RD SHARMA

Solutions

Class 8 Maths

Chapter 20

Ex 20.3

1. Find the area of the pentagon shown in fig. 20.48, if AD = 10 cm, AG = 8 cm, AH= 6 cm, AF= 5 cm, BF = 5 cm, CG = 7 cm and EH = 3 cm.

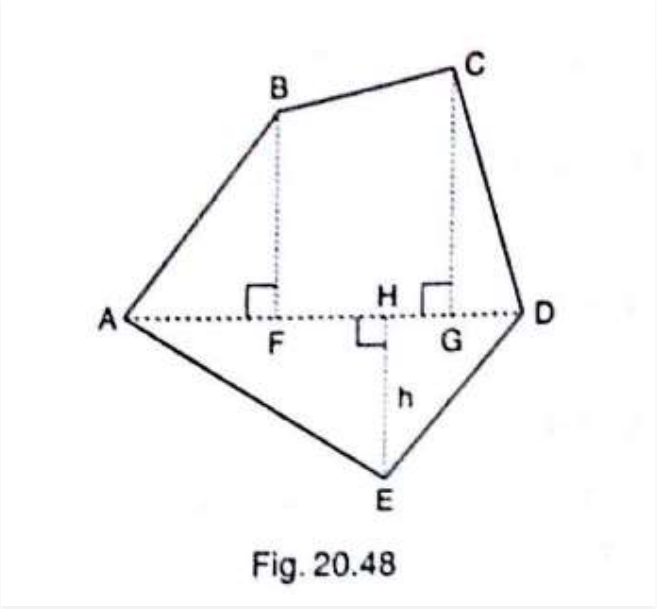


Fig. 20.48

Answer:

Given:

AD = 10 cm, AG = 8 cm, AH = 6 cm, AF = 5 cm

BF = 5 cm, CG = 7 cm, EH = 3 cm

Therefore, FG = AG – AF = 8 – 5 = 3 cm

And, GD = AD – AG = 10 – 8 = 2 cm

From given figure:

Area of Pentagon = (Area of triangle AFB) + (Area of trapezium FBCG) + (Area of triangle CGD) + (Area of triangle ADE)= $(\frac{1}{2}$x AF x BF) + [$\frac{1}{2}$ x (BF + CG) x (FG)] + ($\frac{1}{2}$ x GD x CG) + ($\frac{1}{2}$ x AD x EH).

= ($\frac{1}{2}$ x 5 x 5) + [$\frac{1}{2}$ x (5 + 7) x (3)] + ($\frac{1}{2}$ x 2 x 7) + ($\frac{1}{2}$ x 10 x 3)

= ($\frac{25}{2}$) + ($\frac{36}{2}$) + ($\frac{14}{2}$) + ($\frac{30}{2}$)

= 12.5 + 18 + 7 + 15 = 52.5 cm^2

2. Find the area enclosed by each of the following figures (Fig. 20.49 (i)-(iii)J as the sum of the areas of a rectangle and a trapezium:

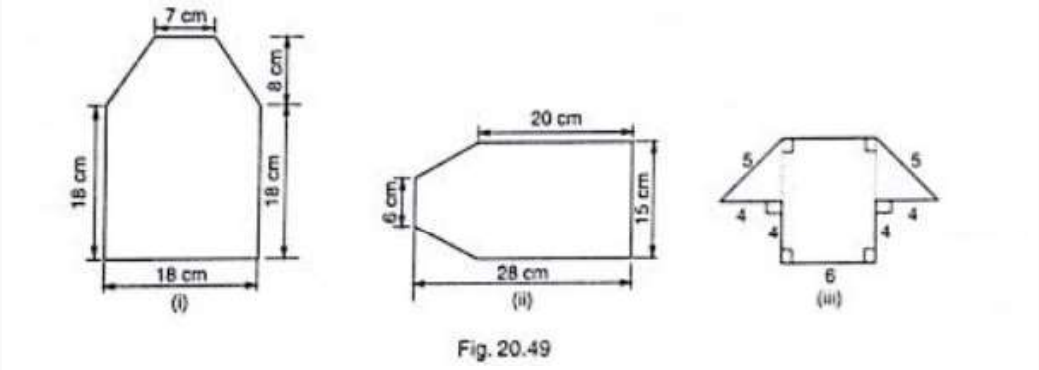


Fig. 20.49

Answer:

(i) From the figure:

Area of the complete figure = (Area of square ABCF) + (Area of trapezium CDEF)

$=(AB \times BC)+[\frac{1}{2} \times (FC + ED) \times (\text{Distance between FC and ED})]$

$=(18 \times 18)+[\frac{1}{2} \times (18 + 7) \times (8)]$

$= 324 + 100 = 424\ cm^2$

(ii) From the figure:

$AB = AC - BC = 28 - 20 = 8$ cm

So that area of the complete figure = (area of rectangle BCDE) + (area of trapezium ABEF)

$=(BC \times CD) + [\frac{1}{2} \times (BE + AF) \times (AB)]$

$=(20 \times 15) + [\frac{1}{2} \times (15 + 6) \times (8)]$

$= 300 + 84 = 384\ cm^2$

(iii) From the figure:

EF = AB = 6 cm

Now, using the Pythagoras theorem in the right angle triangle CDE:

$5^2 = 4^2 + CE^2$

$CE^2 = 25\text{-}16 = 9$

$CE = \sqrt{9} = 3$ cm

And, GD = GH + HC + CD = 4 + 6 + 4 = 14 cm

Area of the complete figure = (Area of rectangle ABCH)+(Area of trapezium GDEF)

$=(AB \times BC)+[\frac{1}{2} \times (GD + EF) \times (CE)]$

$=(6 \times 4) + [\frac{1}{2} \times (14 + 6) \times (3)]$

$= 24 + 30 = 54\ cm^2$

3. There is a pentagonally shaped park as shown in Fig. 20.50. Jyoti and Kavita divided it in two different ways.

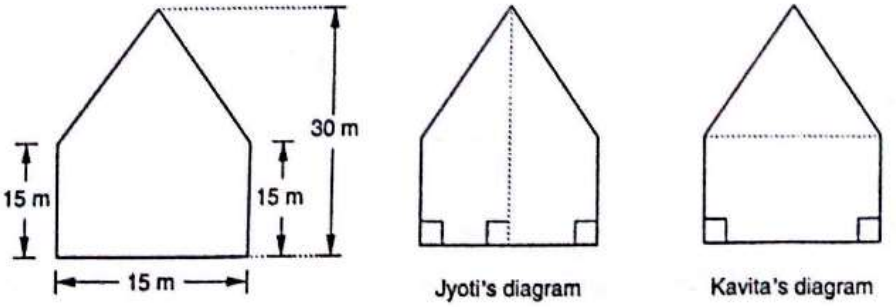
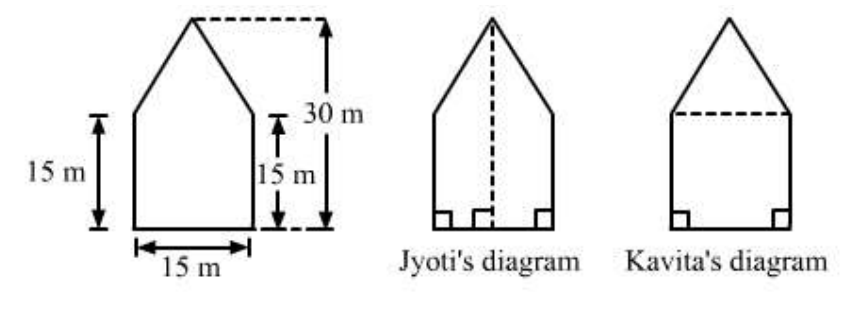


Fig. 20.50

Find the area of this park using both ways. Can you suggest some another way of finding its area?

Answer:

A pentagonal park is given below:



Jyoti and Kavita divided it in two different ways.

(i) Jyoti divided is into two trapeziums. It is clear that the park is divided in two equal trapeziums whose parallel sides are 30 m and 15 m.

And, the distance between the two parallel lines: $\frac{15}{2}$ = 7.5 m

Therefore, Area of the park = 2 x (Area of a trapezium) = 2 x [$\frac{1}{2}$ x (30 + 15) x (7.5)] = 337.5 m^2

(ii) Kavita divided the park into a rectangle and a triangle. Here, the height of the triangle = 30 – 15 = 15 m

Therefore, Area of the park = (Area of square with sides 15 cm)+(Area of triangle with base 15 m and altitude 15 m]

=(15 x 15) + ($\frac{1}{2}$ x 15 x 15)

= 225 + 112. 5 = 337.5 m^2

4. Find the area of the following polygon, if AL =10 cm, AM = 20 cm, AN = 50 cm, AO = 60 cm and AD = 90 cm.

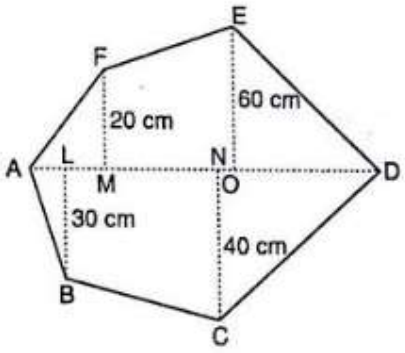


Fig. 20.51

Answer:

Given: AL = 10 cm, AM=20 cm, AN=50 cm

AO = 60 cm, AD = 90 cm

Hence, we have the following: MO = AO – AM = 60 – 20 = 40 cm

OD = AD – A0 = 90 – 60 = 30 cm

ND = AD – AN = 90 – 50 = 40 cm

LN = AN – AL = 50 – 10 = 40 cm

From given figure:

Area of Polygon = (Area of triangle AMF) + (Area of trapezium MOEF) + (Area of triangle DNC) + (Area of trapezium NLBC) + (Area of triangle ALB)

= ($\frac{1}{2}$ x AM x MF) + [$\frac{1}{2}$ x (MF + OE) x OM] + ($\frac{1}{2}$ x OD x OE) + ($\frac{1}{2}$ x DN x NC) + [$\frac{1}{2}$ x (LB + NC) x NL] + ($\frac{1}{2}$ x AL x LB)