

Chords

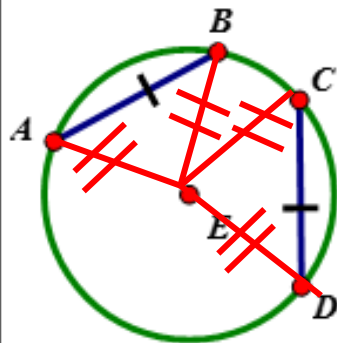
IC3

Review: What is a chord?

A segment with both endpoints ON the circle

Chord Theorem #1: In the same circle or in congruent circles, if two chords are congruent then...

The arcs they intersect are \cong



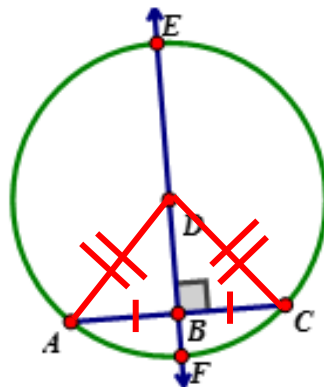
$\triangle AEB \cong \triangle CED$ by SSS, so
central \angle 's \cong as well by
CPCTC \rightarrow arcs \cong
 $\widehat{AB} \cong \widehat{CD}$

Converse?

☒ T/F

Chord Theorem #2: If a diameter of a circle is perpendicular to a chord, then...

It bisects the chord



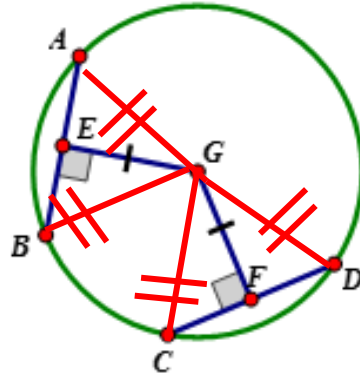
$\triangle ABD \cong \triangle CBD$ by HL, so
 $\overline{AB} \cong \overline{CB}$ by CPCTC
 $\overline{AB} \cong \overline{CB}$

Converse?

☒ T/F

Chord Theorem #3: If two chords are equidistant from the center, then...

they are \cong to each other



All 4 Δ 's \cong by HL, so
chords are \cong also

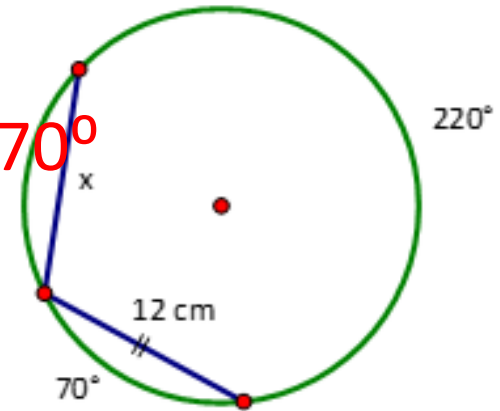
$$\overline{AB} \cong \overline{CD}$$

Converse?

T/F

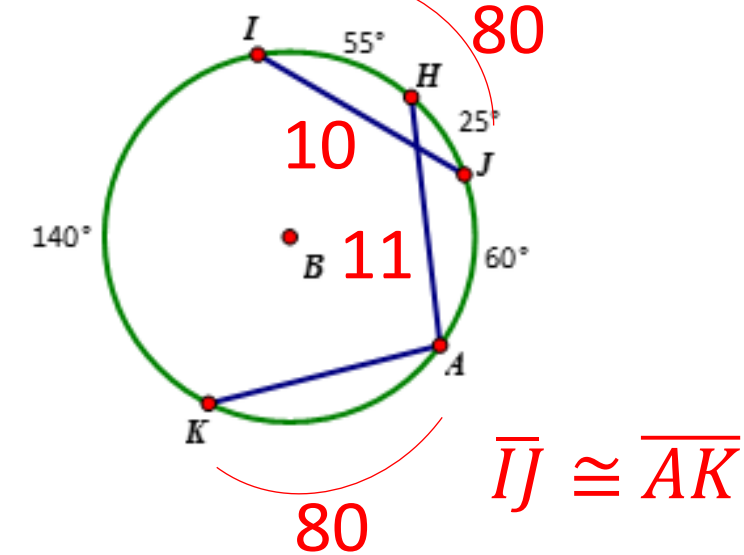
1. Determine the requested value.

a)



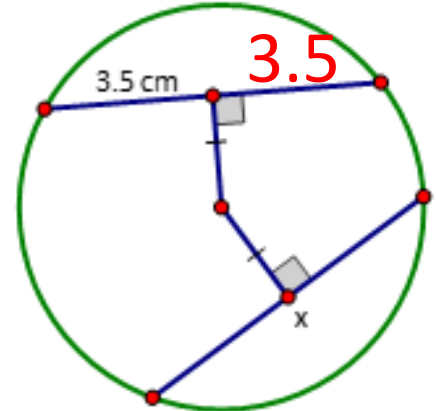
x = 12cm

b) IJ = 10 cm, HA = 11 cm



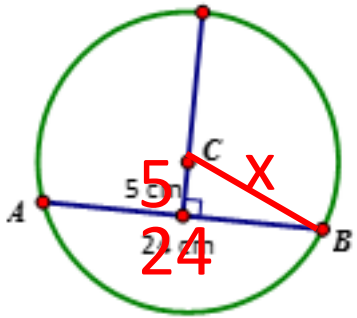
AK = 10cm

c)



x = 7cm

d)

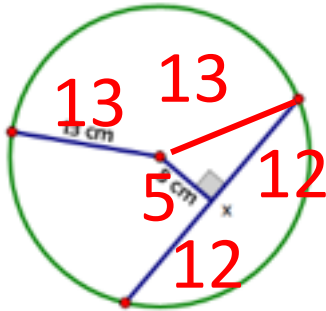


$$5^2 + 12^2 = x^2$$

$$x = 13$$

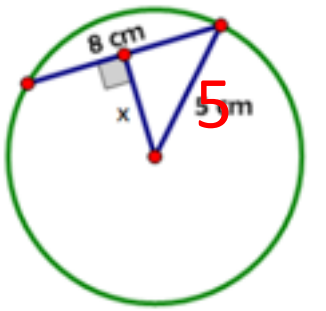
AC = 13cm

e)



x = 24cm

f)



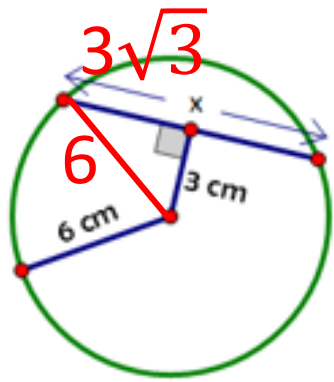
$$4^2 + x^2 = 5^2$$

$$x = 3$$

x = 3cm

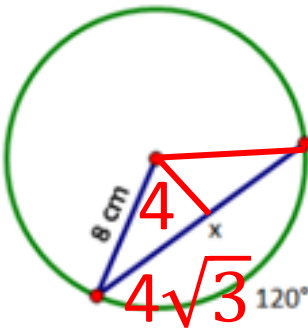
2. Determine the requested value.

a)



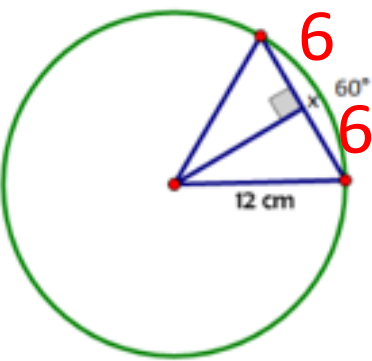
$x = 6\sqrt{3} \text{ cm}$ (E)

b)



$x = 8\sqrt{3} \text{ cm}$ (E)

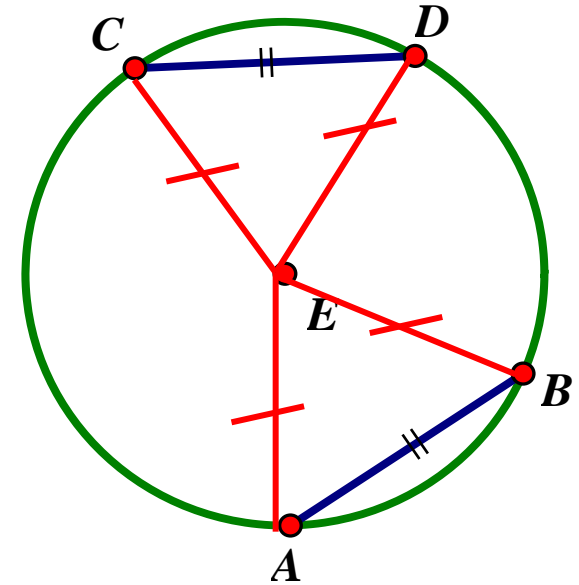
c)



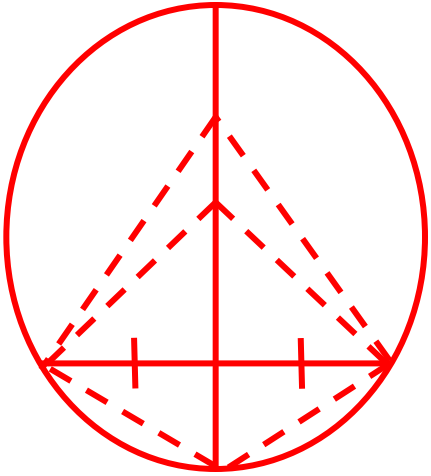
$x = 12 \text{ cm}$ (E)

3. A student questions the teacher.... “It makes sense that if you have congruent chords you would have congruent arcs but can you prove it?” Help the teacher by proving this to be true.

- $\triangle CED \cong \triangle AEB$ by SSS (radii \cong and chords \cong)
- $\angle CED \cong \angle AEB$ by CPCTC
- $\widehat{CD} \cong \widehat{AB}$ since central angles \cong arc measure will be the same.



4. Why would the perpendicular bisector of a chord have to be a diameter?



Points on a \perp bisector are always equidistant from the endpoints of the bisected segment the only way for this to be true is if the \perp bisector is the diameter b/c it would divide the circle in half.

5. An ancient plate from the Mayan time period was dropped at a museum. The curator wanted to put it back together but needed to find the center of the plate for the restoration. If the largest piece looked like this... how could they find the center of the plate?

Find the intersection of 2 \perp bisectors of chords (diameters) since they would have to intersect at the circle's center.

