eSaral

CLASS VIII: Maths

Chapter 9: Mensuration

Questions and Solutions | Exercise 9.3 - NCERT Books

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.

Answer :

(a) In this situation, we will find the volume.

(b) In this situation, we will find the surface area.

(c) In this situation, we will find the volume.

Q2 :

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
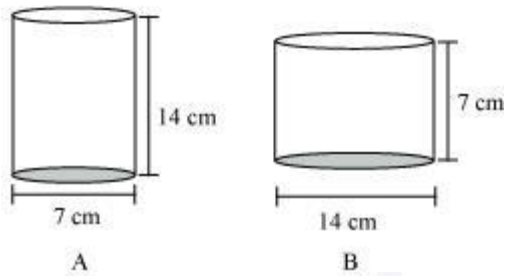
Answer :

The heights and diameters of these cylinders A and B are interchanged.

We know that,

Volume of cylinder $= \pi r^2 h$

If measures of r and h are same, then the cylinder with greater radius will have greater area.

Radius of cylinder A = $\dfrac{7}{2}$ cm

Radius of cylinder B = $\left(\dfrac{14}{2}\right)$ cm = 7 cm

As the radius of cylinder B is greater, therefore, the volume of cylinder B will be greater.

Let us verify it by calculating the volume of both the cylinders.

Volume of cylinder A $= \pi r^2 h$

$$= \left(\dfrac{22}{7} \times \dfrac{7}{2} \times \dfrac{7}{2} \times 14\right) \text{cm}^3$$
$$= 539 \text{ cm}^3$$

Volume of cylinder B $= \pi r^2 h$

$$= \left(\frac{22}{7} \times 7 \times 7 \times 7 \right) \ cm^3$$

$$= 1078 \ cm^3$$

Volume of cylinder B is greater.

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

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

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

$$= \left(22 \times \frac{35}{2} \right) \ cm^2$$

$$= 385 \ cm^2$$

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

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

$$= (44 \times 14) \ cm^2$$

$$= 616 \ cm^2$$

Thus, the surface area of cylinder B is also greater than the surface area of cylinder A.

Q3 : Find the height of a cuboid whose base area is 180 cm sq. and volume is 900 cm cube?

Solution: Volume of cuboid = l x b x h

Base area = l x b

Height = Volume / Area = 900/180 = 5 cm

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

Answer :

Volume of cuboid = 60 cm × 54 cm × 30 cm = 97200 cm³

Side of the cube = 6 cm

Volume of the cube = (6)³ cm³ = 216 cm³

Required number of cubes = $\dfrac{\text{Volume of the cuboid}}{\text{Volume of the cube}}$

$$= \dfrac{97200}{216} = 450$$

Thus, 450 cubes can be placed in the given cuboid.

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

Answer :

Diameter of the base = 140 cm

Radius (r) of the base $= \left(\dfrac{140}{2}\right)$ cm $= 70$ cm $= \dfrac{70}{100}$ m

Volume of cylinder $= \pi r^2 h$

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

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

Thus, the height of the cylinder is 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

Answer :

Radius of cylinder = 1.5 m

Length of cylinder = 7 m

Volume of cylinder $= \pi r^2 h$

$$= \left(\frac{22}{7} \times 1.5 \times 1.5 \times 7 \right) m^3$$
$$= 49.5 \ m^3$$

$1 m^3$ = 1000 L

Required quantity = (49.5 × 1000) L = 49500 L

Therefore, 49500 L of milk can be stored in the tank.

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

Answer :

(i) Let initially the edge of the cube be l.

Initial surface area = $6l^2$

If each edge of the cube is doubled, then it becomes $2l$.

New surface area = $6(2l)^2 = 24l^2 = 4 \times 6l^2$

Clearly, the surface area will be increased by 4 times.

(ii) Initial volume of the cube = l^3

When each edge of the cube is doubled, it becomes 2l.

New volume = $(2l)^3 = 8l^3 = 8 \times l^3$

Clearly, the volume of the cube will be increased 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 m³, find the number of hours it will take to fill the reservoir.

Answer :

Volume of cuboidal reservoir = 108 m^3 = (108 × 1000) L = 108000 L

It is given that water is being poured at the rate of 60 L per minute.

That is, (60 × 60) L = 3600 L per hour

Required number of hours $= \dfrac{108000}{3600}$ = 30 hours

Thus, it will take 30 hours to fill the reservoir.