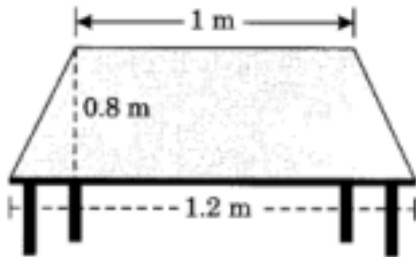


NCERT Solutions for Class 8 Maths Chapter 9 Mensuration Ex 9.1

Ex 9.1 Class 8 Maths 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.



Solution:

$$\begin{aligned} \text{Area of the trapezium} &= \frac{1}{2} \times (a + b) \times h \\ &= \frac{1}{2} \times (1.2 + 1) \times 0.8 \\ &= \frac{1}{2} \times 2.2 \times 0.8 \\ &= 0.88 \text{ m}^2 \end{aligned}$$

Hence, the required area = 0.88 m²

Ex 9.1 Class 8 Maths Question 2.

The area of a trapezium is 34 cm² 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 sides.

Solution:

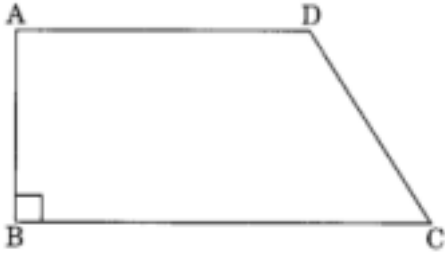
Given: Area of trapezium = 34 cm²
 Length of one of the parallel sides a = 10 cm
 height h = 4 cm

$$\begin{aligned} \text{Area of the trapezium} &= \frac{1}{2} \times (a + b) \times h \\ 34 &= \frac{1}{2} \times (10 + b) \times 4 \\ \Rightarrow 34 &= (10 + b) \times 2 \\ \Rightarrow 17 &= 10 + b \\ \Rightarrow b &= 17 - 10 \\ &= 7 \text{ cm} \end{aligned}$$

Hence, the required length = 7 cm.

Ex 9.1 Class 8 Maths 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.



Solution:

Given:

$$AB + BC + CD + DA = 120 \text{ m .}$$

$$BC = 48 \text{ m, } CD = 17 \text{ m, } AD = 40 \text{ m}$$

$$AB = 120 \text{ m} - (48 \text{ m} + 17 \text{ m} + 40 \text{ m}) = 120 - 105 \text{ m} = 15 \text{ m}$$

$$\text{Area of the trapezium } ABCD = \frac{1}{2} \times (BC + AD) \times AB$$

$$= \frac{1}{2} \times (48 + 40) \times 15 = 44 \times 15 = 660$$

$$= \frac{1}{2} \times 88 \times 15$$

$$= \frac{1}{2} \times 88 \times 15$$

2

2

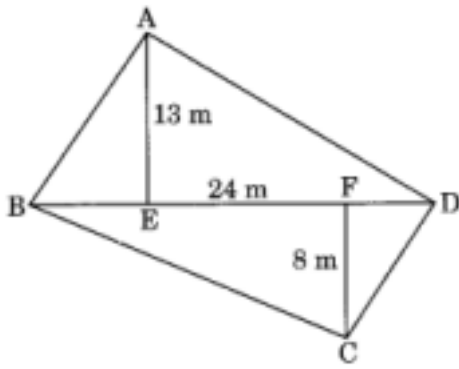
Hence, the required area = 660 m

Ex 9.1 Class 8 Maths 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.

Solution:

$$\text{Area of the field} = \text{area of } \triangle ABD + \text{area of } \triangle BCD$$



$$\begin{aligned}
 &= \frac{1}{2} \times b \times h + \frac{1}{2} \times b \times h \\
 &= \frac{1}{2} \times 24 \times 13 + \frac{1}{2} \times 24 \times 8 \\
 &= 12 \times 13 + 12 \times 8 \\
 &= 12 \times (13 + 8) \\
 &= 12 \times 21 \\
 &= 252 \text{ m}^2
 \end{aligned}$$

Hence, the required area of the field = 252 m².

Ex 9.1 Class 8 Maths Question 5.

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

Here, d₁ = 7.5 cm, d₂ = 12 cm

$$\text{Area of the rhombus} = \frac{1}{2} \times d_1 \times d_2$$

$$= \frac{1}{2} \times 7.5 \times 12$$

$$= 7.5 \times 6$$

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

Hence, area of the rhombus = 45 cm².

Ex 9.1 Class 8 Maths 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.

Solution:

Given: Side = 5 cm

Altitude = 4.8 cm

Length of one diagonal = 8 cm

$$\text{Area of the rhombus} = \text{Side} \times \text{Altitude} = 5 \times 4.8 = 24 \text{ cm}$$

$$\text{Area of the rhombus} = \frac{1}{2} \times d \times d$$

$$24 = \frac{1}{2} \times d \times d \quad d = 6 \text{ cm}$$

$$24 = 4d \quad 24 = 4d$$

Hence, the length of other diagonal = 6 cm.

Ex 9.1 Class 8 Maths 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 ₹ 4.

Solution:

Given: Number of tiles = 3000

Length of the two diagonals of a tile = 45 cm and 30 cm

$$\text{Area of one tile} = \frac{1}{2} \times d \times d$$

$$= \frac{1}{2} \times 45 \times 30 = 675 \text{ cm}^2$$

$$= 45 \times 15$$

$$\text{Area covered by 3000 tiles} = 3000 \times 675 \text{ cm}^2 = 2025000 \text{ cm}^2 = 202.5 \text{ m}^2$$

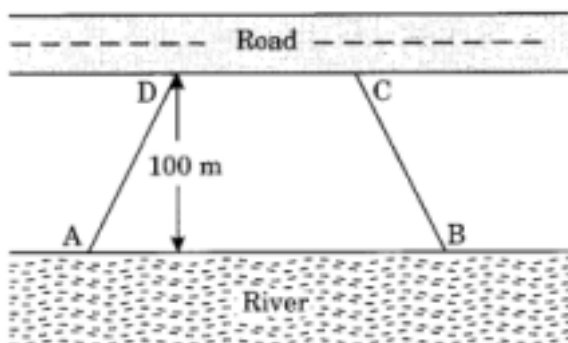
$$\text{Cost of polishing the floor} = 202.5 \times 4 = ₹ 810$$

Hence, the required cost = ₹ 810.

Ex 9.1 Class 8 Maths 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.



Solution:

Let the side of the trapezium (roadside) be x cm.

The opposite parallel side = $2x$ m

$h = 100$ m

Area = 10500 m²

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

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

$$2 \times 10500 = 3x \times 100$$

$$21000 = 300x$$

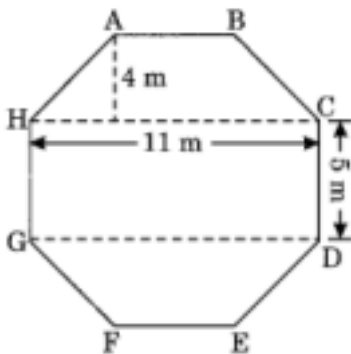
$$x = 70 \text{ m}$$

$$\text{So, } AB = 2x = 2 \times 70 = 140 \text{ m}$$

Hence, the required length = 140 m.

Ex 9.1 Class 8 Maths Question 9.

The 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.



Solution:

Area of the octagonal surface = area of trapezium ABCH + area of rectangle HCDG + area of trapezium GDEF

Area of trapezium ABCH = Area of trapezium GDEF

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

$$= \frac{1}{2}(11 + 5) \times 4$$

$$= \frac{1}{2} \times 16 \times 4$$

$$= 32 \text{ m}^2$$

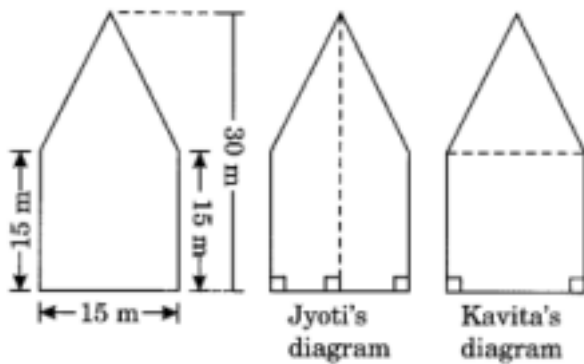
$$\text{Area of rectangle HCDG} = l \times b = 11 \text{ m} \times 5 \text{ m} = 55 \text{ m}^2$$

$$\text{Area of the octagonal surface} = 32 \text{ m}^2 + 55 \text{ m}^2 + 32 \text{ m}^2 = 119 \text{ m}^2$$

Hence, the required area = 119 m^2 .

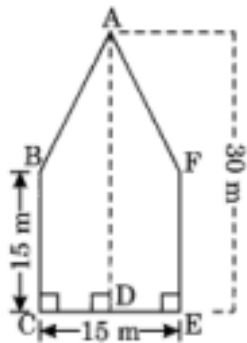
Ex 9.1 Class 8 Maths Question 10.

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? Solution:

(i) From Jyoti's diagram:



Area of the pentagonal shape = Area of trapezium ABCD + Area of trapezium ADEF

$$= 2 \times \text{Area of trapezium ABCD}$$

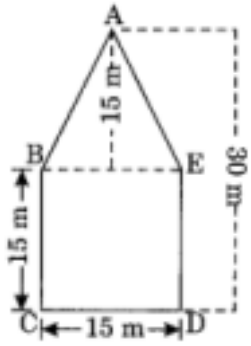
$$= 2 \times \frac{1}{2} (a + b) \times h$$

$$= (15 + 30) \times 7.5$$

$$= 45 \times 7.5$$

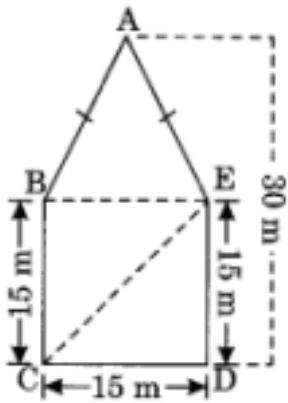
$$= 337.5 \text{ m}^2$$

(ii) From Kavita's diagram:



Area of the pentagonal shape = Area of $\triangle ABE$ + Area of square BCDE

$$\begin{aligned}
 &= \frac{1}{2} \times b \times h + 15 \times 15 \\
 &= \frac{1}{2} \times 15 \times 15 + 225 \\
 &= 112.5 + 225 \\
 &= 337.5 \text{ m}^2
 \end{aligned}$$

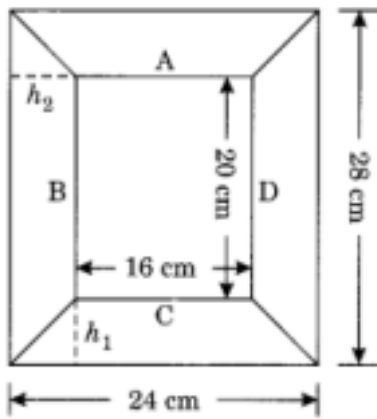


Yes, we can also find the other way to calculate the area of the given pentagonal shape. Join CE to divide the figure into two parts, i.e., trapezium ABCE and right triangle EDC. Area of ABCDE = Area of $\triangle EDC$ + Area of square ABCE

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Ex 9.1 Class 8 Maths Question 11.

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



Solution:

$$h_1 = \frac{1}{2} (28 - 20) = \frac{1}{2} \times 8 = 4 \text{ cm}$$

$$h_2 = \frac{1}{2} (24 - 16) = \frac{1}{2} \times 8 = 4 \text{ cm}$$

Area of the trapezium A

$$\begin{aligned} &= \frac{1}{2} \times (a + b) \times h_1 \\ &= \frac{1}{2} \times (24 + 16) \times 4 \\ &= \frac{1}{2} \times 40 \times 4 \\ &= 80 \text{ cm}^2 \end{aligned}$$

Area of trapezium A = Area of trapezium C
= 80 cm²

Area of trapezium B = Area of trapezium D

$$\begin{aligned} &= \frac{1}{2} \times (28 + 20) \times 4 \\ &= \frac{1}{2} \times 48 \times 4 \\ &= 96 \text{ cm}^2 \end{aligned}$$

Hence, the areas of the four parts A, B, C, and D are 80 cm², 96 cm², 80 cm² and 96 cm² respectively.