Tangents to a Circle

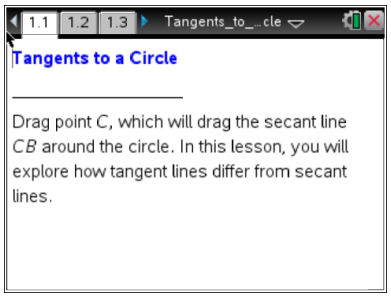
Student Activity

Name _____

Class _____

Open the TI-Nspire document *Tangents_to_a_Circle.tns.*

A line that intersects a circle in two points is called a secant. What is a tangent line, and how does it differ from a secant line? This activity will explore properties of tangents.



Move to page 1.2.

$\overleftrightarrow{CP}$ is a secant of circle *A*. ∠*CBA* has been measured. Dragging point *C* also drags the $\overleftrightarrow{CP}$ around the circle. As you drag *C*, points *P* and *B* will move away from each other or closer to each other.

1. a. As you drag point *C*, what happens to ∠*CBA*?

   b. When points *P* and *B* are very close to each other, what is the measure of ∠*CBA*? What happened to point *P*?

   c. When ∠*CBA* measures 0°, where is point *P* on the circle in relation to *B*?

   d. When ∠*CBA* measures 90°, what has happened to the secant line?

Move to page 1.3.

A tangent line has been constructed at point *T*. Drag point *B* to move the tangent line around the circle.

2. A tangent line intersects the circle in exactly one point, which is known as the point of tangency. How is a tangent related to the radius at the point of tangency?

Move to page 2.1.

This page shows two tangent lines intersecting at point *B*.

3. Drag point *B* and observe the tangent segments $\overline{AB}$ and $\overline{BC}$.
   a. What can you conjecture about the tangent segments $\overline{AB}$ and $\overline{BC}$?

   b. What happens to the tangent segments when *B* is inside the circle? Why?

   c. Select ^ to show the radii and $\overline{OB}$. Look at the triangles formed from the segments. What do you notice about ΔAOB and ΔCOB?

Move to page 3.1.

4. Prove that $\overline{AB} \cong \overline{CB}$.
   a. Select Δ to draw $\overline{OA}$ and $\overline{OC}$. Press Δ to show the next step. Why is $\overline{OA} \cong \overline{OC}$?

   b. Select ^ to show the next step. Why is $\overline{OA} \perp \overline{AB}$? Why is $\overline{OC} \perp \overline{CB}$?

   c. Select ^ to show the next steps. Why is $\Delta AOB \cong \Delta COB$?

   d. Why can you conclude $\overline{AB} \cong \overline{CB}$?