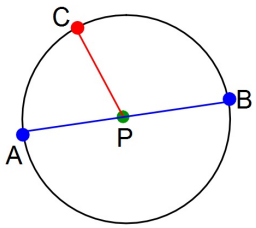
Friday, April 17, 2020

Sec 10-6: Circles and Arcs.

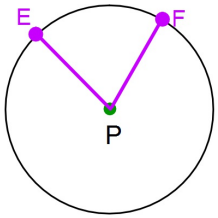
Circle: Set of all points in a plane equidistant from a given point (Center)



Radius: Segment connecting the center of a circle to any point on the circle.
All radii of a given circle are congruent.

Diameter: Segment connecting 2 points on a circle and it must pass through the center.

A circle is named using it's center.
This circle would be named: ⊙P "circle P"



Central Angle:
Angle whose vertex is the center of a circle.

(angle formed by two radii)

∠EPF is a central angle

Circumference: Distance around the outside of a circle.
(just like perimeter of a polygon)

Arc: Part of a circle's circumference.

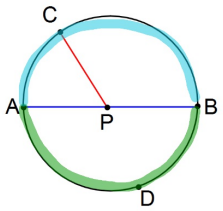
To name an arc:
Use two or three letters(depending on how big the arc is) where the first and last letters are the endpoints. If there are three letters the middle letter is a point inbetween the endpoints.

We use only two letters when the arc is less than half of a circle.

We use three letters when an arc is half of a circle or more.

Symbol for an arc: $\overset{\frown}{QR}$ "arc QR" the arc connecting pts Q and R

There are 3 kinds of arcs:



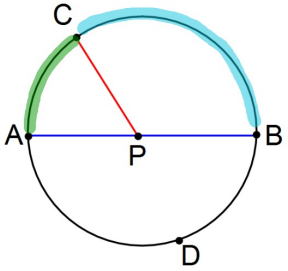
Semicircle = half of a circle.

Must use 3 letters

ex: $\overset{\frown}{ADB}$

The other semicirlce would be

$\overset{\frown}{ACB}$



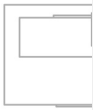
Minor Arc: less than a semicircle.

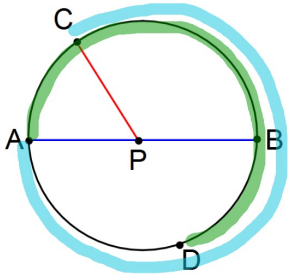
2 letters

ex: $\overset{\frown}{AC}$

Another minor arc in this diagram would be:

$\overset{\frown}{BC}$





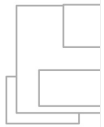
Major Arc: more than a semicircle

Must use 3 letters

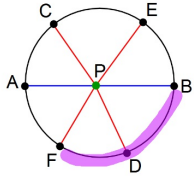
ex: $\overset{\frown}{ABD}$

Another example of a major arc could be:

$\overset{\frown}{CBA}$

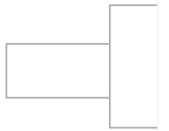


Name the highlighted arc. $\overline{AB}$ is a diameter

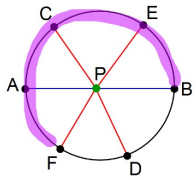


Since this is a minor arc we only use two letters:

$\overset{\frown}{FB}$ or $\overset{\frown}{BF}$



Name the highlighted arc. $\overline{AB}$ is a diameter



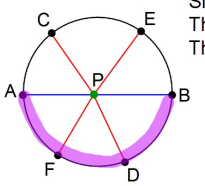
Since this is a major arc we must use 3 letters.
The first and last letters must be F and B.
The middle letter will be either A, C, or E.

There are six ways to name this arc.
Here are some examples:

$\overset{\frown}{FAB}$ or $\overset{\frown}{BEF}$ or $\overset{\frown}{FCB}$

If you only use two letters it alwyas implies the shortest route between those two letter and in this circle it would represent a minor arc.

Name the highlighted arc. $\overline{AB}$ is a diameter



Since this is a semicircle we must use 3 letters.
The first and last letters must be A and B.
The middle letter will be either F or D.

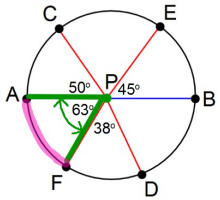
There are four ways to name this arc.
Here are two examples:

$\overset{\frown}{AFB}$ or $\overset{\frown}{BDA}$

The measure of an arc is equal to the measure of its correpsonding central angle.

So the measure of an arc is given in degrees just like an angle.

There are 360° around a circle.

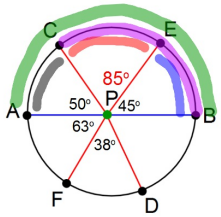


What is the measure of $\overset{\frown}{AF}$?

The measure of $\overset{\frown}{AF}$ is going to equal the measure of its central angle $\angle APF$

$m\overset{\frown}{AF} = m\angle APF = 63°$

Find the measure of $\overset{\frown}{CB}$



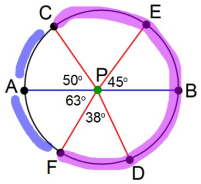
$m\overset{\frown}{CB} = m\overset{\frown}{CE} + m\overset{\frown}{EB} = m\overset{\frown}{CE} + 45°$

$m\overset{\frown}{CE} = \boxed{180°} - 50° - 45° = 85°$

$m\overset{\frown}{CB} = m\overset{\frown}{CE} + m\overset{\frown}{EB} = 85° + 45° = 130°$

$\boxed{m\overset{\frown}{CB} = 130°}$

Find the measure of $\overset{\frown}{FDC}$



You could add up all the arcs that make up $\overset{\frown}{FDC}$

OR

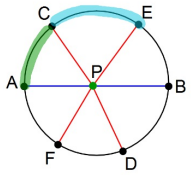
You could subtract $\overset{\frown}{AF}$ and $\overset{\frown}{AC}$ from 360°

$360° - \overset{\frown}{AF} - \overset{\frown}{AC} = 360° - 63° - 50° = 247°$

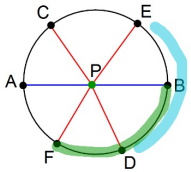
$m\overset{\frown}{FDC} = 247°$

Adjacent Arcs: Arcs of the same circle that have exactly one point in common.

They do not overlap and there is no gap between them

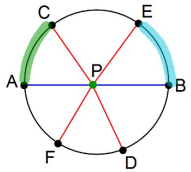


$\overset{\frown}{AC}$ and $\overset{\frown}{CE}$ are adjacent arcs



$\overset{\frown}{FB}$ and $\overset{\frown}{DE}$ are NOT adjacent arcs because they overlap.

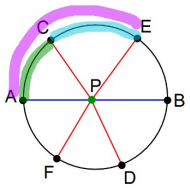
They have more than one pt in common.



$\overset{\frown}{AC}$ and $\overset{\frown}{EB}$ are NOT adjacent arcs

because they have NO pts in common.

Arc Addition Postulate:

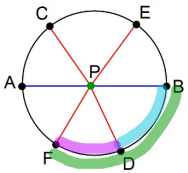


The sum of two adjacent arcs

$\overset{\frown}{AC} + \overset{\frown}{CE} = \overset{\frown}{AE}$

You could also turn this into subtraction:

Arc subtraction:



$\overset{\frown}{FB} - \overset{\frown}{DB} = \overset{\frown}{FD}$

You can now do Practice #17 which is posted on my blog.