

Module 15b: Central Angles

Math Practice(s):

- Construct viable arguments & critique the reasoning of others.
- Look for & make use of structure.

Learning Target(s):

- Discover & apply the relationship between a central angle & the arc it intercepts.

Homework:

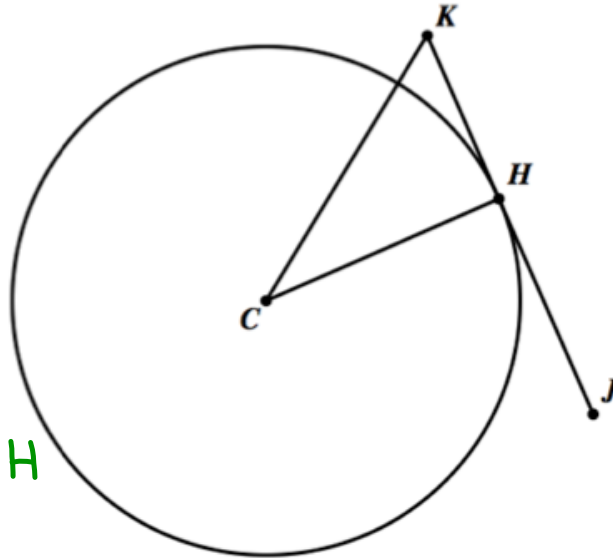
HW#4: 15b #1-12

Warm-up

1. In the diagram below, \overline{KJ} is tangent to circle C at point H , $CK = 50$ ft., and $HK = 30$ ft.

A. Determine the length of the radius of the circle.

$$40 \text{ ft}$$



B. What is the measure of $\angle KCH$?

$$\tan^{-1}\left(\frac{30}{40}\right) = m\angle KCH$$

$$m\angle KCH \approx 37^\circ$$

C. Determine the circumference of the circle. Express your answer in exact form AND state its approximate value using $\pi \approx 3.14$.

$$C = 80\pi \text{ ft}$$

$$C \approx 251.2 \text{ ft}$$

D. Determine the area of the circle. Express your answer in exact form AND state its approximate value using $\pi \approx 3.14$.

$$A = 1600\pi \text{ ft}^2$$

$$A \approx 5024 \text{ ft}^2$$

E. If the circle is dilated about its center by a scale factor of 5, determine the **circumference** and **area** of the resulting circle. For each measurement, express your answer in exact form only.

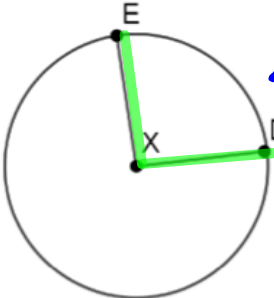
$$C = 400\pi \text{ ft}$$

$$A = 1600\pi$$

$$\times 25$$

$$A = 40,000\pi \text{ ft}^2$$

(erase to show)



Central Angle (#VOC)

- An angle whose vertex is the center of the circle and whose rays contain radii.

$\angle D X E$

Arc Angle Measure (#VOC)

- Equal to the measure of the central \angle associated with the arc.

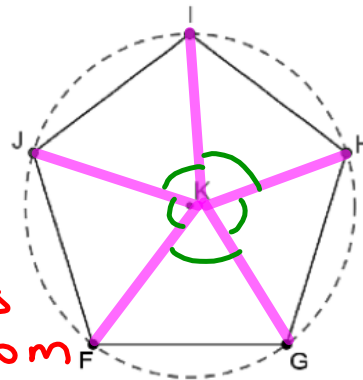
If $m \angle D X E = 84^\circ$,
then $m \widehat{D E} = 84^\circ$.

Practice

1. Circle K is circumscribed about the regular pentagon FGHIJ.

A. One of your classmates analyzed the diagram and said, "Oh, it looks like $\widehat{FG} \cong \widehat{GH} \cong \widehat{HI} \cong \widehat{IJ} \cong \widehat{JF}$."

Do you agree or disagree with your classmate's conjecture? Explain why or why not.



We agree, because it's a regular pentagon, so the sides are \cong . So, all central \angle s from K are \cong . Therefore the arcs are \cong .

B. Determine all five arc angle measures.

$$360 \div 5 = 72$$

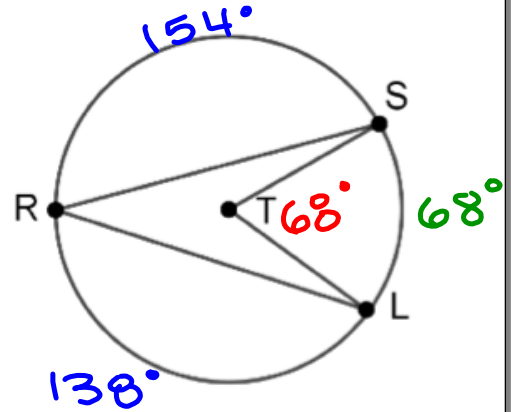
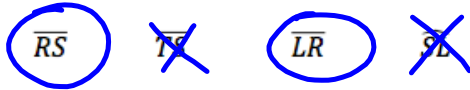
Each arc has a measure of 72°

2. The diagram below shows a circle centered at T and $m\angle STL = 68^\circ$.

A. Name a radius.

$\overline{TL} \cong \overline{TS}$

B. Which of the following is a chord?
Circle all segments that are chords.



C. Do \widehat{RL} and \widehat{RSL} refer to the same arc on circle T? Explain your answer.

No, \widehat{RL} goes from R to L along the bottom, \widehat{RSL} goes from R to S, then to L.

D. What is the $m\widehat{SL}$?

$m\widehat{SL} = 68^\circ$
same as $m\angle STL$.

E. If $m\widehat{RS} = 154^\circ$, what is $m\widehat{RL}$?

$154 + 68 + m\widehat{RL} = 360$
 $m\widehat{RL} = 138^\circ$

F. What is the $m\widehat{RSL}$?

$m\widehat{RS} + m\widehat{SL} = m\widehat{RSL}$
 $154 + 68 = m\widehat{RSL}$
 $m\widehat{RSL} = 222^\circ$

G. What is the $m\widehat{SRL}$?

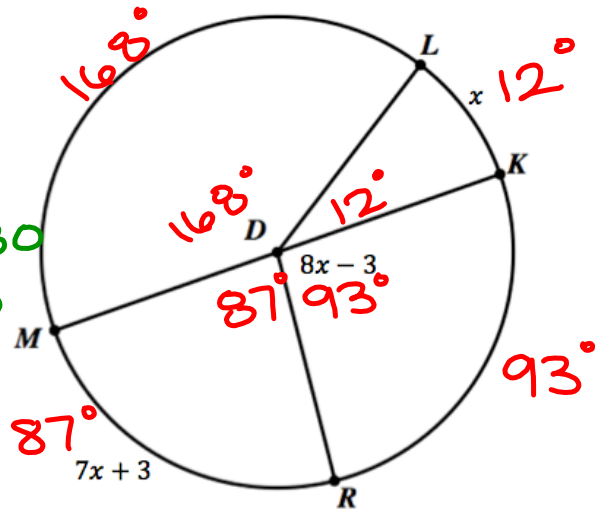
$m\widehat{SR} + m\widehat{RL}$
 $154 + 138$
 $m\widehat{SRL} = 292^\circ$

3. In the diagram below, \overline{MK} is a diameter of circle D.

A. $m\widehat{MRK} = \underline{180^\circ}$

B. Set-up an equation that represents the relationship between $m\angle MDR$ and $m\angle RDK$. Then, solve your equation to determine the value of x .

$m\angle MDR + m\angle RDK = 180$
 $7x + 3 + 8x - 3 = 180$
 $15x = 180$
 $\underline{x = 12}$



C. $m\widehat{RK} = \underline{93^\circ}$

D. $m\widehat{MR} = \underline{87^\circ}$

E. $m\widehat{LK} = \underline{12^\circ}$

F. $m\widehat{LM} = \underline{168^\circ}$

G. $m\angle LDK = \underline{12^\circ}$

H. $m\angle LDM = \underline{168^\circ}$

I. $m\angle RDM = \underline{87^\circ}$

J. $m\widehat{LR} = \underline{105^\circ}$
 $m\widehat{RK} + m\widehat{KL}$