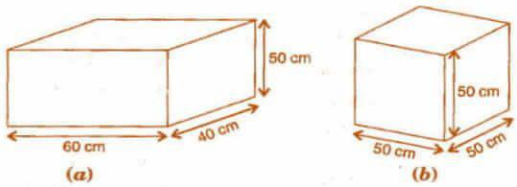
Mathematics

(www.tiwariacademy.com)
(Chapter – 11) (Mensuration)
(Class – VIII)

Exercise 11.3

Question 1:

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



Answer 1:

(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 x 40 + 40 x 50 + 50 x 60)
= 2 (2400 + 2000 + 3000)
= 2 x 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 x 50 + 50 x 50 + 50 x 50)
= 2 (2500 + 2500 + 2500)
= 2 x 7500 = 15000 cm^2

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

Question 2:

A suitcase with measures 80 cm x 48 cm x 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?

Answer 2:

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 x 48 + 48 x 24 + 24 x 80)
= 2 (3840 + 1152 + 1920)
= 2 x 6912 = 13824 cm^2

Area of Tarpaulin cloth = Surface area of suitcase

$\Rightarrow \quad l \times b = 13824$

$\Rightarrow \quad l \times 96 = 13824$

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

Required tarpaulin for 100 suitcases = 144 x 100 = 14400 cm = 144 m
Hence, the tarpaulin cloth required to cover 100 suitcases is 144 m.

Question 3:

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

Answer 3:

Here Surface area of cube = 600 cm^2

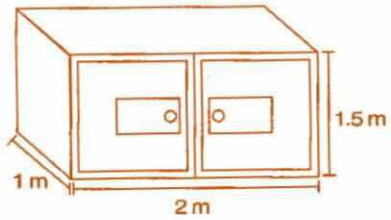
$\Rightarrow \quad 6l^2 = 600 \quad \Rightarrow l^2 = 100 \quad \Rightarrow l = 10$ cm

Hence the side of cube is 10 cm

Question 4:

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

Answer 4:



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 x 1 + 2 (1 x 1.5 + 1.5 x 2)

= 2 + 2 (1.5 + 3.0) = 2 + 9.0 = 11 m^2

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

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

Answer 5:

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 x 10 + 2 (10 x 7 + 7 x 15)

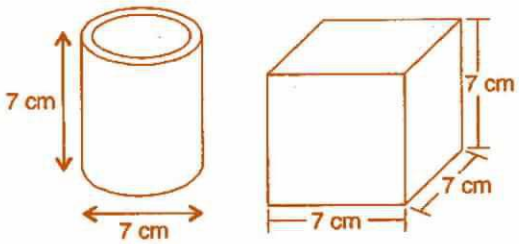
= 150 + 2 (70 + 105) = 150 + 350 = 500 m^2

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

Hence, 5 cans are required to paint the room.

Question 6:

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



Answer 6:

Given: Diameter of cylinder = 7 cm

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

And Height of cylinder (h) = 7 cm

Lateral surface area of cylinder = $2\pi rh = 2\times\frac{22}{7}\times\frac{7}{2}\times 7 = 154\ \text{cm}^2$

Now lateral surface area of cube = $4l^2 = 4\times(7)^2$ = 4 x 49 = 196 cm^2

Hence, the cube has larger lateral surface area.

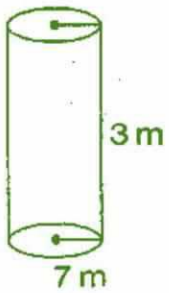
Question 7:

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?

Answer 7:

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 x 10 = 440 m^2

Hence, 440 m^2 metal sheet is required.

Question 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?

Answer 8:

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

And Height of hollow cylinder = 33 cm

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

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

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

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

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

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

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

Hence, the perimeter of rectangular sheet is 322 cm.

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.

Answer 9:

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

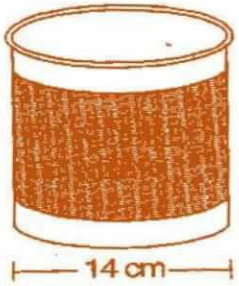
Curved surface area of road roller = $2\pi rh = 2\frac{22}{7}\times 42\times 100$ = 26400 cm^2

$\therefore$ Area covered by road roller in 750 revolutions = 26400 x 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 1980 m^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?



Answer 10:

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 cm^2

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