Key

10.4 Inscribed Angles- Notes

Objectives:
Find measures of inscribed angles
Find measures of inscribed polygons

Recall:

An angle whose vertex is the center of a circle is a central angle.

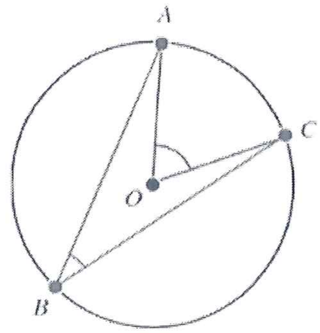
New:

An angle whose vertex is on the circle and its sides are chords is an inscribed angle.

Angles & Arc Relationships

Central Angle:

m<AOC = m$\widehat{AC}$



Inscribed Angle

m<ABC = $\frac{1}{2}$ m$\widehat{AC}$

OR

m$\widehat{AC}$ = 2 · m<ABC

Example 1:

Refer to the figure. Find each measure.

a. $m\angle ABC$ $\frac{1}{2}(180) = 90°$

b. $m\widehat{CD} = 2(59) = 118°$

c. $m\widehat{AD}$ $180 - 118° = 62°$

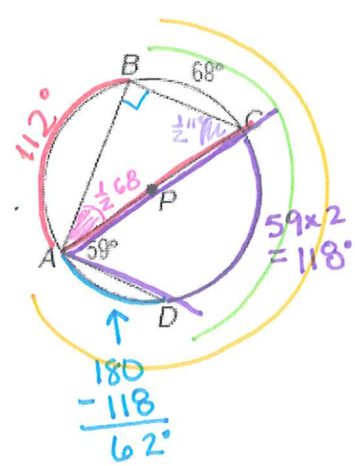
d. $m\angle BAC = \frac{1}{2}(68) = 34°$

e. $m\angle BCA$ $\frac{1}{2}(112) = 56°$

f. $m\widehat{AB} = 180 - 68 = 112°$

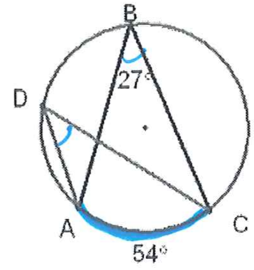
g. $m\widehat{BCD} = 68 + 118 = 180°$

h. $m\widehat{BDA}$ $360 - 112 = 248°$



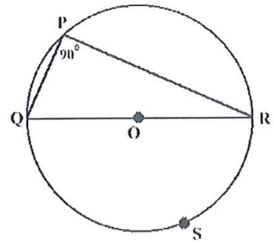
Other Inscribed Angle Theorems

-Inscribed Angles of $\cong$ arcs are $\cong$.



-Inscribed Angles of same arcs are $\cong$.

$\angle ADC$ and $\angle ABC$ both intercept $\overset{\frown}{AC}$, so their measures must be equal

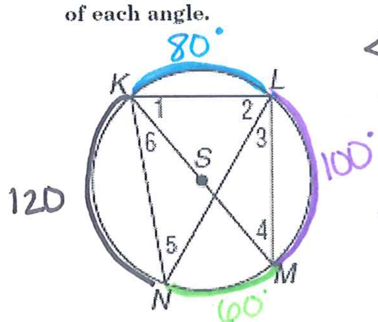


-If an inscribed angle intercepts a semicircle, then the angle = 90°.
OR
- Inscribed angles on a diameter are right.

$\overline{QR}$ is a diameter of circle O.
$\overset{\frown}{QSR}$ is a semicircle.
$\angle QPR$ is a right angle.

Example 2:

In $\odot S$, $m\overset{\frown}{KL} = 80$, $m\overset{\frown}{LM} = 100$, and $m\overset{\frown}{MN} = 60$. Find the measure of each angle.

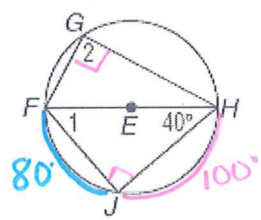


$\angle 1 = \frac{1}{2}100 = 50°$
$\angle 2 = \frac{1}{2}120 = 60°$
$\angle 3 = \frac{1}{2}60° = 30°$
$\angle 4 = \frac{1}{2}80 = 40°$
$\angle 5 = \frac{1}{2}80 = 40°$
$\angle 6 = \frac{1}{2}60 = 30°$

Example 3:

Find the measure of each angle

$m\angle 1, m\angle 2$



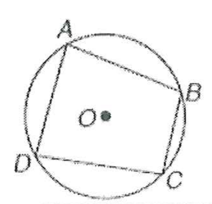
$\angle 1 = \frac{1}{2}100$
$\boxed{\angle 1 = 50°}$

Proof

4. Inscribed Quadrilaterals

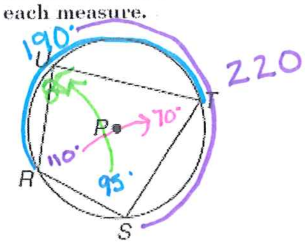
Write a proof for the theorem:
If a quadrilateral is inscribed in a circle, then its opposite angles are supplementary.

Given: quadrilateral $ABCD$ inscribed in $\odot O$
Prove: $\angle A$ and $\angle C$ are supplementary. $\angle B$ and $\angle D$ are supplementary.



1. quad ABCD insc. $\odot O$	1. given
2. $\angle A = \frac{1}{2}\overset{\frown}{BCD}$, $\angle C = \frac{1}{2}\overset{\frown}{BAD}$	2. insc. $\angle = \frac{1}{2}$ arc
3. $\angle A + \angle C = \frac{1}{2}\overset{\frown}{BCD} + \frac{1}{2}\overset{\frown}{BAD}$	3. addition
4. $\overset{\frown}{BCD} + \overset{\frown}{BAD} = 360°$	4. arc addition
5. $\angle A + \angle C = \frac{1}{2}(\overset{\frown}{BCD} + \overset{\frown}{BAD})$	5. Factor for GCF
6. $\angle A + \angle C = \frac{1}{2}360$	6. substitution
7. $\angle A + \angle C = 180°$	7. substitution
8. $\angle A$ and $\angle C$ are suppl.	8. def of suppl.
9. same for $\angle B$ & D.	9. substitution ☺

5. Quadrilateral $RSTU$ is inscribed in $\odot P$ such that $m\overset{\frown}{STU} = 220$ and $m\angle S = 95$. Find each measure.



A. $m\angle R = 110°$

B. $m\angle T = 70°$

C. $m\angle U = 85°$

D. $m\overset{\frown}{SRU}$ ~~[illegible]~~ $360 - 220$
$140°$

E. $m\overset{\frown}{RUT} = 190°$

F. $m\overset{\frown}{RST}$
$170°$