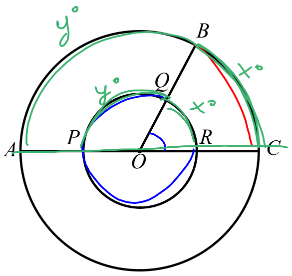
Group Exploration

Find the following: 0:05:00

Given:

$\odot O$ and $\angle BOC$ is acute.



a.) Major arc of smaller circle

$\overset{\frown}{QPR}$

b.) Minor arc of larger circle

$\overset{\frown}{BC}$

c.) $m\overset{\frown}{BC} + m\overset{\frown}{PQ} = 180°$ degrees

d.) Which is greater, $m\overset{\frown}{BC}$ or $m\overset{\frown}{PQ}$? degrees degrees obtuse

e.) Is $\overset{\frown}{BC} \cong \overset{\frown}{QR}$? No (length when no 'm')

$m\overset{\frown}{BC} \cong m\overset{\frown}{QR}$ degrees =

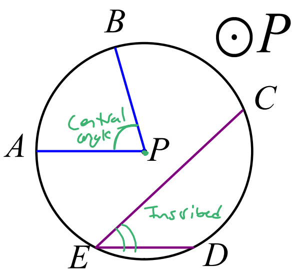
10.4 - Inscribed Angles and Polygons

Central Angle = Angle whose vertex lies at the center of a circle.

Example: $\angle APB$

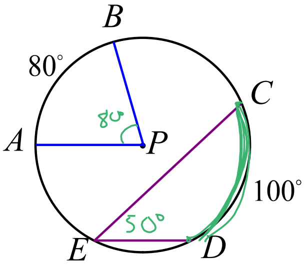
Inscribed Angle = Angle whose vertex lies on the circle and whose sides contain chords of the circle.

Example: $\angle CED$



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

Same Diagram as Previous Slide



Given: $\odot P$

$m\angle APB = \underline{80°}$ same b/c at center

$m\angle CED = \underline{50°}$ half b/c inscribed

Example #1 Using Inscribed Angles

Find the indicated measure.

a. $m\angle T = 24°$

$48 \div 2$

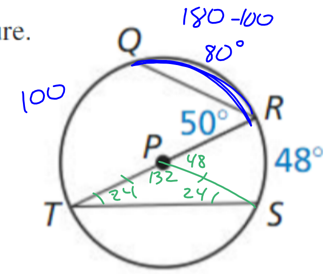
b. $m\overset{\frown}{QR} = 80°$

$50 \cdot 2 = 100°$

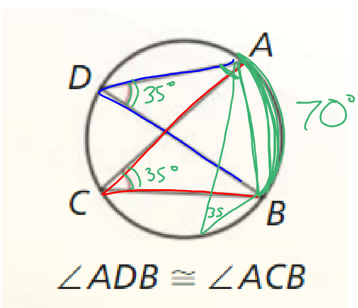
$\overset{\frown}{TQR} = 180°$

$- \overset{\frown}{QT} \; -100$

$\overset{\frown}{QR} = 80°$

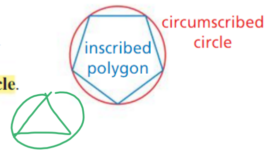


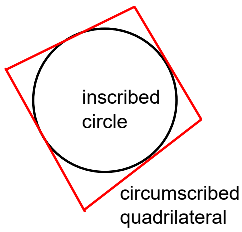
Theorem = If two inscribed angles of a circle have the same intercepted arc, then they are congruent.



Inscribed Polygon

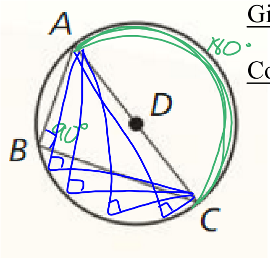
A polygon is an **inscribed polygon** when all its vertices lie on a circle. The circle that contains the vertices is a **circumscribed circle**.





The circle is inscribed inside the polygon.

The polygon is circumscribed around the circle.



Given: AC is a diameter of circle D

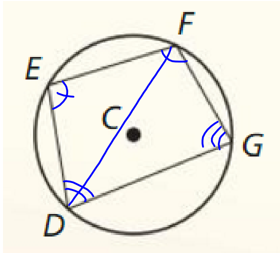
Conclusion: $m\angle B =$ 90°

$\frac{180}{2} = 90°$

all inscribed angles creating a semicircle using diameter will be right triangles

Given: DEFG is inscribed in circle C inside

Conclusion:

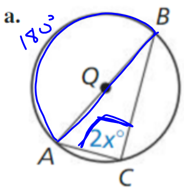


Theorem = If a quadrilateral is inscribed in a circle, then the opposite angles are supplementary.

$m\angle F + m\angle D = 180$
and
$m\angle G + m\angle E = 180°$

Example #2 **Using Inscribed Polygons**

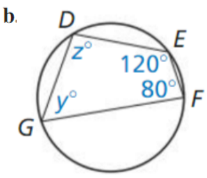
Find the value of each variable.



$m\angle C = \frac{180}{2} = 90$

$\frac{2x}{2} = \frac{90}{2}$

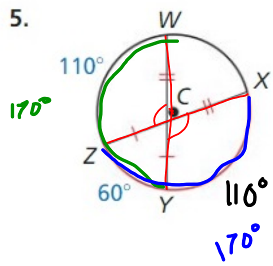
$x = 45°$



$y + 120 = 180$ | $z + 80 = 180$

$y = 60$ | $z = 100°$

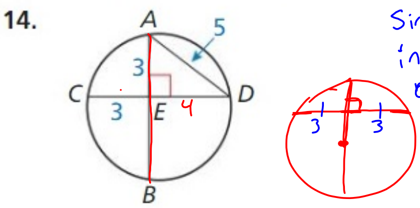
In Exercises 3–6, find the measure of the red arc or chord in ⊙*C*. *(See Example 1.)*



$170 - 60$

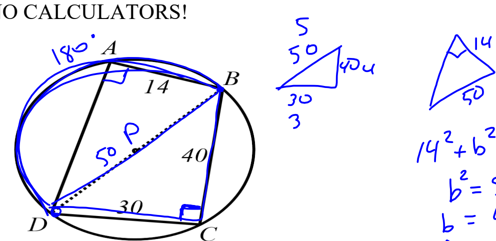
$= 110°$

In Exercises 13 and 14, determine whether $\overline{AB}$ is a diameter of the circle. Explain your reasoning.



Since a diameter intersecting a chord at a 90° angle bisects the chord, ED = 3. But $3^2 + 3^2 \neq 5^2$ so ED = 4 and AB cannot be a diameter.

Find the measure of $\overline{AD}$ in circle P if $\overline{BD}$ is a diameter.
NO CALCULATORS!



$14^2 + b^2 = 50^2$
$b^2 = 50^2 - 14^2$
$b = 48$
$AD = 48$

Why we are able to assume angles A and C right?

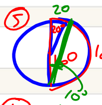
Because the intercepted arc is a semicircle 180°, and thus the angle is $180 \div 2 = 90°$

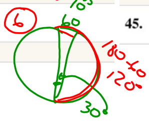
10.4 p. 558
#3-8, 13, 14, 16, 21, 43-46

Key

3. 42°
4. 85°
5. 10° ~~20°~~
6. 134°
7. ~~150°~~ 120°
8. 100°

13. $x = 100, y = 85$	**14.** $m = 120, k = 60$
15. $a = 20, b = 22$	**16.** $x = 30, y = 28$
20. $x = 9, y = 6$; 54°, 36°, 126°, 144°	**21.** $x = 30, y = 20$; 60°, 60°, 60°
34. right angle	**43.** $x = \frac{145}{3}$
44. $x = 126$	**45.** $x = 120$
46. $x = 180$	





$$\frac{2}{1}(75) = \left(\frac{1}{2}\cdot(x-30)\right)\cdot\frac{2}{1}$$
$$150 = x - 30$$
$$-30 \qquad +30$$
$$180 = x$$