Objective 1  Find the Measures of Central Angles and Arcs

In a plane, a(n) ________ is the set of all points equidistant from a given point called the center.

A(n) ________ is a segment that contains the center of a circle and has both endpoints on the circle.

A(n) ________ is a segment that has one endpoint at the center and the other endpoint on the circle.

Congruent ________ have congruent radii.

A(n) ________ angle is an angle whose vertex is the center of the circle.

An arc is a part of a circle. One type of arc, a(n) ________, is half of a circle.

A(n) ________ arc is smaller than a semicircle.

A(n) ________ is larger than a semicircle.

We name a minor arc by its endpoints and a major arc or a semicircle by its endpoints and another point on the arc.
Section 10.5 Arc Measures, Circumferences, and Arc Lengths of Circles

Work Video Exercise 1 with me.

1. Name the major arcs containing point $B$ in $\odot O$.

![Diagram of a circle with points B, O, E, D, C, and F]

<table>
<thead>
<tr>
<th>Arc Measure</th>
<th>Example</th>
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<tbody>
<tr>
<td>Minor arc—The measure of a minor arc is equal to the measure of its corresponding central angle.</td>
<td>$m_{\text{RT}} = m\angle \text{RST} = 50^\circ$</td>
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<tr>
<td>Major arc—The measure of a major arc is the measure of the related minor arc subtracted from $360^\circ$.</td>
<td>$m_{\text{TQR}} = 360^\circ - m_{\text{RT}}$</td>
</tr>
<tr>
<td>Semicircle—The measure of a semicircle is $180^\circ$.</td>
<td>$= 310^\circ$</td>
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Arc Addition Postulate

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

$m_{\text{ABC}} = m_{\text{AB}} + m_{\text{BC}}$

Work Video Exercise 2 with me.

2. Find the measure of each arc in $\odot P$.

- $\overarc{CD}$
- $\overarc{TCD}$
- $\overarc{TDC}$
Section 10.5 Arc Measures, Circumferences, and Arc Lengths of Circles

Pause and work Video Exercise 3.

3. Find $m\overarc{FH}$ for $\odot O$.

Play and check.

Work Video Exercise 4 with me.

4. Hands of a clock suggest an angle whose measure is continuously changing. How many degrees does a minute hand move during the time interval?

1 min

Objective 2 Find the Circumference and Arc Length

The ________ of a circle is the distance around the circle.

________ $(\pi)$ is defined as the ratio of circumference to diameter, $\pi = \frac{c}{d}$. 
Circumference of a Circle

The circumference of a circle is $\pi$ times the diameter

$$C = \pi d \quad \text{or} \quad C = 2\pi r$$

Work Video Exercise 5 with me.

5. Find the circumference of the circle. Leave your answer in terms of $\pi$.

Two circles with the same center and are in the same plane are called _______ circles.

Arc Length

The length of an arc of a circle is the product of the ratio

$$\frac{\text{measure of the arc}}{360^\circ}$$

and the circumference of the circle.

$$\text{length of } \widehat{AB} = \frac{m\widehat{AB}}{360^\circ} \cdot 2\pi r \quad \text{or} \quad \frac{m\widehat{AB}}{360^\circ} \cdot \pi d$$

Work Video Exercise 6 with me.

6. Find the length of the arc. Leave your answer in terms of $\pi$. 