

Spheres & Prisms Problems

1. A sphere is inscribed in a cube with an edge of 10. What is the shortest possible distance from one of the vertices of the cube to the surface of the sphere?

(A) $10(\sqrt{3}-1)$
(B) 5
(C) $10(\sqrt{2}-1)$
(D) $5(\sqrt{3}-1)$
(E) $5(\sqrt{2}-1)$

2. The weight of a hollow sphere is directly dependent on its surface area. The surface area of a sphere is $4\pi R^2$, where R is the radius of the sphere. If a hollow sphere of radius 0.15 cm made of a certain metal weighs 8 grams, a hollow sphere of radius 0.3 cm made of the same metal would weigh how many grams?

A. 16
B. 32
C. 64
D. 128
E. 512

3. The volume of a sphere with radius r is $\frac{4}{3}\pi r^3$ and the surface area is $4\pi r^2$. If a special ballon has a volume of 972π cubic centimeters, what is the surface area of the ballon in square centimeters?

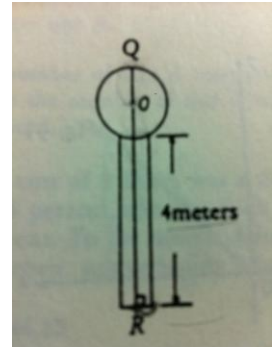
A. 324
B. 729
C. 243π
D. 324π
E. 729π

4. In, a Hemisphere igloo, an Eskimo's head just touches the roof when he stands erect at the centre of the floor, but his son can play over an area of 9856 square units without stooping. If the Eskimo's height is 65 units, what is his son's height?

A. 25 units
B. 33 units
C. 35 units
D. 37 units
E. Insufficient data

5. The figure above shows a streetlight that consists of a glass sphere, with center O , placed on top of a vertical pole that is 4 meters high. What is the height QR of the streetlight?

- (1) The radius of the pole is 6 centimeters.
- (2) The radius OQ of the sphere is 24 centimeters.



6. Three of the sides of a rectangular prism have areas of 91, 39, and 21. What is the volume of the rectangular prism?

- A) 252
- B) 269
- C) 273
- D) 920
- E) 1911