Circles—Angles and Arcs

A circle is the set of all points in a plane that are equidistant from a given point in the plane. Circles, angles, and arcs have many interesting characteristics. In this activity, you will explore relationships among different types of angles and arcs in a circle.

STEP 1

1. Drag point *A* or point *C*. Describe the changes that occur in the figure as you drag the point.

2. Angle *AOC* is called a central angle. Why do you think this is so?

An angle intercepts an arc of a circle if each endpoint of the arc is on a different ray of the angle and the other points of the arc are in the interior of the angle.

STEP 2

As you move point *A* or point *C*, the central angle $\angle AOC$ intercepts a minor arc *AC*. The measure of the minor arc equals the measure of the central angle. The larger remaining arc, *ABC*, is called a major arc.

3. a. Move point *A* or point *C* to help you complete the table.

$\angle AOC$	arc ***AC***	arc ***ABC***	arc ***AC*** + arc ***ABC***
50°	50°		
100°			
		250°	
(Choose an angle.)			

b. What is true about the measure of arc *AC* + arc *ABC*, the sum of the measures of the minor and major arcs?

4. In a circle, the measure of a central angle $\angle AOC$ is $n°$.
   a. What is the measure of the minor arc that is intercepted by the central angle? How do you know?

   b. What is the measure of the major arc? How do you know?

STEP 3

5. Angle *ABC* is called an inscribed angle because $\overline{BA}$ and $\overline{BC}$ are chords of the circle and vertex *B* is on the circle. Drag point *B* around the circle.
   a. As point *B* is moved around the circle, what do you notice about the measure of $\angle ABC$?

   b. Why does $m\angle ABC$ change when point *B* is moved from one arc to the other? Explain your reasoning.

   c. Move point *A* or point *C* until $\angle ABC$ is a right angle. What is special about the arc and $\overline{AC}$?