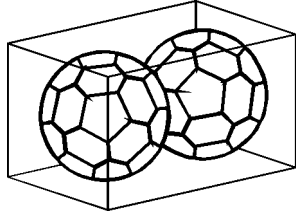**Volume (Challenging)**
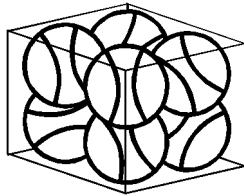
Name: _____   **Date:** _____

1. A rectangular box contains two soccer balls that just fit. What fraction of the space in the box do they occupy?

    A. $\frac{\pi}{9}$ B. $\frac{\pi}{6}$

    C. $\frac{3}{4}$ D. $\frac{\pi}{3}$

2. Eight tennis balls fit snugly in a cubical box. What fraction of the space in the box do they occupy?

    A. $\frac{\pi}{9}$ B. $\frac{1}{6}$

   C. $\frac{\pi}{6}$ D. $\frac{5\pi}{6}$

3. Which is larger: the circumference of a cylindrical can that contains 3 tennis balls, or the height of the same can?

4. Which is larger: the circumference of a cylindrical can that contains 4 tennis balls, or the height of the same can?

5. In the diagram, the right circular cylinder has a base diameter equal in measure to its height. If the sphere is perfectly contained in the cylinder, what is the ratio of the volume of the cylinder to the volume of the sphere?
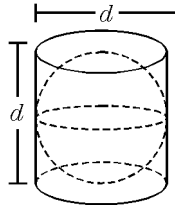
6. In the diagram, the sphere is perfectly contained in the cube. What is the ratio of the volume of the sphere to the volume of the cube?
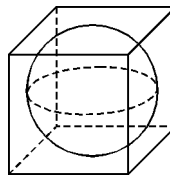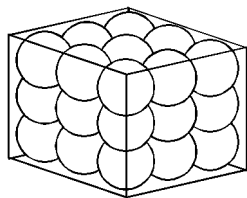
7. A right cylinder with a height h of $10\,\text{cm}$ and a diameter d of $4\,\text{cm}$ has a cone removed as shown in the diagram. Find the remaining volume.
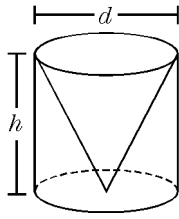
8. A rectangular box is designed to hold exactly five ping pong balls lined up. What fraction of the space in the box do they occupy?
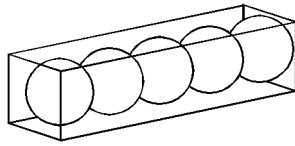
9. Nine ball-bearings fit perfectly in a cubical box. What fraction of the space in the box do they occupy?

10. A sphere is inscribed in a cube. If the volume of the cube is $1000\,\text{cm}^3$, what is the volume of the sphere?

11. A sphere is inscribed in a cube. If the volume of the cube is $64\,\text{cm}^3$, what is the volume of the sphere?

12. To the nearest cubic centimeter, what is the volume of the largest cube that can be inscribed in a sphere with a radius of $5\,\text{cm}$?

13. To the nearest cubic centimeter, what is the volume of the largest cube that can be inscribed in a sphere with a radius of $4\,\text{cm}$?

14. A cubical box contains 8 balls. Each ball has a diameter of 1 foot and each side of the box measures 2 feet. To the nearest tenth of a cubic inch, how much "wasted" space is there inside this box?

15. A rock is dropped into a cylindrical bucket that has a diameter of 12 inches. The water level rises 2 inches. What is the exact volume of the rock?

Volume (Challenging)   11/2/2017

1.
Answer: B

2.
Answer: C

3.
Answer: circumference

4.
Answer: height

5.
Answer: $3 : 2$

6.
Answer: $\pi : 6$

7.
Answer: $\frac{80\pi}{3}\,\text{cm}^3$

8.
Answer: $\frac{\pi}{6}$

9.
Answer: $\frac{\pi}{6}$

10.
Answer: $\frac{500\pi}{3}\,\text{cm}^3$

11.
Answer: $\frac{32\pi}{3}\,\text{cm}^3$

12.
Answer: $192\,\text{cm}^3$

13.
Answer: $99\,\text{cm}^3$

14.
Answer: $3.8\,\text{in}^3$

15.
Answer: $72\pi\,\text{in}^3$