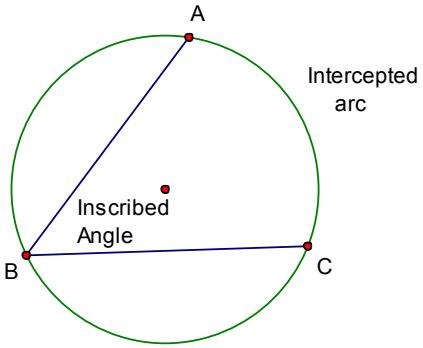
12-4 Inscribed Angles

An angle $\angle ABC$ is an **inscribed angle** of a circle if $\overline{AB}$ and $\overline{BC}$ are chords of the circle.

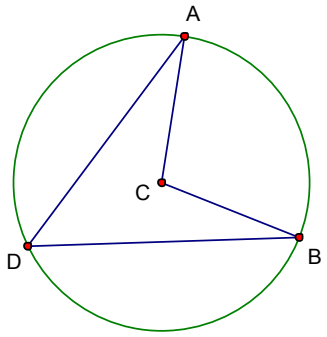


Intercepted arch – the arc that lies in the interior of an inscribed angle

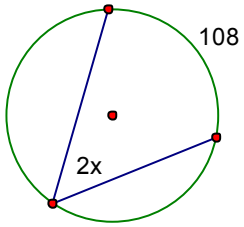
Inscribed Angle Theorem:

If an angle is inscribed in a circle, then its measure is half the measure of its intercepted arc.

$$m\angle ADB = \frac{1}{2} m\overset{\frown}{AB} \quad \text{or} \quad m\angle ADB \cdot 2 = m\overset{\frown}{AB}$$



EX 1) Find the value of x.

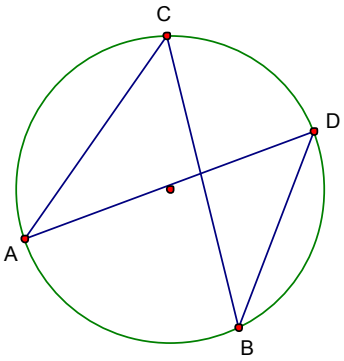


Corollary:

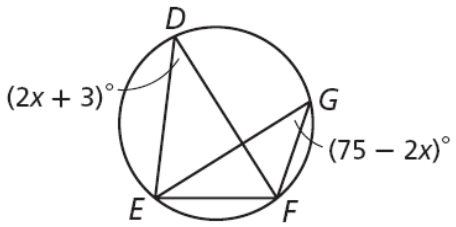
If two inscribed angles in a circle intercept the same arc, then the angles are congruent.

$\angle A \cong \angle B$ because both inscribed angles intercept $\overset{\frown}{CD}$.

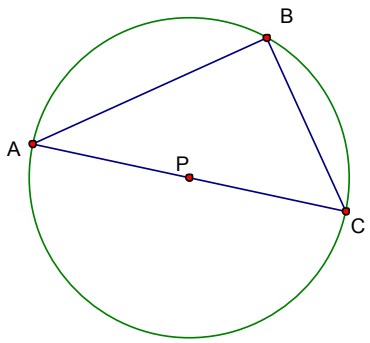
$\angle C \cong \angle D$ because both inscribed angles intercept $\overset{\frown}{AB}$.



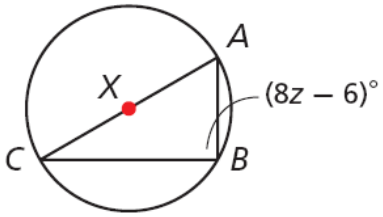
EX 2) Find the value of x.



If all of the vertices of a polygon lie on a circle, the polygon is **inscribed** in the circle and the circle is **circumscribed** about the polygon.

Theorem: A right triangle is inscribed in a circle, if and only if, the hypotenuse is a diameter of the circle. $\angle B$ is a right angle *iff* $\overline{AC}$ is a diameter of the circle.	

EX 3) Find the value of z.



Theorem: If a quadrilateral is inscribed in a circle, then its opposite angles are supplementary. $m\angle 1 + m\angle 2 = 180$ $m\angle 3 + m\angle 4 = 180$