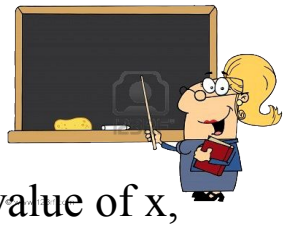
# Curriculum Outcomes:

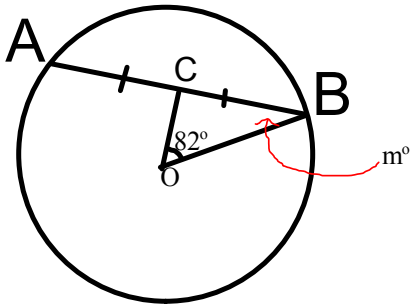
(SS1) Solve problems and justify the solution strategy using circle properties, including: the perpendicular from the centre of a circle to a chord bisects the chord; the measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc; the inscribed angles 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 we can use the tangent properties to solve for unknown lengths. (Tangent properties go hand and hand with Pythagorean theorem)

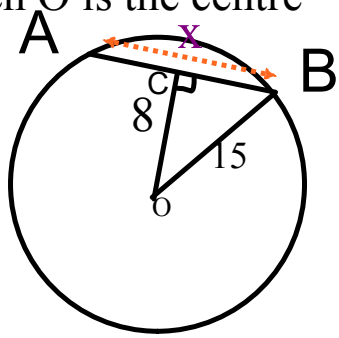
# Warm Up



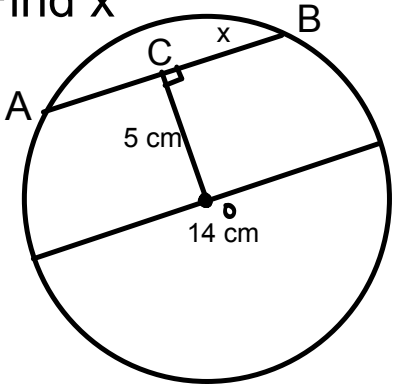
Determine the value of m, when O is the centre



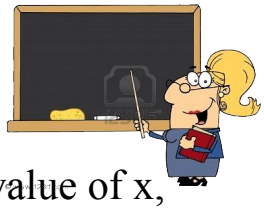

Determine the value of x, when O is the centre



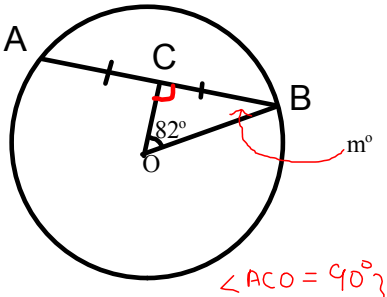

Find x



# Warm Up



Determine the value of m, when O is the centre

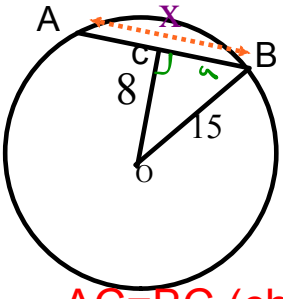



$\angle ACO = 90°$ (chordP)
$\angle BCO = 90°$

$m = 180° - 90° - 82°$

$m = 8°$ (∠ ATT)

Determine the value of x, when O is the centre




AC=BC (chordP)


$a = \sqrt{c^2 - b^2}$

$a = \sqrt{15^2 - 8^2}$

$a = \sqrt{225 - 64}$

$a = \sqrt{161}$

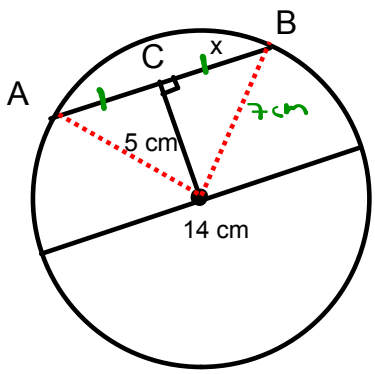
$a = 12.7$

$y = 2(12.7)$

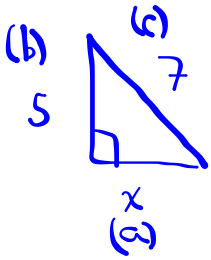
$y = 25.4$

Find x

OB=OA (Radii)




AC=BC (chordP)




$a = \sqrt{c^2 - b^2}$

$a = \sqrt{7^2 - 5^2}$

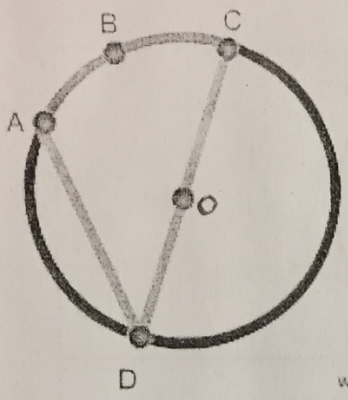
$a = \sqrt{49 - 25}$

$a = \sqrt{24}$

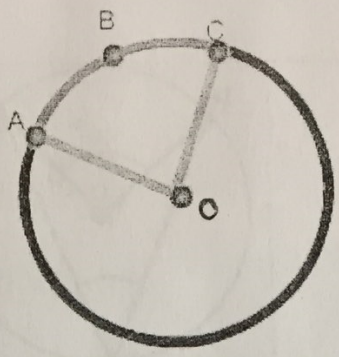
$a = 4.9$

# Inscribe and Central Angles in a Circle

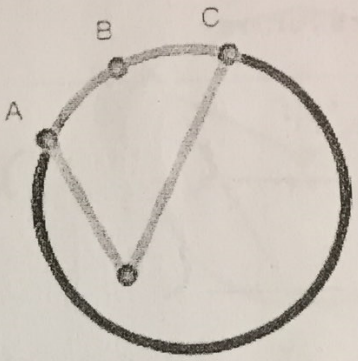
ins




Cent




none






**Vocabulary** : (Your own words)

chord:

major arc

minor arc

tangent

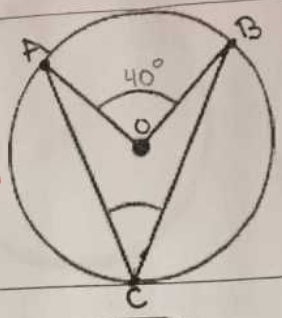
inscribed angle

central angle

## Discover a Pattern

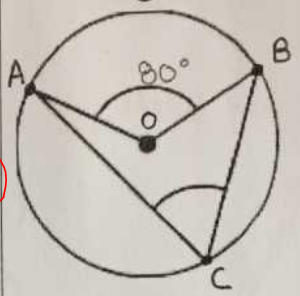
$\angle AOB =$ 40° (given, cent)

$\angle ACB =$ 20° (ins/cent>, $\overset{\frown}{AB}$)




$\angle AOB =$ 80° (given)

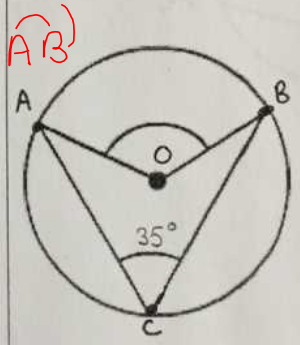
$\angle ACB =$ 40° (ins/cent>, $\overset{\frown}{AB}$)




$\angle AOB =$ 70° (ins/cent>, $\overset{\frown}{AB}$)

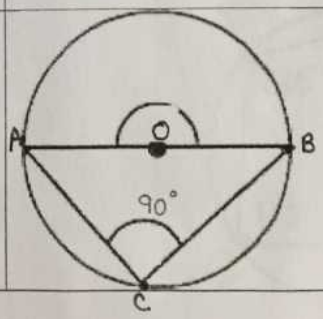
$\angle ACB =$ 35° (given)

ins




$\angle AOB =$ 180° (ins, dia)

$\angle ACB =$ 90° (given)



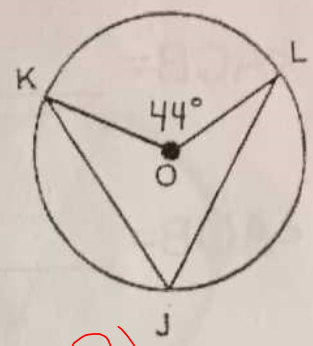

What is the relationship between central and inscribed angle?

The central angle is double the inscribe angle

The inscribe angle is half the central ang

**Model Problems**

1)

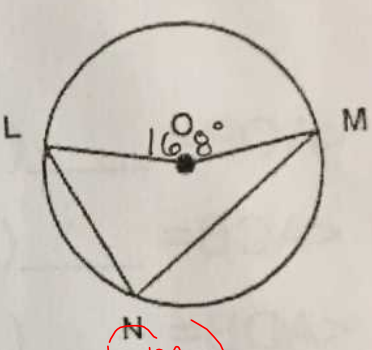



$\angle KOL = \underline{44^\circ}$ (given)

What is the $m\angle KJL$?

$\angle KJL = \underline{22^\circ}$ (ins/cent>, $\overset{\frown}{KL}$)

2) $\angle LOM = \underline{168^\circ}$ (given)



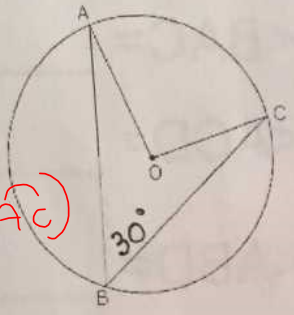

What is the $m\angle LNM$?

$\angle LNM = \underline{84^\circ}$ (ins/cent>, $\overset{\frown}{LM}$)

3) $\angle ABC = \underline{30^\circ}$ (given)

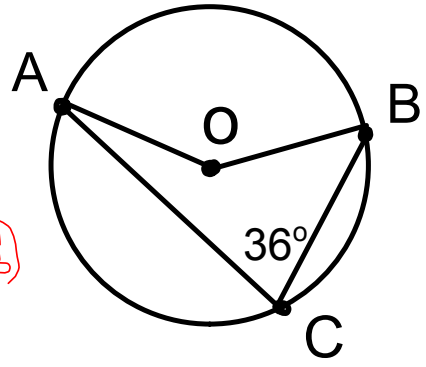
then

$\angle AOC = \underline{60^\circ}$ (ins/cent>, $\overset{\frown}{AC}$)



<ACB= 36° ( given )

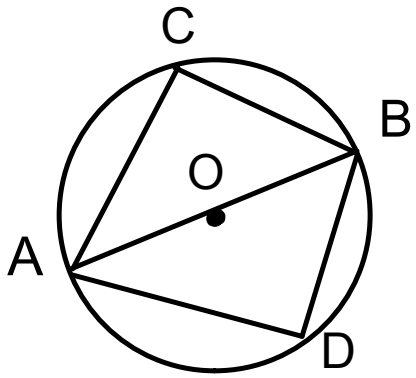
<AOB= 72° ( ins/cent>, $\overset{\frown}{AB}$ )




<AOB= 180° ( diametre)

<ACB= 90° ( ins, dia )

<ADB= 90° ( ins, dia )

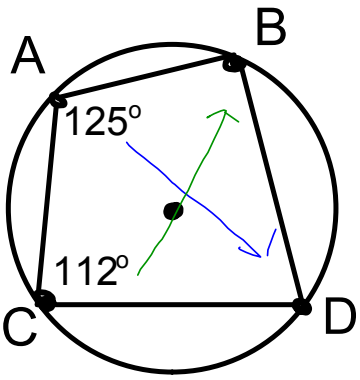


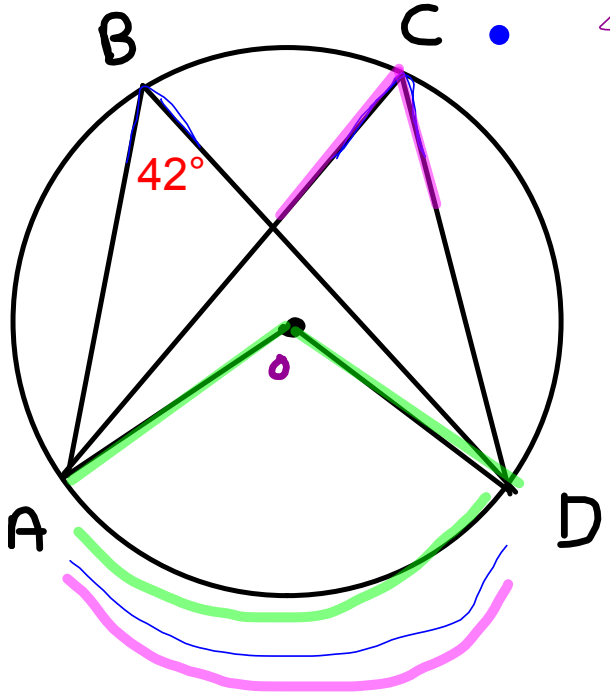

<BAC= 125° ( given )

<ACD= 112° ( given )

<ABD= 68 ( cyclic quad )

<BDC= 55° ( cyclic quad )






$\angle ABD = 42^\circ$ (given, ins)

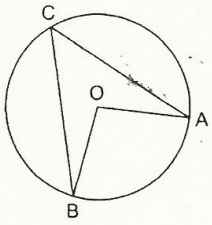
$\angle ACD = 42^\circ$ (ins, $\overset{\frown}{AD}$)

$\angle AOD = 84^\circ$ (ins/cent $\overset{\frown}{AD}$)

Angle Practice Kleo "Apps 11.2 Name: _____

2. In each circle, name a central angle and an inscribed angle subtended by the same arc. Shade the arc.

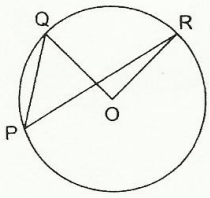
a)




Central angle: ∠_____

Inscribed angle: ∠_____

b)

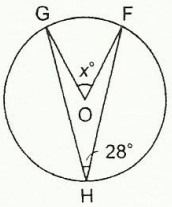



Central angle: ∠_____

Inscribed angle: ∠_____

3. Determine each indicated measure.

a)

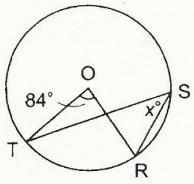



∠GOF = 2 × ∠GHF

$x° = \frac{1}{2} \times$ _____

= _____

b)

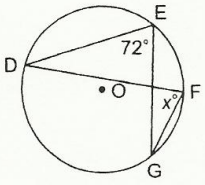



$\angle TSR = \frac{1}{2} \times \angle$_____

$x° = \frac{1}{2} \times$ _____

$x°$ = _____

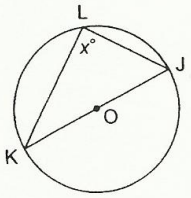
c)




∠DEG = _____

$x°$ = _____

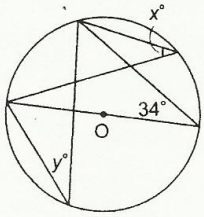
d)




$x°$ = _____

4. Determine each value of $x°$ and $y°$.

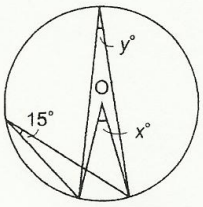
a)




$x°$ = _____

$y°$ = _____

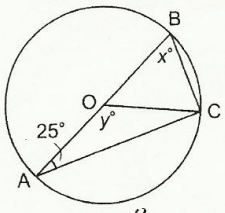
b)




$x°$ = _____ × _____ = ___

$y°$ = _____

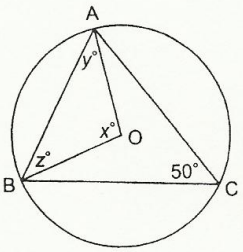
5. Find the value of $x°$ and $y°$.




$x°$ = _____

$y°$ = _____

6. Find the value of $x°$, $y°$, and $z°$.



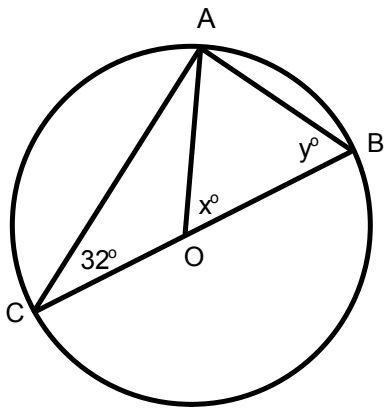

$x°$ = _____

$y°$ = _____

$z°$ = _____

# Example 2

## Applying the Property of an Angle Inscribed in a Semicircle




Point O is the center of the circle.
Determine the value of $x^o$ and $y^o$.