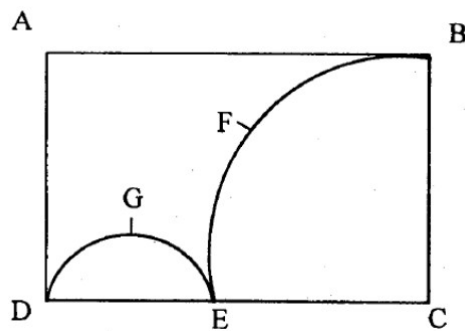


ASSIGNMENT-1

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Question 3(c)



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

(Take $\pi = 22/7$)

Solution

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

Table 1: Required areas

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

since BC and EC are the radius of same circle

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

since AB and DC are the radius of same circle

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

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

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

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

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

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

$$\text{Required area} = 14cm \times 7cm$$

$$- \frac{1}{2} \times \pi \times (7cm)^2 - \frac{1}{4} \times \pi \times \left(\frac{7}{2}\right)^2$$

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

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

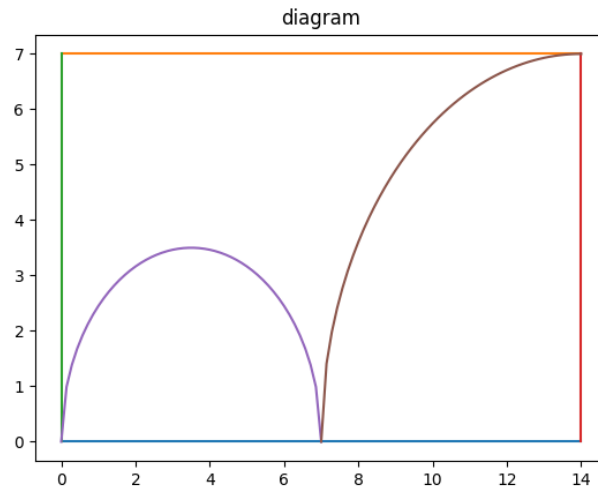


Figure 1: python graph

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
```

Figure 2: python code