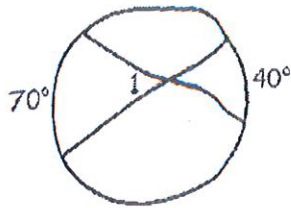


Geometry
Tangents and Secants

Name: Key Date: _____

WARM-UP:

1. $m\angle 1 = 55^\circ$

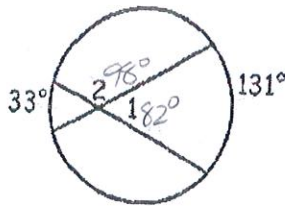


$$\frac{70+40}{2} = \angle 1$$

$$\frac{110}{2} = \angle 1$$

$$\boxed{55 = \angle 1}$$

2. $m\angle 1 = 82^\circ$; $m\angle 2 = 98^\circ$

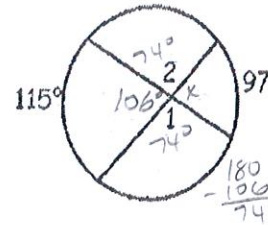


$$\frac{131+33}{2} = \angle 1$$

$$\frac{164}{2} = \angle 1$$

$$\boxed{82 = \angle 1}$$

3. $m\angle 1 = 74^\circ$; $m\angle 2 = 74^\circ$

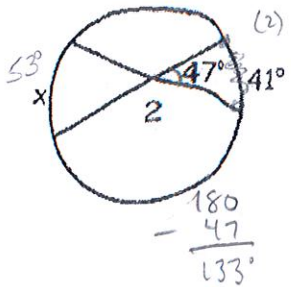


$$\frac{115+97}{2} = \angle 2$$

$$\frac{212}{2} = \angle 2$$

$$106 = \angle 2$$

4. $m\angle 2 = 133^\circ$; $x = 53^\circ$

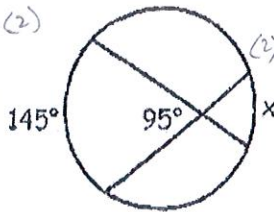


$$(2) \frac{41+x}{2} = 47 (2)$$

$$41+x = 94$$

$$x = 53^\circ$$

5. $x = 45^\circ$

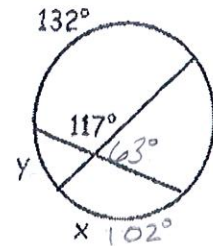


$$\frac{145+x}{2} = 95 (2)$$

$$145+x = 190$$

$$x = 45^\circ$$

6. $x = 102^\circ$; $y = 40^\circ$



$$(2) \frac{132+x}{2} = 117 (2)$$

$$132+x = 234$$

$$\boxed{x = 102}$$

$$\frac{86+y}{2} = 63$$

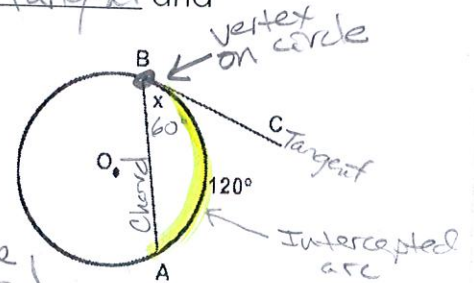
$$86+y = 126$$

$$\boxed{y = 40}$$

Tangent Chord Angle: An angle formed by an intersecting tangent and chord has its vertex "on" the circle.

Tangent Chord Angle = $\frac{1}{2}$ intercepted arc

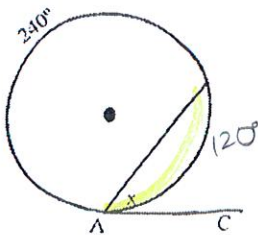
$m\angle ABC = \frac{1}{2}(120^\circ) = 60^\circ$



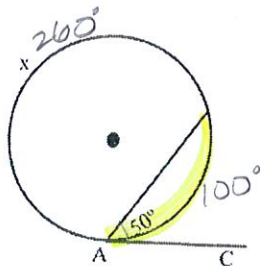
Tangent Chord Angle and inscribed angle have the same formula!

Examples:

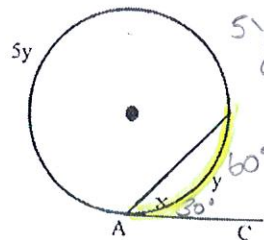
1. $x = 60^\circ$



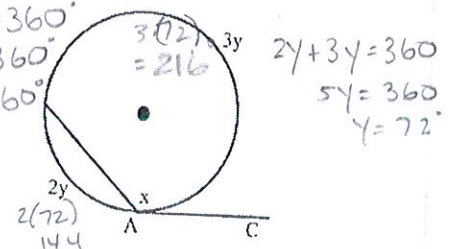
2. $x = 260^\circ$



3. $y = 60^\circ$
 $x = 30^\circ$



4. $y = 72^\circ$
 $x = 108^\circ$



An Angle Formed Outside of a Circle is Constructed by the Intersection of:
"Two Tangents" or "Two Secants" or "a Tangent and a Secant."

The formulas for all THREE of these situations are the same: $\frac{1}{2}$ (difference of intercepted arcs)
(When subtracting, start with the larger arc.)

Two Tangents

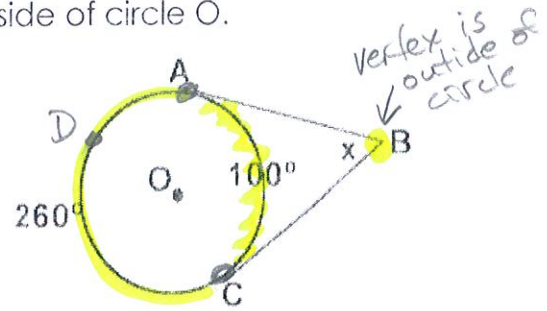
$$\frac{\text{Large arc} - \text{small arc}}{2} = \text{angle}$$

$\angle ABC$ is formed by two tangents intersecting outside of circle O.

The intercepted arcs are \widehat{ADC} and \widehat{AC} .

These two arcs together comprise the entire circle.

$$m\angle ABC = \frac{260 - 100}{2} = \frac{160}{2} = 80^\circ$$

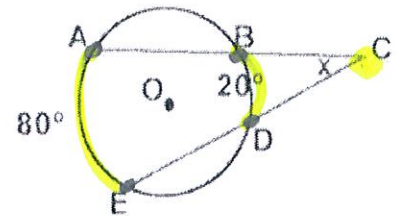


Two Secants

$\angle ACE$ is formed by two secants intersecting outside of circle O.

The intercepted arcs are \widehat{AE} and \widehat{BD} .

$$m\angle ACE = \frac{80 - 20}{2} = \frac{60}{2} = 30^\circ$$

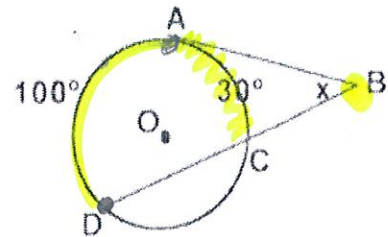


A Secant and A Tangent

$\angle ABD$ is formed by a tangent and a secant intersecting outside of circle O.

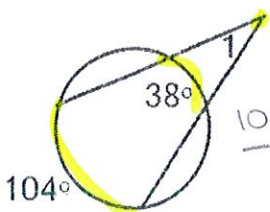
The intercepted arcs are \widehat{AD} and \widehat{AC} .

$$m\angle ABD = \frac{100 - 30}{2} = \frac{70}{2} = 35^\circ$$

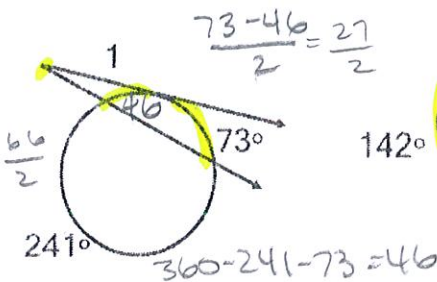


Examples:

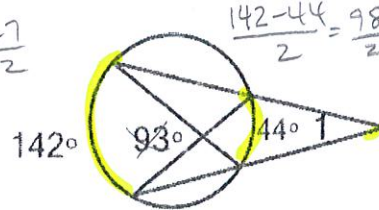
1. $m\angle 1 = 33^\circ$



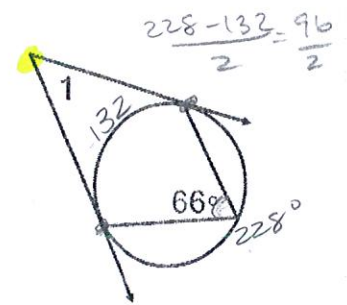
2. $m\angle 1 = 13.5^\circ$



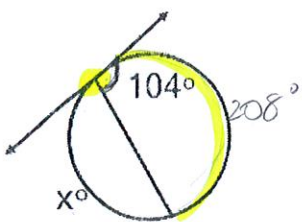
3. $m\angle 1 = 49^\circ$



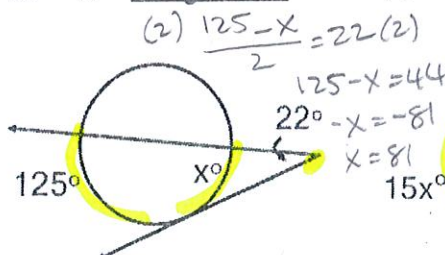
4. $m\angle 1 = 48^\circ$



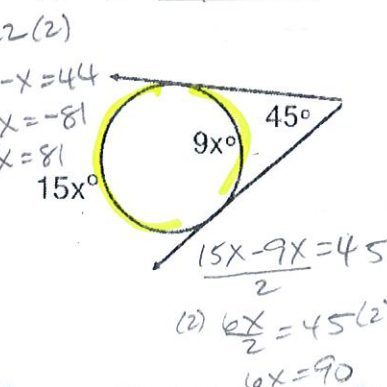
5. $x = 152^\circ$



6. $x = 81^\circ$



7. $x = 15$



8. $x = 76^\circ$

