8

Mathematics

Quarter 3 - Module 3:
Triangle Congruence

Zest for Progress
Zeal of Partnership

Name of Learner: _____

Grade & Section: _____

Name of School: _____

What I Need to Know

This module is intended for you to develop your skills in the concept of learning triangle congruence. It helps to strengthen your foundation in geometry as you take the next level of the lesson. This module contains only one lesson.

Lesson 1 - Definition of congruent triangles

As you go through this module, you are expected to:
a. define congruent triangles;
b. identify congruent triangles; and
c. illustrate congruent triangles. (M8GE-IIId-1)

What I Know

Directions: Read the questions carefully. Choose the letter of your answer and write it on the space provided before each number.

_____1. When can we say two triangles are congruent?
   A. If their corresponding sides are equal in length, and corresponding angles are equal in measure.
   B. If their opposite sides are equal in length and opposite angles are equal in measure.
   C. If their consecutive sides and angles are equal in length and in measure.
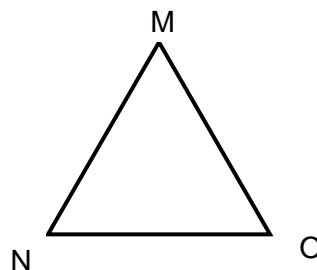   D. At least one corresponding sides and angles are equal in length and in measure.

_____2. How many corresponding parts are congruent, if ΔABC ≅ ΔDEF?
   A. 3
   B. 4
   C. 5
   D. 6
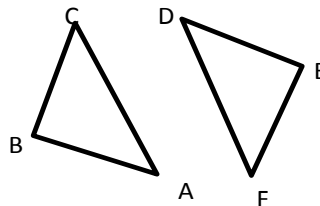
_____3. What side is included between ∠N and ∠O in ΔMNO?
   A. $\overline{MN}$
   B. $\overline{MO}$
   C. $\overline{NM}$
   D. $\overline{NO}$

_____4. What side is corresponding to $\overline{BC}$ in the figure below?
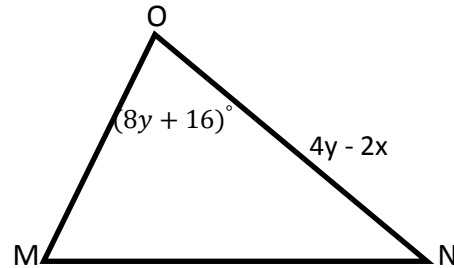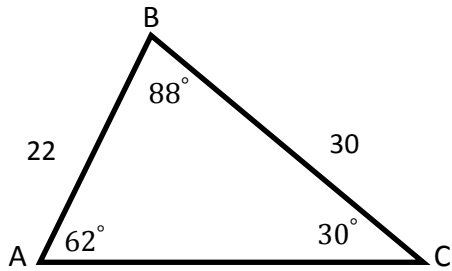
A. $\overline{EC}$

B. $\overline{AC}$

C. $\overline{BE}$

D. $\overline{TC}$
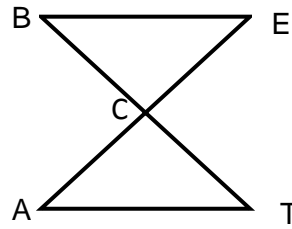
_____5. What is the measure of $\overline{AM}$ and $\overline{FD}$ if $\overline{AM} \cong \overline{FD}$ given that $\overline{AM}$ is 2x + 1 meters and $\overline{FD}$ is 3x – 2 meters?

A. 5 meters   B. 6 meters   C. 7 meters   D. 8 meters

For items 6 – 8, you may refer in the given figure below. $\triangle ABC \cong \triangle MON$

_____6. What is the measure of ∠O?

A. $30°$ B. $62°$ C. $88°$ D. $105°$

_____7. What is the value of y?
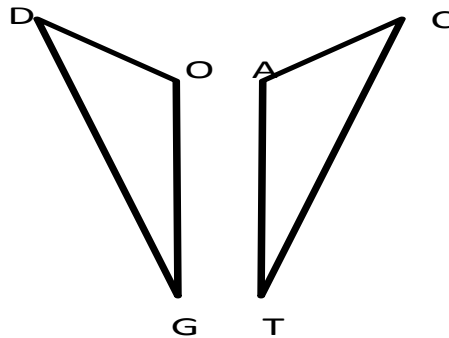
A. 7   B. 8   C. 9   D. 10

_____8. What is the value of x?

A. 3   B. 4   C. 5   D. 6

_____9. Which is the correct congruence statement for the figure below?

A. $\triangle DOG \cong \triangle ATC$

B. $\triangle DOG \cong \triangle TAC$

C. $\triangle DOG \cong \triangle CAT$

D. $\triangle DOG \cong \triangle CTA$

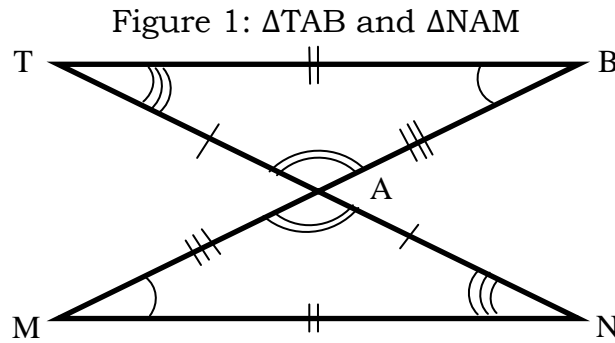_____10. Which angle is congruent to ∠M, if $\triangle SUM \cong \triangle PRO$?

A. ∠O   B. ∠S   C. ∠R   D. ∠P

Activity 1. Name and Pair!

Directions: Study the figure below and try to recall your knowledge about sides and angles. In this activity name and pair all sides and angles that are equal in length and in measure between the given two triangles.

Figure 1: ΔTAB and ΔNAM

Sides:

    1. ____=____
    2. ____=____
    3. ____=____

Angles:

   4. ____=____
    5. ____=____
    6. ____=____

What's New

How did you find activity 1? Did you see common reasons why the two triangles are congruent? What about their corresponding sides and angles? At this time, you will be able to enhance your understanding about congruent triangles by this activity.

Activity 2. Fill Me In!

Directions: Supply the column for each row with your answers based in the given figure below.

Figure 2: ΔACB and ΔEFD
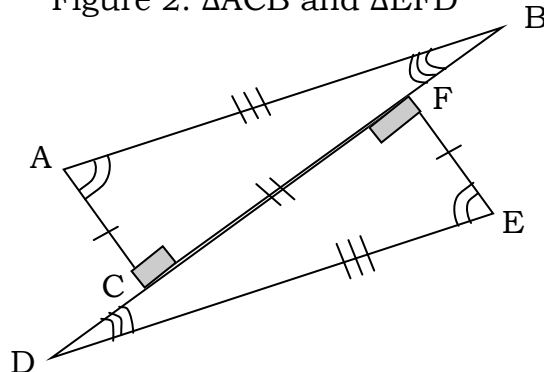
Sides	Corresponding sides	Congruent/ Non-congruent	Angles	Corresponding angles	Congruent/ Non-congruent
1. $\overline{AC}$			4. ∠E		
2. $\overline{DE}$			5. ∠B		
3. $\overline{BC}$			6. ∠F		
7. What can you say about their corresponding sides?					
8. What can you say about their corresponding angles?					
9. Are the two triangles congruent? Why or Why not?					

Did you able to complete the table? Are you now confident to proceed to the next activity? If yes, you may proceeed but if not you may review your answers.

What is it

Let us discuss and process your answers. At this point you will be able to clearly understand the concept of our lesson.

1. We had observed in activity 1 that the two triangles with their corresponding pairs of sides and angles are equal, therefore we can say that the two triangles are congruent. Similarly, in activity 2 you were able to investigate the two triangles and find their corresponding sides and angles with equal length of sides and equal measure of angles.

2. **Corresponding sides and angles** are a pair of matching angles or sides that are in the same spot in two different shapes.

3. Remember, corresponding parts of congruent triangles are congruent (**CPCTC**), congruence denoted in symbol " ≅ " and correspondence denoted in symbol "↔".

4. By definition, **two triangles are congruent** if their vertices can be paired so that corresponding sides are   congruent and corresponding angles are congruent.

5. Since you already know about congruent triangles, let's take some examples so that you will be fully equipped for the next activities.

   A. Identify the corresponding sides and corresponding angles in the given two triangles.

   Example 1: Triangle LMN is congruent to triangle NOL or ΔLMN ≅ ΔNOL
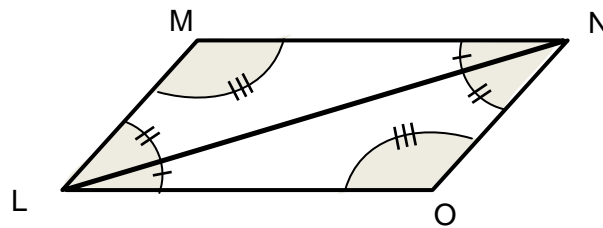
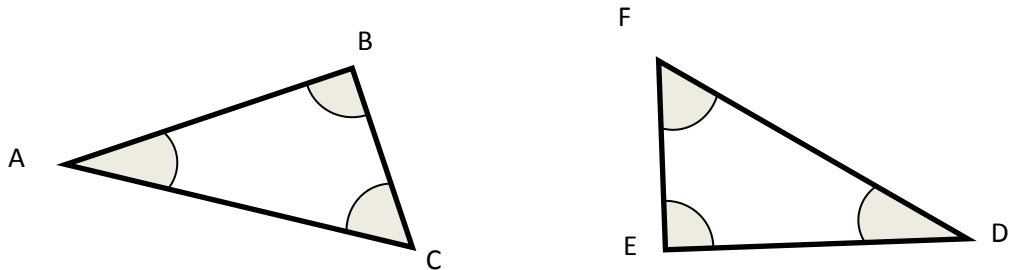   Solution 1:   Corresponding sides   Corresponding angles

   $\overline{LM}$ ↔ $\overline{NO}$ ∠M ↔ ∠O
   $\overline{MN}$ ↔ $\overline{OL}$ ∠LNO ↔ ∠NLM
   $\overline{LN}$ ↔ $\overline{NL}$ ∠OLN ↔ ∠LNM

   Example 2: Triangle ABC is congruent to triangle DEF or ΔABC ≅ ΔDEF

   Solution 2:   Corresponding sides   Corresponding angles

   $\overline{CB}$ ↔ $\overline{FE}$ ∠C ↔ ∠F
   $\overline{BA}$ ↔ $\overline{ED}$ ∠B ↔ ∠E
   $\overline{AC}$ ↔ $\overline{DF}$ ∠A ↔ ∠D

B. Identify included angle and included side.
   Example 3: Triangle SON or ΔSON

S
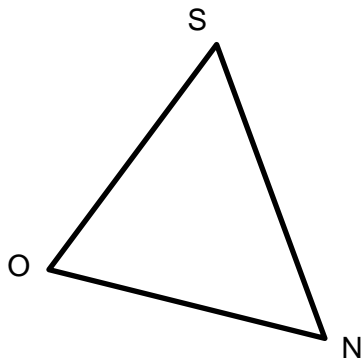
Solution 3:
∠S is an included angle between $\overline{SN}$ and $\overline{SO}$.
∠O is an included angle between $\overline{OS}$ and $\overline{ON}$.
∠N is an included angle between $\overline{NS}$ and $\overline{NO}$
$\overline{SO}$ is an included side between ∠S and∠O.
$\overline{SN}$ is an included side between ∠S and ∠N.
$\overline{ON}$ is an included side between ∠O and ∠N.

O

N

What's More

   Now it's your turn to apply the concept on congruent triangles to create something out of it.

Activity 3. Build Me!
   The scouts are planning to make a tent in their camp would you want to help them? In this activity you will create/build two triangular camping tents using the given corresponding parts of two congruent triangles.

   Corresponding sides - $\overline{MA} \cong \overline{KF}$, $\overline{AX} \cong \overline{FC}$, $\overline{MX} \cong \overline{KC}$
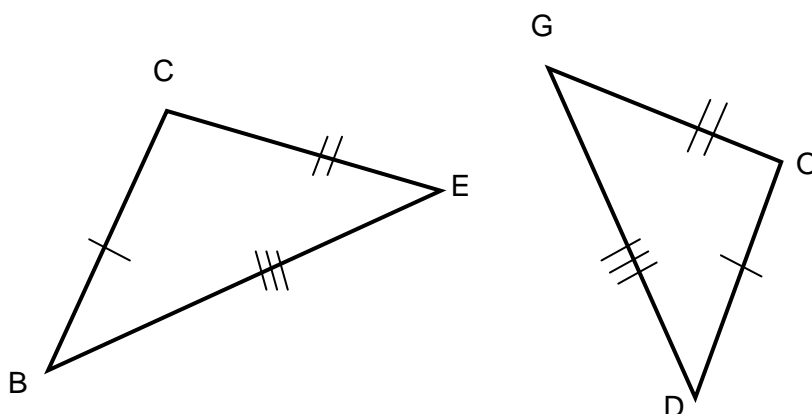   Corresponding sides - ∠M ≅ ∠K, ∠A ≅ ∠F, ∠X ≅ ∠C

What I Have Learned

   Wonderful! You're almost at the peak of this module. This activity helps you to be fully understood about the concept of congruent triangles.

Activity 4. Complete me!
Directions: Refer your answers to the figure below in order to complete each statement.

Figure 3

C

G

E

O

B

D

The correct congruence statement for the two triangles above is ∆BCE is congruent/ ≅ to _____. They have six pairs of corresponding parts where $\overline{BC}$ ↔ _____, $\overline{BE}$ ↔ _____, $\overline{CE}$ ↔ _____,   and ∠D ↔ _____, ∠G ↔ _____, and ∠O ↔ _____. Their corresponding parts are congruent then the two triangles are _____. The included angle of the first triangle   between $\overline{BE}$ and $\overline{BC}$ is _____ and the included sides of the second triangle between ∠G   and ∠D is _____.

What I Can Do

Triangle has many uses in our daily living, a primary shape that contributes a lot to the world and one of the hardest shapes on earth. You can see it everywhere that's why   learning the concept of congruent triangles is vital for us.

Activity 5. Apply it!
Directions: In this activity, you will use the concept of congruent triangles to solve real-life problems. Study the picture below, and answer the following questions.

Figure 4: ∆RBS ≅ ∆IBS
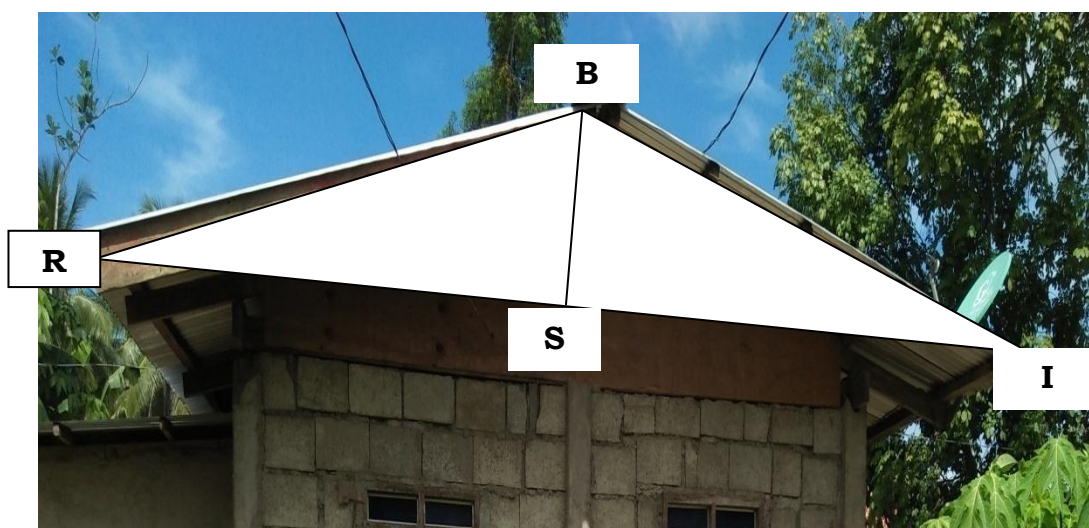
This is my house I need you to determine the length and the measure of its angle using the concepts you had learned.

Given: $\overline{SI}$ = 4y – 5 meters, $\overline{SR}$ = y + 1 meters, and $m∠BSR = (40y + 10)°$

1. What is the value of y? _____

2. Find the length of $\overline{SI}$. _____

3. Find the length of $\overline{SR}$. _____

4. What is the measure of ∠BSR? _____
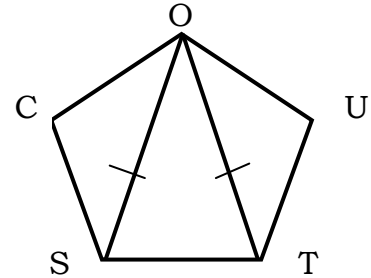
5. What is the measure of ∠BSI? _____

Assessment

Let us evaluate how much you have learned from this lesson.

Directions: Read each question carefully, choose the letter of your answer and write it on the space provided before each number.

_____1. What is the corresponding side of $\overline{SO}$ in the pentagon SCOUT?

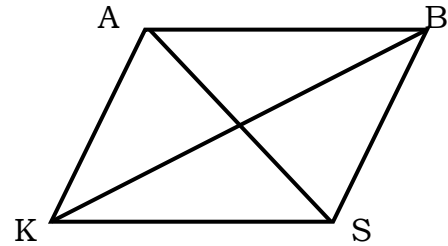   A. $\overline{TO}$ B. $\overline{UT}$ C. $\overline{OT}$ D. $\overline{CO}$

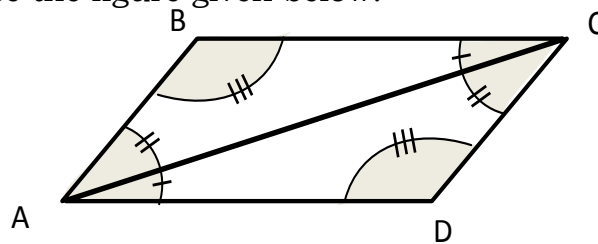_____2. What are the two congruent triangles in the figure above?

   A. ΔSOT and ΔSCO   C. ΔSOT and ΔTUO
   B. ΔSOC and ΔTUO   D. ΔSOC and ΔTOU

_____3. Which angle corresponds to ∠K in the parallelogram KABS?

   A. ∠S   B. ∠A   C. ∠B   D. ∠KBS

For items 4-5, use the figure given below.

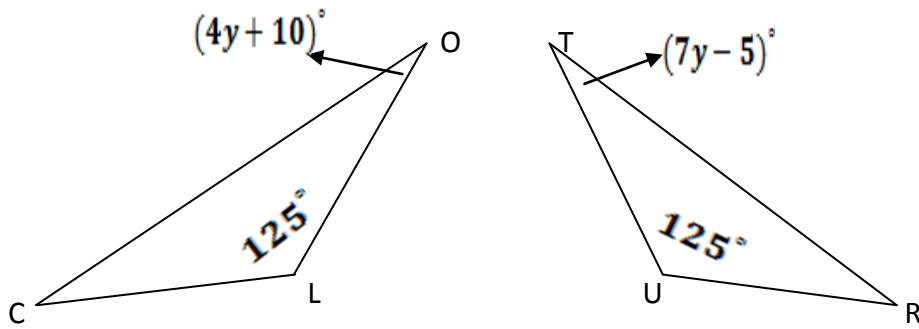_____4. What type of angle is the corresponding of ∠B?

   A. Right   B. Acute   C. Obtuse   D. Straight

_____5. Which is the included side between ∠BAC and ∠BCA in the figure?

   A. $\overline{CD}$ B. $\overline{AC}$ C. $\overline{AB}$ D. $\overline{DA}$

8

For numbers 6 – 8, you may refer in the given two triangles below.

_____6. What is the value of y?
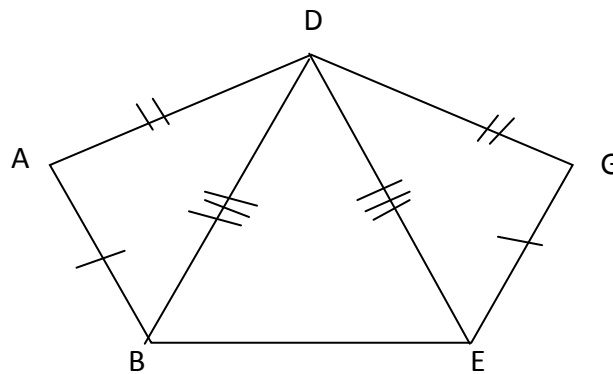
    A. 5   B. 6   C. 7   D. 8

_____7. What is the measure of $\angle O$ and $\angle T$?

    A. $20°$ B. $30°$ C. $40°$ D. $50°$

_____8. What is the measure of $\angle C$ and $\angle R$?

    A. $25°$ B. $26°$ C. $27°$ D. $28°$

For numbers 9 – 10, you may refer in the given figure below.

_____9. Which triangles are congruent in the pentagon BADGE?

    A. ΔBDE ≅ ΔDGE   C. ΔBAD ≅ ΔDGE
    B. ΔBDA ≅ ΔEGD   D. ΔBAD ≅ ΔEGD

_____10. Which is **NOT** included in the group?

    A. $\angle ABD \cong \angle GED$ C. $\angle G \cong \angle A$
    B. $\angle ADB \cong \angle D$ D. $\angle BAD \cong \angle G$

Additional Activities

You did great! Before we end this module, let's have enrichment activity.

Activity 6. Self-check!

1. What have you learned about congruent triangles?

   _____
   _____
   _____
   _____

2. Are they still useful in these days? Why or why not?

   _____
   _____
   _____
   _____

3. Cite a real-life example, where congruent triangles are applied or used.

   _____
   _____
   _____
   _____

__Math 8__   Quarter 3 – Module 3 Answer Key

What I Know

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

What's In

Sides

1. $\overline{TB} = \overline{NM}$
2. $\overline{BA} = \overline{MA}$
3. $\overline{TA} = \overline{NA}$

Angles

4. ∠T = ∠N
5. ∠B = ∠M
6. ∠TAB = ∠NAM

What's New

Sides	Corresponding sides	Congruent/ Non-congruent	Angles		Corresponding angles	Congruent/ Non-congruent
4. $\overline{AC}$	$\overline{EF}$	Congruent	10.	∠E	∠A	Congruent
5. $\overline{DE}$	$\overline{BA}$	Congruent	11.	∠B	∠D	Congruent
6. $\overline{BC}$	$\overline{DF}$	Congruent	12.	∠F	∠C	Congruent

13.   What can you say about their corresponding sides?
   Ans. Their corresponding sides are congruent

14.   What can you say about their corresponding angles?
   Ans. Their corresponding angles are congruent

15.   Are the two triangles congruent? Why or Why not?
   Ans. They're congruent, since their six pairs of corresponding parts are congruent.

What's More
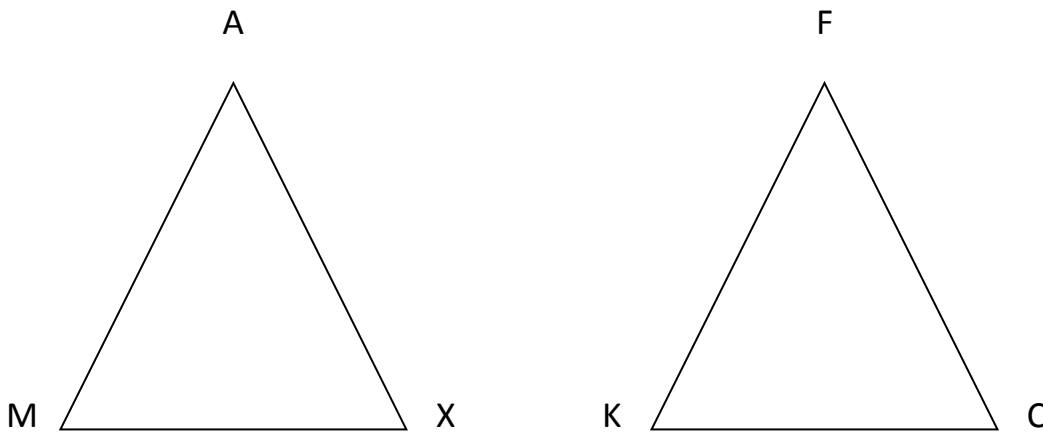
ΔMAX ≅ ΔKFC

What I Have Learned

1. ΔDOG
2. $\overline{DO}$
3. $\overline{DG}$
4. $\overline{OG}$
5. ∠B
6. ∠E
7. ∠C
8. Congruent
9. ∠B
10. $\overline{GD}$

What I Can Do

1. y = 2
2. 3 meters
3. 3 meters
4. 90°
5. 90°

Assessment

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

Additional Activities

1. Allow varied answers
2. Allow varied answers
3. Allow varied answers

References:

Abuzo, Emmanuel P., Merden L. Bryant, Jem Boy B. Cabrella, Belen P. Caldez, et.al. *Grade 8 – Mathematics Learner's Module.* DepEd, Quezon City: Book Media Press Inc., Mandaluyong City: Printwell, Inc., 2013, 343 – 353.

Soledad, Jose-Dilao, Ed,D. and Julieta G. Bernabe. *Geometry Textbook for Third Year.* Quezon City: SD Publications, Inc., 2009, 88 – 91.

Interactimages, A Family Explorer, depositphotos.com/vector-images/camp-scout-cartoon.html, vector I.D: 43066025