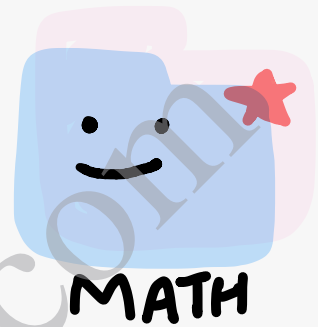


# Volume And Surface Area

## Ex. 15.2



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### Ex. 15.2

1. Let edge of cube =  $a$  metre  
Surface area of cube =  $600 \text{ m}^2$

or  $6a^2 = 600$

or  $a^2 = \frac{600}{6} = 100$

or  $a^2 = 100$

or  $a = \sqrt{100}$

or  $a = 10 \text{ m}$

Area of one face =  $a^2$   
 $= 10^2$   
 $= 100 \text{ m}^2$

2. Diameter of base,  $d = 28 \text{ cm}$

Radius of base,  $r = \frac{d}{2} = \frac{28}{2} = 14 \text{ cm}$

Height of cylinder,  $h = 14 \text{ cm}$

Total surface area =  $2\pi r(h+r)$   
 $= 2 \times \frac{22}{7} \times 14(14+14)$   
 $= 88 \times 28$   
 $= 2464 \text{ cm}^2$

3. Surface area of cube =  $1350 \text{ cm}^2$

or  $6a^2 = 1350$

or  $a^2 = \frac{1350}{6} = 225$

or  $a = \sqrt{225}$

or  $a = 15 \text{ cm}$

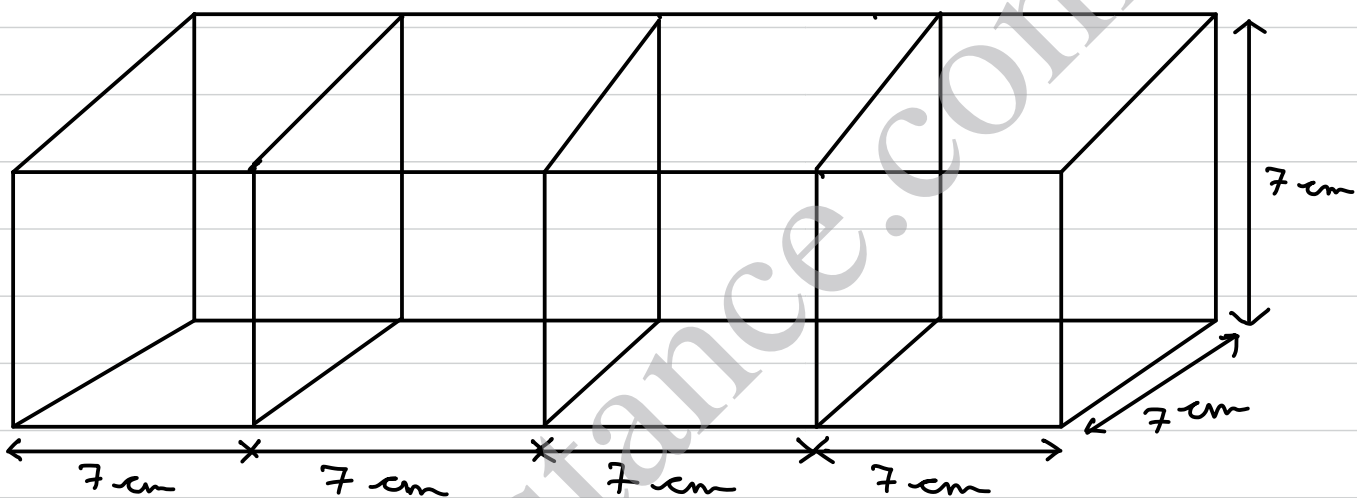
Volume of cube =  $a^3 = (15)^3 = 3375 \text{ cm}^3$

4. Circumference of base =  $250 \text{ cm} = \frac{250}{100} \text{ m} = 2.5 \text{ m}$   
or  $2\pi r = 2.5$  (1 m = 100 cm)

Height of cylinder,  $h = 1.25 \text{ m}$

Lateral surface area =  $2\pi r h$   
 $= 2.5 \times 1.25$   
 $= 3.125 \text{ m}^2$

5.



Length of cuboid,  $l = 7 + 7 + 7 + 7 = 28 \text{ cm}$

Breadth of cuboid,  $b = 7 \text{ cm}$

Height of cuboid,  $h = 7 \text{ cm}$

Surface area of cuboid =  $2(lb + bh + hl)$   
 $= 2(28 \times 7 + 7 \times 7 + 7 \times 28)$   
 $= 2(196 + 49 + 196)$   
 $= 2 \times 441$   
 $= 882 \text{ cm}^2$

OR

Surface area of cuboid =  $18a^2$   
 $= 18 \times 7 \times 7$   
 $= 882 \text{ cm}^2$

6. Height of cylinder,  $h = 14$  cm  
Volume of cylinder =  $39600$  cm<sup>3</sup>

or  $\pi r^2 h = 39600$

or  $\frac{22}{7} \times r^2 \times 14 = 39600$

or  $r^2 = \frac{19800}{39600} \times 900$   
 $22 \times 21$

or  $r^2 = 900$

or  $r = \sqrt{900}$

or  $r = 30$  cm

Lateral surface area =  $2\pi r h$   
 $= 2 \times \frac{22}{7} \times 30 \times 14$

$= 2640$  cm<sup>2</sup>

Total surface area =  $2\pi r (h + r)$   
 $= 2 \times \frac{22}{7} \times 30 \times (14 + 30)$

$= \frac{1320}{7} \times 44$

$= \frac{58080}{7}$

$\approx 8297.14$  cm<sup>2</sup>

7. Length of box,  $l = 3.5$  m

Breadth of box,  $b = 1.5$  m

Height of box,  $h = 2.5$  m

Total surface area of box =  $2(lb + bh + hl)$   
 $= 2(3.5 \times 1.5 + 1.5 \times 2.5 + 2.5 \times 3.5)$   
 $= 2(5.25 + 3.75 + 8.75)$

$$= 2 \times 17.75$$

$$= 35.5 \text{ cm}^2$$

$$\begin{aligned} \text{Lateral surface area} &= 2(l+b)h \\ &= 2(3.5+1.5)2.5 \\ &= 5 \times 5 \\ &= 25 \text{ cm}^2 \end{aligned}$$

8. Height of cylinder,  $h = 49 \text{ cm}$   
 Volume of cylinder =  $2500\pi \text{ cm}^3$

$$\text{or } \pi r^2 h = 2500\pi$$

$$\text{or } \pi r^2 \times 49 = 2500\pi$$

$$\text{or } r^2 = \frac{2500\pi}{49\pi}$$

$$\text{or } r = \sqrt{\frac{2500}{49}}$$

$$\text{or } r = \frac{50}{7} \text{ m}$$

$$\begin{aligned} \text{Total surface area} &= 2\pi r(h+r) \\ &= 2 \times \frac{22}{7} \times \frac{50}{7} \left(49 + \frac{50}{7}\right) \\ &= \frac{2200}{49} \left(\frac{343+50}{7}\right) \\ &= \frac{2200}{49} \times \frac{393}{7} \\ &= \frac{864600}{343} \end{aligned}$$

$$\approx 2520.70 \text{ cm}^2$$

$$\begin{aligned} \text{Lateral surface area} &= 2\pi r h \\ &= 2 \times \frac{22}{7} \times \frac{50}{7} \times 49 \end{aligned}$$

$$= 2200 \text{ cm}^2$$

9. Length of cylinder,  $h = 28 \text{ cm}$

External radius,  $R = 7 \text{ cm}$

Thickness =  $1 \text{ cm}$

Internal radius,  $r = 7 - 1 = 6 \text{ cm}$

Total surface area

= inner surface area  
+ outer surface area  
+ area of two rings

$$= 2\pi rh + 2\pi R h + 2(\pi R^2 - \pi r^2)$$

$$= 2\pi rh + 2\pi R h + 2\pi(R^2 - r^2)$$

$$= 2\pi[ rh + R h + (R^2 - r^2) ]$$

$$= 2\pi[ rh + R h + (R + r)(R - r) ] \quad [ \because a^2 - b^2 = (a + b)(a - b) ]$$

$$= 2 \times \frac{22}{7} [ 6 \times 28 + 7 \times 28 + (7 + 6)(7 - 6) ]$$

$$= \frac{44}{7} (168 + 196 + 13 \times 1)$$

$$= \frac{44}{7} \times 377$$

$$= \frac{16588}{7}$$

$$\approx 2369.71 \text{ cm}^2$$

