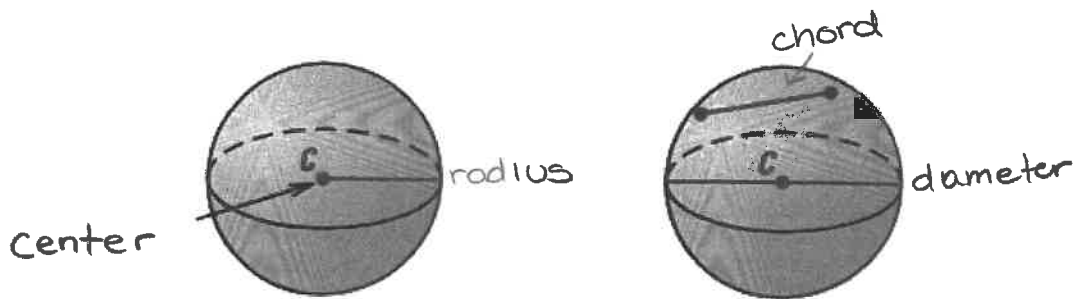




12.6 Volume and Surface Area of a Sphere  
Geometry CP




Surface Area of a Sphere	The surface area $S$ of a sphere with radius $r$ is $S = 4\pi r^2$	
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1. Find the surface area of the spheres below: Do the surface areas double?



$$S = 4\pi(2)^2$$

$$= 16\pi \text{ in}^2$$



$$S = 4\pi(4)^2$$

$$= 64\pi \text{ in}^2$$

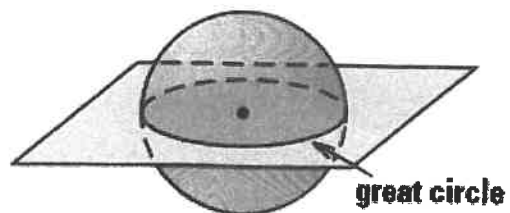
No SA doesn't double

When a plane intersects a sphere the intersection is:

1. point
2. circle

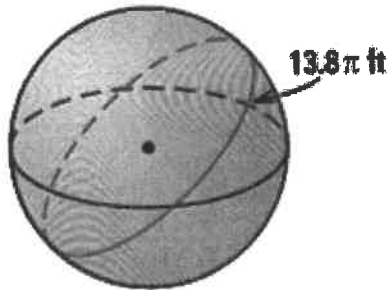
If the intersection ~~is~~ contains the center of the sphere the intersection is a Great Circle

Great circle cuts the sphere into 2  $\cong$  halves called hemispheres



12.6 Volume and Surface Area of a Sphere  
Geometry CP

2. The circumference of a great circle of the sphere below is  $13.8\pi$  feet. What is the surface area of the sphere?



$$C = 2\pi r$$


$$13.8\pi = 2\pi r$$

$$6.9 = r$$

$$S = 4\pi r^2$$

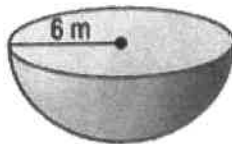
$$= 4\pi (6.9)^2$$

$$= 190.44 \text{ ft}^2$$

Volume of a Sphere	The volume $V$ of a sphere with a radius $r$ is $V = \frac{4}{3}\pi r^3$	
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3. Find the volume of each sphere or hemisphere below:

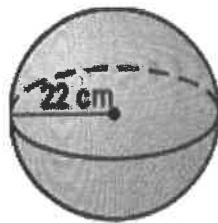
a.



$$V = \frac{1}{2} \left( \frac{4}{3} \pi (6)^3 \right)$$

$$= 144\pi \text{ m}^3$$

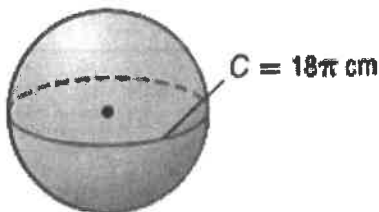
b.



$$V = \frac{4}{3} \pi (22)^3$$

$$= 14,197.\bar{3} \pi \text{ cm}^3$$

4. A sphere with a great circle circumference is  $18\pi$  cm. Find the volume of the sphere.



$$C = 2\pi r$$

$$18\pi = 2\pi r$$

$$9 = r$$

$$V = \frac{4}{3} \pi r^3$$

$$V = \frac{4}{3} \pi (9)^3$$

$$= 972\pi \text{ cm}^3$$

12.6 Volume and Surface Area of a Sphere  
Geometry CP

5. Find the volume of the hemisphere given that the diameter is 16 cm.

$$d = 16 \text{ cm}$$

$$r = 8 \text{ cm}$$

$$V = \frac{1}{2} \left( \frac{4}{3} \pi r^3 \right)$$

$$= \frac{2}{3} \pi (8)^3$$

$$= 341.\overline{3} \pi \text{ cm}^3$$

6. Find the volume of the sphere given that the area of the great circle is  $55\pi \text{ in}^2$ .

$$A = \pi r^2$$

$$55\pi = \pi r^2$$

$$7.4 = r$$

$$V = \frac{4}{3} \pi r^3$$

$$= \frac{4}{3} \pi (7.4)^3$$

$$= 540.3 \pi \text{ in}^3$$

