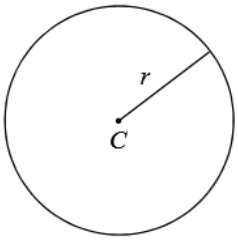
Unit 5 Part A Circles

Unit 5A: Circles



Circles
A *circle* is the set of points in a plane that are ***all a fixed distance (r) from a given point (C).***

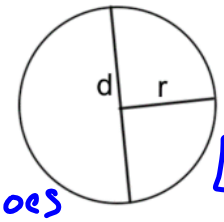
A circle is usually named by its center: ⊙C

Facts:
Two circles are *congruent* if ***they have the same*** radius

Radius
A line segment that connects the center of the circle to any point on the circle.

Fact:

All radii of a given circle are Congruent

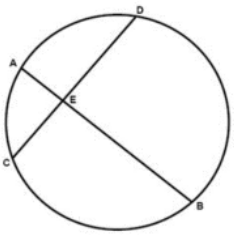


r = radius
d = diameter
2r = d

Diameter
A line segment that connects two point of a circle and goes through the center

Fact: The diameter is equal to 2 times the radius.

Chord
A line segment that connect any two points on a circle.



$\overline{AB}$
$\overline{CD}$

Fact:

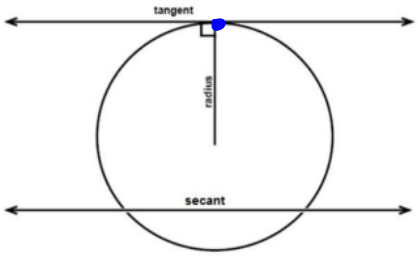
All diameter are chords, but not all chords are diameters.

Secant

A line that passes through two point on a circle.

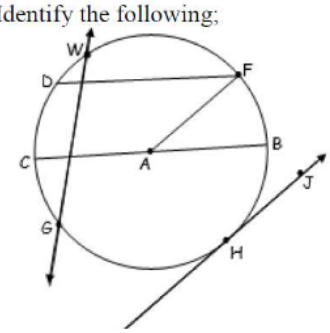
Tangent

A line that intersects a circle only at 1 point.



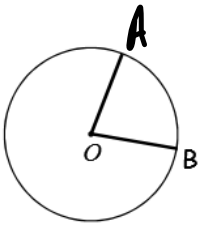
Examples

Identify the following:



1. $\overline{AB}$ Radius
2. $\overline{DF}$ Chord
3. $\overleftrightarrow{WG}$ Secant
4. $\overleftrightarrow{HJ}$ tangent
5. point H Point of tangency
6. $\overline{CB}$ diameter
7. point A Center
8. BC diameter/chord
9. segment WG Chord

Central Angles



A *central angle* of a circle is any angle ***with its vertex at the center of the of the circle***

Example: Name the central angle in the given circle.

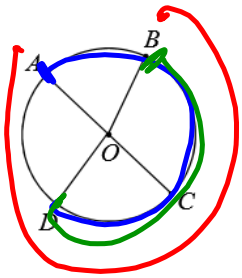
∠AOB, ∠BOA, ∠O

Arcs

An ***arc*** of a circle is ***the part of the circle between two points*** on ***the circle***

A ***minor*** arc is any arc that is less than 180°

*Minor arcs use **TWO** letters when naming.



Examples: Name the minor arc in the given circle O.

AB, DC, BC, AD

A ***major*** arc is any arc that is greater than 180°

*Major arcs use **THREE** letters when naming.

Examples: Name the major arc in the given circle O.

ACD, BCD, ADB

A ***semicircle*** is an arc that is exactly 180°

*Semicircles use **THREE** letters when naming.

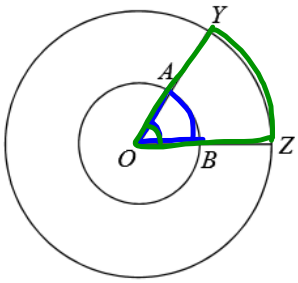
*A semicircle uses one end of the **DIAMETER** to the other.

Examples: Name the semicircles in the given circle O. ABC, ADC

The ***degree measure of an arc*** is ***the same as the measure of the central angle*** ***that forms it.***

$m\overset{\frown}{AB} = m\angle AOB$

*Note: *degree measure* is **NOT** the same as *arc length*.



$\overset{\frown}{AB}$ and $\overset{\frown}{YZ}$ have the same degree measure but they are NOT the same length.

Facts: A full circle is 360°

A semicircle is 180°

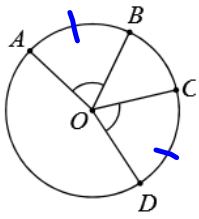
Congruent arcs are two arcs of the same circle (or congruent circles) that have the same measure. ($\overset{\frown}{AB}$ and $\overset{\frown}{YZ}$ above are NOT congruent arcs.)

Congruent central angles intercept congruent angles and vice versa.

If $\angle AOB \cong \angle COD$, then $\overset{\frown}{AB} \cong \overset{\frown}{CD}$ and if $\overset{\frown}{AB} \cong \overset{\frown}{CD}$, then $\angle AOB \cong \angle COD$

Arcs that share an endpoint but no other points may be added.

$\overset{\frown}{AB} + \overset{\frown}{BC} = \overset{\frown}{AC}$ but $\overset{\frown}{AB} + \overset{\frown}{CD}$ = just a number



Ex: In circle O, $m\overset{\frown}{AB} = 70°$ and $\overline{OB} \perp \overline{OC}$. Find

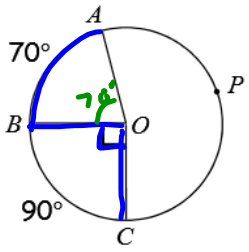
a. $m\overset{\frown}{BC}$ = 90°

b. $m\overset{\frown}{AC}$ = 160°

c. $m\overset{\frown}{APC}$ = 200°

70 + 90 = 160

360 − 160



Ex: In circle O, $m\angle AOB = 70°$, $\overset{\frown}{AB} \cong \overset{\frown}{CD}$, $m\overset{\frown}{BC} = 3x$ and $m\overset{\frown}{AD} = 8x$. Find $m\angle BOC$.

$70 + 3x + 70 + 8x = 360$

$140 + 11x = 360$

$-140 \quad -140$

$\frac{11x}{11} = \frac{220}{11}$ $x = 20$

$m\overset{\frown}{BC} = 3x$

$m\overset{\frown}{BC} = 3(20)$

$m\overset{\frown}{BC} = 60°$

$m\angle BOC = 60°$