

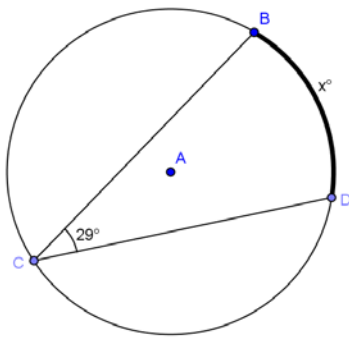
# Lesson 16: Similar Triangles in Circle-Secant (or Circle-Secant-Tangent) Diagrams

## Classwork

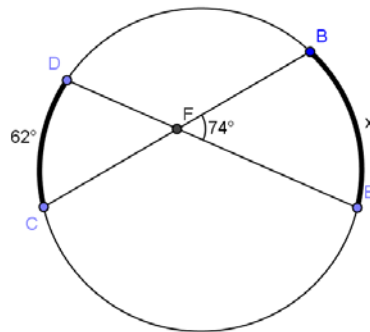
### Opening Exercise

Identify the type of angle and the angle/arc relationship, and then find the measure of  $x$ .

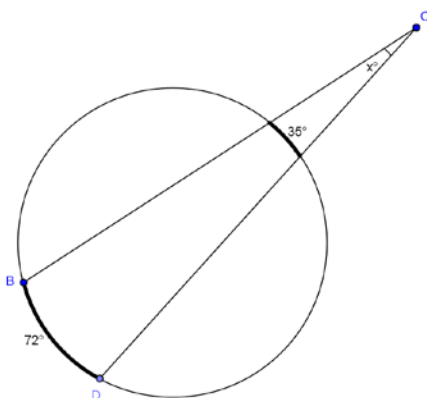
1.



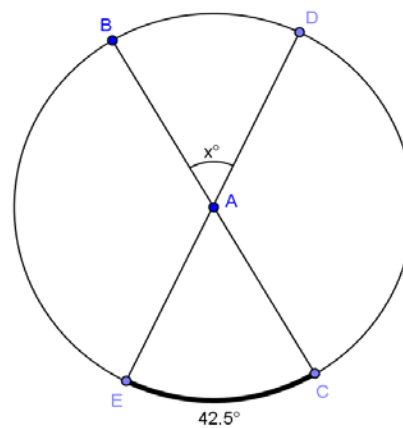
2.



3.



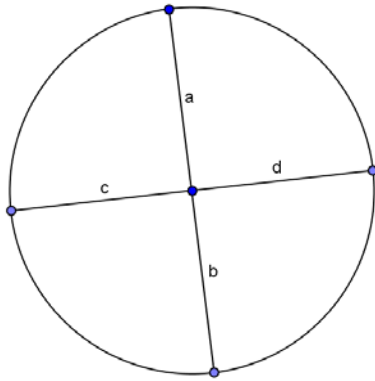
4.



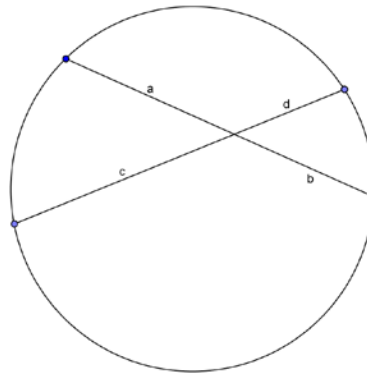
**Example 1**

Measure the lengths of the chords in centimeters and record them in the table.

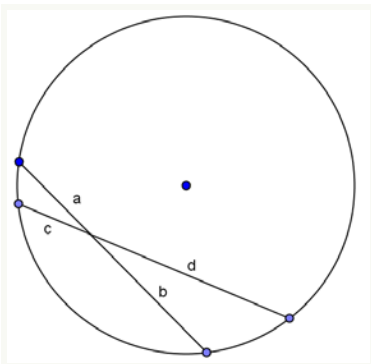
a. s



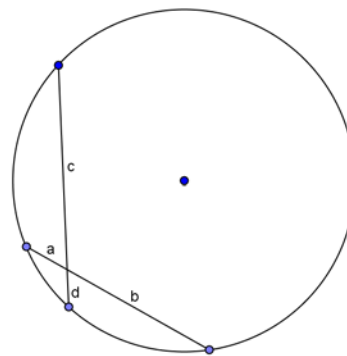
b.



c.



d.

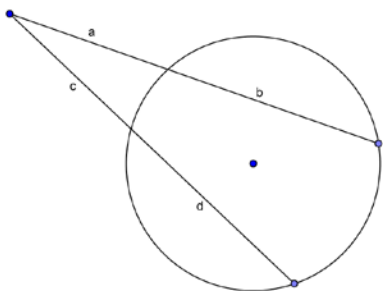


Circle #	$a$ (cm)	$b$ (cm)	$c$ (cm)	$d$ (cm)	Do you notice a relationship?
a					
b					
c					
d					

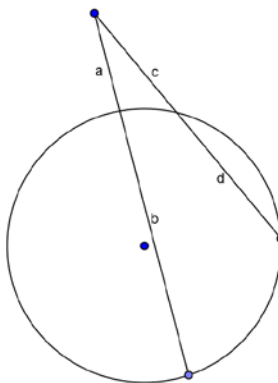
Example 2

Measure the lengths of the chords in centimeters and record them in the table.

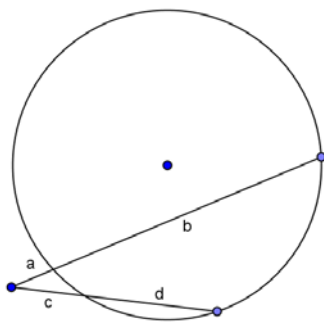
a.



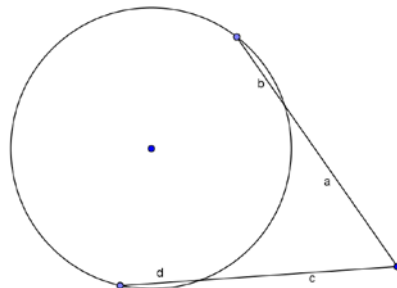
b.



c.

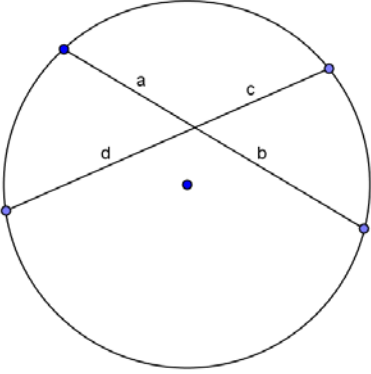
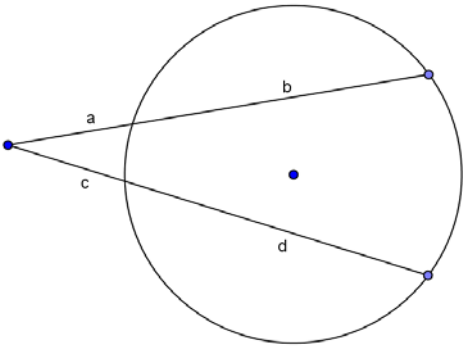
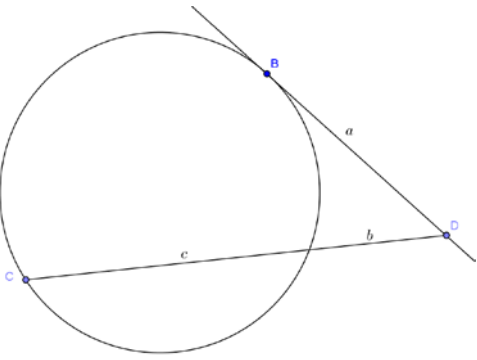


d.



Circle #	a (cm)	b (cm)	c (cm)	d (cm)	Do you notice a relationship?
a					
b					
c					
d					

The inscribed angle theorem and its family:

Diagram	How the two shapes overlap	Relationship between $a, b, c$ and $d$
		
		
		

**Lesson Summary**

**THEOREMS:**

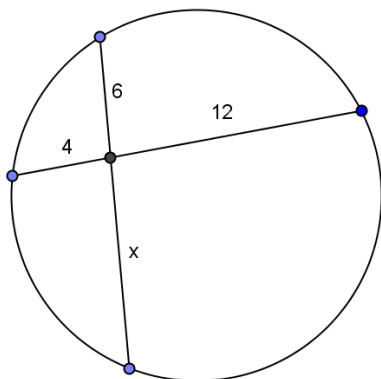
- When secant lines intersect inside a circle, use  $a \cdot b = c \cdot d$ .
- When secant lines intersect outside of a circle, use  $a(a + b) = c(c + d)$ .

**Relevant Vocabulary**

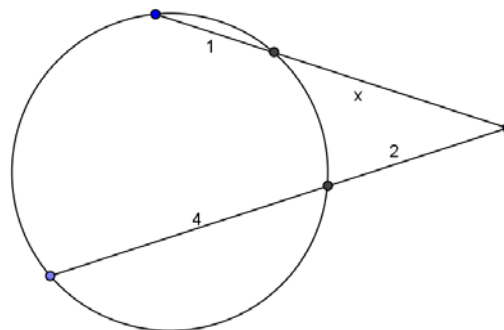
**SECANT TO A CIRCLE:** A secant line to a circle is a line that intersects a circle in exactly two points.

**Problem Set**

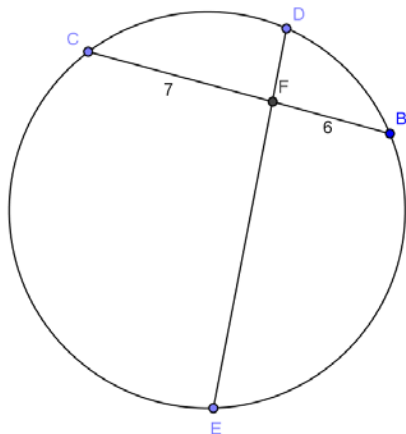
1. Find  $x$ .



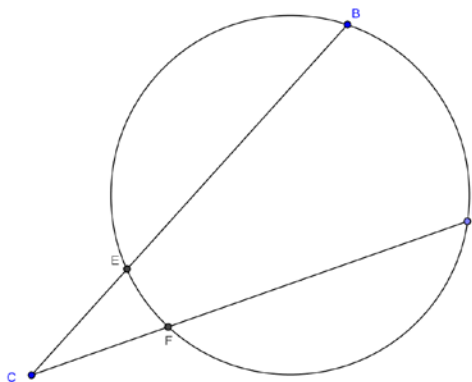
2. Find  $x$ .



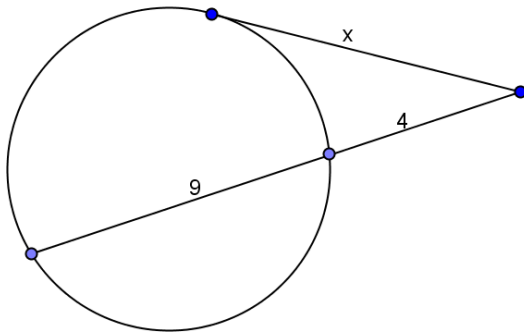
3.  $DF < FB, DF \neq 1, DF < FE$ . Prove  $DF = 3$



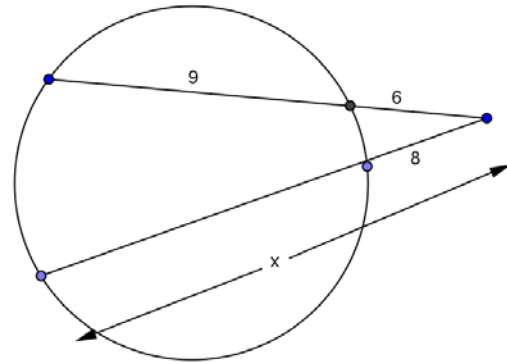
4.  $CE = 6, CB = 9, CD = 18$ . Show  $CF = 3$ .



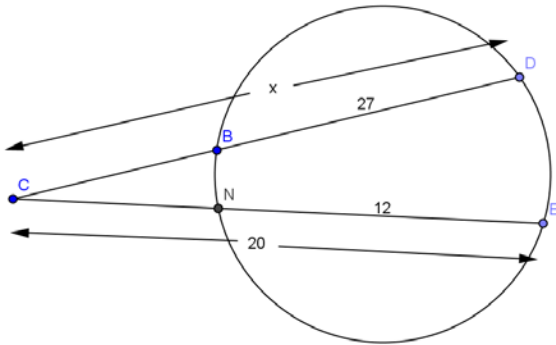
5. Find  $x$ .



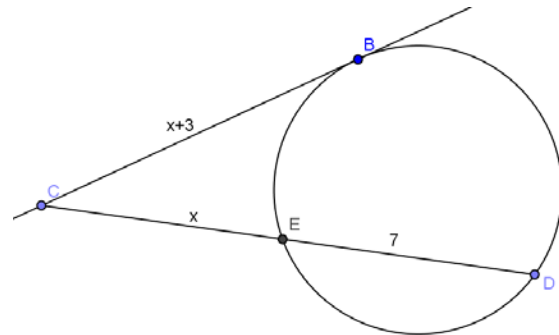
6. Find  $x$ .



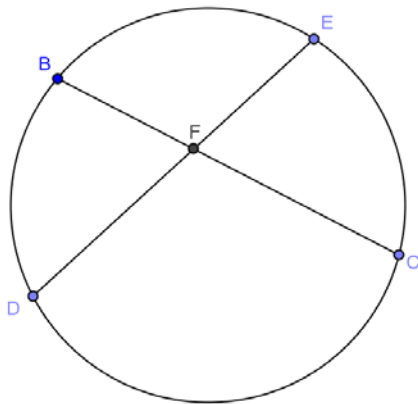
7. Find  $x$ .



8. Find  $x$ .



9. In the circle shown,  $DE = 11$ ,  $BC = 10$ ,  $DF = 8$ . Find  $FE$ ,  $BF$ ,  $FC$ .



10. In the circle shown,  $m\widehat{DBG} = 150^\circ$ ,  $m\widehat{DB} = 30^\circ$ ,  $m\angle CEF = 60^\circ$ ,  $DF = 8$ ,  $DB = 4$ ,  $GF = 12$ .
- Find  $m\angle GDB$ .
  - Prove  $\triangle DBF \sim \triangle ECF$ .
  - Set up a proportion using sides  $\overline{CE}$  and  $\overline{GE}$ .
  - Set up an equation with  $\overline{CE}$  and  $\overline{GE}$  using a theorem for segment lengths from this section.
  - Solve for  $CE$  and  $GE$ .

