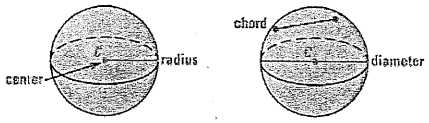
6.9 Surface Area and Volume of Spheres

GPS Geometry

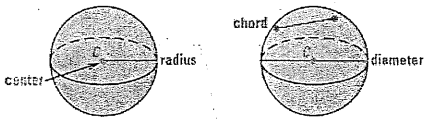
Finding the Surface Area of a Sphere

- In Lesson 6.1, a circle was described as the set of all points in a plane that are equidistant from a given point. (center).
- A sphere is the set of all points in space that are equidistant from a given point. (center)



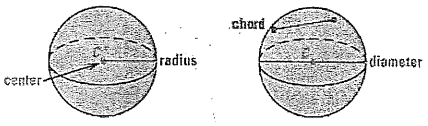
Finding the Surface Area of a Sphere

- A radius of a sphere is a segment from the center to a point on the sphere.
- A chord of a sphere is a segment whose endpoints are on the sphere.



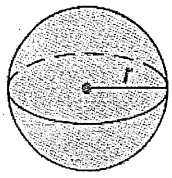
Finding the Surface Area of a Sphere

- A diameter is a chord that contains the center. As with all circles, the terms radius and diameter also represent distances, and the diameter is twice the radius.



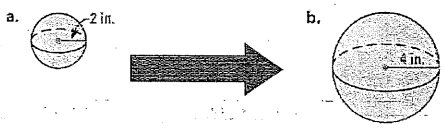
Theorem 6.22: Surface Area of a Sphere

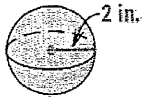
- The surface area of a sphere with radius r is $S = 4\pi r^2$.

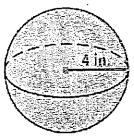


Ex. 1: Finding the Surface Area of a Sphere

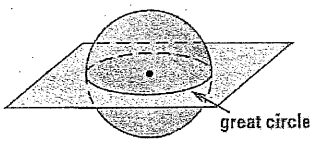
- Find the surface area. When the radius doubles, does the surface area double?



a. 

b. 

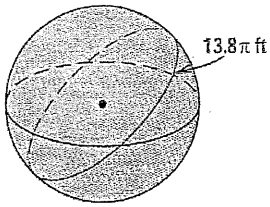
More . . .



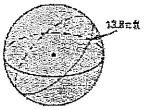
- If a plane intersects a sphere, the intersection is either a single point or a circle. If the plane contains the center of the sphere, then the intersection is a great circle of the sphere. Every great circle of a sphere separates a sphere into two congruent halves called hemispheres.

Ex. 2: Using a Great Circle

- The circumference of a great circle of a sphere is 13.8π feet. What is the surface area of the sphere?



Solution:



So, the surface area of the sphere is _____

Theorem 6.23: Volume of a Sphere

- The volume of a sphere with radius r is $V = \frac{4\pi r^3}{3}$.