

7

# Learning Activity Sheet for Mathematics

Quarter 1

Week

3

## Learning Activity Sheet Mathematics Grade 7

### Quarter 1: Week 3

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Secretary: Sara Z. Duterte

Undersecretary: Gina O. Gonong

#### Development Team

<b>Writer:</b>	Josephine C. Reynoso, Dianne V. Pellazar
<b>Content Reviewer:</b>	Resty I. Rodelas, Alberto J. Tiangco, Marilyn B. Soriano, Evelyn C. Callada, Dominador J. Villafria
<b>External Content Validator:</b>	Dr. Errol Matthew C. Garcia, Dr. Winston S. Sirug
<b>External Language Validator:</b>	Rafael John Sotto
<b>Illustrator:</b>	Gilbert R. Esguerra, Abigail R. Sadang
<b>Layout Artist:</b>	Gilbert G. Manaois, Cyrus T. Festijo, Alberto J. Tiangco Melanie D. Gatanela, Vergel Junior C. Eusebio

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**ELSA R. MATA**, SDO Navotas LRMS Education Program Supervisor

#### Department of Education – National Capital Region (DepEd- NCR)

Office Address: 6 Misamis St, Bago Bantay, Quezon City  
Metro Manila, Philippines, 1105  
Telefax: (02) 85229412  
Email Address: [ncr@deped.gov.ph](mailto:ncr@deped.gov.ph)

# LEARNING ACTIVITY SHEET

<b>Learning Area:</b>	Mathematics 7	<b>Quarter:</b>	First
<b>Week:</b>	3	<b>Day:</b>	1
<b>Lesson Title/ Topic:</b>	Exterior and Adjacent Interior Angles of a Convex Polygon		
<b>Name:</b>		<b>Grade &amp; Section:</b>	7

## Activity 1: Measuring Exterior Angle and Its Adjacent Interior Angle

**Objective(s):** At the end of the lesson, the learners are expected to measure the interior angles and adjacent exterior angles of a convex polygon.

**Materials Needed:** Activity Sheets, protractor

**Duration:** 10 minutes

### Instructions:

Name and measure all interior angles of the given polygons. For each of the interior angles, name and measure its adjacent exterior angle.

Polygon	Interior angle	Adjacent Exterior Angle to the Interior angle

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<b>Lesson Title/ Topic:</b>	Exterior and Adjacent Interior Angles of a Convex Polygon		
<b>Name:</b>		<b>Grade &amp; Section:</b>	7

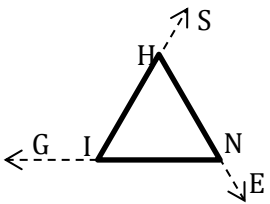
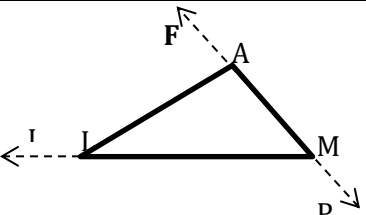
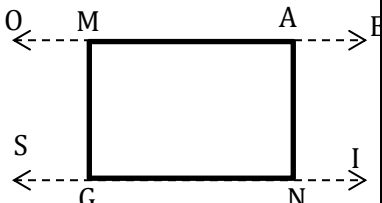
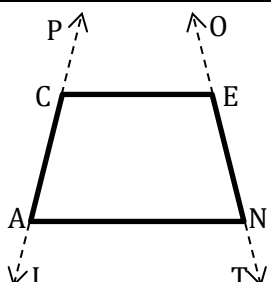
## Activity 2: Angle Measure Match-Up!

**Objective(s):** At the end of the lesson, the learners are expected to identify and measure an exterior angle and its adjacent interior angle of a polygon.

**Materials Needed:** Protractor and Activity sheets

**Duration:** 10 minutes

**Instructions:** Name and give the measure of each of the exterior angles and its interior angle

	Exterior Angle	Adjacent Interior angle
		
		
		
		

### Tasks/Questions:

- 1) What pair of angles is formed by an exterior angle and an interior angle at the same vertex of a polygon?
- 2) What relationship exists between an exterior angle and an interior angle at the same vertex of a polygon based on the sum of their measures? Why?

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<b>Name:</b>		<b>Grade &amp; Section:</b>	7

## Activity 3: Let's Measure and Draw!

**Objective(s):** At the end of the lesson, the learners are expected to identify and measure exterior angles and interior angles of convex polygons.

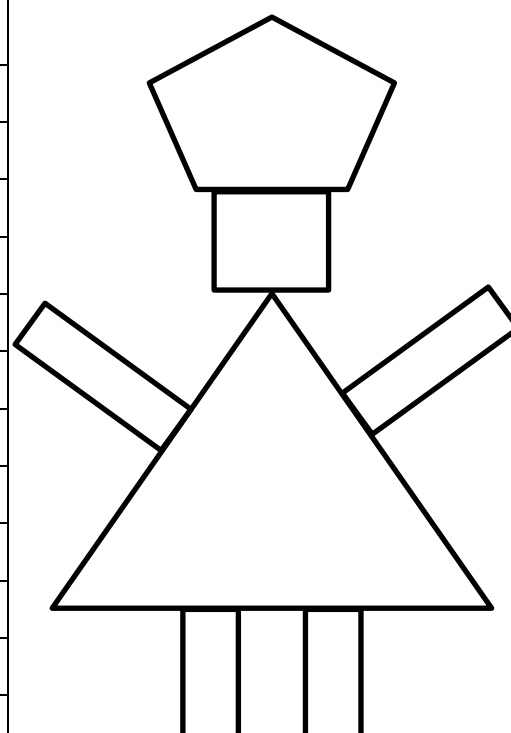
**Materials Needed:** Protractor, ruler, and this activity sheet

**Duration:** 15 minutes

### Instructions:

- A.** Use the given figure to fill in the needed information in the table.
- Label the vertices of all the polygons in the figure using letters of the English alphabet starting from A.
  - Name the polygons (top to bottom) in the figure using letters of the English alphabet starting from A.
  - Extend two (2) sides in each of the polygons.
  - Name and measure pairs of exterior angles and interior angles formed.
  - Write your answers in the table below.

Name of Polygon (i.e. □ABCDE)	Interior Angle & Its measure (i.e. $\angle ABC = 90^\circ$ )	Exterior Angle & Its measure (i.e. $\angle ABC = 60^\circ$ )



- B.** On a whole sheet of paper, draw your own figure containing five (5) polygons. Label, name the polygons, and give the measures of 5 pairs of interior and exterior angles.

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<b>Name:</b>		<b>Grade &amp; Section:</b>	7

## Activity 4: Extra Practice on Exterior and Interior Angles!

**Objective(s):** At the end of the lesson, the learners are expected to draw polygons, and identify and measure the interior angles and exterior angles.

**Materials:** Protractor, ruler, pencil

**Duration:** 15 minutes

### Instructions:

- Draw the polygon (regular or irregular) given the number of sides.
- Label the vertices of the polygon.
- Extend each side to form an exterior angle.
- Measure the exterior angles and interior angles.

### Part A

Number of Sides	Figure	Measure of Interior Angle	Measure of Exterior Angle
5			
6			

### Part B

Number of Sides	Figure (Non-convex Polygon)	Measure of Interior Angle	Measure of Exterior Angle
5			
6			

### Questions:

- What happens if the polygon is not convex? Is the result the same with both convex and non-convex polygons? Why?

# LEARNING ACTIVITY SHEET

<b>Learning Area:</b>	Mathematics 7	<b>Quarter:</b>	First
<b>Week:</b>	3	<b>Day:</b>	2
<b>Lesson Title/ Topic:</b>	Relationship Between Exterior Angle and Its Adjacent Interior Angle		
<b>Name:</b>		<b>Grade &amp; Section:</b>	7

## Activity 1: Relationship of an Exterior Angle and Adjacent Interior Angle of Convex Polygon.

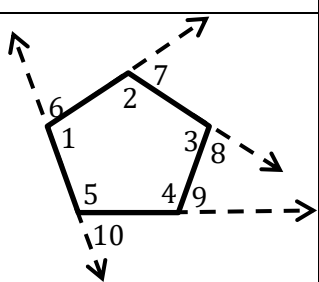
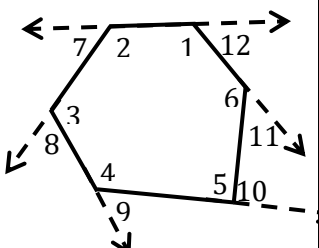
**Objective(s):** At the end of the lesson, learners are expected to identify the relationship between an exterior angle and adjacent interior angle of a convex polygon.

**Materials Needed:** Activity sheets, protractor, mobile phone/ computer or laptop

**Duration:** 10 minutes

### Instructions:

- A. Draw polygons and measure the interior angles and exterior angles.
  1. Open the GeoGebra.
  2. Draw a) pentagon, and b) hexagon.
  3. Extend the sides to show the exterior angles of the polygons.
  4. Measure the angles.
  5. Move any of the vertices of each polygon.
  6. Observe the sum of the measures of pairs of exterior angles and adjacent interior angles.
  7. What is the sum of every pair of exterior angle and adjacent interior angle? Justify.
- B. Measure all pairs of exterior angles and adjacent interior angles. Complete the table below.

Polygon	Exterior angle	Adjacent Interior Angle	Sum of the Measures of an Exterior Angle and adjacent interior Angle
			
			

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<b>Name:</b>		<b>Grade &amp; Section:</b>	7

## Activity 2: Finding the Missing Measure of an Angle

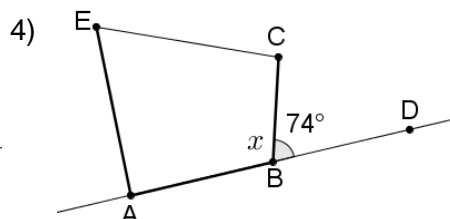
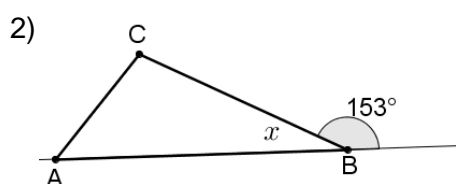
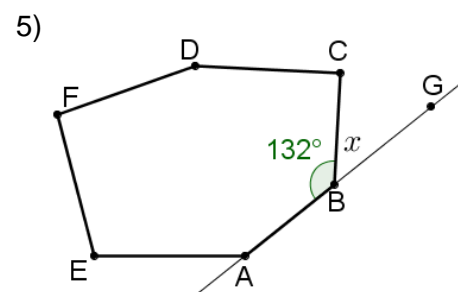
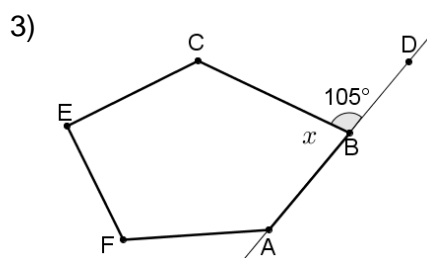
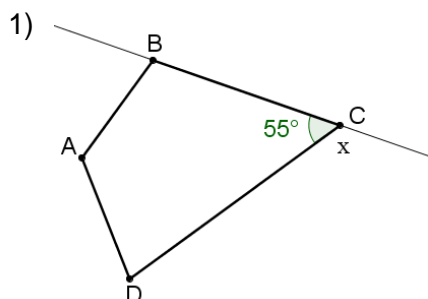
**Objective(s):** At the end of the lesson, the learners are expected to solve for the missing measure of exterior angle or adjacent interior angle.

**Materials Needed:** activity sheet

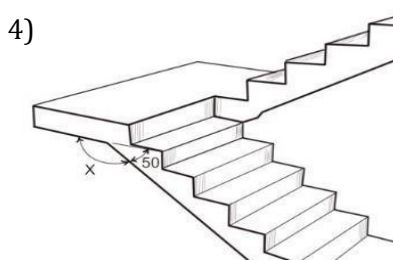
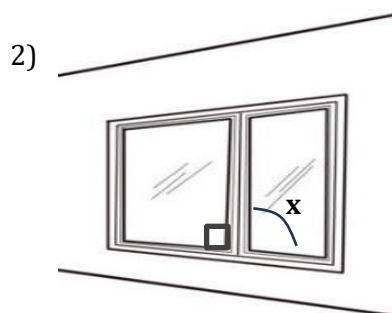
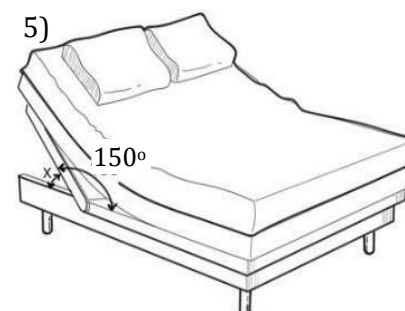
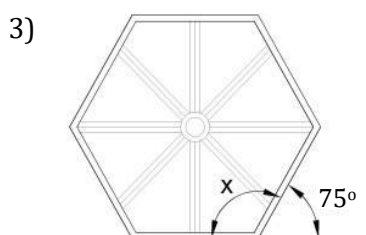
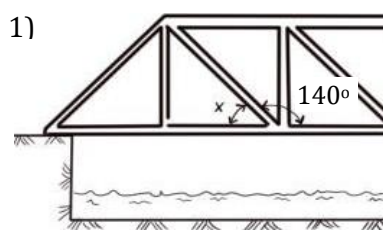
**Duration:** 10 minutes

### Instructions:

**A.** Find the value of  $x$ .



**B.** In each of the given figures, solve for  $x$ . Record them on a separate paper.





# LEARNING ACTIVITY SHEET

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<b>Name:</b>		<b>Grade &amp; Section:</b>	7

## Activity 3: Let us Apply!

**Objective(s):** At the end of the lesson, the learners are expected to find the measure of an exterior angle and adjacent interior angle.

**Materials:** Activity Sheet

**Duration:** 15 minutes

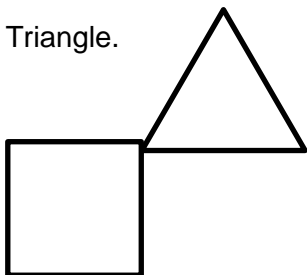
### Instructions:

**A.** Write **TRUE** if the statement is **correct**. Otherwise, change the underlined word to make the statement correct.

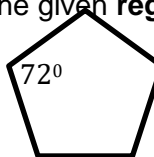
- The sum of the measures of an exterior angle and its adjacent interior angle is always  $180^\circ$ .
- An interior angle of a polygon has two adjacent exterior angles with the same measure.
- An exterior angle of a polygon has two adjacent interior angles.
- An exterior angle of a polygon and its adjacent interior angle always form a linear pair.
- The measure of an exterior angle is always greater than the measure of its adjacent interior angle.

**B.** Find the measure of an exterior angle and adjacent interior angle of the given **regular** polygons.

1) Equilateral Triangle.



3) Regular Pentagon



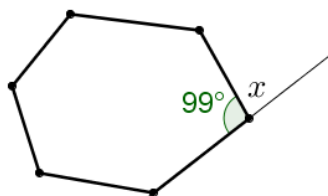
2) Square

4) Regular Hexagon

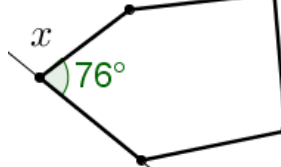


**C.** Find the value of  $x$ .

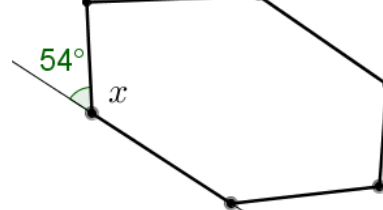
1)



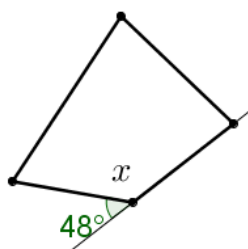
3)



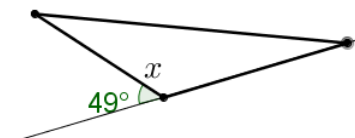
5)



2)



4)



# LEARNING ACTIVITY SHEET

<b>Learning Area:</b>	Mathematics 7	<b>Quarter:</b>	First
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<b>Lesson Title/ Topic:</b>	Relationship Between Exterior Angle and Adjacent Interior Angle of Convex Polygon		
<b>Name:</b>		<b>Grade &amp; Section:</b>	7

## Activity 4: Extra Practice on Finding the Unknown Angle Measures

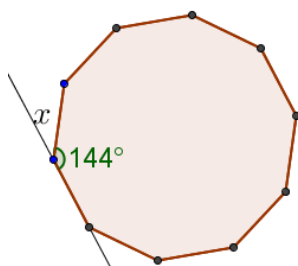
**Objective(s):** The students are expected to find the measure of the indicated angle.

**Duration:** 15 minutes

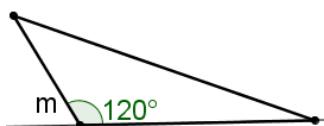
### Instructions:

**A.** Find the indicated angle measure.

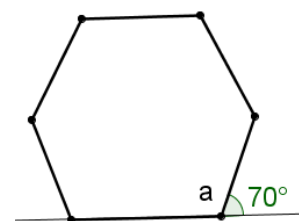
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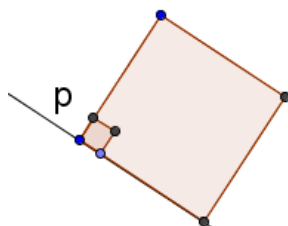
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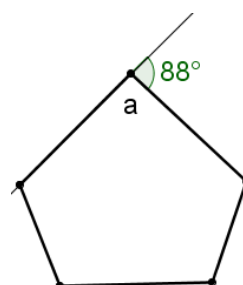
5)



2)

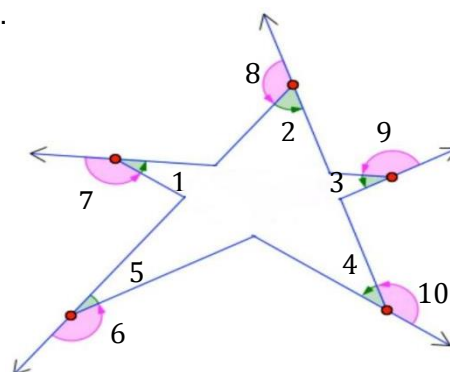


4)



**B.** Refer to the figure at the right to answer the following questions.

- What is the sum of the measures of  $\angle 5$  and  $\angle 6$ ?
- Angle 4 is the interior angle adjacent to what exterior angle?
- Is the sum of  $\angle 1$  and  $\angle 7$  equal to the sum of  $\angle 2$  and  $\angle 8$ ?  
Explain.
- Which interior angle is adjacent to  $\angle 9$ ?
- What angle pair are  $\angle 4$  and  $\angle 10$ ?



- Does the formula for the sum of the measures of an exterior angle and adjacent interior angle of a **convex** polygon apply to all pairs of exterior angles and adjacent interior angles of a **non-convex** polygon? Justify your answer.

# LEARNING ACTIVITY SHEET

<b>Learning Area:</b>	Mathematics 7	<b>Quarter:</b>	First
<b>Week:</b>	3	<b>Day:</b>	3
<b>Lesson Title/ Topic:</b>	Sum of Measures of Angles and Number of Sides of Convex Polygon		
<b>Name:</b>		<b>Grade &amp; Section:</b>	7

## Activity 1: Sum of measures of Angles of a Polygon

**Objective(s):** At the end of the lesson, the learners are expected to find the sum of the measures of angles of a convex polygon.



**Materials Needed:** Bond paper, pencil, ruler

**Duration:** 10 minutes

### Instructions:

- Form groups of five (5). For each member of the group, choose a polygon below.  
triangle      pentagon      heptagon      nonagon  
quadrilateral      hexagon      octagon      decagon
- In a bond paper, draw a polygon of your choice.
- Draw all diagonals from one vertex of the polygon. How many triangles were formed?
- Complete the table below based on the data from your activity

**Sum of Measures of Angles of a Polygon**

Polygon	Number of Sides	Polygons with all diagonals from one vertex	Number of Triangles	Sum of the Measures of Angles (Multiply the number of triangles by $180^\circ$ )	Number of $180^\circ$ in terms of the number of sides	Sum of measures of angles given the number of sides of polygon
Triangle	3		1	$180^\circ$	$3 - 2$	$(3 - 2)(180^\circ) = 180^\circ$
Quadrilateral	4					
Pentagon						
Hexagon						
Heptagon						
Octagon						
Nonagon						
Decagon						

### Tasks/Questions:

- What do you observe on the number of sides and number of triangles formed?
- How is the number of sides and triangles formed related to the sum of the measures of the angles of a polygon?
- What is the formula for finding the sum of measures of angles of a convex polygon given the number of sides?

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<b>Name:</b>		<b>Grade &amp; Section:</b>	7

## Activity 2: Number of Sides of a Polygon Given the Angle Sum.

**Objective(s):** At the end of the lesson, the learners are expected to find the number of sides of a convex polygon given the angle sum.

**Materials Needed:** Table in Activity 4

**Duration:** 10 minutes

**Instructions:** Use the sum of the angle measures obtained in Activity 1 to complete the table below.

### Number of Sides of a Polygon Given the Angle Sum

Polygon	Sum of the Angle measures	Divide the Angle Sum by $180^\circ$	Add 2 to the quotient of Angle Sum divided by $180^\circ$	Number of Sides given the Angle Sum
Triangle	$180^\circ$	1	$1 + 2$	$\frac{180^\circ}{180^\circ} + 2 = 1 + 2$ <b>= 3</b>
Quadrilateral	$360^\circ$	2	$2 + 2$	$\frac{360^\circ}{180^\circ} + 2 = 2 + 2$ <b>= 4</b>
Pentagon				
Hexagon				
Heptagon				
Octagon				
Nonagon				
Decagon				
Hendecagon				
Dodecagon				
n-gon				

**Tasks/Questions:** Answer the questions below.

- 1) What pattern did you observe?
- 2) Write your generalization on how to find the number of sides given the sum of the measures of angles of a convex polygon.

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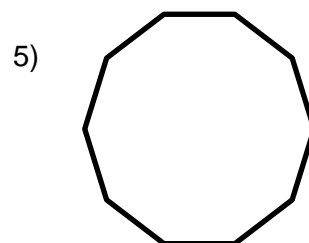
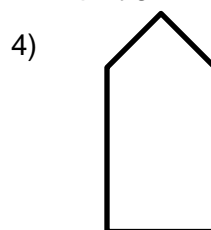
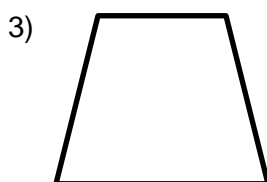
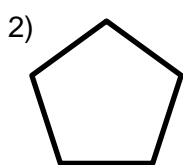
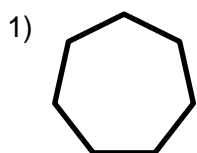
## Activity 3: Let Us Apply

**Objective(s):** At the end of the lesson, the learners are expected to apply the formula in solving for the sum of the measures of the interior angles of a polygon given the number of sides and vice-versa.

**Duration:** 15 minutes

### Instructions:

**A.** Find the sum of the measures of all the interior angles of the polygons.



6) 13-gon

7) 21-gon

8) 27-gon

9) 35-gon

10) 49-gon

**B.** Find the number of sides of the polygon given the sum of measures of angles.

1)  $900^\circ$

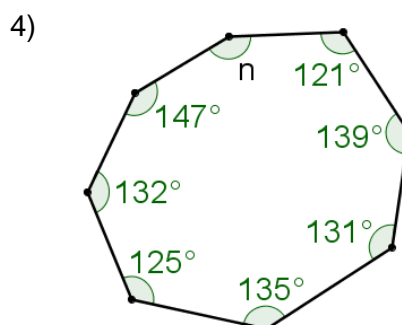
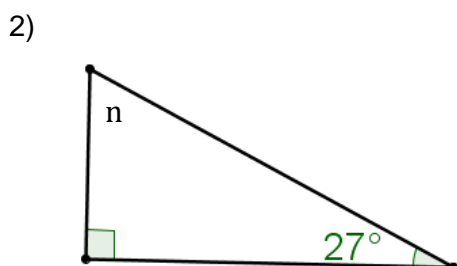
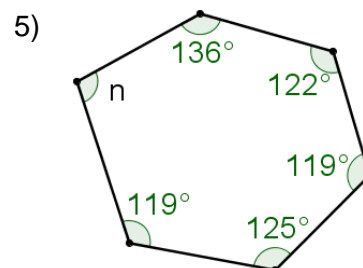
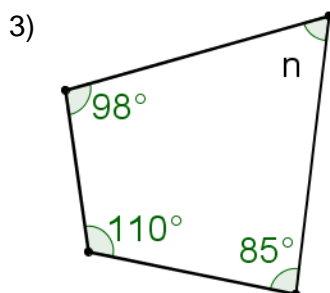
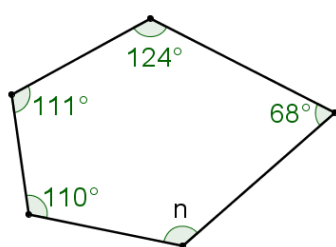
2)  $1,440^\circ$

3)  $2,700^\circ$

4)  $3,420^\circ$

5)  $11,520^\circ$

**C.** Find the unknown measure of angle in the given figure.



# LEARNING ACTIVITY SHEET

<b>Learning Area:</b>	Mathematics 7	<b>Quarter:</b>	First
<b>Week:</b>	3	<b>Day:</b>	3
<b>Lesson Title/ Topic:</b>	Sum of Measures of Angles and Number of Sides of Convex Polygon		
<b>Name:</b>		<b>Grade &amp; Section:</b>	7

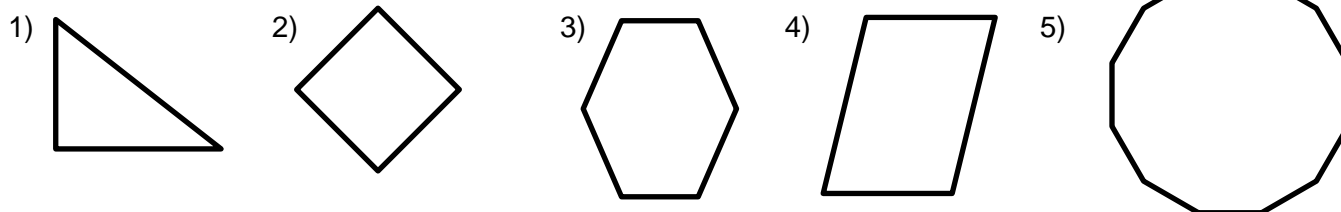
## Activity 4: Extra Practice on the Sum of Measures of Angles of Polygon and Number of Sides

**Objective(s):** At the end of the lesson, the learners are expected to apply the formula in solving for the sum of the measures of the interior angles of a polygon given the number of sides and vice-versa.

**Duration:** 15 minutes

### Instructions:

**A.** Solve the sum of the measures of the interior angles of the polygons below.



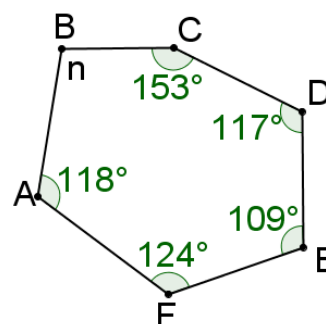
- 6) 16-gon      7) 34-gon      8) 39-gon      9) 50-gon      10) 66-gon

**B.** Find the number of sides of the polygon given the sum of measures of angles.

- 1)  $1,260^\circ$       2)  $1,620^\circ$       3)  $3,240^\circ$       4)  $4,320^\circ$       5)  $6,480^\circ$

**C.** Solve for the following problems.

- Five angles of a hexagon have measures  $114^\circ$ ,  $123^\circ$ ,  $95^\circ$ ,  $149^\circ$ , and  $117^\circ$ . What is the measure of the sixth angle?
- The interior angles of a polygon add up to  $3,060^\circ$ . How many sides does the polygon have?
- A polygon has an interior angle that is five times larger than its exterior angle. How many sides does the polygon have?
- Find the unknown measure of angle in the given figure.



# LEARNING ACTIVITY SHEET

<b>Learning Area:</b>	Mathematics 7	<b>Quarter:</b>	First
<b>Week:</b>	3	<b>Day:</b>	4
<b>Lesson Title/ Topic:</b>	Sum of Measures of Exterior Angles and Measures of Angles of Convex Polygon		
<b>Name:</b>		<b>Grade &amp; Section:</b>	7

## Activity 1: Sum of Measures of Exterior Angles of a Polygon

**Objective(s):** At the end of the lesson, the learners are expected to find the sum of the measures of exterior angles of a convex polygon, and solve for the unknown measure of an angle.

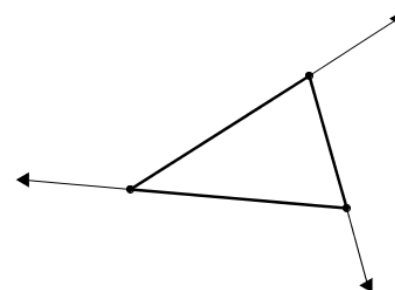
**Materials Needed:** mobile phone/ laptop/ computer, activity sheet

**Duration:** 10 minutes

**A.** Draw and measure using GeoGebra.

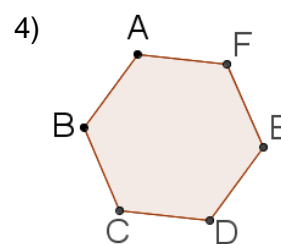
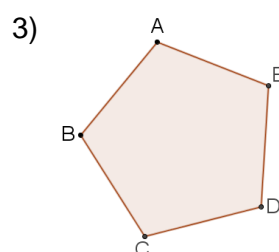
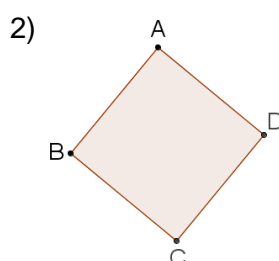
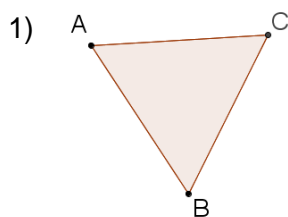
- 1) Open GeoGebra.
- 2) Draw a convex polygon.
- 3) Extend the sides to show the exterior angles of the polygons.
- 4) Measure all the exterior angles.
- 5) Find the sum of all the measures of the exterior angles using the built-in worksheet or formula in GeoGebra.
- 6) Move any of the vertices of the polygon.
- 7) Observe the sum of the measures of the exterior angles. Make a concluding statement
- 8) Justify the concluding statement by following the sample below.

Given a triangle at the right:



- How many pairs of exterior angles and adjacent interior angles does a triangle have?
  - What is the total degree measure of all the pairs of exterior angles and adjacent interior angles?
  - What is the sum of measures of all the **interior angles** of the triangle?  $(3 - 2) (180^\circ) = 180^\circ$
  - What is the sum of measures of the **exterior angles** of the triangle?  $540^\circ - 180^\circ = 360^\circ$
- 9) What is the sum of the exterior angles of any convex polygon? Choose one polygon as an example and justify your answer.

**B.** Find the measure of each exterior angle of the given **regular** convex polygon.



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<b>Lesson Title/ Topic:</b>	Sum of Measures of Exterior Angles and Measures of Angles of Convex Polygon		
<b>Name:</b>		<b>Grade &amp; Section:</b>	7

### Activity 2: Measures of Angles of Regular Polygons

**Objective(s):** At the end of the lesson, the learners are expected to find the number of sides and measure of an angle of a regular polygon given the angle sum.

**Materials Needed:** Activity Sheets, paper, and pen.

**Duration:** 10 minutes

**Instructions:** Complete each of the tables below and answer the questions that follow. An example is given as your guide.

#### A. Measure of Angles of Regular Polygons given the Angle Sum

Sum of the Measures of Angles of the <b>Regular</b> Polygon	Number of Sides	Measure of each Interior Angle	Measure of each exterior angle
180°	$\frac{180^\circ}{180^\circ} + 2 = 3$	$\frac{180^\circ}{3} = 60^\circ$	$\frac{360^\circ}{3} = 120^\circ$
360°			
540°			
1 080			
1 800°			

#### B. Number of Sides and Measure of Angles of Regular Polygons

Name of a <b>Regular</b> Polygon	Number of Sides	Sum of measures of Exterior angles	Measure of each Exterior Angle	Measure of each Interior Angle (Interior)
Equilateral triangle	3	360°	$\frac{360^\circ}{3} = 120^\circ$	$180^\circ - 120^\circ = 60^\circ$
Square		360°		
Equiangular Pentagon		360°		
Equilateral Hexagon		360°		
Equiangular Octagon		360°		

#### Task/Questions:

- Given the sum of the measures of the angles of a **regular** polygon, how do you find the following?
  - number of sides,
  - measure of each interior angle, and
  - measure of each exterior angle
 Write in formula.
- Are the formulae applicable for **irregular n-gon**?



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## Activity 3: Let's Apply!

**Objective(s):** At the end of the lesson, learners are expected to find the number of sides of a polygon and find the measures of each interior/ exterior angle of a regular convex polygon.

**Materials Needed:** Activity sheet, pen

**Duration:** 15 minutes

### Instructions:

A. Find a) number of sides; b) measure of each exterior angle; and c) measure of interior angle, given the sum of measures of angles of the following **regular** polygons.

- |                |                |                  |                  |                   |
|----------------|----------------|------------------|------------------|-------------------|
| 1) $360^\circ$ | 3) $720^\circ$ | 5) $1,260^\circ$ | 7) $1,980^\circ$ | 9) $3,780^\circ$  |
| 2) $540^\circ$ | 4) $900^\circ$ | 6) $1,800^\circ$ | 8) $2,340^\circ$ | 10) $8,640^\circ$ |

B. Find: a) number of sides; b) measure of each exterior angle; and c) measure of interior angle, given the following **regular** polygons.

- |             |            |           |           |           |
|-------------|------------|-----------|-----------|-----------|
| 1) pentagon | 3) nonagon | 5) 15-gon | 7) 34-gon | 9) 71-gon |
| 2) hexagon  | 4) decagon | 6) 25-gon | 8) 49-gon | 5) 86-gon |

C. Complete the table below by supplying the missing data.

Name of Regular Polygon	Number of sides	Sum of the measures of the interior angles	Measure of Each of the Interior Angle	Measure of Each of the Exterior Angle
	12			
Hendecagon				
	56			
17-gon				
			4,680	

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<b>Learning Area:</b>	Mathematics 7	<b>Quarter:</b>	<b>First</b>
<b>Week:</b>	3	<b>Day:</b>	<b>4</b>
<b>Lesson Title/ Topic:</b>	Measures of Angles in any Polygon		
<b>Name:</b>		<b>Grade &amp; Section:</b>	<b>7</b>

### **Activity 4: Extra Practice on Number of Sides and Measure of Each Interior and Exterior Angle of a Regular Polygon**

**Objective(s):** At the end of the lesson, learners are expected to find the number of sides of a polygon and find the measures of each interior/ exterior angle of a regular convex polygon.

**Duration:** 15 minutes

**Instructions:** Complete the table below by supplying the missing data.

Name of Polygon	Number of sides	Measure of Each of the Interior Angles	Sum of the measures of the interior angles
15-gon			
		$140^\circ$	1,260
	72		
		$135^\circ$	1 080°
34-gon			