Exercise 9.1 (Revised) - Chapter 11 - Mensuration - Ncert Solutions class 8 - Maths

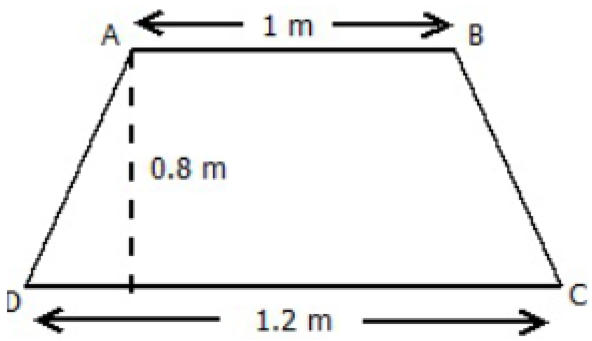
Updated On 11-02-2025 By Lithanya

Chapter 9 Mensuration - NCERT Solutions Class 8 Maths | Free PDF Download

Ex 9.1 Question 1.

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

Answer.



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

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

$=\frac{1}{2} \mathrm{x}(\mathrm{AB}+\mathrm{CD}) \mathrm{xAM}$

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

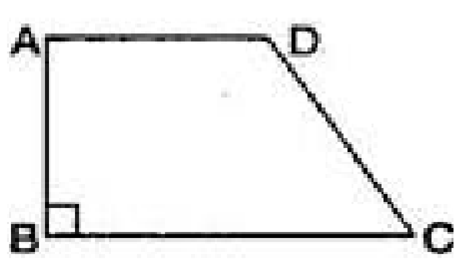
$=\frac{1}{2} \times 2.2 \times 0.8$

$=0.88 \mathrm{~m}^2$

Thus surface area of the table is $0.88 \mathrm{~m}^2$

Ex 9.1 Question 2.

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



Find the length of the other parallel side.

Answer.

Let the length of the other parallel side be $=\mathrm{bcm}$
Length of one parallel side $=10$ am and height $(h)=4 \mathrm{~cm}$
Area of trapezium $=\frac{1}{2}$(sum of parallel sides) Height

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

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

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

$\Rightarrow 34=20+2b$

$\Rightarrow 34-20=2b$

$\Rightarrow 14=2b$

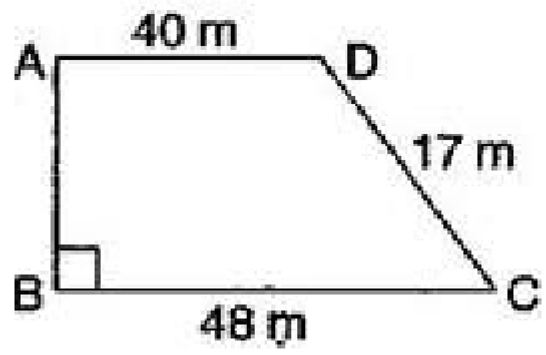
$\Rightarrow 7=b$

$\Rightarrow b=7$

Hence another required parallel side is 7 cm.

Ex 9.1 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.

Given: $BC=48$ m, $CD=17$ m,

$AD=40$ m and perimeter $=120$ m

$\because$ Perimeter of trapezium $ABCD=$ Sum of all sides

$120=(AB+BC+\mathbf{CD}+DA)$

$120=AB+48+17+40$

$120=AB+105$

$(120-105)=AB$

$AB=15$ m

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

$=\frac{1}{2}x(BC+AD)xAB$

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

$=\frac{1}{2}x(88)x15\ m^2$

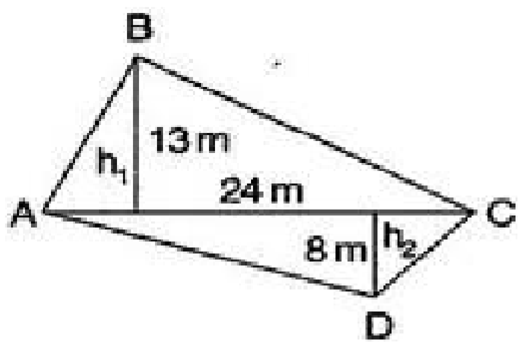
$=\frac{1}{2}(1320)m^2$

$=660\ m^2$

Hence area of the field $ABCD$ is $66\ m^2$.

Ex 9.1 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.

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

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

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

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

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

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

$= 12 \times 21 \mathrm{~m}^2$

$= 252 \mathrm{~m}^2$

Hence required area of the field is $252 \mathrm{~m}^2$

Ex 9.1 Question 5.

The diagonals of a rhombus are $7.5 \mathrm{~cm}$ and $12 \mathrm{~cm}$. Find its area.

Answer.

Given: $\mathrm{d}_1 = 7.5 \mathrm{~cm}$ and $\mathrm{d}_2 = 12 \mathrm{~cm}$

Area of rhombus $= \frac{1}{2} x$ (Product of digonals)

$= \frac{1}{2} \mathrm{x}\left(\mathrm{d}_1 \times \mathrm{d}_2\right)$

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

$= 45 \mathrm{~cm}^2$

Hence area of rhombus is $45 \mathrm{~cm}^2$.

Ex 9.1 Question 6.

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

Answer.

Rhombus is also a kind of Parallelogram.

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

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

$= 24 \mathrm{~cm}^2$

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

$24 = \frac{1}{2} \mathrm{x}\left(8 \mathrm{xd}_2\right)$

$24 = 4 \mathrm{~d}_2$

$\frac{24}{4} \mathrm{~cm} = \mathrm{d}_2$

$\mathrm{d}_2 = 6 \mathrm{~cm}$

Hence, the length of the other diagonal is $6 \mathrm{~cm}$.

Ex 9.1 Question 7.

The floor of a building consists of 3000 tiles which are rhombus shaped and each of its diagonals are $45 \mathrm{~cm}$ and $30 \mathrm{~cm}$ in length. Find the total cost of polishing the floor, if the cost per m^2 is ` 4 .

Answer.

Here, $d_1 = 45 \mathrm{~cm}$ and $d_2 = 30 \mathrm{~cm}$

∵ Area of one tile $=\frac{1}{2} \times\left(d_1 \times d_2\right)

Here, $\mathrm{d}_1 = 45 \mathrm{~cm}$ and $\mathrm{d}_2 = 30 \mathrm{~cm}$

$\because$ Area of one tile $= \frac{1}{2} \times \left(d_1 \times d_2\right)$

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

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

$= 675 \mathrm{~cm}^2$

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

Area of 3000 tiles $= 675 \times 3000 \mathrm{~cm}^2$

$= 2025000 \mathrm{~cm}^2$

$= \frac{2025000}{100 * 100} \mathrm{~m}^2$

$\left[1 \mathrm{~cm} = \frac{1}{100} \mathrm{~m}, \text{ Here } \mathrm{cm}^2 = \text{ Cm } \times \mathrm{cm} = \frac{1}{100} \times \frac{1}{100} \mathrm{~m}^2\right]$

$= 202.50 \mathrm{~m}^2$

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

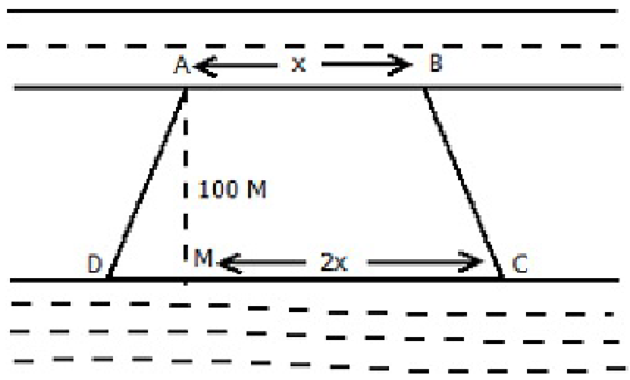
∴ Cost of polishing the floor per 202.50 sq. meter $=$ Rs. $4 \times 202.50 =$ Rs. 810

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

Ex 9.1 Question 8.

Mohan wants to buy a trapezium shaped field. Its side along the river is parallel to and twice the sidealong the road. If the area of this field is $10500 \mathrm{~m}^2$ and the perpendicular distance between the two parallel sides is $100 \mathrm{~m}$, find the length of the side along the river.

Answer.



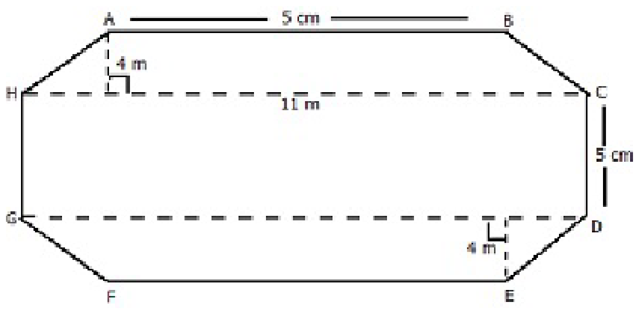
Given: Perpendicular distance (h) AM $= 100 \mathrm{~m}$
Area of the trapezium shaped field $= 10500 \mathrm{~m}^2$
Let side along the road $\mathrm{AB} = x \mathrm{~m}$
side along the river $\mathrm{CD} = 2x \mathrm{~m}$
$\therefore$ Area of the trapezium field $= \frac{1}{2}$x$(\mathrm{AB} + \mathrm{CD})$x AM

$$10500 = \frac{1}{2}(x + 2x) \times 100$$
$$10500 = 3x \times 50$$
$$3x = \frac{10500}{50}$$
$$x = \frac{10500}{50 \times 3}$$
$$x = 70 \mathrm{~m}$$

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

Ex 9.1 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.



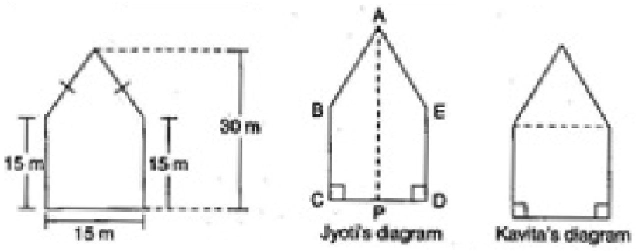
Given: Octagon having eight equal sides, each $5 \mathrm{~m}$.
Construction: Join HC and GD It will divide the octagon into two equal trapezium.
And AM is perpendicular on HC and EN is perpendicular on GD
Area of trap. $ABCD =$ Area of trap. GDFE.
Area of two trapeziums = (area of trap. $\mathrm{ABCH}+$ area of trap. GDFE)
$=$ (area of trap. $\mathrm{ABCH}+$ area of trap. ABCH) (by statement 1).
$=$ (2x area of trap. ABCH)

$$= \left(2 \times \frac{1}{2} \times \text{ (sum of parallel sides} \right) \times \text{ height)}$$
$$= \left(2 \times \frac{1}{2} \times (AB + CH) \times AM\right)$$
$$= (11 + 5) \times 4 \mathrm{~m}^2$$
$$= (16) \times 4$$
$$= 64 \mathrm{~m}^2$$

And Area of rectangle $(HCDG) =$ length $\times$ breadth
$= \mathrm{HC} \times \mathrm{HG} = 11 \times 5 = 55 \mathrm{~m}^2$
$\therefore$ Total area of octagon $=$ Area of 2 Trapezium + Area of Rectangle
$= 64 \mathrm{~m}^2 + 55 \mathrm{~m}^2 = 119 \mathrm{~m}^2$

Ex 9.1 Question 10.

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

Answer.

First way: By Jyoti's diagram,

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

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

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

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

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

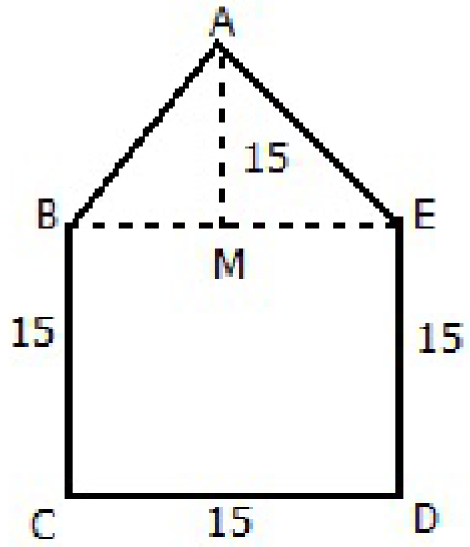
$=\frac{1}{2} \times 45 \times 15$

$=337.5 \mathrm{~m}^2$

Second way: By Kavita's diagram

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

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



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

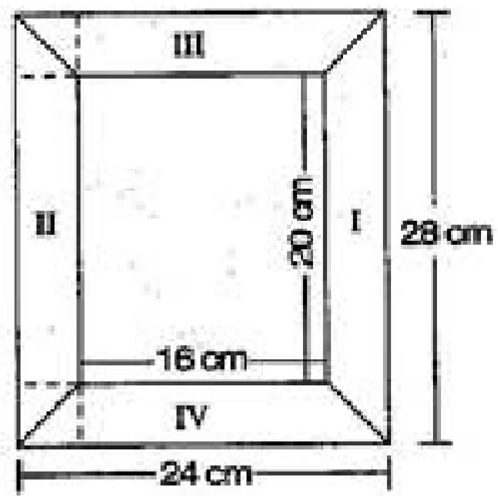
$=(112.5+225.0) \mathrm{m}^2$

$=337.5 \mathrm{~m}^2$

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

Ex 9.1 Question 11.

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



Answer.

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

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

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

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

Now Area of figure (III)

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

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

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

$=80 \mathrm{~cm}^2$

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

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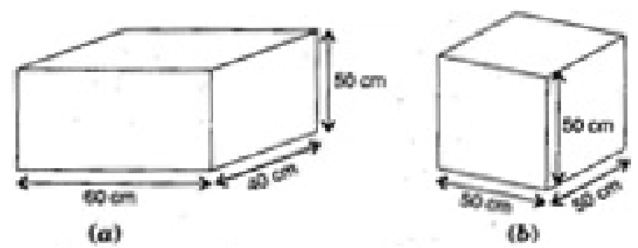
Ex 9.2 Question 1.

There are two cuboidal boxes as shown in the adjoining figure. Which box requires the lesser amount of material to make?



Solution.

(a) Length of cuboidal box (l) $= 60 \mathrm{~cm}$
Breadth of cuboidal box $(b) = 40 \mathrm{~cm}$
Height of cuboidal box $(h) = 50 \mathrm{~cm}$
$\therefore$ Total surface area of cuboidal box $= 2(lb + bh + hl)$
$= 2(60 \times 40 + 40 \times 50 + 50 \times 60) \mathrm{cm}^2$
$= 2(2400 + 2000 + 3000) \mathrm{cm}^2$
$= 2 \times 7400 \mathrm{~cm}^2$
$= 14800 \mathrm{~cm}^2$
(b) Length of the cube is $50 \mathrm{~cm}$
$\therefore$ Total surface area of cuboidal box $= 6(\text{ side })^2$
$= 6(50)^2 \mathrm{~cm}^2$
$= 6(2500) \mathrm{cm}^2$
$= 15000 \mathrm{~cm}^2$

Thus, the cuboidal box (a) requires the lesser amount of materal.
Ex 9.2 Question 2.

A suitcase with measures $80 \mathrm{~cm} \times 48 \mathrm{~cm} \times 24 \mathrm{~cm}$ is to be covered with a tarpaulin cloth. How many meters of tarpaulin of width $96 \mathrm{~cm}$ is required to cover 100 such suitcases?

Solution.

Given: Length of suitcase box $(l) = 80 \mathrm{~cm}$, Breadth of suitcase box $(b) = 48 \mathrm{~cm}$

And Height of cuboidal box $(h) = 24 \mathrm{~cm}$
$\therefore$ Total surface area of suitcase box $= 2(lb + bh + hl)$
$= 2(80 \times 48 + 48 \times 24 + 24 \times 80) \mathrm{cm}^2$
$= 2(3840 + 1152 + 1920)$
$= 2 \times 6912 = 13824 \mathrm{~cm}^2$

Area of Tarpaulin cloth = Surface area of suitcase

$\Rightarrow I \times b = 13824$

$\Rightarrow I \times 96 = 13824$

$\Rightarrow I = \frac{13824}{96}$

$= 144 \text{ cm}$

$\text{Required tarpaulin for 100 suitcases } = (144 \times 100)\text{cm}$

$= 14400 \text{ cm}$

$= 144 \text{ m} \left[1 \text{ cm} = \frac{1}{100} \text{m}\right]$

Thus, 144 m tarpaulin cloth required to cover 100 suitcases.

Ex 9.2 Question 3.

Find the side of a cube whose surface area id 600 cm^2.

Solution.

Here Surface area of cube $= 600 \text{ cm}^2$

$\Rightarrow 6l^2 = 600 \text{ cm}^2$

$\Rightarrow l^2 = 100 \text{ cm}^2$

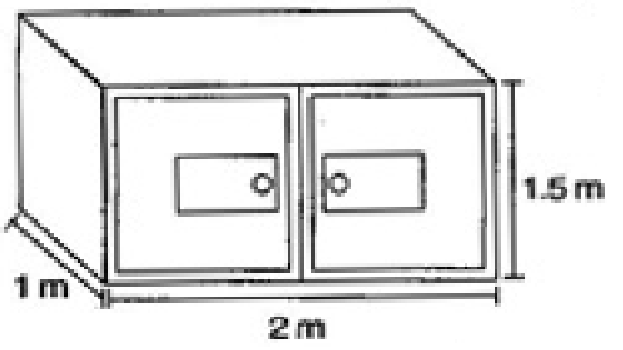
$\Rightarrow l = \sqrt{100} \text{ cm}$

$\Rightarrow l = 10 \text{ cm}$

Hence the side of cube is 10 cm

Ex 9.2 Question 4.

Rukshar painted the outside of the cabinet of measure $1 \text{ m} \times 2 \text{ m} \times 1.5 \text{ m}$. How much surface area did she cover if she painted all except the bottom of the cabinet?



Solution.

Length of cabinet $(l) = 2 \text{ m}$

Breadth of cabinet $(b) = 1 \text{ m}$

Height of cabinet $(h) = 1.5 \text{ m}$

$\therefore$ Surface area of cabinet $=$ (Area of Base of cabinet (Cuboid) $+$ Area of four walls)

$= lb + 2(l + b)h$

$= \{2 \times 1 + 2(1 + 2)1.5\}\text{m}^2$

$= 2 + 2(3)1.5 \text{ m}^2$

$= 2 + 6(1.5)\text{m}^2$

$= (2 + 9.0)\text{m}^2$

$= 11 \text{ m}^2$

Hence required surface area of cabinet is 11 m^2.

Ex 9.2 Question 5.

Daniel is paining the walls and ceiling of a cuboidal hall with length, breadth and height of $15 \text{ m}, 10 \text{ m}$ and 7 m respectively. From each can of paint 100 m^2 of area is

painted. How many cans of paint will she need to paint the room?

Sol. Length of wall $(l) = 15 \text{ m}$

Breadth of wall $(b) = 10 \text{ m}$

Height of wall $(h) = 7 \text{ m}$

$\therefore$ Total Surface area of classroom=(Area of Base of ceiling (Cuboid) + Area of four walls)

$= lb + 2(l + b)h$

$= (15 \times 10 + 2(10 + 15)(7))\text{m}^2$

$= (150 + 2(25)(7))\text{m}^2$

$= (150 + 350)\text{m}^2$

$= 500 \text{ m}^2$

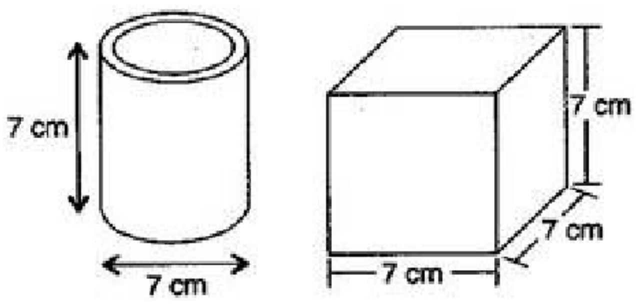
Area of one can is 100 m^2

Now Required number of cans $= \frac{\text{Area of hall}}{\text{Area of one can}} = \frac{500}{100} = 5$ cans

Hence 5 cans are required to paint the room.

Ex 9.2 Question 6.

Describe how the two figures below are alike and how they are different. Which box has larger lateral surface area?



Solution.

Diameter of cylinder $= 7\ \mathrm{cm}$
$\therefore$ Radius of cylinder $(r) = \frac{7}{2}\mathrm{cm}$
Height of cylinder $(h) = 7\ \mathrm{cm}$
Lateral surface area of cylinder $= 2\pi rh$

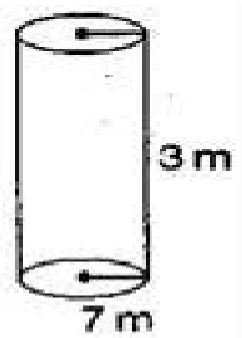
$$= 2 \times \frac{22}{7} \times \frac{7}{2} \times 7$$
$$= 154\ \mathrm{cm}^2$$

Now lateral surface area of cube $= 4(\text{ Side })^2 = 4(7)^2\ \mathrm{cm}^2$
$$= (4 \times 49)\mathrm{cm}^2$$
$$= 196\ \mathrm{cm}^2$$

Hence the cube has larger lateral surface area.

Ex 9.2 Question 7.

A closed cylindrical tank of radius $7\ \mathrm{m}$ and height $3\ \mathrm{m}$ is made from a sheet of metal. How much sheet of metal is required?



Solution

$$\text{Radius of cylindrical tank } (r) = 7\ \mathrm{m}$$
$$\text{Height of cylindrical tank } (h) = 3\ \mathrm{m}$$
$$\text{Total surface area of cylindrical tank } = (\text{Curved surface area } + \text{ Area of upper end}$$
$$(\text{circle}) + \text{ Area of Lower (circle) end})$$
$$= \left(2\pi rh + \pi r^2 + \pi r^2\right)$$
$$= \left(2\pi rh + 2\pi r^2\right)$$
$$= 2\pi r(h + r)$$
$$= 2 \times \frac{22}{7} \times 7(3 + 7)\mathrm{m}^2$$
$$= 44 \times 10\ \mathrm{m}^2$$
$$= 440\ \mathrm{m}^2$$

Hence $440\ \mathrm{m}^2$ metal sheet is required.

Ex 9.2 Question 8.

The lateral surface area of a hollow cylinder is $4224\ \mathrm{cm}^2$. It is cut along its height and formed a rectangular sheet of width $33\ \mathrm{cm}$. Find the perimeter of rectangular sheet?

Solution.

Lateral surface area of hollow cylinder $= 4224\ \mathrm{cm}^2$
Height of hollow cylinder $= 33\ \mathrm{cm}$
Curved surface area of hollow cylinder $= 2\pi h$

$$\Rightarrow 4224 = 2 \times \frac{22}{7} \times r \times 33$$
$$\Rightarrow r = \frac{4224 \times 7}{2 \times 22 \times 33}$$
$$= \frac{64 \times 7}{22}\mathrm{cm}$$

Now Length of rectangular sheet $= 2\pi\gamma$

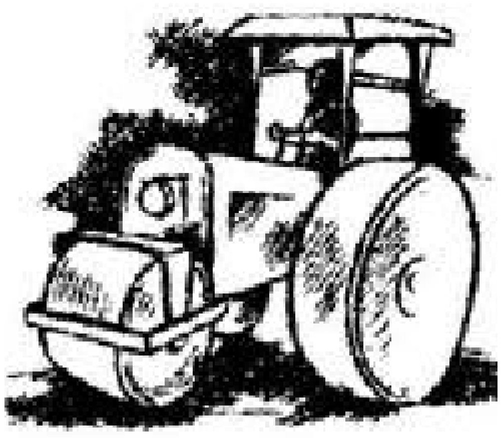
$$\Rightarrow l = 2 \times \frac{22}{7} \times \frac{64 \times 7}{22}$$
$$= 128\ \mathrm{cm}$$

Perimeter of rectangular sheet $= 2(l+b)$
$= 2(128+33)$
$= 2 \times 161$
$= 322 \text{ cm}$

Hence perimeter of rectangular sheet is 322 cm.

Ex 9.2 Question 9.

A road roller takes 750 complete revolutions to move once over to level a road. Find the area of the road if the diameter of a road roller is 84 cm and length 1 m.



Solution.

Diameter of road roller $= 84 \text{ cm}$
$\therefore$ Radius of road roller $(r) = \frac{d}{2} = \frac{84}{2}$
$= 42 \text{ cm}$

Length of road roller $(h) = 1 \text{ m} = 100 \text{ cm}$

Curved surface area of road roller $= 2\pi rh$
$= 2\frac{22}{7} \times 42 \times 100$
$= 26400 \text{ cm}^2$
$\therefore$ Area covered by road roller in 750 revolutions $= 26400 \times 750 \text{ cm}^2$
$= 1,98,00,000 \text{ cm}^2$
$= 1980 \text{ m}^2 \left[\because 1 \text{ m}^2 = 10,000 \text{ cm}^2\right]$

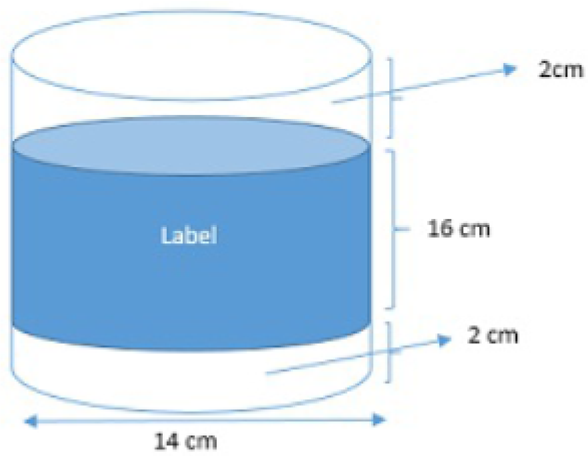
Thus, the area of the road is 1980 m^2.

Ex 9.2 Question 10.

A company packages its milk powder in cylindrical container whose base has a diameter of 14 cm and height 20 cm. Company places a label around the surface of the container (as shown in figure). If the label is placed 2 cm from top and bottom, what is the area of the label?

Solution .

Diameter of cylindrical container $= 14 \text{ cm}$



$\therefore$ Radius of cylindrical container $(r) = \frac{d}{2} = \frac{14}{2} = 7 \text{ cm}$
Height of cylindrical container $= 20 \text{ cm}$
Height of the label $(h) = (20-2-2)$
$= 16 \text{ cm}$

Curved surface area of label $= 2\pi\mu h$
$= 2 \times \frac{22}{7} \times 7 \times 16$
$= 704 \text{ cm}^2$

Hence the area of the label of 704 cm^2.

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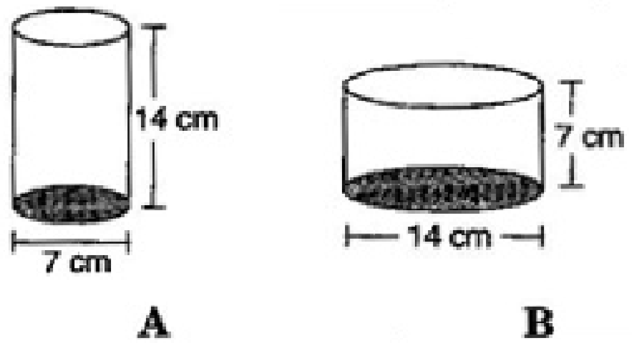
Ex 9.3 Question 1.

Given a cylindrical tank, in which situation will you find surface area and in which situation volume.
(a) To find how much it can hold.
(b) Number of cement bags required to plaster it.
(c) To find the number of smaller tanks that can be filled with water from it.

Answer.

(a) Volume (it is measure of the amount of space inside of a solild figures)
(b) Surface area (the outside part or uppermost layer of the soild figures)
(c) Volume
Ex 9.3 Question 2.

Diameter of cylinder A is $7 \mathrm{~cm}$ and the height is $14 \mathrm{~cm}$. Diameter of cylinder B is $14 \mathrm{~cm}$ and height is $7 \mathrm{~cm}$. Without doing any calculations can you suggest whose volume is greater? Verify it by finding the volume of both the cylinders. Check whether the cylinder with greater volume also has greater surface area.



Answer.

Yes, we can say that volume of cylinder B is greater, Because radius of cylinder B is greater than that of cylinder A.

Diameter of cylinder $\mathrm{A}=7 \mathrm{~cm}$
$\Rightarrow$ Radius(r) of cylinder $\mathrm{A}=\frac{7}{2} \mathrm{~cm}$ and Height(h) of cylinder $\mathrm{A}=14 \mathrm{~cm}$

$\therefore$ Volume of cylinder $\mathrm{A}=\pi r^2 h$
$=\frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 14$
$=539 \mathrm{~cm}^3$

Now Diameter of cylinder $\mathrm{B}=14 \mathrm{~cm}$
$\Rightarrow$ Radius of cylinder $\mathrm{B}=\frac{14}{2}=7 \mathrm{~cm}$ and Height of cylinder $\mathrm{B}=7 \mathrm{~cm}$
$\therefore$ Volume of cylinder $\mathrm{A}=\pi r^2 h$
$=\frac{22}{7} \times 7 \times 7 \times 7 \mathrm{~cm}^3$
$=1078 \mathrm{~cm}^3$

Since the cylinder A and cylinder B is open from upper end then it will exclude from the Total surface area

Total surface area of cylinder $\mathrm{A}=($ Area of lower end circle + curved surface area of cyliner)

$=\left(\pi r^{2}+2 \pi r h\right)$

$=\pi r(r+2 h)$

$=\frac{22}{7} \times \frac{7}{2}\left(\frac{7}{2}+2 \times 14\right)$

$=11\left(\frac{7}{2}+28\right)$

$=11(31.5) \mathrm{cm}^{2}=346.5 \mathrm{~cm}^{2}$

Total surface area of cylinder $\mathrm{B}=\pi \mu(2 h+\mu)$

$=\frac{22}{7} \times 7(2 \times 7+7)$

$=22 \times(14+7)$

$=22 \times 21=462 \mathrm{~cm}^{2}$

Yes, cylinder with greater volume also has greater surface area.

Ex 9.3 Question 3.

Find the height of a cuboid whose base area is $180 \mathrm{~cm}^{2}$ and volume is $900 \mathrm{~cm}^{3}$?

Answer.

Let the Length, breadth and height of the cuboid be l, b, h.

Base of the cuboid is form a Recatangle so,that the Base(Reactangle) Area is (Length x Breadth)

Base area of cuboid $=180 \mathrm{~cm}^{2}$

$\mathrm{LxB}=180 \mathrm{~cm}^{2}$

Volume of cuboid $=l \times b \times h$

Volume of cuboid $=900 \mathrm{~cm}^{3}$

$(l b) h=900$ (From eq. 1)

(180) $\mathrm{h}=900$

$h=\frac{900}{180}$

$=5 \mathrm{~m}$

Hence the height of cuboid is $5 \mathrm{~m}$.

Ex 9.3 Question 4.

A cuboid is of dimensions $60 \mathrm{~cm} \times 54 \mathrm{~cm} \times 30 \mathrm{~cm}$. How many small cubes with side 6 cm can be placed in the given cuboid?

Answer.

Given: Length of cuboid $(l)=60 \mathrm{~cm}$,

Breadth of cuboid $(b)=54 \mathrm{~cm}$ and

Height of cuboid $(h)=30 \mathrm{~cm}$

We know that, Volume of cuboid $=I \times b \times h$

$=(60 \times 54 \times 30) \mathrm{cm}^{3}$

And Volume of cube $=(\text { Side })^{3}$

$=6 \times 6 \times 6 \mathrm{~cm}^{3}$

$\therefore$ Number of small cubes $=\frac{\text { Volume of cuboid }}{\text { Volume of cube }}=\frac{60 \times 54 \times 30}{6 \times 6 \times 6}$

$=450$

Hence required number of small cubes are 450 .

Ex 9.3 Question 5.

Find the height of the cylinder whose volume if $1.54 \mathrm{~m}^{3}$ and diameter of the base is $140 \mathrm{~cm}$.

Answer.

Given: Volume of cylinder $=1.54 \mathrm{~m}^{3}$ and Diameter of cylinder $=140 \mathrm{~cm}$

$\therefore$ Radius $(\mu)=\frac{d}{2}=\frac{140}{2}=70 \mathrm{~cm}$

$=\frac{70}{100} \mathrm{~m}=0.7 \mathrm{~m}[1 \mathrm{~cm}=1 / 100 \mathrm{~m}]$

Volume of cylinder $=\pi \mu^{2} h$

$\Rightarrow 1.54=\frac{22}{7} \times 0.7 \times 0.7 \times h$

$\Rightarrow h=\frac{1.54 \times 7}{22 \times 0.7 \times 0.7}$

$\Rightarrow h=\frac{154 \times 7 \times 10 \times 10}{22 \times 7 \times 7 \times 100}$

$=1 \mathrm{~m}$

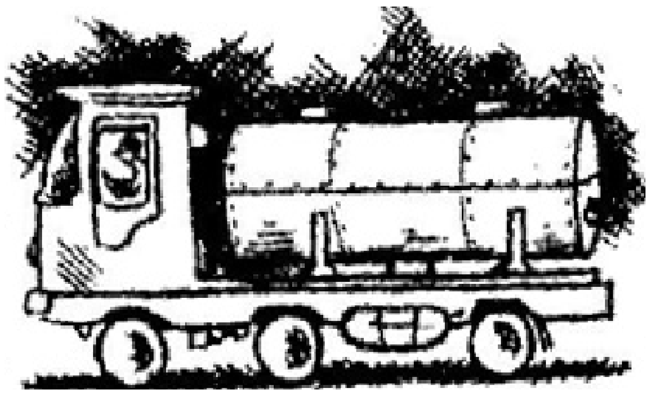
Hence height of the cylinder is $1 \mathrm{~m}$.

Ex 9.3 Question 6.

A milk tank is in the form of cylinder whose radius is $1.5 \mathrm{~m}$ and length is $7 \mathrm{~m}$. Find the quantity of milk in liters that can be stored in the tank.

Answer.

Given: Radius of cylindrical tank $(\mu)=1.5 \mathrm{~m}$
Height of cylindrical tank $(h)=7 \mathrm{~m}$



$$\text{Volume of cylindrical tank } =\pi r^{2} h$$
$$=\frac{22}{7} \times 1.5 \times 1.5 \times 7$$
$$=49.5 \mathrm{~m}^{3}$$
$$=49.5 \times 1000 \text{ liters } \left[\because 1 \mathrm{~m}^{3}=1000 \text{ liters }\right]$$
$$=49500 \text{ liters}$$

Hence required quantity of milk is 49500 liters that can be stored in the tank.

Ex 9.3 Question 7.

If each edge of a cube is doubled,
(i) how many times will its surface area increase?
(ii) how many times will its volume increase?

Answer.

Let l units be the edge of the cube.
Surface area $=6 l^{2}$ and Volume of the cube $=l^{3}$

When its edge is doubled $=2 l$
(i) Surface area $=6(\text{ side })^{2}$
$$=6(2 l)^{2}=6\left(4 l^{2}\right)$$
$$=4\left(6 l^{2}\right)$$
$$=4 \text{ (Surface area)}$$

The surface area of the new cube will be 4 times that of the original cube.
(ii) Volume of cube $(\mathrm{V})=l^{3}$

When edge of cube is doubled $=2 l$, then
Volume of cube $\left(\mathrm{V}^{\prime}\right)=(2 l)^{3}=8 l^{3}$
$V^{\prime}=8$ (Volume of cube)

Hence volume will increase 8 times.

Ex 9.3 Question 8.

Water is pouring into a cuboidal reservoir at the rate of 60 liters per minute. If the volume of reservoir is $108 \mathrm{~m}^{3}$, find the number of hours it will take to fill the reservoir.

Answer.

Volume of reservoir $=108 \mathrm{~m}^{3}$
$$=108 \times 1000 \text{ litres } \left[1 \mathrm{~m}^{3}=1000 l\right]$$
$$=108000 \text{ litres}$$

Since water is pouring into reservoir @ 60 litres per minute and in Time taken to fill the reservoir $=\frac{108000}{60} \mathrm{x} \frac{1}{60}$ hours $=30$ hours

Hence, 30 hours it will take to fill the reservoir.