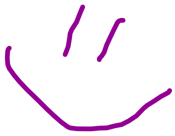
Lesson 11-3 : Perpendicular Bisectors of Chords, Arc Ratios



AGENDA

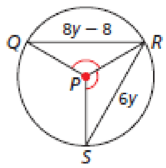
- Check HW 11.2
- Lesson Notes & Guided Practice (fill in graphic org)
- Quiz

HOMEWORK

p 761 # 31, 32, 37, 47, 49 and problems in Notes

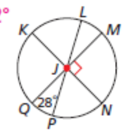
HW p 761 # 15,25-30,38,39,48

15. $\angle QPR \cong \angle RPS$. Find QR. 24

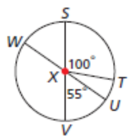


Find each measure.

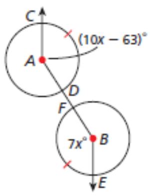
25. $m\widehat{MP}$ 152°
26. $m\widehat{QNL}$ 208°



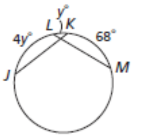
27. $m\widehat{WT}$ 155°
28. $m\widehat{WTV}$ 235°



29. $\odot A \cong \odot B$, and $\overline{CD} \cong \overline{EF}$. Find $m\angle CAD$. 147°

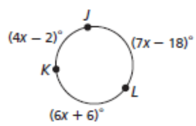


30. $\overline{JK} \cong \overline{LM}$. Find $m\widehat{JK}$. 85°

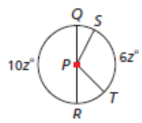


Algebra Find the indicated measure.

38. $m\widehat{JL}$ 136°

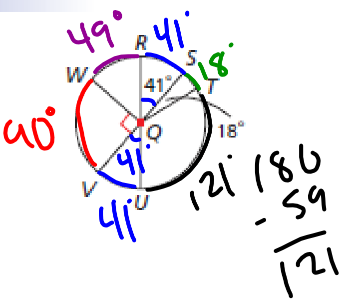


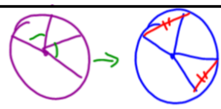
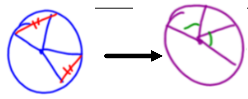
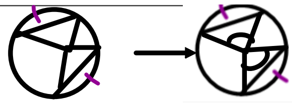
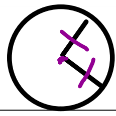
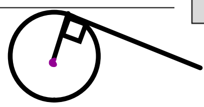
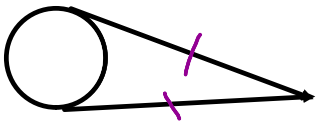
39. $m\angle SPT$ 108°

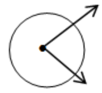


48. Which of these arcs of $\odot Q$ has the greatest measure?

- (A) $\widehat{WT}$
- (B) $\widehat{UW}$
- (C) $\widehat{VR}$
- (D) $\widehat{TV}$



• ≅ central angles have ≅ chords	
• ≅ chords have ≅ arcs (One ⊙ or 2 ≅ ⊙'s)	
• ≅ arcs have ≅ central angles	
• If a radius (or diameter) is ⊥ to a chord →it bisects the chord and the arc	
• In a circle all radii are ≅	
• A tangent is ⊥ to the radius at the point of tangency	
• 2 segs. tangent to circle from the same external point → segs. ≅	

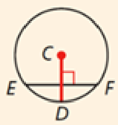
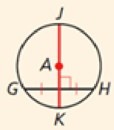
∡ and $\overset{\frown}{arc}$ relationships	Center of circle
Example	
∡ Name	Central Angle
∡ rays are	radii - (extended)
Measurements relationship	θ m< = m $\overset{\frown}{ARC}$

11-3 Notes: Perpendicular Bisector of a Chord; Arc Ratios

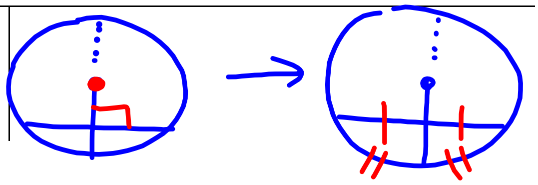
Perpendicular Bisector of a Chord

In a circle, the perpendicular bisector of a chord must include the center of the circle.

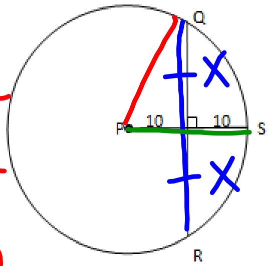
Theorems

THEOREM	HYPOTHESIS	CONCLUSION
11-2-3 In a circle, if a radius (or diameter) is perpendicular to a chord, then it bisects the chord and its arc.	 $\overline{CD} \perp \overline{EF}$	$\overline{CD}$ bisects $\overline{EF}$ and $\overset{\frown}{EF}$.
11-2-4 In a circle, the perpendicular bisector of a chord is a radius (or diameter).	 $\overline{JK}$ is ⊥ bisector of $\overline{GH}$.	$\overline{JK}$ is a diameter of ⊙A.

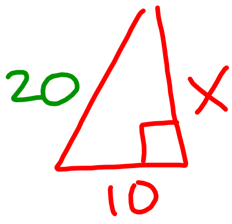
complete graphic organizer

Arcs and Chords	• If a radius (or diameter) is ⊥ to a chord →it bisects the chord and the arc	

Example 1: Find QR in simplest radical form. **Watch your final answer**



$QR = 2x$



$a^2 + b^2 = c^2$

$x^2 + 10^2 = 20^2$

$x^2 = 300$

$x = \pm\sqrt{300}$

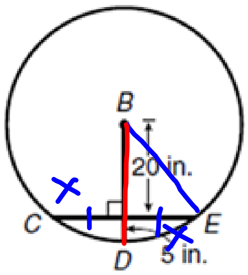
$x = \sqrt{100}\sqrt{3}$

$x = 10\sqrt{3}$

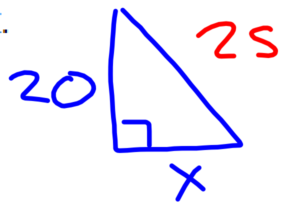
$QR = 2(10\sqrt{3})$

$\boxed{= 20\sqrt{3}}$

Example 2: Find CE.



$CE = 2x$



$\{3-4-5\}$

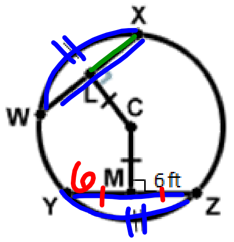
$3(5)$ x 20 25

15 $k=5$ $k=5$

$CE = 2(15)$

$\boxed{CE = 30}$ IN

Example 3: Find LX.



IN A ⊙, ≅ ARCS → ≅ CHORDS

$WX = YZ$

$WX = 12$ BY SUBST

$LX = \frac{1}{2}(WX) = \frac{1}{2}(12)$

$\boxed{LX = 6}$

* RADIUS ⊥ CHORD BISECTS CHORD

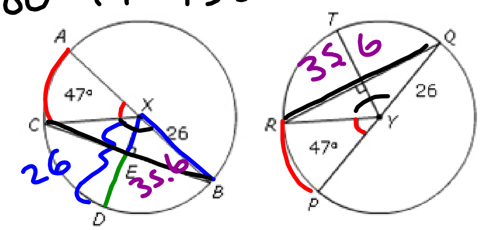
$YM = 6$

$YZ = 2(6) = 12$

Example 3:

⊙X ≅ ⊙Y and RQ = 35.6. Identify ED rounded to the nearest tenth.

$180 - 47 = 133°$



RADII IN A ⊙ ARE ≅

$XD = 26$

$XD = XE + ED$

$26 = 18.5151 + ED$

7.0485

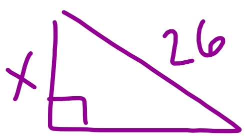
$\boxed{7.0}$ ED

IN ≅ ⊙'S, ≅ CENTRAL ∠'S → ≅ CHORDS

$CB = 35.6 = RQ$

RADIUS ⊥ CHORD BISECTS CHORD

$17.8 = EB$



$x^2 + 17.8^2 = 26^2$

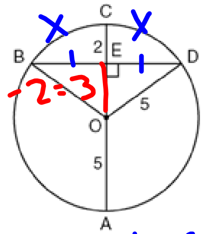
$\sqrt{x^2} = \sqrt{359.16}$

$\pm$

$x = 18.5151$

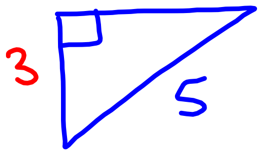
Regents Question: In the diagram below, circle O has a radius of 5, and $CE = 2$. Diameter $\overline{AC}$ is perpendicular to chord $\overline{BD}$ at E. What is the length of $\overline{BD}$? $= 2x = 2(4)$

(1) 12
(2) 10
(3) 8
(4) 4



$5-2=3$

$x=4$



$\{3-4-5\}$

Arc Ratios

Extending the arc addition postulate, try the following problems:

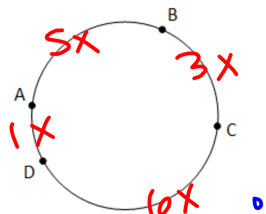
$5x:3x:6x:1x$

A) The ratio of AB:BC:CD:DA is 5:3:6:1. Find the degree measure of the largest arc.

$5x + 3x + 6x + 1x = 360°$

$15x = 360°$

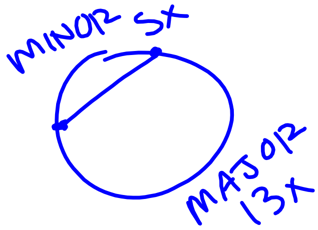
$x = 24°$



$6(24) = 144°$

$m\overset{\frown}{DC}$

B) In a circle, a chord divides the major and minor arcs into a ratio of 13:5. Find the measure of each arc.



$13x : 5x$

MAJOR + MINOR = 360°

$13x + 5x = 360°$

$18x = 360°$

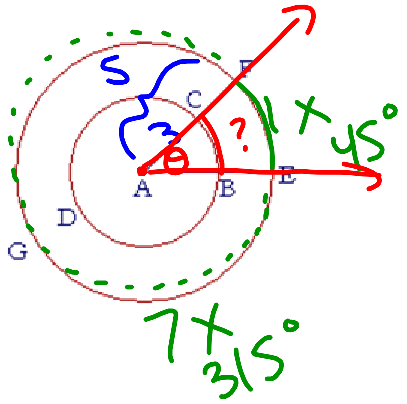
$x = 20°$

MAJOR = 13(20) = 260°

MINOR = 5(20) = 100°

360° ✓

C) Given the two concentric circles centered at A with radius AC=3 and AF=5, the ratio of $\overset{\frown}{EF}$ to $\overset{\frown}{EGF}$ is 1:7. Find the measure of $\measuredangle CAB$ and the measure of $\overset{\frown}{CB}$.



MAJOR + MINOR = 360°

$7x + 1x = 360°$

$8x = 360°$

$x = 45°$

$m\measuredangle CAB = m\overset{\frown}{ARC}$

CENTRAL

$= m\overset{\frown}{FE}$

$\boxed{m\measuredangle CAB = 45°}$

$m\measuredangle CAB = m\overset{\frown}{CB}$

$\boxed{45° = m\overset{\frown}{CB}}$

Supplemental Homework Problems: (do on separate paper)

1) In a circle, a chord divides the minor and major arcs into a ratio of 1:9. Find the measure of the major arc.
2) In circle A, diameters $\overline{BC}$ and $\overline{DE}$ create arcs $\overset{\frown}{BD}, \overset{\frown}{DC}, \overset{\frown}{CE}, \overset{\frown}{EB}$. If $\overset{\frown}{BD} : \overset{\frown}{DC}$ is 3:5, determine the measure of $\overset{\frown}{CE}$.

Attachments

Bridge to Unit 11 KEY.docx