

Circles

Name: Answers

Angle Measure of Secants & Tangents

Date: \_\_\_\_\_ Period: \_\_\_\_\_

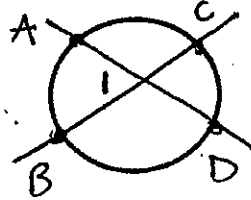
Essential Question

? How can I find the measure of an angle formed by tangents and secants?

Theorem #1

$$\frac{\text{Big} + \text{Small}}{2}$$

If two secants or chords intersect inside a circle, the measure of the angle formed is half the sum of the two arc measures.

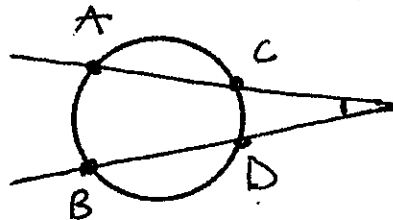


$$m\angle I = \frac{m\widehat{AB} + m\widehat{CD}}{2}$$

Theorem #2

$$\frac{\text{Big Arc} - \text{Small Arc}}{2}$$

If two secants or chords intersect outside a circle, the measure of the angle formed is half the difference of the two arc measures.

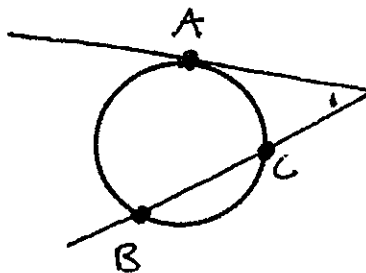


$$m\angle I = \frac{m\widehat{AB} - m\widehat{CD}}{2}$$

Theorem #3

$$\frac{\text{Big} - \text{Small}}{2}$$

If one secant and one tangent intersect outside a circle, the measure of the angle formed is half the difference of the two arc measures.

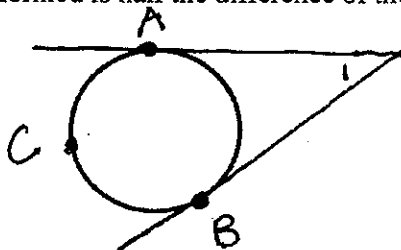


$$m\angle I = \frac{m\widehat{AB} - m\widehat{AC}}{2}$$

Theorem #4

$$\frac{\text{Big} - \text{Small}}{2}$$

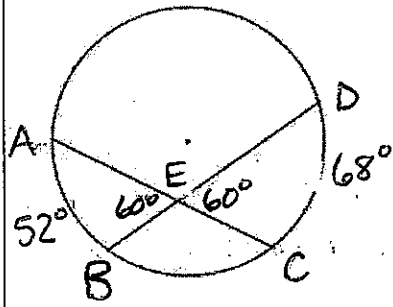
If two tangents intersect outside a circle, the measure of the angle formed is half the difference of the two arc measures.



$$m\angle I = \frac{m\widehat{ACB} - m\widehat{AB}}{2}$$

Example #1

(Theorem #1)

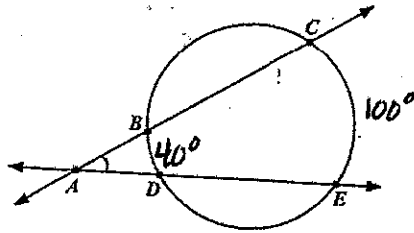


Given  $m\widehat{DC}$  and  $m\widehat{AB}$ , find  $m\angle AEB$  and  $m\angle DEC$ .

$$\frac{68 + 52}{2} = \frac{120}{2} = \boxed{60^\circ}$$

Example #2

(Theorem #2)

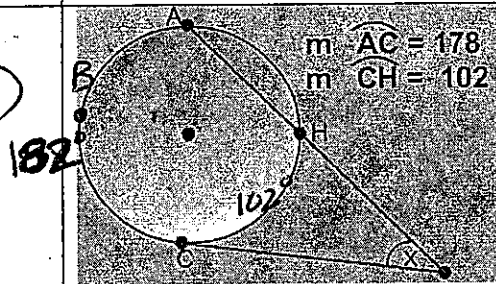


Given  $m\widehat{BD} = 40^\circ$  and  $m\widehat{CE} = 100^\circ$ , find  $m\angle CAE$ .

$$\frac{100 - 40}{2} = \frac{60}{2} = \boxed{30^\circ}$$

Example #3

(Theorem #3)



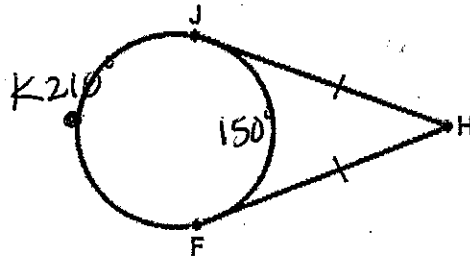
Given  $m\widehat{ABC} = 182^\circ$  and  $m\widehat{CH} = 102^\circ$ , find  $x$ .

$$\frac{182 - 102}{2} = \frac{80}{2} = \boxed{40^\circ}$$

$$\frac{182 - 102}{2} = \frac{80}{2} = \boxed{40^\circ}$$

Example #4

Theorem #4



Given  $m\widehat{JKF} = 210^\circ$ ,  $m\widehat{JF} = ?$  find  $m\angle JHF$ .

$$\frac{210 - 150}{2} = \frac{60}{2} = \boxed{30^\circ}$$