Name _____ Date _____

LESSON 10.2

Study Guide

For use with pages 659–663

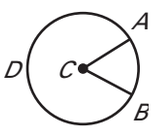
GOAL **Use angle measures to find arc measures.**

Vocabulary

A **central angle** of a circle is an angle whose vertex is the center of the circle.

A **semicircle** is an arc with endpoints that are the endpoints of a diameter.

If $m\angle ACB$ is less than 180°, then the points on $\odot C$ that lie in the interior of $\angle ACB$ form a **minor arc** with endpoints A and B. The points on $\odot C$ that do not lie on minor arc $\overset{\frown}{AB}$ form a **major arc** with the endpoints A and B.



The **measure of a minor arc** is the measure of its central angle.

The **measure of a major arc** is the difference between 360° and the measure of the related minor arc.

Postulate 23 Arc Addition Postulate: The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs.

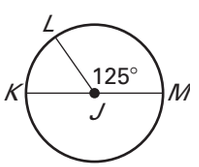
Congruent circles are two circles with the same radius.

Congruent arcs are two arcs with the same measure that are arcs of the same circle or of congruent circles.

EXAMPLE 1 ## Find measures of arcs

Find the measure of each arc of $\odot J$, where $\overline{KM}$ is a diameter.

a. $\overset{\frown}{LM}$ **b.** $\overset{\frown}{LMK}$ **c.** $\overset{\frown}{KLM}$



Solution

a. $\overset{\frown}{LM}$ is a minor arc, so $m\overset{\frown}{LM} = m\angle LJM = 125°$.

b. $\overset{\frown}{LMK}$ is a major arc, so $m\overset{\frown}{LMK} = 360° - 125° = 235°$.

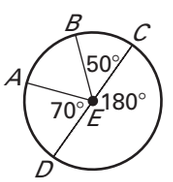
c. $\overline{KM}$ is a diameter, so $\overset{\frown}{KLM}$ is a semicircle and $m\overset{\frown}{KLM} = 180°$.

Exercises for Example 1

Identify the given arc as a *major arc, minor arc,* or *semicircle* and find the measure of the arc.

1. $\overset{\frown}{AD}$ **2.** $\overset{\frown}{AB}$ **3.** $\overset{\frown}{CD}$

4. $\overset{\frown}{BDC}$ **5.** $\overset{\frown}{ACD}$ **6.** $\overset{\frown}{BC}$



Name _____ Date _____

LESSON 10.2

Study Guide *continued*

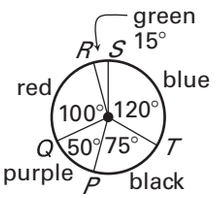
For use with pages 659–663

EXAMPLE 2 Find measures of arcs

Several students were recently asked about their favorite color. The results are shown in the graph. Find the indicated arc measures.

a. $m\overset{\frown}{RT}$ **b.** $m\overset{\frown}{PRT}$

c. $m\overset{\frown}{RTQ}$ **d.** $m\overset{\frown}{STQ}$



Solution

a. $m\overset{\frown}{RT} = m\overset{\frown}{RS} + m\overset{\frown}{ST} = 15° + 120° = 135°$

b. $m\overset{\frown}{PRT} = 360° - m\overset{\frown}{PT} = 360° - 75° = 285°$

c. $m\overset{\frown}{RTQ} = 360° - m\overset{\frown}{QR} = 360° - 100° = 260°$

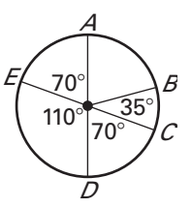
d. $m\overset{\frown}{STQ} = m\overset{\frown}{ST} + m\overset{\frown}{TQ} = m\overset{\frown}{ST} + m\overset{\frown}{TP} + m\overset{\frown}{PQ} = 120° + 75° + 50° = 245°$

Exercises for Example 2

Find the measure of the arc.

7. $\overset{\frown}{AED}$ **8.** $\overset{\frown}{AC}$ **9.** $\overset{\frown}{ACE}$

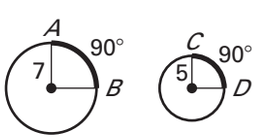
10. $\overset{\frown}{BE}$ **11.** $\overset{\frown}{CDE}$ **12.** $\overset{\frown}{AEC}$



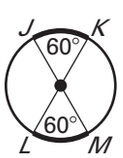
EXAMPLE 3 Identify congruent arcs

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

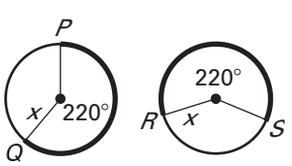
a.



b.



c.



Solution

a. $\overset{\frown}{AB}$ and $\overset{\frown}{CD}$ have the same measure, but are not congruent because the circles that contain them are not congruent.

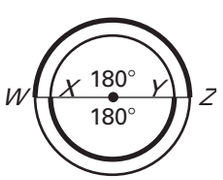
b. $\overset{\frown}{JK} \cong \overset{\frown}{LM}$ because they have the same measure and are in the same circle.

c. $\overset{\frown}{PQ} \cong \overset{\frown}{RS}$ because they have the same measure and are in congruent circles.

Exercises for Example 3

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

13.



14.