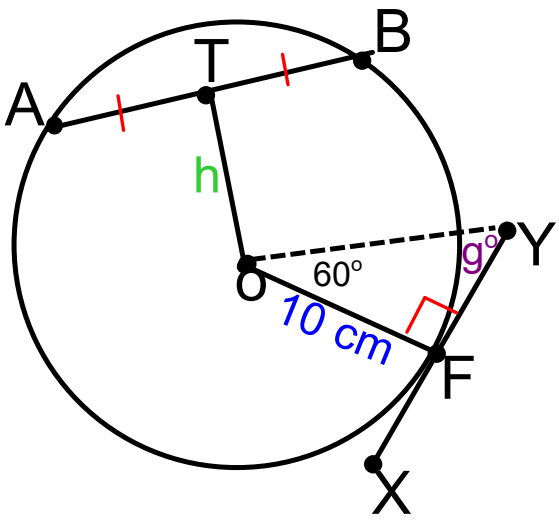
Curriculum Outcomes:

(SS1) Solve problems and justify the solution strategy using circle properties, including: the perpendicular from the centre of a circle to a chord bisects the chord; the measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc; the inscribed angles subtended by the same arc are congruent; a tangent to a circle is perpendicular to the radius at the point of tangency.

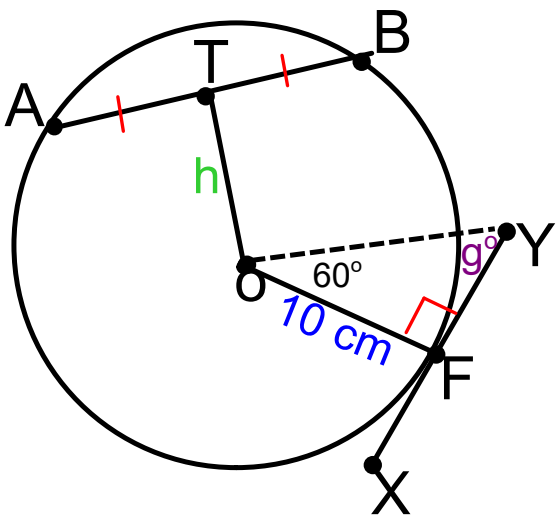
Student Friendly:
How angles found at the centre of a circle are related to angles formed by two chords found inside the circle.

Warm Up



If AB is 16 cm, calculate the length of OT and the <OYF.

Warm Up



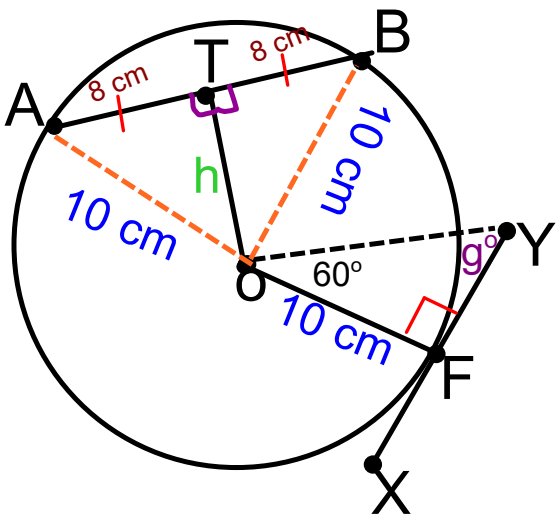
If AB is 16 cm, calculate the length of OT and the <OYF.

<OFY = 90° (Tang P)

g° = <OYF = 180° - 90° - 30°

g° = <OYF = 30° (SATT)

Warm Up



If AB is 16 cm, calculate the length of OT and the <OYF.

AT= BT = 8 cm (given/Chord)

<OTB =<OTA = 90° (Chord P)

OF = 6cm (radius)

OA = 6cm (radius)

OB = 6cm (radius)

OT ⇒ leg

$a^2=c^2- b^2$

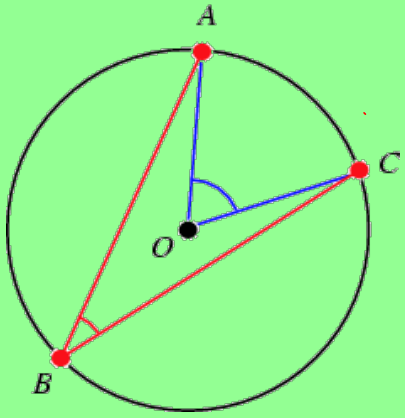
$a^2=10^2- 8^2$

$a^2=100 - 64$

$a^2=36$

$a = \sqrt{36}$

$a = 6$

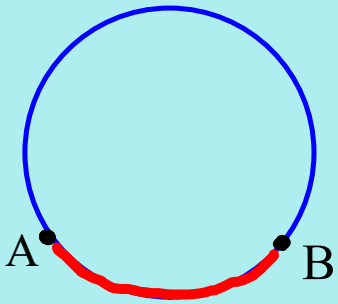


Section 8.3

Properties of Angles in Circles

- The longer arc AB is the major arc .

- The shorter arc AB is the minor arc.

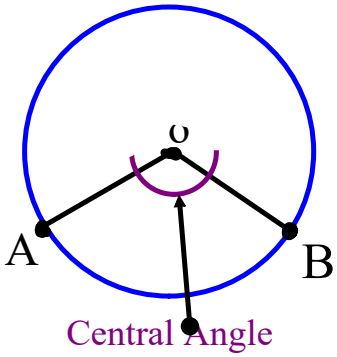


arc $\overset{\frown}{AB}$

Central Angle:

The angle formed by joining the endpoints of a arc to the centre of a circle
(Made with 2 radii)

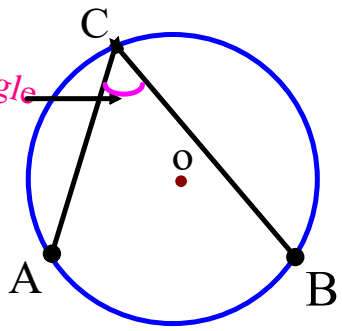
$< AOB$



Inscribed Angle:

The angle formed by joining the endpoints of a arc to a point on the circle
(Made with two chords)

$< ACB$

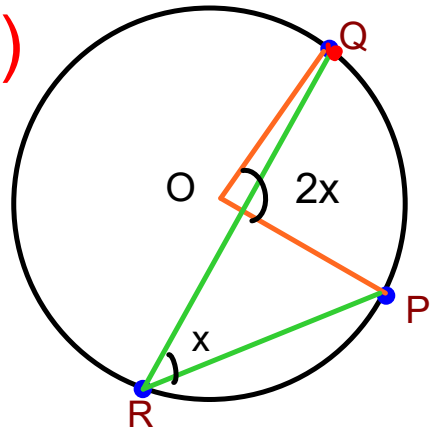


Inscribed and central angles are SUBTENDED by the MINOR arc

come from the same 'smaller arc'

Central Angle & Inscribed Angle Property

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



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

$\angle POQ = 2\angle PRQ$

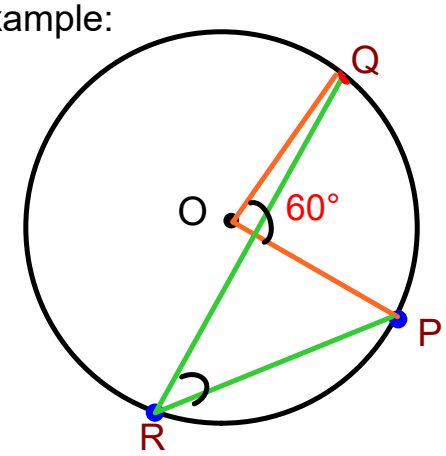
Central angle is twice the inscribed angle

or

$\angle PRQ = \frac{1}{2}\angle POQ$

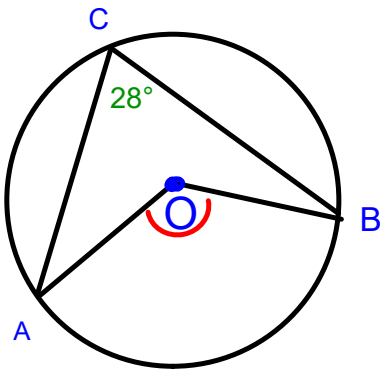
Inscribed angle is half the center angle

Example:



$\angle QOP = 60°$ (given/central)

$\angle QPR = 30°$ (inc/cent<, $\overset{\frown}{QP}$)



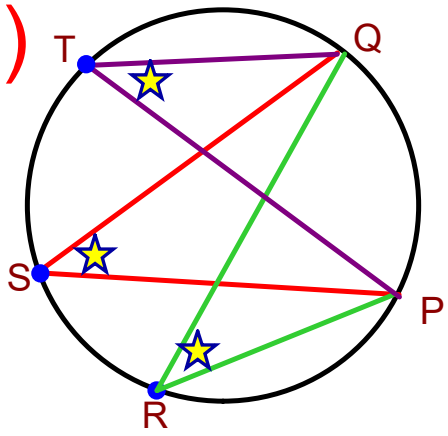
$\angle ACB = 28°$ (given/inc)

$\angle AOB = 56°$ (inc/cent<, $\overset{\frown}{AB}$)

Inscribed Angle Property

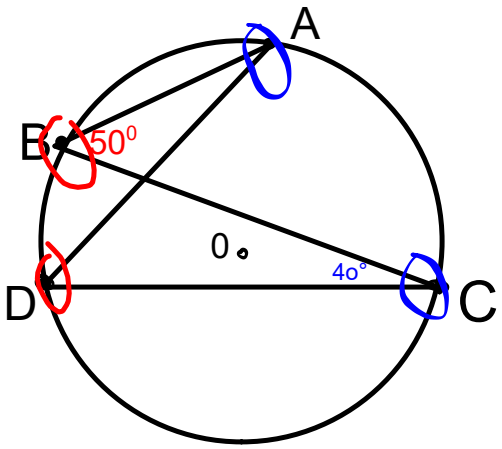
Property 2: (Ins<, $\overset{\frown}{\quad}$)

In a circle, all inscribed angles coming from the same arc are equal.



<PTQ = < PSQ = <PRQ

Example:



<ABC = 50° (given/ ins)

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

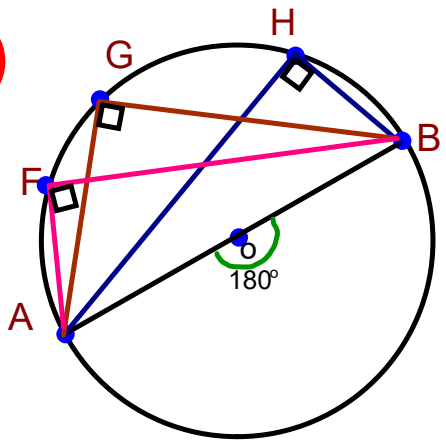
<BCD = 40° (given/ ins)

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

Angles is a Semicircle Property

Property 3: (Inc <, diam)

All inscribed angles subtended by a semicircle (diameter)are right angles



Makes sense

Inscribed angles are always half the centre

Center Angle = 180° (Straight Line)

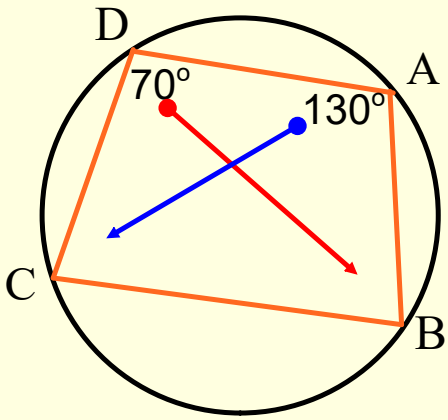
Inscribed angle is half the Central Angle

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.
(add up to 180º)



< A + < C = 180º

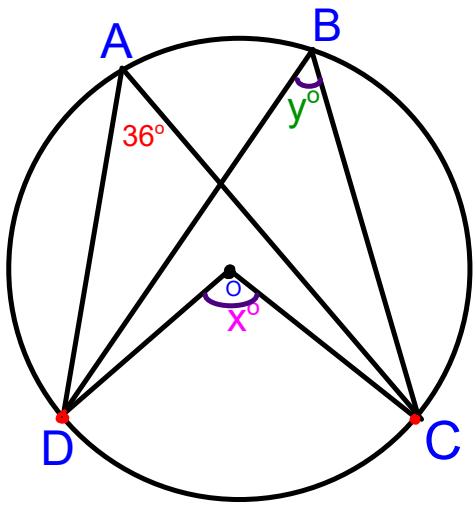
< B + < D = 180º

<C = 50º (Cy Quad)

<B = 110º (Cy Quad)

Ever thing you have learned

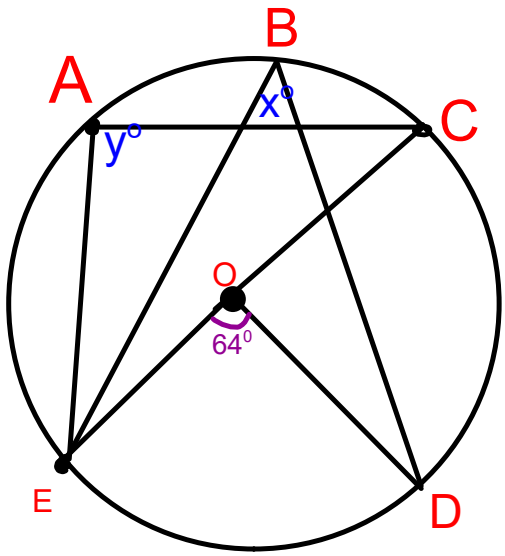
Angle Properties	Tangent & Chord Properties	Circle Properties
(SATT) (ITT) (SAT) (CAT) (OAT) (CyAT) (EAT)	< ___ = 90° (Tang P) <___= <___= 90° (Chord P) ___ = ____(Chord P) ___ = ____=___(Radii)	< ___= __° (ins/cent >, $\overset{\frown}{\_\_}$) < ___= __° (ins >, $\overset{\frown}{\_\_}$) < ___= __° (ins >, diam) < ___= __° (CyQuad)



<DAC=36°(given/inc)

y° <DBC = 36° (inc <, $\overset{\frown}{DC}$)

x° <DOC = 72° (inc/Cent, $\overset{\frown}{DC}$)

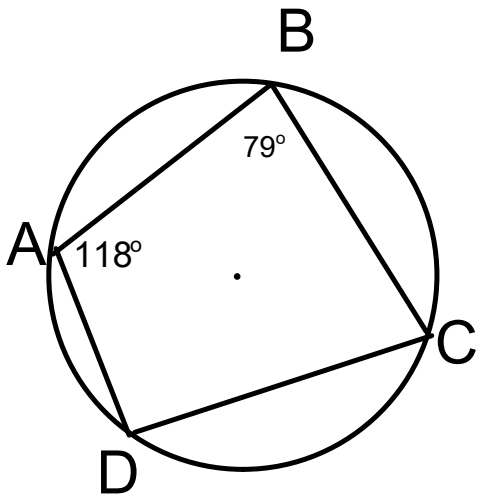


<DOE=64°(given/cent)

x° <DBE = 32° (inc/Cent, $\overset{\frown}{ED}$)

y°<DBC = 90° (inc >, dia)

Example:

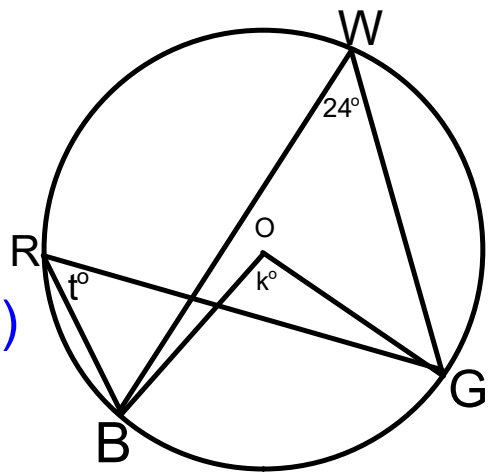


<BCD= 62° (CyQuad)

<ADC= 101° (CyQuad)

Example 1
Using Inscribe and Central Angles

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



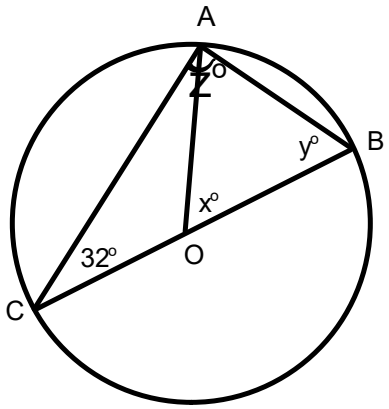
<BWG = 24° (given/ ins)

k <BOG= 48° (Inc/Cent, $\overset{\frown}{BG}$)

t <BRG= 24° (Inc<, $\overset{\frown}{BG}$)

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° , y° and z°

<ACB = 32° (given/ ins)

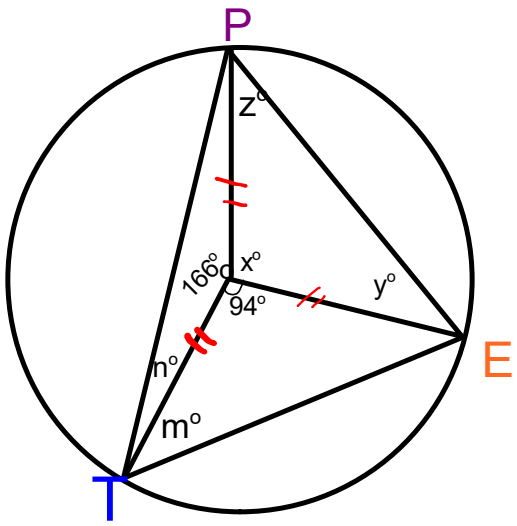
x <AOB= 64° (Inc/Cent<, $\overset{\frown}{AB}$)

z <CAB= 90° (Inc <, Dia)

y <ABC= 58° (SATT)

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 <POE= 100° (CyAT)

Y <PEO= 40° (ITT)

Z <EPO= 40° (ITT)

m <OTE= 43° (ITT)

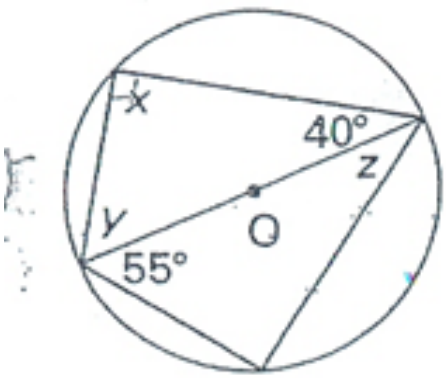
n <OTP= 7° (ITT)

OT= OP = OE (Radii)

Angle Properties	Tangent & Chord Properties	Circle Properties
(SATT) (ITT) (SAT) (CAT) (OAT) (CyAT) (EAT)	< ___ = 90° (Tang P) <___= <___= 90° (Chord P) ___ = ____(Chord P) ___ = ____=___(Radii)	< ___= __° (ins/cent >, $\overset{\frown}{\_\_}$) < ___= __° (ins >, $\overset{\frown}{\_\_}$) < ___= __° (ins >, diam) < ___= __° (CyQuad)

Examples

1.



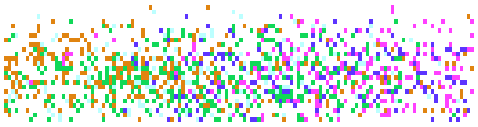
X= 90° (ins<, dia)

y= 50 (SATT)

z = 35° (SATT)

(cylic quad)

Class/Homework



-click on the "Homework" link on my teachers page for optional review questions

- If you have any questions you can contact me on the

Remind app

or

through email:

melanie.burns@nbed.nb.ca

Attachments

Worksheet - Angles in a Circle.doc