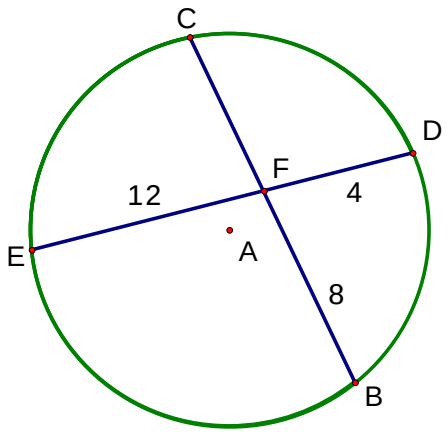
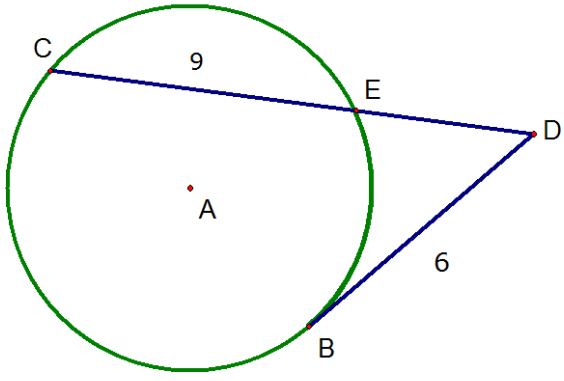
Lesson on Chord-Chord, Tangent-Secant and Secant-Secant

Do Now - Distribute copies of the Do Now for students to complete. These exercises should remind students that two triangles can be determined to be similar by AA and the proportions that can be written when triangles are similar.

Distribute copies of the Student Activity Sheet.

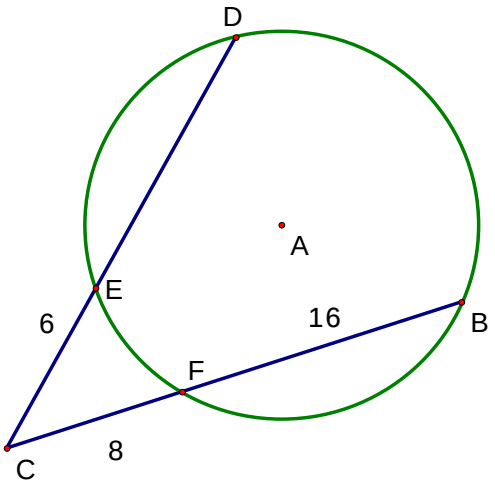


Display the first tranparency. (Problem 1 from Student Activity Sheet.) Ask students if they see any similar triangles. They should respond negatively. Ask students whether they see any central angles or inscribed angles? Again they should respond negatively. Which types of angles can you make by added two chords to the circle? (Inscribed) Ask students to add two chords to the drawing to make two triangles. (Chords CD and EB or CE and BD can be drawn. Discussion will be based on CD and EB being drawn.) Ask students why the two triangles formed by adding the chords, are similar? $\measuredangle C \cong \measuredangle E$ because both are inscribed angles that open up onto arc DB. $\measuredangle D \cong \measuredangle B$ because both are inscribed angles that open up onto arc CE. $\triangle CEF \sim \triangle DFB$ by AA. Now sides are proportional so $\frac{m\overline{EF}}{m\overline{FD}} = \frac{m\overline{CF}}{m\overline{BF}}$. Complete the problem on the transparency.



Ask students to look at the second picture on their activity sheet. Display the second transparency. Ask students if they see any similar triangles? (Students should respond negatively again.) Ask students if they can form two triangles by adding two chords to the circle. (They should draw chords BC and BE.) Two triangles are formed. Are any of the angles of the two triangles common angles? (Yes, Angle D.) Are any other angles

congruent. Students may not realize that angle BCE is congruent to angle BED. A sketchpad file can be used to explore this idea. (Tangent-Secant.gsp) Once the two angles are identified as congruent ask students if they can describe the two similar triangles. ($\triangle BCD \sim \triangle EBD$ by AA. Once the two triangles are identified ask students to write a proportion for the corresponding sides using only the original segments. ($\frac{m\overline{BD}}{m\overline{ED}} = \frac{m\overline{DC}}{m\overline{BD}}$ or $\frac{9+x}{6} = \frac{6}{x}$) Use this to complete the problem on the transparency.



Ask students to view the third example on the Student Activity Sheet. Display the third transparency. Again ask students if they see any triangles? (No.) Ask student to add two chords to the drawing so there are two overlapping triangles. (Draw chords DF and BE.) Are any of the angles of the two triangles in common? (Angle C) Are any of the other angles opening on to the same arc? (Angle B and angle D.) Therefore they are the same size. ($\triangle CFD \sim \triangle CEB$ by AA) If these two triangles are similar what proportion can you write that uses the measurements in the diagram? ($\frac{m\overline{CF}}{m\overline{CE}} = \frac{m\overline{CB}}{m\overline{CD}}$) Use this to solve for the missing length. $\frac{6}{8} = \frac{24}{6+x}$)

Summarize how chords were added to form similar triangles and then how proportions were written for each picture.

Assign problem similar to these for an assignment.