

Part A: Comparing Central and Inscribed Angles

1. Open a New Sketch in Geometer's Sketchpad 4.0 on your computer.
2. Draw a circle and label it A.
3. Choose any point on circle A and call it B.
4. From point B, draw two **chords** to form an acute **inscribed** angle. Label the angle $\angle DBC$. Find $m\angle DBC$ and record it in the table below.
5. Draw $\angle DAC$. Find $m\angle DAC$ and record it in the table below.

$m\angle DBC$	$m\angle DAC$

6. Choose a different location for B, but don't change the location of D and C. In other words, move point B along circle A. Record $m\angle DBC$ and $m\angle DAC$ at the new location.

7. Make a conjecture based on your results in Step 6. _____

8. Choose a different location for C, but don't change the location of B and D. In other words, move point C along circle A to form an acute $\angle DBC$. Record $m\angle DBC$ and $m\angle DAC$ in the table below.

9. Repeat Step 8, two more times.

$m\angle DBC$	$m\angle DAC$

10. Make a conjecture based on your results in Step 8 and 9. _____
- _____
- _____
- _____

Extra Credit:

1. A tangent line intersects a circle in only one point. Open a new sketch in Geometer's Sketchpad. Draw circle A.
2. Construct diameter \overline{BC} and tangent \overline{AC} . (Hint: The radius of a circle is perpendicular to the tangent line.)
3. Use $m\angle ADB$ and your results from Steps 8 and 9 to make a conjecture about the measure of any angle formed by a tangent and a diameter. Explain your reasoning.

Part B: Exploring Arcs and Angles

1. Open "circleA.gsp"
2. To measure the angle of an arc, first highlight the two points on the circle and then highlight the circle. Go to "measure" and then "arc angle." What is the measure of the arc BC? _____
3. A **minor arc** measures less than 180° and is named by its two endpoints. Name up to five minor arcs in circle A. _____
4. A **major arc** measures greater than 180° and is named by three points, its endpoints, and a third point on the major arc. Name all the major arcs in circle A. _____
5. Name a **semicircle** of circle A, if any: _____
6. Find the angle measure of the arcs:

$m\widehat{BC} =$	$m\widehat{CD} =$	$m\widehat{BD} =$
$m\widehat{HG} =$	$m\widehat{GF} =$	$m\widehat{HF} =$
$m\widehat{BD} =$	$m\widehat{HB} =$	$m\widehat{HD} =$
$m\widehat{HF} =$	$m\widehat{FE} =$	$m\widehat{HE} =$

7. Make a conjecture based on your data in #6 about angle measures: _____

Part C: Inscribed Angle Theorems

1. Open “circleF.gsp”
2. Find the measure of the angles and the arc lengths.

$m\angle BDA =$	$m\widehat{BA} =$
$m\angle CAD =$	$m\widehat{CD} =$
$m\angle ACE =$	$m\widehat{AE} =$

3. Make a conjecture based on your data in #2. Hint: What is the relationship between the measure of the inscribed angle and the intercepted arc? _____

4. Open “circleE.gsp”

5. Find $m\angle ABC =$ _____ and $m\angle ADC =$ _____

6. Highlight point A and move it around the circle. What happens to the measurements of $\angle ABC$ and $\angle ADC$? What about when you move Point C? _____

7. Make a conjecture based on your data in #5 and #6. _____

8. Open “circleD.gsp”

9. \overline{BE} is tangent to circle D. Find $m\angle ABE =$ _____ and $m\widehat{AB} =$ _____

10. Move the chord \overline{AB} , by highlighting point A and dragging it around the circle. How are $m\angle ABE$ and $m\widehat{AB}$ related? Make a conjecture based on your observations. _____

