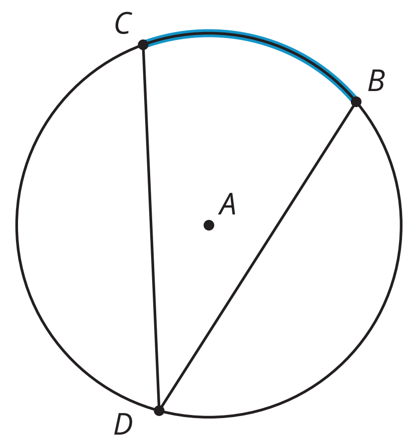
Unit 7, Lesson 6

Inscribed Angles

Let's analyze angles made from chords.

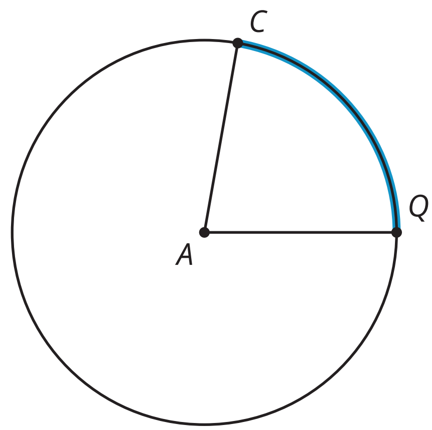
6.1 Notice and Wonder: A New Angle

What do you notice? What do you wonder?



6.2 A Central Relationship

Here is a circle with central angle QAC.

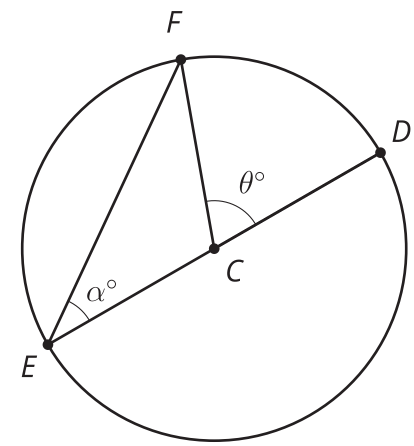


1. Use a protractor to find the approximate degree measure of angle QAC.
2. Mark a point B on the circle that is *not* on the highlighted arc from C to Q. Each member of your group should choose a different location for point B. Draw chords BC and BQ. Use a protractor to find the approximate degree measure of angle QBC.
3. Share your results with your group. What do you notice about your answers?

4. Make a conjecture about the relationship between an **inscribed angle** and the central angle that defines the same arc.

Are you ready for more?

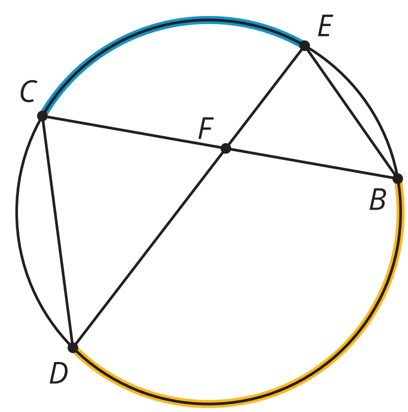
Here is a special case of an inscribed angle in which one of the chords that defines the inscribed angle goes through the center. The central angle DCF measures θ degrees, and the inscribed angle DEF measures α degrees. Prove that $\alpha = \frac{1}{2}\theta$.



6.3 Similarity Returns

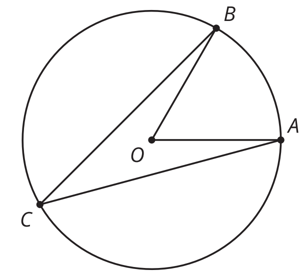
The image shows a circle with chords $CD, CB, ED,$ and EB. The highlighted arc from point C to point E measures 100 degrees. The highlighted arc from point D to point B measures 140 degrees.

Prove that triangles CFD and EFB are similar.



Lesson 6 Summary

We have discussed central angles such as angle AOB. Another kind of angle in a circle is an **inscribed angle**, or an angle formed by two chords that share an endpoint. In the image, angle ACB is an inscribed angle.



It looks as though the inscribed angle is smaller than the central angle that defines the same arc. In fact, the measure of an inscribed angle is always exactly half the measure of the associated central angle. For example, if the central angle AOB measures 50 degrees, the inscribed angle ACB must measure 25 degrees, even if we move point C along the circumference (without going past A or B). This also means that all inscribed angles that define the same arc are congruent.