Name_____ Date _____

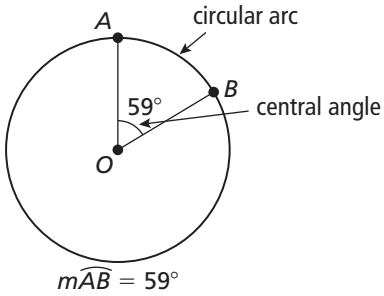
10.2 Finding Arc Measures

For use with Exploration 10.2

Essential Question How are circular arcs measured?

A **central angle** of a circle is an angle whose vertex is the center of the circle. A *circular arc* is a portion of a circle, as shown below. The measure of a circular arc is the measure of its central angle.

If $m\angle AOB < 180°$, then the circular arc is called a **minor arc** and is denoted by $\overset{\frown}{AB}$.

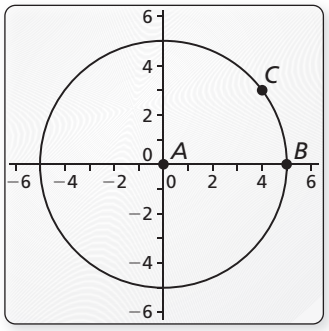


1 EXPLORATION: Measuring Circular Arcs

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

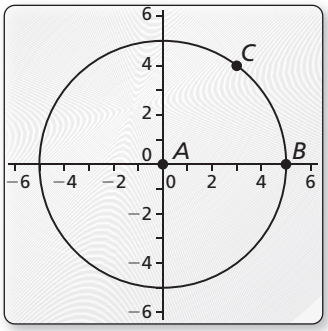
Work with a partner. Use dynamic geometry software to find the measure of $\overset{\frown}{BC}$. Verify your answers using trigonometry.

a.



Points
$A(0, 0)$
$B(5, 0)$
$C(4, 3)$

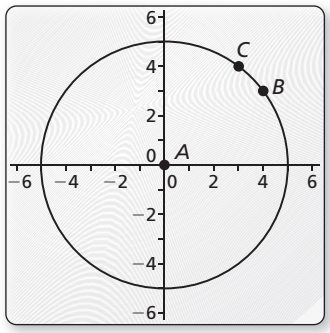
b.



Points
$A(0, 0)$
$B(5, 0)$
$C(3, 4)$

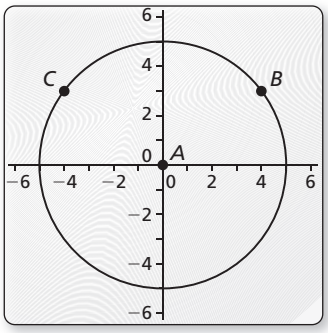
1 EXPLORATION: Measuring Circular Arcs (continued)

c.



Points
$A(0, 0)$
$B(4, 3)$
$C(3, 4)$

d.



Points
$A(0, 0)$
$B(4, 3)$
$C(-4, 3)$

Communicate Your Answer

2. How are circular arcs measured?

3. Use dynamic geometry software to draw a circular arc with the given measure.

a. 30°

b. 45°

c. 60°

d. 90°

Name_____ Date _____

10.2 Notetaking with Vocabulary

For use after Lesson 10.2

In your own words, write the meaning of each vocabulary term.

central angle

minor arc

major arc

semicircle

measure of a minor arc

measure of a major arc

adjacent arcs

congruent circles

congruent arcs

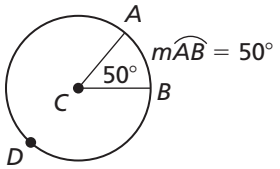
similar arcs

Core Concepts

Measuring Arcs

The **measure of a minor arc** is the measure of its central angle. The expression $m\overset{\frown}{AB}$ is read as "the measure of arc AB."

The measure of the entire circle is 360°. The **measure of a major arc** is the difference of 360° and the measure of the related minor arc. The measure of a semicircle is 180°.



$m\overset{\frown}{ADB} = 360° - 50° = 310°$

Notes:

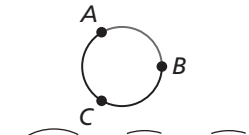
Name _____ Date _____

10.2 Notetaking with Vocabulary (continued)

Postulates

Postulate 10.1 Arc Addition Postulate

The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs.



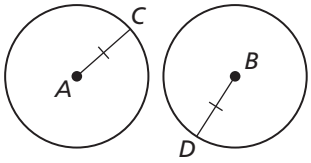
$m\overset{\frown}{ABC} = m\overset{\frown}{AB} + m\overset{\frown}{BC}$

Notes:

Theorems

Theorem 10.3 Congruent Circles Theorem

Two circles are congruent circles if and only if they have the same radius.

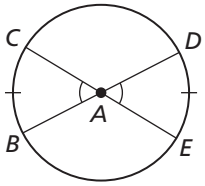


$\odot A \cong \odot B$ if and only if $\overline{AC} \cong \overline{BD}$.

Notes:

Theorem 10.4 Congruent Central Angles Theorem

In the same circle, or in congruent circles, two minor arcs are congruent if and only if their corresponding central angles are congruent.



$\overset{\frown}{BC} \cong \overset{\frown}{DE}$ if and only if $\angle BAC \cong \angle DAE$.

Notes:

Theorem 10.5 Similar Circles Theorem

All circles are similar.

Notes:

Name_____ Date _____

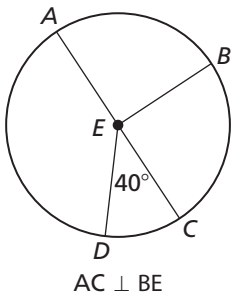
10.2 Notetaking with Vocabulary (continued)

Extra Practice

In Exercises 1–8, identify the given arc as a *major arc*, *minor arc*, or *semicircle*. Then find the measure of the arc.

1. $\overset{\frown}{AB}$

2. $\overset{\frown}{ABC}$



AC ⊥ BE

3. $\overset{\frown}{ABD}$

4. $\overset{\frown}{BC}$

5. $\overset{\frown}{BAC}$

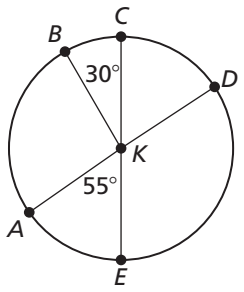
6. $\overset{\frown}{DAB}$

7. $\overset{\frown}{AD}$

8. $\overset{\frown}{CD}$

9. In $\odot E$ above, tell whether $\overset{\frown}{ABC} \cong \overset{\frown}{ADC}$. Explain why or why not.

10. In $\odot K$, find the measure of $\overset{\frown}{DE}$.



11. Find the value of x. Then find the measure of $\overset{\frown}{AB}$.