ' r_1 ' and ' r_2 ' are radii of two concentric circles ($r_1 < r_2$) and ' w ' is the width of path $w = r_2 - r_1$.

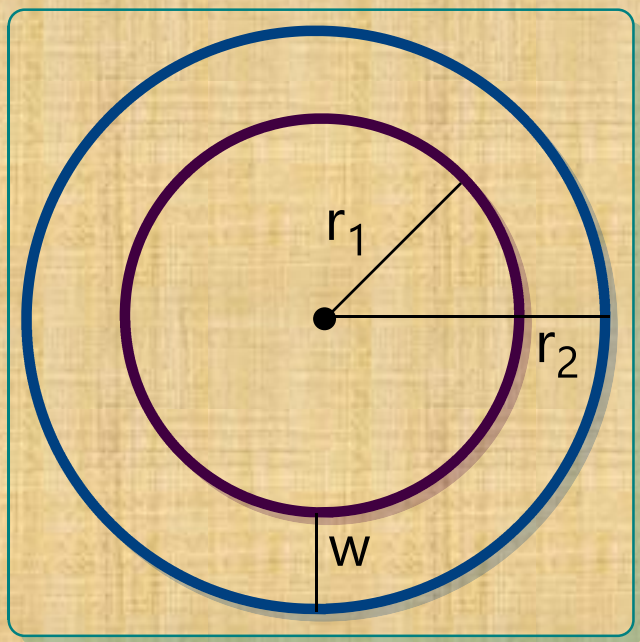
Now,

Area of circular path

= Area of the outer circle – Area of inner circle.

$$= \pi r_2^2 - \pi r_1^2$$

$$= \pi (r_2^2 - r_1^2)$$



$$= \pi(r_2 + r_1)(r_2 - r_1)$$

(OR)

$$= \pi(r_2 + r_1)w$$

(OR)

$$= \pi(2r_2 - w)w$$

(OR)

$$= \pi(2r_1 + w)w$$

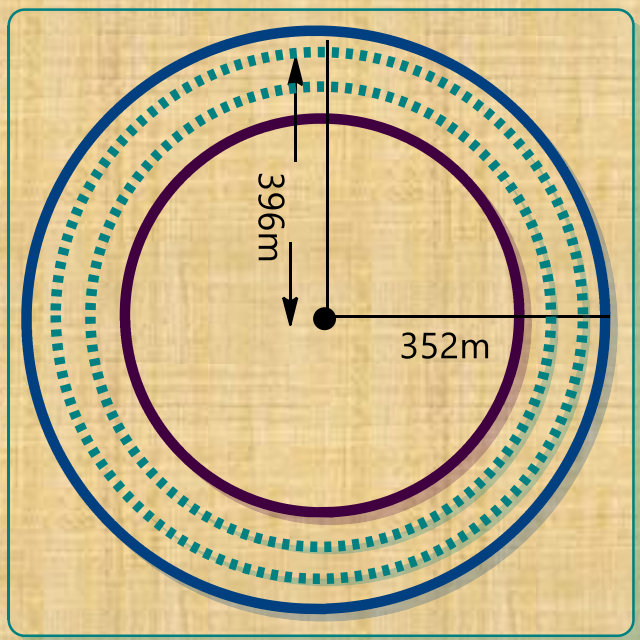


Brainbox
learn easy

Example:

A racetrack in the form of a ring whose inner circumference is 352m, and the outer circumference is 396m. Find the width of the track and the area of shaded region.

Sol.



Let 'r' be the inner radius.

'R' be the outer radius.

Given inner circumference = 352m

$$2\pi r = 352\text{m}$$

$$\Rightarrow 2 \times \frac{22}{7} \times r = 352\text{m}$$

$$\Rightarrow r = 56\text{m}$$

Outer circumference = 396cm

$$2\pi r = 396\text{m}$$

$$2 \times \frac{22}{7} \times R = 396\text{m}$$

$$R = 63\text{m}$$

$$\text{Width of the truck} = R - r$$

$$= 63 - 56$$

$$= 7 \text{ cm}$$

$$\text{Area of shaded region} = \pi (R^2 - r^2)$$

$$= \pi (R - r)(R + r)$$

$$= \frac{22}{7} (7)(119)$$

$$= 2618 \text{ m}^2$$

