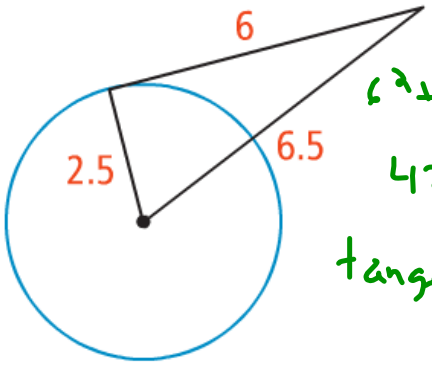
Warm Up:

1. Determine if the segment is tangent to the circle.

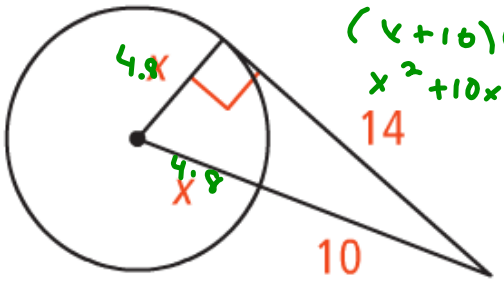


$6^2+2.5^2=6.5^2$

$42.25=42.25$

tangent

2. Find the value of x.



$(x+10)(x+1$
$x^2+10x+10x+$
100

$x^2+14^2=(x+10)^2$

$x^2+14^2=x^2+20x+100$

$-x^2$

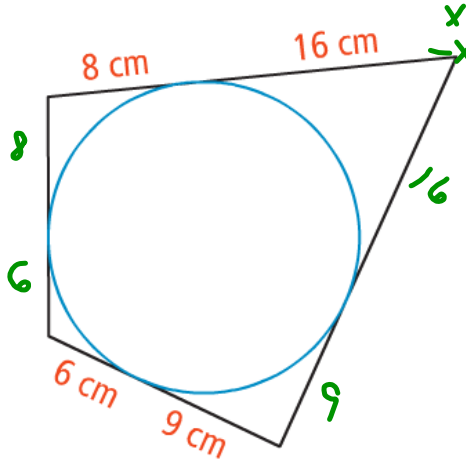
$196=20x+100$

$-100 \quad -100$

$\frac{96}{20}=\frac{20x}{20}$

$x=4.8$

3. What is the perimeter of the polygon?



78 cm

Learning Goal: Today I will learn about chords and arcs.

Success Criteria: I am able to apply the properties of chords and arcs in order to problem solve.

12-2 Chords and Arcs

*Chords

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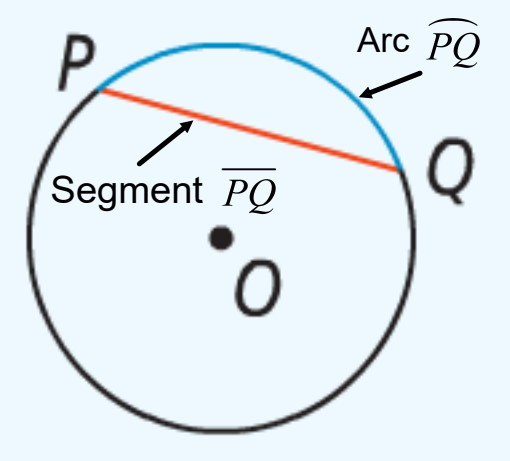
Chord - a **segment** whose **endpoints** are on a **circle**.



*Chords and Arcs

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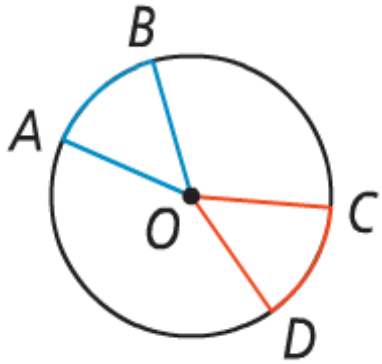
Theorem 12-4 and its Converse

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

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



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

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

*Chords and Arcs

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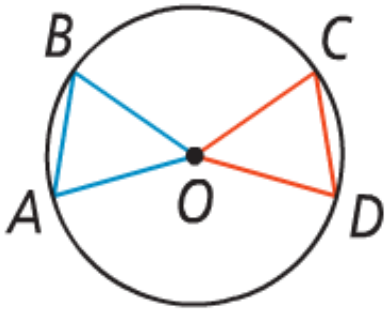
Theorem 12-5 and its converse



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

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

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

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

*Chords and Arcs

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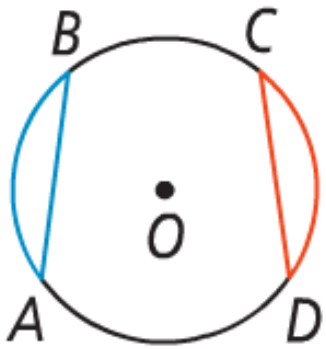
Theorem 12-6 and its Converse

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

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

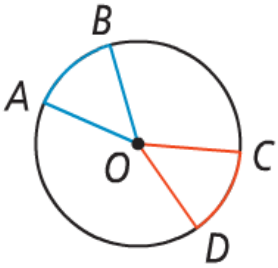


Within a circle or in congruent circles, congruent **chords** have congruent **arcs**.

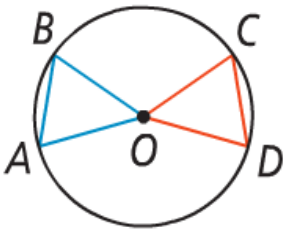
Within a circle or in congruent circles, **congruent** arcs have **congruent** chords.

Chords and Arcs

In the same or congruent circles:

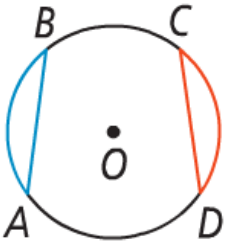


Congruent Central Angles



Congruent Arcs

Congruent Chords



*Chords and Arcs

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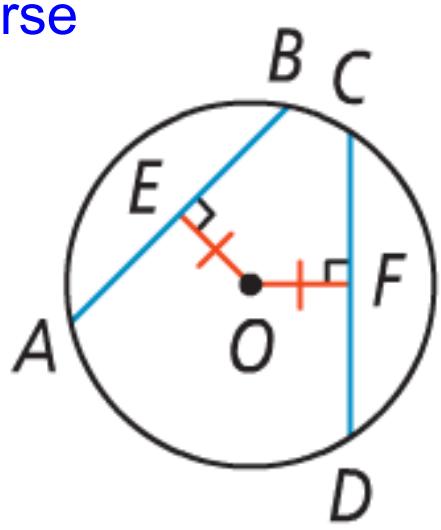
Theorem 12-7 and its converse

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

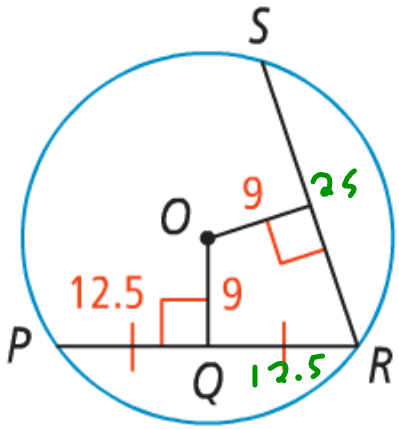
If $\overline{AB} \cong \overline{CD}$, then $OE = OF$.



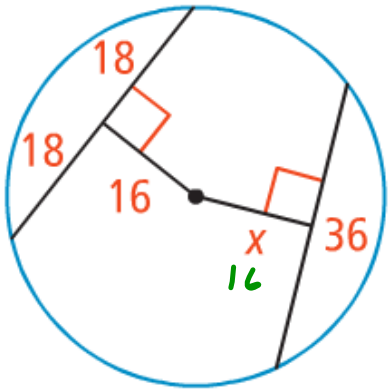
Chords equidistant from the center(s) are congruent.

Congruent chords are equidistant from the center.

Example



Find the length of $\overline{RS}$ = 25



Find x

*Chords and Arcs

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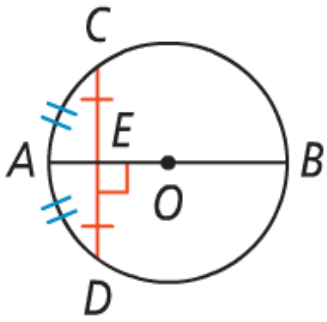
Theorem 12-8

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

$\overline{CE} \cong \overline{ED}$ and $\overset{\frown}{CA} \cong \overset{\frown}{AD}$



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

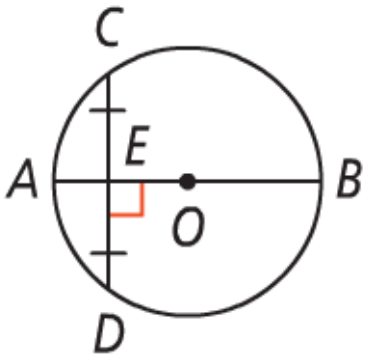
*Chords and Arcs

gs

Theorem 12-9

$\overline{AB}$ is a diameter and $\overline{CE} \cong \overline{ED}$

$\overline{AB} \perp \overline{CD}$



In a circle, a **diameter** that bisects a chord (that is not a diameter), then it is perpendicular to the **chord**.

*Chords and Arcs

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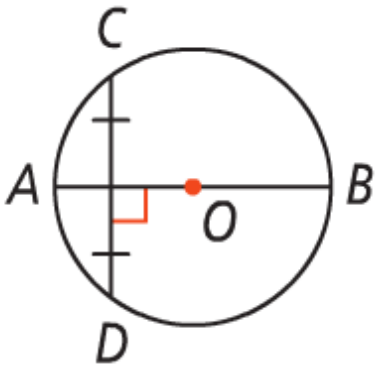
Theorem 12-10

$\overline{AB}$ is the perpendicular bisector of chord $\overline{CD}$

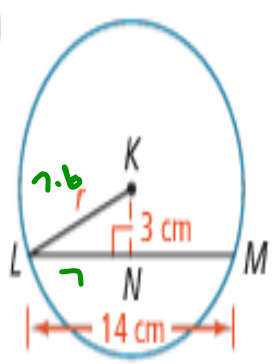
$\overline{AB}$ contains the center of $\odot O$



In a circle, the perpendicular **bisector** of a chord contains the **center** of the circle.

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

A

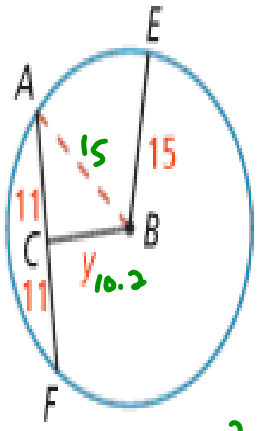


$LN = \frac{1}{2}(14) = 7$ A diameter $\perp$ to a chord bisects the chord.

$r^2 = 3^2 + 7^2$ Use the Pythagorean Theorem.

$r \approx 7.6$ Find the positive square root of each side.

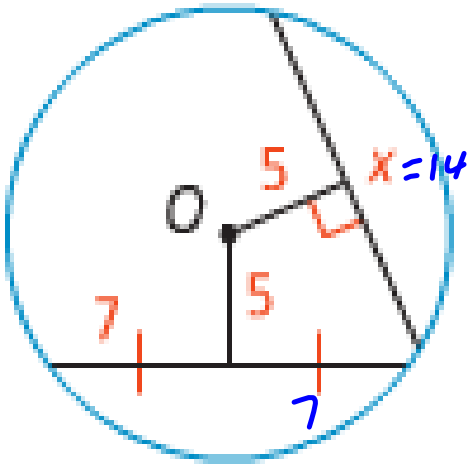
B



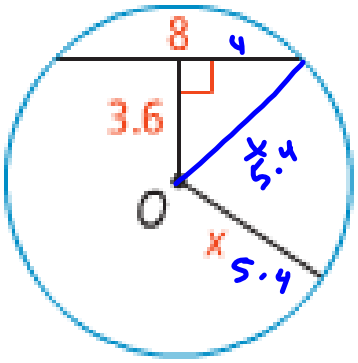
$15^2 - 11^2 = y^2$

$\overline{BC} \perp \overline{AF}$	A diameter that bisects a chord that is not a diameter is $\perp$ to the chord.
$BA = BE = 15$	Draw an auxiliary $\overline{BA}$. The auxiliary $\overline{BA} \cong \overline{BE}$ because they are radii of the same circle.
$y^2 + 11^2 = 15^2$	Use the Pythagorean Theorem.
$y^2 = 104$	Solve for y^2.
$y \approx 10.2$	Find the positive square root of each side.

Find the value of x



Solve for x



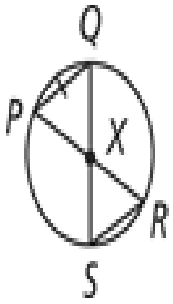
$4^2 + 3.6^2 = x^2$

$\sqrt{28.96} = \sqrt{x^2}$

Closure: Today I learned about chords and arcs, and their properties.

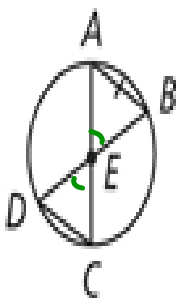
In Exercises 1 and 2, the $\odot X \cong \odot E$. What can you conclude?

1.



$\overset{\frown}{PQ} \cong \overset{\frown}{SR}$

$\overline{PQ} \cong \overline{SR}$

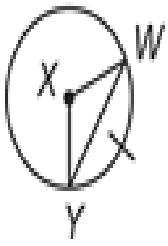


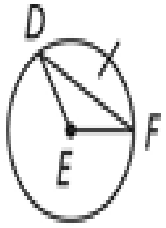
$\overset{\frown}{AB} \cong \overset{\frown}{DC}$

$\overline{AB} \cong \overline{DC}$

$\angle AEB \cong \angle CED$

2.

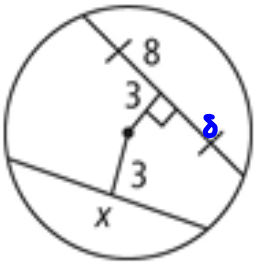




$\overset{\frown}{WY} \cong \overset{\frown}{DF}$

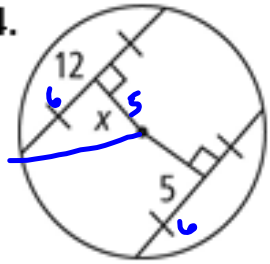
Find the value of x.

3.

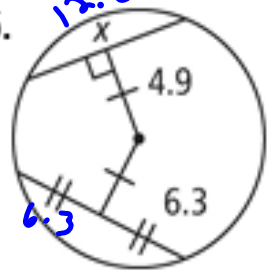


16

4.

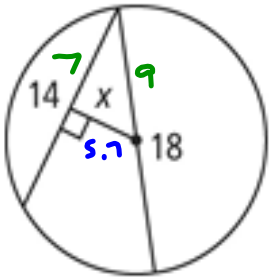


5.



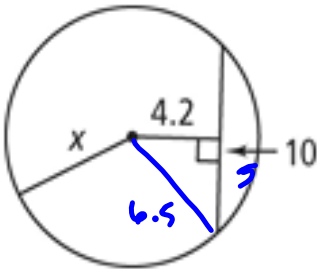
Find the value of x to the nearest tenth.

6.



$9^2 - 7^2 = x^2$

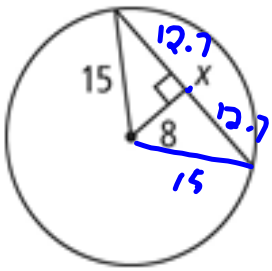
7.



$4.2^2 + 5^2$

8.

$x = 25.4$



$15^2 - 8^2 = x^2$