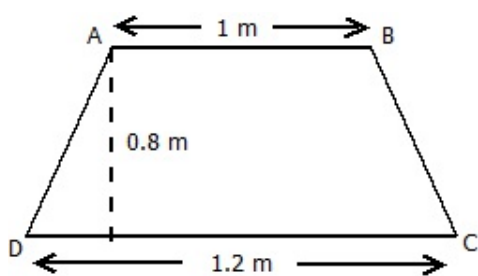


CBSE Class –VIII Mathematics  
NCERT Solutions  
CHAPTER - 11  
Mensuration (Ex. 11.2)

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.

Ans.



Parallel side of the trapezium  $AB = 1\text{ m}$ ,  $CD = 1.2\text{ m}$  and height ( $h$ ) of the trapezium ( $AM$ ) =  $0.8\text{ m}$

*Area of top surface of the table =  $\frac{1}{2}$  (sum of parallel sides) Height*

$$= \frac{1}{2} \times (AB + CD) \times AM$$

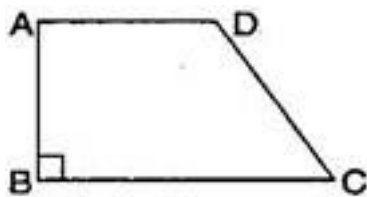
$$= \frac{1}{2} \times (1 + 1.2) \times 0.8$$

$$= \frac{1}{2} \times 2.2 \times 0.8$$

$$= 0.88\text{ m}^2$$

*Thus surface area of the table is  $0.88\text{ m}^2$*

2. The area of a trapezium is  $34\text{ cm}^2$  and the length of one of the parallel sides is  $10\text{ cm}$  and its height is  $4\text{ cm}$ .



**Find the length of the other parallel side.**

**Ans.** Let the length of the other parallel side be =  $b$  cm

Length of one parallel side = 10 cm and height ( $h$ ) = 4 cm

**Area of trapezium** =  $\frac{1}{2} (\text{sum of parallel sides}) \text{ Height}$

$$\Rightarrow 34 = \frac{1}{2} (a+b)h$$

$$\Rightarrow 34 = \frac{1}{2} (10+b) \times 4$$

$$\Rightarrow 34 = (10+b) \times 2$$

$$\Rightarrow 34 = 20 + 2b$$

$$\Rightarrow 34 - 20 = 2b$$

$$\Rightarrow 14 = 2b$$

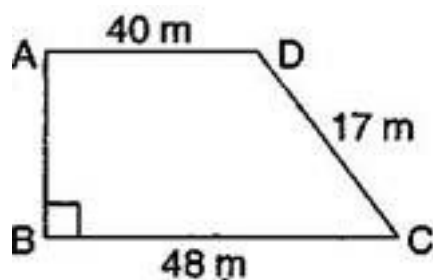
$$\Rightarrow 7 = b$$

$$\Rightarrow b = 7$$

**Hence another required parallel side is 7 cm.**

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**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.**



**Ans.** Given: BC = 48 m, CD = 17 m,

AD = 40 m and perimeter = 120 m

**$\therefore$  Perimeter of trapezium ABCD = Sum of all sides**

$$120 = (AB + BC + CD + DA)$$

$$120 = AB + 48 + 17 + 40$$

$$120 = AB + 105$$

$$(120 - 105) = AB$$

$$AB = 15 \text{ m}$$

Now **Area of the field** =  $\frac{1}{2} \times (\text{Sum of parallel sides}) \times \text{Height}$

$$= \frac{1}{2} \times (BC + AD) \times AB$$

$$= \frac{1}{2} \times (48 + 40) \times 15 \text{ m}^2$$

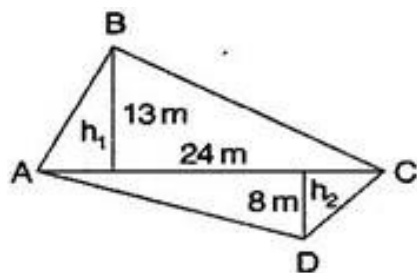
$$= \frac{1}{2} \times (88) \times 15 \text{ m}^2$$

$$= \frac{1}{2} (1320) \text{ m}^2$$

$$= 660 \text{ m}^2$$

**Hence area of the field ABCD is  $660 \text{ m}^2$ .**

**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.**



**Ans.** Here  $h_1 = 13$  m,  $h_2 = 8$  m and  $AC = 24$  m

**Area of quadrilateral ABCD = Area of  $\triangle ABC$  + Area of  $\triangle ADC$**

$$= \frac{1}{2} b \times h_1 + \frac{1}{2} b \times h_2$$

$$= \frac{1}{2} b (h_1 + h_2)$$

$$= \frac{1}{2} \times 24 (13 + 8) \text{ m}^2$$

$$= \frac{1}{2} \times 24 (21) \text{ m}^2$$

$$= 12 \times 21 \text{ m}^2$$

$$= 252 \text{ m}^2$$

**Hence required area of the field is  $252 \text{ m}^2$**

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

**Ans.** Given:  $d_1 = 7.5$  cm and  $d_2 = 12$  cm

**Area of rhombus =  $\frac{1}{2} \times (\text{Product of diagonals})$**

$$= \frac{1}{2} \times (d_1 \times d_2)$$

$$= \frac{1}{2} \times (7.5 \times 12) \text{ cm}^2$$

$$= 45 \text{ cm}^2$$

**Hence area of rhombus is  $45 \text{ cm}^2$ .**

6. Find the area of a rhombus whose side is 6 cm and whose altitude is 4 cm. If one of the diagonals is 8 cm long, find the length of the other diagonal.

**Ans. Rhombus is also a kind of Parallelogram.**

**$\therefore$  Area of rhombus = Base  $\times$  Altitude**

$$= (6 \times 4) \text{ cm}^2$$

$$= 24 \text{ cm}^2$$

Also **Area of rhombus** =  $\frac{1}{2} \times (d_1 \times d_2)$

$$24 = \frac{1}{2} \times (8 \times d_2)$$

$$24 = 4 d_2$$

$$\frac{24}{4} \text{ cm} = d_2$$

$$d_2 = 6 \text{ cm}$$

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

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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  $\text{m}^2$  is ₹ 4.

**Ans.** Here,  $d_1 = 45 \text{ cm}$  and  $d_2 = 30 \text{ cm}$

**$\therefore$  Area of one tile** =  $\frac{1}{2} \times (d_1 \times d_2)$

$$= \frac{1}{2} \times (45 \times 30)$$

$$= \frac{1}{2} (1350)$$

$$= 675 \text{ cm}^2$$

**So, the area of one tile is  $675 \text{ cm}^2$**

**Area of 3000 tiles** =  $675 \times 3000 \text{ cm}^2$

$$= 2025000 \text{ cm}^2$$

$$= \frac{2025000}{100 \times 100} \text{ m}^2$$

$$[1 \text{ cm} = \frac{1}{100} \text{ m, Here cm}^2 = \text{cm} \times \text{cm} = \frac{1}{100} \times \frac{1}{100} \text{ m}^2]$$

$$= 202.50 \text{ m}^2$$

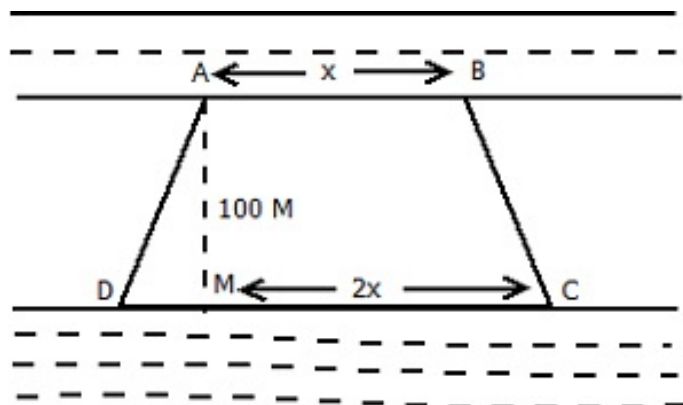
∴ Cost of polishing the floor per sq. meter = Rs. 4

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

**Hence the total cost of polishing the floor is Rs. 810.**

**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  $10500 \text{ m}^2$  and the perpendicular distance between the two parallel sides is 100 m, find the length of the side along the river.**

**Ans.**



Given: Perpendicular distance (h) AM = 100 m

Area of the trapezium shaped field =  $10500 \text{ m}^2$

Let side along the road AB =  $x \text{ m}$

side along the river CD =  $2x \text{ m}$

∴ Area of the trapezium field =  $\frac{1}{2} \times (AB + CD) \times AM$

$$10500 = \frac{1}{2}(x + 2x) \times 100$$

$$10500 = 3x \times 50$$

$$3x = \frac{10500}{50}$$

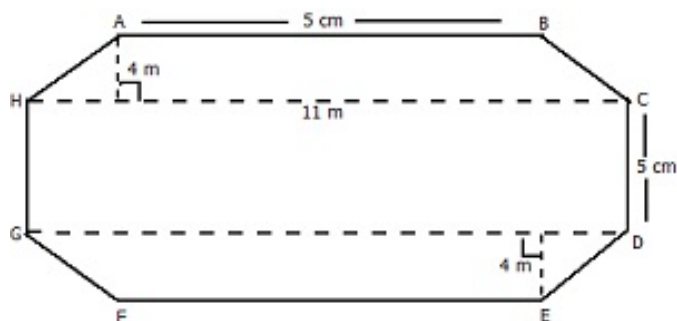
$$x = \frac{10500}{50 \times 3}$$

$$x = 70 \text{ m}$$

Hence the side along the river =  $2x = (2 \times 70) = 140 \text{ m}$ .

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.

Ans.



Given: Octagon having eight equal sides, each 5 m.

Construction: Join HC and GD It will divide the octagon into two equal trapezium.

And AM is perpendicular on HC and EN is perpendicular on GD

Area of trap. ABCD = Area of trap. GDFE .....(1)

Area of two trapeziums = (area of trap. ABCH + area of trap. GDFE)

= (area of trap. ABCH + area of trap. ABCH) (by statement 1).

= (2 x area of trap. ABCH )

$$= (2 \times \frac{1}{2} \times (\text{sum of parallel sides}) \times \text{height})$$

$$= (2 \times \frac{1}{2} \times (AB + CH) \times AM)$$

$$= (11 + 5) \times 4 \text{ m}^2$$

$$= (16) \times 4$$

$$= 64 \text{ m}^2$$

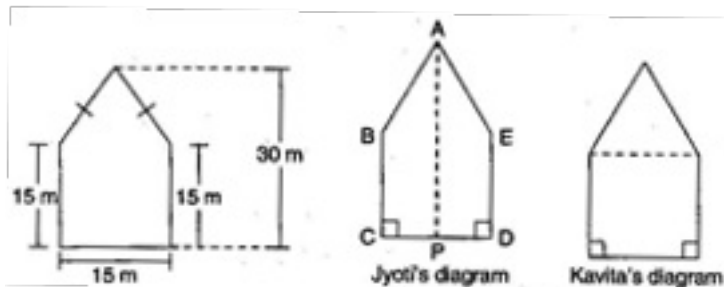
And Area of rectangle (HCDG) = length  $\times$  breadth

$$= HC \times HG = 11 \times 5 = 55 \text{ m}^2$$

$\therefore$  Total area of octagon = Area of 2 Trapezium + Area of Rectangle

$$= 64 \text{ m}^2 + 55 \text{ m}^2 = 119 \text{ m}^2$$

**10. There is a pentagonal shaped park as shown in the figure. For finding its area a 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?**

**Ans.** First way: By Jyoti's diagram,

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

$$= \frac{1}{2} (AP + BC) \times CP + \frac{1}{2} (ED + AP) \times DP$$

$$= \frac{1}{2} (30 + 15) \times CP + \frac{1}{2} (15 + 30) \times DP$$



$$= \frac{1}{2} (30 + 15) (CP + DP)$$

$$= \frac{1}{2} \times 45 \times CD$$

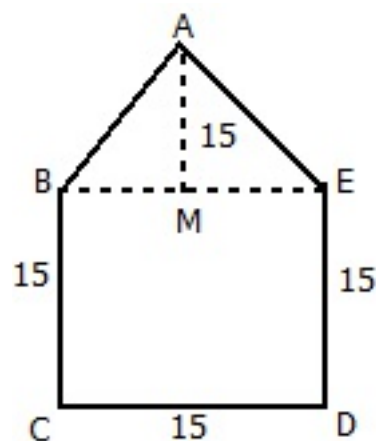
$$= \frac{1}{2} \times 45 \times 15$$

$$= 337.5 \text{ m}^2$$

**Second way: By Kavita's diagram**

Here, a perpendicular AM drawn to BE.  $AM = 30 - 15 = 15 \text{ m}$

**Area of pentagon = Area of  $\triangle ABE$  + Area of square BCDE**



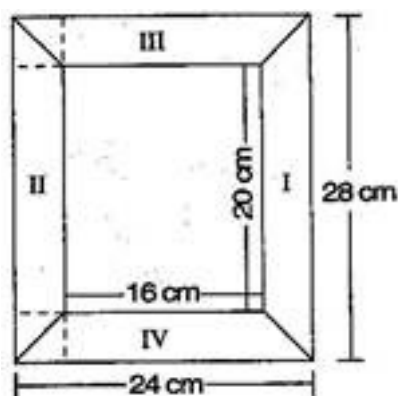
$$= \left\{ \frac{1}{2} \times 15 \times 15 \right\} + (15 \times 15) \text{ m}^2$$

$$= (112.5 + 225.0) \text{ m}^2$$

$$= 337.5 \text{ m}^2$$

**Hence total area of pentagon shaped park =  $337.5 \text{ m}^2$ .**

**11. Diagram of the adjacent picture frame has outer dimensions =  $24 \text{ cm} \times 28 \text{ cm}$  and inner dimensions  $16 \text{ cm} \times 20 \text{ cm}$ . Find the area of each section of the frame, if the width of each section is same.**



**Ans.** Here two of given figures (I) and (II) are similar in dimensions. And also figures (III) and (IV) are similar in dimensions.

$\therefore$  Area of figure (I) = Area of trapezium

$$= \frac{1}{2}(a+b) \times h = \frac{1}{2}(28+20) \times 4$$

$$= \frac{1}{2} \times 48 \times 4 = 96 \text{ cm}^2$$

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

Now Area of figure (III)

$$\text{Area of trapezium} = \frac{1}{2}(a+b) \times h$$

$$= \frac{1}{2}(24+16) \times 4$$

$$= \frac{1}{2} \times 40 \times 4$$

$$= 80 \text{ cm}^2$$

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