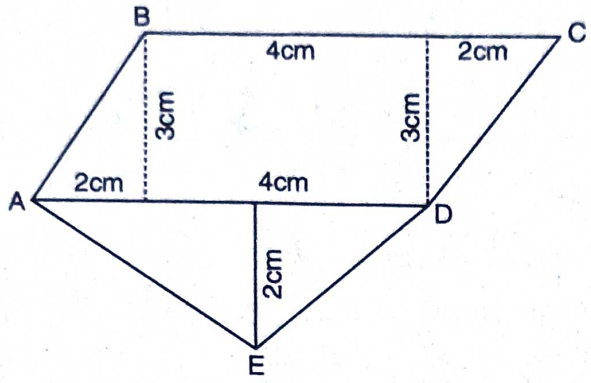
TEXT BOOK EXERCISE 9.3

Q. 1. Find the area of pentagon ABCD shown in figure 9.27 (Textbook).



Solution. According to the figure

Area of pentagon ABCDE

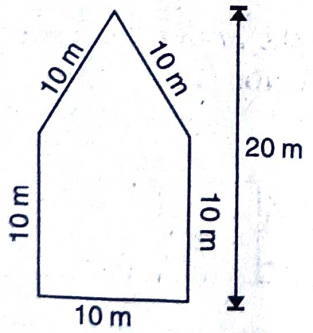
= Area of right ΔI + Area of rectangle + Area of ΔII + Area of ΔADE

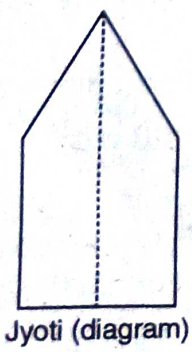
$$= \left[\frac{1}{2}\times 2\times 3 + 4\times 3 + \frac{1}{2}\times 2\times 3 + \frac{1}{2}\times 6\times 2\right] \text{cm}^2$$

$$= (3 + 12 + 3 + 6)\ \text{cm}^2$$

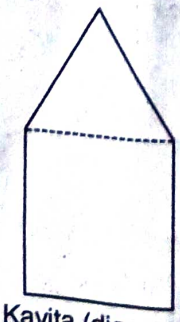
$$= 24\ \text{cm}^2$$ **Ans.**

Q. 2. There is a pentagonal shaped park as shown in figure 9.28 (Textbook). Jyoti and kavita divided it in two different ways. Find the area of park using both ways.





Jyoti (diagram)

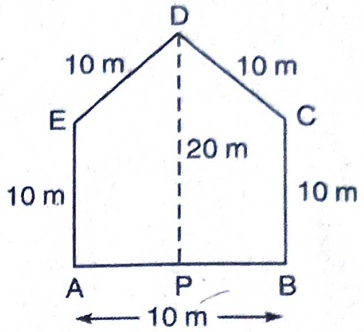


Kavita (diagram)

Solution. Jyoti's Case

The length of each side of pentagon = 10 m

Length of perpendicular DP = 20 m



Area of pentagon ABCDE = 2 × Area of trapezium APDE

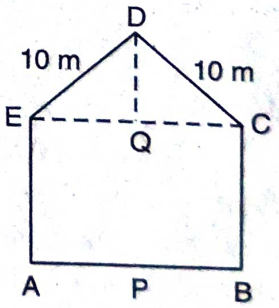
$$= 2\times\left(\frac{1}{2}\times \text{sum of parallel sides}\right) \times \text{perpendicular distance}$$

$$= 2\times\left[\frac{1}{2}(20+10)\times\frac{10}{2}\right] \text{m}^2$$

$$= 30\times 5\ \text{m}^2 = 150\ \text{m}^2$$ **Ans.**

Kavita's Case

Area of pentagon = Area of ΔDEC + Area of square ABCD



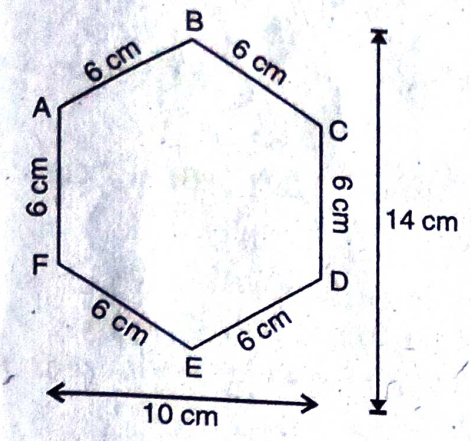
$$= \frac{1}{2}\times EC\times DQ + EA\times AB$$

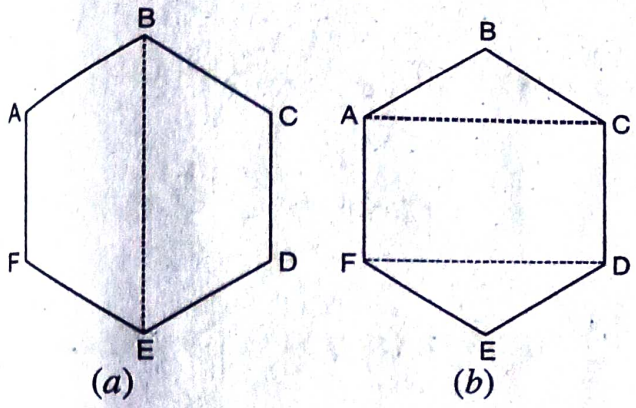
$$= \left(\frac{1}{2}\times 10\times 10 + 10\times 10\right) \text{m}^2$$

$$= (50 + 100)\ \text{m}^2$$

$$= 150\ \text{m}^2$$

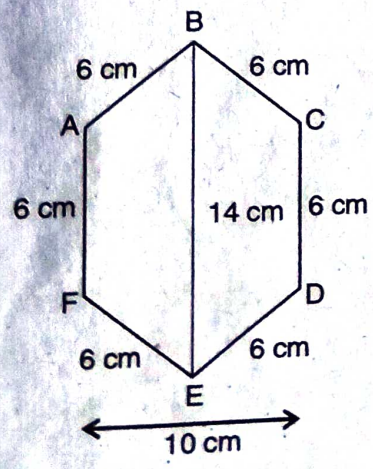
Q. 3. Find the area of hexagon shown in figure 9.29 (Textbook) by two different ways as shown in figure 9.29 (*a*) (Textbook) and 9.29 (*b*) (Textbook). Where AB = BC = CD = DE = EF = FA.





In case of fig. (*a*)

Length of each side of hexagon = 6 cm



Length of diagonal BE = 14 cm

Now Area of hexagon ABCDEF

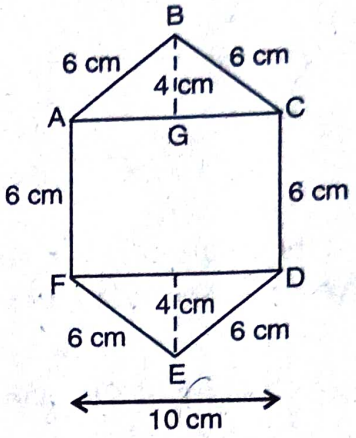
= 2 × Area of trapezium

$= 2 \times \left[\frac{1}{2} \times \text{sum of parallel sides} \times \text{perpendicular distance}\right]$

$= 2 \times \left[\frac{1}{2} \times (14+6) \times \frac{10}{2}\right] \text{cm}^2$

$= (20 \times 5)\ \text{cm}^2 = 100\ \text{cm}^2$ **Ans.**

In case of fig. (*b*)



Length of diagonal BE = 14 cm

Length of perpendicular BG = $\frac{1}{2}(14-6)$ cm

= 4 cm

Now, Area of hexagon ABCDEF

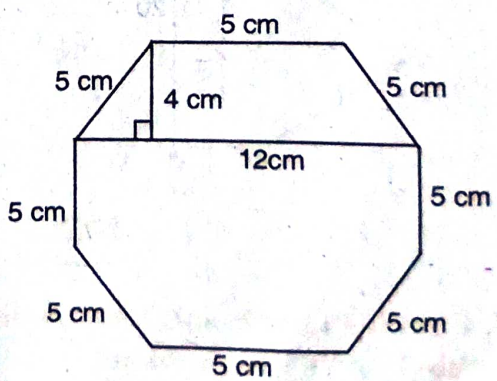
= 2 × Area of ΔABC + Area of rectangle ACDF

$= 2 \times \left[\frac{1}{2} \times 10 \times 4\right] \text{cm}^2 + (6 \times 10)\ \text{cm}^2$

$= 40\ \text{cm}^2 + 60\ \text{cm}^2$

$= 100\ \text{cm}^2$ **Ans.**

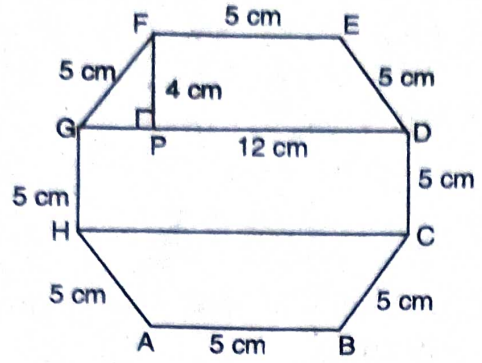
Q. 4. Find the area of octagon as shown in figure 9.30 (Textbook).



Solution. Let ABCDEFGH be the regular octagonal surface as shown in the figure.

Each side of octagon = 5 m

Now, area of octagon ABCDEFGH



= Area of trapezium ABCH + Area of rectangle CDGH + Area of trapezium DEFG

$$= \left[\frac{1}{2}(12+5)\times 4\right] \text{cm}^2 + (12 \times 5)$$

$$\text{cm}^2 + \left[\frac{1}{2}(12+5)\times 4\right] \text{cm}^2$$

$$= 34 \text{ cm}^2 + 60 \text{ cm}^2 + 34 \text{ cm}^2$$

$$= 128 \text{ cm}^2$$

Q. 5. Find the area of Hexagon shown in the figure 9.31 (Textbook).

where

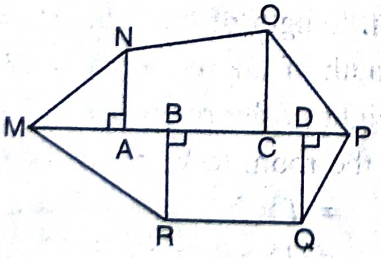
MP = 9 cm **MD = 7 cm**

MC = 6 cm **MB = 4 cm**

MA = 2 cm **AN = 2.5 cm**

OC = 3 cm **QD = 2 cm**

RB = 2.5 cm.



Solution. The hexagon is divided in six parts shown in the figure.

Here, $AC = MC - MA = 6 \text{ cm} - 2 \text{ cm}$

$= 4 \text{ cm}$

$CP = MP - AC = 9 \text{ cm} - 6 \text{ cm}$

$= 3 \text{ cm}$

$DP = MP - MD = 9 \text{ cm} - 7 \text{ cm}$

$= 2 \text{ cm}$

$BD = MD - MB = 7 \text{ cm} - 4 \text{ cm}$

$= 3 \text{ cm}.$

Area of hexagon MNOPQR = Area of ΔMAN + Area of trapezium ANOC + Area of ΔOCP + Area of ΔDPQ + Area of trapezium BDQR + Area of ΔMBR.

$$= \left[\frac{1}{2}\times MA \times AN\right] + \left[\frac{1}{2}\times (AN+CO)\times AC\right] +$$

$$\left[\frac{1}{2}\times (CP\times CO)\right] + \left[\frac{1}{2}\times DP\times DQ\right] +$$

$$\left[\frac{1}{2}\times (RB+QD)\times BD\right] + \left[\frac{1}{2}\times MB\times RB\right]$$

$$= \left(\frac{1}{2}\times 2\times 2.5\right)\text{cm}^2 + \left[\frac{1}{2}\times(2.5+3)\times 4\right]\text{cm}^2$$

$$+ \left(\frac{1}{2}\times 3\times 3\right)\text{cm}^2 + \left(\frac{1}{2}\times 2\times 2\right)\text{cm}^2$$

$$+ \left(\frac{1}{2}\times (2.5+2)\times 3\right) \text{cm}^2 + \left(\frac{1}{2}\times 4\times 2.5\right) \text{cm}^2$$

$$= 2.5 \text{ cm}^2 + 11 \text{ cm}^2 + 4.5 \text{ cm}^2$$

$$+ 2 \text{ cm}^2 + 6.75 \text{ cm}^2 + 5 \text{ cm}^2$$

$$= 31.75 \text{ cm}^2 \textbf{ Ans.}$$