

Areas Related to Circles Ex 15.4 Q10

Since four semicircular flower beds rounds the rectangular park. Then, diameters of semicircular plots are $2r_1=l$ and $2r_2=w$

So, the radius of semicircle at larger side of rectangle

$$r_1 = \frac{l}{2}$$
$$= \frac{100}{2}$$
$$= 50 \text{ m}$$

Area of semicircluar plot at larger side of rectangle = $\frac{1}{2}\pi r^2$ = $\frac{1}{2} \times 3.14 \times 50 \times 50$

And the radius of semicircle at smaller side of rectangle

$$r_2 = \frac{l}{2}$$
$$= \frac{50}{2}$$
$$= 25 \text{ m}$$

Area of semicircluar plot at smaller side of rectangle = $\frac{1}{2}\pi r^2$ = $\frac{1}{2} \times 3.14 \times 25 \times 25$ = 981.25 m²

Now, the total area of semicircular plot is sum of area of four semicircular plots.

Total Area of plot = $2 \times 3925 + 2 \times 981.25$ = $7850 + 1962.5 \text{ m}^2$

 $= 9812.5 \text{ m}^2$

Since. The cost of levelling semicircular flower bed per square meter = $Rs\ 0.60$ So, The cost of levelling 9812.5 square meter flower bed = $Rs\ 0.60 \times 9812.5$

= Rs 5887.50/-

Areas Related to Circles Ex 15.4 Q11

Answer:

We know that the area of a circle of radius r is $A = \pi r^2$

It is given that a circular path of width h surrounds the circle of radius r.

So, radius of the outer circle = r + h

Using the value of radius in above formula,

Area of the outer circle = $\pi (r+h)^2$

Hence.

Area of the circular path = Area of outer circle-Area of inner circle

$$=\pi (r+h)^2 - \pi r^2$$

$$=\pi (r^2 + 2rh + h^2) - \pi r^2$$

$$= 2\pi rh + \pi h^2$$

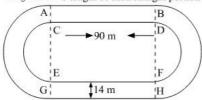
$$= \pi h (2r+h)$$

Area of the circular path $= \pi h(2r + h)$

Areas Related to Circles Ex 15.4 Q12

Answer:

It is given that, length of each straight portion = 90 m and width of track = 14 m



We know that the circumference C of semicircle of radius be r is

$C = \pi r$

The inside perimeter of running track is the sum of twice the length of straight portion and circumferences of semicircles. So,

inside perimeter of running track = 400 m

$$2l + 2\pi r = 400 m$$

$$\Rightarrow 2 \times 90 + 2 \times \frac{22}{7} \times r = 400 m$$

$$\Rightarrow r = \frac{220 \times 7}{2 \times 22} = 35 m$$

Thus, radius of inner semicircle is 35 m.

Now,

radius of outer semi circle r' = 35 + 14 = 49 m

Area of running track =

 $2\times Area$ of rectangle $+\,2\times Area$ of outer semi circle $-\,2\times Area$ of inner semicircle

$$= 2 \times 90 \times 14 + 2 \times \frac{\pi(49)^2}{2} - 2 \times \frac{\pi(35)^2}{2}$$

$$= 2520 + \pi \times (49 + 35)(49 - 35)$$

$$= 2520 + \frac{22}{7} \times 84 \times 14$$

$$= 2520 + 3696 = 6216 \text{ } m^2$$

Hence, the area of running track = 6216 m^2

Now, length L of outer running track is

$$L = 2 \times l + 2\pi r'$$

$$= 2 \times 90 + 2\pi \times 49$$

$$= 180 + 2 \times \frac{22}{7} \times 49$$

$$= 180 + 308 = 488 \ m$$

Hence, the length L of outer running track is 488 m.

