ESSENTIAL QUESTION(S): What is the difference between a central and inscribed angle? What does a central angle measure? What does an inscribed angle measure? What is the difference between arc measure and arc length? How do you find the length of an arc?

NOTES:
Example 1:
Arc Classification

**Minor Arc:** an arc that measures **less than 180°**.

**Major Arc:** an arc that measures **more than 180°**, but **less than 360°**.

**Semicircle:** an arc that measures **exactly 180°**.

Example 2:
Central vs. Inscribed Angle

**Central Angle:** A central angle is an angle whose **vertex** is the **center** of the circle.

A central angle measures its **arc**.

**Inscribed Angle:** An inscribed angle is an angle whose **vertex** is on the **edge** of the circle.

An inscribed angle measures **half** its **arc**.

Example 3:
Angles in semicircles

If \( \overline{CD} \) is a diameter of \( \odot P \), the measure of \( \angle CAD \) is **90°**. Below, clearly explain why.

\( \overline{CD} \) is a diameter and cuts \( \odot P \) in half.

\( \angle CED \) measures **180°**.

\( \angle CAD \) is an inscribed angle and intercepts \( \angle CED \), so it measures half the arc.

In Sum, if a triangle is inscribed in a semicircle, then the triangle will always be a **right** triangle.
Example 4:
A. \(\odot P\)
\[x + 3x = 180\]
\[x = 45^\circ\]
\[m\angle APB = 45^\circ\]
\[m\angle BPC = 135^\circ\]
\[m\angle AB = 45^\circ\]
\[m\angle BC = 135^\circ\]
\[m\angle ABC = 180^\circ\]
\[m\angle ABC = 90^\circ\]
\[m\angle ACB = 22.5^\circ\]

B. \(\odot Q, m\angle CBA = 72^\circ\)
\[m\angle CA = 144^\circ\]
\[m\angle CD = 46^\circ\]
\[m\angle AD = 98^\circ\]
\[m\angle ABC = 216^\circ\]
\[m\angle BC = 134^\circ\]
\[m\angle CBD = 23^\circ\]
\[m\angle BAQ = 49^\circ\]

Example 5:
Arc Measure vs. Arc Length
Arcs can be measured:
- in degrees: \(m\overline{AB}\), arc measure
- in length: \(\overline{AB}\), arc length

Arc length vs. arc measure:
Arc measure is degrees and is equal to the central angle; arc length is the distance between endpoints of the arc and is a portion of the circumference.

Arc Length: \(\text{Length (ARC)} = \frac{m\overline{ARC}}{360} \cdot 2\pi r\)

A. \(\text{FH} = \frac{137\pi(9)}{180} = \frac{137\pi}{20} \text{ m}\)

B. \(\text{ACB} = \frac{253\pi(2)}{180} = \frac{253\pi}{90} \text{ ft}\)