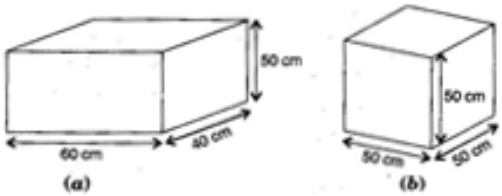
NCERT solutions for class 8 maths chapter 11 mensuration Ex-11.3

Q1. There are two cuboidal boxes as shown in the adjoining figure. Which box requires the lesser amount of material to make?



Ans. (a) Given: 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)

= 2 (2400 + 2000 + 3000

= 2 $\times$ 7400 = 14800 cm^2

(b) Given: Length of cuboidal box (l)

= 50 cm

Breadth of cuboidal box (b) = 50 cm

Height of cuboidal box (h) = 50 cm

$\therefore$ Total surface area of cuboidal box

= $2(lb+bh+hl)$

= 2 (50 $\times$ 50 + 50 $\times$ 50 + 50 $\times$ 50)

= 2 (2500 + 2500 + 2500)

$= 2 \times 7500 = 15000 \text{ cm}^2$

Hence cuboidal box (a) requires the lesser amount of materal to make, since surface area of box (a) is less than that of box (b).

Q2. A suitcase with measures 80 cm $\times$ 48 cm $\times$ 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?

Ans. 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

$= 2(lb + bh + hl)$

$= 2(80 \times 48 + 48 \times 24 + 24 \times 80)$

$= 2(3840 + 1152 + 1920)$

$= 2 \times 6912 = 13824 \text{ cm}^2$

Area of Tarpaulin cloth = Surface area of suitcase

$\Rightarrow l \times b = 13824$

$\Rightarrow l \times 96 = 13824$

$\Rightarrow l = \frac{13824}{96} = 144 \text{ cm}$

Required tarpaulin for 100 suitcases

$= 144 \times 100 = 14400 \text{ cm} = 144 \text{ m}$

Hence tarpaulin cloth required to cover 100 suitcases is 144 m.

Q3. Find the side of a cube whose surface area id $600\,\mathrm{cm}^2$.

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

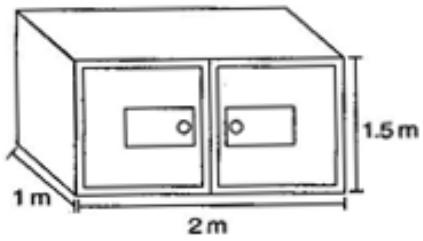
$\Rightarrow 6l^2 = 600$

$\Rightarrow l^2 = 100$

$\Rightarrow l = 10$ cm

Hence the side of cube is 10 cm

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



Ans. Here, Length of cabinet (l) = 2 m, Breadth of cabinet (b) = 1 m

And Height of cabinet (h) = 1.5 m

$\therefore$ Surface area of cabinet = $lb + 2(bh + hl)$

= 2 $\times$ 1 + 2 (1 $\times$ 1.5 + 1.5 $\times$ 2)

$= 2 + 9.0$

$= 11\ \text{m}^2$

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

Q5. 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 m^2 of area is painted. How many cans of paint will she need to paint the room?

Ans. Here, Length of wall $(l) = 15$ m, Breadth of wall $(b) = 10$ m

And Height of wall $(h) = 7$ m

$\therefore$ Total Surface area of classroom

$= lb + 2(bh + hl)$

$= 15 \times 10 + 2\,(10 \times 7 + 7 \times 15)$

$= 150 + 2\,(70 + 105)$

$= 150 + 350$

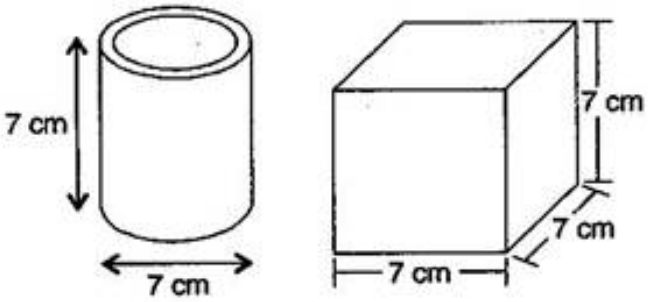
$= 500\ \text{m}^2$

Now Required number of cans

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

Hence 5 cans are required to paint the room.

Q6. Describe how the two figures below are alike and how they are different. Which box has larger lateral surface area?



Ans. Given: Diameter of cylinder = 7 cm

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

And Height of cylinder $(h) = 7$ cm

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

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

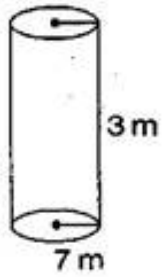
$= 154$ cm^2

Now lateral surface area of cube

$= 4l^2 = 4 \times (7)^2 = 4 \times 49 = 196$ cm^2

Hence the cube has larger lateral surface area.

Q7. 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?



Ans. Given: Radius of cylindrical tank $(r) = 7$ m

Height of cylindrical tank $(h) = 3$ m

Total surface area of cylindrical tank

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

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

$= 44 \times 10 = 440 \text{ m}^2$

Hence 440 m^2 metal sheet is required.

Q8. 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?

Ans. Given: Lateral surface area of hollow cylinder = 4224 cm^2

And Height of hollow cylinder = 33 cm

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

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

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

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

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

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

= 2 (128 + 33) = 2 x 161 = 322 cm

Hence perimeter of rectangular sheet is 322 cm.

Q9. 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.

Ans. Given: 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

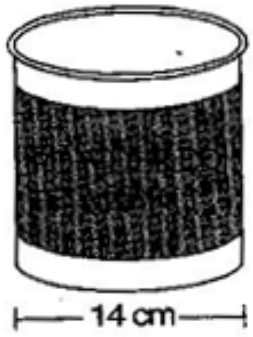
$\therefore$ Area covered by road roller in 750 revolutions
= 26400 $\times$ 750

= 1,98,00,000 cm^2

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

Hence the area of the road is 1980m^2.

Q10. 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?



Ans. Given: 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 = $2\pi rh$

$= 2\frac{22}{7} \times 7 \times 16 = 704 \text{ cm}^2$

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

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