

IX / Case Study / Volume and surface area

Mathematics teacher of a school took her 9th standard students to show Gol Gumbaz. It was a part of their Educational trip. The teacher had interest in history as well. She narrated the facts of Gol Gumbaz to students. Gol Gumbaz is the tomb of king Muhammad Adil Shah, Adil Shah Dynasty. Construction of the tomb, located in Vijayapura , Karnataka, India, was started in 1626 and completed in 1656. It reaches up to 51 meters in height while the giant dome has an external diameter of 44 meters, making it one of the largest domes ever built. At each of the four corners of the cube is a dome shaped octagonal tower seven stories high with a staircase inside.



1. (a) What is the total surface area of a cuboid?
 - (i) $lb + bh + hl$
 - (ii) $2(lb + bh + hl)$
 - (iii) $2(lb + bh)$
 - (iv) $l^2 + b^2 + h^2$
1. (b) What is the curved surface area of hemispherical dome ?
 - (i) $908\pi \text{ m}^2$
 - (ii) $968\pi \text{ m}^2$
 - (iii) $340\pi \text{ m}^2$
 - (iv) $780\pi \text{ m}^2$
2. (c) What is the height of the cubodial part ?
 - (i) 14 m
 - (ii) 7 m
 - (iii) 29 m
 - (iv) 18 m
3. d) What is the circumference of the base of the dome ?
 - (i) 34π
 - (ii) 22π
 - (iii) 44π
 - (iv) 55π
4. (v) The total surface area of a hemispherical dome having radius 7 cm is:
 - (a) 462 cm^2
 - (b) 294 cm^2
 - (c) 588 cm^2
 - (d) 154 cm^2

Mathematics teacher of a school took his 10th standard students to show Taj Mahal. It was a part of their Educational trip. The teacher had interest in history as well. He narrated the facts of Taj Mahal to the students. Then the teacher said in this monument one can find combination of solid figures. There are 4 pillars which are cylindrical in shape. Also, 2 domes at the back side which are hemispherical. 1 big domes at the centre. It is the finest example of the symmetry. (Use $\pi = 22/7$)

(i) How much cloth material will be required to cover 2 small domes each of radius 4.2 metres?



(a) 52.08 cm^2 (b) 52.8 m^2 (c) 52 m^2 (d) none of these

(ii) Write the formula to find the volume of one pillar (including hemispherical dome) :

(a) $\pi r^2(l + r)$ (b) $\pi r^2(2/3 r + h)$ (c) $2\pi r^2 h$ (d) none of these

(iii) The volume of the hemispherical dome at the centre if base radius is 7 m is :

(a) 718.66 cm^3 (b) 152.8 m^3 (c) 718.66 m^3 (d) 56 m^3

(iv) What is the lateral surface area of all 4 pillars if height of the each pillar is 14 m and base radius is 1.4 m (without dome)?

(a) 508 m^2 (b) 591.36 m^2 (c) 52 m^2 (d) none of these

(v) The cost of polishing all the four pillars if the cost of 1 m^2 is Rs. 270, will be :

(a) Rs. 1,59,667.20

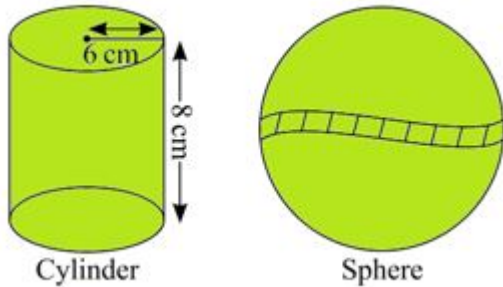
(b) Rs. 2,00,000

(c) Rs. 1,52,567.50

(d) none of these

Mr. Kumar, a Mathematics teacher brings some green coloured clay in the classroom to teach the topic 'mensuration'. First, he forms a cylinder of radius 6 cm and height 8 cm with the clay. Then, he moulds that cylinder into a sphere similarly, he moulds the sphere in other different shapes. Answer the following questions:

(i) Which of the following is not a 3D shape?



- (a) cone (b) cuboid (c) rectangle (d) sphere

(ii) What is the volume of cylindrical shape?

- (a) $268\pi \text{ cm}^3$ (b) $288\pi \text{ cm}^3$ (c) $36\pi \text{ cm}^2$ (d) $48\pi \text{ cm}^3$

(iii) What is the formula of volume of sphere?

- (a) $2323 \pi r^3$ (b) πr^3 (c) $1313 \pi r^3$ (d) $4343 \pi r^3$

(iv) When clay changes into one shape to other which of the following remains same.

- (a) Volume (b) Area (c) CSA (d) Radius

(v) The radius of the sphere formed is :

- (a) 4 cm (b) 5 cm (c) 6 cm (d) 3 cm