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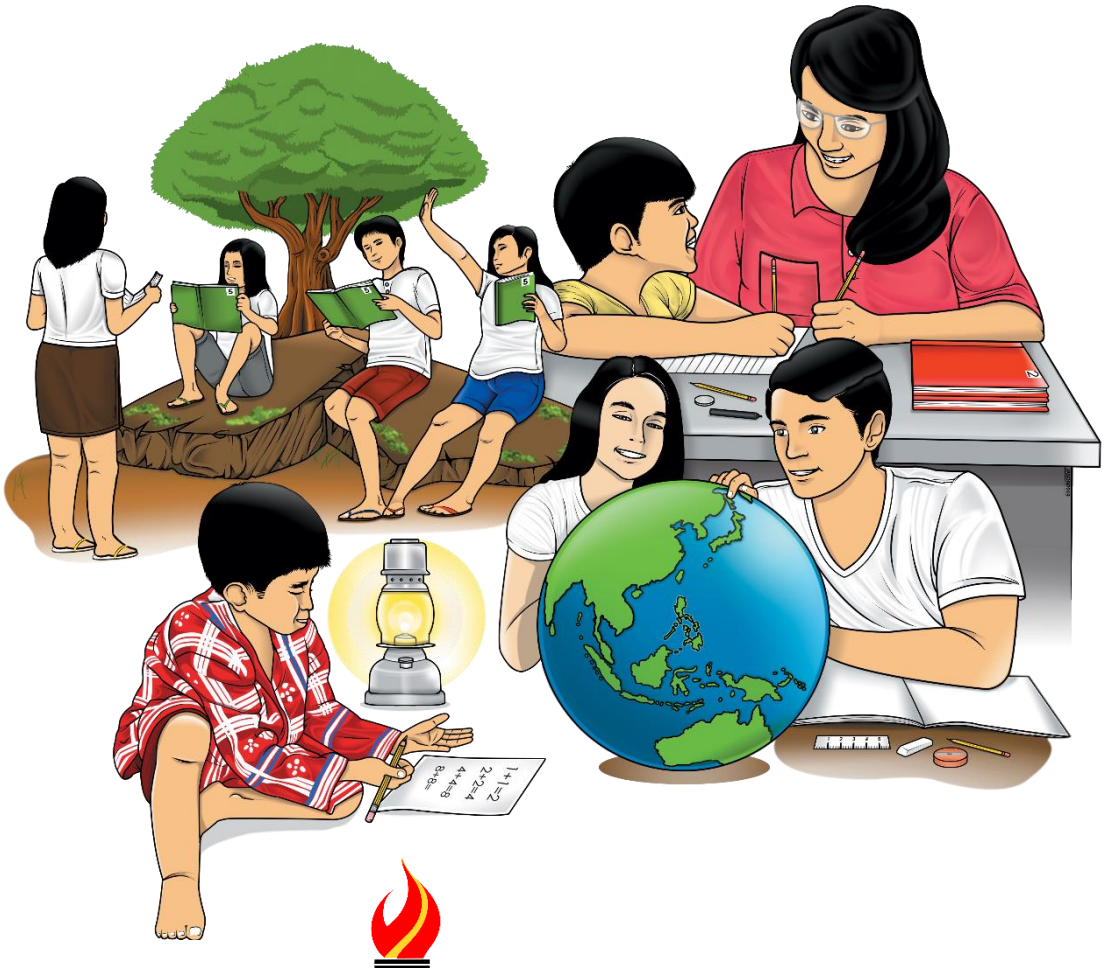
# Mathematics

## Quarter 3 – Module 6: Visualizing, Identifying and Describing Polygons with 5 or More Sides



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**Alternative Delivery Mode**
**Quarter 3 – Module 6: Visualizing, Identifying and Describing Polygons with 5 or More Sides**
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# Mathematics

## Quarter 3 – Module 6: Visualizing, Identifying and Describing Polygons with 5 or More Sides

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# Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

# *What I Need to Know*

Good day Mathletes! In this module, you are going to gain an understanding on visualizing, identifying and describing polygons with 5 or more sides. You will also realize the importance of polygons in our day-to-day living. Moreover, you will surely enjoy the fun and challenging activities which are provided for you to strengthen your understanding of the lesson.

When you finish up this module, you will be able to:

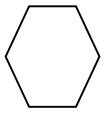
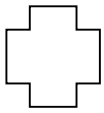
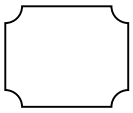
1. visualize polygons with five or more sides;
2. identify polygons with five or more sides; and
3. describe polygons with five or more sides.

Let us first check what you know about polygons.

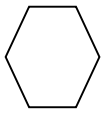
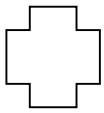
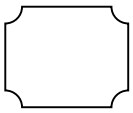
# *What I Know*

Directions: Read and understand the given. Choose the letter that corresponds to the correct answer. Write the letters of your answers on a separate sheet of paper.

1) Which of the following illustrates a 12-sided polygon?

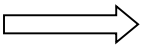
A.  B.  C.  D. 

2) Which of the following illustrates a hexagon?

A.  B.  C.  D. 

3) Which of the following is **not true** about polygons?
   A. Polygons have more than two (2) sides.
   B. Polygons are 2-dimensional geometric figures.
   C. Polygons are 3-dimensional geometric figures.
   D. Polygons can be classified by the number of their vertices.

4) What do you call a 5-sided polygon?
   A. a hexagon B. a pentagon C. a heptagon D. a nonagon

5) What polygon is illustrated by the figure on the right? 
   A. a hexagon B. a pentagon C. a heptagon D. a nonagon

6) Which of the following has exactly 5 angles?
   A. a hexagon B. a pentagon C. a heptagon D. a nonagon

7) What is the exact number of vertices of an octagon?
   A. five (5) B. six (6) C. eight (8) D. nine (9)

8) What is the exact number of line segments that are connected to each vertex of a pentagon?
   A. one (1) B. two (2) C. three (3) D. five (5)

9) Which of the following is a six-sided polygon?
   A. a hexagon B. a pentagon C. a heptagon D. a dodecagon

10) What do you call a ten-sided polygon?
   A. a hexagon B. a pentagon C. a heptagon D. a decagon

Please check your answers against the ANSWER KEY on page 14.

# Lesson 1 Visualizing, identifying and describing polygons with 5 or more sides

Mastery on polygons is not only an important part of mathematics, but it is also an important part of daily living. It helps you become acquainted with the applications of polygons in science, engineering, art, design and social studies.

Are you ready to explore the lesson? So, let's proceed.

## *What's In*

Let us review the previous lesson. Can you still recall the steps on solving routine problems and different methods/strategies on solving non-routine problems involving percentage?

Let us consider the next word problem. We solve it using the steps on solving routine problems.

**Example 1**

In a church organization with 100 members, each is required to donate 10% from their monthly salary or any form of income which can be 3,000.00 pesos and above. What is the maximum length of time it would take to save 1 500 000 pesos if all of the 100 members contributed monthly?

**Solution:**

**Understand the problem.**

- *Know what is asked.*
  We are asked to find the maximum length of time needed for the 100 church members to save 1.5M pesos.
- *Know the given facts.*
  There are 100 members.
  Each monthly salary/income of 3,000 pesos and above is with required donation of 10%.
  The target amount is 1.5 million pesos

**Plan.**

- *Determine the operations to be used.*
  Multiplication and division are the needed operations.
- *Write the number sentence.*
  0.10 x 3000 = N = percentage of the income

N x 100 = amount of donations per month

1,500,000 ÷ amount of donations per month = number of months to complete the needed amount

**Show your solution.**

$$\begin{array}{r} 0.10 \\ \times\ 3000 \\ \hline 300.00 \end{array} \qquad \begin{array}{r} 300 \\ \times\ 100 \\ \hline 30000 \end{array} \qquad \begin{array}{r} 50 \\ \hline 30000\,\big)\,1\ 500\ 000 \\ 1\ 500\ 00 \\ \hline 0 \\ 0 \\ \hline 0 \end{array}$$

**Check and look back.**

- *Verify if your answer makes sense.*

$$\begin{array}{r} 30000 \\ \times\ 50\ \text{(months)} \\ \hline 1\ 500\ 000 \end{array} \qquad \begin{array}{r} 4.1666\ldots \\ \hline 12\,\big)\,50.0000 \\ 48 \\ \hline 20 \\ 12 \\ \hline 80 \\ 72 \\ \hline 80 \end{array}$$

**1 year = 12 months**

**4 years = 48 months**

**50 months**

**= 48 months + 2 months**

**= 4 years and 2 months**

State the complete answer.

| |
|---|
| If each of the 100 members donated monthly and the minimum income is 3 000 pesos, then it will take a maximum of 50 months or 4 years and 2 months to complete the 1.5 million pesos for the reconstruction of the church. |

Try the next problem. Decide for yourself if you will use 2 or 3 strategies in solving non-routine problem.

**Example 2**

Eric hosted a children's party. He counted the persons who attended the event and found out that 60% of 200 visitors were female. How many visitors were female?

You can solve by drawing an illustration first.


In the given problem, 60% can also be represented in fractional form as $\frac{6}{10}$ Since there were 200 persons who attended the party, we simply divide it into 10 regions. So, each regions represents 20 persons. If one shaded region represents 20 persons, then 6 shaded regions represents 120 persons. It means that 120 female attended the children's party.

## *What's New*

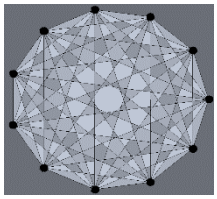
In the previous lessons, you were taught on how to solve routine and non-routine problems involving percentage. This module is going to teach and guide you on how to visualize, identify and describe polygons with 5 sides or more.

Always remember that polygons are closed plane figures that are formed by the line segments that meet only at their endpoints. The line segments are the *sides*. The endpoints where the sides meet are the *vertices*.

Polygons are classified according to the number of their sides, vertices and angles.

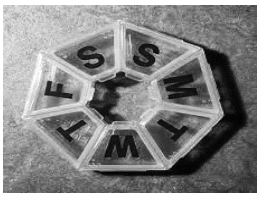
**Example 3**

Look at the images below. Let us consider them as representations of polygons. Count the number of their sides.

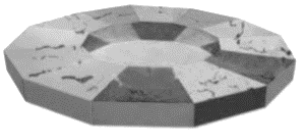


1)

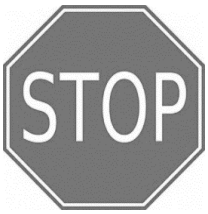
2)




3)



4)




5)


6)

7)

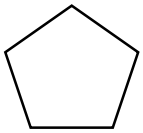
8)

## *What is It*

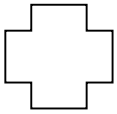
Everyday, we encounter representations of polygons in many different forms, colors and sizes, even in the streets or inside our homes. Thus, knowing and identifying shapes and angles are not enough. It is also important to master the skills in visualizing, naming and describing polygons with 5 sides or more, so that we can easily recognize them wherever we go, in whatever form and shape they are having.

Remember that a three-sided polygon is called a **triangle**. A four-sided polygon is called a **quadrilateral**. A five-sided polygon is called a **pentagon**. A six-sided polygon is called a **hexagon**. A seven-sided polygon is called a **heptagon**. An eight-sided polygon is called an **octagon**. A nine-sided polygon is called a **nonagon**. A ten-sided polygon is called a **decagon**. An eleven-sided polygon is called an **undecagon.** A twelve-sided polygon is called a **dodecagon**. An n-sided polygon can be called n-gon.

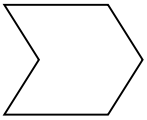
Let us consider the following polygons. Write your answers on a separate sheet of paper.



A



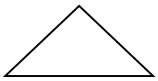
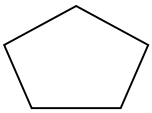
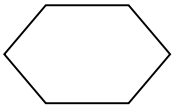
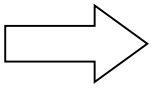
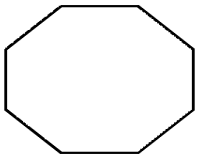
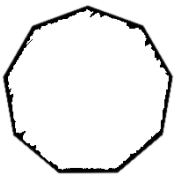
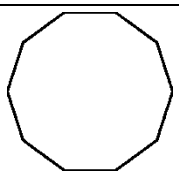
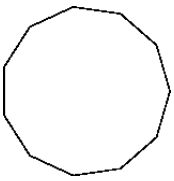
B



C

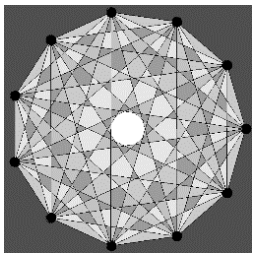
1) How many sides are there in each polygon?
2) How many angles are there in each polygon?
3) How many vertices are there in each polygon?
4) What can you say about the number of sides, angles and vertices of a polygon?
5) Are the polygons the same?
6) If there are any similarities, what are they?
7) If there are any differences, what are they?
8) How are polygons identified?
9) In each polygon, how how many sides are there in each vertex?
10) Using your own words, describe a polygon.

Consider the different polygons below and their identifications.

| FIGURE | NAME | NUMBER OF SIDES |
|---|---|---|
|  | Triangle | 3 |
|  | Quadrilateral | 4 |
|  | Pentagon | 5 |
|  | Hexagon | 6 |
|  | Heptagon | 7 |
|  | Octagon | 8 |
|  | Nonagon | 9 |
|  | Decagon | 10 |
|  | Undecagon | 11 |
|  | Dodecagon | 12 |

Let's consider the given objects from the previous part of this lesson.

Let's name what types of polygons they are.

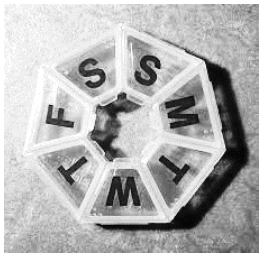


11 sides
undecagon

1)

6 sides
hexagon

2)

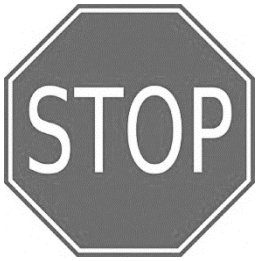



7 sides
heptagon

3)

12 sides
dodecagon

4)




8 sides
octagon

5)


10 sides
decagon

6)

9 sides
nonagon

7)

5 sides
pentagon

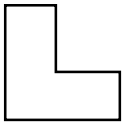
8)

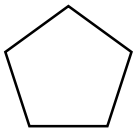
Congratulations you can now visualize, identify and describe the different types of polygons. Now try to answer the three activities that follow.

## *What's More*

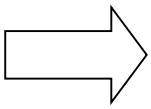
### Activity 1: Can You Recognize Me!

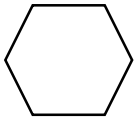
Directions**:** Name each polygon by the number of its sides. Write your answer on a separate sheet of paper. The first item is already answered for you as a guide.

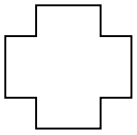
1) 

2) 

3) 

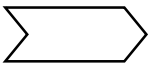
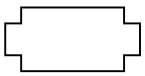
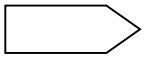
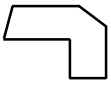
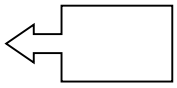
4) 

5) 

6) 

### Activity 2: Remember My Name!

Directions: On a separate sheet of paper, copy the table below. Count the number of sides in each polygon. Name the polygon. The first item is already answered for you as a guide.

| Figure | Number of Sides | Name of Polygon |
|---|---|---|
| 1)  | 6 | Hexagon |
| 2)  | | |
| 3)  | | |
| 4)  | | |
| 5)  | | |
| 6)  | | |

## Activity 3 Picture Me Out!

Directions: Think of objects that you see around you which represent polygons. Draw the given objects on a separate sheet of paper.

| 1) dodecagon | 2) octagon | 3) heptagon |
|---|---|---|
| | | |
| **4) pentagon** | **5) undecagon** | **6) hexagon** |
| | | |

Now, you already have understood what polygons are. Let's try some more activities to strengthen what you have learned.

## *What I Have Learned*

Directions: On a separate sheet of paper, match the terms in Column A with their definition or description in Column B. Write the letter of the correct answer on a separate answer sheet.

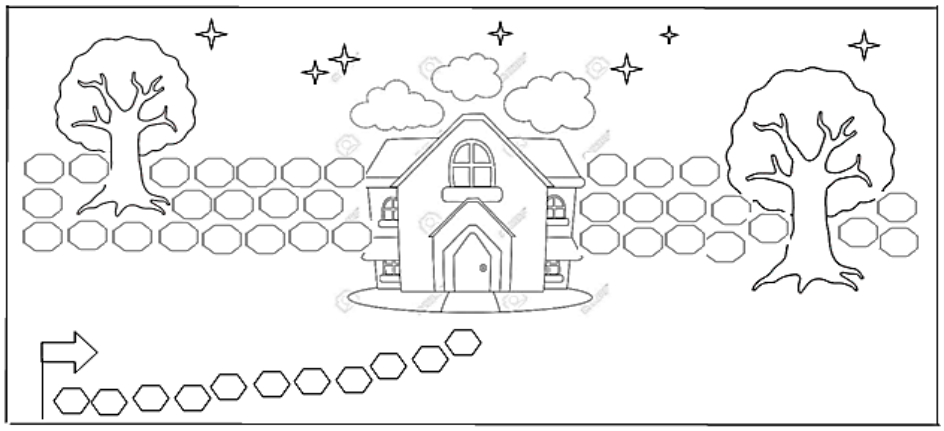
| **COLUMN A** | **COLUMN B** |
|---|---|
| 1. Vertex | a. a closed plane figure formed by line segments |
| 2. Octagon | b. intersection of two sides of a polygon |
| 3. Polygon | c. seven-sided polygon |
| 4. Decagon | d. twelve-sided polygon |
| 5. Heptagon | e. ten-sided polygon |
| 6. Dodecagon | f. eight-sided polygon |
| | g. bounded by two angles of a polygon |

Good job! You are almost done with this module. Just three more activities and you are done

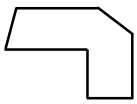
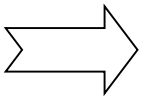
## *What I Can Do*

Directions: A. Look at the picture on the right. It shows a "house facade". Create your own house facade on a separate sheet of paper. Use at least 5 different kinds of polygons. Color your work using the legend below.

| | |
|---|---|
| octagon(s) = blue | triangle(s)= red |
| heptagon(s)= green | hexagon(s)= yellow |
| quadrilateral(s)= pink | pentagon(s) = brown |



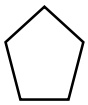
Directions: B. On a separate sheet of paper, copy and complete the table below.

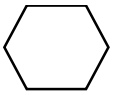
| Figure | Number of Sides | Name of Polygon |
|---|---|---|
| 1) | 5 | |
| 2)  | | |
| 3) | | hexagon |
| 4)  | | |
| 5) | 9 | |

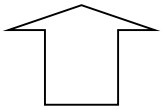
Perfect! What a nice work. Now, answer the activity below. Let's see if you remember what you have acquired today from this lesson.

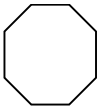
## *Assessment*

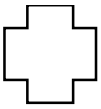
Directions: A. Identify the following geometric shapes. Choose the letter that corresponds to the correct answer. Write your answers on a separate sheet of paper.

1) 
A. heptagon
B. pentagon
C. hexagon
D. dodecagon

2) 
A. pentagon
B. nonagon
C. octagon
D. hexagon

3) 
A. nonagon
B. octagon
C. heptagon
D. dodecagon

4) 
A. pentagon
B. heptagon
C. octagon
D. hexagon

5) 
A. dodecagon
B. undecagon
C. nonagon
D. octagon

Directions: B. Read each item carefully. Choose the letter that corresponds to the correct answer. Write your answers on a separate sheet of paper.

6) Which of the following is the exact number of sides of a pentagon?
A. three (3) B. five (5) C. seven (7) D. nine (9)

7) Which of the following has exactly 7 angles?
A. A hexagon B. A pentagon C. A heptagon D. An octagon

8) Which of the following is an eight-sided polygon?
A. A triangle B. A heptagon C. An octagon D. A nonagon

9) Which of the following has exactly 12 angles?
A. A nonagon B. A decagon C. An undecagon D. A dodecagon

10) Which of the following is **not true** about polygons?
A. Polygons have more than two (2) angles.
B. Polygons are 2-dimensional geometric figures.
C. Polygons are 3-dimensional geometric figures.
D. Each vertex of a polygon has exactly two-line segments.

Please check your answers with the ANSWER KEY on page 14.

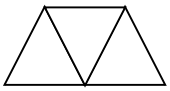
Got a score of 8-10? CONGRATULATIONS! Job well done. See you in the next module. If below 8, you may have to go over the lessons and the exercises again.

# *Additional Activities*

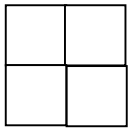
Directions: A. Read the following carefully. Do what is asked. Use a separate sheet of paper for your work.

A **polygon** with equal sides and equal angles is a **regular polygon**.

A **tessellation** is created when a shape is repeated over and over again covering a plane without any gaps or overlaps. Tiling is another word for a tessellation.



The three regular triangles form a tessellation.

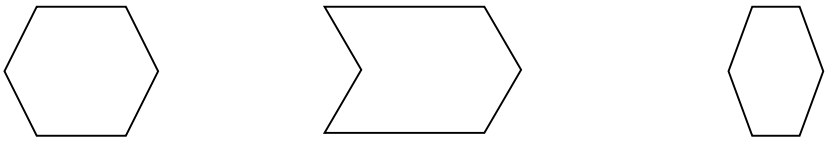


Squares form tessellation.

What are other polygons, with 5 or more sides, that can form tessellation? Illustrate your findings.

Directions: B. Read the following carefully. Do what is asked. Use a separate sheet of paper for your work.

Consider the following polygons.



A B C

1) What kind of polygons are they? How do you identify them?
2) How is A different from B?
3) How is B similar to A?
4) State the similarities of the three polygons, if any.
5) State the differences of the three polygons, If any.

# *Answer Key*

**What I Know**

1. B
2. A
3. C
4. B
5. C
6. B
7. C
8. B
9. A
10. D

**What's In**

**Example 1**

The length of time needed for the 100 church members to save 1.5M pesos is 50 months or 4 years and 2 months

**Example 2**

there are 120 female attendees in the children's party

**What is it**

**Example 1**

For 1, 2 and 3,

A= 5 B = 12 C= 6

4. They are the same.
5. No.
6. They are all polygons.
7. They have different exact numbers of sides.
8. They are identified with the number of their sides, angles or vertices.
9. Two
10. Answers vary.

**Example 2**

There are 120 female attendees in the children's party

**What's More**

**Activity 1:**

1. Hexagon
2. Pentagon, 5 sided
3. Decagon, 10-sided
4. Heptagon, 7-sided
5. Hexagon, 6-sided
6. Dodecagon, 12 sided

**Activity 2:**

1. Hexagon, 6-sided
2. Octagon, 8-sided
3. Dodecagon, 12-sided
4. Pentagon ,5-sided
5. Heptagon, 7-sided
6. undecagon- 11-sided

**Activity 3:**

Answers vary per learner

**What's I Have**

**Learned**

1. B
2. F
3. A
4. E
5. C
6. D

**What I Can Do**

A. Answers vary

B. The figures may vary.

1. pentagon
2. 7 sides, heptagon
3. 6 sides, hexagon
4. 8 sides, octagon
5. nonagon

**Assessment**

1. B
2. D
3. C
4. C
5. A
6. B
7. C
8. C
9. D
10. C

**Additional Activities**

A. Answers vary.

B.

1) They are hexagons.
2) A is a regular polygon. B is not a regular polygon. Other differences can be pointed out.
3) Both are hexagons.
4) They are all hexagons.
5) They have different lengths of sides and different measures of angles.

# *References*

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