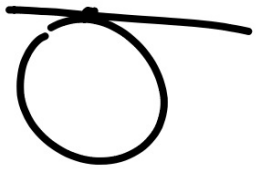
Geometry 10.6

Find measures of angles formed by lines intersecting:

...inside the circle

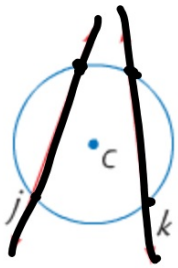
... outside the circle



tangent line

secant line (chord)

hula hoops & meter sticks



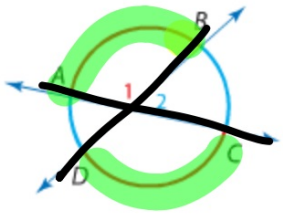
Quiz 10.3-10.4

Circle + 2 intersecting lines:

Not a central angle...
But they are vertical angles!

Theorem 10.12

Words If two secants or chords intersect in the interior of a circle, then the measure of an angle formed is one half the *sum* of the measure of the arcs intercepted by the angle and its vertical angle.

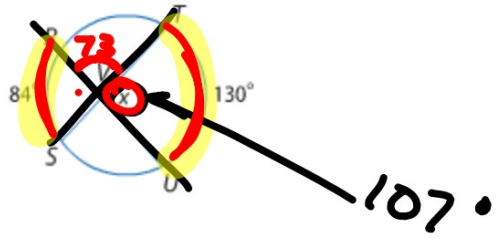


Example $m\angle 1 = \frac{1}{2}(m\overset{\frown}{AB} + m\overset{\frown}{CD})$ and $m\angle 2 = \frac{1}{2}(m\overset{\frown}{DA} + m\overset{\frown}{BC})$

Example 1 Use Intersec

Find x.

a.



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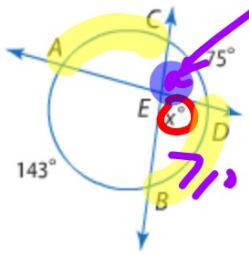
b.



109

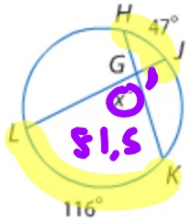
$\frac{143 + 75}{2}$

71

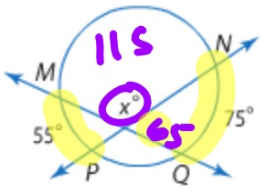
Which angle is x?
Linear pair?

GuidedPractice

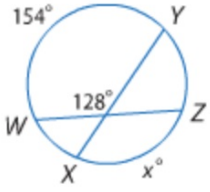
1A.



1B.



1C.

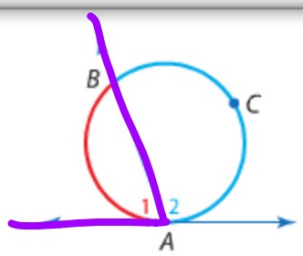


(same as inscribed angle)

Theorem 10.13

Words 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.

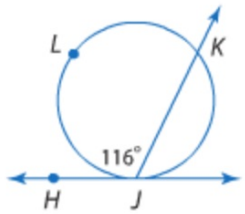
Example $m\angle 1 = \frac{1}{2}m\overset{\frown}{AB}$ and $m\angle 2 = \frac{1}{2}m\overset{\frown}{ACB}$



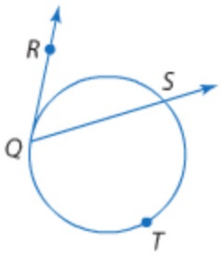
You will prove Theorem 10.13 in Exercise 33.

GuidedPractice

2A. Find $m\widehat{JLK}$.



2B. Find $m\angle RQS$ if $m\overset{\frown}{QTS} = 238$.



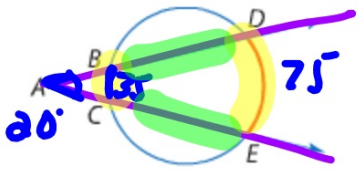
Intersection outside the circle...turns into 1/2 the difference of

Theorem 10.14

Words 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 *difference* of the measures of the intercepted arcs.

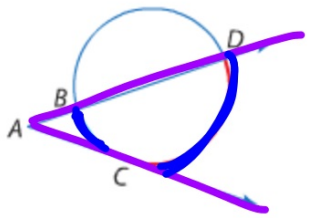
$\frac{1}{2}(75-35)$ $\frac{1}{2}(19-5m)$

Examples



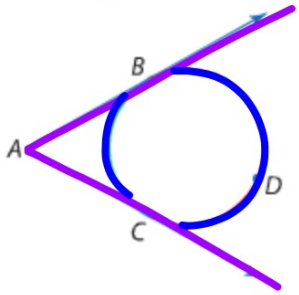
Two Secants

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



Secant-Tangent

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

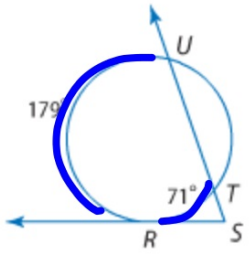


Two Tangents

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

Guided Practice

3A. $m\angle S$

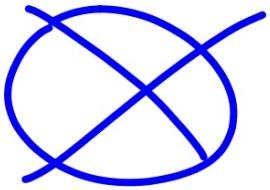


54°

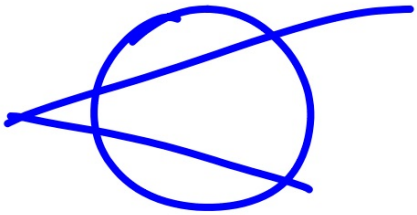
$\frac{1}{2}(179-71)$

$\frac{1}{2} \cdot 108$

54

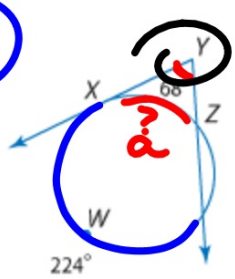


$\frac{1}{2}$(sum)



$\frac{1}{2}$(diff)

3B $m\widehat{XZ}$



$a = 88$

$68 = \frac{1}{2}(224 - a)$

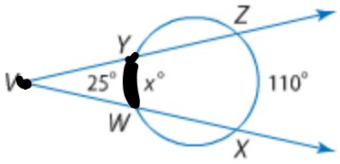
$68 = 112 - \frac{1}{2}a$

$-112 \quad -112$

$-2 \cdot -44 = -\frac{1}{2}a \cdot -2$

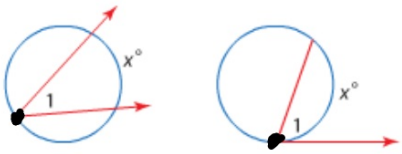
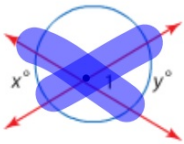
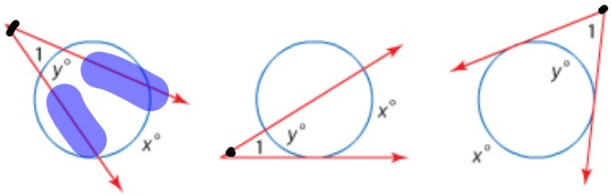
GuidedPractice

4. Find the value of x.



$25 = \frac{1}{2}(110 - x$)

KeyConcept Circle and Angle Relationships

Vertex of Angle	Model(s)	Angle Measure
on the circle		one half the measure of the intercepted arc $m\angle 1 = \frac{1}{2}x$
inside the circle		one half the measure of the sum of the intercepted arc $m\angle 1 = \frac{1}{2}(x + y)$
outside the circle		one half the measure of the difference of the intercepted arcs $m\angle 1 = \frac{1}{2}(x - y)$

stupid Kroon trick (?)

p 746

9-29 o

43-47 all