

key

# Volume of a Sphere

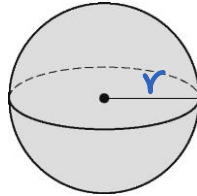
A sphere is the locus of points in space that are a fixed distance from the **center** of the sphere.

A radius connects the center of the sphere to any point on the sphere.

What do we call half a sphere?  
hemisphere

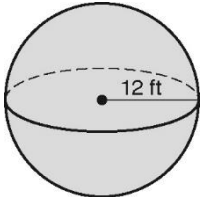
A **great circle** divides a sphere into two hemispheres (think equator)

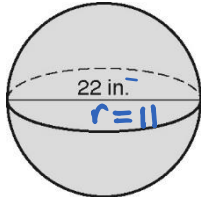
Volume of a Sphere  
$$V = \frac{4 \cdot \pi \cdot r^3}{3}$$

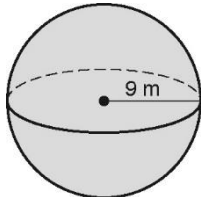


★ review how to do 12<sup>3</sup> on the calc ★

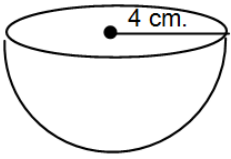
Find the volume of each sphere. Give your answers in terms of π.

1.   $\frac{4 \cdot \pi \cdot 12^3}{3}$  2.  $\frac{4 \cdot \pi \cdot 1728}{3}$   
 $\frac{6912\pi}{3}$   
 $2304\pi \text{ ft}^3$


  $\frac{4 \cdot \pi \cdot 11^3}{3}$   
 $\frac{4 \cdot \pi \cdot 1331}{3}$   
 $\frac{5324\pi}{3}$   
 $1774.67\pi \text{ in}^3$

3.   $\frac{4 \cdot \pi \cdot 9^3}{3}$   
 $\frac{4 \cdot \pi \cdot 729}{3}$   
 $\frac{2916\pi}{3}$   
 $972\pi \text{ m}^3$

4. Find the volume of the hemisphere.

  
 whole sphere:  $\frac{4 \cdot \pi \cdot 4^3}{3}$   
 $\frac{85.3\pi}{2} \Rightarrow 42.6\pi \text{ cm}^3$   
 (take 1/2 because hemisphere)

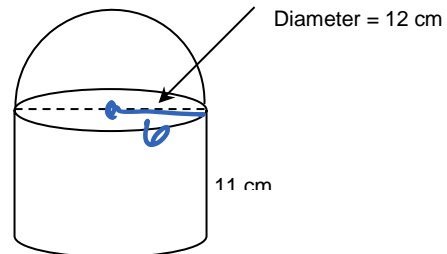
5. Find the volume of the quarter-sphere.

  
 whole sphere:  $\frac{4 \cdot \pi \cdot 12^3}{3}$   
 $\frac{2304\pi}{4} \rightarrow 576\pi \text{ cm}^3$

6. Find the total volume of the solid shown at right.

Volume of hemisphere:  $\frac{4 \cdot \pi \cdot 6^3}{3} = 288\pi$   
 $\frac{288\pi}{2} = 144\pi$

Volume of cylinder:  $36\pi \cdot 11 = 396\pi$



Total volume:  $288\pi + 396\pi = 684\pi \text{ cm}^3$