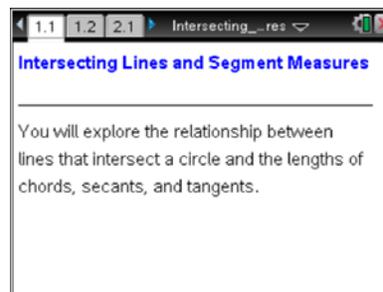




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Intersecting_Lines_and_Segment_Measures.tns.

When two lines intersect a circle, they may also intersect each other inside or outside the circle. These intersecting lines may form chords, secants, or tangents. In this activity, you will explore the relationship between intersecting lines and the lengths of various segments.



Move to page 1.2.

Press **ctrl** **▶** and **ctrl** **◀** to navigate through the lesson.

\overline{AQ} and \overline{BR} intersect circle O . The measures of \overline{PA} , \overline{PB} , \overline{PC} , and \overline{PD} are shown at the bottom of the screen.

Rotate \overline{AQ} by dragging point Q . Rotate \overline{BR} by dragging point R .

- Point P is the intersection of \overline{AQ} and \overline{BR} . Drag point P to various locations inside the circle.
 - What special type of segment is \overline{AC} ? What two segments form \overline{AC} ?
 - What special type of segment is \overline{BD} ? What two segments form \overline{BD} ?
- Drag point P to various locations outside the circle. Rotate \overline{AQ} and \overline{BR} by dragging points Q and R so that both lines intersect the circle. What special type of segments are \overline{PC} and \overline{PD} ?
- While point P is outside the circle, drag point Q until points A and C are at the same location.
 - \overline{PA} and \overline{PC} are now the same segment. What special type of segment is this?
 - What special type of segment is still formed by \overline{PD} ?



4. While point P is outside the circle and points A and C are at the same location, drag point R until points B and D are at the same location. \overline{PB} and \overline{PD} are now the same segment. What special type of segment is this?

Move to page 2.1.

\overline{AQ} and \overline{BR} intersect circle O . The measures of \overline{PA} , \overline{PB} , \overline{PC} , and \overline{PD} are shown at the bottom of the screen. The product of \overline{PA} and \overline{PC} , and the product of \overline{PB} and \overline{PD} are also shown.

Rotate \overline{AQ} by dragging point Q . Rotate \overline{BR} by dragging point R .

5. The product of the segment lengths of each chord is given. What is the relationship between the products of the segment lengths of each chord?
6. Drag points P , Q , and R so that segments \overline{PC} and \overline{PD} are secant segments. \overline{PA} and \overline{PB} are called external secant segments because they lie outside the circle. What is the relationship between the products of the lengths of the external secant segments and the secants?
7. Drag point Q so that \overline{PC} is a tangent segment. What is the relationship between the square of the length of \overline{PC} and the product of the lengths of \overline{PD} and \overline{PB} ?
8. Drag point R so that \overline{PD} is a tangent segment. What is the relationship between the lengths of \overline{PC} and \overline{PD} ?