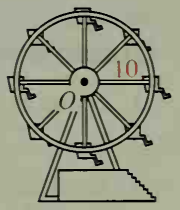
Tangents, Arcs, and Chords

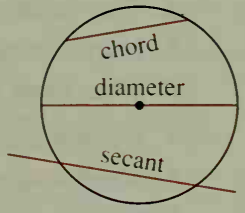
Objectives

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*

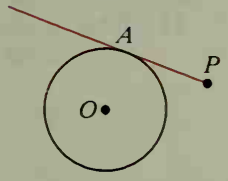


A **circle** is the set of points in a plane at a given distance from a given point in that plane. The given point is the **center** of the circle and the given *distance* is *the* **radius.** Any *segment* that joins the center to a point of the circle is called *a* radius. All radii of a circle are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



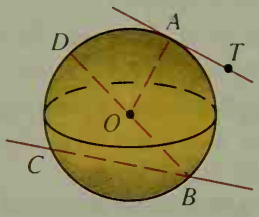
A **chord** is a segment whose endpoints lie on a circle. A **secant** is a line that contains a chord. A **diameter** is a chord that contains the center of a circle. (Like the word *radius*, the word *diameter* can refer to *the* length of a segment or to *a* segment.)

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* $\overline{PA}$ are often called tangents.



$\overleftrightarrow{AP}$ is tangent to $\odot O$.
$\odot O$ is tangent to $\overleftrightarrow{AP}$.
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.
$\overleftrightarrow{BC}$ is a secant.
$\overleftrightarrow{AT}$ is a tangent.
$\overline{AT}$ is a tangent segment.