
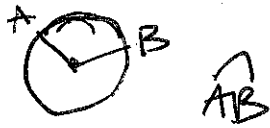
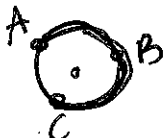
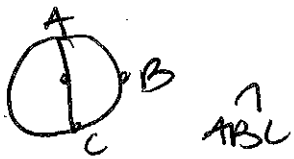
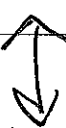


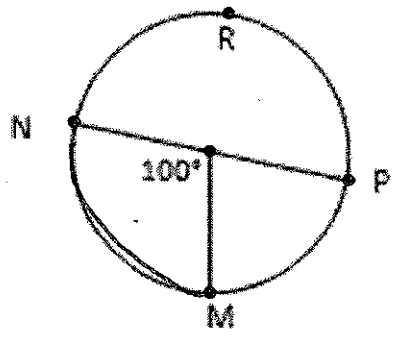
## Arc Measurement/ Properties of Chords

Objective: Use properties of arcs of circles  
 Use properties of chords of circles

	Description	Drawing
Central Angle:	Angle whose vertex is at the center	
Minor Arc:	less than $180^\circ$ $\widehat{AB}$ (2 letters)	
Major Arc:	More than $180^\circ$ $\widehat{ABC}$ (3 letters)	
Semicircle:	Arc = $180^\circ$ (3 letters)	
Measure of a Minor arc:	less than $180^\circ$	arc = central angle measure 
Measure of a Major arc:	More than $180^\circ$	

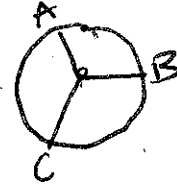
**EXAMPLE 1:** Finding measures of each arc of circle R. (NP is a diameter)

- a.  $\widehat{MN}$   $100^\circ$
- b.  $\widehat{MPN}$   $260^\circ$
- c.  $\widehat{PMN}$   $140^\circ$
- d.  $\widehat{PM}$   $80^\circ$



**Arc Addition Postulate**  
 The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs

$$m \widehat{AB} + m \widehat{BC} = m \widehat{ABC}$$



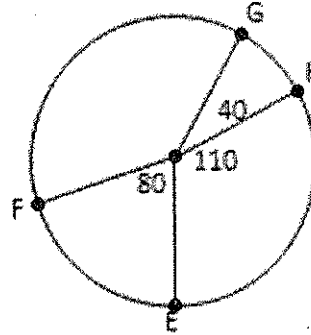
**EXAMPLE 2: Finding the measures of Arcs**

a.  $\widehat{GE}$   
 $150^\circ$

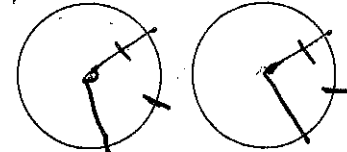
b.  $\widehat{GEF}$   
 $230^\circ$

c.  $\widehat{GF}$   
 $130^\circ$

d.  $\widehat{FHE}$   
 $280^\circ$

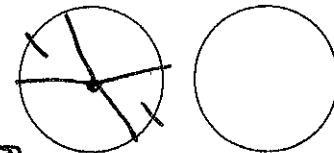


**Congruent Circles:**  
 Two circles that have the same radius.

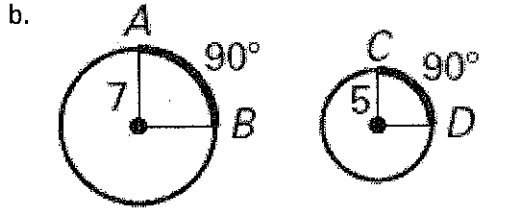
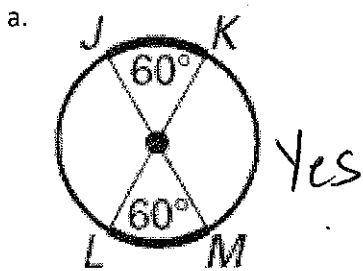


**Congruent Arcs:**  
 Two arcs that have the same measure. They are part of the same circle or congruent circles

*congruent arcs* →

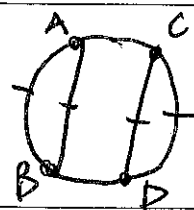


**EXAMPLE 3: Tell whether the highlighted arcs are congruent. Explain why or why not.**



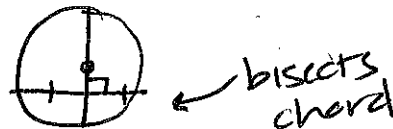
NO  
 (radius is different, not  $\cong$ )

**RULE:**  
In the same circle, or in congruent circles, two minor arcs are congruent IF AND ONLY IF their corresponding chords are congruent



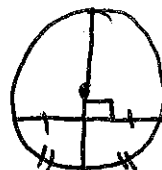
$AB \cong CD$   
 $m\widehat{AB} \cong m\widehat{CD}$

**RULE:**  
If one chord is a perpendicular bisector of another chord, then the first chord is a diameter.



bisects chord

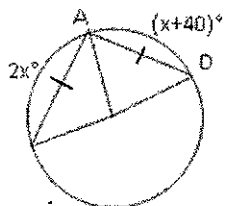
**RULE:**  
If a diameter of a circle is perpendicular to a chord, then the diameter bisects the chord and its arc.



$\cong$  arcs

**EXAMPLE 4:**

a. Find  $m\widehat{AD}$

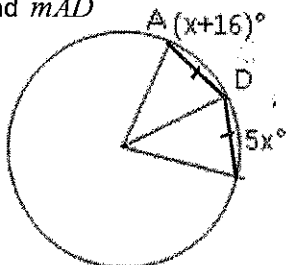


$2x = x + 40$

$x = 40$

$\widehat{AD} = 80$

b. Find  $m\widehat{AD}$



$x + 16 = 5x$

$16 = 4x$

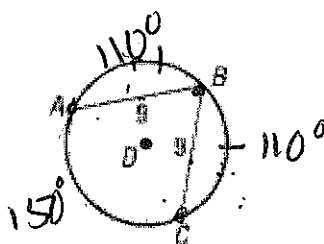
$x = 4$

$\widehat{AD} = 20$

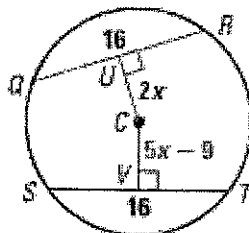
Use the diagram of  $\odot D$ .

1. If  $m\widehat{AB} = 110^\circ$ , find  $m\widehat{BC}$ .  $110^\circ$

2. If  $m\widehat{AC} = 150^\circ$ , find  $m\widehat{AB}$ .  $105^\circ$



In the diagram of  $\odot C$ ,  $QR = ST = 16$ . Find  $CU$ .



$5x - 9 = 2x$

$3x = 9$

$x = 3$

$2(3) = 6$   $\widehat{CU} = 6$

Find the measure of the indicated arc in the diagram.

3.  $\widehat{CD}$

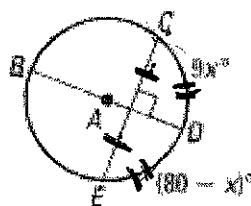
$72^\circ$

4.  $\widehat{DE}$

$72^\circ$

5.  $\widehat{CE}$

$144^\circ$



$9x = 80 - x$

$10x = 80$

$x = 8$