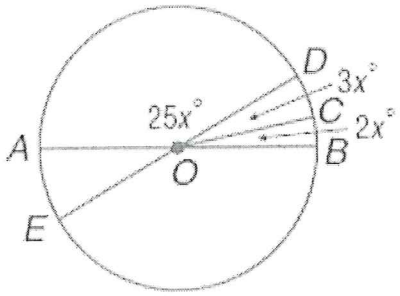
Name: _____ Circles – Day 2

10.2 and 10.4 Angles and Arcs

Review Example 1: Find the m<AOD.



$\angle AOD + \angle DOC + \angle COB = 180$

$25x + 3x + 2x = 180$

$30x = 180$

$x = 6$

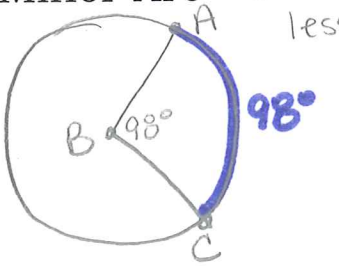
$\angle AOD = 25x$

$= 25(6)$

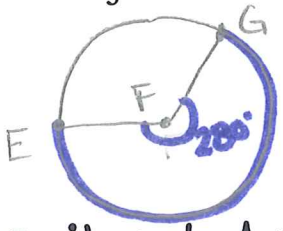
$= 150°$

Types of Arcs

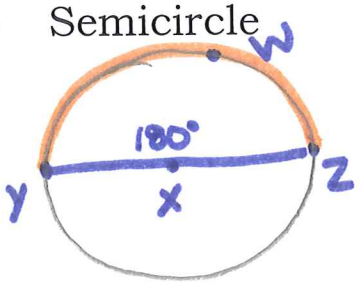
Minor Arc – arc w/measure less than 180



Major Arc – arc w/measure of more than 180°

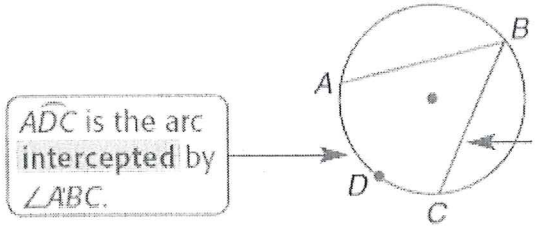


Semicircle

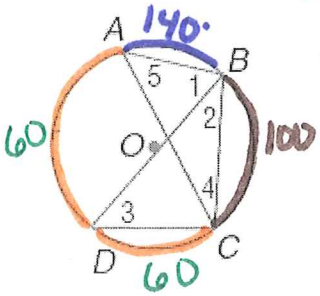


Inscribed Angles

An inscribed angle is an angle that has the vertex on the circle and its sides are chords



Example 1: In Circle O, $m\widehat{AB} = 140, m\widehat{BC} = 100, m\widehat{AD} = m\widehat{DC}$. Find the measures of <1, <2, <3, <4, and <5.



$m\widehat{AB} + m\widehat{BC} + m\widehat{AD} + m\widehat{DC} = 360$

$140 + 100 + x + x = 360$

$240 + 2x = 360$

$2x = 120$

$x = 60$

$\angle 1 = \frac{1}{2} m\widehat{AD}$

$\angle 1 = \frac{1}{2}(60)$

$\angle 1 = 30°$

$\angle 2 = \frac{1}{2} m\widehat{DC}$

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

$\angle 3 = \frac{1}{2}\widehat{BC}$

$\angle 3 = \frac{1}{2}(100)$ $\angle 3 = 50°$

$\angle 4 = \frac{1}{2} m\widehat{AB}$

$\angle 4 = \frac{1}{2}(140)$

$\angle 4 = 70°$

$\angle 5 = \frac{1}{2} m\widehat{BC}$

$\angle 5 = \frac{1}{2}(100)$

$\angle 5 = 50°$

What did you notice about <3 and <5? intercept the same arc • are ≅

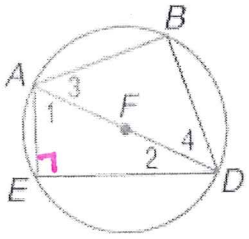
Why? This is because if two inscribed angles of a circle intercept

congruent arcs or the same arc, then the angles are ≅.

Angles of Inscribed Polygons

If the inscribed angle of a ***triangle*** intercepts a semicircle, the angle is a right angle.

Example 2: Triangles ABD and ADE are inscribed in Circle F with $\widehat{AB} \cong \widehat{BD}$. Find the measures of <1 and <2 if $m < 1 = 12x - 8$ and $m < 2 = 3x + 8$.



$m\angle 1 + m\angle 2 + 90 = 180$

$12x - 8 + 3x + 8 + 90 = 180$

$15x + 90 = 180$

$15x = 90$

$x = 6$

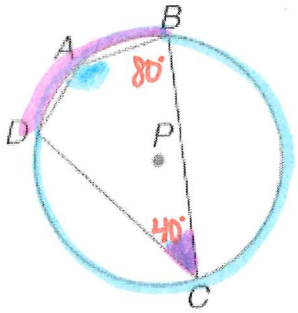
$m\angle 1 = 12(6) - 8$

$\boxed{m\angle 1 = 64°}$

$m\angle 2 = 3(6) + 8$

$\boxed{m\angle 2 = 26°}$

Example 3: Quadrilateral ABCD is inscribed in Circle P. If m<B=80 and m<C=40, find m<A and m<D.



$m\overset{\frown}{DAB} = 2(m\angle C)$

$m\overset{\frown}{DAB} = 80°$

$m\overset{\frown}{BCD} + m\overset{\frown}{DAB} = 360$

$x + 80 = 360$

$x = 280°$

$m\overset{\frown}{BCD} = 2(m\angle A)$

$280 = 2(m\angle A)$

$\boxed{140° = m\angle A}$

$m\overset{\frown}{ADC} = 2(m\angle B)$

$m\overset{\frown}{ADC} = 2(80) = 160°$

$m\overset{\frown}{ABC} + m\overset{\frown}{ADC} = 360$

$x + 160 = 360$

$x = 200$

$m\overset{\frown}{ABC} = 2(m\angle D)$

$200 = 2(m\angle D)$

$\boxed{m\angle D = 100°}$

If a quadrilateral is inscribed in a circle, then its opposite angles are supplementary