Circles & their Angles

Warm Up

1. $A_{\text{sector}} = \underline{\quad \quad \quad \quad}$
   Arc length = $\underline{\quad \quad \quad \quad}$

2. Find the degree measure of the arc of a sector with area $36\pi$ if the area of the circle is $144\pi$.

3. The shaded area of the circle below is $24\pi$ in$^2$, and the radius is 12 cm. Find $x$.

   \[
   \begin{array}{c}
   \text{12 cm} \\
   x^\circ
   \end{array}
   \]

Vocab

Label the following circle with diameter, radius, chord, tangent, and secant.

(When these lines intersect, special angle/arc relationships occur.)

Central Angles:

Inscribed Angles:
Discovery Activity
Goal: Create a “Angles Formed by Secants, Tangents, & Chords” Booklet
This will be graded as a quiz!

Supplies you’ll need:
- at least 3 half-sheet papers
- compass
- protractor
- pencils & colored pencils

Page 1: "Tangent & Chord Meeting On the Circle"

1.) Draw a circle on the half sheet and make a dot at the center.

2.) Draw a random chord through your circle with endpoints A and B.

3.) Create a tangent line from the chord’s endpoints B in one direction.

4.) Measure the arc intercepted AB by the chord by measuring the central angle. (Use dashed line for all central angle measuring!)

5.) Measure the angle ABC created between the chord and the tangent line.

6.) Divide the intercepted arc AB by 2.

7.) What is the relationship between the intercepted arc of a chord and the angle formed by a tangent?
Page 2:  "Two Secants Meeting Outside the Circle"

1.) Draw a circle on the half sheet and make a dot at the center.

2.) Draw two secant lines through the circle that meet at the outside of the circle. Label A, B, C, D, and E according to the following picture.

3.) Measure the arc AD using the central angle. __________

4.) Measure the arc BC using the central angle. __________

5.) Measure the angle BEC. __________

6.) Compute \((\text{arc } AD - \text{arc } BC)/2\). _________

7.) What is the relationship between the angle created by two secants meeting outside the circle and the two intercepted arcs of the secants?

Page 3:  "Secant & Tangent Meeting Outside the Circle"

1.) Draw a circle on the half sheet and make a dot at the center.

2.) Draw one secant lines through the circle and one tangent line that meet at the outside of the circle. Label A, B, C, and D according to the following picture.

3.) Measure the arc AC using the central angle. __________

4.) Measure the arc BC using the central angle. __________

5.) Measure the angle BDC. __________

6.) Compute \((\text{arc } AC - \text{arc } BC)/2\). __________

7.) What is the relationship between the angle created by a secant and a tangent meeting outside the circle and the two intercepted arcs of the lines?
Page 4: "Two Tangents Meeting Outside the Circle"

1.) Draw a circle on the half sheet and make a dot at the center.

2.) Draw two tangent line that meet at the outside of the circle. Label A, B, C, and D according to the following picture.

3.) Measure the arc AC using the central angle. __________

4.) Measure the arc ABC using the central angle (or 360 rule). __________

5.) Measure the angle ADC. __________

6.) Compute (arc ABC – arc AC)/2. __________

7.) What is the relationship between the angle created by two tangent lines meeting outside the circle and the two intercepted arcs of the lines?

Page 5: "Two Secants Meeting Inside the Circle"

1.) Draw a circle on the half sheet and make a dot at the center.

2.) Draw two secant lines that meet within the circle, but not at the center. Label A, B, C, D, and E according to the following picture.

3.) Measure the arc AB using the central angle. ______

4.) Measure the arc CD using the central angle. ______

5.) Measure the angle AEB = ______

6.) Compute (arc AB + arc CD)/2. ______

7.) What is the relationship between the angle created by two secant lines meeting inside the circle and the two intercepted arcs of the lines?
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Homework!

Inscribed / Central Angles: Find the values of the missing arc, (?) or find x.

1)

2)

3)

Secants, Tangents, & Chords: Find the values of the missing value (?) or find x.

1.

2.

3.
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