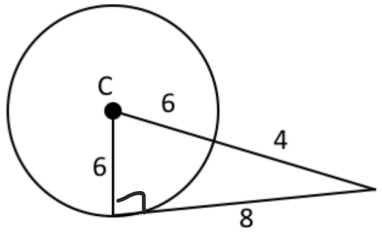
1. Verify a Tangent to a Circle.

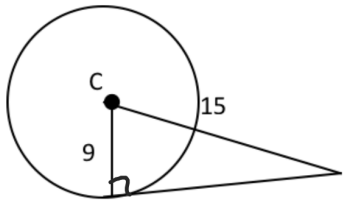
a.



$10^2 = 6^2 + 8^2$

yes

b.

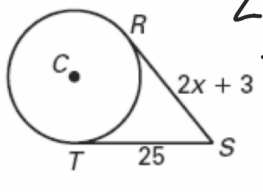


$15^2 = 9^2 + 12^2$

yes

2. Using Properties of Tangents. SR and ST are tangent to Circle C. Find the value of x

a.

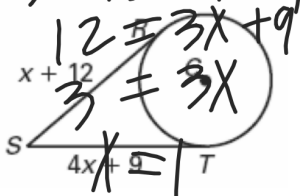


$25 = 2x + 3$

$22 = 2x$

$x = 11$

b.



$x + 12 = 4x + 9$

$12 = 3x + 9$

$3 = 3x$

$x = 1$

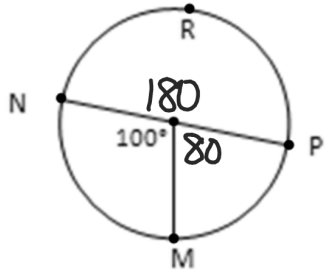
3. Finding measures of each arc of circle R. (NP is a diameter)

a. $\overset{\frown}{MN}$ 100°

b. $\overset{\frown}{MPN}$ 260°

c. $\overset{\frown}{PMN}$ 180°

d. $\overset{\frown}{PM}$ 80°



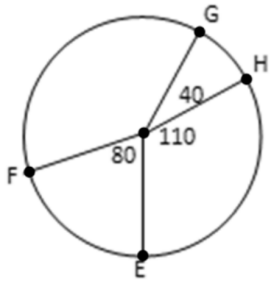
4. Finding the measures of Arcs

a. $\overset{\frown}{GE}$ 150°

b. $\overset{\frown}{GEF}$ 220°

c. $\overset{\frown}{GF}$ 140°

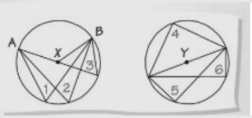
d. $\overset{\frown}{FHE}$ 280°



Geometry 12-3: Inscribed Angles

Objective 1: I can find the measure of an inscribed angle.

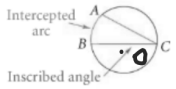
Hands-On Activity: Exploring Inscribed Angles



1. a. Patterns In ⊙X, use a protractor to measure ∠AXB and each numbered angle. Determine $m\overset{\frown}{AB}$. Record your results and look for patterns. Compare your results with others.
   b. Write a conjecture about the relationship between $m\angle 1$ and $m\overset{\frown}{AB}$.
   c. Write a conjecture about the measures of ∠1, ∠2, and ∠3.
2. a. Patterns Use a protractor to measure the numbered angles in ⊙Y. Record your results and look for patterns. Compare your results.
   b. Write a conjecture about an angle whose vertex is on a circle and whose sides intersect the endpoints of a diameter of the circle.

Below, the vertex of ∠C is on ⊙O, and the sides of ∠C are chords of the circle.

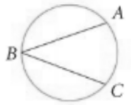
∠C is an inscribed angle $\overset{\frown}{AB}$ is the intercepted arc of ∠C



Theorem 12-9 describes the relationship between an inscribed angle and its intercepted arc.

Theorem 12-9: Inscribed Angle Theorem

The measure of an inscribed angle is half the measure of its intercepted arc.



$\angle B = \frac{1}{2} m\overset{\frown}{AC}$

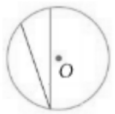
$\angle ABC$

There are three different ways that an angle can be inscribed inside of a circle.

I. II. III.

I: The center is on a side of the angle.

II: The center is inside the angle.

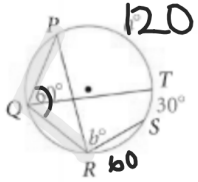


III: The center is outside the angle.

Regardless of where the center of the circle is located, you will still use Theorem 12-9 to find the measure of inscribed angles.

Example 1: Use Theorem 12-9 to find the measure of inscribed angles.

A) Find the values of a and b.



$b^\circ = \frac{1}{2}(\overset{\frown}{PT} + \overset{\frown}{TS})$

$\frac{1}{2}(120 + 30)$

$= 75^\circ$

B) Use the diagram above and find $m\angle PQR$ if $m\overset{\frown}{RS} = 60$.

$1/2(120+30+60) = 105^\circ$

These corollaries below will help you find the measures of angles in circles.

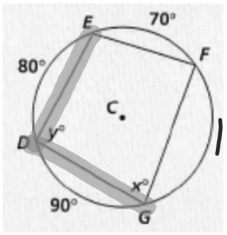
Corollaries to the Inscribed Angle Theorem:

(1) Two inscribed angles that intercept the same arc are $\cong$.

(2) An angle inscribed in a semicircle is a 90° rt∠

(3) The opposite angles of a quadrilateral inscribed in a circle are suppl. $= 180^\circ$

C) Find the values of x and y.



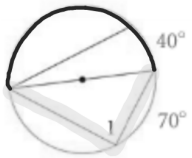
$x^\circ = \frac{1}{2}(DE + EF)$

$= \frac{1}{2}(80 + 70) = 75^\circ$

$y = \frac{1}{2}(70 + 120) = 95^\circ$

Example 2: Use the above corollaries to find the measure of the numbered angles.

A)



$\angle 1 = 90$

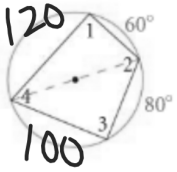
(2)

B)

$\angle 2 = 38$

(1)

C)

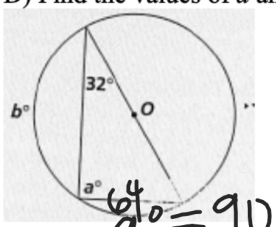


$\angle 1 \& \angle 3 = 90°$

$\angle 2 = 110°$

$\angle 4 = 70°$

D) Find the values of *a* and *b*.

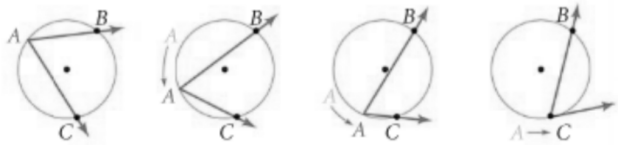


$a° = 90$

$b° = 116°$

Objective 2: I can find angles formed by a tangent line and a chord.

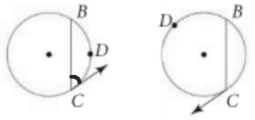
In the diagram, *B* and *C* are fixed points, and point *A* moves along the circle. From the Inscribed Angle Theorem, you know that as *A* moves, $m\angle A$ remains the same and is $\frac{1}{2}m\overset{\frown}{BC}$. As the last diagram suggests, this is also true when *A* and *C* coincide.



Theorem 12-10

The measure of an angle formed by a tan line and a chord is half the measure of the intercepted arc.

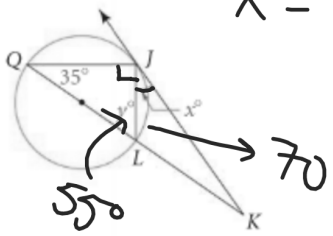
$\angle C = \frac{1}{2}m\overset{\frown}{BC}$



Example 3:

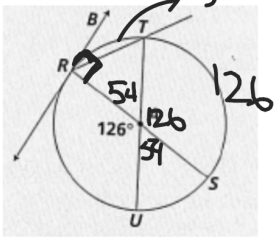
A) In the diagram below, $\overleftrightarrow{KJ}$ is tangent to the circle at J. Find the values of *x* and *y*.

$x° = 35°$



B) How could we find $m\angle QJK$?

Example 4: $\overline{RS}$ and $\overline{TU}$ are diameters of $\odot A$. $\overline{RB}$ is tangent to $\odot A$ at point R. Find and $m\angle TRS$



$\angle TRS = 63^\circ$

$\angle BRT = 27$

90

Hwk #30 -

Sec. 12-3

Pages 681-682

Problems 1-3, 5-14, 15-17, 21

IXL #16 - U.8 & U.9 due Friday at 4pm!