

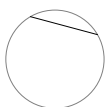
Chords and Arcs

Today I Can

1. Use congruent chords, arcs, and central angles.
2. Use perpendicular bisectors to chords.

Chord

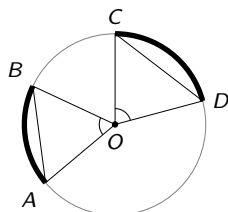
A segment whose endpoints are on the circle.



Congruent Central Angles and Chords

In the same circle or congruent circles, two minor arcs are congruent if and only if their corresponding central angles are congruent.

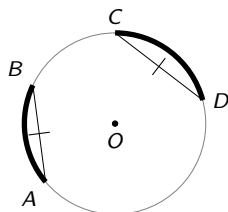
$$\bullet \angle AOB \cong \angle COD \longleftrightarrow \overline{AB} \cong \overline{CD}$$



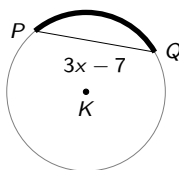
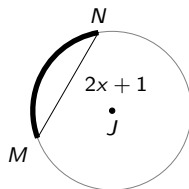
Congruent Chords and Arcs

In the same circle or congruent circles, two minor arcs are congruent if and only if their corresponding chords are congruent.

$$\bullet \overline{AB} \cong \overline{CD} \longleftrightarrow \widehat{AB} \cong \widehat{CD}$$



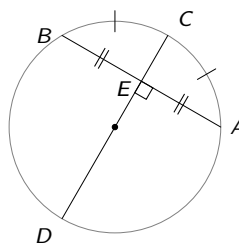
Example 1. In the figures, $\odot J \cong \odot K$ and $\widehat{MN} \cong \widehat{PQ}$. Find PQ .



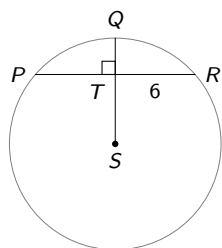
Bisecting Arcs and Chords

If a diameter (or radius) is perpendicular to a chord, then it bisects the chord and its arc (and vice versa).

- If $\overline{CD} \perp \overline{AB}$ then
 - $\overline{AE} \cong \overline{BE}$
 - $\widehat{AC} \cong \widehat{BC}$
- If $\overline{AE} \cong \overline{BE}$ and $\widehat{AC} \cong \widehat{BC}$ then
 - $\overline{CD} \perp \overline{AB}$

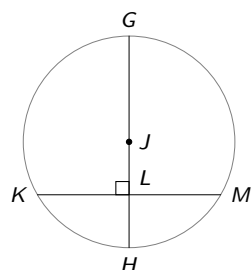


Example 2. In $\odot S$, $m\widehat{PQR} = 98$. Find $m\widehat{PQ}$ and PR .

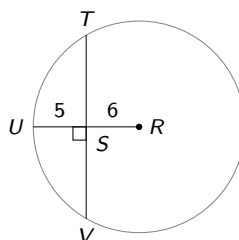


Example 3. Find the length of each.

(a) Find JL if $GH = 30$ and $KM = 22$.



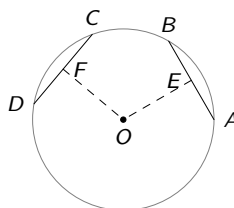
(b) Find TV .



Equidistant Chords Theorem

In the same circle or congruent circles, two chords are congruent if and only if they are equidistant from the center.

- If $OE = OF$ then $\overline{AB} \cong \overline{CD}$
- If $\overline{AB} \cong \overline{CD}$ then $OE = OF$



Example 4.

(a) Find AB if $WX = XY = 22$.

(b) Find x if $PQ = 3x - 4$ and $RS = 14$.

