NOTES: MATH 2 HONORS
Unit 10: Introduction to Circles

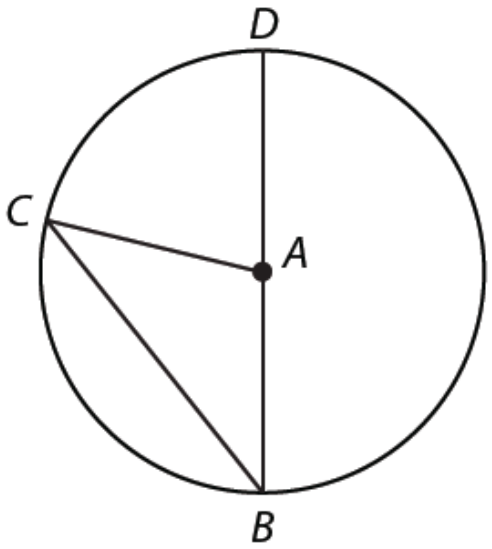
Brainstorm: What do you know about a circle? Consider their properties, area, circumference, etc.

Since we know that **all circles are similar**, we can find the scale factor required to map one circle to another. For example, find the scale factor necessary to map ⊙A→⊙B, if:

a. ⊙A has a radius of 4 units and ⊙B has a radius of 6 units.

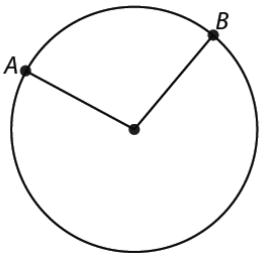
b. ⊙A has a diameter of 55 units and ⊙B has a diameter of 75 units.

Use the diagram below to identify the following parts of the circle:

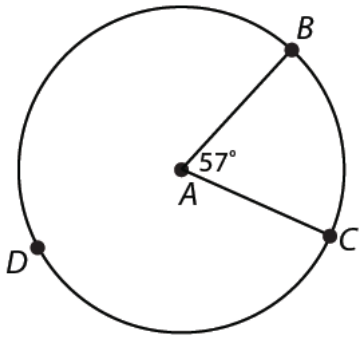


Part of Circle	Example(s)
Radius	
Diameter	
Minor Arc	
Major Arc	
Central Angle	
Inscribed Angle	
Chord	

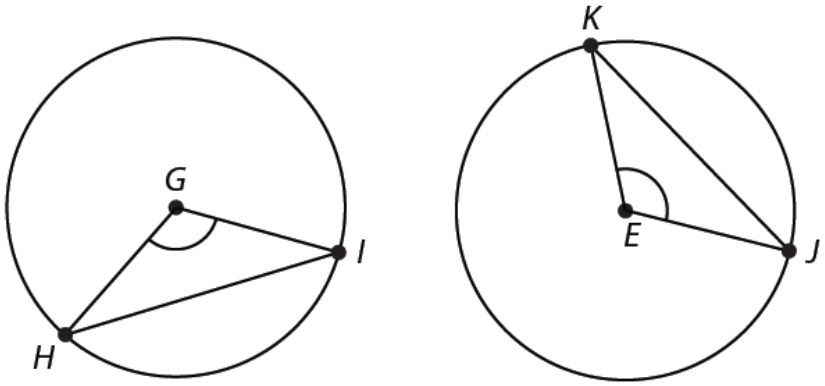
Central Angle Theorem: The measure of a central angle is _____ to the measure of its intercepted arc.



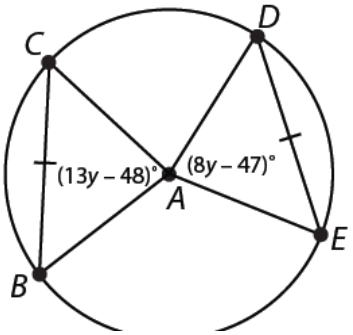
Example 1: Find the measure of the minor arc and the major arc.



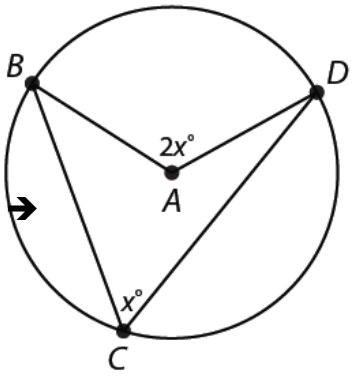
Example 2: ⊙G≅⊙E. What can you conclude about the chords? What can you conclude about the triangles?



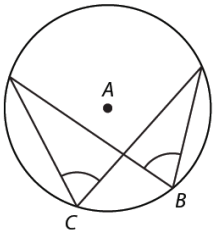
Example 3: Find y and find the measure of the central angle ∠CAB



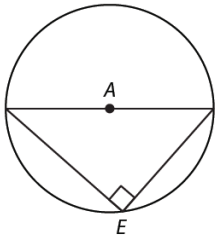
Inscribed Angle Theorem: The measure of an inscribed angle is _____ the measure of its intercepted arc



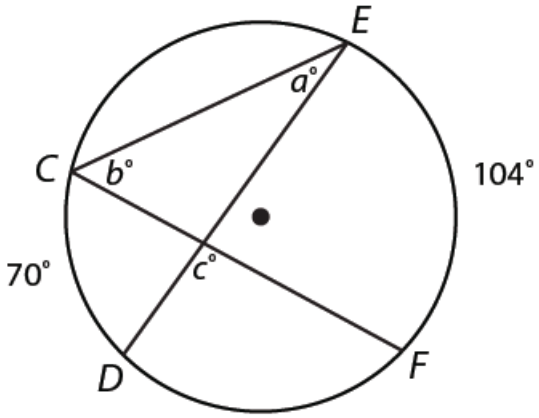
➔ Two inscribed angles that intercept the same arc are _____



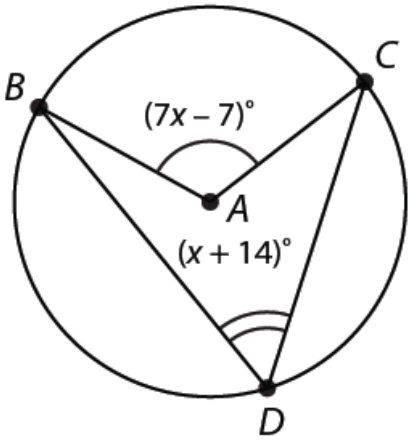
➔ An angle inscribed in a semicircle is a _____ angle.



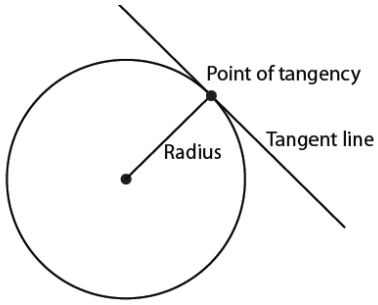
Example 4: Find the value of each variable.



Example 5: Find the measure of ∠BAC and ∠BDC (page 20)

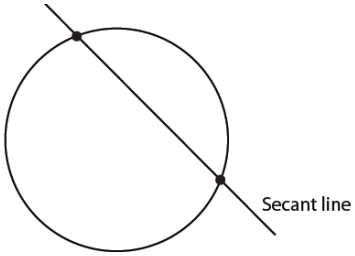


Tangent Line: A line that intersects a circle at exactly one point.



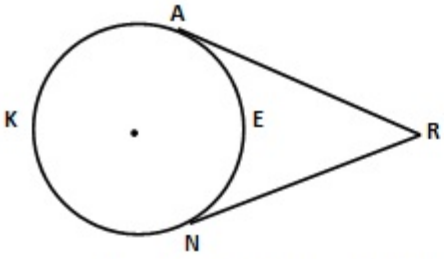
Tangent lines are _____ to the radius of the circle at the point of tangency.

Secant Line: A line that intersects a circle at two points.



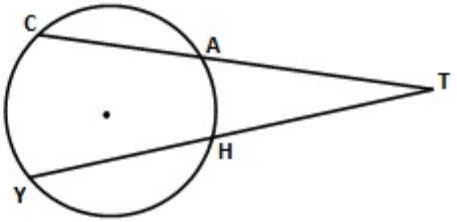
The following diagrams show the relationship between tangents, secants, angle measures, and arc measures in circles:

Two Tangents



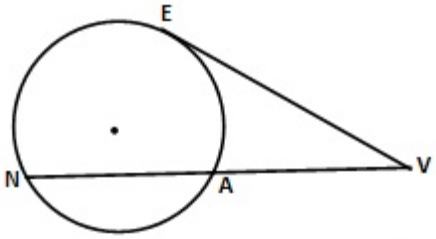
$$m\angle ARN = \frac{1}{2}(m\widehat{NKA} - m\widehat{AEN})$$

Two Secants



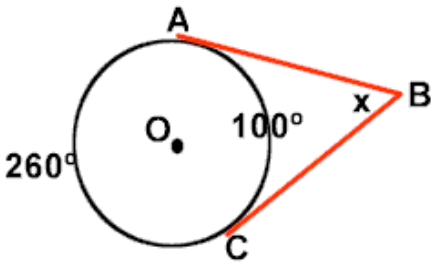
$$m\angle ATH = \frac{1}{2}(m\widehat{CY} - m\widehat{AH})$$

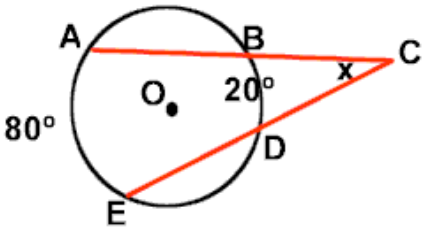
Tangent and Secant

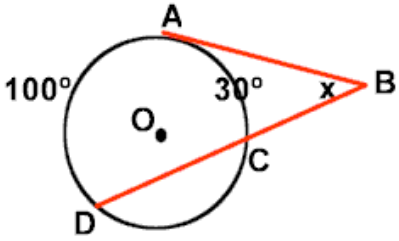


$$m\angle EVA = \frac{1}{2}(m\widehat{EN} - m\widehat{EA})$$

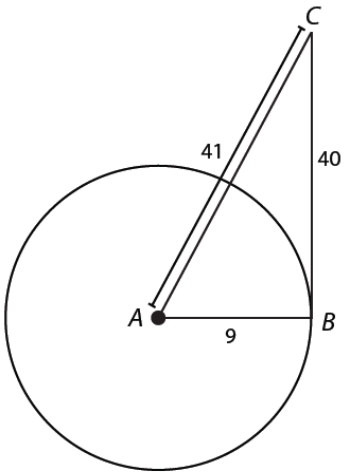
Numerical examples:



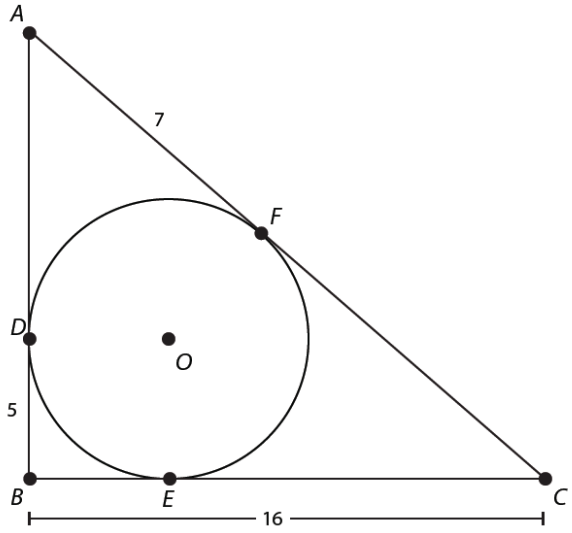




Example 6: Determine whether $\overline{BC}$ is tangent to ⊙A.



Example 7: Each side of ΔABC is tangent to circle O at the points D, E, and F. Find the perimeter of ΔABC.



Example 8: $\overline{AB}$ is tangent to ⊙C at point B as shown below.

Find the length of $\overline{AB}$ as well as the measure of arc BD.