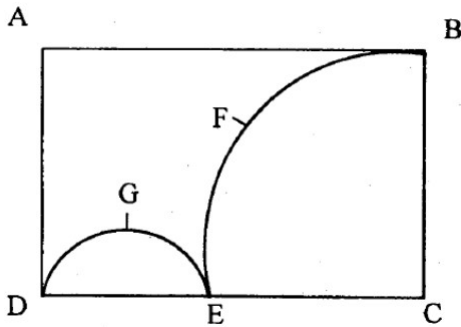


ASSIGNMENT-1

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QUESTION 3(C)



In the figure given below, ABCD is a rectangle. $AB = 14\text{cm}$ and $BC = 7\text{cm}$. From the rectangle, a quarter circle BFEC and a semicircle DGE are removed. Calculate the area of the remaining piece of the rectangle?.

(Take $\pi = 22/7$)

since BC and EC are the radius of same circle

\Rightarrow The length of $BC = EC = 7\text{cm}$.

since AB and DC are the radius of same circle

\Rightarrow length of $AB = DC = 14\text{cm}$.

So $DE = DC - EC = 7\text{cm}$.

\therefore The radius of semicircle GDE = $\frac{DE}{2} = \frac{7}{2}\text{cm}$

$$\begin{aligned}\text{Area of BFEC region} &= \frac{1}{4} \times \pi \times (r)^2 \\ &= \frac{1}{4} \times \pi \times 7\text{cm} \times 7\text{cm} \\ &= \frac{77}{2}\text{cm}^2. (\text{radius is BC})\end{aligned}$$

SOLUTION

Shape	Rectangle	semi circle	Quarter circle
Area	$l \times b$	$\frac{1}{2}\pi r^2$	$\frac{1}{4}\pi r^2$

Areas of various shapes

$$\begin{aligned}\text{so area of rectangle ABCD} &= l \times b \\ &= 14\text{cm} \times 7\text{cm} \\ &= 98\text{cm}^2.\end{aligned}$$

$$\begin{aligned}\text{Area of GDE region} &= \frac{1}{2} \times \pi \times (r)^2 \\ &= \frac{1}{2} \times \pi \times \frac{7}{2}\text{cm} \times \frac{7}{2}\text{cm}. \\ &= \frac{77}{4}\text{cm}^2.\end{aligned}$$

To get the area of the remaining part take total area of rectangle and subtract the areas of semicircle and quarter circle.

$$\begin{aligned}\text{Required area} &= 14\text{cm} \times 7\text{cm} \\ &\quad - \frac{1}{2} \times \pi \times (7\text{cm})^2 - \frac{1}{4} \times \pi \times \left(\frac{7}{2}\right)^2\end{aligned}$$

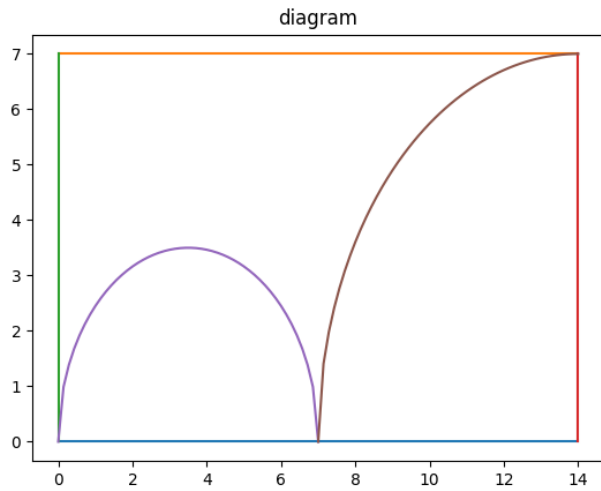


Fig. 1: python graph

Verification in python

```
area of the requires region = area of rectangle
                             - area of semcircle-area of quatercircle
required area = 98-19.24225500323748-38.48451000647496
               = 40.27323499028755
```

Fig. 2: python code

$$\begin{aligned}
 \Rightarrow \text{arearequired} &= 98\text{cm}^2 - \frac{77}{2}\text{cm}^2 - \frac{77}{4}\text{cm}^2 \\
 &= \frac{161}{4}\text{cm}^2 \\
 &= 40.25\text{cm}^2
 \end{aligned}$$

\therefore Area of the remaining piece of rectangle = 40.25cm^2