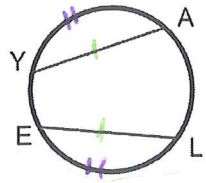
Geometry - 10.3 - Arcs and Chords

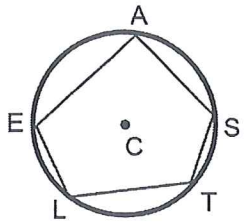
Theorem 10.2



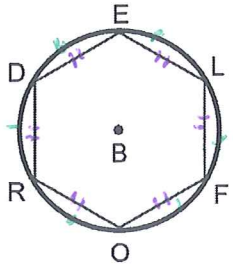
- In a circle or in congruent circles, two minor arcs are congruent if and only if their corresponding chords are congruent.

$\overset{\frown}{YA} \cong \overset{\frown}{EL} \longleftrightarrow \overline{YA} \cong \overline{EL}$

- An Inscribed Polygon is a polygon whose vertices all lie on the same circle.
- Pentagon ASTLE is Inscribed in circle C.
- Circle C is Circumscribed about pentagon ASTLE.



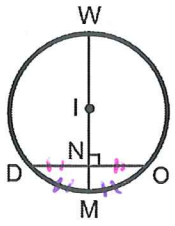
Ex 1 - Determine the measure of each arc of a circle circumscribed about a regular hexagon.



$\frac{360°}{6} = 60° = m\overset{\frown}{EL} = m\overset{\frown}{LF} = m\overset{\frown}{FO} = m\overset{\frown}{OR} = m\overset{\frown}{RD} = m\overset{\frown}{DE}$

Theorem 10.3

- In a circle, if a diameter (or radius) is perpendicular to a chord, then it bisects the chord and its arc.



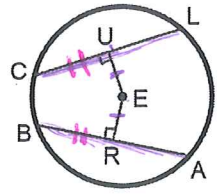
$\overline{WM} \perp \overline{DO}$

$\overline{DN} \cong \overline{ON}$

$\overset{\frown}{DM} \cong \overset{\frown}{OM}$

Theorem 10.4

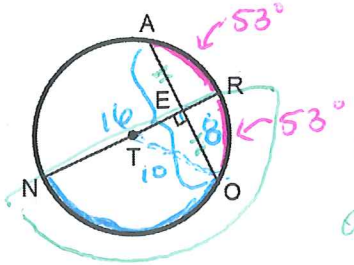
- Two chords are Congruent if and only if they are equidistant from the center.



$\overline{CL} \cong \overline{BA}$

$\overline{UE} \cong \overline{RE}$

Ex 2 - In the circle below, the radius is 10 cm, AO = 16 cm, and $m\overset{\frown}{AR} = 53°$. Find $m\overset{\frown}{NO}$ and ER.



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

$a^2 + 8^2 = 10^2$

$a^2 + 64 = 100$

$-64 \quad -64$

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

$a = 6$

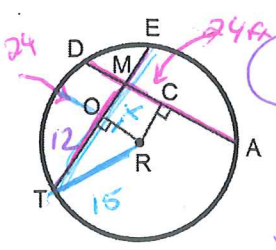
$MT = 6$

$10 - 6 = 4 \quad ER = 4$

$180° - 53°$

$m\overset{\frown}{NO} = 127°$

Ex 3 - Chords DA and ET are equidistant from the center of the circle. If the radius of the circle is 15 ft and DA = 24 ft, find RO and RT.



$\overline{RT} = 15$ ft

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

$x^2 + 144 = 225$

$-144 \quad -144$

$x^2 = 81$

$x = 9$

$\overline{RO} = 9$