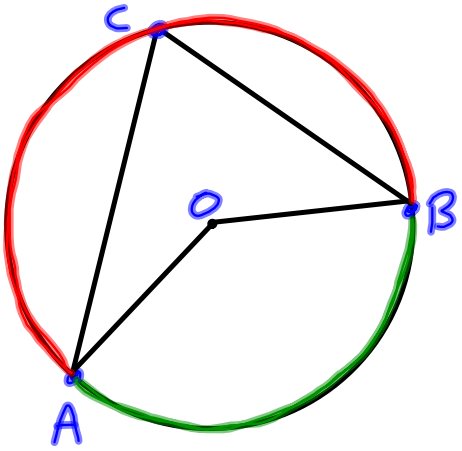
8.3: Properties of Angles in a Circle:

Investigation #1:



$\angle AOB = 2x\angle ACB$

Note: A section of the circumference of a circle is called an arc.

$\overset{\frown}{AB}$ is a minor arc (green)

$\overset{\frown}{ACB}$ is a major arc (red)

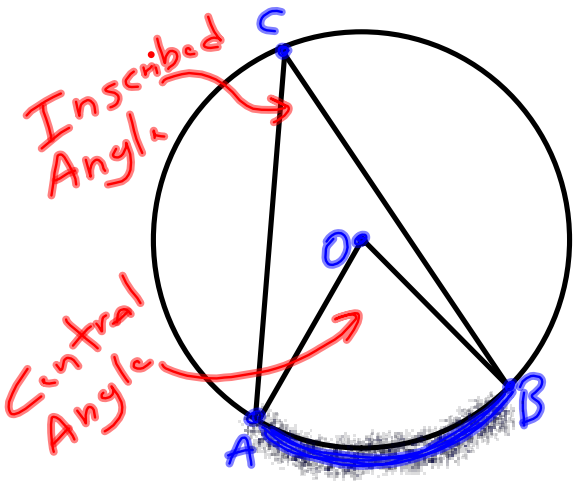
Property 5: Central Angle and Inscribed Angle Property

→ In a circle, the measure of a central angle subtended by an arc is <u>twice</u> the measure of an inscribed angle.

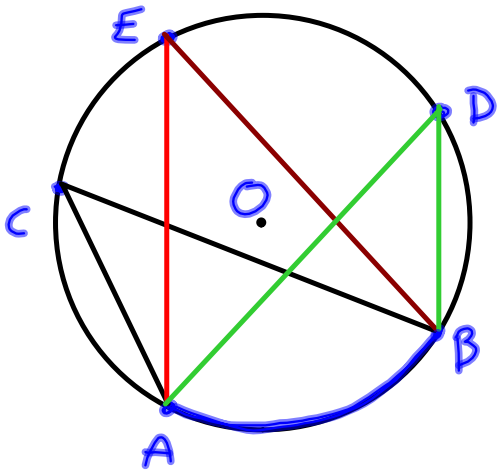
$\angle AOB = 2x\angle ACB$

OR

$\angle ACB = \frac{1}{2}\angle AOB$



Investigation #2:



$\angle ACB = 45^\circ$

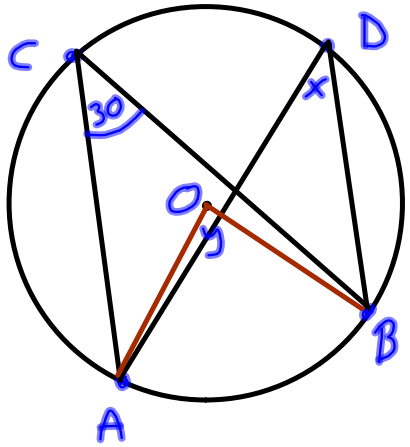
$\angle AEB = 45^\circ$

$\angle ADB = 45^\circ$

Property 6: Inscribed Angles Property:

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

Example 1: Determine the measure of x and y



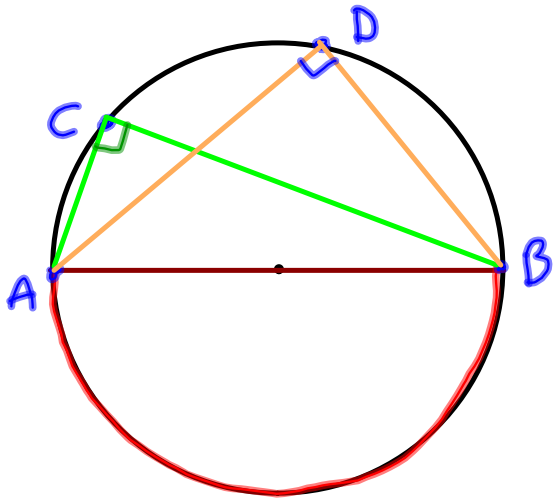
Answer:

$x = 30^\circ$

$y = 60^\circ$

Property #7: Angles in a Semi Circle Property

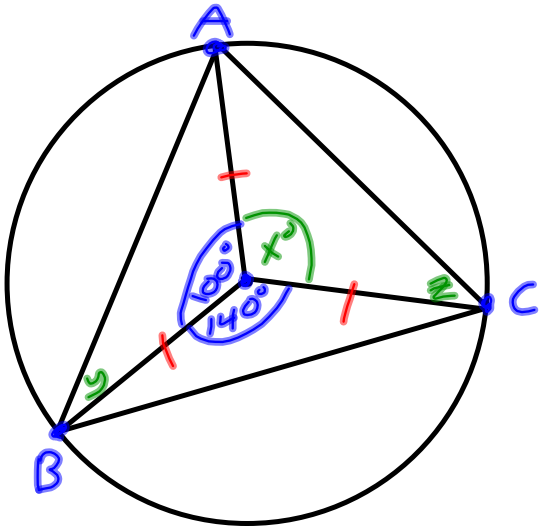
→ All inscribed angles subtended by a semi circle are right angles.



∴ $\angle ACB = 90°$

$\angle ADB = 90°$

Example #2: Triangle ABC is inscribed in a circle, with center O. $\angle AOB = 100°$ and $\angle COB = 140°$. Determine the value of x, y and z.



Answer:

$100 + 140 = 240$

$\therefore x = 360 - 240$

$= 120°$

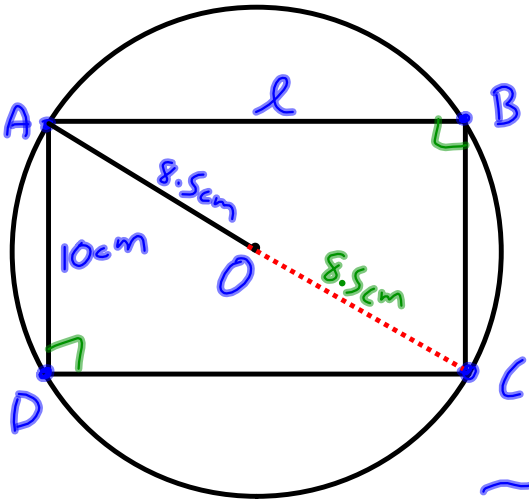
$180 - 100 = 80$

$\therefore y = \frac{1}{2}(80) = 40°$

$180 - 120 = 60°$

$\therefore z = \frac{1}{2}(60) = 30°$

Example #3: Rectangle ABCD has its vertices on a circle with radius 8.5 cm. The width of the rectangle is 10cm. What is its length?



Answer:

$\angle ABC = 90°$ because $\overset{\frown}{AC}$ forms a semi circle and $\angle ABC$ is an inscribed angle.

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

$a^2 = 17^2 - 10^2$

$a^2 = 289 - 100$

$a^2 = 189$

$\therefore a = \sqrt{189}$

$a \approx 13.7\text{cm}$

Homework:

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