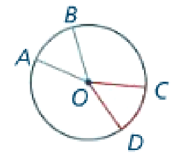
12.3: Chords Notes

take note

Theorem 77 and Its Converse

Theorem

Within a circle or in congruent circles, congruent central angles have congruent arcs.



Converse

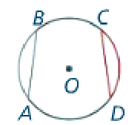
Within a circle or in congruent circles, congruent arcs have congruent central angles.

If $\angle AOB \cong \angle COD$, then $\widehat{AB} \cong \widehat{CD}$.
If $\widehat{AB} \cong \widehat{CD}$, then $\angle AOB \cong \angle COD$.

Theorem 79 and Its Converse

Theorem

Within a circle or in congruent circles, congruent chords have congruent arcs.



Converse

Within a circle or in congruent circles, congruent

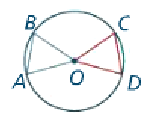
If $\overline{AB} \cong \overline{CD}$, then $\widehat{AB} \cong \widehat{CD}$.
If $\widehat{AB} \cong \widehat{CD}$, then $\overline{AB} \cong \overline{CD}$.

take note

Theorem 78 and Its Converse

Theorem

Within a circle or in congruent circles, congruent central angles have congruent chords.



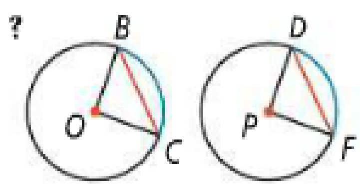
Converse

Within a circle or in congruent circles, congruent chords have congruent central angles.

If $\angle AOB \cong \angle COD$, then $\overline{AB} \cong \overline{CD}$.
If $\overline{AB} \cong \overline{CD}$, then $\angle AOB \cong \angle COD$.

Problem 1 Using Congruent Chords

In the diagram, $\odot O \cong \odot P$. Given that $\overline{BC} \cong \overline{DF}$, what can you conclude?

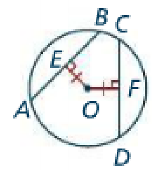


take note

Theorem 80 and Its Converse

Theorem

Within a circle or in congruent circles, chords equidistant from the center or centers are congruent.



Converse

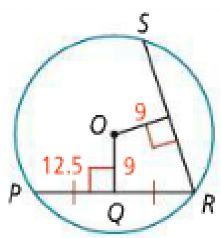
Within a circle or in congruent circles, congruent chords are equidistant from the center (or centers).

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

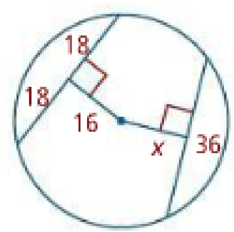
ONLINE PROBLEMS

Problem 2 Finding the Length of a Chord

What is the length of $\overline{RS}$ in $\odot O$?



Got It? What is the value of x? Justify your answer.



take note

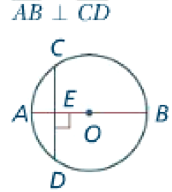
Theorem 81

Theorem

In a circle, if a diameter is perpendicular to a chord, then it bisects the chord and its arc.

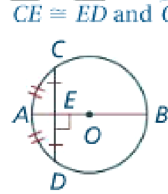
If . . .

$\overline{AB}$ is a diameter and $\overline{AB} \perp \overline{CD}$

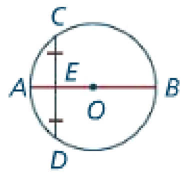
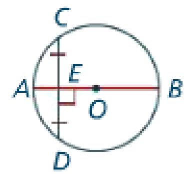


Then . . .

$\overline{CE} \cong \overline{ED}$ and $\widehat{CA} \cong \widehat{AD}$

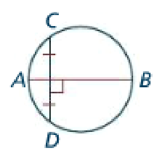
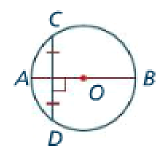


Theorem 82

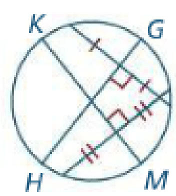
Theorem	If . . .	Then . . .
In a circle, if a diameter bisects a chord (that is not a diameter), then it is perpendicular to the chord.	$\overline{AB}$ is a diameter and $\overline{CE} \cong \overline{ED}$ 	$\overline{AB} \perp \overline{CD}$ 

Take note

Theorem 83

Theorem	If . . .	Then . . .
In a circle, the perpendicular bisector of a chord contains the center of the circle.	$\overline{AB}$ is the perpendicular bisector of chord $\overline{CD}$ 	$\overline{AB}$ contains the center of $\odot O$ 

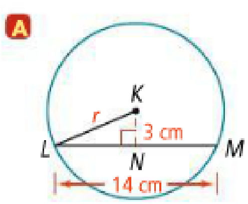
5. In the diagram at the right, $\overline{GH}$ and $\overline{KM}$ are perpendicular bisectors of the chords they intersect. What can you conclude about the center of the circle? Justify your answer.



Problem 4 Finding Measures in a Circle

Algebra What is the value of each variable to the nearest tenth?

A



B