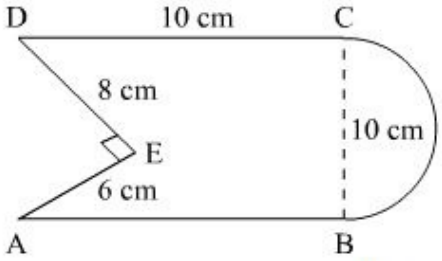
Areas Related to Circles Ex 15.4 Q13

Answer :

Let the area of square ABCD be A.

It s given that, $AB = 10$ cm

So, $A = 10 \times 10$ cm^2



It is given that a semicircle is attached to one side of the square.

The diameter of semicircle $= 10$ cm

So, radius r of semicircle $= 5$ cm

We know that the area of semicircle of radius r is

$$A' = \frac{1}{2}\pi r^2$$

Substituting the value of r,

$$A' = \frac{1}{2} \times \frac{22}{7} \times 5 \times 5$$
$$= 39.3 \text{ cm}^2$$

From the above figure it is seen that a right angle triangle is cutoff from one side of square.

$$\text{The area of right angle triangle} = \frac{1}{2}bh$$
$$= \frac{1}{2} \times 8 \times 6$$
$$= 24 \text{ cm}^2$$

Now, the area A'' of above figure is,

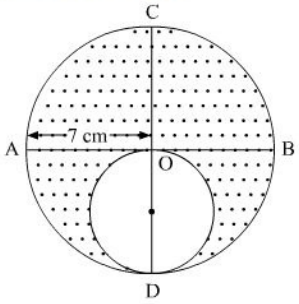
$$A'' = \text{Area of square} + \text{Area of semicircle-Area of triangle}$$
$$= 100 + 39.3 - 24$$
$$= \boxed{115.3 \text{ cm}^2}$$

Hence area of given figure is $\boxed{115.3 \text{ cm}^2}$

Areas Related to Circles Ex 15.4 Q14

Answer :

It is given that AB and CD are two diameters of a circle perpendicular to each other and OD is the diameter of small circle.



It is given that, $\mathrm{OA} = 7\ \mathrm{cm}$

So, radius r of small circle is

$$r = \frac{7}{2}\ \mathrm{cm}$$
$$= 3.5\ \mathrm{cm}$$

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

Substituting the value of r in above formula,

$$A = \frac{22}{7} \times 3.5 \times 3.5$$
$$= 38.5\ \mathrm{cm}^2$$

Now, let the area of large circle be A'.

Using the value radius OA,

$$A' = \frac{22}{7} \times 7 \times 7$$
$$= 154\ \mathrm{cm}^2$$

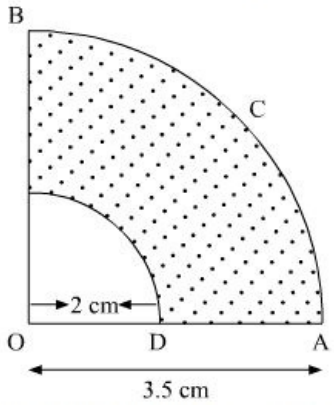
Hence,

$$\text{Area of shaded region} = \text{Area of large circle} - \text{Area of small circle}$$
$$= 154 - 38.5$$
$$= \boxed{115.5\ \mathrm{cm}^2}$$

Areas Related to Circles Ex 15.4 Q15

Answer :

It is given that OACB is a quadrant of circle with centre at O and radius 3.5 cm.



(i) We know that the area of quadrant of circle of radius r is,

$$A = \frac{1}{4}\pi r^2$$

Substituting the value of radius $r = 3.5\ \mathrm{cm}$,

$$A = \frac{1}{4} \times \frac{22}{7} \times 3.5 \times 3.5$$
$$= \boxed{9.625\ \mathrm{cm}^2}$$

Hence, the area of OACB is $\boxed{9.625\ \mathrm{cm}^2}$.

(ii) It is given that radius of quadrant of small circle is 2 cm.

Let the area of quadrant of small circle be A'.

$$A' = \frac{1}{4}\pi r^2$$
$$= \frac{1}{4} \times \frac{22}{7} \times 2 \times 2$$
$$= 3.14 \text{ cm}^2$$

It is clear from the above figure that area of shaded region is the difference of larger quadrant and the smaller one. Hence,

$$\text{Area of shaded region} = A - A'$$
$$= 9.625 - 3.14$$
$$= \boxed{6.485 \text{ cm}^2}$$

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