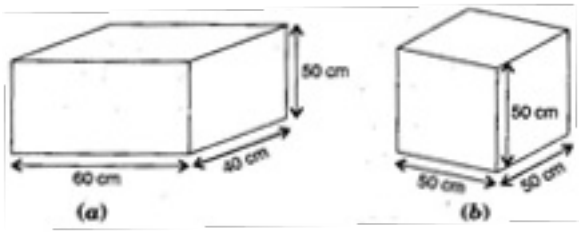
CBSE Class –VIII Mathematics

NCERT Solutions

CHAPTER - 11

Mensuration (Ex. 11.3)

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



Sol. (a) Length of cuboidal box (l) = 60 cm

Breadth of cuboidal box (b) = 40 cm

Height of cuboidal box (h) = 50 cm

$\therefore$ Total surface area of cuboidal box = $2(lb + bh + hl)$

= 2 (60 $\times$ 40 + 40 $\times$ 50 + 50 $\times$ 60) cm^2

= 2 (2400 + 2000 + 3000) cm^2

= 2 $\times$ 7400 cm^2

= 14800 cm^2

(b) Length of the cube is 50 cm

$\therefore$ Total surface area of cuboidal box = $6(side)^2$

=6 (50)^2 cm^2

= 6 (2500) cm^2

= 15000 cm^2

Thus, the cuboidal box (a) requires the lesser amount of materal.

2. A suitcase with measures 80 cm × 48 cm × 24 cm is to be covered with a tarpaulin cloth. How many meters of tarpaulin of width 96 cm is required to cover 100 such suitcases?

Sol. Given: Length of suitcase box (l) = 80 cm, Breadth of suitcase box (b) = 48 cm

And Height of cuboidal box (h) = 24 cm

$\therefore$ Total surface area of suitcase box= $2(lb + bh + hl)$

= 2 (80 × 48 + 48 × 24 + 24 × 80) cm^2

= 2 (3840 + 1152 + 1920)

= 2 × 6912 = 13824 cm^2

Area of Tarpaulin cloth = Surface area of suitcase

$\Rightarrow l \times b$ = 13824

$\Rightarrow l \times 96 = 13824$

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

= 144 cm

Required tarpaulin for 100 suitcases = (144 × 100) cm

= 14400 cm

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

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

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

Sol. Here Surface area of cube = 600 cm^2

$\Rightarrow 6l^2$ = 600 cm^2

$\Rightarrow l^2$ = 100 cm^2

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

$\Rightarrow l$ = 10 cm

Hence the side of cube is 10 cm

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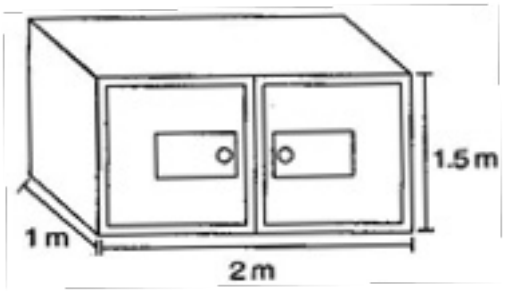
4. Rukshar painted the outside of the cabinet of measure 1 m × 2 m × 1.5 m. How much surface area did she cover if she painted all except the bottom of the cabinet?



Sol. Length of cabinet (l) = 2 m

Breadth of cabinet (b) = 1 m

Height of cabinet (h) = 1.5 m

∴ Surface area of cabinet = (Area of Base of cabinet (Cuboid) + Area of four walls)

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

={2 × 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$_{\text{m}^2}$.

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

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

Sol. Length of wall (l) = 15 m

Breadth of wall (b) = 10 m

Height of wall (h) = 7 m

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

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

= (15 × 10 + 2 (10 +15) (7)) m^2

= (150 + 2 (25) (7)) m^2

= (150 + 350) m^2

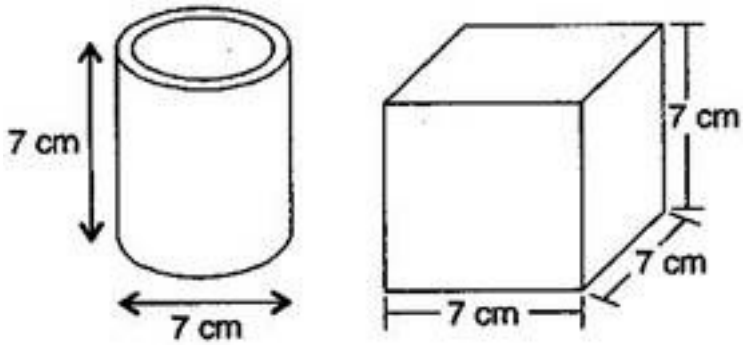
= 500 m^2

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.

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



Sol. Diameter of cylinder = 7 cm

$\therefore$ Radius of cylinder $(r) = \frac{7}{2}$ cm

Height of cylinder (h) = 7 cm

Lateral surface area of cylinder = $2\pi rh$

= $2 \times \frac{22}{7} \times \frac{7}{2} \times 7$

= 154 cm^2

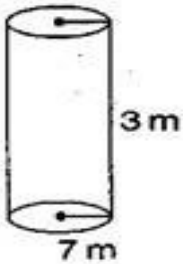
Now lateral surface area of cube = $4(Side)^2 = 4(7)^2$ cm^2

= (4 × 49) cm^2

= 196 cm^2

Hence the cube has larger lateral surface area.

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



Sol. Radius of cylindrical tank (r) = 7 m

Height of cylindrical tank (h) = 3 m

Total surface area of cylindrical tank* = *(Curved surface area + Area of upper end (circle)+ Area of Lower (circle) end)

= $(2\pi rh + \pi r^2 + \pi r^2)$

= $(2\pi rh + 2\pi r^2)$

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

= $2 \times \frac{22}{7} \times 7(3+7)$ m^2

= 44 × 10 m^2

= 440 m^2

Hence 440 m^2 metal sheet is required.

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

Sol. Lateral surface area of hollow cylinder = 4224 cm^2

Height of hollow cylinder = 33 cm

Curved surface area of hollow cylinder = $2\pi rh$

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

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

= $\frac{64\times 7}{22}$ cm

Now **Length of rectangular sheet** = $2\pi r$

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

= 128 cm

Perimeter of rectangular sheet = $2(l+b)$

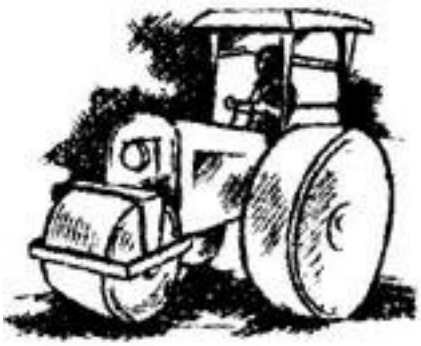
= 2 (128 + 33)

= 2 x 161

= 322 cm

Hence perimeter of rectangular sheet is 322 cm.

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.



Sol. Diameter of road roller = 84 cm

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

= 42 cm

Length of road roller (h) = 1 m = 100 cm

Curved surface area of road roller = $2\pi rh$

= $2 \frac{22}{7} \times 42 \times 100$

= 26400 cm^2

$\therefore$ Area covered by road roller in 750 revolutions = $26400 \times 750 \, cm^2$

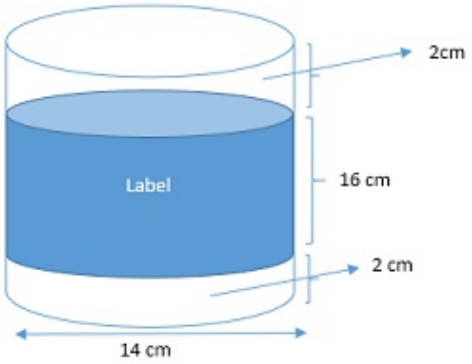
= $1,98,00,000 \, cm^2$

= 1980 m^2 [$\because$ $1 \, m^2 = 10,000 \, cm^2$]

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

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?

Sol. Diameter of cylindrical container = 14 cm



$\therefore$ Radius of cylindrical container $(r) = \frac{d}{2} = \frac{14}{2}$ = 7 cm

Height of cylindrical container = 20 cm

Height of the label (h) = (20 – 2 – 2)

= 16 cm

Curved surface area of label = $2\pi rh$

= $2 \times \frac{22}{7} \times 7 \times 16$

= 704 cm^2

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