

Accelerated Geometry
Chapter 10 – Section 3: Arcs of a Circle

Name _____
Date 4/3

After this lesson, you should be able to:

- Identify the different types of arcs
- Determine the measure of an arc
- Recognize congruent arcs
- Apply the relationships between congruent arcs, chords, and central angles

Given: Circle P.

Definitions

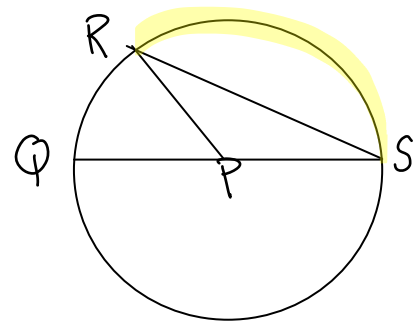
1. Arc – 2 points on a circle and all points on the circle needed to connect the points by a single path.

- a. Give another name for \widehat{RS} . \widehat{SR}
- b. What is the center of \widehat{RS} ? P
- c. Name all the other arcs in the diagram.

$$\widehat{QR} = \widehat{RQ}$$

$$\widehat{RQS}$$

$$\widehat{SQ}$$



2. **Central Angle** – an angle whose vertex is at the center of the circle.

- a. Name one central angle. $\angle RPS$, $\angle QPR$, $\angle QPS$

3. Minor arc – an arc whose points are on or between the sides of a central angle. *smaller than a semi-circle*

- a. Name a minor arc. \widehat{QR} , \widehat{RS}

4. Major arc – an arc whose points are on or outside of a central angle. *bigger than a semi-circle*
need 3 points to label

- a. Name a major arc. \widehat{RQS}

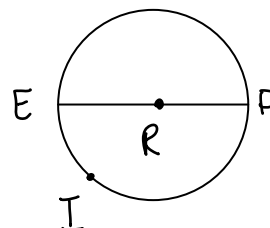
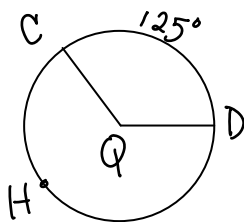
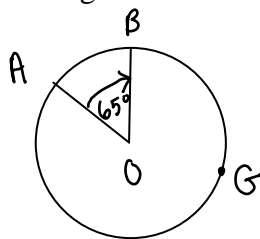
5. Semicircle – an arc whose endpoints are the endpoints of a diameter. \widehat{SQ}

- a. Name a semicircle.

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Refer to the diagrams below for parts 6 and 7.



6. The measure of a minor arc is the same as the measure of the central angle.

- a. In circle O, what is the $m\widehat{AB}$? **65**
 b. In circle Q, what is the $m\angle CQD$? **125**
 c. In circle R, what is the $m\widehat{EF}$? **180**

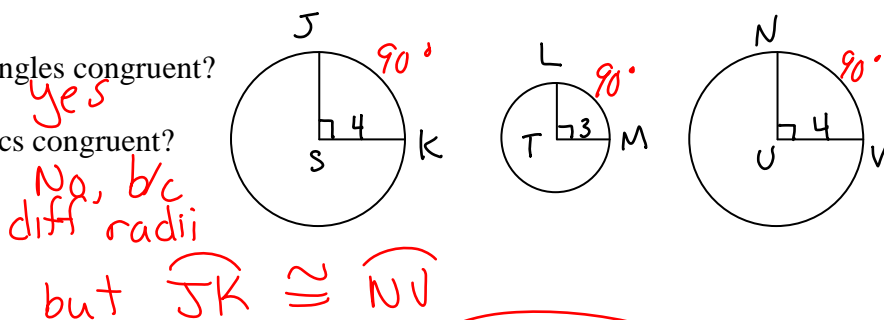
7. The measure of a major arc is 360 minus the measure of the minor arc with the same endpoints.

- a. In circle O, what is the $m\widehat{AGB}$? **$360 - 65 = 295$**
 b. In circle Q, what is the $m\widehat{CHD}$? **$360 - 125 = 235$**

8. Congruent arcs – 2 arcs with the same measure **AND** are parts of the same circle or congruent **\cong radii** circles.

- a. Are all 3 central angles congruent?

- b. Are all 3 minor arcs congruent?
 Why or why not?



- c. Which angles are congruent?

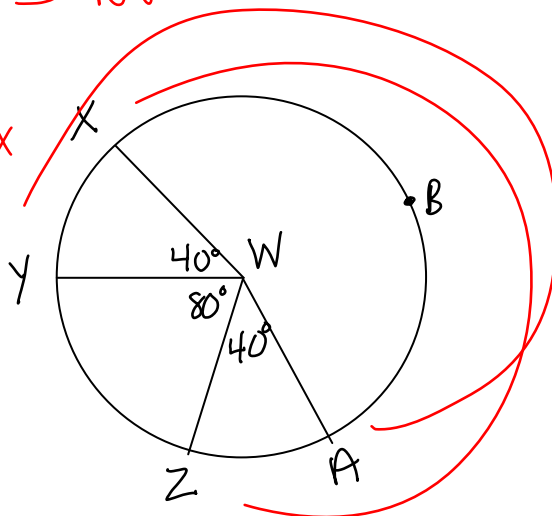
$\angle ZWA \cong \angle XWY$ $\angle YWA \cong \angle ZWX$

- d. Which arcs are congruent?

$\widehat{XY} \cong \widehat{ZA}$

$\widehat{XZ} \cong \widehat{YA}$

$\widehat{ZAX} \cong \widehat{YXA}$

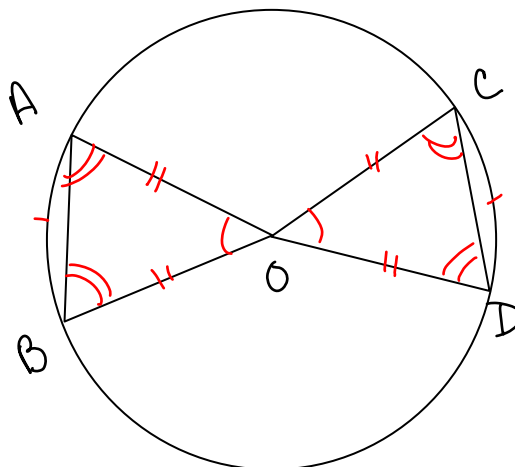




9. Given: Circle O
 $\angle AOB \cong \angle COD$

What conclusions can you draw? Why?

$\overline{AB} \cong \overline{CD}$
all radii \cong
 $\triangle OAD, \triangle AOB$ isosceles
 $\triangle AOB \cong \triangle COD$ by SAS
 $\therefore \overline{AB} \cong \overline{CD}$



10. Summarize: In the same circle or congruent circles,

\cong central \angle s $\Leftrightarrow \cong$ arcs $\Leftrightarrow \cong$ chords $\Leftrightarrow \cong$ distances from center

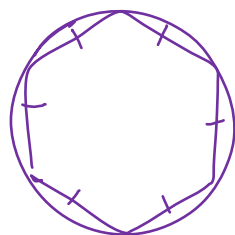
11. What fractional part of a circle is an arc that measures 8 degrees?

$$\frac{8}{360} = \boxed{\frac{1}{45}}$$

12. Find the measure of an arc that is $\frac{3}{5}$ of its circle.

$$\frac{3}{5}(360) = \boxed{216}$$

13. A polygon is inscribed in a circle if all its vertices lie on the circle. Find the measure of the arc cut off by a side of an inscribed regular hexagon.



all sides & angles \cong

$\therefore \cong$ chords $\Rightarrow \cong$ arcs

$$\text{so arc} = \frac{360}{6} = \boxed{60^\circ}$$