7

DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for Mathematics

Quarter 1
Lesson
1

Lesson Exemplar for Mathematics Grade 7
Quarter 1: Lesson 1 (Week 1)
SY 2024-2025

Development Team

Writers:
- Magdalena C. Valdez
- Maria-Josephine T. Arguilles (Tinajeros National High School)

Validator:
- Aurora B. Gonzales, Ph.D. (Philippine Normal University – Manila)

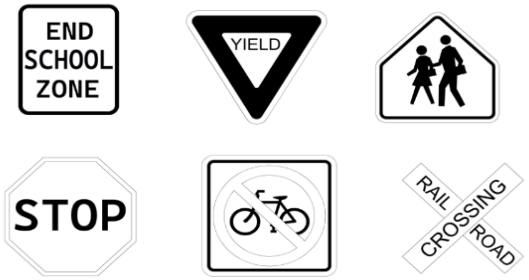
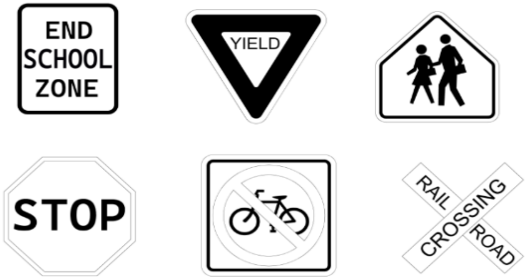
Management Team

Philippine Normal University
Research Institute for Teacher Quality
SiMERR National Research Centre

MATHEMATICS / QUARTER 1 / GRADE 7

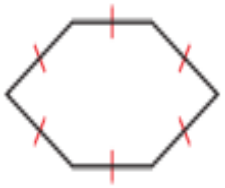
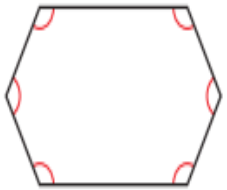
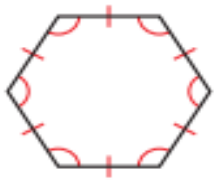
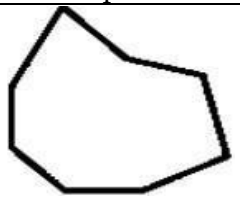
I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
A. Content Standards	The learners demonstrate knowledge and understanding of: 1. regular and irregular polygons and their features/properties; and 2. determination of measures of angles and the number of sides of polygons.
B. Performance Standards	By the end of the quarter, the learners are able to draw and describe the features/properties of regular and irregular polygon.
C. Learning Competencies and Objectives	***Learning Objectives:*** At the end of the lesson, the learners will be able to: 1. Define a polygon. 2. Classify polygon according to its sides and as regular or irregular. 3. Name, describe, and compare regular and irregular polygons and polygons with 5, 6, 8, or 10 sides based on measurements of sides and angles 4. Draw triangles, quadrilaterals and polygons with 5, 6, 8, or 10 using a ruler, protractor, and a compass
D. Content	Properties of Regular and Irregular Polygons
E. Integration	Paintings and Artwork, signboard etc.

II. LEARNING RESOURCES
DRAWINGEDUTECH. (n.d.). Introduction to perspective drawing [Video]. YouTube. https://www.youtube.com/watch?v=IJC6Cfb3Ck0 ikenschool. (n.d.). Learn basic English grammar [Video]. YouTube. https://www.youtube.com/watch?v=Pz64J1hJV8E MathTuklaswithSirJojo. (n.d.). How to graph a quadratic function in standard form [Video]. YouTube. https://www.youtube.com/watch?v=W_a7gywc6fg Maythmatics. (n.d.). The beauty of mathematics [Video]. YouTube. https://www.youtube.com/watch?v=YyyNpgaNn_8 PAAcademy. (n.d.). The Fibonacci sequence and the golden ratio [Video]. YouTube. https://www.youtube.com/watch?v=SSxNxyx6FzY RVTUTORIALS. (n.d.). Math 101: Introduction to algebra [Video]. YouTube. https://www.youtube.com/watch?v=ujz_8-zweEY

III. TEACHING AND LEARNING PROCEDURE		NOTES TO TEACHERS
A. Activating Prior Knowledge	**DAY 1** **1. Short Review** **Round 1: Naming Polygons** The teacher shows a road sign that is a polygon (from the flashcards or on the screen). Players have 10 seconds to write down the name of the polygon based on the number of sides and what polygon it reminds you. Correct answers earn 1 point.  **Round 2:** The teacher shows the name of a polygon (e.g., pentagon, hexagon). Players have 10 seconds to write down the number of sides. Correct answers earn 1 point. **2. Feedback (Optional)**	
B. Establishing Lesson Purpose	**1. Lesson Purpose** Use the exact figures used in the short review. Let the students identify the polygons and non-polygons on the illustrations. Engage students by asking them to develop their definition or description of a polygon. Write their suggestions on the board and refine them to match the correct definition.  The purpose of this lesson is to help students understand the definition of polygon, learn how to identify and name different polygons based on their number of sides, and explore their properties. Additionally, students will practice drawing various polygons, including triangles, quadrilaterals, and polygons with 5, 6, 8, or 10 sides, using a ruler, protractor, and compass.	Suggestion on how to present the Helpful definitions during discussion of subtopic 1: Use PowerPoint presentation or write them on Manila paper or may use cartolina.

2. Unlocking Content Vocabulary

Polygon is a closed-plane figure bounded by line segments that meet only at their endpoints.

Equilateral polygon is a polygon whose sides are all congruent.	**Equiangular polygon** is a polygon whose all angles are congruent.	**Regular polygon** is a polygon that is both equilateral and equiangular.	**Irregular polygon** is a polygon whose sides and angles are not equal.
		 Regular Hexagon	 Irregular Octagon

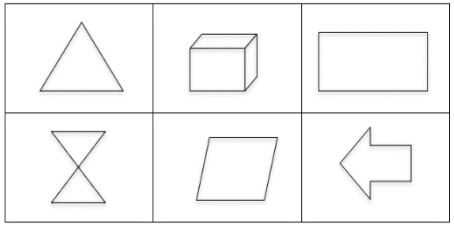
C. Developing and Deepening Understanding

DAY 1

SUB-TOPIC 1: Define polygon and describe its properties

1. Explicitation

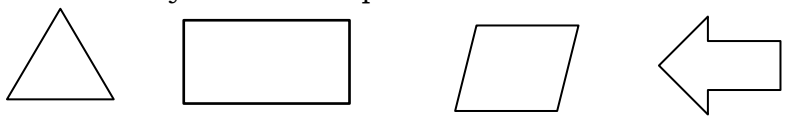
Which figure is a polygon?



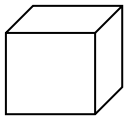
2. Worked Example

Developing concept of polygon

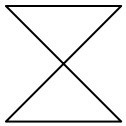
The figures below are polygons. They are closed, plane figures, made of line segments, and the segments intersect only at their endpoints.



These are not polygons.



Not a plane figure



Sides do not intersect at their endpoints

For Explicitation:

Let the learners pick their choice even if they don't have knowledge of the meaning of polygon. Use learners' answers in processing the discussion of the meaning of a polygon.

For Developing the concept of polygon:

Ask the learners to read:

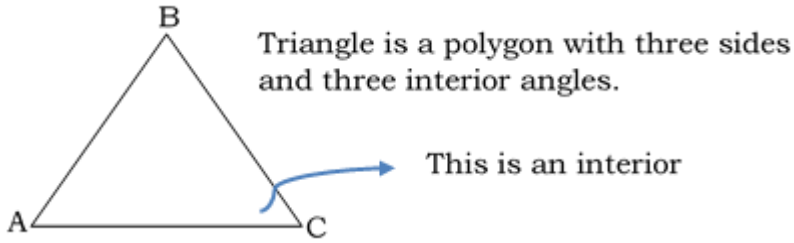
Polygon is a closed-plane figure bounded by line segments that meet only at their endpoints.

Use the definition of polygon to process learners' answers in the previous question. This will help the learners to understand the definition of polygon.

Ask the learner: What is a polygon?
Give your own example of a polygon or ask them to draw a polygon.

For formative evaluation, ask the learners to give/or draw a polygon that is not the same with the examples found in your discussion.

Naming Polygon and its Parts



A polygon is named using its vertices. The vertices are points A, B, and C. So, the triangle may be called triangle ABC, triangle BCA, or triangle ACB.

Sides of triangle ABC are $\underline{AB}$,$\underline{BC}$, $\underline{AC}$

Interior angles of triangle ABC are ∠BAC, ∠BCA, and ∠ABC

3. Lesson Activity

Complete the table.

Name of Polygon	Number of sides	Number of interior angles	Name the sides	Name the interior angles
Triangle	3	3		
Quadrilateral	4	4		
Pentagon	5	5		
Hexagon	6	6		
Heptagon	7	7		
Octagon	8	8		
Nonagon	9	9		
Decagon	10	10		

For naming sides and interior angles, choose 1 or 2 polygons from column 1. Not advisable to do it in all polygons in column 1.

Use the discussion found in Developing the concept of polygon as your guide in processing learners' answers.

For Naming Polygon and its parts:
Tell the learners that polygons may be named based on the number of sides.

You may begin with the triangle; it has three sides – the prefix – "tri".

Polygons may be classified according to the number of sides. Tell learners about the prefixes used, Such as tri, quad, penta, etc.

You may have another example to further emphasize naming parts of a polygon similar to the discussion of triangles.

Use a table to present other polygons similar to the table shown on the left.

You may have a simple activity in naming polygons based on the number of sides. May ask learners to use matchsticks to form the polygons and then paste on a bond paper. May be done by group.

DAY 2

SUB-TOPIC 2: Name, describe, and compare regular and irregular polygons with 5, 6, 8, or 10 sides based on measurements of sides and angles

1. Explicitation

Ask the learners to describe a square:
What do you know about a square?

Possible response(s): *A square has 4 sides. A square has 4 equal sides. All interior angles of a square are equal to 90 degrees.*

Tell the learners: Square is one of the regular polygons.
Ask the learners: What do you think is special in square that makes it regular polygon?

Then, tell the learners that the topic for the day is all about regular and irregular polygons. Post the Definition of regular and irregular polygon from the list of helpful definitions. Ask learners to read the definitions.

2. Worked Example

Activity 1: Exploring Regular and Irregular Polygons

The goal of the activity is to give the learners authentic experience on the following:

1. Polygons maybe regular or irregular
2. Regular polygons are equilateral and equiangular
3. When polygons are regular, we just add the term "regular" to its name, except for regular triangle – we call it equilateral triangle and for regular quadrilateral- we call it square.
4. Measure of each interior angles:

a. regular pentagon	**b. regular hexagon**	**c. regular octagon**	**d. regular decagon**
108° each	120° each	135° each	144° each

(They will need this information when you discuss drawing regular polygons)

In processing the result of the activity, emphasis must be placed on the following:

a. polygons maybe classified according to the number of sides
b. number of sides and number of interior angles of any polygon are the same
c. polygons are named using the vertices

For Sub Topic 2:
The aim of this question is to direct the learners to the idea of regular polygon.

Square is one of the regular polygons and learners have encountered this polygon in their elementary mathematics.

Tell the learners that in geometry, if sides of a polygon are equal, they can see markings as shown in the figure below, you may draw markings in your given square. The markings mean the same measures of sides and the other marking in blue means that the measure of each angle is 90 degrees.

5. the sum of the interior angles:

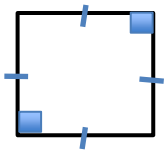
for regular and irregular pentagon	for regular and irregular hexagon	for regular and irregular octagon	for regular and irregular decagon
540°	720°	1080°	1,440°

3. Lesson Activity

Activity 1: Exploring Regular and Irregular Polygons

	Length of each side	Length of each angle	Name of the polygon	Classify as regular or irregular polygon
Draw /paste/attach here a **regular pentagon** with side lengths equal to 3 cm each. Angle measurements are 108° each.				
Draw /paste/attach here a **pentagon** with different side lengths. Use definite lengths only in centimeters.				
Draw /paste/attach here a **hexagon** with different side lengths. Use definite lengths only in centimeters.				
Draw /paste/attach here a **regular hexagon** with side lengths equal to 3 cm each. Angle measurements are 120° each.				
Draw /paste/attach here an **octagon** with different side lengths. Use definite lengths only in centimeters.				
Draw /paste/attach here a **regular octagon** with side lengths equal to 1.5cm each. Angle measurements are 135° each.				
Draw /paste/attach here a **decagon** with different side lengths. Use definite lengths only in centimeters.				
Draw /paste/attach here a **regular decagon** with side lengths equal to 1 cm each. Angle measurements are 144° each.				

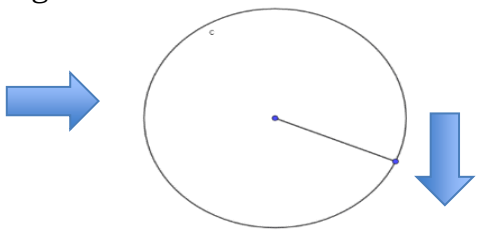
(Side length assignment for each polygon may be changed)



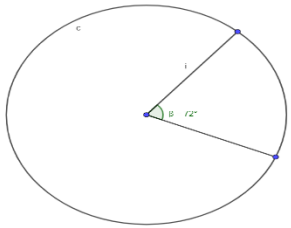
For the polygons in column 1 of Activity 1: **It is highly recommended that the polygons on the first column must have definite length for each side and interior angle measurements.** This is to achieve the goal of the activity. You may construct regular polygons from Geogebra for exact measurements or download from the internet, or construct manually (see subtopic 2 on how to do it) using compass, ruler, and protractor.

Activity 1 should be done as a collaborative work. Prepare at least five (5) sets of this. Tell the learners that in each group, there must be a team lead to guide the members in accomplishing the task.

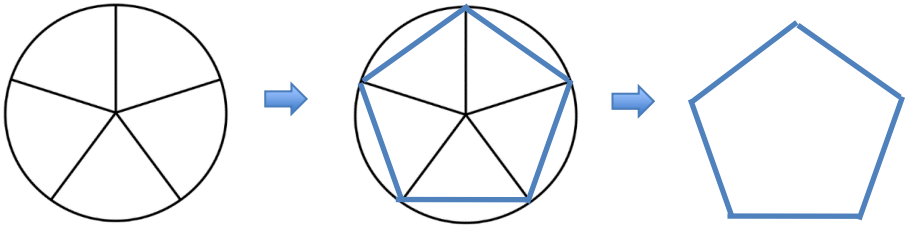
Better, if you will model first to the learners how to measure side lengths of a polygon using ruler and how to measure an interior angle of a polygon using protractor.

	Activity 2: "Who Am I?" This learning activity should be given as an exercise to end Day 1. **DAY 3-4** **SUB-TOPIC 3: Draw polygons with 5, 6, 8, or 10 sides using a ruler, protractor, and a compass.** **1. Explicitation** Begin the session by reviewing the information gathered from doing Activity 1. You may prepare a short game in a quiz bee format for the recall of the information. **Quiz Bee: Polygon Identification and Properties** **Questions:** 1. What do you call a polygon with 6 sides? 2. What is the sum of the interior angles of an octagon? 3. A polygon has 10 sides. What is it called? 4. What is a polygon called if all its sides and angles are equal? 5. What is the measure of each interior angle of a regular hexagon? 6. What do you call a polygon with 8 sides? 7. What do you call a polygon with 5 sides? 8. A polygon has 4 sides. What is it called and how is it classified if all sides and angles are equal? 9. What do you call a polygon with 7 sides? **2. Worked Example** **Activity 3: Drawing Polygons** Instructions: Draw each polygon using your ruler, protractor, and compass. **Drawing 1**: Regular pentagon with side length of 2 cm. **Step 1:** Start with a circle with a radius of **2 cm.** To do this, draw a line segment 2cm long, then use a compass to draw the circle using the segment as the radius. 	Refer to the worksheet for the activity that the learners will accomplish. Assignment for Day 3, ask learners to bring drawing materials, protractor, ruler, and compass. **Answer Key:** 1. Hexagon 2. 1080° 3. Decagon 4. Regular polygon 5. 120° 6. Octagon 7. Pentagon 8. Quadrilateral, Regular (specifically a Square) 9. Heptagon Activity 3 is a Guided Activity. In implementing this activity, it is highly recommended that the teacher will do initial practice to see how it works. During discussion, use a compass and protractor that are intended for big groups.

Step 2: Divide the circle into five equal parts by marking points every 72° around the center. Use protractor in doing this.



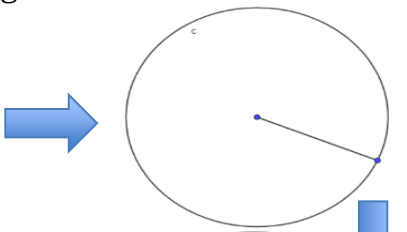
Step 3: Connect the points on the circle formed in step 2 to form the regular pentagon. See diagram below.



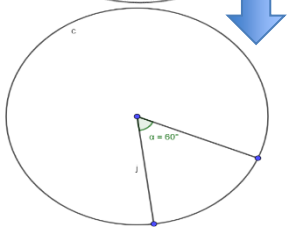
Regular pentagon side length is 2 cm each.

Drawing 2: Regular hexagon with side length of 3 cm.

Step 1: Start with a circle with a radius of **3 cm.**



Step 2: Divide the circle into six equal parts by marking points



Step 3: Connect the points on the circle formed in step 2 to form the regular hexagon. See diagram below**.**

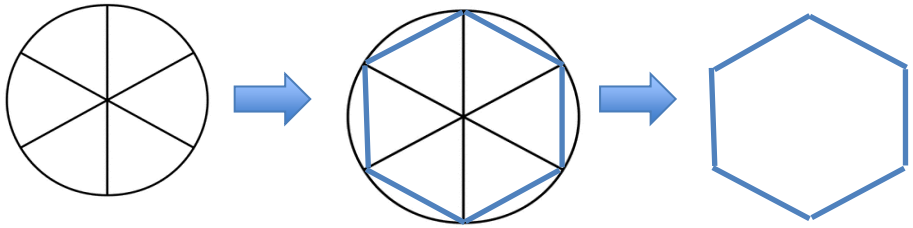
Post on the board the steps in drawing the polygons with no specific side lengths and angle measurements. You will put measures as you work with the learners in drawing each polygon.

The very idea of doing a Guided Activity is, the teacher and the learners work together in performing the task. Teacher should see to it that learners can follow step 1 through step 3 of Drawing Polygons.

You may assign a student leader per group to assist you in this activity.

Monitoring learners' work is crucial here. Strategize on how to deal with possible problems that may arise for having a big class.

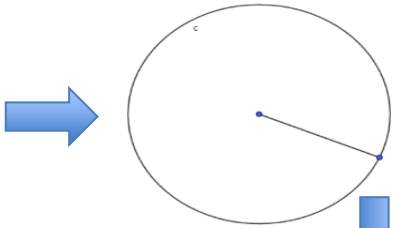
You may do pre-recording of Drawing activities if you can, then if classroom facilities include a big monitor, you may just play the video and assist learners in doing the task.



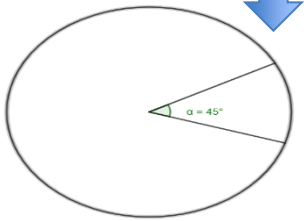
Regular hexagon side length is 3cm each.

Drawing 3: Regular octagon with a side length of 3 cm.

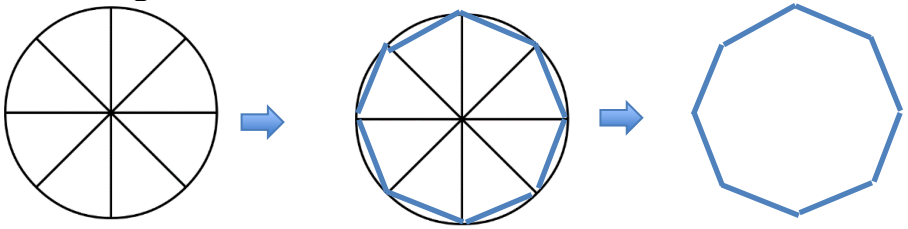
Step 1: Start with a circle with a radius of **3 cm.** To do this, draw a line segment 3 cm long, then use a compass to draw the circle using the segment as the radius.



Step 2: Divide the circle into eight equal parts by marking points every 45 degrees around the center. Use protractor in doing this.



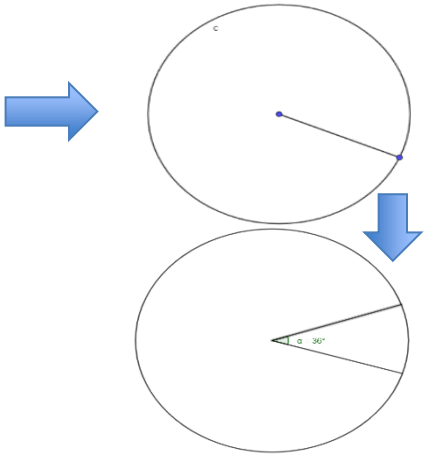
Step 3: Connect the points on the circle formed in step 2 to form the regular octagon. See diagram below.



Regular octagon side length is 3cm each.

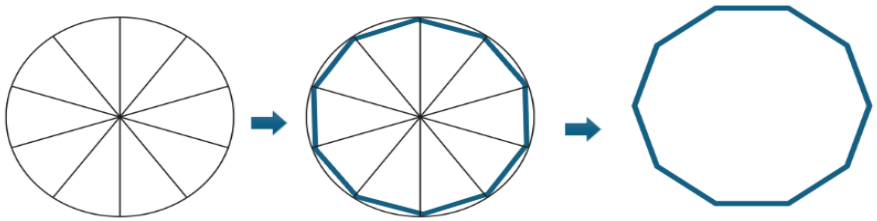
Drawing 4: Regular decagon with side length of 3 cm

Step 1: Start with a circle with a radius of **3 cm.** To do this, draw a line segment 3 cm long, then use a compass to draw the circle using the segment as the radius.



Step 2: Divide the circle into eight equal parts by marking points every 36 degrees around the center. Use protractor in doing this.

Step 3: Connect the points on the circle formed in step 2 to form the regular decagon. See diagram below.



Regular decagon side length is 3 cm each.

3. Lesson Activity

Activity No. 4: Complete the table

For Activity 4, ask the learners to use the results of their drawing activity in Activity 3 to complete the needed information. Ask the learners to make an intelligent guess about the following based on the results found in activity 4:

- The relationship of a polygon's number of sides and its number of interior angles.
- The measure of each interior angle of a regular polygon and an irregular polygon.
- The sum of the interior angles of a regular polygon and the measure of each interior angle.
- The sum of the measure of the interior angles of an irregular polygon.

(Note: the derivation of the formula for the sum of the interior angles is not included here.)

In processing the result of this activity, present the table in activity no. 4.

	Activity 5: Drawing triangles and quadrilaterals This activity may be given as a group task. They will need to use their experience in Activity 3 to be able to draw the given polygon.	
D. Making Generalizations	**1. Learners' Takeaways** • Can you think of real-life examples where understanding how to construct polygons, triangles, or quadrilaterals would be beneficial? • What are some strategies for ensuring accuracy when measuring angles and side lengths in geometric constructions? **2. Reflection on Learning** Reflect on any challenges you faced during the drawing process and how you addressed them during the lesson of Regular Polygons.	

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION	**NOTES TO TEACHERS**
A. Evaluating Learning	**Answer:**

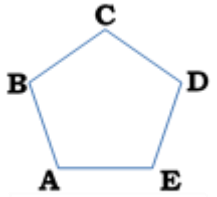
DAY 4

1. Formative Assessment

I. Fill in the blank with the correct word to make the statement true.

1. _____ are closed plane figures that are formed by straight line segments that meet only at their endpoints.
2. Polygons are classified according to the number of _____.
3. _____ are polygons with all of its sides and angles equal.
4. _____ are quadrilaterals with 4 right angles & have all sides equal.
5. _____ is a five-sided polygon with equal sides and equal angles.
6. _____ are polygons that have non-congruent sides.
7. _____ is an eight-sided polygon with unequal sides.
8. _____ is a three-sided polygon with equal sides.

II. Use the polygon below in answering the ff questions.



Regular

1. If side BC = 10 cm, how long is side AE?
2. What is the measure of ∠CBA?
3. What is the sum of the measures of ∠CBA and ∠CDE?
4. What is the sum of the interior angles of the regular pentagon ABCDE?

2. Homework (Optional)

Answer:

I.
1. Polygons
2. Sides
3. Regular polygons
4. Squares
5. Pentagon
6. Irregular polygons
7. Octagon
8. Equilateral triangle

II.
1. 10 cm
2. 108°
3. 108° + 108° = 216°
4. 540°

<table>
<tr><td rowspan="5">B. Teacher's Remarks</td><td>Note observations on any of the following areas:</td><td>Effective Practices</td><td>Problems Encountered</td><td rowspan="5">The teacher may take note of some observations related to the effective practices and problems encountered after utilizing the different strategies, materials used, learner engagement, and other related stuff.

Teachers may also suggest ways to improve the different activities explored/lesson exemplar.</td></tr>
<tr><td>strategies explored</td><td></td><td></td></tr>
<tr><td>materials used</td><td></td><td></td></tr>
<tr><td>learner engagement/ interaction</td><td></td><td></td></tr>
<tr><td>others</td><td></td><td></td></tr>
<tr><td>C. Teacher's Reflection</td><td colspan="2">Reflection guide or prompt can be on:
• <u>principles behind the teaching</u>
What principles and beliefs informed my lesson?
Why did I teach the lesson the way I did?

• <u>students</u>
What roles did my students play in my lesson?
What did my students learn? How did they learn?

• <u>ways forward</u>
What could I have done differently?
What can I explore in the next lesson?</td><td colspan="2">Teacher's reflection in every lesson conducted/facilitated is essential and necessary to improve practice. You may also consider this as an input for the LAC/Collab sessions.</td></tr>
</table>