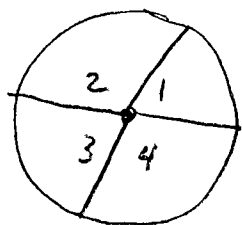


Ch 10-2 Angles and Arcs

CENTRAL ANGLE

AN angle with the center of a circle at one vertex and its two sides are radii of the circle.

EX

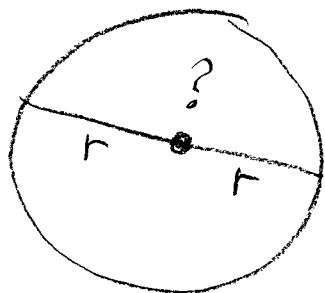


$\angle 1, \angle 2, \angle 3,$ and $\angle 4$ ARE central $\angle$ s.

What is the measure of $\angle 1 + \angle 2 + \angle 3 + \angle 4$?

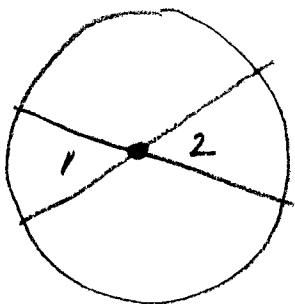
360°

EX What is the measure of the central angle if the 2 radii are part of the same diameter?



180°

How do central $\angle 1$ and $\angle 2$ compare?

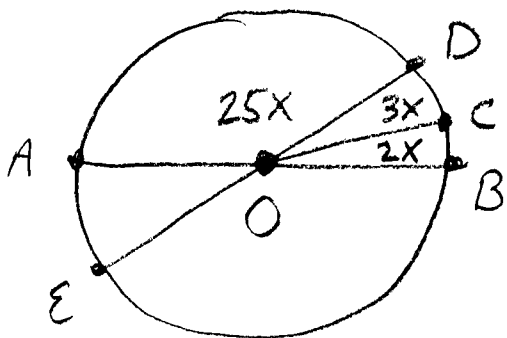


Congruent, because they are vertical $\angle$ s

EX1 (A) Find $m\angle AOD$ in $\odot O$

pg 529

$\uparrow$ poor choice of NAME!!
"Circle 'OH'"



$$\angle DOC = 3x^\circ$$

$$\angle COB = 2x^\circ$$

$$\angle AOD = 25x^\circ$$

Since $\angle AOD + \angle DOB$ are a linear pair

$$25x + 5x = 180^\circ$$

$$30x = 180$$

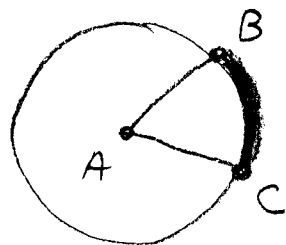
$$x = \frac{180}{30} = 6^\circ$$

$$\therefore \boxed{m\angle AOD = 25(6) = 150^\circ}$$

$$\textcircled{B} \quad m\angle AOE = ? \quad \boxed{5(6) = 30^\circ = m\angle AOE}$$

ARC the part of the circle
"subtended" by a central angle

(EX)

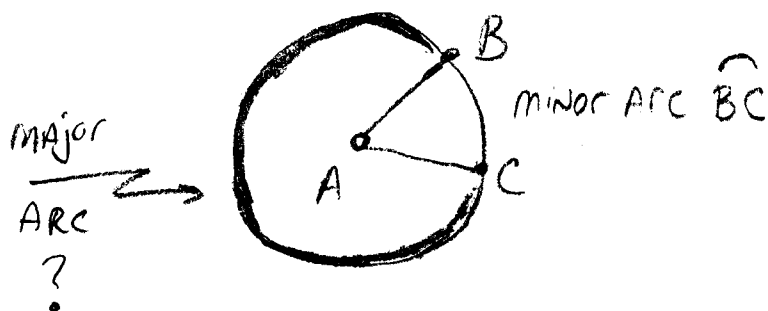


Arc $\widehat{BC}$ is formed
by central angle $\angle BAC$
 $\widehat{BC}$ ← symbol for
arc, be Neat!

MINOR ARC AN ARC $< 180^\circ$

MAJOR ARC AN ARC $> 180^\circ$

A central angle makes one minor and one
major arc. How would you name the
major arc below?



Answer, you need to find or create a point
on the major arc

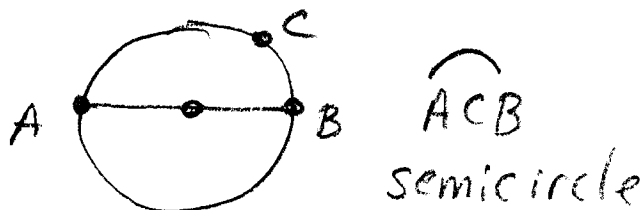


$\widehat{BDC} \cong \widehat{CDB}$
MAJOR ARC

Semicircle

AN ARC THAT = 180°

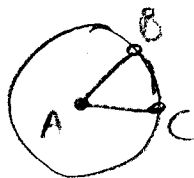
(EX)



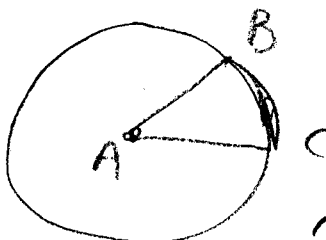
MAJOR ARCS AND semicircles are named by the two endpoints with the 3rd point on the arc as the middle letter.

Central angles and their arcs are both measured in degrees. There is one important difference. Arcs can also be measured in length! But only if you know the radius.

A 30° angle and arc are the same degree for any circle:



$$m\angle A = m\widehat{BC} = 30^\circ$$



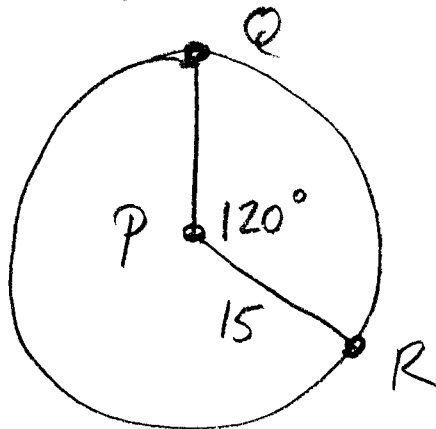
$$m\angle A = m\widehat{BC} = 30^\circ$$

But the measure of the length of $\widehat{BC}$ is different because the circles are not the same size.

Finding Arc length

EX4
Pg 532

In $\odot P$, $PR = 15$ $m\angle QPR = 120^\circ$
Find length of $\widehat{QR}$



Since the total degrees around the circle is 360° , $m\angle QPR$ is $\frac{120}{360}$ part of the circle.

The total distance around the circle $C = 2\pi r$ so $m\widehat{QR}$ is the same part of $2\pi(15) = 30\pi$

$$\frac{120}{360} = \frac{\widehat{QR}}{30\pi} \quad \therefore \overset{5}{30}\pi \left(\frac{120}{\overset{6}{360}} \right) = \widehat{QR}$$

$$\therefore \boxed{10\pi = \widehat{QR}} \quad \text{EXACT}$$

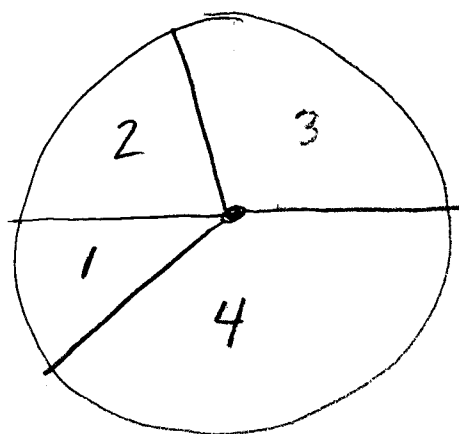
$$\text{or } \boxed{31.42 \approx \widehat{QR}} \quad \text{APPROX.}$$

A common use of central angles are
in Pie Charts = Circle Graphs.

EX) Express 1, 2, 3, 4 as a circle graph.

Make a table, for each number you need
to find its % of total which you then
take that part of 360° to find its central
angle.

<u>Number</u>	<u>% of total</u>	<u>Part of 360°</u>
1	$\frac{1}{10} = 10\%$	$\frac{1}{10} (360) = 36^\circ$
2	$\frac{2}{10} = 20\%$	$\frac{2}{10} (360) = 72^\circ$
3	$\frac{3}{10} = 30\%$	$\frac{3}{10} (360) = 108^\circ$
4	$\frac{4}{10} = 40\%$	$\frac{4}{10} (360) = 144^\circ$
		<u>$360^\circ \checkmark$</u>



*TIP: Enter WolframAlpha "Pie Chart 1, 2, 3, 4"

A few more notes about Angles & Arcs:

Theorem 10.1 $\Rightarrow$ In two $\cong$ $\odot$, 2 Arcs
are $\cong$ iff their central
angles are $\cong$

Minor arcs may or may not be named
using 3 letters, Major arcs or semicircles
must use 3 letters.

Study example 3 on pg 531 for another
example of making a Pie Chart

Homework: Pg. 532-533 # 1-13 odd
20, 32.