

Lesson Guide

In

Elementary Mathematics

Grade 5

Chapter III

Geometry



DEPARTMENT OF EDUCATION
BUREAU OF ELEMENTARY EDUCATION
in coordination with
ATENEO DE MANILA UNIVERSITY



2010

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I N T R O D U C T I O N

The Lesson Guides in Elementary Mathematics were developed by the Department of Education through the Bureau of Elementary Education in coordination with the Ateneo de Manila University. These resource materials have been purposely prepared to help improve the mathematics instruction in the elementary grades. These provide integration of values and life skills using different teaching strategies for an interactive teaching/learning process. Multiple intelligences techniques like games, puzzles, songs, etc. are also integrated in each lesson; hence, learning Mathematics becomes fun and enjoyable. Furthermore, Higher Order Thinking Skills (HOTS) activities are incorporated in the lessons.

The skills are consistent with the Basic Education Curriculum (BEC)/Philippine Elementary Learning Competencies (PELC). These should be used by the teachers as a guide in their day-to-day teaching plans.

MATRIX IN ELEMENTARY MATHEMATICS
Grade V

COMPETENCIES	VALUES INTEGRATED	STRATEGIES USED	MULTIPLE INTELLIGENCES TECHNIQUES	With HOTS
<p>III. GEOMETRY</p> <p>Comprehension of Polygons</p> <p>1. Draws 3- to 4-sided polygons</p> <p>1.1 Visualize polygons</p> <p>1.2 Identifies kinds of polygons</p> <p>1.3 Describes polygons</p> <p>2. Draws 5- or more-sided polygons e.g. pentagon, hexagon, etc.</p> <p>2.1.2 Transforms the word problem into a number sentence</p> <p>2.1.3 Uses the correct operation</p> <p>2.1.4 States the complete answer</p>	<p>Work cooperatively in a group, Patience</p> <p>Cooperation</p>	<p>Modeling, Drawing pictures, Acting out the problem</p> <p>Looking for patterns, Modeling, Drawing pictures</p>	<p>Hands-on activities, Speaking, Drawing, Cooperative groups</p> <p>Nature, Drawing, Cooperative groups</p>	<p>√</p> <p>√</p>

Visualizing Polygons

I. Learning Objectives

- Cognitive:** Visualize 3 – 4 sided polygons
Identify 3 – 4 sided polygons
Describe 3 – 4 sided polygons
- Psychomotor:** Draw 3 - 4 sided polygons
- Affective:** Observe patience in doing assigned task.
Work cooperatively

II. Learning Content

- Skill:** Visualizing, identifying and describing, and drawing 3 – 4 sided polygons
- Reference:** BEC-PELC III.1
- Materials:** cutouts or 3-4 side polygons, tape measure, geo-board
- Value:** Patience and cooperation

III. Learning Experiences

A. Preparatory Activities

Line segments form closed figures on a plane. Closed plane figures formed by line segments are called polygons. A three-sided polygon is called triangle and a four-sided polygon is called a quadrilateral.

1. Drill

Korek ka ba dyan?

Mechanics:

- Group the pupils into 4's.
- Distribute envelopes with geometric figure to each group such as drawings of parallel lines, intersecting lines, ray, line segment, perpendicular lines.
- As the teacher flashes the words, the pupils will get from the envelope the geometric figures and put it on the board assigned for the groups.

2. Review

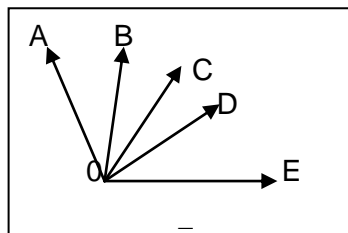
“What am I” – kinds of angles.

The teacher flashes a card with the following questions. Let it be answered by the pupils.

- I measure less than 90° .
- I measure 110° .
- I measure 18° .
- I measure 90° .
- I measure more than 90° but less than 180° .

3. Mental Computation

How many angles are there in the figure?

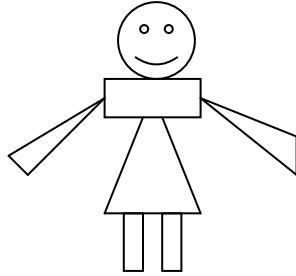


B. Developmental Activities

1. Presentation

What do you call this figure?

What polygons can you see in the picture?



Strategy 1:

Materials: cutouts of 3 and 4-sided polygons, ruler, manila paper - protractor

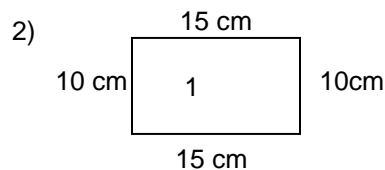
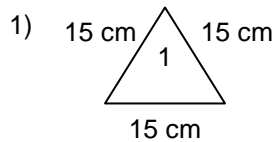
The teacher will group the pupils into 4.

He or she will distribute envelopes with 3 and 4-sided polygons.

Let the pupils do what is written in the activity card.

- Separate the 3-sided polygons from the 4-sided polygons.
- Number the 3 and 4-sided polygons separately as 1, 2, 3, 4.
- Measure the length of each side of the polygon. Record them.

Example: All sides measure 15 centimetres.



- Ask the question what can you say about $\triangle 1, 2, 3, 4$. Describe them.
- What can you say about 4-sided polygons 1, 2, 3, 4. Describe them.
- Let the pupils repeat by group.
- Let the pupils answer exercises on the different kinds of triangles and quadrilaterals.
- Draw the different kinds of 3 and 4-sided polygons and identify them.

Strategy 2: Acting out

Materials:

- 4 plastic straw, each measures 60 cm
- 4 strings or plastic straw which measure 50 cm, 50 cm, 35 cm, 35 cm
- 4 strings or plastic straw with different lengths

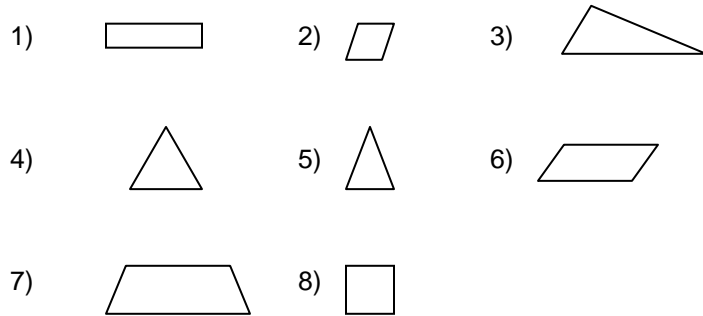
Mechanics:

- Using 3 pieces of string/plastic straws
Call 3 pupils to form a triangle by connecting

- the ends of the 3 – 60 cm straws
What can you say about the triangle? Its sides?
- use the 50 cm, 50 cm and 35 cm. What do you call this triangle?
- use 3 straws with different lengths. Describe the triangle formed.

- b. Using 4 pieces of string/plastic straw, call 4 pupils to connect the ends of the
- 4 pieces 60 cm plastic straw. What figure is formed? What can you say about its sides?
 - 4 pieces of straw: 2 – 50 cm and 2 – 35 cm. What do you call this polygon? Why?
 - 4 pieces of straw with different lengths. What do you call this 4-sided polygon?

Identify the following.



2. Fixing Skills

Show models of polygons and let them identify and describe each.

3. Generalization

What are the kinds of 3-sided polygons?

Describe each.

What are the kinds of 4-sided polygons?

Describe each.

Three-sided polygons are called triangles.

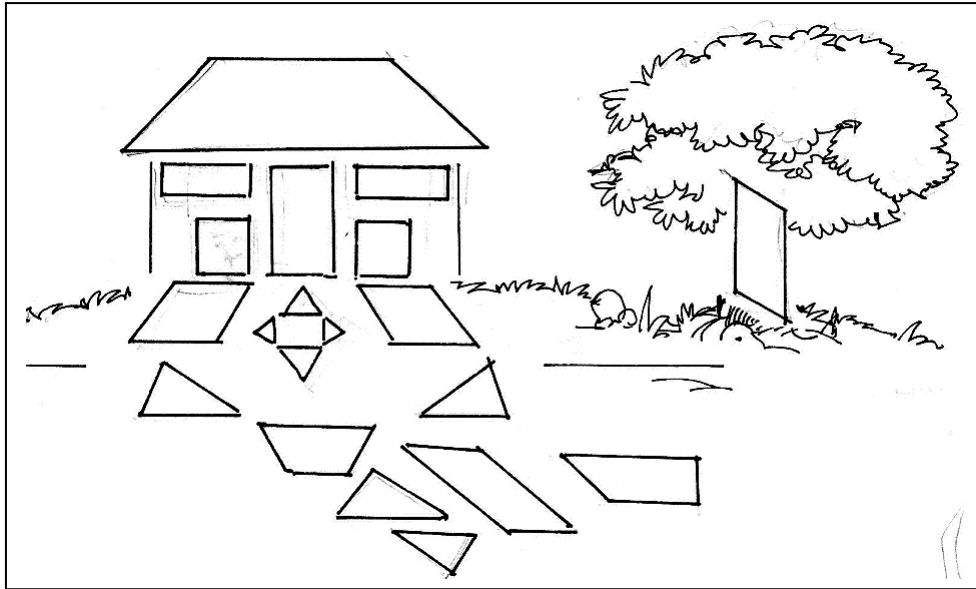
- Equilateral triangle – three sides are equal or congruent
- Isosceles triangle – two sides are congruent
- Scalene triangle – no two sides are congruent

Four-sided polygons are called quadrilaterals.

- Rectangle – has two pairs of equal opposite sides. It has four right angles
- Square – all sides are equal. It has four right angles.
- Rhombus – has four equal sides.
- Parallelogram – has both pairs of opposite sides parallel.
- Trapezoid – it has 1 pair of opposite sides parallel

C. Application

- 1) Color the squares blue, the triangle, red, rectangles, green, the trapezoid yellow and the parallelogram.



- 2) To which group does each of the following belong?

- _____ a. the face of a 1-peso coin
- _____ b. the shape of a pad paper
- _____ c. the shape of this traffic sign
- _____ d. the face of the chalkboard
- _____ e. the floor of the classroom

IV. Evaluation

Match column A with column B.

Column A	Column B
_____ 1. It has 4 equal sides and 4 right angles.	a. Trapezoid
_____ 2. Three sides are congruent.	b. Parallelogram
_____ 3. A 3-sided polygon with two sides equal.	c. Equilateral \triangle
_____ 4. A four-sided polygon with one pair of parallel side.	d. Isosceles
_____ 5. A 4-sided polygon with 2 pairs of parallel sides.	e. Rectangle
	f. Square

V. Assignment

Draw the following:

1. equilateral triangle
2. square
3. trapezoid
4. rectangle
5. rhombus
6. scalene triangle
7. isosceles triangle

Five or More Sided Polygons

I. Learning Objectives

- Cognitive:** Identify 5- or more sided polygons (e.g. pentagon, hexagon, heptagon, etc.)
Psychomotor: Draw 5- or more sided polygons
Affective: Find enjoyment in drawing 5- or more sided polygons
Work cooperatively in a group

II. Learning Content

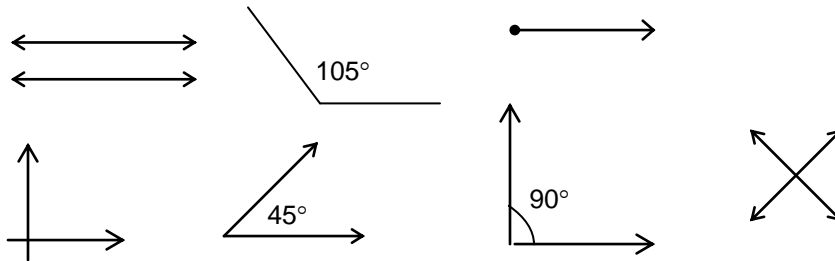
- Skill:** Visualizing, identifying, describing and drawing 5- or more sided polygons (e.g. pentagon, hexagon etc.)
Reference: BEC PELC III 2
Materials: cutouts, drawings, real objects
Value: Cooperation

III. Learning Experiences

A. Preparatory Activities

1. Drill

Identify the different geometric figures.



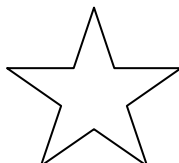
2. Review

- Checking of assignment.
- Game: What am I?
 - I am a 3-sided polygon with congruent sides.
 - I have one pair of parallel sides.
 - All my sides are congruent and no right angles.
 - I am a 3-sided polygon with 2 congruent sides.
 - My 4 sides are equal. All my sides form right angles.

3. Motivation

The teacher shows different cutouts and real objects.

What do you see class?
How many sides are there in the picture?



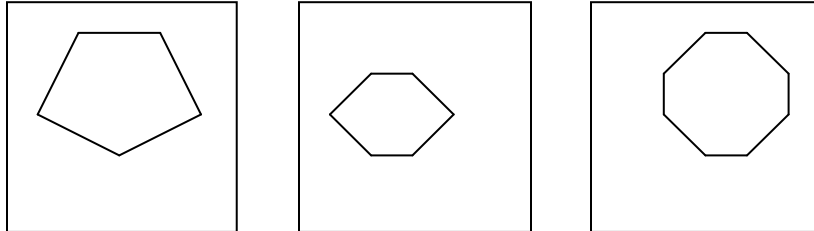
B. Developmental Activities

1. Presentation

Strategy 1: Geoboard Game (Looking for Pattern)

Materials: geoboard, rubber band

The teacher uses a geoboard in presenting the lesson.



How many sides are there in the polygon shown in the geoboard?

What do you call a polygon with 5 sides? 6 sides? 7 sides? etc.

Let the pupils show 5, 6, 7, etc. sided polygon using the geoboard and let them identify it.


Let them draw 5 – 12 sided polygon and name them.

Strategy 2: Activity work

Materials: Cutouts of 5-12 sided polygons

Mechanics:

- The teacher groups the pupils into four.
- She or he distributes cutouts placed in an envelope.
- Let the pupils paste the cutouts intended for the different column as shown below.

Cutout	Number of sides	Name of Polygon
	5 sides	

- Call a leader to report for the group.
- Let the pupils draw 5-12 sided polygons and identify them.
What values were shown when you work as a group.

2. Fixing Skills











Draw the following.

- heptagon
- pentagon
- hexagon
- parallelogram
- decagon

3. Generalization

What do you call a polygon with 5 sides? Polygon with 6 sides? etc.

- A. Polygon with 5 sides is called a pentagon.
- | | |
|--------------------|----------------------|
| Hexagon – 6 sides | Decagon – 10 sides |
| Heptagon – 7 sides | Undecagon – 11 sides |
| Octagon – 8 sides | Dodecagon – 12 sides |
| Nonagon – 9 sides | |

Figure	Number of Sides	Name of Polygon
	3	Triangle
	4	Quadrilateral
	5	Pentagon
	6	Hexagon
	7	Heptagon
	8	Octagon
	9	Nonagon
	10	Decagon
	11	Undecagon
	12	dodecagon



C. Application

- On an illustration board, make models of different polygons.
- Using bamboo sticks or plastic straws, make models.
- Complete each statement

- a) Dodecagon has _____ angles c) An octagon has _____ angles
b) A nonagon has _____ vertices d) A decagon has _____ vertices

IV. Evaluation

- A. Match column A with Column B.

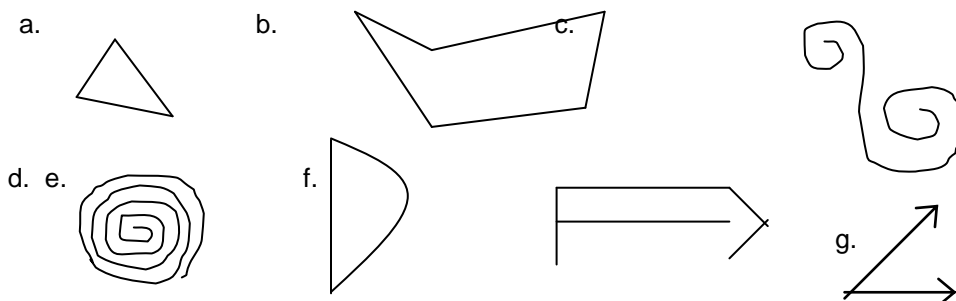
- | A | B |
|--|--------------|
| _____ 1. polygon with 5 sides | a) pentagon |
| _____ 2. polygon with 10 sides | b) octagon |
| _____ 3. polygon with 8 sides | c) nonagon |
| _____ 4.  | d) hexagon |
| _____ 5.  | e) heptagon |
| _____ 6. polygon with 9 sides | f) decagon |
| _____ 7. polygon with 7 sides | g) dodecagon |

- B. Draw the following polygon

- octagon
- nonagon
- heptagon
- decagon
- hexagon

V. Assignment

1. Name some objects in your house, in the school, in your surrounding which are: 5-12 sided polygons.
2. Encircle the polygons. Explain why the others are not polygons.



Visualizing and Identifying Congruent Polygons

I. Learning Objectives

- Cognitive:** Visualize congruence of polygons
Identify congruent polygons
Draw congruent polygons
- Psychomotor:** Draw congruent polygons
- Affective:** Show enthusiasm in performing any assigned task

II. Learning Content

- Skills:** Visualizing congruence of polygons
Identifying congruent polygons
- Reference:** BEC PELC III.3
- Materials:** cutouts of different polygons, graphing paper, ruler, pencil, scissors, chart, flash cards
- Value:** Willingness to do assigned task

III. Learning Experiences

A. Preparatory Activities

1) Mental Computation

Mother bought $\frac{5}{8}$ piece of cake. She gave $\frac{3}{8}$ piece to her children. How much cake was left?

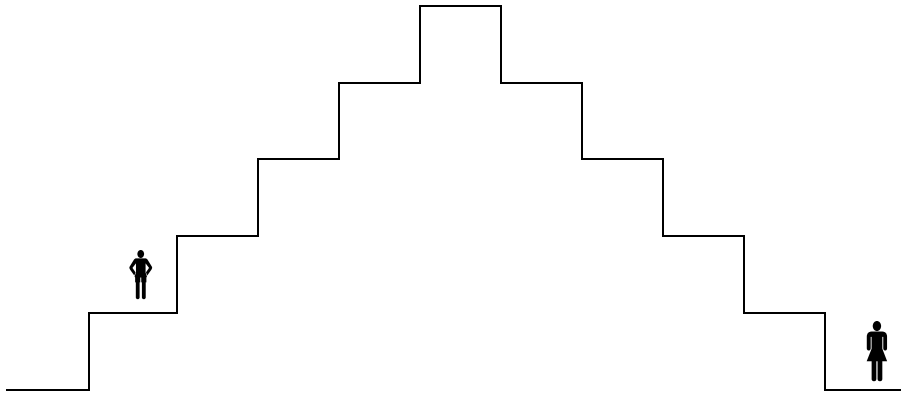
2) Drill

Climbing the ladder

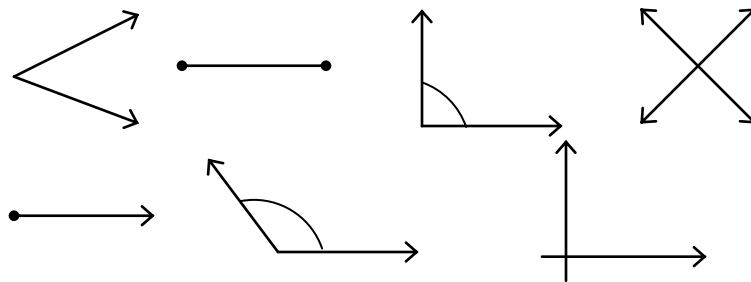
Mechanics:

- a. The teacher groups the pupils into 2 – boys and girls.

- b. He or she flashes the geometrical figures written on the flash cards and let it be identified by the pupils.
- c. The pupils who answer the question will step one ladder up. The first group to reach the top is the winner.



Write the following drill exercises on the flash card.



3) Review

Guessing Game – What am I?

- a. I am a 3-sided polygon with congruent side.
- b. I am a 4-sided polygon with congruent sides.
- c. I have 10 sides.
- d. I am a four-sided polygon with 1 pair of parallel side.
- e. I have 8 sides.

4) Motivation

Look at our blackboards. Do they have the same size and shape? Look around the room. What objects have the same shape and size?

B. Developmental Activities

1. Presentation

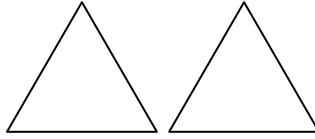
Strategy 1: Looking for the correct pair

Materials: cutouts of polygons, ruler, protractor

Mechanics:

- a. Group the pupils into 4's.
- b. Distribute envelopes with cutouts of polygons, two of which are pair.

- c. Instruct the pupils to look for the pair of the polygons as shown below. Let them measure the sides and the angles. Let them paste the polygons in pair on manila paper.



- d. Ask the pupils. What can you say about the sides of each pair of polygons? What can you say about the shape? What can you say about the angles?
 e. Let the pupils draw congruent polygons and identify them.

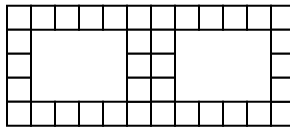
Strategy 2: Drawing Congruent Polygons

Materials: graphing paper, ruler

Mechanics:

- Group the pupils into 4 groups.
- Let them bring out their ruler and graphing paper.
- Instruct the pupils to draw different polygons using the graphing paper. Draw 1 pair of polygons with the same size and shape.
 Group 1 – all 3 sided polygons like equilateral, isosceles and scalene
 Group 2 – all 4 sided polygons
 Group 3 – 5 to 8 sided polygons
 Group 4 – 9 to 12 sided polygons

Example: Group II



- Let the pupils compare the rectangle formed as the case may be. Ask: What can you say about the rectangles?
- Guide the pupils to answer that the pair of rectangle has the same size and that they are congruent.
- Let the pupils post their work on the board to see if the polygons that they have drawn are all correct.
- What values is shown when you performed the activity?

Strategy 3: Tracing Out

Materials: cutouts of different polygons, pencil or cartolina, pair of scissors, protractor

Mechanics:

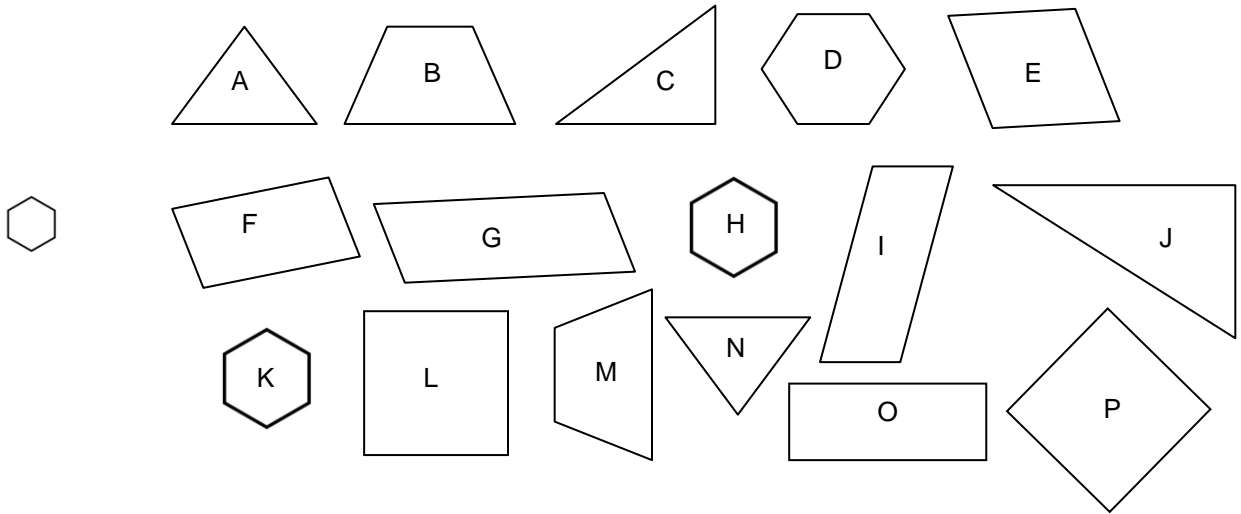
- Group the pupils into 4 groups.
- Distribute envelopes with cutouts of different polygons.
- Let the pupils trace the polygons inside the envelope and cut it with scissors.
- As soon as the group has finished tracing, call one pupil from the group and report what they have found using the guide questions.
 - What polygon have you traced and cut?
 - What can you say about the shape?
 - What can you say about the size?
 - Measure the angle. What can you say about the angles?
 What value is developed when you performed the activity?

2. Fixing Skills

Which pairs of figures appear to be congruent? Name the pairs.

- 1)
- 2)
- 3)

- 4)
- 5)



3. Generalization

When do you say that two polygons are congruent?

Two polygons are congruent if:

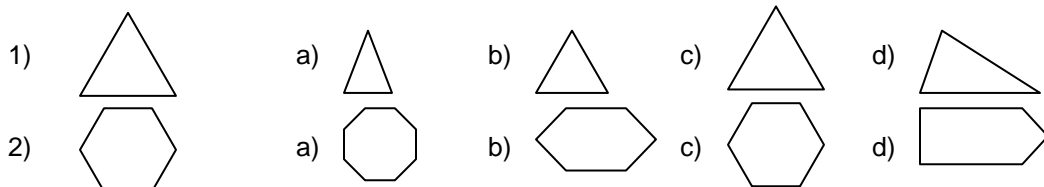
- a. Both have the same shape and size.
- b. Tracing of one fits the other.
- c. Their corresponding angles and sides are congruent.

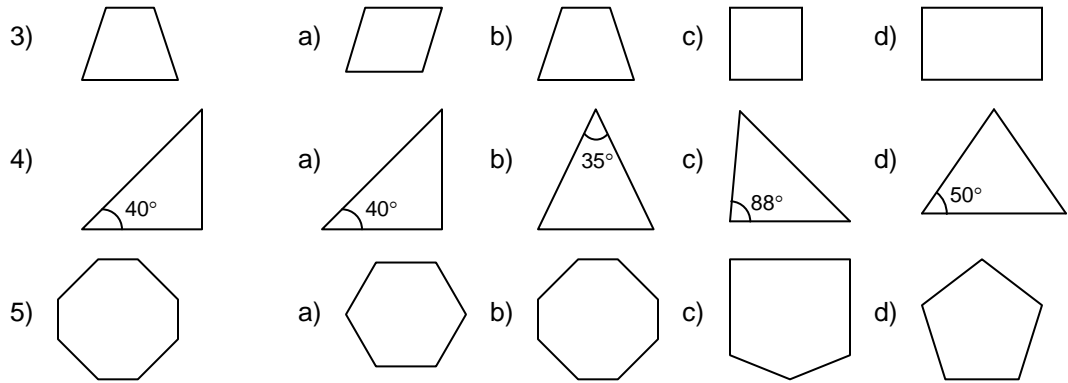
C. Application

1. Look at the things inside the classroom and identify the congruent sides or faces.
 - a. books
 - b. chalkboard
 - c. cabinets
 - d. tables
 - e. walls
2. Find pairs of figures in your classroom that show congruency.
3. Differentiate identical objects with congruent objects. How are they similar?

IV. Evaluation

Check the letter of the figure that is congruent to the first figure.





V. Assignment

Draw 2 congruent figures of the following polygons.

1. trapezoid
2. octagon
3. pentagon
4. isosceles triangle
5. decagon