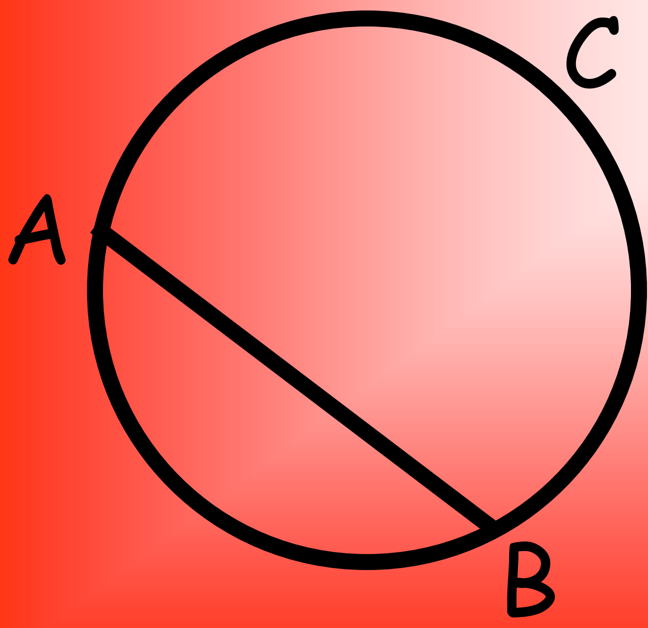
Section 9.4

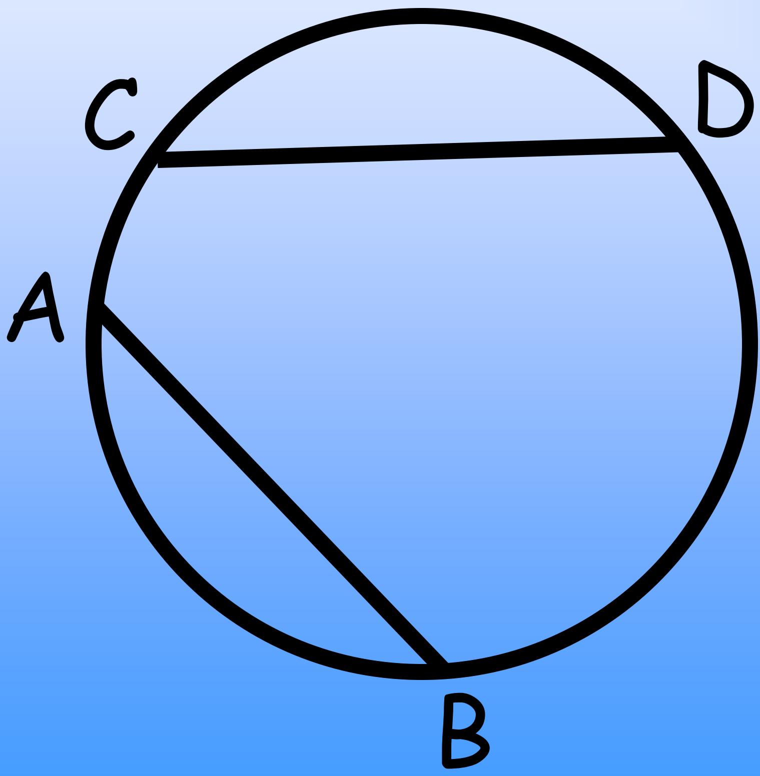
Chords & Arcs

Arcs can be formed by figures other than central angles. Arcs can be formed by chords, inscribed angles, and tangents. **Today we will focus on examining relationships between chords and their intercepted arcs.**



Chord $\overline{AB}$ creates intercepted **<u>minor</u>** arc <u>$\overset{\frown}{AB}$</u> and intercepted **<u>major</u>** arc <u>$\overset{\frown}{ACB}$</u>.

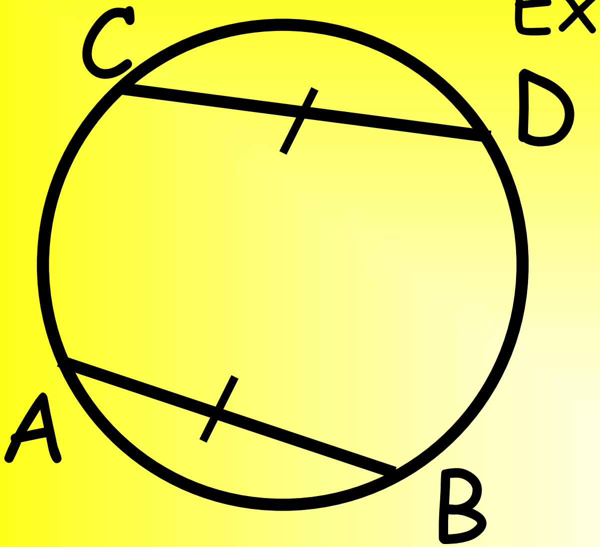
Theorem 9-4: In the same circle, congruent chords create congruent intercepted arcs.



If $\overline{AB} \cong \overline{CD}$,

then $\overset{\frown}{AB} \cong \overset{\frown}{CD}$.

Example 1



Given: $m\overset{\frown}{AC} = 100$

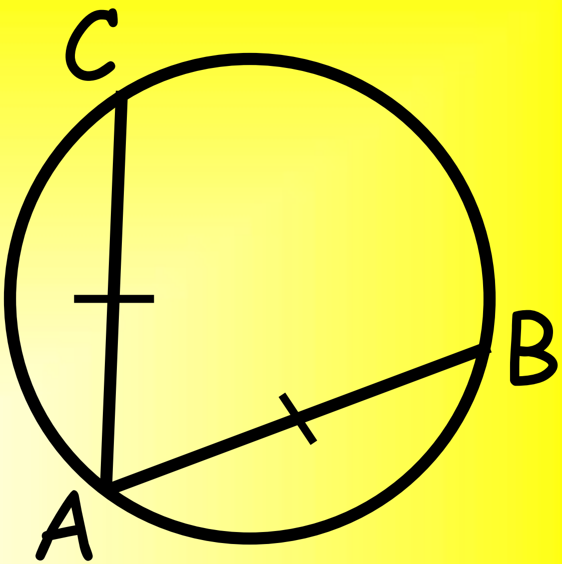
$m\overset{\frown}{CD} = 75$

$m\overset{\frown}{AB} = 75$ $m\overset{\frown}{BD} = 110$

$m\overset{\frown}{ACD} = 175$

$m\overset{\frown}{BAD} = 250$

Example 2



Given: $m\overset{\frown}{CB} = 140$

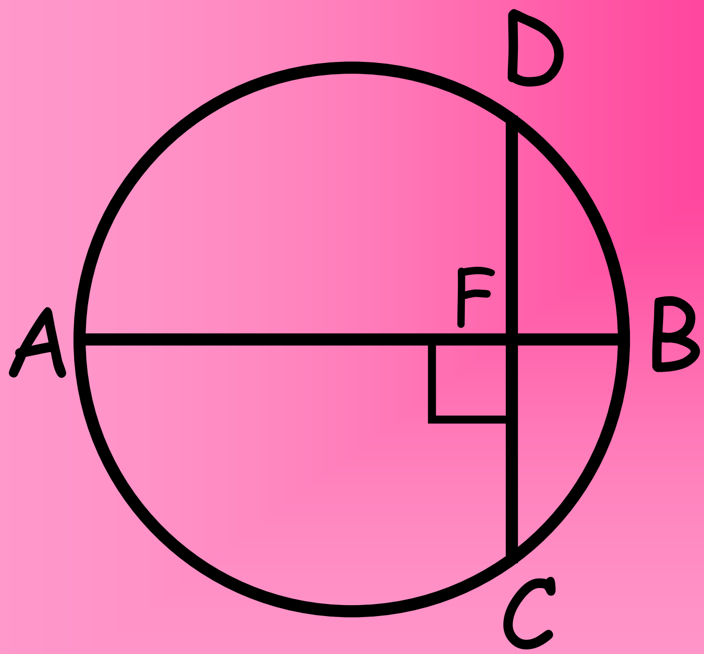
$m\overset{\frown}{AC} = 110$ $m\overset{\frown}{AB} = 110$

$m\overset{\frown}{ACB} = 250$

$m\overset{\frown}{ABC} = 250$

$m\overset{\frown}{BAC} = 220$

Theorem 9-5 – <u>A diameter that is perpendicular to a chord, bisects the chord and its intercepted arc.</u>

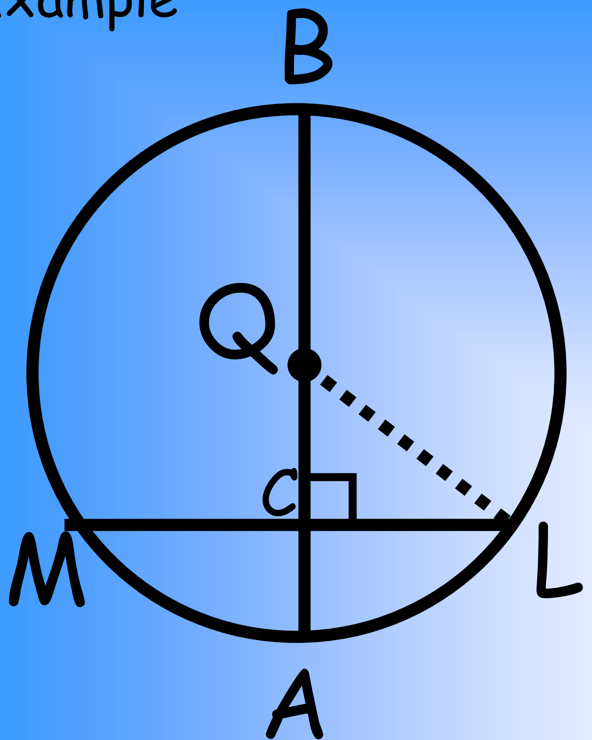


If $\underline{\overline{AB} \perp \overline{CD}}$,

then $\underline{\overline{CF} \cong \overline{FD} \text{ and } \overset{\frown}{CB} \cong \overset{\frown}{DB}}$.

Also: $\overset{\frown}{AD} \cong \overset{\frown}{AC}$.

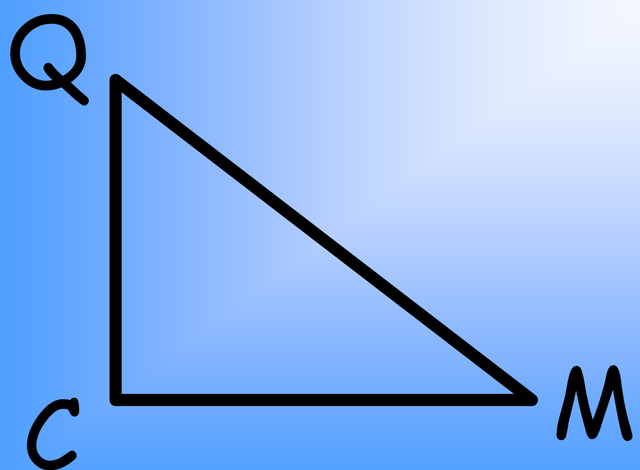
Example



Given: $\overline{AB}$ is a diameter of circle Q; AB = 10, LM = 8.

Find CA.

CA = 2



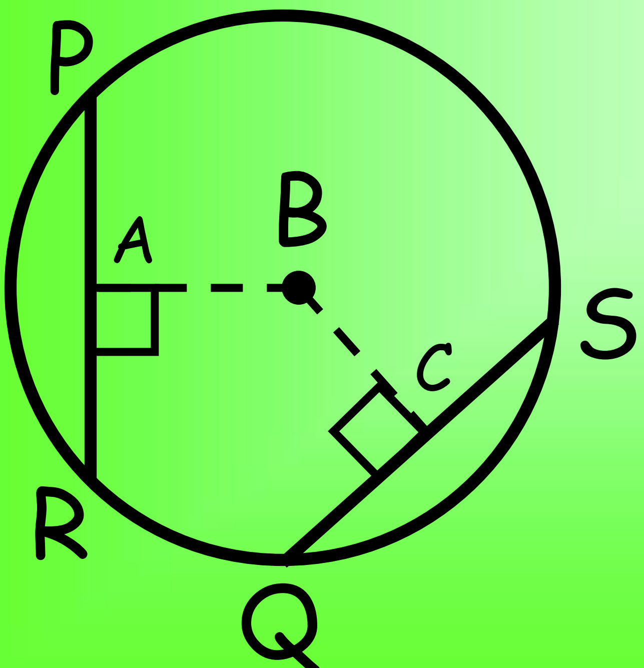
If $m\widehat{ML} = 118$, find $m\widehat{BL}$.

$m\widehat{BL} = 121$

Theorem 9-6 – In the same circle (or $\cong$ circles):

1. Chords equally distant from the center are congruent.

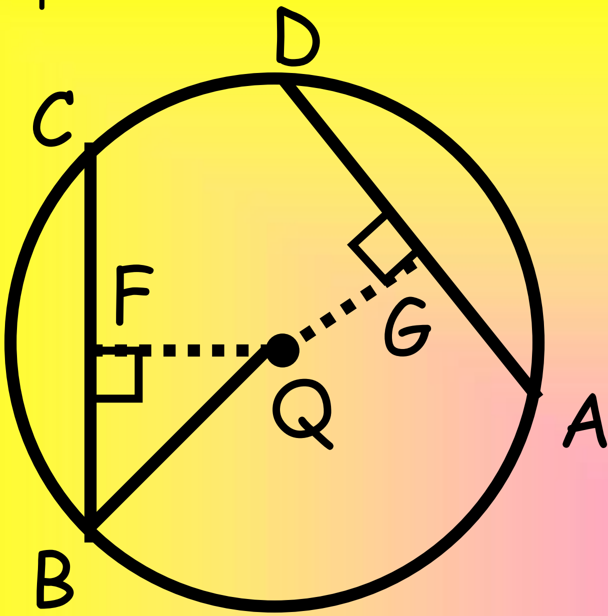
2. Congruent chords are equally distant from the center.



1) If $AB = BC$, then $\overline{PR} \cong \overline{QS}$.

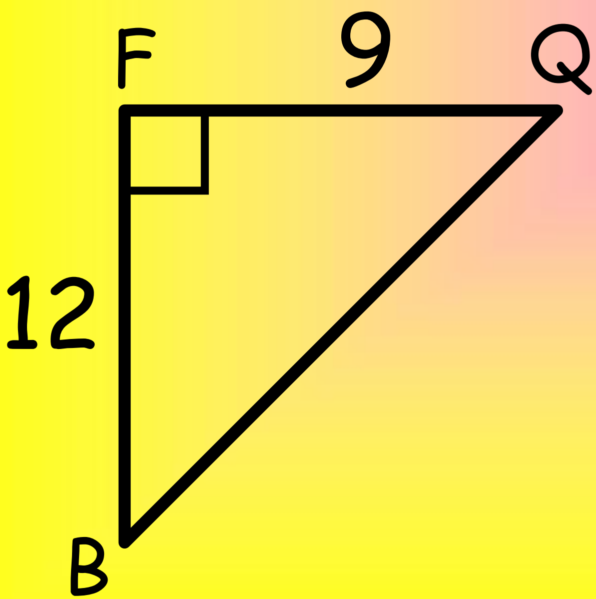
2) If $\overline{PR} \cong \overline{QS}$, then $AB = BC$.

Example



$FQ = QG = 9; CB = 24.$

Find the length of the radius of circle Q.



$$9^2 + 12^2 = BQ^2$$

$$225 = BQ^2$$

$$BQ = 15$$