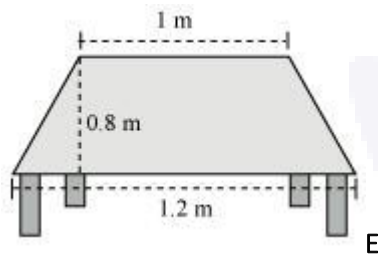# CLASS VIII: Maths
Chapter 9: Mensuration

Questions and Solutions | Exercise 9.1 - NCERT Books

Q1. 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 = $\dfrac{1}{2}$ (Sum of parallel sides) × (Distances between parallel sides)

$$= \left[\frac{1}{2}(1+1.2)(0.8) \right] m^2 = 0.88 \ m^2$$

Q2 :

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 side.

Answer :

It is given that,area of trapezium = 34 cm² and height = 4 cm

Let the length of one parallel side be a. We know that,

Area of trapezium = $\dfrac{1}{2}$ (Sum of parallel sides) × (Distances between parallel sides)

$$34 \text{ cm}^2 = \dfrac{1}{2}(10 \text{ cm} + a) \times (4 \text{ cm})$$
$$34 \text{ cm} = 2(10 \text{ cm} + a)$$
$$17 \text{ cm} = 10 \text{ cm} + a$$
$$a = 17 \text{ cm} - 10 \text{ cm} = 7 \text{ cm}$$

Thus, the length of the other parallel side is 7 cm.

Q3 :

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 :

Length of the fence of trapezium ABCD = AB + BC + CD + DA

120 m = AB + 48 m + 17 m + 40 m

AB = 120 m - 105 m = 15 m

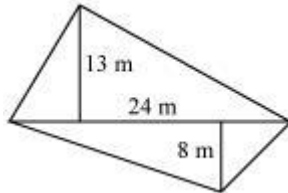Area of the field ABCD $= \dfrac{1}{2}(AD + BC) \times AB$

$$= \left[\dfrac{1}{2}(40 + 48) \times (15) \right] \text{ m}^2$$
$$= \left(\dfrac{1}{2} \times 88 \times 15 \right) \text{ m}^2$$
$$= 660 \text{ m}^2$$

Q4 :

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 :

It is given that,

Length of the diagonal, d = 24 m

Length of the perpendiculars, h_1 and h_2, from the opposite vertices to the diagonal are h_1 = 8 m and h_2 = 13 m

Area of the quadrilateral $= \frac{1}{2} d \left(h_1 + h_2 \right)$

$$= \frac{1}{2} \left(24\,\text{m} \right) \times \left(13\,\text{m} + 8\,\text{cm} \right)$$

$$= \frac{1}{2} \left(24\,\text{m} \right) \left(21\,\text{m} \right)$$

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

Thus, the area of the field is 252 m².

Q5 :

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

Answer :

Area of rhombus = $\dfrac{1}{2}$ (Product of its diagonals)

Therefore, area of the given rhombus

$= \dfrac{1}{2} \times 7.5\,cm \times 12\,cm$

$= 45\ cm^2$

Q6 :

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

Answer :

Let the length of the other diagonal of the rhombus be x.

A rhombus is a special case of a parallelogram.

The area of a parallelogram is given by the product of its base and height.

Thus, area of the given rhombus = Base × Height = 6 cm × 4 cm = 24 cm^2

Also, area of rhombus = $\dfrac{1}{2}$ (Product of its diagonals)

$$\Rightarrow 24\ cm^2 = \dfrac{1}{2}\left(8\ cm \times x\right)$$
$$\Rightarrow x = \left(\dfrac{24 \times 2}{8}\right)\ cm = 6\ cm$$

Thus, the length of the other diagonal of the rhombus is 6 cm.

Q7 :

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 m^2 is Rs 4.

Answer :

Area of rhombus = $\dfrac{1}{2}$ (Product of its diagonals)

Area of each tile

$$= \left(\dfrac{1}{2} \times 45 \times 30 \right) \ cm^2$$

= 675 cm^2

Area of 3000 tiles = (675 × 3000) cm^2 = 2025000 cm^2 = 202.5 m^2

The cost of polishing is Rs 4 per m^2.

Cost of polishing 202.5 m^2 area = Rs (4 × 202.5) = Rs 810

Thus, the cost of polishing the floor is Rs 810.

Q8 :

Mohan wants to buy a trapezium shaped field. Its side along the river is parallel to and twice the side along the road. It the area of this field is 10500 m^2 and the perpendicular distance between the two parallel sides is 100 m, find the length of the side along the river.
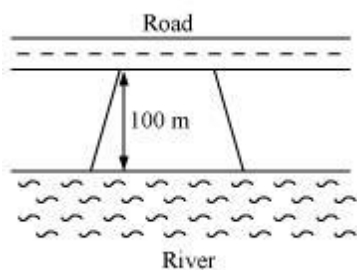
Answer :

Let the length of the field along the road be l m. Hence, the length of the field along the river will be $2l$ m.

Area of trapezium = $\dfrac{1}{2}$ (Sum of parallel sides) (Distance between the parallel sides)

$$\Rightarrow 10500 \text{ m}^2 = \frac{1}{2}(l+2l)\times(100 \text{ m})$$
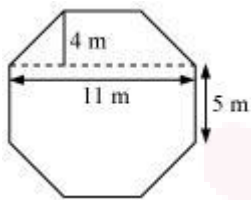
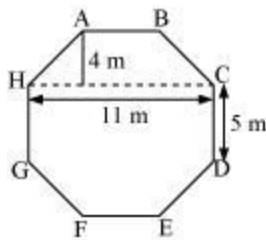$$3l = \left(\frac{2\times10500}{100}\right) \text{ m} = 210 \text{ m}$$

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

Thus, length of the field along the river = (2 × 70) m = 140 m

Q9 :

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 :

Side of regular octagon = 5 cm

Area of trapezium ABCH = Area of trapezium DEFG

$$\text{Area of trapezium ABCH} = \left[\frac{1}{2}(4)(11+5)\right] \text{ m}^2 = \left(\frac{1}{2}\times4\times16\right) \text{ m}^2 = 32 \text{ m}^2$$

Area of rectangle HGDC = 11 × 5 = 55 m^2

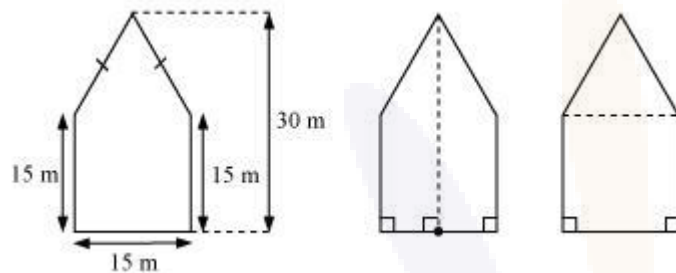Area of octagon = Area of trapezium ABCH + Area of trapezium DEFG

+ Area of rectangle HGDC

= 32 m² + 32 m² + 55 m² = 119 m²

Q10 :

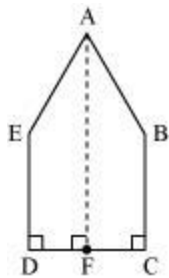There is a pentagonal shaped park as shown in the figure.

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 :

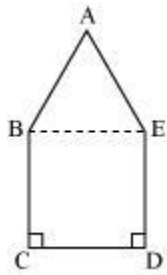Jyoti's way of finding area is as follows.

Area of pentagon = 2 (Area of trapezium ABCF)

$$= \left[2 \times \frac{1}{2}(15+30)\left(\frac{15}{2}\right) \right] m^2$$

= 337.5 m²

Kavita's way of finding area is as follows.

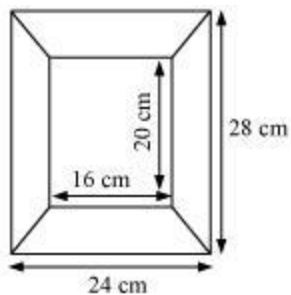Area of pentagon = Area of ΔABE + Area of square BCDE

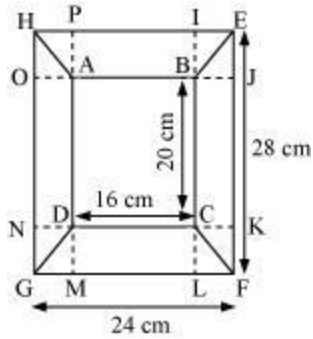$$= \left[\frac{1}{2} \times 15 \times (30-15) + (15)^2 \right] m^2$$

$$= \left(\frac{1}{2} \times 15 \times 15 + 225 \right) m^2$$

$$= (112.5 + 225) \, m^2$$

$$= 337.5 \, m^2$$

Q11 :

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

Answer :

Given that, the width of each section is same. Therefore,

IB = BJ = CK = CL = DM = DN = AO = AP

IL = IB + BC + CL

28 = IB + 20 + CL

IB + CL = 28 cm - 20 cm = 8 cm

IB = CL = 4 cm

Hence, IB = BJ = CK = CL = DM = DN = AO = AP = 4 cm

Area of section BEFC = Area of section DGHA

$$= \left[\frac{1}{2}(20+28)(4) \right] \ cm^2 = 96 \ cm^2$$

Area of section ABEH = Area of section CDGF
⇒Area of section ABEH = Area of section CDGF
= [12(16+24)(4)]=80