

Surface Area and Volume Formative Assessment

Fill in the blank

Question 1

- (a) A cylinder radius is doubled and height is halved, the curved surface area of the cylinder will (Increase/decrease/remain same)
- (b) The radius of the sphere is 7 cm, the surface area of the sphere is (616 cm² / 700 cm² / 800 cm²)
- (c) Three cubes whose sides are 6 cm, 8 cm and 10 cm. They are melted and form a big cube. The volume of the big cube is (1800cm³/1728 cm³)
- (d) The total surface area of a hemisphere of radius 10 cm using value of $\pi=3.14$ is(956 cm²/942 cm²)
- (e) A right circular cylinder just encloses a sphere of radius. The ratio of there surface area is (1:1 / 1:2)
- (f) The lateral surface area of a cube is 256 m², the volume is (456 m³/512 m³)

Solution

- (a) Remain same
 $CSA = 2\pi rh$
 So if r is doubled, h is halved, CSA will remain same
- (b) 616 cm² Surface area = $4\pi r^2$
- (c) 1728 cm³ $V = V_1 + V_2 + V_3 = 6^3 + 8^3 + 10^3$
- (d) 956 cm² Total surface area = $3\pi r^2$
- (e) 1:1 In this height of cylinder will be 2r and radius of cylinder will r. So it is equal
- (f) 512 m³ Lateral surface area = $4a^2$ and Volume = a^3

True or False statement

Question 2

- a) A cylinder, hemisphere and cone stand on equal base and same height, the Volume ratio is 3:2:1
- b) The radius of a solid sphere is 24 cm. 8 spheres can be made from it of 12cm radius
- c) radius of the cone is doubled and height is halved, the volume will be halved
- d) A river 10m deep and 40m wide is flowing at the rate of 2m per min. 48000m³ water will flow into the sea from river
- e) A cylinder radius is halved and height is doubled, the volume will become halved

f) The side of the cube is 4 cm, the diagonal length is $8\sqrt{3}$ cm

Solution

a) True.. All of them will have height as r as hemisphere height can be r only.

For cylinder $=\pi r^3$

Hemisphere $=(2/3) \pi r^3$

Cone $=(1/3) \pi r^3$

So ratio is 3:2:1

b) True Sphere volume $=(4/3) \pi r^3$

c) False. Volume will be doubled Volume is given by $=(1/3)\pi r^2 h$

d) True. It is equal to the volume of the cuboid 10m,40m,and 120 m

e) True.

b) False

Multiple choice Questions

Question 2

The length, breadth and height of a room are 12 m, 10 m, and 9m respectively. Find the area of our walls of room?

a) 636 m²

b) 516 m²

c) 800 m²

d) 456m²

Solution (b)

Area of the walls is given by $=2(BH+LH) +LB=2(90+108)+120=516 \text{ m}^2$

Question 3

The plastic paint in a Asian paint container is sufficient to paint an area equal to 93.75m² How many blocks of dimensions 22.5 cm × 10 cm × 7.5 cm can be painted out of this container

a) 100

b) 800

c) 940

d) 1000

Solution (d)

Total surface area of one block = $2(lb + bh + lh)$

$= [2(22.5 \times 10 + 10 \times 7.5 + 22.5 \times 7.5)] \text{ cm}$

$= 2(225 + 75 + 168.75) \text{ cm}^2$

$= (2 \times 468.75) \text{ cm}^2$

$= 937.5 \text{ cm}^2$

Let n blocks can be painted out by the paint of the container.

Area of n bricks = $(n \times 937.5) \text{ cm}^2 = 937.5n \text{ cm}^2$

Area that can be painted by the paint of the container = $93.75 \text{ m}^2 = 937500 \text{ cm}^2$

$937500 = 937.5n$

$n = 1000$

Therefore, 100 blocks can be painted out by the paint of the container

Question 5

Curved surface area of a cone is 308 cm^2 and its slant height is 14 cm.

- a) Radius of the cone is 7cm
- b) total surface area is 462 cm^2
- c) Height of the cone is $\sqrt{147}$
- d) None of the above

Solution (a),(b),(c)

Curved surface area = $\pi r l$

So $r = 7 \text{ cm}$

Now total surface area = $\pi r^2 + \pi r l = 462 \text{ cm}^2$

Question 6

Sita had to make a model of cylindrical kaleidoscope for her science project. She wanted to use black chart paper to make the curved surface of the kaleidoscope. What would be the area of chart paper required by her, if she wanted to make a kaleidoscope of length 30cm with a 2.7 cm radius? (Use $\pi = 22/7$)

- a) 1320 cm^2
- b) 1400 cm^2
- c) 986 cm^2
- d) None of these

Solution a

Curved surface of cylinder = $2\pi r h$

Question 7

The radii of two cones are in the ratio of 2:3 and their heights are in the ratio of 7:3. The ratio of their volumes is

- a) 20:9
- b) 28:9
- c) 29:29
- d) None of these

Solution (c)

Volume = $(1/3)\pi r^2 h$

Question 8

Find the maximum length of the rod that can be kept in cuboidal box of sides 30cm, 20cm and 10cm.

- a) $\sqrt{1400}$
- b) $2\sqrt{400}$
- c) $2\sqrt{300}$
- d) None of these

Solution (a)

Diagonal is the longest length in the cuboid so

$$D = \sqrt{L^2 + B^2 + H^2} = \sqrt{1400}$$

Question 9

A box is made entirely of glass panes (including base) held together with tape. It is 3 cm long, 2.5 cm wide and 2.5 cm high. How much of tape is needed for all the 12 edges?

- a) 30cm
- b) 32cm
- c) 40 cm
- d) None of these

Solution (b)

Length of tape = $4(L+B+H) = 32$ cm

Question 10

The curved surface area of a right circular cylinder of height 14 cm is 88 cm². Find the Volume of the cylinder. Assume $\pi = 22/7$

- a) 144 cm³
- b) 180 cm³
- c) 176 cm³
- d) None of the above

Solution (c)
Match the column

| | |
|----------------------------------|-----------------------------------|
| Curved surface area of Cone | $3\pi r^2$ |
| Curved surface of Hemisphere | $2\pi rH$ |
| Curved surface area of Cylinder | $2\pi r^2$ |
| Total surface area of Hemisphere | $\pi r^2 + \pi r\sqrt{r^2 + H^2}$ |
| Total surface area of cone | $\pi r\sqrt{r^2 + H^2}$ |