# Mensuration: Exercise 11.4

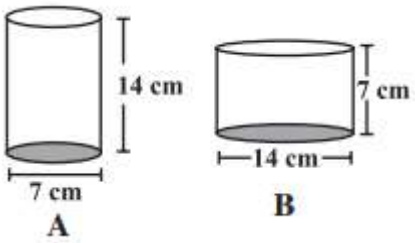
**Q.1 Given a cylindrical tank, in which situation will you find surface area and in which situation volume.**
**(a) To find how much it can hold.**
**(b) Number of cement bags required to plaster it.**
**(c) To find the number of smaller tanks that can be filled with water from it.**

***Sol.* (a) Situation:** To find how much it can hold.
For this situation we need to find the volume.

**(b) Situation:** To find the number of cement bags required to plaster.
For this situation, we will need to find the surface area.

**(c) Situation:** To find the number of smaller tanks that can be filled with water from it.
For this situation, we need to find the volume.

**Q.2 Diameter of cylinder A is 7 cm, and the height is 14 cm. Diameter of cylinder B is 14 cm and height is 7 cm. Without doing any calculations can you suggest whose volume is greater? Verify it by finding the volume of both the cylinders. Check whether the cylinder with greater volume also has greater surface area?**




***Sol.* Without Calculation:** As the radius of the cylinder B is greater than the cylinder A and also volume of cylinder is proportional to the square of the radius.
So, volume of cylinder B is greater than the cylinder A.
**Calculation for cylinder A:**

**Given:** Dimension of cylinder A, diameter ($d$) = 7 cm, Radius of cylinder (r) = $\frac{d}{2}=\frac{7}{2}$ cm and height ($h$) = 14 cm.

So, volume of cylinder A = $\pi r^2 h$

$$= \frac{22}{7}\times\frac{7}{2}\times\frac{7}{2}\times 14$$

$$= 539 \text{ cm}^2$$

Surface area of cylinder A = $2\pi r(r+h)$

$$= \left[2\times\frac{22}{7}\times\frac{7}{2}\left(\frac{7}{2}+14\right)\right] \text{ cm}^2$$

$$= \left[22\times\left(\frac{7+28}{2}\right)\right] \text{ cm}^2$$

$$= \left[22 \times \frac{35}{2}\right] \text{cm}^2$$

$$= 385 \text{ cm}^2$$

**Calculation for cylinder B:**

**Given:** Dimension of cylinder B, diameter ($d$) = 14 cm, Radius of cylinder (r) = $\frac{d}{2} = \frac{14}{2}$ =7 cm and height ($h$) = 7 cm.

So, volume of cylinder B = $\pi r^2 h$

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

$$= 1078 \text{ cm}^2$$

Surface area of cylinder B = $2\pi r(r+h)$

$$= \left[2 \times \frac{22}{7} \times 7(7+7)\right] \text{cm}^2$$

$$= 616 \text{ cm}^2$$

From above calculations, the volume of cylinder B is greater than that of cylinder A. And the cylinder B has the greater surface area.

**Q.3 Find the height of a cuboid whose base area is 180 cm² and volume is 900 cm³?**

**Sol. Given:** Base area of cuboid = 180 cm²

And volume of cuboid = 900 cm³

Since, volume of cuboid = $l$ x $b$ x $h$

900 = 180 x $h$ (Since, base area = 180 cm²)

$$h = \frac{900}{180} = 5m$$

Thus, the height of cuboid = 5 m

**Q.4 A cuboid is of dimensions 60 cm × 54 cm × 30 cm. How many small cubes with side 6 cm can be placed in the given cuboid?**

***Sol.* Given:** Dimension of cuboid = 60 cm × 54 cm × 30 cm

So volume of cuboid = l x b x h

= 60 cm × 54 cm × 30 cm

= 97200 cm³

And side of cube = 6 cm

Since, volume of cube = (Side)³

= (6)3 cm³

= 216 cm³

So, required number of cubes = $\frac{\text{Volume of the cuboid}}{\text{Volume of the cube}}$

$$= \frac{97200}{216}$$

= 450

Thus, number of cubes required to place in the given cuboid = 450

**Q.5 Find the height of the cylinder whose volume is 1.54 m³ and diameter of the base is 140 cm?**

***Sol.* Given:** Volume of cylinder = 1.54 m³ and diameter of base ($d$) = 140 cm

So, radius ($r$) = $\frac{d}{2} = \frac{140}{2}$ = 70 cm or $\frac{70}{100}$ m

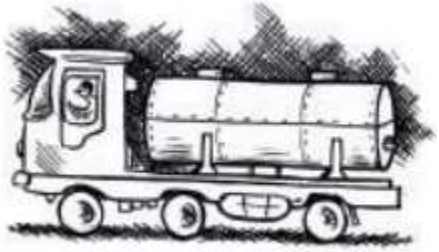
Now, volume of cylinder = $\pi r^2 h$

$$1.54 \text{ m}^3 = \frac{22}{7} \times \frac{70}{100} \text{m} \times \frac{70}{100} \text{m} \times h$$

$$h = \left( \frac{1.54 \times 100}{22 \times 7} \right) \text{m} = 1 \text{ m}$$

Thus, the height of the cylinder = 1 m

**Q.6 A milk tank is in the form of cylinder whose radius is 1.5 m and length is 7 m. Find the quantity of milk in litres that can be stored in the tank?**



***Sol.* Given:** Dimension of cylinder, radius ($r$) = 1.5 m and length or height ($h$) = 7 m.

Since, volume of cylinder = $\pi r^2 h$

$$= \frac{22}{7} \times 1.5 \times 1.5 \times 7 \text{ m}^3$$

$$= 49.5 \text{ cm}^3$$

Since, 1 $m^3$ = 1000 litres

= 49.5 x 1000

= 49500 litres

Thus, the quantity of milk can be stored in the tank = 49500 litres

**Q.7 If each edge of a cube is doubled,**
**(i) how many times will its surface area increase?**
**(ii) how many times will its volume increase?**

***Sol.*** Let $a$ be the initial edge of the cube.

Since, edge of cube is doubled, so it will become = $2a$.

(i) Initial surface area = 6 x (Side)$^2$ = 6 x $a^2$

So, new surface area = $6(2a)^2$

= 24 x $a^2$

= 4 x 6 $a^2$

= 4 x Initial surface area

Thus, if each edge of cube is doubled then the surface area will increase by 4 times.

(ii) Initial volume = $a^3$

So, new surface area = $(2a)^3$

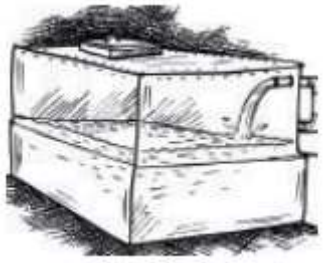
= $8a^3$

= 8 x $a^3$

= 8 x Initial volume

Thus, if each edge of cube is doubled then the volume will increase by 8 times.

**Q.8 Water is pouring into a cubiodal reservoir at the rate of 60 litres per minute. If the volume of reservoir is 108 $m^3$, find the number of hours it will take to fill the reservoir.**



***Sol.*** **Given:** Volume of reservoir = 108 $m^3$
And water is pouring into cuboidal reservoir at the rate of 60 litres per minute.
Water is poured in one hour = (60 x 60)L
= 3600 L per hour

So, required number of hours = $\frac{108000}{3600}$ = 30 hours

Thus, Time taken to fill the reservoir = 30 hours.