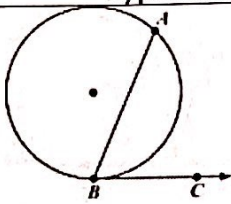
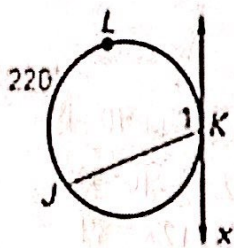


# Day 5 – Angle Relationships (Vertex On, Inside & Outside) – Notes

**Learning Target:** Use properties and theorems of angle relationships inside and outside circles to solve problems.

Name	Theorem	Hypothesis	Conclusion
<b>Tangent Chord Theorem</b> <u>(Vertex ON)</u>	If a tangent and a chord intersect at a point on the circle, then the measure of each angle formed is one half the measure of its intercepted arc.		$\angle ABC = \frac{1}{2} \widehat{AB}$

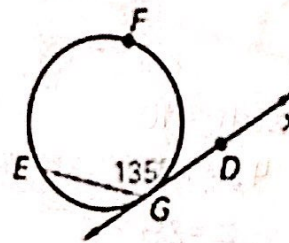
**Example:** Find the measure of angle 1.



$$\angle 1 = \frac{1}{2} (220)$$

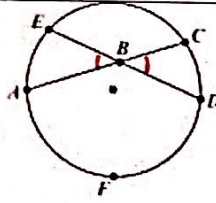
$$\angle 1 = 110^\circ$$

**Example:** Find the measure of arc EFG.

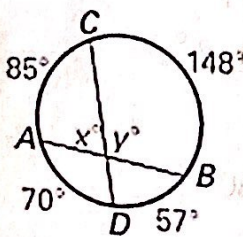


$$\widehat{EFG} = 2 \cdot 135$$

$$\widehat{EFG} = 270^\circ$$

Name	Theorem	Hypothesis	Conclusion
<b>Interior Angles of a Circle Theorem</b> <u>(Vertex INSIDE)</u>	If two chords intersect <b>inside</b> the circle, then the measure of each angle is half the sum of the measures of the arcs intercepted by the angle and its vertical angle.		$\angle EBA = \angle CBD = \frac{1}{2} (\widehat{EA} + \widehat{CD})$

**Example:** Find x and y.



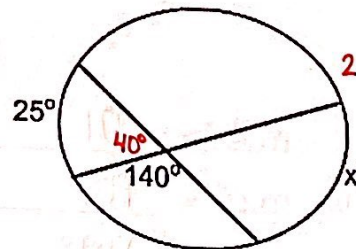
$$x = \frac{1}{2} (85 + 57)$$

$$x = 71^\circ$$

$$y = \frac{1}{2} (70 + 148)$$

$$y = 109^\circ$$

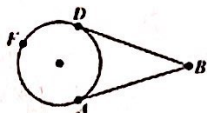
**Example:** Find the value of x.



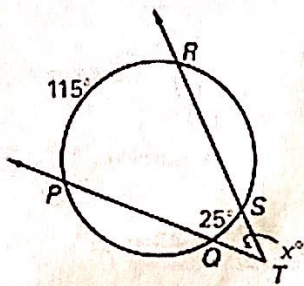
$$2 \cdot 40 = \frac{1}{2} (25 + x)$$

$$80 = 25 + x$$

$$x = 55^\circ$$

Name	Theorem	Hypothesis	Conclusion
<p><b>Exterior Angles of a Circle Theorem (Vertex OUTSIDE)</b></p>	<p>If a tangent and a secant, two tangents, or two secants intersect <b>outside</b> the circle, then the measure of the angle formed is half the difference of the measures of the intercepted arcs.</p>	 $\angle B = \frac{1}{2} (\widehat{DFA} - \widehat{DA})$	

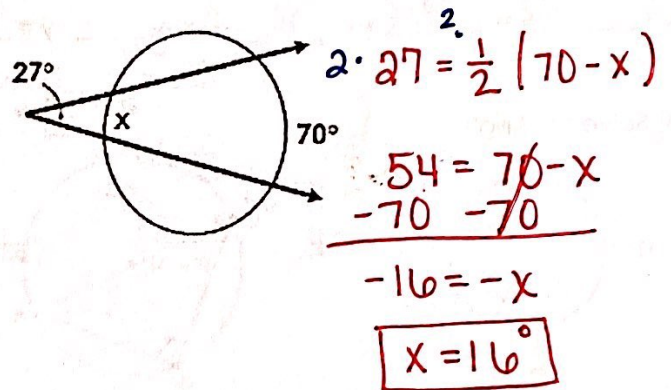
Example: Find the value of x.



$$\angle T = \frac{1}{2} (115 - 25)$$

$$\angle T = 45^\circ$$

Example: Find the value of x.



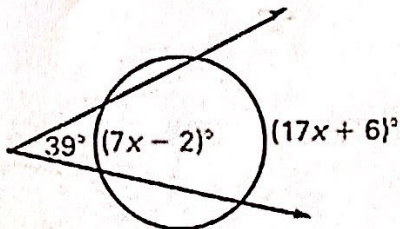
$$2 \cdot 27 = \frac{1}{2} (70 - x)$$

$$54 = \frac{70 - x}{2}$$

$$-16 = -x$$

$$x = 16^\circ$$

Example: Find the value of x.



$$39 = \frac{1}{2} ((17x + 6) - (17x - 2))$$

$$39 = \frac{1}{2} (17x + 6 - 17x + 2)$$

$$2 \cdot 39 = 10x + 8$$

$$78 = 10x + 8$$

$$70 = 10x$$

$$x = 7$$