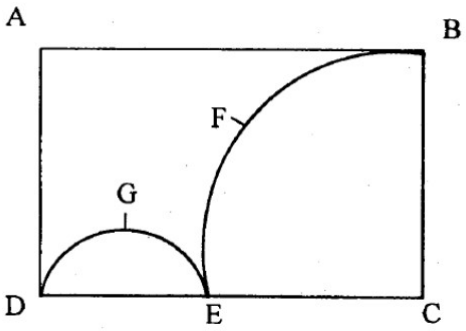
ASSIGNMENT-1

AI21BTECH11021

March 2022

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

so area of rectangle ABCD $= 14cm \times 7cm$
$= 98cm^2$.

since BC and EC are the radius of same$circle$
$\implies$ The length of$BC = EC = 7cm$.
since AB and DC are the radius of same circle
$\implies$ length of$AB = DC = 14cm$.
So $DE = DC - EC = 7cm$.
$\therefore$ The radius of semicircle GDE $= \frac{DE}{2} = \frac{7}{2}cm$

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

Area of GDE region $= \frac{1}{2} \times \pi \times \frac{7}{2}cm \times \frac{7}{2}cm$.
$= \frac{77}{4}cm^2$.

Area of required part = area of rectangle - area of semicircle - area of quarter circle.

$\implies arearequired = 98cm^2 - \frac{77}{2}cm^2 - \frac{77}{4}cm^2$
$= \frac{161}{4}cm^2$
$= 40.25cm^2$

$\therefore$ Area of the region ABFEGD $= 40.25cm^2$

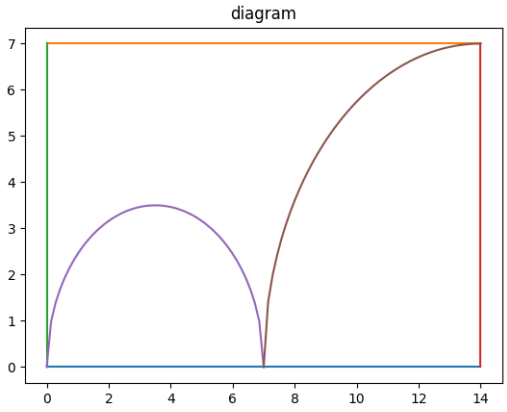


Figure 1: python programmed

Verification in python

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area of the requires region = area of rectangle - area of semcircle-area of quatercircle
required area = 98-19.24225500323748-38.48451000647496 = 40.27323499028755
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Figure 2: python