NAME ______________________ DATE __________

Reteaching with Practice

For use with pages 603–611

GOAL **Use properties of arcs of circles and use properties of chords of circles**

VOCABULARY

In a plane, an angle whose vertex is the center of a circle is a **central angle** of the circle.

If the measure of a central angle, $\angle APB$, is less than 180°, then A and B and the points of $\odot P$ in the interior of $\angle APB$ form a **minor arc** of the circle.

The points A and B and the points of $\odot P$ in the *exterior* of $\angle APB$ form a **major arc** of the circle. If the endpoints of an arc are the endpoints of a diameter, then the arc is a **semicircle.**

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

The **measure of a major arc** is defined as the difference between 360° and the measure of its associated minor arc.

Two arcs of the same circle or of congruent circles are **congruent arcs** if they have the same measure.

Postulate 26 Arc Addition Postulate
The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs.

Theorem 10.4
In the same circle, or in congruent circles, two minor arcs are congruent if and only if their corresponding chords are congruent.

Theorem 10.5
If a diameter of a circle is perpendicular to a chord, then the diameter bisects the chord and its arc.

Theorem 10.6
If one chord is a perpendicular bisector of another chord, then the first chord is a diameter.

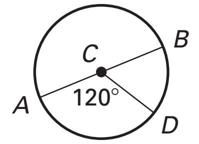
Theorem 10.7
In the same circle, or in congruent circles, two chords are congruent if and only if they are equidistant from the center.

EXAMPLE *Finding Measures of Arcs*

Find the measure of each arc of $\odot C$.

a. $\overset{\frown}{AD}$ **b.** $\overset{\frown}{ADB}$

c. $\overset{\frown}{DBA}$ **d.** $\overset{\frown}{BD}$



SOLUTION

a. $\overset{\frown}{AD}$ is a minor arc, so $m\overset{\frown}{AD} = m\angle ACD = 120°$.

b. $\overset{\frown}{ADB}$ is a semicircle, so $m\overset{\frown}{ADB} = 180°$.

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c. $\overset{\frown}{DBA}$ is a major arc, so $m\overset{\frown}{DBA} = 360° - 120° = 240°$.

d. $\overset{\frown}{BD}$ is a minor arc, so $m\overset{\frown}{BD} = m\angle BCD$. Because $\angle BCD$ and $\angle ACD$ form a linear pair, $m\angle BCD = 180° - m\angle ACD = 180° - 120° = 60°$. So $m\overset{\frown}{BD} = 60°$.

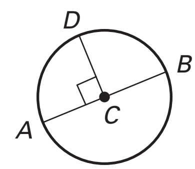
Exercises for Example 1

Find the measure of the arcs of the given circle.

1. Find the measure of each arc of $\odot C$.

a. $\overset{\frown}{ADB}$ **b.** $\overset{\frown}{AD}$

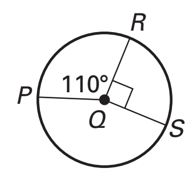
c. $\overset{\frown}{DB}$ **d.** $\overset{\frown}{DBA}$



2. Find the measure of each arc of $\odot Q$.

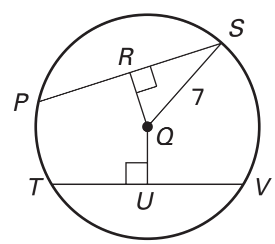
a. $\overset{\frown}{PR}$ **b.** $\overset{\frown}{PRS}$

c. $\overset{\frown}{PS}$ **d.** $\overset{\frown}{RSP}$



EXAMPLE 2 *Using Theorem 10.7*

$PS = 12$, $TV = 12$, and $SQ = 7$. Find QU.



SOLUTION

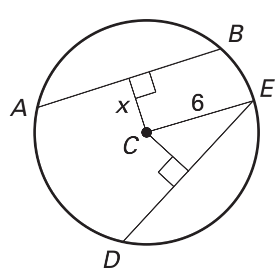
Because $\overline{PS} \cong \overline{TV}$, they are equidistant from the center by Theorem 10.7. To find QU, first find QR. $\overline{QR} \perp \overline{PS}$, so $\overline{QR}$ bisects $\overline{PS}$. Because $PS = 12$, $RS = \frac{12}{2} = 6$. Now look at $\triangle QRS$ which is a right triangle. Use the Pythagorean Theorem to find QR. $QR = \sqrt{QS^2 - RS^2} = \sqrt{7^2 - 6^2} = \sqrt{13}$.

Because $\overline{QR} \cong \overline{QU}$, $QR = QU = \sqrt{13}$.

Exercises for Example 2

Use the given information to find the value of *x*.

3. $AB = DE = 10$, radius $= 6$



4. $QV = 2$, $QU = 2$, $SU = 3$