

Geometry
Arcs and Chords

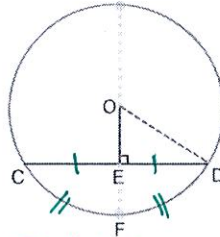
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In a circle, if a diameter is perpendicular to a chord, then it bisects the chord and its arc.

$$m\widehat{CF} \cong m\widehat{FD}$$

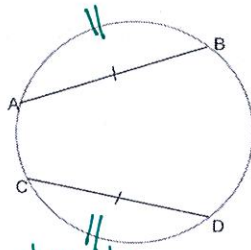
and

$$\overline{CE} \cong \overline{ED}$$



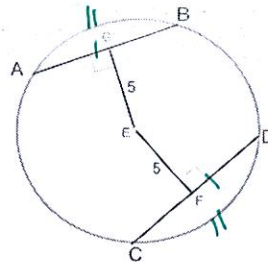
In a circle or in congruent circles, 2 minor arcs are congruent if and only if their corresponding chords are congruent.

Given $\overline{AB} \cong \overline{CD}$
then $\widehat{AB} \cong \widehat{CD}$



In a circle or in congruent circles, two chords are congruent if and only if they are equidistant from the center.

Since $EG = EF$,
then $\overline{AB} \cong \overline{CD}$
and $\widehat{AB} \cong \widehat{CD}$



Examples

1. $\frac{240}{3} = 80$
 $\widehat{NP} = 80$

2. $KM = 24$

3. $x^2 + 12^2 = 20^2$
 $x^2 + 144 = 400$
 $\sqrt{x^2} = \sqrt{256}$
 $x = 16$
 $XY = 32$

4. $360 - 110 = 250$
 $\frac{250}{4} = 62.5$
 $m\widehat{BC} = 62.5$

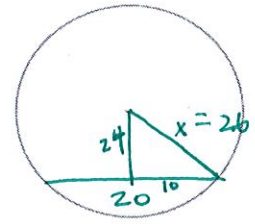
5. Suppose a chord is 20 inches long and is 24 inches from the center of the circle. Find the length of the radius.

$$10^2 + 24^2 = X^2$$

$$100 + 576 = X^2$$

$$\sqrt{676} = \sqrt{X^2}$$

$$X = 26 \text{ inches}$$



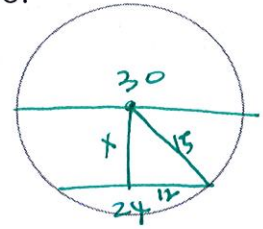
6. Suppose the diameter of a circle is 30 centimeters long and a chord is 24 centimeters long. Find the distance between the chord and the center of the circle.

$$X^2 + 12^2 = 15^2$$

$$X^2 + 144 = 225$$

$$\sqrt{X^2} = \sqrt{81}$$

$$X = 8 \text{ cm}$$



7. Find the length of a chord that is 5 inches from the center of a circle with a radius of 13 inches.

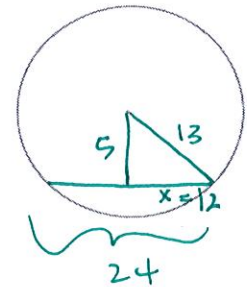
$$X^2 + 5^2 = 13^2$$

$$X^2 + 25 = 169$$

$$\sqrt{X^2} = \sqrt{144}$$

$$X = 12$$

$$\text{Chord} = 24 \text{ in}$$



8. Suppose a radius of a circle is 17 units and a chord is 30 units long. Find the distance from the center of the circle to the chord.

$$X^2 + 15^2 = 17^2$$

$$X^2 + 225 = 289$$

$$\sqrt{X^2} = \sqrt{64}$$

$$X = 8$$

$$8 \text{ units}$$

