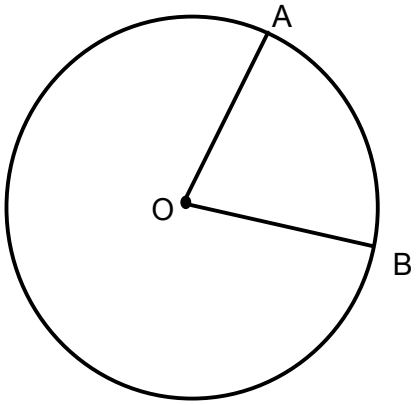
10-2 Angles & Arcs

Central Angle:

* An angle that has the center of the circle as the vertex.

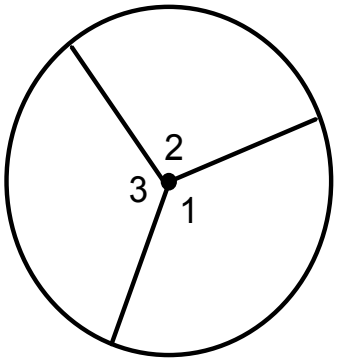
* The sides of the angle will be the two radii of the circle.



$\angle AOB$ is a central angle.

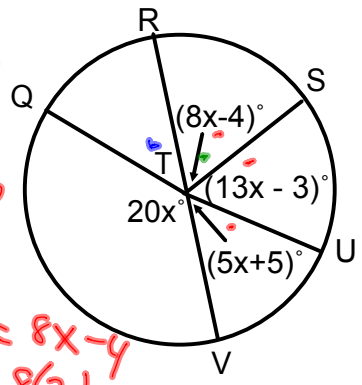
Sum of Central Angle:

* The sum of the measures of the central angles of a circle when there is not interior points in common is 360˚.



$m\angle 1 + m\angle 2 + m\angle 3 = 360^\circ$

1. $\overline{RV}$ is a diameter of $\odot T$.



a. Find $m\angle RTS$.

$8x-4+13x-3+5x+5=180$

$26x+-2=180$

$+2 \quad +2$

$26x=182$

$\frac{26x}{26}=\frac{182}{26}$

$x=7$

$\angle RTS = 8x-4$

$= 8(7)-4$

$= 56-4$

$m\angle RTS = 52^\circ$

b. Find $m\angle QTR$.

$52+13(7)-3+5(7)+5+20(7)+m\angle QTR=360$

$52+91-3+35+5+140+m\angle QTR=360$

$320+m\angle QTR=360$

$-320 \quad -320$

$m\angle QTR=40^\circ$

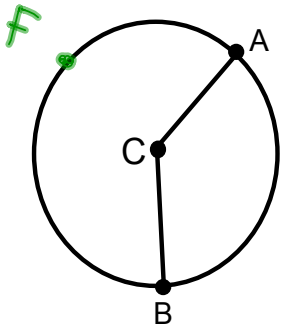
Arc:

* The central angle separates the circle into 2 parts. These parts are arcs.

* The measure of the arc is related to the measure of the central angle.

* Think of an arc as the crust of a pizza or pie.

$m\overset{\frown}{AFB}$



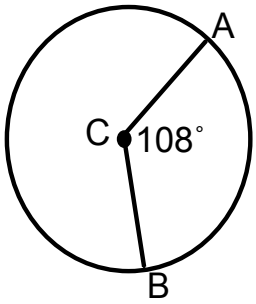
* Symbol: $m\overset{\frown}{AB}$

Minor Arc:

* An arc with a measure less than 180˚.

* Usually name it with the the two endpoints of the arc.

* Will be the same measure as the central angle.



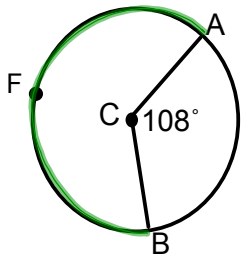
$m\overset{\frown}{AB} = 108^\circ$

Major Arc:

* An arc with a measure more than 180˚.

* Usually name it with the two endpoints and a point on the arc. (3 letters are needed, endpoints are 1st and 3rd letters.)

* Measure will = 360˚ - central angle.



$m\overset{\frown}{AFB} = 360^\circ - mAB$

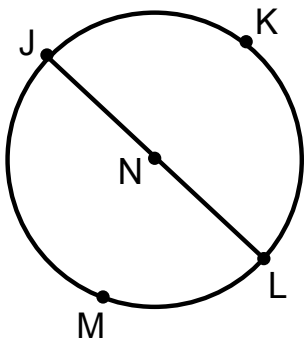
$m\overset{\frown}{AFB} = 360^\circ - 108^\circ$

$m\overset{\frown}{AFB} = 252^\circ$

Semicircle:

* An arc with a measure exactly 180°

* Usually name it with the two endpoints and a point on the arc. (3 letters are needed, endpoints are 1st and 3rd letters.)

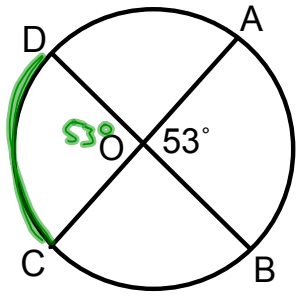


$m\overset{\frown}{JKL} = 180°$

$m\overset{\frown}{JML} = 180°$

Congruent Arcs:

* 2 arcs are ≅ in the same circle (or congruent circles) iff their corresponding central angles are congruent.

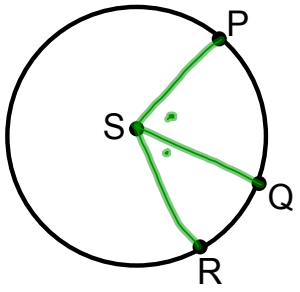


$m\overset{\frown}{AB} = 53°$

$m\overset{\frown}{DC} = 53$

Arc Addition Postulate:

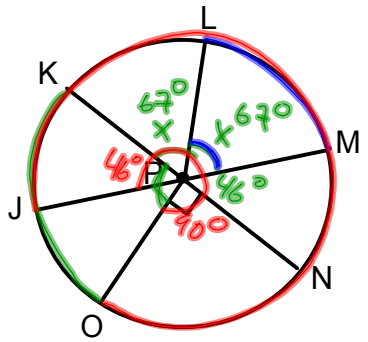
* The measure of an arc formed by 2 adjacent arcs is the sum of the measures of the 2 arcs.



In $\odot S$,

$m\overset{\frown}{PQ} + m\overset{\frown}{QR} = m\overset{\frown}{PR}$

2. In $\odot P$, $m\angle NPM = 46^\circ$, $\overline{PL}$ bisects $\angle KPM$, and $\overline{OP} \perp \overline{KN}$. Find each measure.



a. $m\overset{\frown}{OK} = 90^\circ$

b. $m\overset{\frown}{LM}$

$x + x + 46 = 180$

$2x + 46 = 180$

$-46 \quad -46$

$\frac{2x}{2} = \frac{134}{2}$

$x = 67$

$m\overset{\frown}{LM} = 67^\circ$

c. $m\overset{\frown}{JKO}$

$46 + 67 + 67 + 46 + 90 = 316^\circ$

$m\overset{\frown}{JKO} = 316^\circ$

Circle Graphs:

* To make a circle graph: take the category percent and multiply it by 360˚ to find the measure of the central angle you need to draw.

* Make sure all angles add up to 360˚.

Suppose two of the categories in a circle graph are sleep 25% and eating 10%. You would find the central angle by:

sleep: (0.25)(360˚) = 90˚
eating: (0.10)(360˚) = 36˚

Arc Length:

* Arc length is part of the circumference since an arc is part of a circle.

* Think of it as how much pizza (or pie) crust you will eat.

$$\frac{A}{360^\circ} \times (2\pi r) = \ell$$

A= Central angle measure

or

ℓ = arc length

r = radius

$$\frac{A}{360^\circ} = \frac{\ell}{2\pi r}$$

3. In ⊙B, AC = 9 and m∠ABD = 40°. Find the length of $\overset{\frown}{AD}$.

$\frac{A}{360} = \frac{\ell}{2\pi r}$

$d = 9$

$r = \frac{1}{2} \cdot 9$

$r = 4.5$

$\frac{40}{360} = \frac{\ell}{2\pi(4.5)}$

$360\ell = 40 \cdot 2\pi \cdot 4.5$

$\frac{360\ell}{360} = \frac{1130.97335}{360}$

$\ell = 3.14159265$

$\ell = \pi$