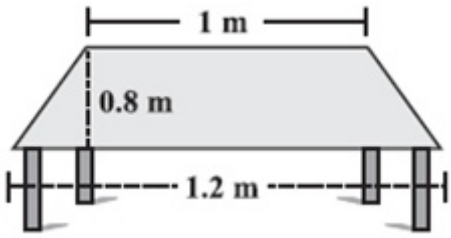
CHAPTER – 11

MENSURATION

EXERCISE – 11.2

Question – 1

The shape of the top surface of a table is a trapezium. Find its area if its parallel sides are 1 m and 1.2 m and perpendicular distance between them is 0.8 m.



Answer:

Area of trapezium = 1/2 (a + b) × h

Here, a = 1.2m, b = 1m, h = 0.8m, thus

Area = 1/2 × (1.2 + 1) × 0.8
Area = 0.5 × 2.2 × 0.8Area = 1.1 × 0.8Area = 0.11 × 8

= 0.88 m^2

Question 2

The area of a trapezium is 34 cm^2 and the length of one of the parallel sides is 10 cm and its height is 4 cm. Find the length of the other parallel side.

Answer:

Area of Trapezium = 1/2 × (Sum of Length of Parallel Side) × Distance Between Them

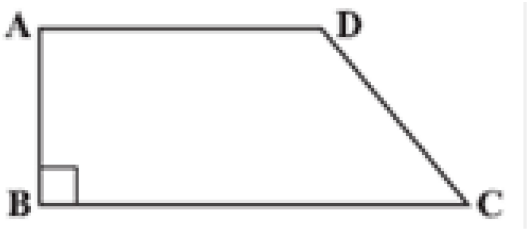
∴ Area of trapezium = 1/2 × (a + b) × h = 34 cm^2

Here, a = 10cm, h = 4cm, b = length of another parallel Side

∴ 1/2 × (10 + b) × 4 = 34
(10 + b) × 2 = 3420 + 2b = 342b = 34 - 202b = 14 b = 7 cm

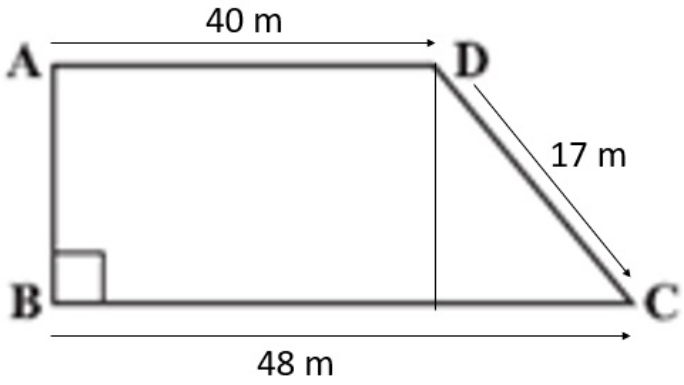
Question 3

Length of the fence of a trapezium shaped field ABCD is 120 m. If BC = 48 m, CD = 17 m and AD = 40 m, find the area of this field. Side AB is perpendicular to the parallel sides AD and BC



Answer:

If a perpendicular from D to BC is drawn then it will be equal to



AB,

then EC = 48-40 = 8 m.

In ΔDEC,
By Pythagoras theorem$DE^2 = DC^2-EC^2$

$DE^2 = 17^2 - 8^2 = 289 - 64 = 225$

Or, DE = 15 m

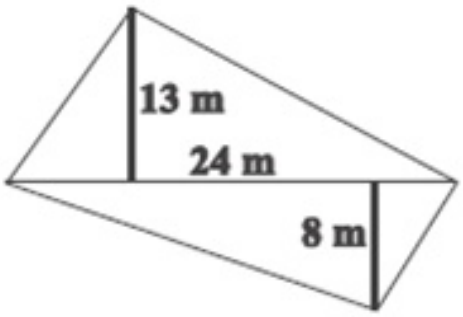
Area of Trapezium = 1/2 × (sum of parallel sides) × height

= 1/2 × (48 + 40) × 15

= 660 m^2

Question. 4

The diagonal of a quadrilateral shaped field is 24 m and the perpendiculars dropped on it from the remaining opposite vertices are 8 m and 13 m. Find the area of the field.



Answer:

Area of upper triangle = 1/2 × height × base

= 1/2 × 13 × 24

= 156 m^2

Area of lower triangle = 1/2 × height × base

= 1/2 × 8 × 24

= 96 m^2

Area of the field = 156 + 96 = 252 m^2

Question 5

The diagonals of a rhombus are 7.5 cm and 12 cm. Find its area.

Answer:

Formula: Area of Rhombus = 1/2 × product of diagonals

Given: Diagonals are 7.5cm and 12cm
Applying the formula, we get,

= 1/2 × 7.5 × 12

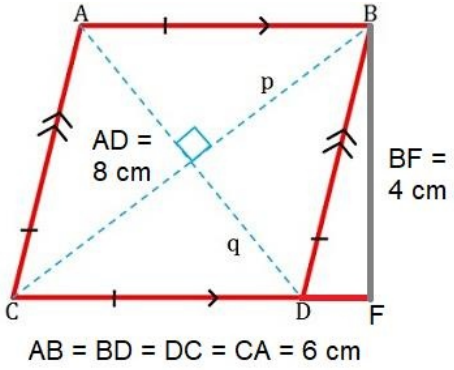
= 45 cm^2

Question – 6

Find the area of a rhombus whose side is 5 cm and whose altitude is 4.8 cm. If one of its diagonals is 8 cm long, find the length of the other diagonal.

Answer:

The diagram is given below:



Now,

Area of rhombus = Base × Altitude

= CD × BF

= 5 cm × 4.8 cm

= 24.0 cm^2

Also, Area of rhombus = 1/2 × AD× BC

⇒ 24 = 1/2 × 8 × BC

⇒ BC = 6 cm

Hence, the length of the other diagonal is 6 cm.

Question – 7

The floor of a building consists of 3000 tiles which are rhombus shaped and each of its diagonals are 45 cm and 30 cm in length. Find the total cost of polishing the floor, if the cost per m2 is Rs 4

Answer:

Here, d' = 45 cm and d''= 30 cm

∵ Area of one tile = area of rhombus= 1/2 (d' × d'')

= 1/2 × 45 × 30

= 675 cm^2

∴ Area of 3000 tiles= 675 × 3000 = 2025000 cm^2

= 202.50 m^2 ----------(∵ $1m^2 = 10000cm^2$)

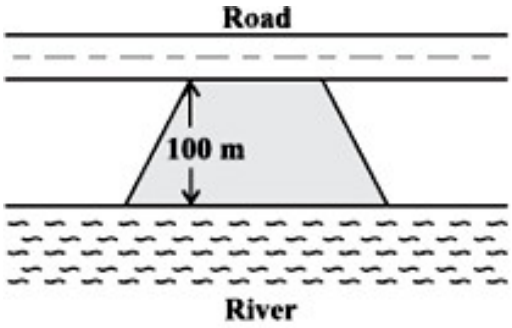
∵ Cost of polishing the floor per sq. meter = 4

∴ Cost of polishing the floor per 202.50 sq. meter = 4 × 202.50 = 810

Hence the total cost of polishing the floor is Rs810

Question – 8

Mohan wants to buy a trapezium shaped field. Its side along the river is parallel to and twice the side along the road. If the area of this field is 10500 m2 and the perpendicular distance between the two parallel sides is 100 m, find the length of the side along



the river.

Answer:

Given: Perpendicular distance(h) = 100 m

Area of the trapezium shaped field

= 10500 m^2

Let side along the road be x m then, side along the river = 2 x m

∴ Area of the trapezium field

= 1/2× (sum of parallel sides) h

⇒ 10500 = 1/2 × (x + 2x) × 100

⇒ 10500 = 1/2 × 3x × 100

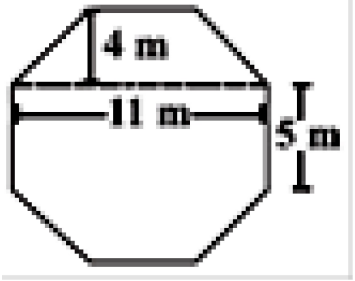
$\Rightarrow x = \frac{10500 \times 2}{3 \times 100} = 70m$

Hence the side along the river = 2x

= 2 × 70 = 140 m.

Question – 9

Top surface of a raised platform is in the shape of a regular octagon as shown in the figure. Find the area of the octagonal

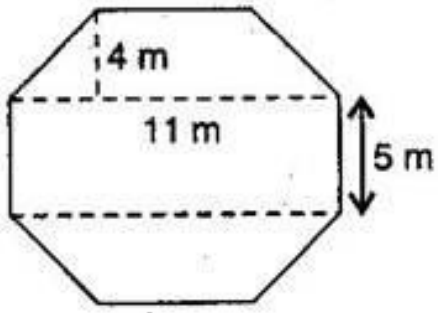


surface.

Answer:

Given: Octagon having eight equal sides, each 5 m

Construction: Divided the octagon in 3 figures, two trapeziums whose parallel and perpendicular sides are 11 m and 4 m respectively and third figure is rectangle having length and



breadth 11 m and 5 m respectively.

Now Area of two trapeziums = 2 x 1/2 × (a + b) h

= (11 + 5) × 4

= 64 sq. m

And Area of rectangle = length × breadth

= 11 × 5

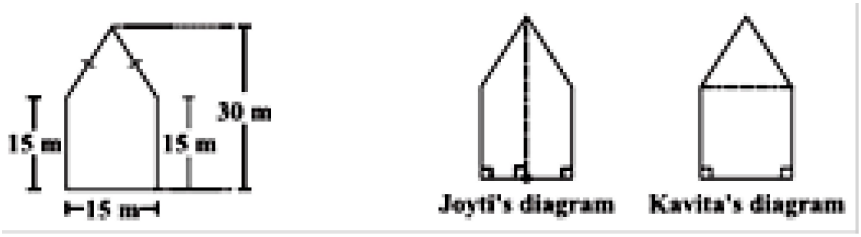
= 55 sq. m

∴ Total area of octagon = 64 + 55

= 119 sq. m

Question – 10

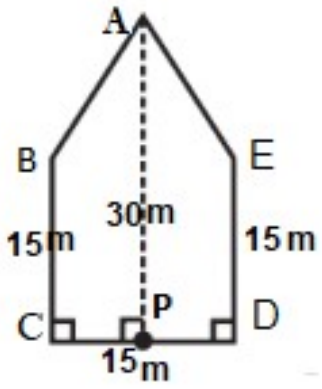
There is a pentagonal shaped park as shown in the figure. For finding its area Jyoti and Kavita divided it in two different ways. Find the area of this park using both ways. Can you suggest



some other way of finding its area?

Answer:

By Jyoti's diagram,



Area of pentagon = Area of trapezium ABCP + Area of trapezium AEDP

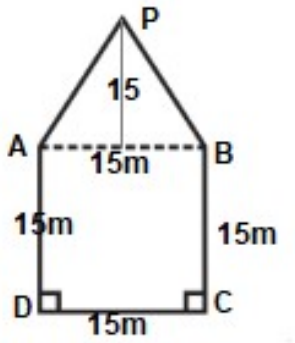
we know area of trapezium = 1/2 × (Sum of parallel lines) × (Distance between parallel lines)
= 1/2 (AP + BC) × CP + 1/2 (ED + AP) × DP = 1/2 (30 + 15) × CP + 1/2 (15 + 30) × DP

= 1/2 (30 + 15) (CP + DP)

= 1/2 × 45 × CD

= 1/2 × 45 × 15

=337.5 m^2



By Kavita's diagram,

Area of pentagon = Area of square ABCD + Area of triangle ABP
we know, area of square = $(side)^2$ = side × side
area of triangle = (1/2) × base x Height= AB×AB + 1/2(AB × h)

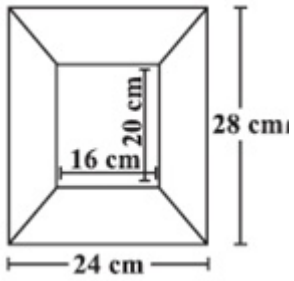
= 15×15 + ½ (15×15)

= 225 + 225/2

=225+112.5 = 337.5 m^2

Question 11

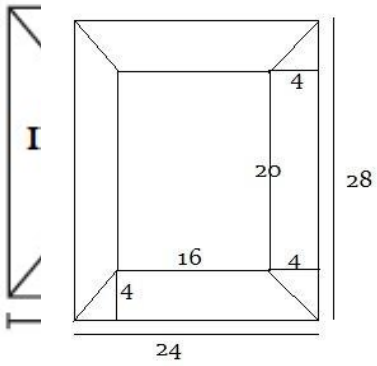
Diagram of the adjacent picture frame has outer dimensions =24 cm × 28 cm and inner dimensions 16 cm × 20 cm. Find the area of each section of the frame, if the width of each section is same.



Answer:

Here two of given figures (I) and (II) are similar in dimensions. we know area of trapezium = (1/2) × (sum of parallel sides) × height

And also figures (III) and (IV) are similar in dimensions.



For trapezium I, 2 h = 24 - 16, 2 h = 8, h = 4

∴ Area of figure (I) = Area of trapezium

$= 1/2 (a + b) h$

$= 1/2 (28 + 20) \times 4$

$= 96 \text{ cm}^2$

Also Area of figure (II) $= 96 \text{ cm}^2$

Now Area of figure (III)

= Area of trapezium = $= 1/2 (24 + 16) \times 4$

$= 80 \text{ cm}^2$

Also Area of figure (IV) $= 80 \text{ cm}^2$