1. **GRADE LEVEL: Grade 7**

Subject Area: Mathematics

Quarter 1 – Week   
Duration: 45 minutes

1. **LEARNING OBJECTIVES**

Learners are expected to:

1. Students will be able to use the formula (n-2) \* 180 to find the sum of interior angles of a polygon
2. Students will be able to calculate the number of sides of a polygon given the sum of its interior angles
3. Students will be able to find the measure of a single interior angle in a regular polygon.
4. **CONTENT**

* Title: Polygon Angle Side Puzzles
* Learning Competency: determine the measures of angles and the number of sides of polygons.
* Particular Focus: Using the interior angle sum formula to solve for unknown angle sums, individual angles in regular polygons, and the number of sides.

1. **LEARNING RESOURCES**

1. Teacher's Guide
2. Calculators
3. Worksheets
4. Online polygon calculator for verification
5. PPT: 'Solving Polygon Puzzles'
6. **PROCEDURE**

**Introduction:**

Start by reviewing the sum of angles in a triangle (180°) and a quadrilateral (360°). Ask students to predict the sum of angles in a pentagon. Guide them to see that a pentagon can be divided into three triangles, leading to the formula (5-2) \* 180.

**Presentation:**  
The teacher explicitly introduces the formula S = (n-2) \* 180 for the sum of interior angles. They model its use for a hexagon (n=6). Then, they show how to work backwards: 'If the sum of angles is 900°, how many sides does the polygon have?' (900/180 = 5, so n-2=5, n=7). Finally, they demonstrate how to find a single angle in a regular polygon by dividing the sum by n.

**Practice:**  
Students work through a scaffolded worksheet. Part 1: Find the sum of interior angles for polygons with 7, 9, and 12 sides. Part 2: Find the number of sides for polygons with given angle sums. Part 3: Find the measure of one interior angle in a regular nonagon. Part 4: A challenge problem with an irregular polygon where all but one angle is known.

**Integration:**  
This has direct applications in fields like architecture, design, and computer graphics. For example, a game developer needs to know these formulas to render polygonal models correctly. Values: The power of using a single formula to solve multiple related problems.

**Assessment:**  
['1. What is the sum of the interior angles of a heptagon (7 sides)? (900°)', ' 2. A regular octagon has 8 equal interior angles. What is the measure of each? (135°)', ' 3. The sum of the interior angles of a polygon is 1440°. How many sides does it have? (10)', ' 4. True or False: The formula for the sum of exterior angles is also (n-2) \* 180. (False)']

**Enrichment:**  
['Remediation: Provide a table with the first few polygon angle sums already calculated. Allow students to focus on just using the formula before they work backwards. Use calculators to reduce cognitive load on arithmetic.', ' Enhancement: Challenge students to derive the formula themselves by drawing polygons, dividing them into triangles from a single vertex, and finding the pattern.']  
**Asignment:**  
Research and write a short paragraph on how polygons and their angle properties are used in a specific real-world application (e.g., construction, art, nature, or technology).

1. **EVALUATION TOOLS**

The worksheet will be the main assessment, focusing on correct application of the formulas. A 'challenge problem' on the worksheet will serve as a formative assessment for higher-order thinking. Peer-checking of worksheet answers can reinforce learning.

1. **REMARKS**

["Ensure all students have access to calculators. The algebraic step of solving for 'n' when working backwards can be tricky", ' be prepared to re-teach solving simple linear equations. The notation (n-2) can be confusing', ' explain that it represents the number of triangles you can form inside the polygon.']

1. **REFLECTION**

The formula-based approach was very effective for most students, who appreciated the clear, step-by-step process. A few students got bogged down in the arithmetic when they misplaced their calculators. The 'working backwards' problems were the most challenging. Next time, I will include more guided examples for that specific skill. The connection to computer graphics was a good motivator for some students.