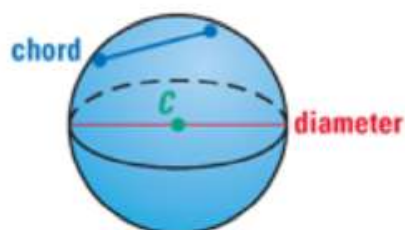
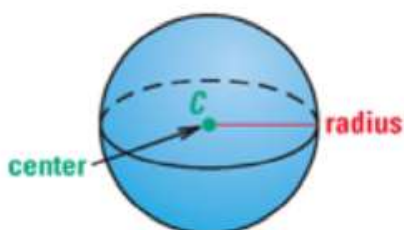


11.8 Surface Area and Volume of Spheres

A **sphere** is the set of all points in space equidistant from a given point. This point is called the **center** of the 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. A **diameter** of a sphere is a chord that contains the center.



THEOREM 11.11 Surface Area of a Sphere

The surface area S of a sphere is

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

where r is the radius of the sphere.



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

Find the surface area of the sphere.

Solution

$S = 4\pi r^2$	Formula for surface area of a sphere
$= 4\pi(8^2)$	Substitute 8 for r .
$= 256\pi$	Simplify.
≈ 804.25	Use a calculator.



► The surface area of the sphere is about 804.25 square inches.

THEOREM 11.12 Volume of a Sphere

The volume V of a sphere is

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

where r is the radius of the sphere.

The soccer ball has a diameter of 9 inches.
Find its volume.

**Solution**

The diameter of the ball is 9 inches, so the radius is $\frac{9}{2} = 4.5$ inches.

$$V = \frac{4}{3}\pi r^3 \quad \text{Formula for volume of a sphere}$$

$$= \frac{4}{3}\pi(4.5)^3 \quad \text{Substitute.}$$

$$= 121.5\pi \quad \text{Simplify.}$$