

Section 8.3

Properties of Angles in Circles



Investigate:

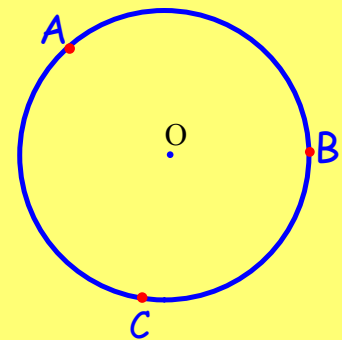
You will need a cut-out of a circle, a protractor and a ruler.

1. Choose 2 points on the circumference of your circle. Label them as A and B, and then choose a third point C on the circle. Join AC and BC. (C on the larger arc)

2. Measure the \angle ACB with the protractor.

3. Join AO and OB and measure \angle AOB

4. Record your measurements

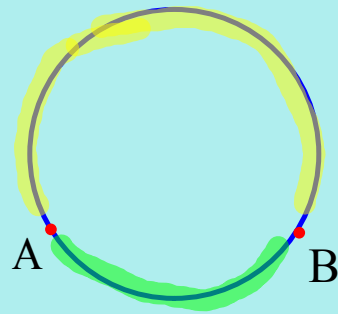


Are the two angles related

5. Repeat the steps above for points A, B and C on a different circle.

- The longer arc AB is the major arc .

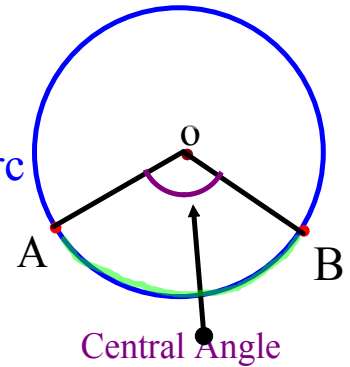
- The shorter arc AB is the minor arc.





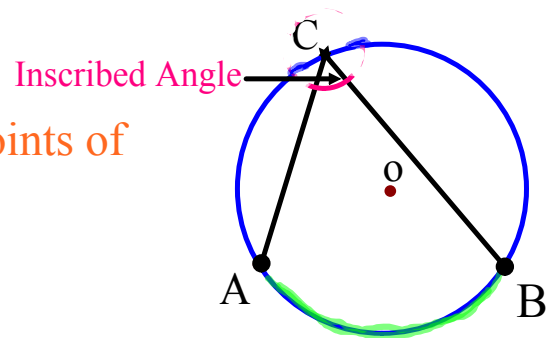
Central Angle:

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



Inscribed Angle:

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



Inscribed and central angles are **SUBTENDED** by the **MINOR** arc.

come from the same 'similar arc'
smaller arc'

Central Angle & Inscribed Angle Property

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

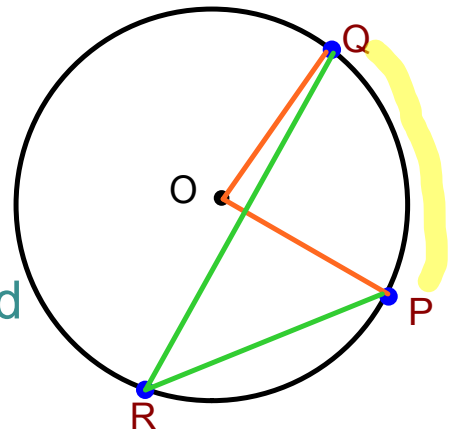
$$\angle POQ = 2 \angle PRQ$$

or

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

Central angle is twice the inscribed angle

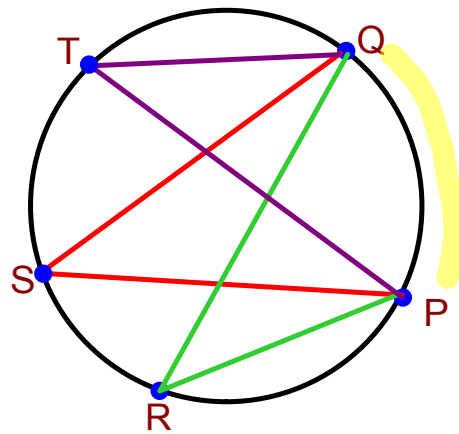
Inscribed angle is half the center angle



Inscribed Angle Property

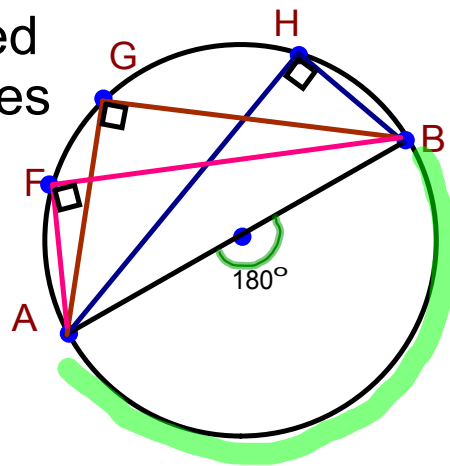
In a circle, all inscribed angles subtended by the same arc are congruent.

$$\angle PTQ = \angle PSQ = \angle PRQ$$



Angles in a Semicircle Property

All inscribed angles subtended by a semicircle are right angles



Makes sense

Inscribed angles are always half the centre

Center Angle = 180° (Straight Line)

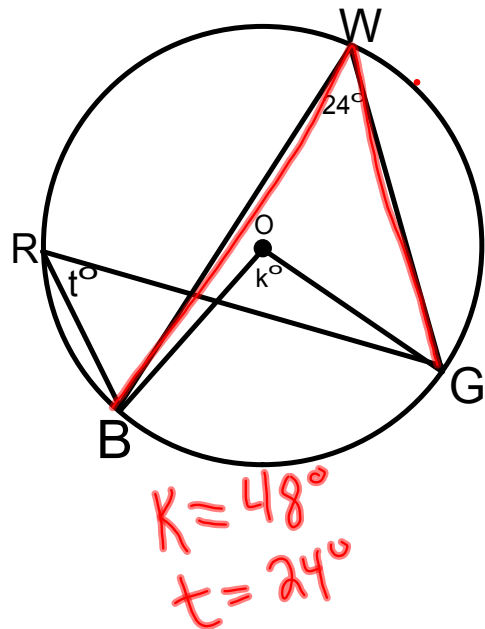
Inscribed angle is half the Central Angle

$$\begin{aligned}\text{Inscribed} &= (1/2) \text{ central} \\ &= (1/2) 180^\circ \\ &= 90^\circ\end{aligned}$$

Example 1

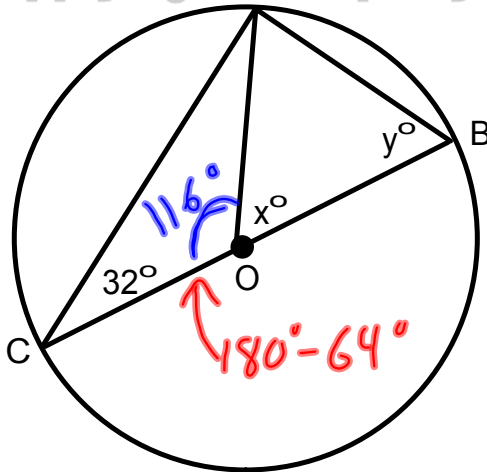
Using Inscribed and Central Angles

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



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° .

$$\angle COB = 180^\circ$$

(diameter)

$$x = 64^\circ$$

$$y = 58^\circ$$

For Y°

In Triangle ABC, $\angle A = 90^\circ$
(Inscribed from the semicircle)

THUS

Find y°
by Angle Sum of Triangle of $\triangle ABC$

$$180 - 90 - 32 = 48^\circ$$

$$y^\circ = 48^\circ$$

For X°

Central/Inscribed Angle Theorem

$\angle AOB$ is a Central Angle
subtended from arc AB

$\angle ACB$ is an Inscribed Angle
subtended from arc AB

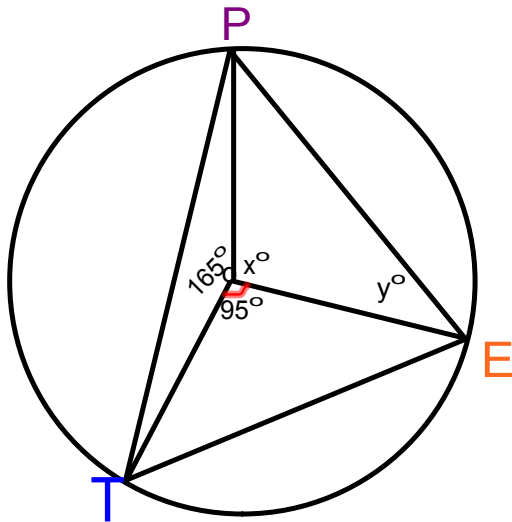
Thus

$$\begin{aligned} \angle AOB &= 2 \angle ACB \\ &= 2 (32^\circ) \\ &= 64 \end{aligned}$$

Example 3

Determining Angles in an Inscribed Triangle

Determining the values of x° and y° .



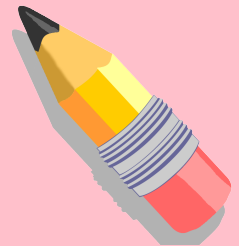
Hint: LOOK AT CENTER ANGLES and Complete the circle for x





Homework :

p. 410 - 412
3, 4, 5, 6, 11,



Attachments

CSI Crime Scene Investigation.mp3