Areas Related to Circles Ex 15.4 Q10

Answer :

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

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

$$\text{Area of semicircluar plot at larger side of rectangle} = \frac{1}{2}\pi r^2$$
$$= \frac{1}{2} \times 3.14 \times 50 \times 50$$
$$= 3925 \text{ m}^2$$

And the radius of semicircle at smaller side of rectangle

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

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

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

$$\text{Total Area of plot} = 2 \times 3925 + 2 \times 981.25$$
$$= 7850 + 1962.5 \text{ m}^2$$
$$= 9812.5 \text{ m}^2$$

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 0.60×9812.5

$$= \boxed{\text{Rs } 5887.50/-}$$

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,

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

Hence,

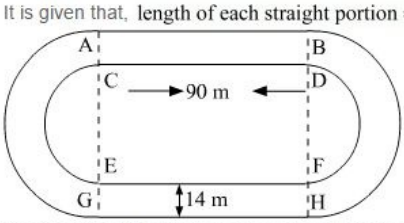
$$\text{Area of the circular path} = \text{Area of outer circle-Area of inner circle}$$
$$= \pi (r + h)^2 - \pi r^2$$
$$= \pi \left(r^2 + 2rh + h^2\right) - \pi r^2$$
$$= 2\pi rh + \pi h^2$$
$$= \pi h (2r + h)$$

$$\boxed{\text{Area of the circular path} = \pi h (2r + h)}$$

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 =

$2 \times \text{Area of rectangle} + 2 \times \text{Area of outer semi circle} - 2 \times \text{Area of inner semicircle}$

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

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

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

$= 2520 + 3696 = 6216\ m^2$

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

Now, length L of outer running track is

L = 2 × *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*.

********** END **********