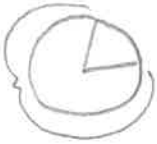
Central Angle: an angle whose vertex is the center of a circle

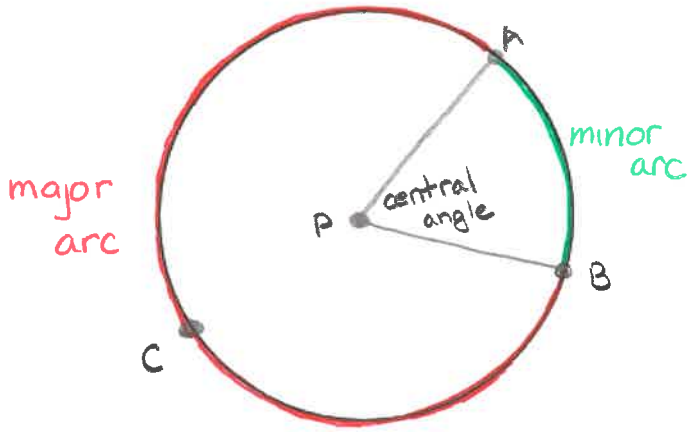
Minor Arc: formed when the central angle is less than 180°

Major Arc: the larger arc (not the minor arc)

major arc



Semicircle: when the endpoints of an arc are the endpoints of a diameter



Naming Arcs

minor arc

named by endpoints

$\overset{\frown}{AB}$

say "minor arc AB"

major arc & semicircle

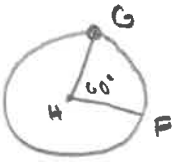
named by endpoints AND additional point on the arc

$\overset{\frown}{ACB}$

say "major arc ACB"

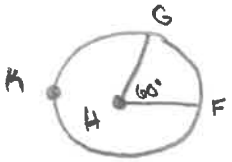
Measuring Arcs:

- Measure of a minor arc: defined to be the measure of its central angle



$m\overset{\frown}{GF} = m\angle GHF = 60°$

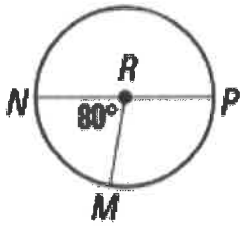
- Measure of a major arc: defined as the difference between 360° and the measure of its associated minor arc



$m\overset{\frown}{GKF} = 360 - m\overset{\frown}{GF}$
$= 360 - 60$
$= 300°$

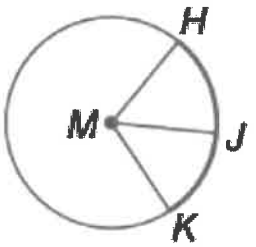
1. Find the measure of each of the arcs in $\odot R$

$\overline{NP}$ is diameter



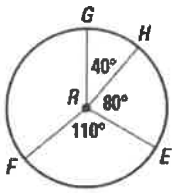
$m\overset{\frown}{NM} = 80°$
$m\overset{\frown}{MP} = 100°$
$m\overset{\frown}{NMP} = 180°$

$m\overset{\frown}{NPM} = 280°$
$m\overset{\frown}{MNP} = 260°$

Arc Addition Postulate (Postulate 26)	The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs	 $m\overset{\frown}{HJ} + m\overset{\frown}{JK} = m\overset{\frown}{HK}$

2. Find the measure of each arc:

a.

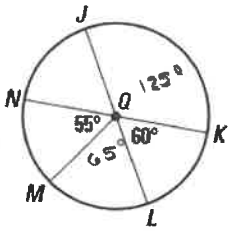


$m\overset{\frown}{GE} = 120°$

$m\overset{\frown}{HEF} = 190°$

$m\overset{\frown}{GF} = 130°$

b.



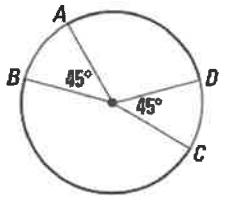
$m\overset{\frown}{ML} = 65°$

$m\overset{\frown}{JK} = 125°$

$m\overset{\frown}{JN} = 60°$

Congruent Arcs: Two arcs of the same circle or congruent circles that have the same measure.

3. Find the measure of arc AB and arc DC. Are the arcs congruent?



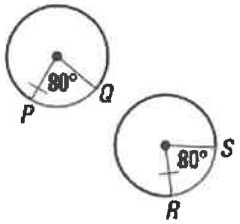
$m\overset{\frown}{AB} = 45°$

$m\overset{\frown}{DC} = 45°$

in the same circle

$\overset{\frown}{AB} \cong \overset{\frown}{DC}$

4. Find the measure of arc PQ and arc SR. Are the arcs congruent?



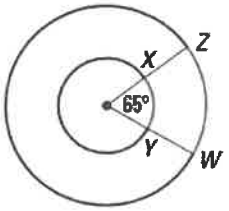
radii $\cong$ so circles are $\cong$

$m\overset{\frown}{PQ} = 80°$

$m\overset{\frown}{SR} = 80°$

$\overset{\frown}{PQ} \cong \overset{\frown}{SR}$

5. Find the measure of arc XY and arc ZW. Are the arcs congruent?

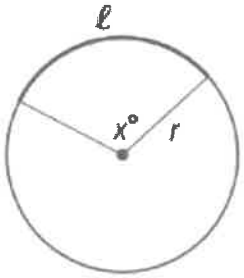


the arcs are in concentric circles that are not congruent

$\overset{\frown}{XY} \ncong \overset{\frown}{ZW}$

Arc Length: the distance between the endpoints along an arc measured in linear units

The ratio of the length of an arc l to the circumference of the circle is equal to the ratio of the degree measure of the arc to $360°$



★ proportion ★

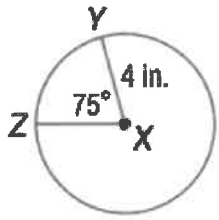
$$\frac{l}{2\pi r} = \frac{x°}{360°}$$

$C = 2\pi r$

$\frac{\text{part}}{\text{whole}}$

6. Find the length of $\overset{\frown}{ZY}$. Round to the nearest hundredth

a.

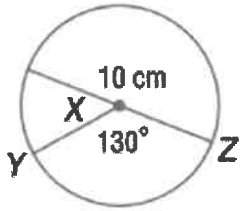


$$\frac{\overset{\frown}{ZY}}{2\pi(4)} = \frac{75}{360}$$

$$\overset{\frown}{ZY} = \frac{75}{360} \cdot 8\pi$$

≈ 5.24 in

b.

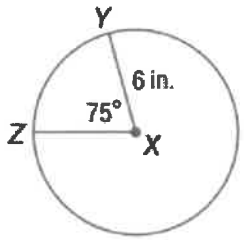


$$\frac{\overset{\frown}{ZY}}{\pi(10)} = \frac{130°}{360°}$$

$$\overset{\frown}{ZY} = \frac{130}{360} \cdot 10\pi$$

$\overset{\frown}{ZY} \approx 11.34$ cm

c.



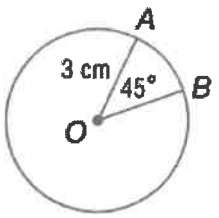
$$\frac{\overset{\frown}{ZY}}{2\pi(6)} = \frac{75}{360}$$

$$\overset{\frown}{ZY} = \frac{75}{360} \cdot 12\pi$$

$\overset{\frown}{ZY} \approx 7.85$ in

7. Find the length of $\overset{\frown}{AB}$. Round to the nearest hundredth.

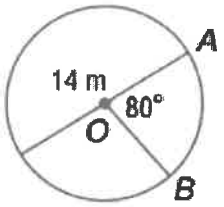
a.



$\frac{\overset{\frown}{AB}}{2\pi(3)} = \frac{45}{360}$

$\overset{\frown}{AB} \approx 2.36\text{ cm}$

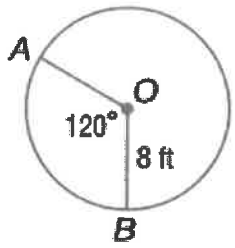
b.



$\frac{\overset{\frown}{AB}}{14\pi} = \frac{80}{360}$

$\overset{\frown}{AB} \approx 9.77\text{ m}$

c.



$\frac{\overset{\frown}{AB}}{2\pi(8)} = \frac{120}{360}$

$\overset{\frown}{AB} \approx 16.76\text{ ft}$