



MATHS

BOOKS - HT Olympiad Previous Year Paper

SURFACE AREAS AND VOLUMES

Mathematical Reasoning

1. If the height of a cylinder is doubled, by what number must the radius of the base be multiplied so that the resulting cylinder has the same

volume as the original cylinder? 4 (b) $\frac{1}{\sqrt{2}}$ (c) 2 (d)

$$\frac{1}{2}$$

A. 4

B. $\frac{1}{\sqrt{2}}$

C. 2

D. $\frac{1}{2}$

Answer: B



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2. An aluminium sheet 27 cm long, 8 cm broad and 1 cm thick is melted into a cube. The difference in the surface areas of the two solids would be (a) Nil (b) 284 cm² (c) 286 cm² (d) 296 cm²

A. 280cm^2

B. 284cm^2

C. 296cm^2

D. 286cm^2

Answer: D



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3. If the height of a cone is equal to its base diameter, then its slant height is

A. $\sqrt{2r^2 + h^2}$

B. $r\sqrt{5}$

C. $h\sqrt{5}$

D. $rh\sqrt{5}$

Answer: B



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4. The length of the longest rod that can be placed in a room of dimensions $(10m \times 10m \times 5m)$ is

A. 16 m

B. 10 m

C. 15 m

D. 12 m

Answer: C



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5. A hollow cylindrical pipe is 28 dm long. Its outer and inner diameters are 12 cm and 8 cm respectively. Find the volume of the copper used in making the pipe.

A. 17600cm^3

B. 17000cm^3

C. 16600cm^3

D. 16000cm^3

Answer: A



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6. The volume of a cylinder of radius r is $\frac{1}{4}$ of the volume of a rectangular box with a square base of side length x . If the cylinder and the box have equal heights, what is r in terms of x ? $\frac{x^2}{2\pi}$ (b)

$\frac{x}{2\sqrt{\pi}}$ (c) $\frac{\sqrt{2x}}{\pi}$ (d) $\frac{\pi}{2\sqrt{x}}$

A. $\frac{x^2}{2\pi}$

B. $\frac{x}{2\sqrt{x}}$

C. $\frac{\sqrt{2x}}{\pi}$

D. $\frac{x}{\sqrt{\pi}}$

Answer: B





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7. The edge of a cube is 20 cm. How many small cubes of edge 5 cm can be formed from this cube?

A. 4

B. 32

C. 64

D. 100

Answer: C



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8. The volume of two spheres are in the ratio 216 : 125. The difference of their surface areas, if the sum of their radii is 11 units, is

A. 38π sq. units

B. 45π sq. units

C. 50π sq. units

D. 44π sq. units

Answer: D



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9. The radii of two cylinders are in the ratio 3:4 and their heights are in the ratio 6: 5. The ratio of their curved surface areas is

A. 5: 4

B. 3: 4

C. 9: 10

D. 4: 5

Answer: C



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1. An open rectangular box has the external measures as 98 cm, 84 cm, 77 cm and the thickness of wood is 2 cm. Then the volume of the wood is ____

A. 70000 cu. cm

B. 64865 cu. cm

C. 60000 cu. cm

D. 84904 cu. cm

Answer: D



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2. A spherical ball of radius 3cm is melted and recast into three spherical balls. The radii of two of these balls are 1.5cm and 2cm . The radius of the third ball is

A. 2.66 cm

B. 2.5 cm

C. 3 cm

D. 3.5 cm

Answer: B



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3. How many metres of cloth 5m wide will be required to make a conical tent, the radius of whose base is 7m and whose height is 24m?

$$\left(Take \pi = \frac{22}{7} \right)$$

A. 550 m

B. 168 m

C. 110 m

D. 33.6 m

Answer: C



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4. Water flows in a tank $150m \times 100m$ at the base, through a pipe whose cross-section is $2dm$ by $1.5dm$ at the speed of 15 km per hour . In what time, will the water be 3 metres deep ?

A. 50 hours

B. 150 hours

C. 100 hours

D. 200 hours

Answer: C



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5. A hemispherical dome of a building needs to be painted from outside. If the circumference of the base of the dome is 17.6 m, then find the cost of painting it at the rate of Rs. 8 per 100 cm^2

A. Rs. 35680

B. Rs. 28650

C. Rs. 39424

D. None of these

Answer: C



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6. A circus tent is cylindrical to a height of 3 metres and conical above it. If its diameter is 105 m and the slant height of the conical portion is 53 m, calculate the length of the canvas 5 m wide to make the required tent.

A. 1996 m

B. 2096 m

C. 1947 m

D. 1800 m

Answer: C



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7. A school provides milk to the students daily in a cylinder glasses of diameter 7 cm. If the glass is filled with milk upto a height of 12 cm, find how

many liters of milk is needed to server 1600 students.

A. 739.2 litres

B. 538 litres

C. 742 litres

D. 400 litres

Answer: A



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8. A small village having a population of 5000, requires 75 L of water per head per day . The village has got an overhead tank of measurement $40m \times 25m \times 15m$. For how days will the water of this tank last?

A. 30 days

B. 32 days

C. 40 days

D. 45 days

Answer: C



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Achievers Section Hots

1. Read the following statements carefully and write 'T' for true and 'F' for false.

(i) Volume of a cylinder is three times the volume of a cone on the same base and of same height

(ii) Volume of biggest sphere in cube of edge 6 cm is $30\pi\pi cm^3$

(iii) Total surface area of a cone of radius r and slant height l is $\pi rl + \pi r^2$

- A. (i) (ii) (iii)
T F T
- B. (i) (ii) (iii)
T T T
- C. (i) (ii) (iii)
F T F
- D. (i) (ii) (iii)
F T T

Answer: B



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2. Match the following

Column-I	Column-II
(P) A cylinder of radius 3 cm is inscribed in a sphere of radius 5 cm, then volume of cylinder is _____.	(1) $2\sqrt{61}$ cm
(Q) A conical tent of base diameter 24 cm is 10 cm in height, the slant height of tent is _____.	(2) 216 cm^3
(R) If the length of a diagonal of a cube is $6\sqrt{3}$ cm, then its volume is _____.	(3) $72\pi \text{ cm}^3$
(S) The volume of a conical vessel with height 12 cm and slant height 13 cm is _____.	(4) $100\pi \text{ cm}^3$

A.

$(P) \rightarrow (2), (Q) \rightarrow (3), (R) \rightarrow (4), (S) \rightarrow (1)$

B.

$(P) \rightarrow (1), (Q) \rightarrow (3), (R) \rightarrow (2), (S) \rightarrow (4)$

C.

$$(P) \rightarrow (3), (Q) \rightarrow (1), (R) \rightarrow (2), (S) \rightarrow (4)$$

D.

$$(P) \rightarrow (4), (Q) \rightarrow (1), (R) \rightarrow (3), (S) \rightarrow (2)$$

Answer: C



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3. Study the following statements carefully and select the correct option.

Statement-1 : If diameter of a sphere is decreased

by 25%, then its curved surface area is decreased by 43.75%.

Statement-II : Curved surface area is increased when diameter decreases.

- A. Both Statement-I and Statement-II are true.
- B. Statement-I is true but Statement-II is false.
- C. Statement-I is false but Statement-II is true.
- D. Both Statement-I and Statement-II are false.

Answer: B



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