Geometry ~ Volume Application

Name:_____

Draw a picture to represent each situation and then find each volume. Round to the nearest tenth if necessary.

1. Mr. Smith purchased a cylindrical aquarium for his office. The aquarium has a height of 25.5 inches and a radius of 21 inches. What is the volume of the aquarium?

$$V = \pi r^2 h$$

$$V = \pi (21^2)(25.5) = 35328.8 \ in^3$$

2. The start of the pyramid age began with King Zoser's pyramid, built in the 27th century B.C. In its original state, it stood 62 meters high with a rectangular base that measured 140 meters by 118 meters. Find the volume of the original pyramid.

$$V = \tfrac{1}{3} Bh = \tfrac{1}{3}(140 \times 118)(62) = 341413.33 m^3$$

3. Mr. Ganty built a conical storage shed. The base of the shed is 4 meters in diameter, and the height of the shed is 3.8 meters. What is the volume of the shed?

$$V = \tfrac{1}{3} \pi (2^2)(3.8) = 15.9 m^3$$

4. A regulation basketball is a sphere with a diameter of 9 inches. What is the volume of this sphere?

$$V = \tfrac{4}{3} \pi (4.5^3) = 381.7 in^3$$

5. A billiard ball set consists of 16 spheres, each 2.25 inches in diameter. What is the total volume of a complete set of billiard balls?

$$V = \tfrac{4}{3} \pi (1.125^3) = 5.96 \times 16 = 95.4 in^3$$

6. How many pounds of wet snow would a person shovel in a rectangular driveway 25 feet by 10 feet after 2 feet of snow has fallen?

$$V = (25 \times 10)(2) = 500 ft^3$$

7. The diameter of the moon is 3,476 kilometers. What is the volume of the moon?

$$V = \tfrac{4}{3} \pi (1738^3) = 2.2 \times 10^{10} \ km^3$$

8. The world's most powerful digital camera is located in New Mexico at the Apache Point Observatory. It is surrounded by a rectangular prism made of aluminum that protects the camera from wind and unwanted light. If the prism is 12 feet long, 12 feet wide and 14 feet high, find its volume.

$$V = (12 \times 12)(14) = 2016 \, ft^3$$

9. The American Heritage Center at the University of Wyoming is a conical building. If the height is 77 feet, and the area of the base is about 38,000 square feet, find the volume of air that the heating and cooling systems would have to accommodate.

$$V = (38000)(77)\left(\tfrac{1}{3}\right) = 975333.3 \, ft^3$$

10. If a golf ball has a diameter of 4.3 centimeters and a tennis ball has a diameter of 6.9 centimeters, find the difference between the volumes of the two balls.

$$V_{golf} = \tfrac{4}{3}\pi(2.15^3) = 41.6$$

$$V_{tennis} = \tfrac{4}{3}\pi(3.45^3) = 172.0$$

$$V_{diff} = 130.4 \, cm^3$$

11. Still standing in Egypt after more than four thousand years is the Khufu or Great Pyramid. Each side of the base of this square pyramid measures 755 feet. The original height was 481 feet and the current height is 449 feet

A) Find the original volume of the pyramid

$$V = \tfrac{1}{3}(755 \times 755)(481) = 91394008.3 \, ft^3$$

B) Find the present day volume of the pyramid.

$$V = \tfrac{1}{3}(755 \times 755)(449) = 85313741.7 \, ft^3$$

12. Jordan has two glasses. One is a hemisphere of radius 2 inches and the other is a cylinder with base radius 1.25 inches.

A) What is the volume of the hemispherical glass?

$$V = \tfrac{2}{3}\pi(2^3) = 16.8 \, in^3$$

B) If the cylindrical glass can hold twice as much water as the hemispherical glass, what is the height of the cylinder?

$$33.6 = \pi(1.25^2)h$$

$$h = 6.8 \, in$$