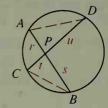
Theorem 9-11

When two chords intersect inside a circle, the product of the segments of one chord equals the product of the segments of the other chord.

Given: \overline{AB} and \overline{CD} intersect at P.

Prove: $r \cdot s = t \cdot u$



Proof:

Statements

- 1. Draw chords \overline{AD} and \overline{CB} .
- 2. $\angle A \cong \angle C$; $\angle D \cong \angle B$
- 3. $\triangle APD \sim \triangle CPB$
- $4. \frac{r}{t} = \frac{u}{s}$
- 5. $r \cdot s = t \cdot u$

Reasons

- 1. Through any two points there is exactly one line.
- 2. If two inscribed angles intercept ?
- 3. _?_
- 4. _?
- 5. A property of proportions

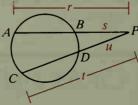
For a proof of the following theorem, see Classroom Exercise 7. In the diagram for the theorem, \overline{AP} and \overline{CP} are secant segments. \overline{BP} and \overline{DP} are exterior to the circle and are referred to as external segments. The terms "secant segment" and "external segment" can refer to the length of a segment as well as to the segment itself.

Theorem 9-12

When two secant segments are drawn to a circle from an external point, the product of one secant segment and its external segment equals the product of the other secant segment and its external segment.

Given: \overline{PA} and \overline{PC} drawn to the circle from point P

Prove: $r \cdot s = t \cdot u$



Study the diagrams at the top of the next page from left to right. As \overline{PC} approaches a position of tangency, C and D move closer together until they merge. Then \overline{PC} becomes a tangent, and t = u.