

Tangents to a Circle



A line can intersect a circle in zero, one, or two points. A line that intersects a circle in exactly one point—that just touches the circle without going into the circle's interior—is called a *tangent*. The point of intersection is called the *point of tangency*. A line that intersects a circle in two points is called a *secant*. In this investigation you'll construct a secant, then manipulate it until it becomes a tangent to discover an important property of tangents.

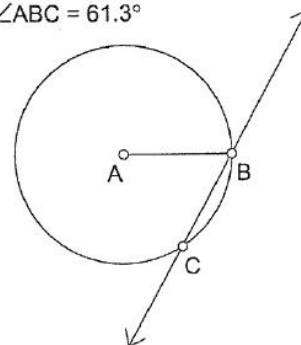
SKETCH AND INVESTIGATE

Press and hold the pointer on the **Segment** tool; then drag right to choose the **Line** tool.

Select, in order, points A , B , and C . Then, in the **Measure** menu, choose **Angle**.

1. Construct circle AB .
2. Construct \overline{AB} .
3. Construct secant \overline{BC} , making sure point C falls on the circle.
4. Measure $\angle ABC$.
5. Drag point C around the circle and observe the angle measure.

$$m\angle ABC = 61.3^\circ$$



- Q1** What happens to $m\angle ABC$ as point C gets closer to point B ? What's the measure of $\angle ABC$ when point C is right on top of point B ?
- Q2** When points B and C coincide, your line intersects the circle in a single point, so it's tangent to the circle. How is a tangent related to the radius at the point of tangency?
- Q3** Use what you observed in Q2 to construct a line in your sketch that is always tangent to the circle. Describe how you did it.

EXPLORE MORE

6. Come up with methods for constructing two circles that always intersect in one point. The circles could be *internally tangent* (one inside the other) or *externally tangent* (neither inside the other).