

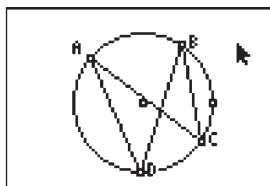
# Inscribed Angles Intercepting The Same Arc

Approximate  
Total Time:  
30 minutes

## ACTIVITY OVERVIEW:

### In this activity we will

- Draw a circle
- Mark two points on the circle to determine an arc
- Mark two points to be the vertices of inscribed angles
- Observe the relationship between the inscribed angles



This activity gives us the opportunity to investigate angles inscribed in a circle. By drawing and measuring certain angles, we can establish the relationship between angles that intercept the same arc.

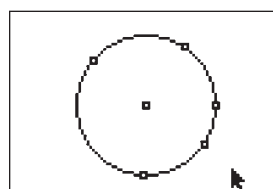
**NCTM Geometry Standard:** Analyze characteristics and properties of 2- and 3-dimensional geometric shapes and develop mathematical arguments about geometric relationships.



1

Press **[APPS]**. Move down to the Cabri Jr APP and press **[ENTER]**. Press **[ENTER]**, or any key, to begin using the application.

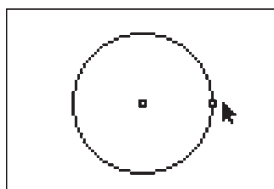
Press **[Y=]** for the F1 menu and select **New**. (If asked to **Save changes?** press **[↓]** **[ENTER]** to choose “No.”)



4

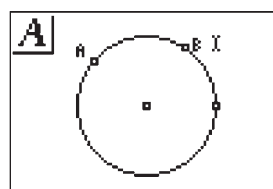
Now we will mark two more points along the “bottom” of the circle. Each of these points will be the vertex of an inscribed angle.

The **Point** tool is still active, so move until the circle is flashing and press **[ENTER]**. Move the pencil until the circle is again flashing and press **[ENTER]**. Press **[CLEAR]** to turn off the **Point** tool.



2

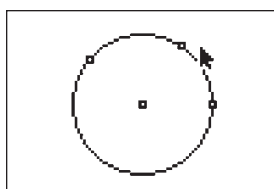
Press **[WINDOW]** for F2, move down to **Circle** and press **[ENTER]**. Move to the desired location of the center and press **[ENTER]**. Move to indicate the length of the radius and press **[ENTER]**. Press **[CLEAR]** to turn off the **Circle** tool.



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Now we will name the points that determine the arc.

Press **[GRAPH]** for F5, move to **Alpha-Num**, and press **[ENTER]**. Move the text cursor until one of the two points of the arc is flashing and press **[ENTER]**. Press **[MATH]** (for the alpha character A) then press **[ENTER]**. Move the text cursor until the other point of the arc is flashing and press **[ENTER]**. Press **[APPS]** (for the alpha character B), then press **[ENTER]**. We now have  $\widehat{AB}$ .

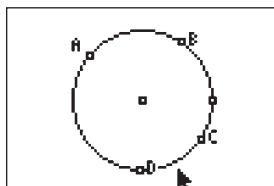


3

We will mark two points along the “top” of the circle to determine a minor arc of the circle.

Press **[WINDOW]** for F2, move to **Point**, then right to **Point** and press **[ENTER]**. Move the pencil until the circle is flashing and press **[ENTER]** to mark a point on the circle. Move the pencil until the circle is flashing again and press **[ENTER]** to mark a second point on the circle.

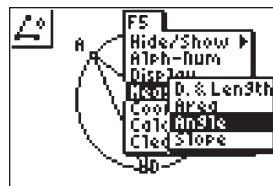
# Inscribed Angles Intercepting The Same Arc



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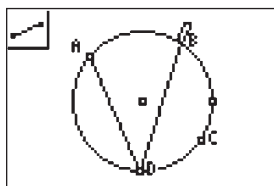
Now we will name the points that will be the vertices of the inscribed angles.

The **Alpha-Num** labeling tool is still active, so move to one of the points along the “bottom” of the circle. When the point is flashing, press **[ENTER]** **[PRGM]** **[ENTER]**. Move the text cursor to the other point that you placed along the “bottom” of the circle and press **[ENTER]** **[X-1]** **[ENTER]**. Press **[CLEAR]** to turn off the **Alpha-Num** tool.



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Press **[GRAPH]** for the F5 menu, move down to **Measure**. Move right and down to **Angle** and press **[ENTER]**. To measure an angle you will select three points. As in naming an angle, the second point will be the vertex of the angle. Each of the other two points can be one of the labeled points or any point on a side of the angle.

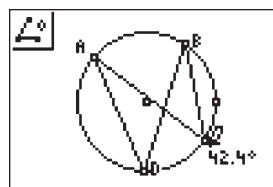


7

Next we will draw segments that will form the sides of the inscribed angles.

Press **[WINDOW]**, move to **Segment**, and then press **[ENTER]**. Move the pencil until the point at A is flashing and press **[ENTER]**. Move until the point at D is flashing and press **[ENTER]**. You should now see AD.

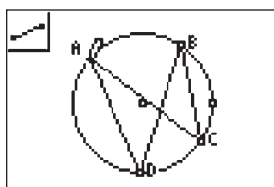
With point D still flashing, press **[ENTER]** to begin a new segment. Move until the point at B is flashing and press **[ENTER]**.



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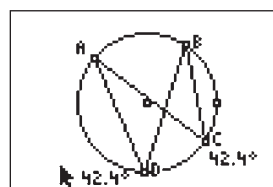
We will first find the measure of  $\angle BCA$ .

Move the pencil until the point at B is flashing, then press **[ENTER]**. Move the pencil until the vertex of the angle to be measured, the point at C, is flashing. Press **[ENTER]**. Move the pencil until the point at A is flashing. Press **[ENTER]** to mark the third point naming the angle. The measurement of the inscribed angle is displayed and the pointer changes to a *hand*. Press **[+]** to display the angle measurement rounded to tenths. Use the arrow keys to move the measurement to a convenient location. Press **[CLEAR]** to deactivate the *hand*.



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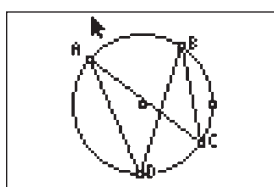
With point B still flashing, press **[ENTER]** to begin a new segment. Move until the point at C is flashing and press **[ENTER]**. With the point at C still flashing, press **[ENTER]** to begin a new segment. Move until the point at A is flashing and press **[ENTER]**. Press **[CLEAR]** to turn off the **Segment** tool.



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The **Angle** measurement tool is still active so now we will find the measure of  $\angle BDA$ .

Move the pencil until the point at B is flashing, then press **[ENTER]**. Move the pencil until the vertex of the angle to be measured, the point at D, is flashing. Press **[ENTER]**. Move the pencil until the point at A is flashing. Press **[ENTER]** to mark the third point naming the angle. The measurement of the inscribed angle is displayed and the pointer changes to a *hand*. Press **[+]** to display the angle measurement rounded to tenths. Use the arrow keys to move the measurement to a convenient location. Press **[CLEAR]** to deactivate the *hand*. Press **[CLEAR]** to turn off the **Angle** tool.

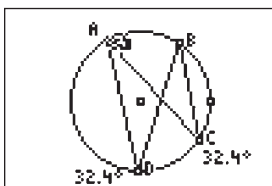


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$\angle BCA$  and  $\angle BDA$  are inscribed angles that intercept the same arc. What appears to be true about these angles?

These angles appear to be congruent. We can use the measurement tool to find their measures.

# Inscribed Angles Intercepting The Same Arc

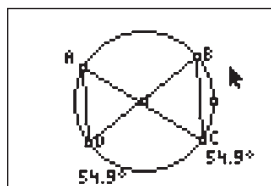


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The inscribed angles have the same measure. This illustrates the theorem: "If inscribed angles intercept the same arc (or congruent arcs), then the angles are congruent."

To further explore this, move the pointer until the point at A is flashing, press **[ALPHA]**, and move the point. Press **[CLEAR]** to turn off the *hand*.

You can observe that as the arc changes, the measures of the inscribed angles change, but stay equal to each other.



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You can explore this further by moving any of the points A, B, C, or D. Move until the desired point is flashing, press **[ALPHA]**, then move the point to a new location. Press **[CLEAR]** to turn off the *hand*. Repeat the steps to move a different point.



## For TI-Navigator™ Users

Use Screen Capture to check students' progress. For help, see page 56.



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To exit the APP, press **[Y=]** for the F1 menu. Move to **Quit**, then press **[ENTER]**. (Or you can press **[2nd] [MODE]** for **[QUIT]**.)