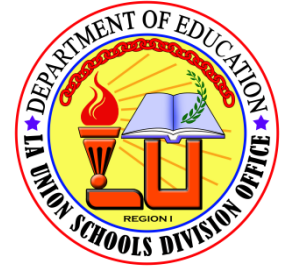


7



# Mathematics

## Quarter 3 – Module 4 POLYGON AND ITS PARTS



**AIRs - LM**

GOVERNMENT PROPERTY  
**NOT FOR SALE**

## **Mathematics Grade 7**

Quarter 3: Week 6 - Module 4: **Polygons and Its Parts**

First Edition, 2021

Copyright © 2021  
La Union Schools Division  
Region I

All rights reserved. No part of this module may be reproduced in any form without written permission from the copyright owners.

### **Development Team of the Module**

**Author: ERLIZA D. AREOLA**

**Editor:** SDO La Union, Learning Resource Quality Assurance Team

**Illustrator:** Ernesto F. Ramos, Jr. *P II*

### **Management Team:**

Atty. Donato D. Balderas, Jr.  
*Schools Division Superintendent*

Vivian Luz S. Pagatpatan, PhD  
*Assistant Schools Division Superintendent*

German E. Flora, PhD, *CID Chief*

Virgilio C. Boado, PhD, *EPS in Charge of LRMS*

Erlinda M. Dela Peña, EdD, *EPS in Charge of Mathematics*

Michael Jason D. Morales, *PDO II*

Claire P. Toluyen, *Librarian II*



## Target

In the previous lesson, you have learned how to use compass and straight edge to bisect line segments and angles and construct perpendiculars and parallels. In this module, you will learn how to illustrate polygons according to its convexity, angles and sides.

After going through this module, you are expected to:

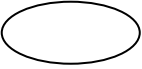
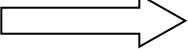



### Learning Competency:


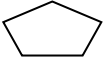


illustrates polygons: (a) convexity; (b) angles; (c) sides **(M7GE-IIIe-2)**

Before going on, check how much you know about this topic.

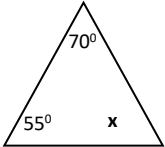
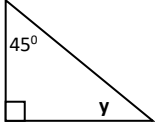
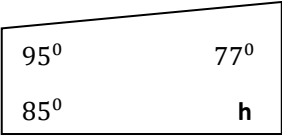
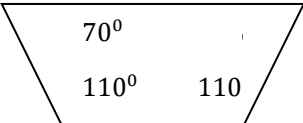
### PRE – ASSESSMENT

**Directions:** Read and answer each statement below carefully. Select the letter of the correct answer and write it in a separate sheet of paper. Take note of the items that you were not able to answer correctly and find the right answer as you go through this module.

- \_\_\_\_ 1. Which of the following is a polygon?  
A.  B.  C.  D. 
- \_\_\_\_ 2. How many sides does a nonagon have?  
A. 7 B. 8 C. 9 D. 10
- \_\_\_\_ 3. What is the measure of a right angle of a triangle?  
A.  $90^0$  B.  $180^0$  C.  $270^0$  D.  $360^0$
- \_\_\_\_ 4. What do you call a triangle with two congruent sides?  
A. equilateral B. equiangular C. isosceles D. scalene
- \_\_\_\_ 5. Which of the following describes a regular polygon?  
A. all sides are congruent B. no sides are congruent  
C. their sides are congruent D. two sides are congruent
- \_\_\_\_ 6. How will you describe the polygon below?  
  
A. isosceles trapezoid B. non isosceles trapezoid  
C. rectangle D. rhomboid

- \_\_\_\_ 7. Which of the following is a hexagon?  
 A.  B.  C.  D. 
- \_\_\_\_ 8. James will construct a house which is a pentagon. How many sides are needed?  
 A. 5 B. 6 C. 7 D. 8
- \_\_\_\_ 9. What is the sum of the measures of the angles of an octagon?  
 A.  $90^0$  B.  $180^0$  C.  $1080^0$  D.  $1800^0$
- \_\_\_\_ 10. How many diagonals can be drawn from a triangle?  
 A. 0 B. 1 C. 2 D. 3
- \_\_\_\_ 11. If one angle of an scalene triangle is  $33^0$  and the other is  $67^0$ , what is the measure of the third angle?  
 A.  $30^0$  B.  $80^0$  C.  $90^0$  D.  $180^0$

For numbers 12 - 15, What are the measures of the angles marked with letters?

- \_\_\_\_ 12.  A.  $55^0$  B.  $60^0$  C.  $65^0$  D.  $70^0$
- \_\_\_\_ 13.  A.  $35^0$  B.  $45^0$  C.  $55^0$  D.  $65^0$
- \_\_\_\_ 14.  A.  $93^0$  B.  $95^0$  C.  $103^0$  D.  $113^0$
- \_\_\_\_ 15.  A.  $70^0$  B.  $90^0$  C.  $110^0$  D.  $130^0$



## ***Jumpstart***

Previously, you have learned about the concepts of angles and lines. So, let us recall the Geometrical symbols or illustrations and terms used in the lessons.

### **Activity 1: Match Me.**

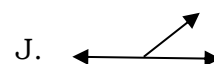
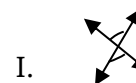
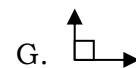
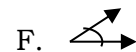
Write the letter of the correct match of Column A from Column B for the term, symbol or illustration used in Geometry.

#### **COLUMN A**

- \_\_\_1) ray
- \_\_\_2) line
- \_\_\_3) point
- \_\_\_4) plane
- \_\_\_5) segment
  
- \_\_\_6) linear pair
  
- \_\_\_7) right angle
  
- \_\_\_8) acute angle
  
- \_\_\_9) obtuse angle
  
- \_\_\_10) vertical angles

#### **COLUMN B**

- A. O
- B.  $\overline{AB}$
- C.  $\overrightarrow{AB}$
- D.  $\overleftrightarrow{AB}$
- E.  $\angle ABC$  or  $\angle M$





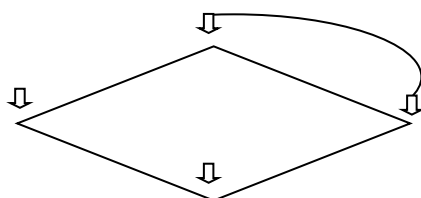
## Discover

The above activity illustrates how the concept of terms, symbols or illustrations can be used in Geometry. Now, let us proceed to the next lesson that you need to know, that is on how to illustrate polygon according to its convexity, angles and sides.

### POLYGON

A **polygon** is a closed figure which is the union of three or more segments, such that:

- These segments called their **sides** are non-collinear; and
- Each segment or side intersects two other sides only at their endpoints, called **vertices**.



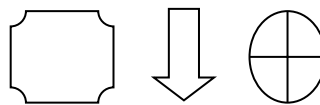
**side or segment** (the figure has 4 sides)

**vertex** (all the corners pointed by the arrows are called vertices)

#### Examples of polygon



#### Examples of not polygon



### Polygon According to its Convexity

A **convex polygon** is a simple polygon having the following properties:

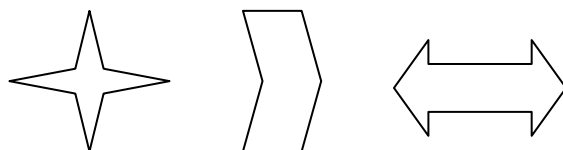
- Every internal angle is less than  $180^\circ$ .
- Every line segment between two vertices remains inside or on the boundary of the polygon

#### Examples of convex polygon



A **non-convex or concave polygon** is a polygon that is not convex. It will always have an interior angle with a measure that is greater than  $180^\circ$ .

### Examples of non-convex or concave polygon



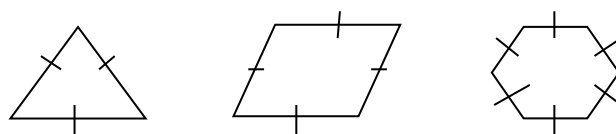
### Polygon According to the Number of Sides

Polygons	Number of Sides	Number of Triangles	Sum of the Measures of Angles	Number of Diagonals
Triangle	3	1	$180^\circ$	0
Quadrilateral	4	2	$360^\circ$	2
Pentagon	5	3	$540^\circ$	5
Hexagon	6	4	$720^\circ$	9
Heptagon	7	5	$900^\circ$	14
Octagon	8	6	$1080^\circ$	20
Nonagon	9	7	$1260^\circ$	27
Decagon	10	8	$1440^\circ$	35
Dodecagon	12	10	$1800^\circ$	54
N-gon	n	n-2	$(n-2) 180^\circ$	$\frac{n(n-3)}{2}$

### Polygon According to its Sides and Angles

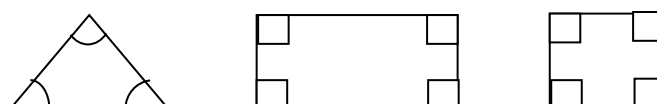
- Equilateral Polygon** is a polygon whose sides are equal.

Examples of Equilateral Polygon

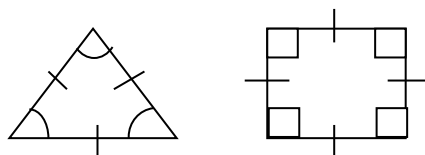


- Equiangular Polygon** is a polygon whose angles are equal.

Examples of Equiangular Polygon



- **Regular Polygon** is a polygon whose sides and angles are equal.  
Examples of Regular Polygon

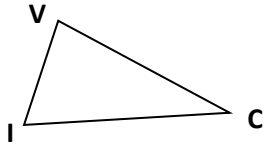
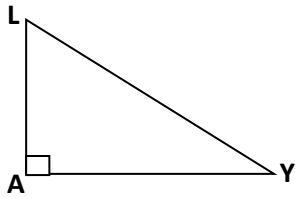
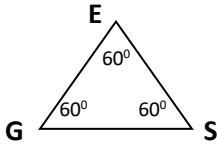
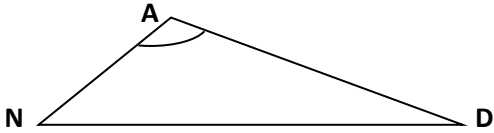
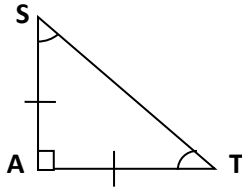


### Classification of Triangles According to Sides

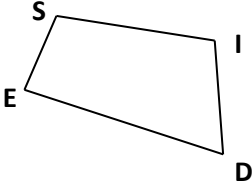
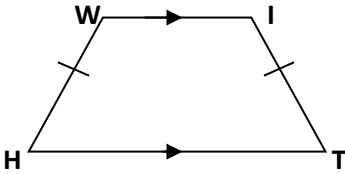
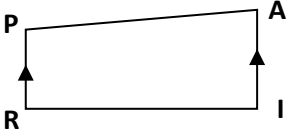
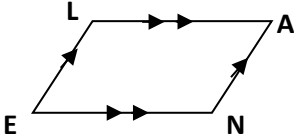
Kind	Illustration
<p><b>Scalene Triangle</b> – a triangle with no congruent sides</p>	
<p><b>Isosceles Triangle</b> – a triangle with two congruent sides</p> <p>In an isosceles triangle; The congruent sides are the legs.</p> <p><b>Vertex angle</b> is the angle opposite the base.</p> <p><b>Base</b> is the segment opposite the vertex angle.</p> <p><b>Base Angles</b> are the angles opposite the congruent sides.</p>	<p><b>Legs:</b> <math>\overline{BO}</math> and <math>\overline{BY}</math></p> <p><b>Vertex Angle:</b> <math>\angle B</math></p> <p><b>Base:</b> <math>\overline{OY}</math></p> <p><b>Base Angles:</b> <math>\angle O</math> and <math>\angle Y</math></p>
<p><b>Equilateral Triangle</b> – a triangle with three congruent sides</p>	



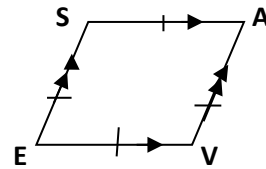
### Classification of Triangles According to Angles

Kind	Illustration
<p><b>Acute Triangle</b> – a triangle with three acute angles</p>	
<p><b>Right Triangle</b> – a triangle with one right angle</p> <p>In a right triangle, <b>hypotenuse</b> is the side opposite to right angle and the legs are the two other sides.</p>	
<p><b>Equiangular Triangle</b> – a triangle with three congruent angles</p>	
<p><b>Obtuse Triangle</b> – a triangle with one obtuse angle</p>	
<p><b>Isosceles Right Triangle</b> – a triangle with a right angle and two congruent angles.</p>	

### Classification of Quadrilaterals

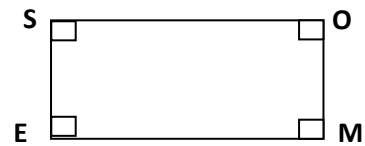
Kinds of Quadrilateral	Illustration
<p><b>General Quadrilateral or Trapezium</b> – a quadrilateral with no pair of parallel sides.</p>	 <p>SIDE is General Quadrilateral or Trapezium</p>
<p><b>Trapezoid</b> – a quadrilateral with one pair of parallel sides.</p> <p>1. <b>Isosceles trapezoid</b> – a trapezoid with congruent legs.</p> <p>2. <b>Non-isosceles trapezoid</b> – a trapezoid with no congruent legs.</p> <p>In a trapezoid the;</p> <p>a) <b>bases</b> are the parallel sides</p> <p>b) <b>legs</b> are the non-parallel sides</p>	 <p>WITH is an Isosceles Trapezoid</p> <p><math>\overline{WI}</math> and <math>\overline{HT}</math> are the bases</p> <p><math>\overline{WH}</math> and <math>\overline{IT}</math> are the legs</p>  <p>PAIR is a non-isosceles trapezoid.</p>
<p><b>Parallelogram</b> – a quadrilateral with two pairs of opposite sides parallel.</p>	 <p>LANE is a parallelogram</p> <p><math>\overline{LE} \parallel \overline{AN}</math> and <math>\overline{LA} \parallel \overline{EN}</math></p> <p><math>\overline{LE} \cong \overline{AN}</math> and <math>\overline{LA} \cong \overline{EN}</math></p>

**Rhombus** – a parallelogram with four congruent sides.



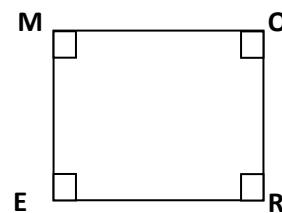
SAVE is a rhombus  
 $\overline{SE} \parallel \overline{AV}$  and  $\overline{SA} \parallel \overline{EV}$   
 $\overline{SE} \cong \overline{AV}$  and  $\overline{SA} \cong \overline{EV}$

**Rectangle** – a parallelogram with four right angles.



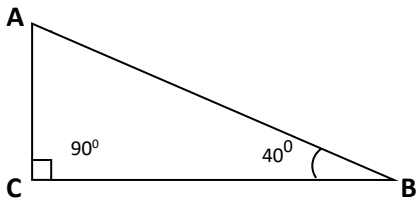
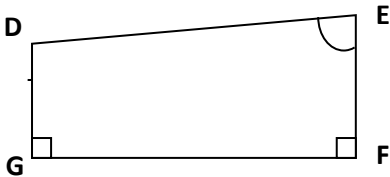
SOME is a rectangle  
 $\overline{SE} \parallel \overline{OM}$  and  $\overline{SO} \parallel \overline{EM}$   
 $\overline{SE} \cong \overline{OM}$  and  $\overline{SO} \cong \overline{EM}$   
 $\angle S, \angle O, \angle M, \text{ and } \angle E$  are right  $\angle$ s

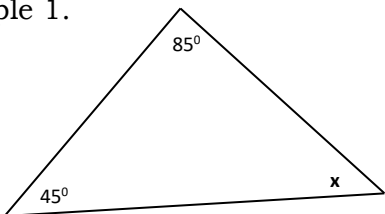
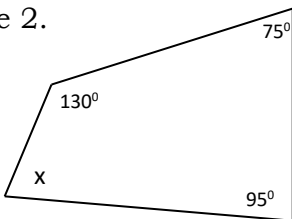
**Square** – a rectangle with four congruent sides. It is also a parallelogram with four right angles and four congruent sides.

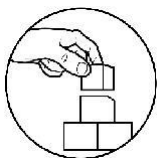


MORE is a square  
 $\overline{ME} \parallel \overline{OR}$  and  $\overline{MO} \parallel \overline{ER}$   
 $\overline{ME} \cong \overline{OR}$  and  $\overline{MO} \cong \overline{ER}$   
 $\angle M, \angle O, \angle R, \text{ and } \angle E$  are right  $\angle$ s

## Angle Measures of Triangles and Quadrilaterals

Triangle	Quadrilateral
	
$m \angle A + m \angle B + m \angle C = 180^\circ$	$m \angle D + m \angle E + m \angle F + m \angle G = 360^\circ$
$50^\circ + 40^\circ + 90^\circ = 180^\circ$	$100^\circ + 80^\circ + 90^\circ + 90^\circ = 360^\circ$
The sum of the measures of the angles of a triangle is $180^\circ$ .	The sum of the measures of the angles of a quadrilateral is $360^\circ$ .

Let us try to find a missing angle in a triangle or quadrilateral.	
<p>Example 1.</p>  <p>x is referred to as the missing angle.</p> <p>Then in finding x,</p> $85^\circ + 45^\circ + x = 180^\circ$ <p>Add <math>85^\circ</math> and <math>45^\circ</math> then subtract it from <math>180^\circ</math>.</p> $180^\circ - (85^\circ + 45^\circ) = x$ $180^\circ - 130^\circ = x$ $50^\circ = x$ <p>Therefore the missing angle is <math>50^\circ</math>.</p>	<p>Example 2.</p>  <p>x is referred to as the missing angle.</p> <p>Then in finding x,</p> $130^\circ + 75^\circ + 95^\circ + x = 360^\circ$ <p>Add <math>130^\circ</math>, <math>75^\circ</math> and <math>95^\circ</math> then subtract it from <math>360^\circ</math>.</p> $360^\circ - (130^\circ + 75^\circ + 95^\circ) = x$ $360^\circ - 300^\circ = x$ $60^\circ = x$ <p>Therefore the missing angle is <math>60^\circ</math>.</p>



# Explore

## Activity 2: Riddle. What makes a bird a bird?

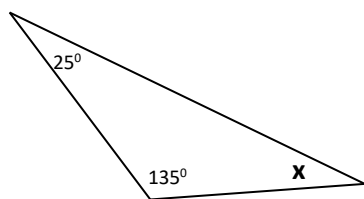
**Directions:** Match column A with Column B. Write the letter of the correct answer in the space provided before each number. Refer to the boxes at the bottom and write the letter that corresponds to the number to discover the answer to the trivia.

A. Find the measure of the missing angle of a triangle or quadrilateral.

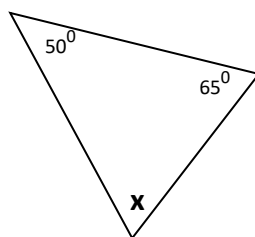
	COLUMN A	COLUMN B
___ 1)		A. 16°
___ 2)		T. 30°
___ 3)		R. 40°
___ 4)		F. 47°
___ 5)		S. 52°
___ 6)		E. 60°
___ 7)		W. 70°
___ 8)		N. 75°
___ 9)		H. 105°
___ 10)		I. 130°

5	8	10	1		7	3		8	2	6		9	10	2	3	8	10	4	6

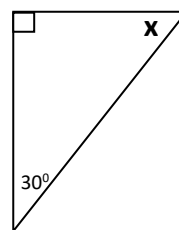
B. Find the measure of the missing angle of a triangle or a quadrilateral.



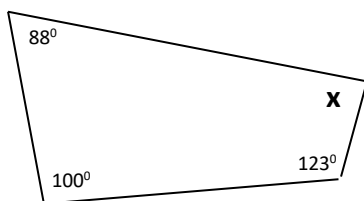
1. \_\_\_\_\_



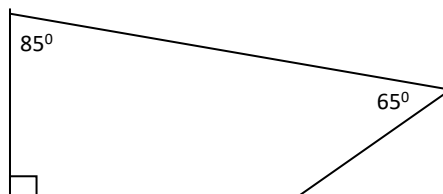
2. \_\_\_\_\_



3. \_\_\_\_\_



4. \_\_\_\_\_



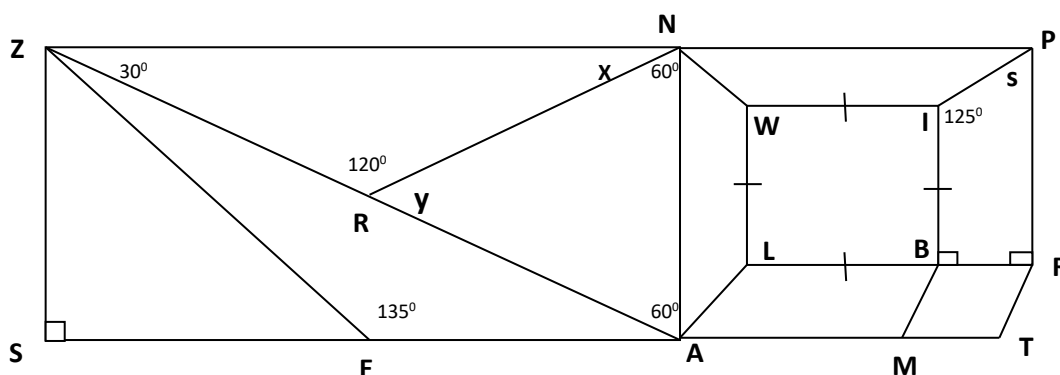
5. \_\_\_\_\_



**Deepen**

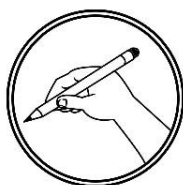
### Activity 9: Think of Me.

In this activity, it will enable you to formulate your own way or strategy to come up with the correct answer. Refer to the figure given below.



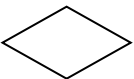

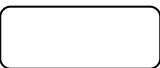
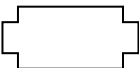

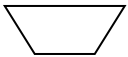
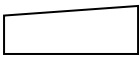
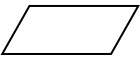
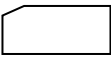
- \_\_\_\_\_ 1) How many sides are there in  $\triangle ZSA$ ?
- \_\_\_\_\_ 2) What kind of triangle is  $\triangle ZEA$  according to sides?
- \_\_\_\_\_ 3) What kind of triangle is  $\triangle ZSE$  according to angles?
- \_\_\_\_\_ 4) If  $\triangle NRA$  is an equiangular triangle, what is the measure of  $\angle y$ ?
- \_\_\_\_\_ 5) In  $\triangle ZYN$ , what is the measure of  $\angle x$ ?

- \_\_\_\_\_ 6) What kind of polygon is NPTA?
- \_\_\_\_\_ 7) How many sides are there in a quadrilateral?
- \_\_\_\_\_ 8) If quadrilateral WILB has congruent sides and angles, what kind of quadrilateral is it?
- \_\_\_\_\_ 9) If quadrilateral BRTM is a rhombus and  $\angle B = 140^\circ$ , what is the measure of  $\angle T$ ?
- \_\_\_\_\_ 10) What is the measure of  $\angle$ s in quadrilateral PRBI?



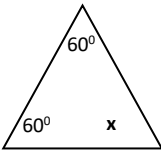
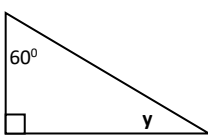
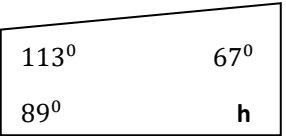
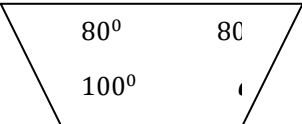
## Gauge

**Directions:** Find out how much you have learned in this module. Read and answer each statement below carefully. Select the letter of the correct answer and write it in a separate sheet of paper.

- \_\_\_\_\_ 1. Which of the following is a pentagon?  
 A.  B.  C.  D. 
- \_\_\_\_\_ 2. How many sides does a decagon have?  
 A. 7 B. 8 C. 9 D. 10
- \_\_\_\_\_ 3. What is the sum of the measures of the angles of a triangle?  
 A.  $90^\circ$  B.  $180^\circ$  C.  $270^\circ$  D.  $360^\circ$
- \_\_\_\_\_ 4. What do you call a triangle with three congruent sides?  
 A. equiangular B. equilateral C. isosceles D. scalene
- \_\_\_\_\_ 5. What is the sum of the measures of the angles of a quadrilateral?  
 A.  $90^\circ$  B.  $180^\circ$  C.  $270^\circ$  D.  $360^\circ$
- \_\_\_\_\_ 6. How will you describe the polygon below?  
  
 A. isosceles trapezoid B. non isosceles trapezoid  
 C. rectangle D. rhomboid
- \_\_\_\_\_ 7. Which of the following is a parallelogram?  
 A.  B.  C.  D. 
- \_\_\_\_\_ 8. How many vertices does a regular heptagon have?  
 A. 6 B. 7 C. 8 D. 9
- \_\_\_\_\_ 9. What is the sum of the measures of the angles of a hexagon?  
 A.  $180^\circ$  B.  $360^\circ$  C.  $540^\circ$  D.  $720^\circ$

- \_\_\_\_\_10. How many diagonals can be drawn from a quadrilateral?  
 A. 0                      B. 1                      C. 2                      D. 3
- \_\_\_\_\_11. If one angle of an scalene triangle is  $35^\circ$  and the other is  $65^\circ$ , what is the measure of the third angle?  
 A.  $30^\circ$                       B.  $80^\circ$                       C.  $90^\circ$                       D.  $180^\circ$

For numbers 12 - 15, What are the measures of the angles marked with letters?

- \_\_\_\_\_12.  A.  $55^\circ$                       B.  $60^\circ$                       C.  $65^\circ$                       D.  $70^\circ$
- \_\_\_\_\_13.  A.  $30^\circ$                       B.  $40^\circ$                       C.  $50^\circ$                       D.  $60^\circ$
- \_\_\_\_\_14.  A.  $89^\circ$                       B.  $90^\circ$                       C.  $91^\circ$                       D.  $92^\circ$
- \_\_\_\_\_15.  A.  $60^\circ$                       B.  $80^\circ$                       C.  $100^\circ$                       D.  $120^\circ$

*Great job! You are done with this module.*



# ***References***

## A. Books

- Bernabe, Julieta Elementary Algebra I
- Custodio, Sergio C. and Mirabona, Isaac P. Interactive Mathematics 7
- Terrenal, Virgilio B. , Gerona, Ignacio, Lardizabal and Mamaradlo Math Connections
- Mathematics – Grade 7 Learner’s Material. DepEdIMCS. First Edition, 2013 .ISBN: 978-971-9990-60-4

## B. Online Resources

- [https://www.mcckc.edu/tutoring/docs/bt/geo\\_pol\\_ang/Geometry\\_& Practice.pdf](https://www.mcckc.edu/tutoring/docs/bt/geo_pol_ang/Geometry_&_Practice.pdf)
- <https://guidetothephilippines.ph/articles/things-to-do/top-tourist-spots-philippines>
- <https://www.geometry.com/geometry/homework/geometry.angles.sides.faq.question.7179.html>