Math 3

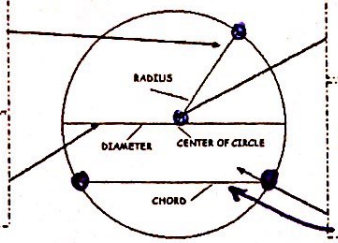
6.4 Chords & Arcs of Circles

Unit 6

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.

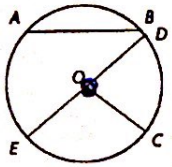
A chord that passes through the center is a diameter of a circle.



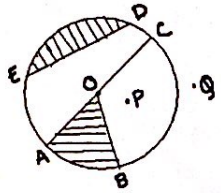
The given point is called the center. This point names the circle.

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.

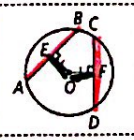
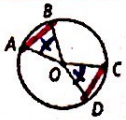
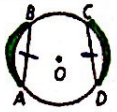


Circle: Q
Radius: $\overline{QC}$
Chord: $\overline{ED}$, $\overline{AB}$
Diameter: $\overline{ED}$



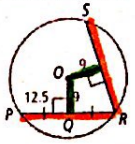
Circle: O
Radius: $\overline{OB}$, $\overline{AO}$
Chord: $\overline{ED}$
Diameter: $\overline{AC}$

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 the same distance away from center are the same	
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 $\overset{\frown}{AB} \cong \overset{\frown}{CD}$.	angles in center that are the same, have the same arc measure	
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 $\overline{AB} \cong \overline{CD}$.		
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 $\overset{\frown}{AB} \cong \overset{\frown}{CD}$.		

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

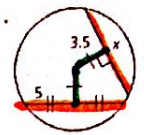
a) What is the length of RS?



Use Th. 1

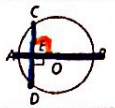
12.5 + 12.5 = 25

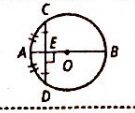
b) Solve for x.



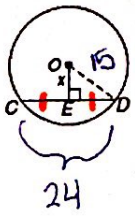
5 + 5 = 10

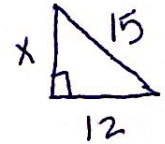
Theorem 5:	If ...	Then ...
In a circle, if a diameter is perpendicular to a chord, then it bisects the chord and its arc. cut in half	$\overline{AB}$ is a diameter and $\overline{AB} \perp \overline{CD}$	$\overline{CE} \cong \overline{ED}$ and $\overset{\frown}{CA} \cong \overset{\frown}{AD}$





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





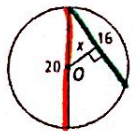
$x^2 + 12^2 = 15^2$

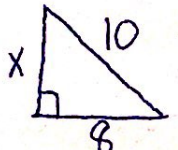
$x^2 + 144 = 225$

$x^2 = 81$

$x = 9$

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





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

$x^2 + 64 = 100$

$x^2 = 36$

$x = 6$

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