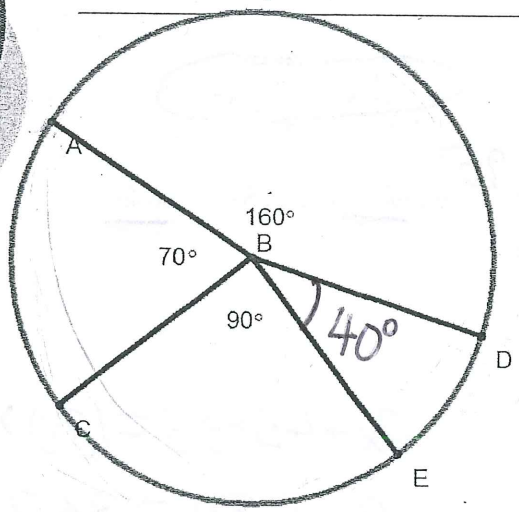
Warm Up



Find:

$m\overset{\frown}{AC}$: 70°

$m\overset{\frown}{CE}$: 90°

$m\overset{\frown}{ED}$: 40°

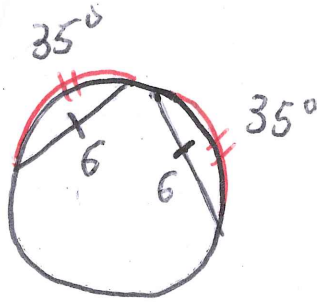
$m\overset{\frown}{AD}$: 160°

$m\overset{\frown}{ACE}$: 160°

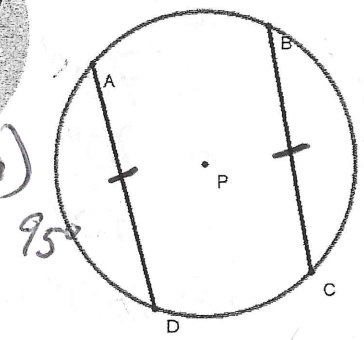
Use congruent chords to find arc measures

- To determine if two minor arcs are congruent, we need to see if the chords that create them are equal.

- Theorem 6.5 – In the same circle or in congruent circles, two minor arcs are congruent if and only if their corresponding chords are congruent.



Examples

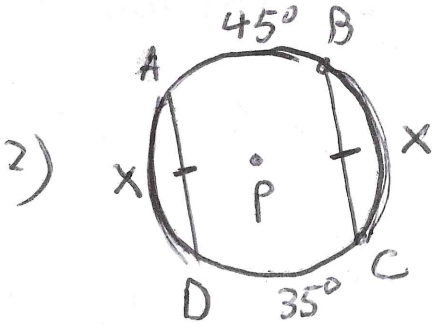


In ⊙P, $\overline{AD}$ and $\overline{BC}$ are congruent.

1) If m$\overset{\frown}{AD}$ = 95°, find m$\overset{\frown}{BC}$.

1) 95° 95°

2) If m$\overset{\frown}{AB}$ = 45° and m$\overset{\frown}{CD}$ = 35°, find m$\overset{\frown}{BC}$



2) $2x+45+35=360$

$2x+80=360$

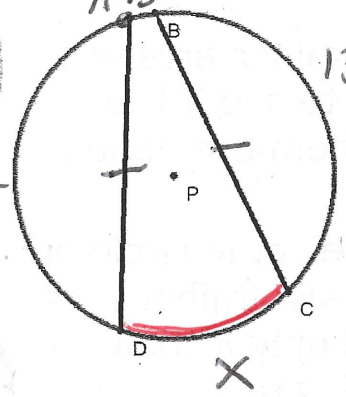
$-80 \quad -80$

$\frac{2x}{2}=\frac{280}{2}$

$x=140$

$m\overset{\frown}{BC}=140°$

Now You Try!



In ⊙P, $\overline{AD}$ and $\overline{BC}$ are congruent.

1) If m$\overset{\frown}{AD}$ = 105°, find m$\overset{\frown}{BC}$. $=105°$

2) If m$\overset{\frown}{AB}$ = 15° and m$\overset{\frown}{BC}$ = 135°, find m$\overset{\frown}{CD}$

$x+15+135+135=360$

$x+285=360$

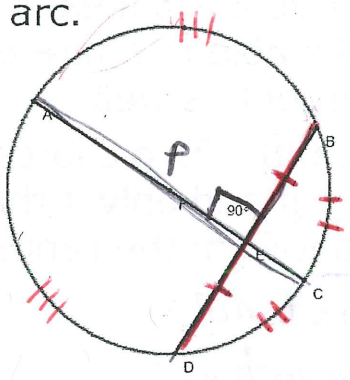
$-285 \quad -285$

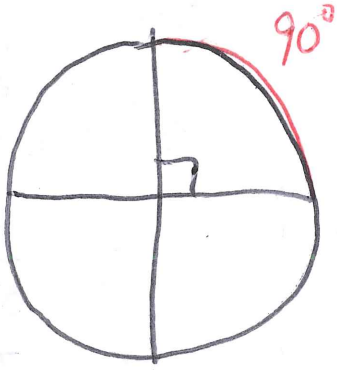
$x=75$

$m\overset{\frown}{CD}=75°$

Properties of perpendicular bisectors of chords

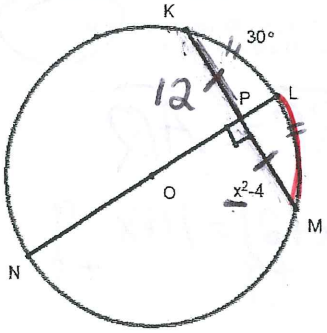
- Theorem 6.7: If a diameter is perpendicular to another chord, then the diameter bisects the chord and its arc.





Theorem 6.7

- Theorem 6.7 states that if a diameter is a perpendicular bisector of another chord, then it bisects both the chord and that chord's arc.



In ⊙O, $\overline{NL}$ is a diameter. $\overline{KM}$ is a chord in the circle. $m\widehat{KL}$ is 30°

Find:

1) $m\widehat{LM}$ = 30°

2) If $\overline{KP} = 12$, then solve for x if $\overline{PM} = x^2-4$

$12 = x^2 - 4$

$+4 \quad +4$

$\sqrt{16} = \sqrt{x^2}$

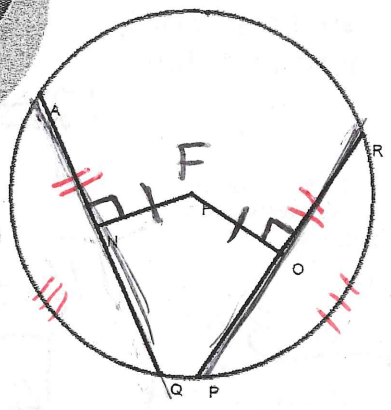
$4 = x$

Congruent Chords

- So far, we have seen how congruent chords can be used to find congruent arc measures but we need to be able to figure out if they are congruent as well.
- Theorem 6.8 – Two chords are congruent if and only if they are equidistant from the center.

same distance to the center

Congruent Chords



If $\overline{FN} \cong \overline{FO}$, $m\angle N = 90°$, $m\angle O = 90°$ and $\overline{RP} = 14$, find $\overline{AQ}$

If $\overline{FN} \cong \overline{FO}$, $m\angle N = 90°$ and $m\angle O = 90°$ solve for x if $\overline{RP} = 9x + 21$ and $\overline{AQ} = 14x - 9$

$\overline{RP} = \overline{AQ}$

$9x + 21 = 14x - 9$

$+9 \qquad +9$

$9x + 30 = 14x$

$-9x \qquad -9x$

$30 = 5x$

$x = 6$