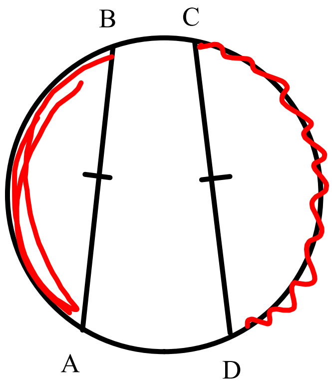
Section 10.3 Apply Properties of Chords

Theorem 10.3 : In the same circle, or in congruent circles, two minor arcs are congruent if and only if their corresponding chords are congruent.

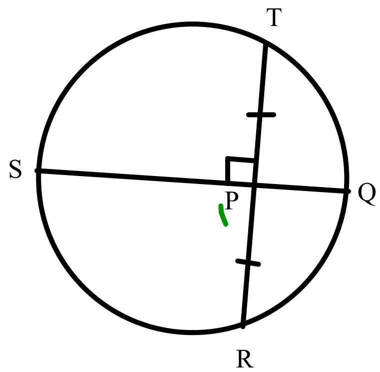


if: $AB \cong DC$

then: $\overset{\frown}{AB} \cong \overset{\frown}{DC}$

<u>Theorem 10.4</u> : If one chord is a perpendicular bisector of another chord then the first chord is a diameter.

If $\overline{QS}$ is a perpendicular bisector of $\overline{TR}$, then $\overline{QS}$ is a diameter of the circle.



if: $PT \cong PR$

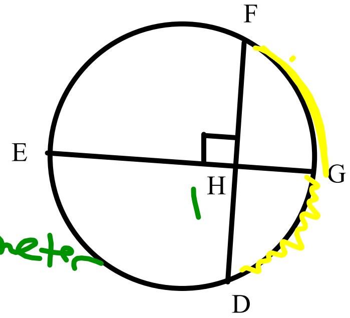
$\angle 1 = 90°$

then: SQ is a diameter

<u>Theorem 10.5</u> : If a diameter of a circle is perpendicular to a chord, then the diameter bisects the chord and its arc.

If $\overline{EG}$ is a diameter and $\overline{ED} \perp \overline{DF}$, then $\overline{HD} \cong \overline{HF}$ and

GD $\cong$ GF.

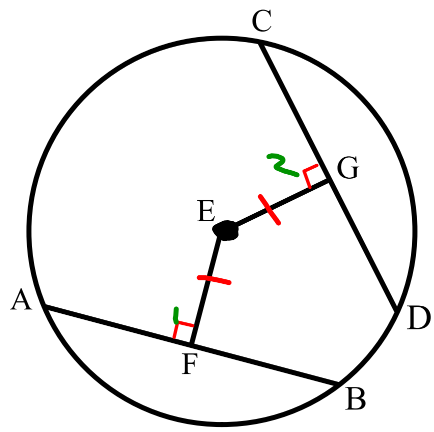


if: EG is a diameter

$\angle 1 = 90°$

then: $FH \cong DH$, $\overset{\frown}{FG} \cong \overset{\frown}{DG}$

Theorem 10.6 : In the same circle, or in congruent circles, two chords are congruent if and only if they are equidistant from the center.



if: $EF \cong EG$

$\angle 1 = 90$

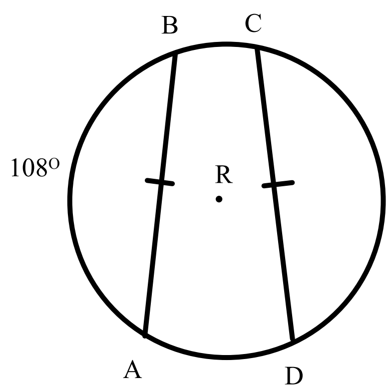
$\angle 2 = 90$

then: $AB \cong CD$

Example 1: If $\odot$R, $\overline{AB} \cong \overline{CD}$ and mAB=108°.

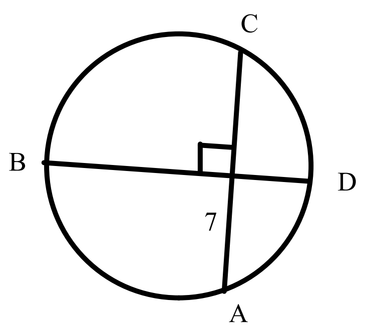
Find mCD.

108°



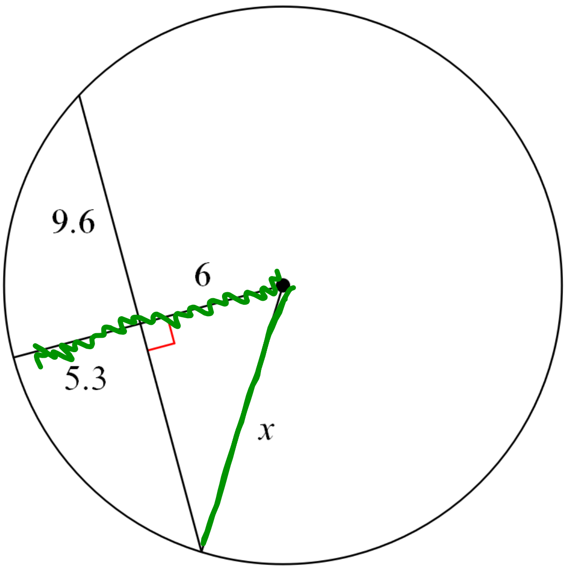
Example 2: Use the diagram of ⊙E to find the length of AC.

14



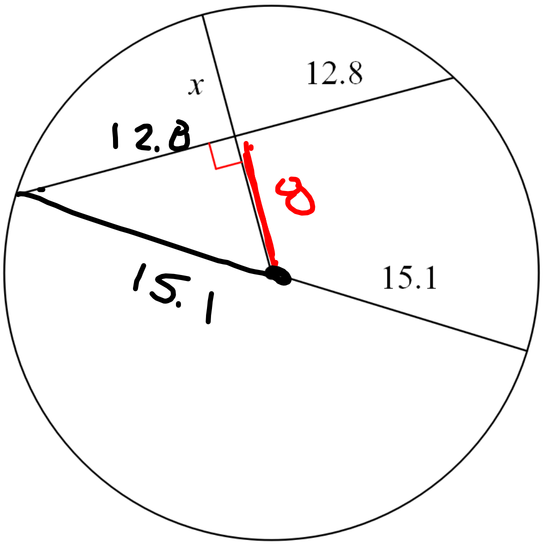
Example 3:

Find the length of the segment indicated. Round your answer to the nearest tenth if necessary.



$x = 11.3$

Example 4:



$?^2 + 12.8^2 = 15.1^2$

$?^2 + 163.84 = 228.01$

$?^2 = 64.17$

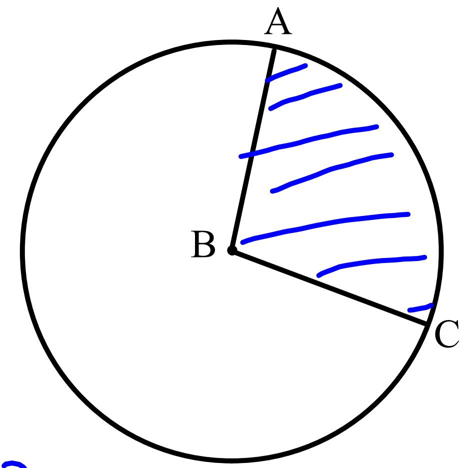
$? = 8$

$X = 15.1 - 8$

$X = 7.1$

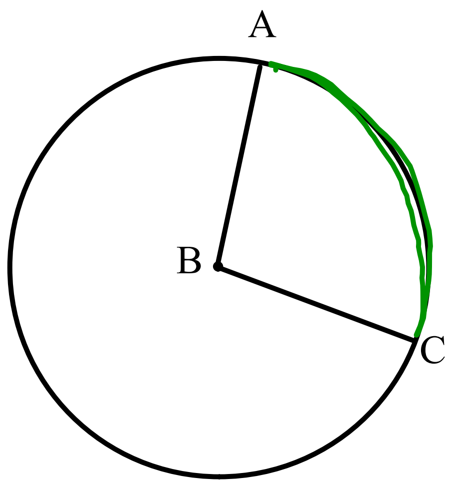
Area of a sector of a circle

Take the angle measure and divide it by 360. Keep it as a fraction.
Then multiply it by the area of the circle to get your final answer.



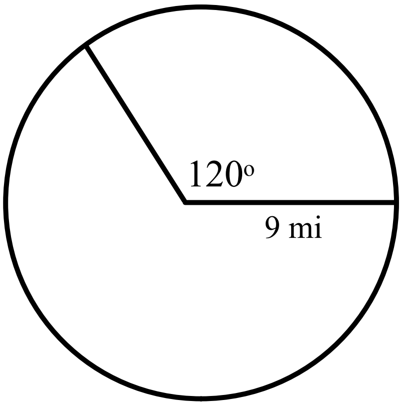
$$\text{Area of Sector} = \frac{m\overset{\frown}{AC}}{360} \cdot \pi r^2$$

Arc length:



$$\text{Arc length} = \frac{m\overset{\frown}{AC}}{360} \cdot 2\pi r$$

Find the area of the sector, and the arc length



Area:

$= \frac{120}{360} \cdot \pi\, 9^2$

$\frac{120}{360} \cdot \pi \cdot 81$

$\frac{9720}{360} \pi$

$\boxed{27\pi \text{ mi}^2}$

Arc length

$= \frac{120}{360} \cdot 2\pi \cdot 9$

$\frac{1}{3} \cdot 18\pi$

$\boxed{6\pi \text{ mi}}$