Circumscribed Polygons

Lesson Summary:
Students will investigate circumscribed polygons while creating a ferris wheel using geometry software.

Key Words:
Circumscribed, polygons

Existing knowledge:
Students should have previous knowledge of the term circumscribed

Learning objectives:
1. Create a circle around a polygon.
2. Find the center of a regular polygon.
3. Discover the relationships between the angles of a circumscribed polygons.

Materials:
Computer lab or set of calculators equipped with Cabri Geometry II and a lab worksheet.

Suggested Procedure:
• Group students in pairs.
• Discuss the definition of a tessellation with students.
• Have students complete the lab to discover the properties of tessellations.
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Team members’ names: __________________________________________________

File name: ____________________________________________________________

Goals: The goal of this lab is for students to examine relationships between a
circumscribed polygon and a circle.

Investigation:

1. Open Cabri, and create a regular octagon \(PQRSTUVW\). Label the center \(O\).

2. Draw line segments connecting points opposite.
3. Construct the midpoint between $Q$ and $P$ and label it $D$.

4. Draw a circle from center $O$ having a radius $D$.


6. In the diagram above, $D, E, F, G, H, I, J,$ and $K$ are spaced equally around the circle $O$. Find the measure of arc $EF$ (measure angle $EOF$). What other arcs have the same measure?

7. Construct line segments $EO$ and $FO$. Explain why triangle $OER$ and triangle $OFR$ are congruent.
8. Find the measures $EOR$ and $FOR$. What other angles must have the same measures?

**Extensions:**

1. Explain why triangle $SOR$ and triangle $ROQ$ are congruent.

2. Explain why $PQRSTUVW$ is a regular octagon.