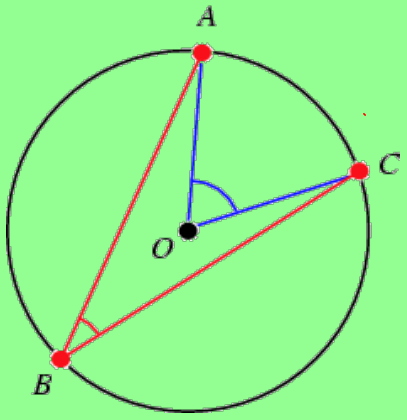


Section 8.3

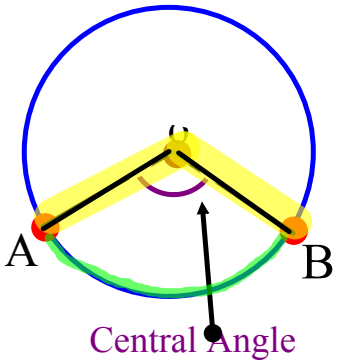
Properties of Angles in Circles

Central Angle:

The angle formed by joining the endpoints of a arc to the centre of a circle

(Made with 2 radii)

$\angle AOB$

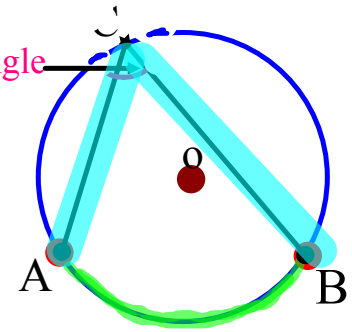


Inscribed Angle:

The angle formed by joining the endpoints of a arc to a point on the circle

(Made with two chords)

$\angle ACB$

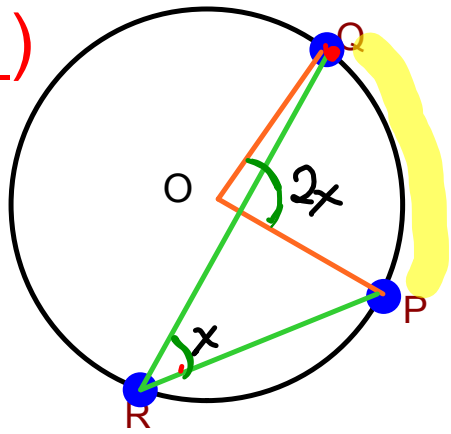


Inscribed and central angles are SUBTENDED by the MINOR arc

come from the same 'smaller arc'

Central Angle & Inscribed Angle Property

Property 1: (Ins/Cent <, $\overset{\frown}{QP}$)



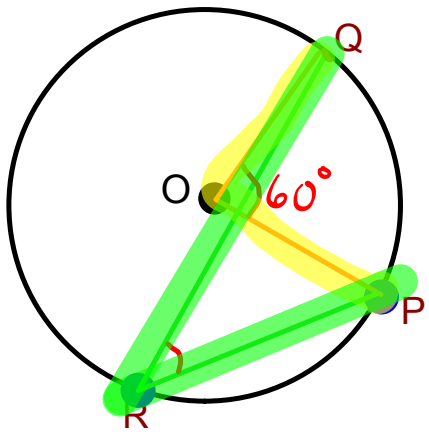
In a circle, the measure of a central angle subtended by an arc is TWICE the measure of an inscribe angle subtended by the same arc.

$\angle POQ = 2\angle PRQ$ Central angle is twice the inscribed angle

or

$\angle PRQ = \frac{1}{2}\angle POQ$ Inscribed angle is half the center angle

Example:



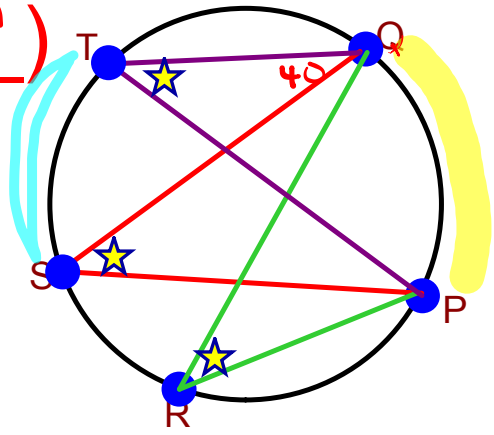
$\angle QOP = 60°$

$\angle QRP = 30°$ (Ins/Cent <, $\overset{\frown}{QP}$)

Inscribed Angle Property

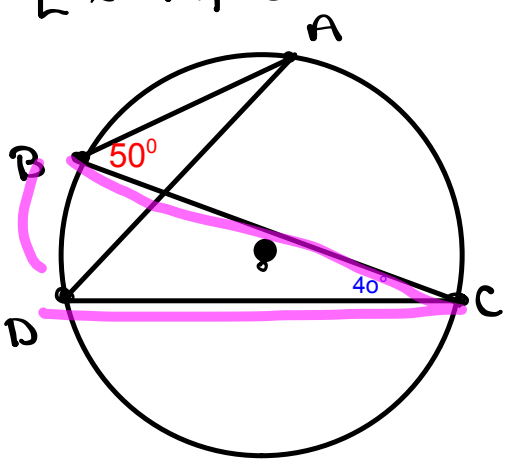
Property 2: (Ins<, ⌒)

In a circle, all inscribed angles subtended by (coming from) the same arc are congruent (equal).



<PTQ = < PSQ = <PRQ

Example



∠ABC = 50°

∠ADC = 50° (ins<, $\overset{\frown}{AC}$)

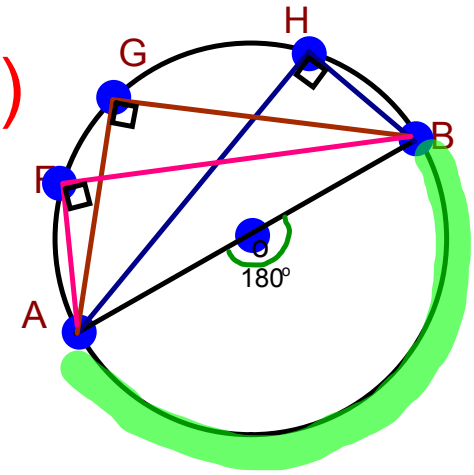
∠BCD = 40

∠BAD = 40° (ins<, $\overset{\frown}{BD}$)

Angles is a Semicircle Property

Property 3: (Ins <, diam)

All inscribed angles subtended by a semicircle are right angles



Makes sense

Inscribed angles are always half the centre

Center Angle = 180° (Straight Line)

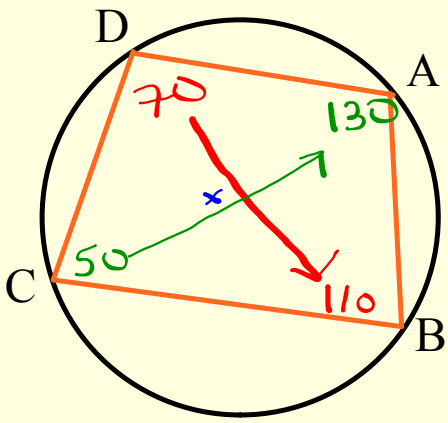
Inscribed angle is half the Central Angle

Inscribed = (1/2) central
=(1/2) 180°
= 90°

Cyclic Quadrilateral Angle Properties:

Property 4: (Cy Quad)

__The opposite angles of an inscribed **quadrilateral** are supplementary.
(their sum is 180º)



ABCD is an inscribed quadrilateral.
< A and < C are opposite
therefore, < A + < C = 180º

< B and < D are opposite
therefore, < B + < D = 180º

Section 8. 3: Circle Properties reasoning

(ins/cent <, $\overset{\frown}{\ }$)

(ins<, $\overset{\frown}{\ }$)

(ins <, dia)

(CyQuad)

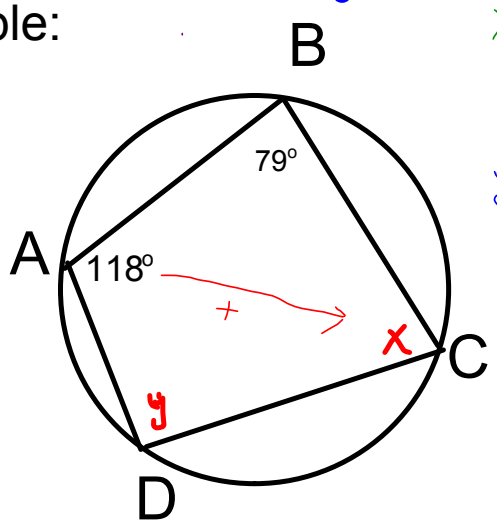
(SATT)

(ITT)

(SAT)

(CyAT)

Example:

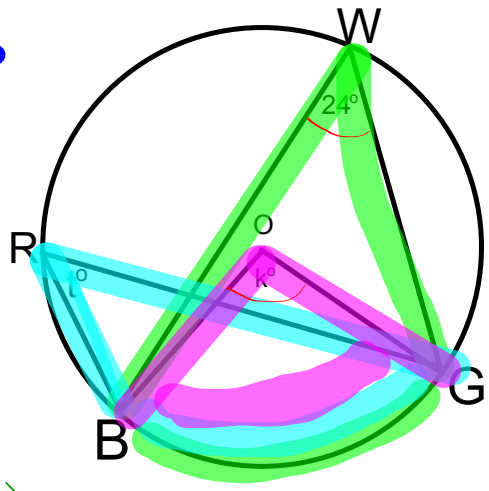


$x \Rightarrow \angle BCD = 62^\circ$ (Cy Quad)

$y \Rightarrow \angle ADC = 101^\circ$ (Cy Quad)

Example 1
Using Inscribe and Central Angles

Point O is the center of a circle.
Determine the values of k° and t°.

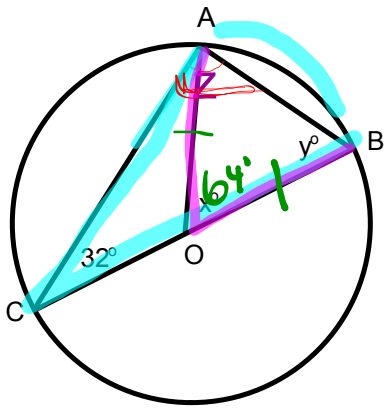


$k \Rightarrow \angle BOG = 48^\circ$ (Ins/cent, $\overset{\frown}{BG}$)

$t \Rightarrow \angle BRG = 24^\circ$ (Ins $\angle$, $\overset{\frown}{BG}$)

Example 2

Applying the Property of an Angle Inscribed in a Semicircle



Point O is the center of the circle.
Determine the value of x° and y°.

$\angle CAB = 90^\circ$ (Ins, dia)

For Y°

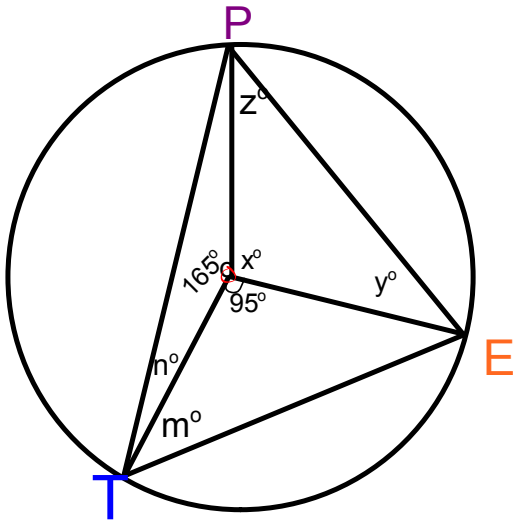
$y = 58^\circ$ (Itt)
or
(SATT)

For X°

$\angle AOB = 64^\circ$ (Ins/cent, $\overset{\frown}{AB}$)

Example 3
Determining Angles in an Inscribed Triangle

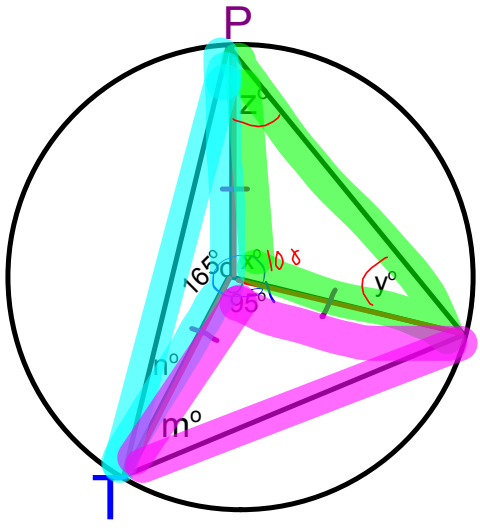
Determining the values of x º , yº , zº, mº, nº



Hint: LOOK AT CENTER ANGLES and Complete the circle for x

Example 3
Determining Angles in an Inscribed Triangle

Determining the values of x °, y^o, z^o, m^o, n^o



Hint: LOOK AT CENTER ANGLES and Complete the circle for x

$x = \angle POE =$ 100° (CyAT)

$y = \angle OEP =$ 40° (Itt)

$z = \angle OPE =$ 40° (Itt)

$m = \angle OTE =$ 42.5° (Itt)

$n = \angle OTP =$ 7.5° (Itt)

Attachments

Worksheet - Angles in a Circle.doc