Cyclic Quadrilaterals

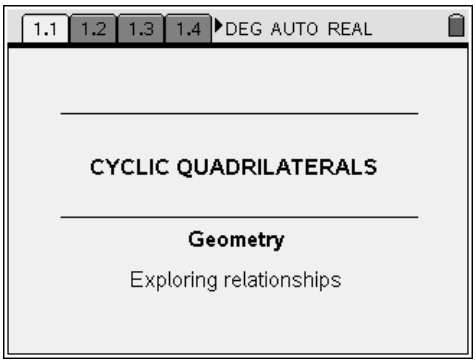
ID: 9691

Name _____

Class _____

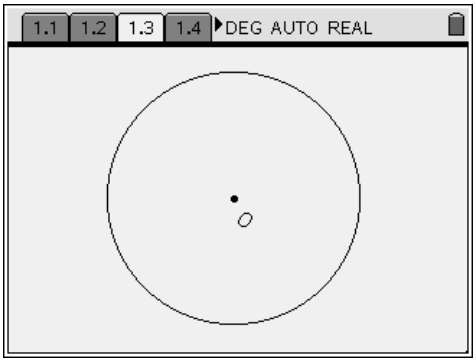
In this activity, you will explore:

- *relationships in cyclic quadrilaterals*



Open the file *GeoAct33_CyclicQuads_EN.tns* on your handheld and follow along with your teacher to work through the activity. Use this document as a reference and to record your answers.

Problem 1 – Exploring cyclic quadrilaterals



A ***cyclic quadrilateral*** is a quadrilateral that has all four of its vertices on a single circle.

On page 1.3, construct cyclic quadrilateral *ABCD* using the **Polygon** tool. Draw one here.

Use the **Angle** tool to measure the angles of quadrilateral *ABCD*.

- What appears to be true about the opposite interior angles of a cyclic quadrilateral? Explain why this occurs.

Use the **Perpendicular Bisector** tool to construct the perpendicular bisector of each side of the quadrilateral.

- What appears to be true about the perpendicular bisectors of the sides of a cyclic quadrilateral? Explain your reasoning.

Now, measure the distance from the center of the circle to each vertex of the quadrilateral.

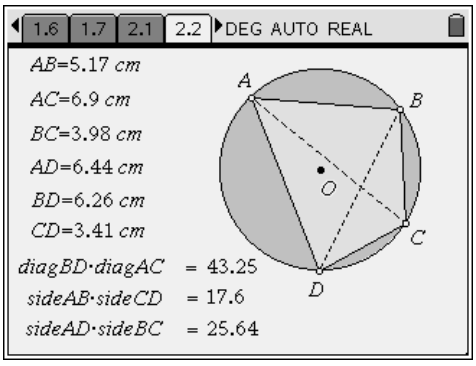
- What conjecture can you make about these distances? Explain why this is the case.

Drag two opposite vertices such that they are collinear with the center of the circle.

- What appears to be true about the measures of the angles formed at the other two vertices? Explain why this happens.

Problem 2 – Ptolemy's theorem

On page 2.2, cyclic quadrilateral *ABCD* is shown, along with its diagonals. The length of each side and diagonal of the quadrilateral is displayed on the screen, and so are certain products of these measurements.



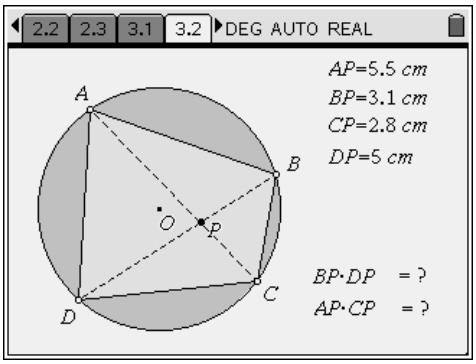
Drag vertices and observe how the measurements change.

- What relationship exists between the six displayed measurements?

- What types of special quadrilaterals can also be cyclic quadrilaterals? What types cannot be cyclic? Explain your reasoning.

Problem 3 – Chord-Chord Power theorem

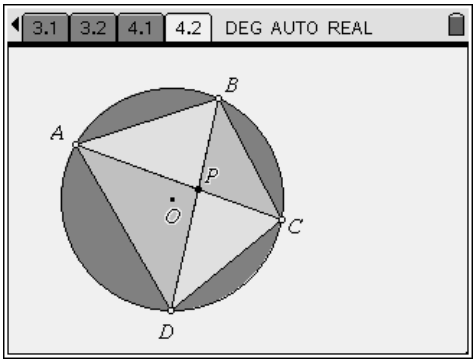
Another cyclic quadrilateral is shown on page 3.2. This time, its diagonals are shown with their intersection point *P*, and the distance of each vertex from point *P* has been measured. Two expressions are also shown at the bottom of the screen.



- How are these measurements related?

Problem 4 – Similar triangles

Page 4.2 shows a diagram similar to the one from Problem 3. For this diagram, consider △*ABP* and △*CDP*. Measure their angles.



- What can you say about these two triangles? Explain.

- What about △*DAP* and △*BCP*?