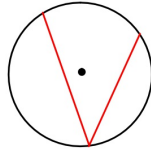
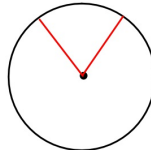


Launch: Answer the following questions in your notes:

The following picture shows an inscribed angle.



How is it different from a central angle?



Why do you think it is called an inscribed angle?

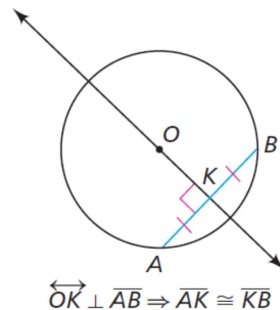
5.9

Chords and Inscribed Angles

Objective: To recognize the relationship between inscribed angles and their corresponding central angles.

Theorem 5.8

A line through the center of a circle bisects a chord if it is perpendicular to the chord.



Theorem 5.9

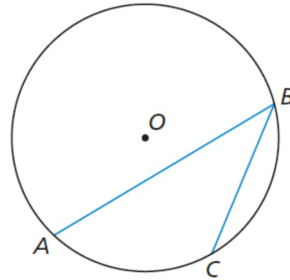
If a line through the center of a circle bisects a chord, then it is perpendicular to the chord.

Theorem 5.10

The center of a circle lies on the line perpendicular to a chord if and only if the line bisects the chord.

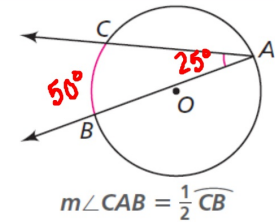
Definition

An **inscribed angle** is an angle that has its vertex on the circle and has sides that are chords of the circle. You say that $\angle ABC$ intercepts \widehat{AC} and that it is inscribed in \widehat{ABC} .



Theorem 5.11

The measure of an inscribed angle is equal to half of its intercepted arc.



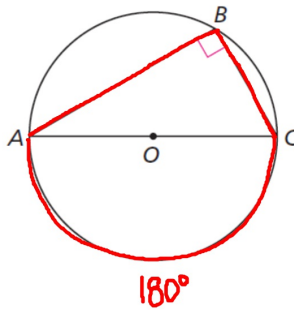
Corollary 5.11.1

Inscribed angles are congruent if and only if they intercept the same arc or congruent arcs.



Corollary 5.11.2

Any triangle inscribed in a semicircle is a right triangle.



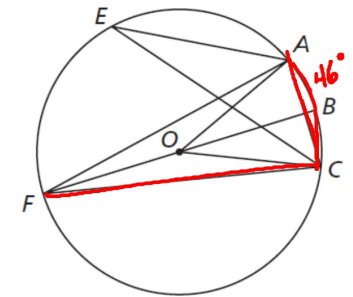
Remember...

One side of a triangle inscribed in a semicircle is a diameter of the circle. So $\angle ABC$ intercepts an arc of 180° and therefore measures 90° .

Check Your Understanding

5. In the figure, $m\widehat{ABC} = 46^\circ$ and $\widehat{AB} \cong \widehat{BC}$. Find the measures of the inscribed angles.

- $\angle CFB = 11.5^\circ$
- $\angle CFA = 23^\circ$
- $\angle CEA = 23^\circ$
- $\angle FAC = 78.5^\circ$
- $\angle FCA = 78.5^\circ$

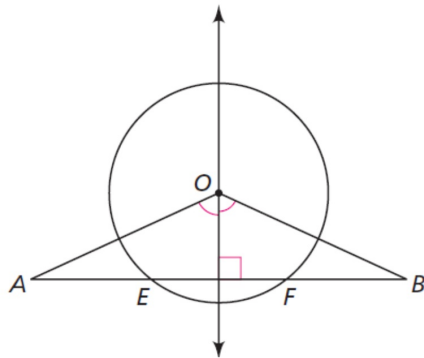


On Your Own

Page 403: 10, 15

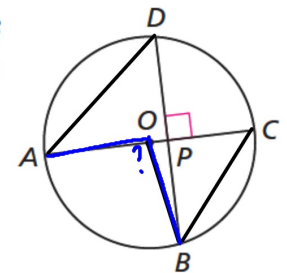
- The midpoints of two chords of a circle are the same distance from the center O . Prove that these chords are congruent.
- Draw a circle with a 3-cm radius. Consider a chord that is 2 cm long and draw at least ten other chords 2 cm long on the circle. What is the locus of the midpoints of these chords?

- The line through the center of the circle below is the bisector of $\angle AOB$. Prove that \overline{AE} is congruent to \overline{BF} .



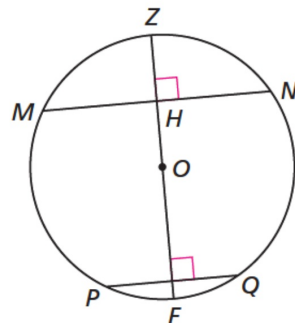
- If $m\angle CAD = 20^\circ$ and $\overline{DP} = \overline{PB}$ in the figure at the right, what is the measure of each of the following angles?

- $\angle DPA, \angle DPC, \angle CPB, \angle BPA$
- $\angle ADB$
- $\angle AOB$
- $\angle ACB$
- $\angle COB$



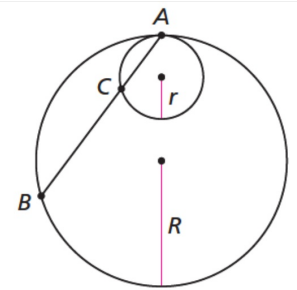
12. In the figure at the right, $FZ = 10$ cm, $PQ = 5$ cm, and the distance from the center of the circle O to \overline{MN} is 2.5 cm. \overline{FZ} is perpendicular to \overline{MN} , which is parallel to \overline{PQ} . Answer the following questions.

- Why is \overline{FZ} the perpendicular bisector of \overline{PQ} and \overline{MN} ?
- What is the radius of the circle?
- How long is \overline{MN} ?
- How far is \overline{PQ} from O ?
- What is $m\angle NOQ$?



14. The diagram shows a pair of nested circles. One circle is inside the other, and the two circles have point A in common.

- Why are the circles similar?
- Let the ratio of corresponding lengths be the common ratio for the two circles. In terms of the radii r and R , what is the common ratio?
- Any chord \overline{AB} of the larger circle determines a chord \overline{AC} of the smaller circle. Explain why the ratio of AB to AC equals the common ratio.



15. **Standardized Test Prep** What is $m\angle EFH$ if $m\angle EOF = 30^\circ$ and $m\angle FGH = 40^\circ$?

- 80°
- 110°
- 125°
- not enough information to answer

