

Surface Area and Volume exercise 2

Question 1)

The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2 . Find the diameter of the base of the cylinder.

Question 2)

It is required to make a closed cylindrical tank of height 1 m and base diameter 140 cm from a metal sheet. How many square metres of the sheet are required for the same?

Question 3)

A metal pipe is 77 cm long. The inner diameter of a cross section is 4 cm, the outer diameter being 4.4 cm. Find its

- (i) Inner curved surface area,
- (ii) Outer curved surface area,
- (iii) Total surface area

**Question 4)**

The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to move once over to level a playground. Find the area of the playground in m^2

Question 5)

A cylindrical pillar is 50 cm in diameter and 3.5 m in height. Find the cost of painting the curved surface of the pillar at the rate of Rs 12.50 per m^2

Question 6)

Curved surface area of a right circular cylinder is 4.4 m^2 . If the radius of the base of the cylinder is 0.7 m , find its height.

Question 7)

The inner diameter of a circular well is 3.5 m . It is 10 m deep. Find

- (i) its inner curved surface area,
- (ii) the cost of plastering this curved surface at the rate of Rs 40 per m^2

Question 8)

In a hot water heating system, there is a cylindrical pipe of length 28 m and diameter 5 cm . Find the total radiating surface in the system.

Question 9)

Find

- (i) The lateral or curved surface area of a closed cylindrical petrol storage tank that is 4.2 m in diameter and 4.5 m high.
- (ii) How much steel was actually used, if $1/12$ of the steel actually used was wasted in making the tank?

Question 10)

In below figure, you see the frame of a lampshade. It is to be covered with a decorative cloth. The frame has a base diameter of 20 cm and height of 30 cm . A margin of 2.5 cm is to be given for folding it over the top and bottom of the frame. Find how much cloth is required for covering the lampshade.


Question 11)

The students of a Vidyalaya were asked to participate in a competition for making and Decorating penholders in the shape of a cylinder with a base, using cardboard. Each penholder was to be of radius 3 cm and height 10.5 cm . The Vidyalaya was to supply the competitors with cardboard. If there were 35 competitors, how much cardboard was required to be bought for the competition?

We are assuming the value of $\pi=22/7$ in all the solutions

Solution 1:

Height (h) of cylinder = 14 cm

Let the diameter of the cylinder be d.

Curved surface area of cylinder = 88 cm^2

$$2\pi rh = 88 \text{ cm}^2$$

$$r=1 \text{ cm}$$

$$\text{So } d=2\text{cm}$$

Solution 2

Height of closed cylindrical tank = $h=1 \text{ m}$

Base diameter of cylindrical tank = $d=140 \text{ cm} = 1.4 \text{ m}$

Radius of cylindrical tank =

$$r= d/2= 0.7 \text{ m}$$

$$\text{Total surface area of cylindrical tank} = 2\pi.r(r+h) = 2 \times (22/7) \times 0.7(0.7+1)$$

$$= 7.48 \text{ m}^2$$

Solution 3:

Inner radius of the pipe(a) = 2 cm

Outer radius of the pipe(b) = 2.2cm

Height of the cylindrical pipe(h)=77 cm

$$\text{Inner curved area of cylindrical pipe} = 2 \pi aH = 968 \text{ cm}^2$$

$$\text{Outer curved area of cylindrical pipe} = 2 \pi bH = 1064. \text{ cm}^2$$

Surface area of whole pipe = Inner curved area + outer curved area + circular area at both ends of the pipe

$$= 2 \pi aH + 2 \pi bH + 2\pi(b^2 - a^2)$$

$$= 2038.08 \text{ cm}^2$$

Solution 4

It can be observed that a roller is cylindrical.

Height (h) of cylindrical roller = Length of roller = 120 cm

Radius (r) of the circular end of roller = $84/2=42 \text{ cm}$

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

$$= 31680 \text{ cm}^2$$

Area of field = $500 \times \text{CSA of roller}$

$$= (500 \times 31680) \text{ cm}^2$$

$$= 15840000 \text{ cm}^2$$

$$= 1584 \text{ m}^2$$

Solution 5:

Height of the cylindrical pillar $= h = 3.5 \text{ m}$

Diameter of the cylindrical pillar $= d = 50 \text{ cm}$

So Radius of the cylindrical pillar $= r = 50/2 = 25 \text{ cm} = 0.25 \text{ m}$

So Curved surface of the cylindrical pillar $= 2\pi \cdot r \cdot h = 5.5 \text{ m}^2$

Cost of painting the curved surface of the pillar at the rate of Rs 12.50 per m^2
 $= 12.5 \times 5.5 = \text{Rs } 68.75$

Solution 6:

Let the height of the cylinder be h .

Radius of the base of the cylinder $= 0.7 \text{ m}$

Curved surface of cylinder $= 4.4 \text{ m}^2$

$$2\pi \cdot r \cdot h = 4.4$$

We know the value of r , so substituting and calculating

$$h = 1 \text{ m}$$

Solution 7:

Inner radius (r) of circular well $= 1.75 \text{ m}$

Depth (h) of circular well $= 10 \text{ m}$

Inner curved surface area $= 2\pi rh$

$$= (44 \times 0.25 \times 10) \text{ m}^2$$

$$= 110 \text{ m}^2$$

Therefore, the inner curved surface area of the circular well is 110 m^2 .

Cost of plastering 1 m^2 area $= \text{Rs } 40$

So Cost of plastering 110 m^2 area $= \text{Rs } (110 \times 40)$

$$= \text{Rs } 4400$$

Solution 8:

Length of cylindrical pipe $= h = 28 \text{ m}$

Diameter of cylindrical pipe $= d = 5 \text{ cm}$

Radius of cylindrical pipe $= r = 2.5 \text{ cm} = 0.025 \text{ m}$

Total radiating surface in the system $=$ Curved Surface Area of cylindrical pipe $= 2\pi \cdot r \cdot h$

$$= 2 \times (22/7) \times 0.025 \times 28 = 4.4 \text{ m}^2$$

Solution 9:

Height of tank=4.5 m

Radius of the circular end of the tank= $4.2/2=2.1$ m

Lateral curved area of the tank= $2\pi.r.h=59.4$ m²

Total surface of tank= Lateral curved area + area of the circular end

= $2\pi r(r+h)=87.12$ m²

Let x m² of the sheet is used in making the tank

Then actual sheet in making the tank = $x(1-1/12)=11x/12$

Now

$11x/12=87.12$

Or $x=95.04$ m²

Solution 10:

Height (h) of the frame of lampshade after taking the margin at the top and bottom of the lamp post = $(2.5 + 30 + 2.5)$ cm = 35 cm

Radius (r) of the circular end of the frame of lampshade = 10 cm

Cloth required for covering the lampshade = $2\pi rh$

= 2200 cm²

Solution 11:

Radius of each pen holder = $r=3$ cm

Height of each pen holder = $h=10.5$ cm

Cardboard needed for 1 pen holder = Curved Surface area of 1 pen holder + Area of base of 1 pen holder

= $2\pi.r.h + \pi.r^2$

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

= 72π cm²

Cardboard required for 35 pen holders = $35 \times (22/7) \times 3 \times 24=7920$ cm²