Tangents, Arcs, and Chords

Objectives

- 1. Define a circle, a sphere, and terms related to them.
- 2. Recognize circumscribed and inscribed polygons and circles.
- 3. Apply theorems that relate tangents and radii.
- 4. Define and apply properties of arcs and central angles.
- 5. Apply theorems about the chords of a circle.

9-1 Basic Terms

A **circle** is the set of points in a plane at a given distance from a given point in that plane. The given point is the **center** of the circle and the given *distance* is the **radius**. Any segment that joins the center to a point of the circle is called a radius. All radii of a circle are congruent. The rim of the Ferris wheel shown is a circle with center $O(\bigcirc O)$ and radius 10.

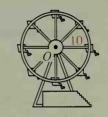
A **chord** is a segment whose endpoints lie on a circle. A **secant** is a line that contains a chord. A **diameter** is a chord that contains the center of a circle. (Like the word *radius*, the word *diameter* can refer to *the* length of a segment or to a segment.)

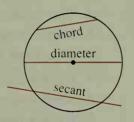
A tangent is a line in the plane of a circle that intersects the circle in exactly one point, called the point of tangency. The tangent ray \overrightarrow{PA} and tangent segment \overrightarrow{PA} are often called tangents.

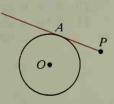
 \overrightarrow{AP} is tangent to $\bigcirc O$.

 $\bigcirc O$ is tangent to \overrightarrow{AP} .

A is the point of tangency.







A **sphere** with center O and radius r is the set of all points in space at a distance r from point O. Many of the terms used with spheres are the same as those used with circles.

 \overline{OA} , \overline{OB} , and \overline{OD} are radii.

 \overline{BD} is a diameter.

 \overline{BC} is a chord.

 \overrightarrow{BC} is a secant.

 \overrightarrow{AT} is a tangent.

 \overline{AT} is a tangent segment.

