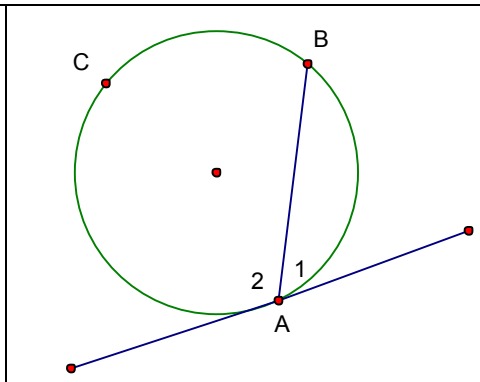
12-5: Angle Relationships in Circles

Theorem:

If a tangent and a chord (or secant) ***intersect*** at a point ***on*** a circle (point of tangency), then the measure of the angle formed is ***half*** the measure of its intercepted arc.

$$m\angle 1 = \frac{1}{2}\left(m\overset{\frown}{AB}\right) \qquad m\angle 2 = \frac{1}{2}\left(m\overset{\frown}{ACB}\right)$$

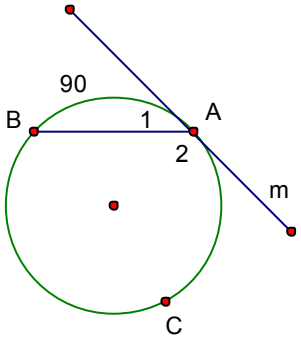


EX 1) Line *m* is tangent to the circle. Find the following:

a) $m\angle 1 =$ _____

b) $m\overset{\frown}{ACB} =$ _____

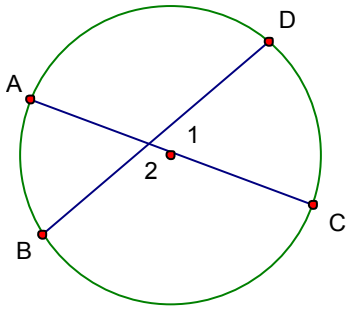
c) $m\angle 2 =$ _____



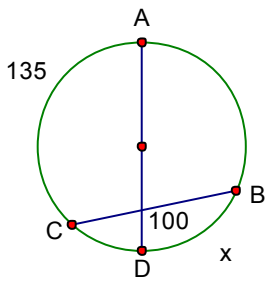
Theorem:

If two chords (or secants) ***intersect inside*** a circle, then the measure of each angle formed is ***half*** the ***sum*** of the measures of the arcs that are intercepted by the angle and its vertical angle.

$$m\angle 1 = \frac{1}{2}\left(m\overset{\frown}{CD} + m\overset{\frown}{AB}\right) \qquad m\angle 2 = \frac{1}{2}\left(m\overset{\frown}{BC} + m\overset{\frown}{AD}\right)$$



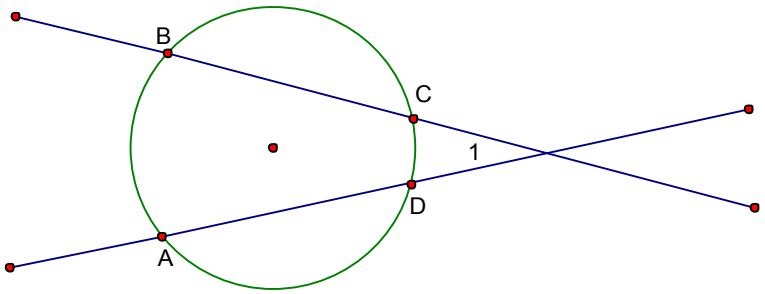
EX 2) Find the value of *x*.



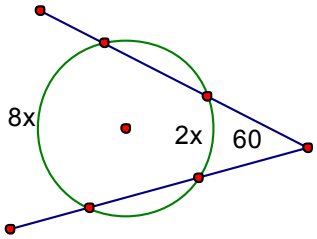
Theorem:

If a tangent and a secant, two tangents, or two secants ***intersect outside*** of a circle, then the measure of the angle formed is ***half*** the ***difference*** of the measure of the intercepted arcs.

$$m\angle 1 = \frac{1}{2}\left(m\overset{\frown}{AB} - m\overset{\frown}{CD}\right)$$



EX 3) Solve for x.



<u>Challenge</u>:

EX 4) Find $m\overset{\frown}{LP}$ and $m\angle MNL$.