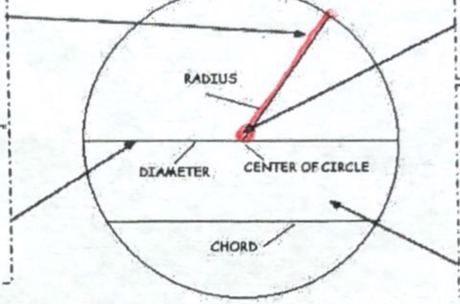
Ms. Maher

6.4 Chords & Arcs of Circles

SWBAT solve for unknown variables using theorems about chords and arcs of circles.

Any segment with endpoints that are the center and a point on the circle is a radius

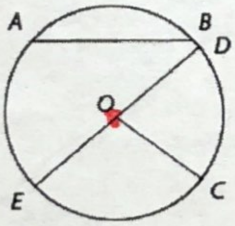
A segment that passes through the center is a diameter of a circle.



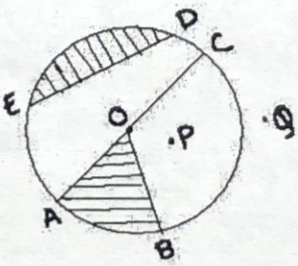
The given point is called the Center. This point names the circle.

Any segment with endpoints that are on a circle is called a Chord.

Example 1: Name the circle, a radius, a chord, and a diameter of the circle.

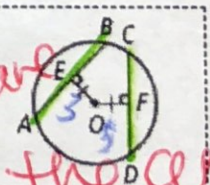
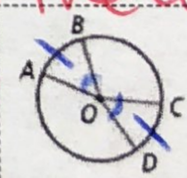
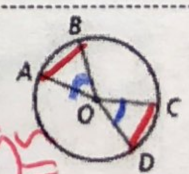
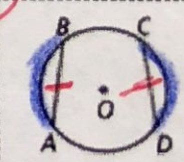


Circle: ⊙O
Radius: $\overline{OC}$, $\overline{OE}$, $\overline{DO}$
Chord: $\overline{AB}$, $\overline{DE}$
Diameter: $\overline{ED}$



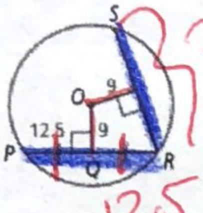
Circle: ⊙O
Radius: $\overline{OB}$
Chord: $\overline{ED}$, $\overline{CA}$
Diameter: $\overline{AC}$

Since a diameter is composed of two radii, then **d = 2r** and **r = d/2**

Theorem 1:	In My Own Words...	
Within a circle or in congruent circles, chords equidistant from the center or centers are congruent. If $OE = OF$, then $\overline{AB} \cong \overline{CD}$.	Chords ≅ if they are same distance from the center	
Theorem 2:	**In My Own Words...**	
Within a circle or in congruent circles, congruent central angles have congruent arcs. If $\angle AOB \cong \angle COD$, then $\overset{\frown}{AB} \cong \overset{\frown}{CD}$.	If ∠s ≅, then arcs ≅	
Theorem 3:	**In My Own Words...**	
Within a circle or in congruent circles, congruent central angles have congruent chords. If $\angle AOB \cong \angle COD$, then $\overline{AB} \cong \overline{CD}$.	If ∠s ≅ the chords connecting ≅	
Theorem 4:	**In My Own Words...**	
Within a circle or in congruent circles, congruent chords have congruent arcs. If $\overline{AB} \cong \overline{CD}$, then $\overset{\frown}{AB} \cong \overset{\frown}{CD}$.	If chords ≅, arcs ≅	

Example 2: The following chords are equidistant from the center of the circle.

a) What is the length of RS? ?? $RS = 25$

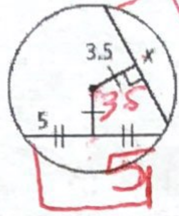


$12.5 + 12.5$

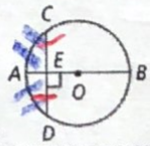
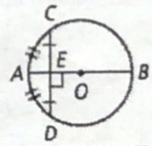
25

b) Solve for x.

$\boxed{x = 10}$



$5 + 5 = 10$

Theorem 5:	If . . .	Then . . .
In a circle, if a diameter is perpendicular to a chord, then it bisects the chord and its arc. split in half	$\overline{AB}$ is a diameter and $\overline{AB} \perp \overline{CD}$ 	$\overline{CE} \cong \overline{ED}$ and $\widehat{CA} \cong \widehat{AD}$ 

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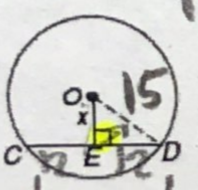
Example 3: In ⊙O, $\overline{CD} \perp \overline{OE}$, $OD = 15$, and $CD = 24$. Find x.

Pythag. Thm



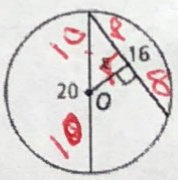
$a^2 + b^2 = c^2$

$x^2 + 12^2 = 15^2$

$x^2 + 144 = 225$

$\sqrt{x^2} = \sqrt{81}$ $\boxed{x = 9}$

Example 4: Find the value of x to the nearest tenth.



$a^2 + b^2 = c^2$

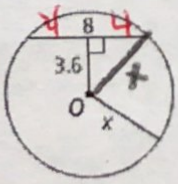
$x^2 + 8^2 = 10^2$

$x^2 + 64 = 100$

$\sqrt{x^2} = \sqrt{36}$

$x = 6$

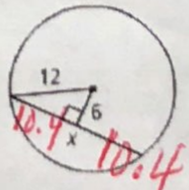
You Try! Find the value of x to the nearest tenth.



$a^2 + b^2 = c^2$

$3.6^2 + 4^2 = c^2$

$\boxed{c = 5.38}$



$10.4 + 10.4 = 20.8$

$a^2 + b^2 = c^2$

$a^2 + 6^2 = 12^2$

$a^2 + 36 = 144$

$\sqrt{a^2} = \sqrt{108}$

$a = 10.4$