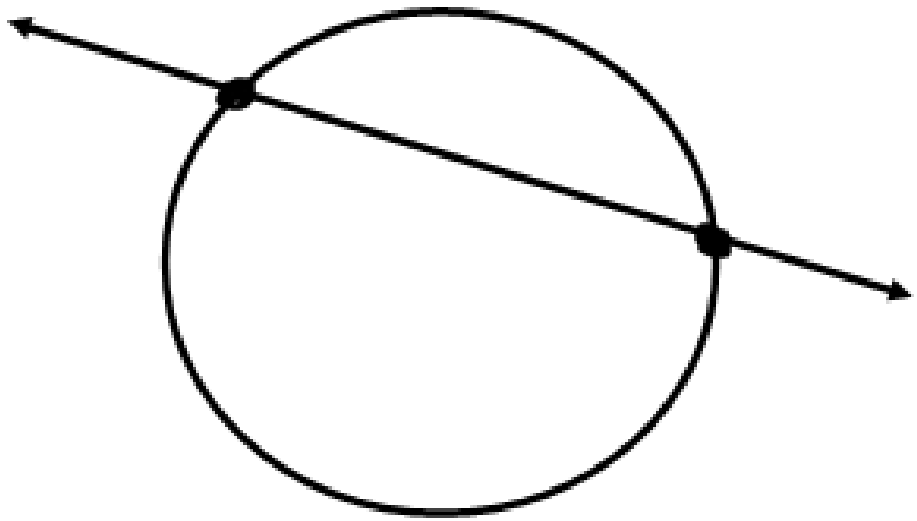
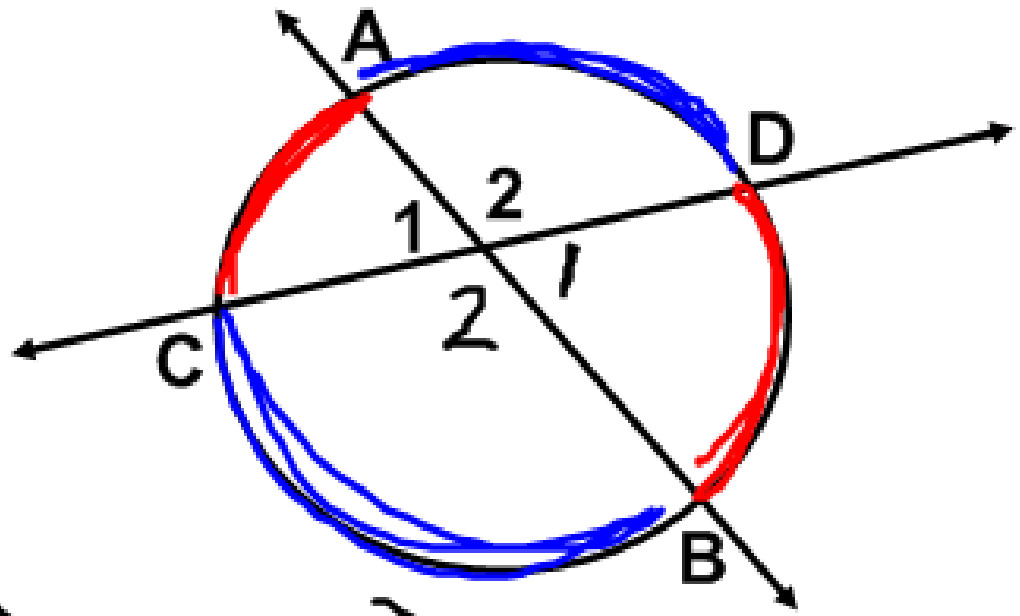
10 - 6
Secants, Tangents, and Angle Measures

secant: line intersecting a circle at two points



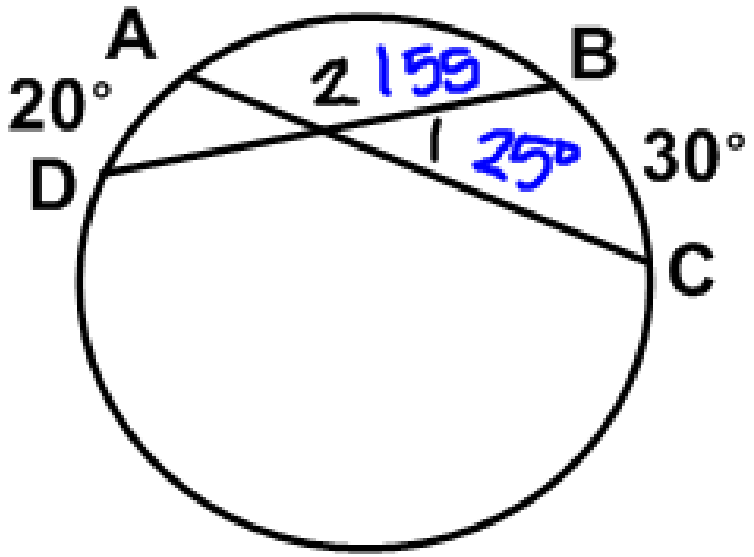
Theorem 10.12



$m\angle 1 = \frac{1}{2}\left(m\overset{\frown}{AC} + m\overset{\frown}{DB}\right)$

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

Ex: Find $m\angle 2$ if $m\overset{\frown}{BC} = 30$ and $m\overset{\frown}{AD} = \overset{\frown}{20}$.



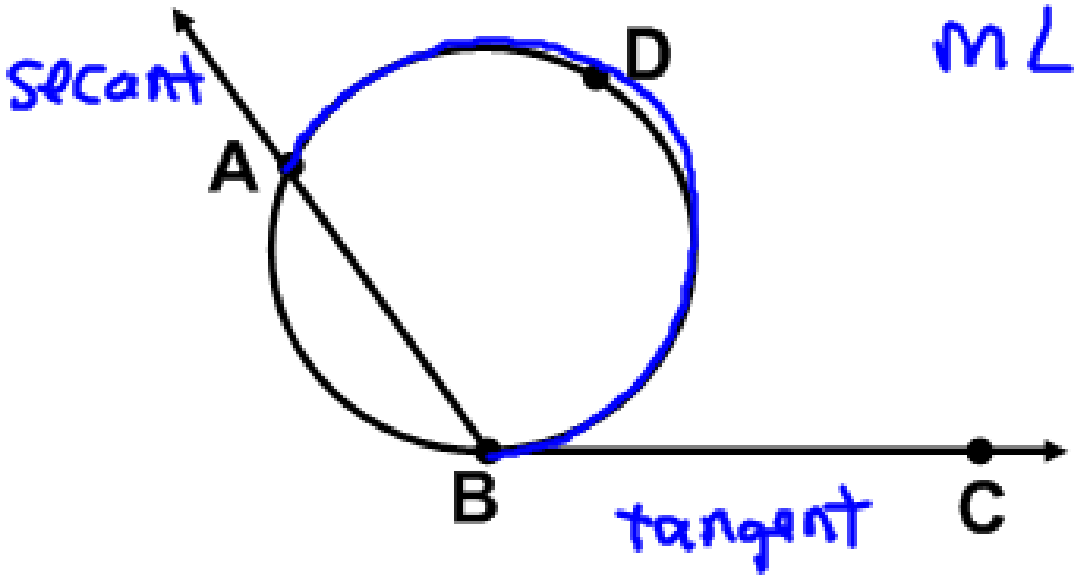
$m\angle 1 = \frac{1}{2}(20+30)$

$m\angle 1 = 25$

$m\angle 2 = 155°$

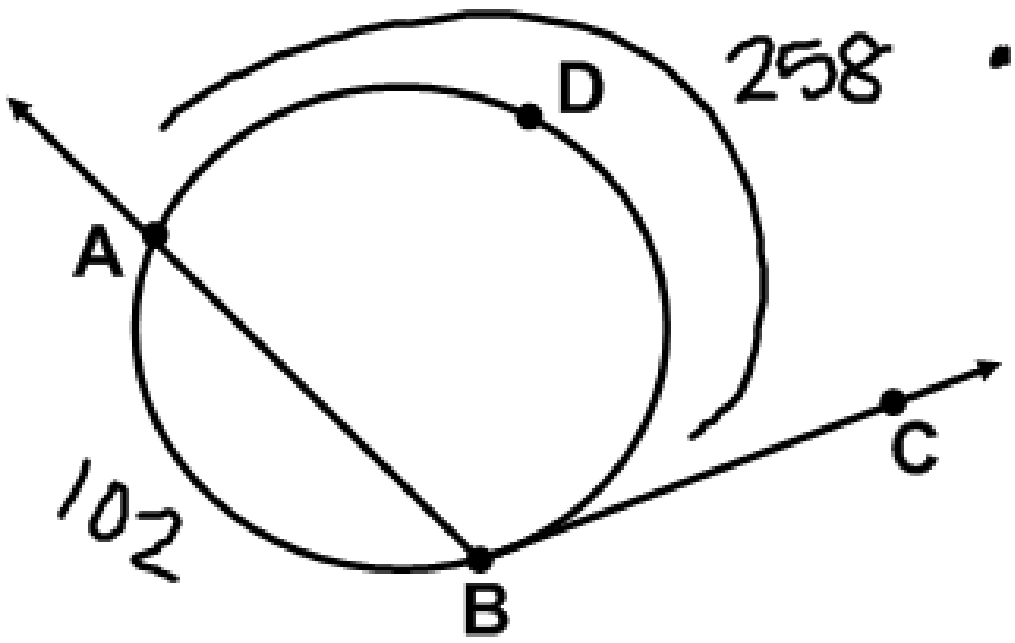
Theorem 10.13

If a secant and a tangent intersect at the point of tangency, then the measure of each angle formed is one-half the measure of its intercepted arc.



$m\angle ABC = \frac{1}{2} m\overset{\frown}{ADB}$

Ex: Find $m\angle ABC$ if $m\overset{\frown}{AB} = 102$.



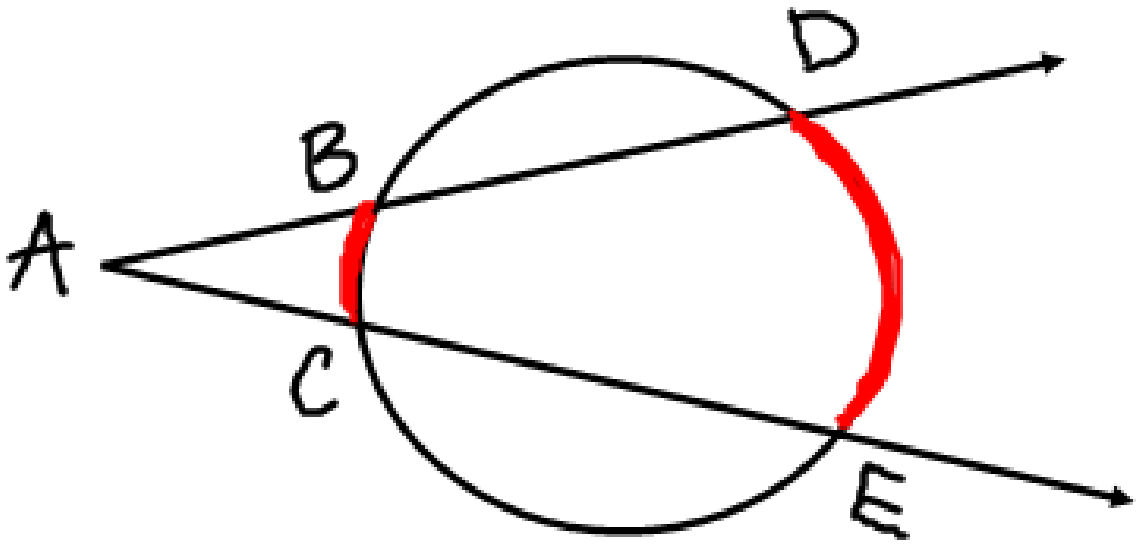
258 $\cdot \frac{1}{2} =$ 129°

360
− 102
258

Theorem 10.14

If two secants, a secant and a tangent, or two tangents intersect in the exterior of a circle, then the measure of the angle formed is one-half the positive difference of the measures of the intercepted arcs.

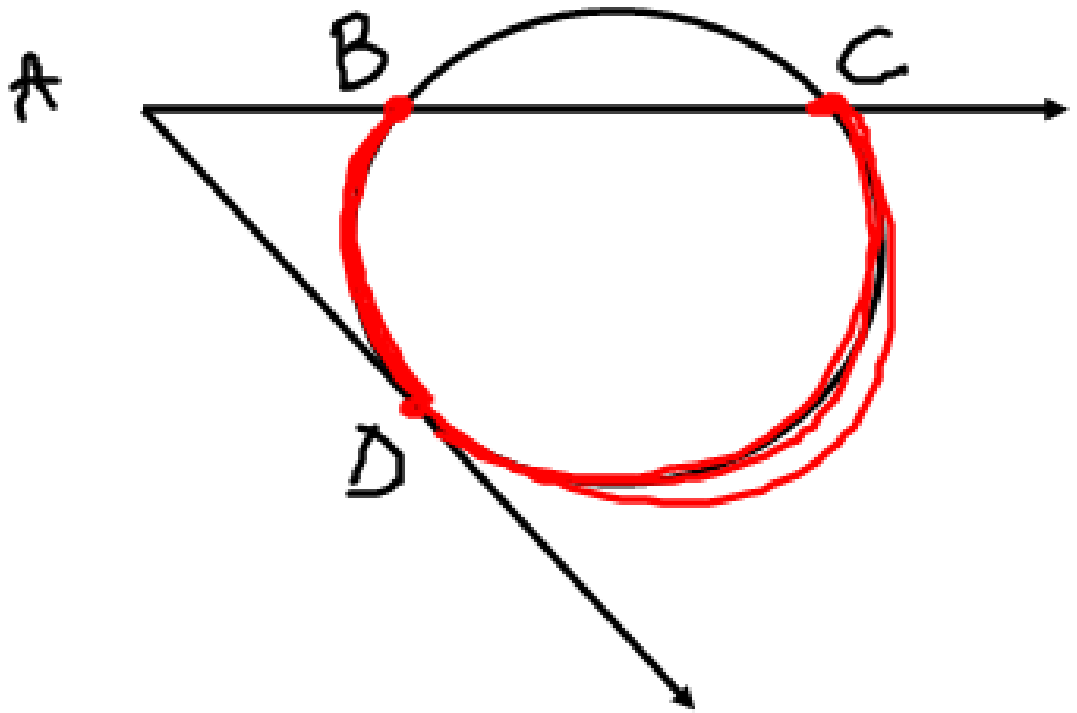
Two Secants



$$m\angle A = \frac{1}{2}\left(m\overset{\frown}{DE} - m\overset{\frown}{BC}\right)$$

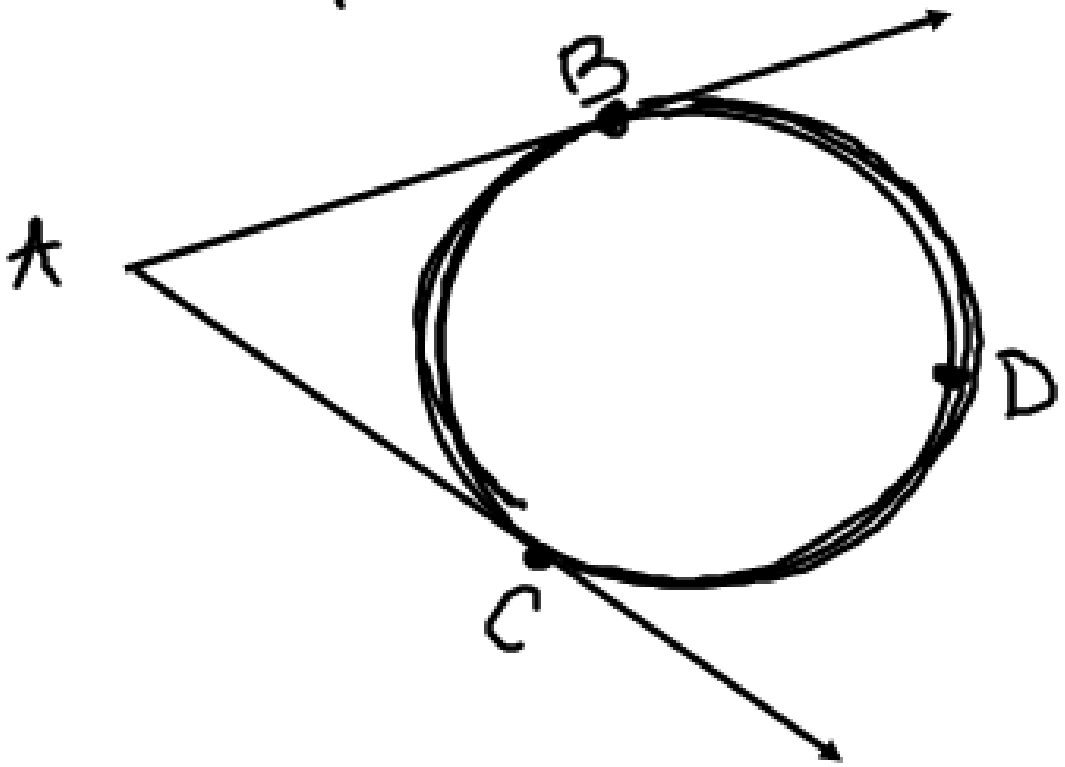
Secant - Tangent

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

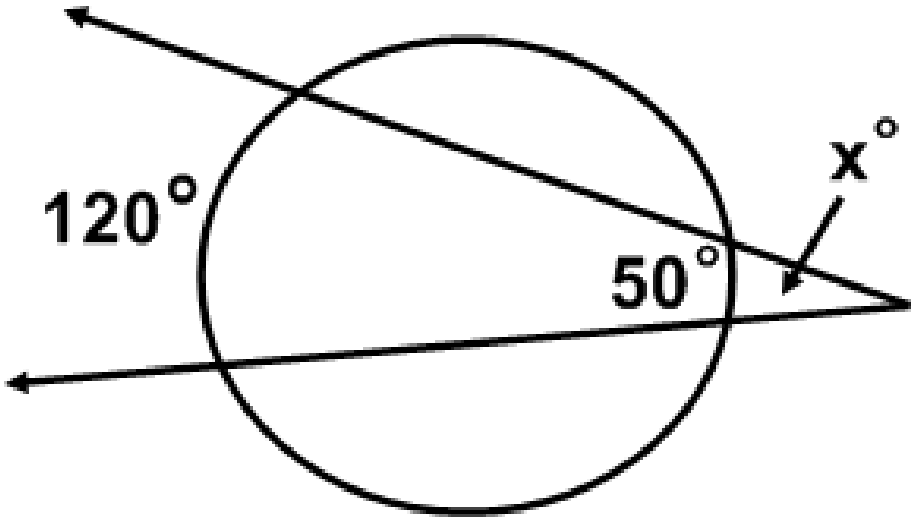


Two Tangents

$$m\angle A = \frac{1}{2}\left(m\overset{\frown}{BDC} - \overset{\frown}{BC}\right)$$



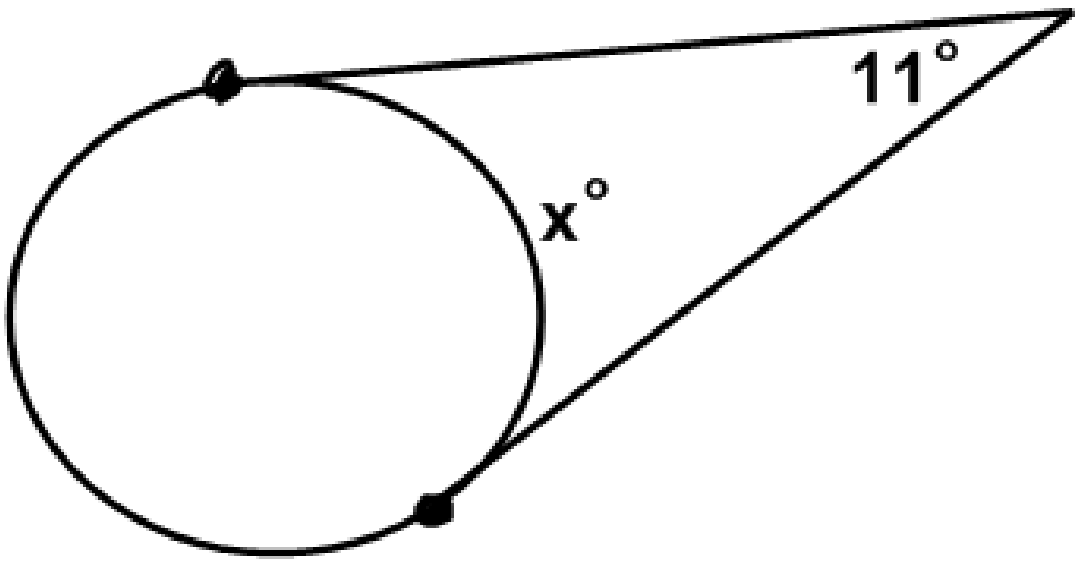
Ex: Solve for x.



$120 - 50 = 70$

$\frac{70}{2} = 35°$

Ex: Solve for x.



angle = $\frac{1}{2}$(big - small)

$11 = \frac{1}{2}(360 - x - x)$

$11 = \frac{1}{2}(360 - 2x)$

$11 = 180 - x$

$-180 \quad -180$

$-169 = -x$

$x = 169°$

Ex: Solve for x.

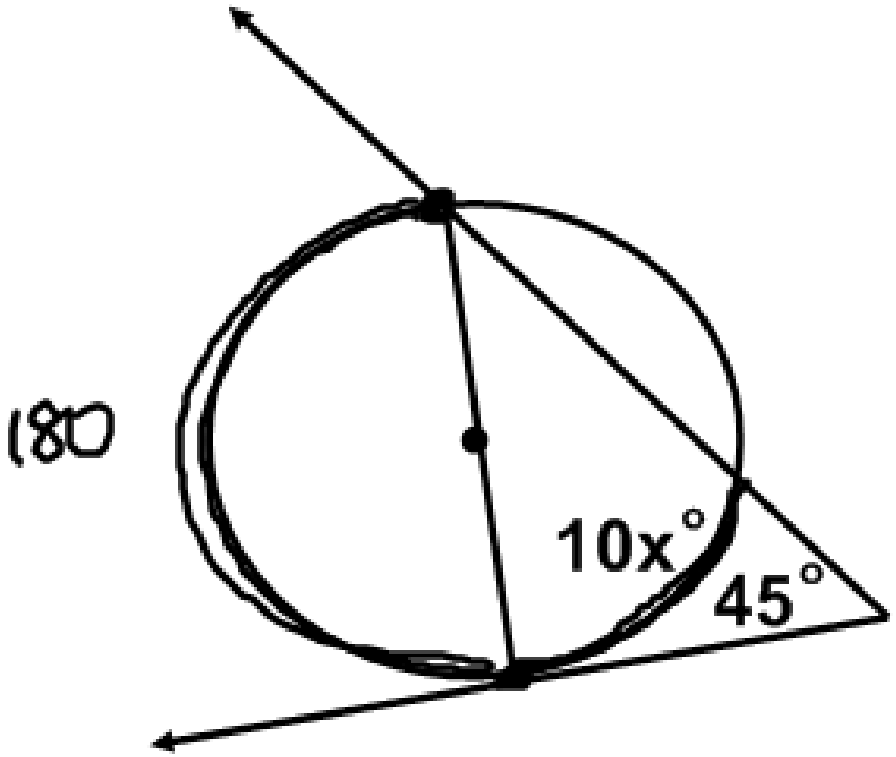
$45 = \frac{1}{2}(180 - 10x)$

$45 = 90 - 5x$

$-90 \quad -90$

$\frac{-45}{-5} = \frac{-5x}{-5}$

$9 = x$



Homework:

10 - 6 WS