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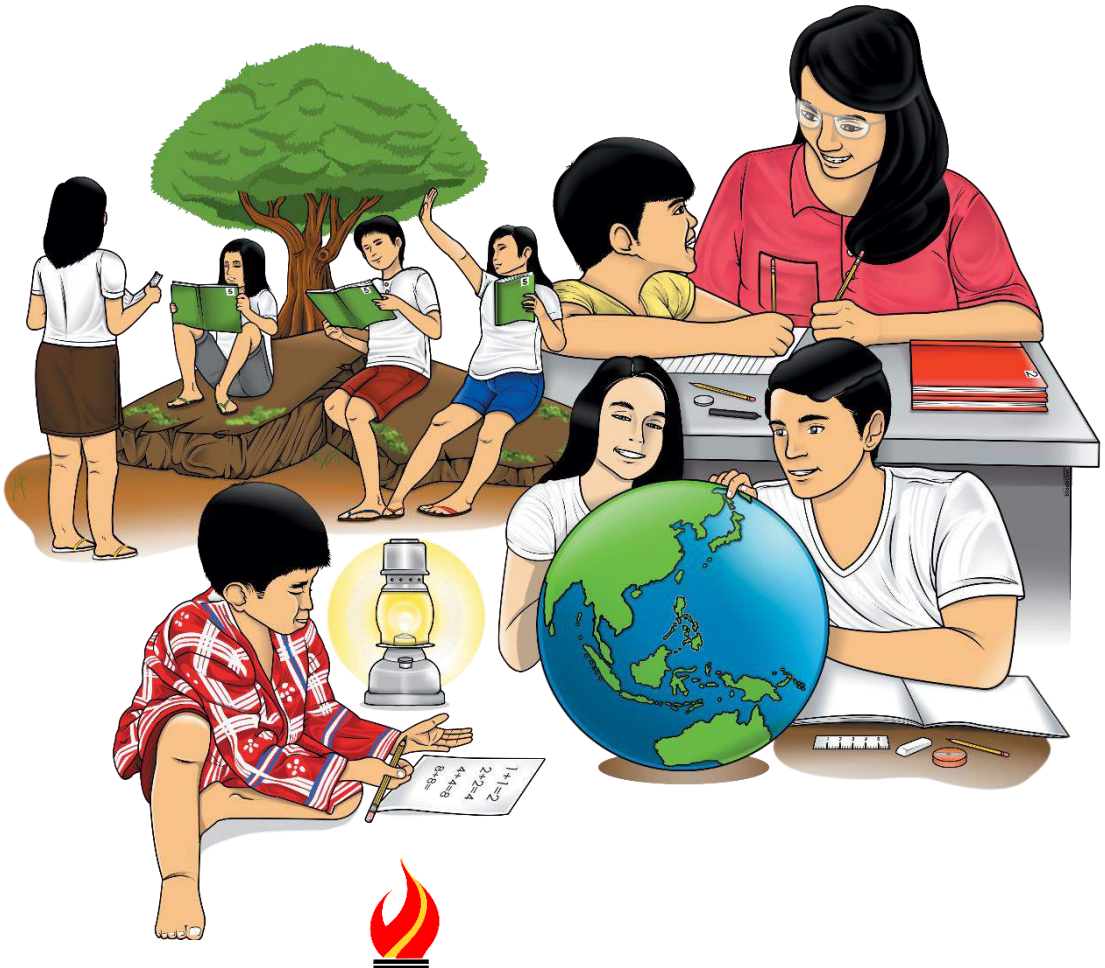
DepED
DEPARTMENT OF EDUCATION

Mathematics

Quarter 3 – Module 1:
Kinds of Lines



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Mathematics – Grade 4
Alternative Delivery Mode
Quarter 3 – Module 1: Kinds of Lines
First Edition, 2020

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Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by _____

Department of Education – Region V

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Mathematics

Quarter 3 – Module 1:
Kinds of Lines

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Introductory Message

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Thank you.

What I Need to Know

This module was designed in order to help you learn the different kinds of lines. Lines can be seen in most objects.

In this lesson, you will learn about the three different kinds of lines. The learning activities will allow you to explore, discover and appreciate the different kinds of lines which can be seen in objects around us. You will also learn how to describe and illustrate the different kinds of lines.

After going through this module, you are expected to be able to:

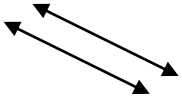
1. Describe and draw parallel, intersecting and perpendicular lines using a ruler and set square set.
2. Identify the different kinds of lines.

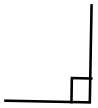
What I Know

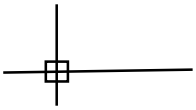
We need a sheet of paper for our next activities.

A. Identify the kind of lines shown in the figure. Fill in the blanks by writing parallel, intersecting, or perpendicular.

_____ 1.

_____ 2. 

_____ 3. 

_____ 4. 

B. Draw objects that show parallel, intersecting or perpendicular lines. (one object for each kind of lines)

C. Describe the following kinds of lines.

a. parallel lines
b. intersecting lines
c. perpendicular lines

Look at the last page to check your answers.

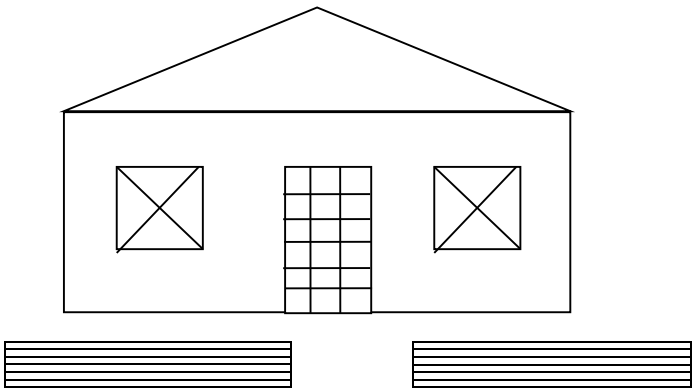
CONGRATULATIONS! If you got a score of 9 or 10, you should not have any difficulty studying the lesson in this module.

If you got a score of 8 or below, you may need to study the lesson more carefully and do all the given activities.

Lesson 1 Kinds of Lines

What's In

Each of the pupils of Grade 4 Resourceful was asked to draw a house. Neil presented his drawing to the class. Take a look at it.



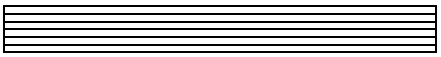
Do you see lines in Neil's drawing? In what parts of the house do you see lines? Do you think we can draw houses without lines? Are lines important? Why?

We see lines in most of the things around us. We see different kinds of lines in almost everything. Today, we will talk about the three kinds of lines.

What's New

Parallel Lines

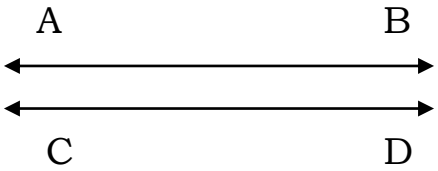
Let us look at Neil's drawing of the fence.



Neil drew the fence using horizontal and vertical lines. The horizontal lines do not intersect even if we extend them. Likewise, the vertical lines do not intersect even if we extend them. These lines are said to be parallel lines.

Parallel lines are lines that do not intersect.

Lines AB and CD below are parallel lines. They will not intersect however long we extend them to the left or to the right.



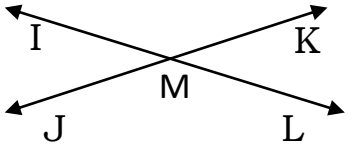
Intersecting Lines

Let us now look at Neil's drawing of the window of the house.

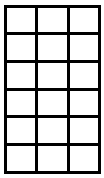
The diagonal lines cross or intersect each other. They are thus called **intersecting lines**.

So, we say, "**Intersecting lines** are lines which intersect".

Line IL and line JK below are intersecting lines. They intersect at point M.



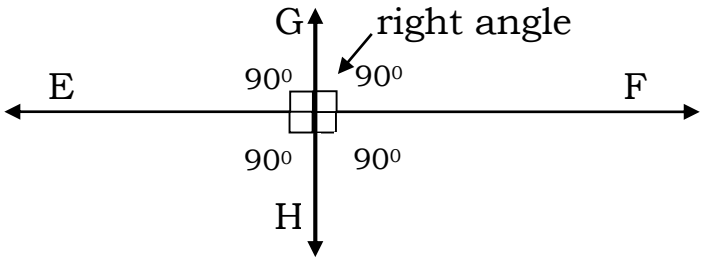
Let us now look at Neil's drawing of the door of the house.



Neil used horizontal and vertical lines to draw his door. The horizontal lines intersect the vertical lines. What kind of angle is formed by one of the horizontal lines and one of the vertical lines. If you answered, "right angle", you are correct. Each pair of intersecting horizontal and vertical lines in Neil's door form a right angle. Each of these pairs are then described as perpendicular lines.

And so we say, "**Perpendicular lines** are lines that intersect and form a right angle".

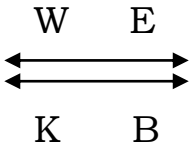
Lines EF and GH below intersect and form right angles. They are therefore perpendicular. The four small squares at the corners tell us that the angles formed are right angles or that the measures of the angles is 90°.



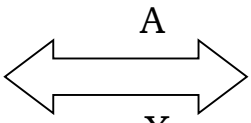
What is It

How do the kinds of lines differ from one another? Take a close look at the examples.

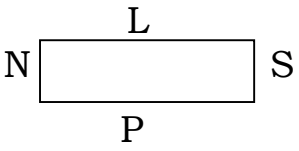
Parallel lines – lines that do not intersect. The figures below show parallel lines.



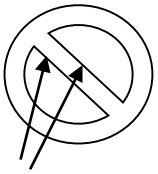
Lines WE and KB are parallel



Side A and side X are parallel

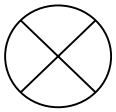


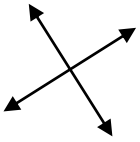
Sides L and P are parallel. Line N and line S are also parallel



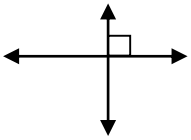
The lines to which the two arrows point are parallel

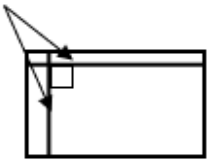
Intersecting lines – lines that meet or intersect at a point. The figures below show intersecting lines.

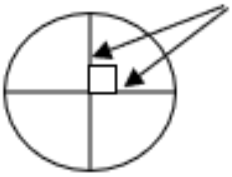




Perpendicular lines – lines that intersect and form right angles (angles measuring 90^0). The pictures below show perpendicular lines.







What's More

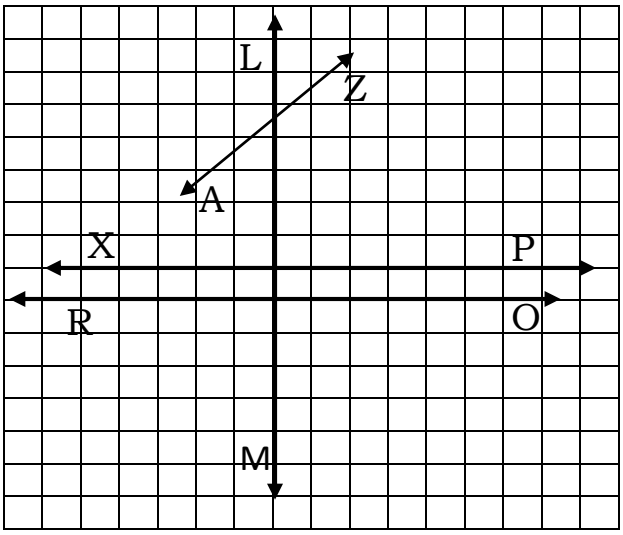
Activity 1 – "Name Us"

Name the pair of lines being described by each statement.

1. We are lines that intersect each other.
2. We are lines that intersect and form a right angle.
3. We are lines which do not meet or intersect even when extended.

Activity 2 - "Explore the Space"

Look at the grid below and give at least 1 pair of parallel lines, 1 pair of intersecting lines, and 1 pair of perpendicular lines.



Activity 3 - "Draw Me"

1. Draw 2 parts of your house which show parallel lines.
2. Draw 2 objects in your bag which show perpendicular lines.
3. Draw 2 objects in the garden which show intersecting lines.

What I Have Learned

Let us remember:

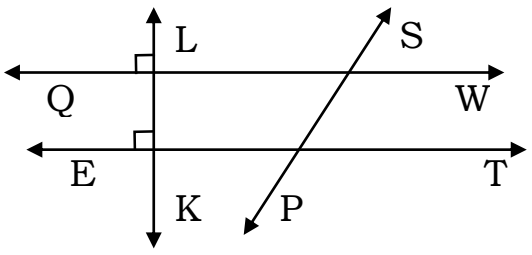
- **Parallel lines** are lines that do not intersect even when extended in either direction.
- **Intersecting lines** are lines that intersect.
- **Perpendicular lines** are lines that intersect and form a right angle.

What I Can Do

Using the different kinds of lines, design a vegetable garden that you can put up in your yard.

Assessment

A. From the figure below, name 2 pairs of intersecting lines, 1 pair of parallel lines, and 2 pairs of perpendicular lines.



B. Fill in the blanks with the kind of lines being described.

1. _____ are lines that intersect at a point.
2. _____ are lines that do not intersect even if they are extended in either direction.
3. _____ are lines that intersect and form right angles.

C. Draw an example of each kind of lines.

1. Intersecting lines
2. Perpendicular lines
3. Parallel lines

Additional Activities

Using the different kinds of lines, make a design of a house that cannot be easily destroyed by a typhoon.

Answer Key

What I Know

A. 1. Intersecting lines
2. Parallel lines
3. Perpendicular lines
4. Perpendicular lines

B. (drawings may vary)

C. a. Parallel lines are lines which will not intersect even when extended in either direction.
b. Intersecting lines are lines which intersect at a point.
c. Perpendicular lines are lines which form right angles.

What's More

Activity 3

1. parts of the house with these lines

2. objects with these lines

3. objects with these lines

Assessment

C.

1.

2.

3.

What's More

Activity 2

1. Parallel lines
   - lines XP and RO
2. Perpendicular lines
   - lines LM and XP
   - lines LM and RO
3. Intersecting lines
   - lines LM and ZA

Assessment

B.

1. Intersecting lines
2. Parallel lines
3. Perpendicular lines

What's More

Activity 1

1. Parallel lines
2. Perpendicular lines
3. Intersecting lines

Assessment

A.

1. Intersecting lines
   - lines QW and SP
   - lines ET and SP
2. Parallel lines
   - lines QW and ET
3. Perpendicular lines
   - lines LK and QW
   - lines ET and LK

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Electronic Sources:

Cue Math, The Math Experts. “Types of Lines in Math”. https://www.cuemath.com/learn/types-of-lines/

Department of Education. “DepEd Order No. 12, s. 2020. Adoption of the Basic Education Learning Continuity Plan for SY 2020-2021 In Light of the Covid-19 Public Health Emergency”. Accessed June 19, 2020. p. 342. https://www.deped.gov.ph/2020/06/19/june-19-2020-do-012-2020-adoption-of-the-basic-education-learning-continuity-plan-for-school-year-2020-2021-in-the-light-of-the-covid-19-public-health-emergency/

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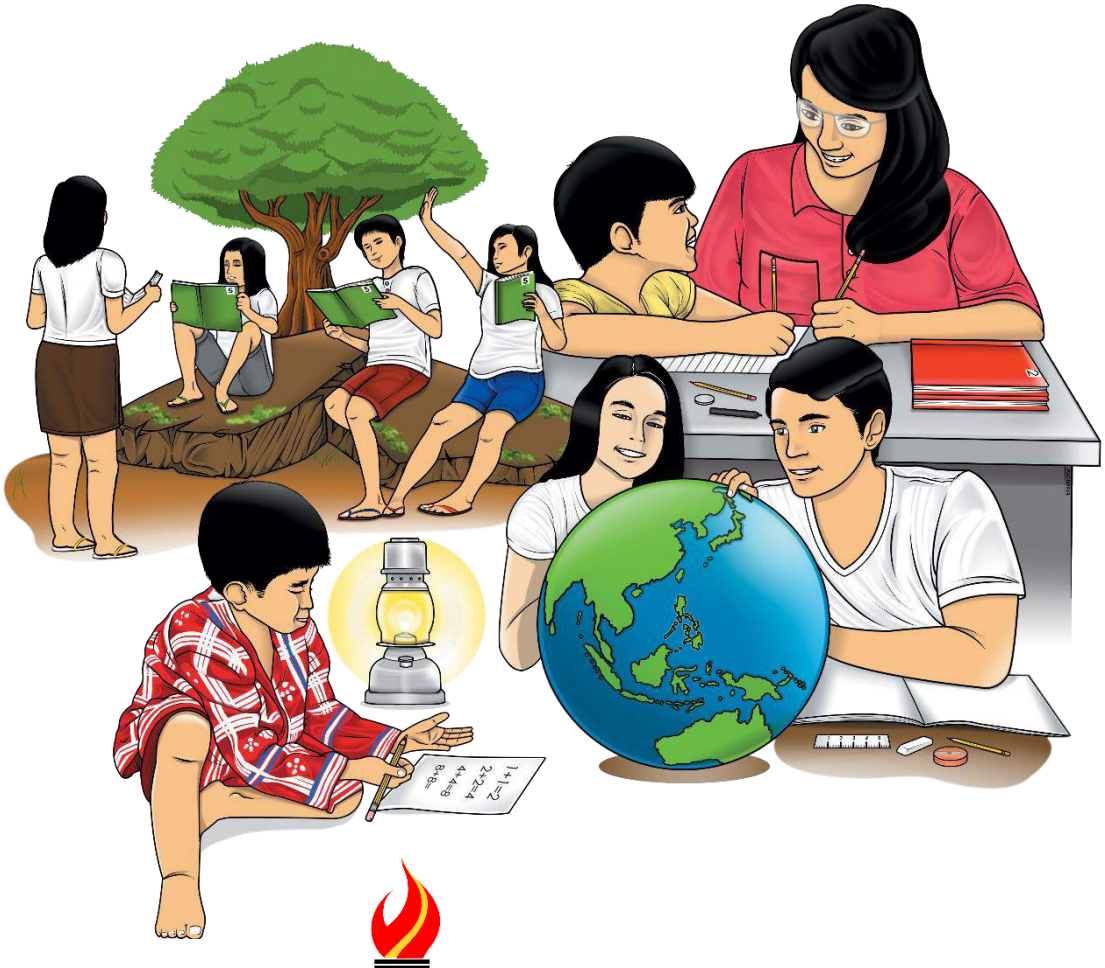
Mathematics

Quarter 3 – Module 2:
Kinds of Angles



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Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Thank you.

What I Need to Know

Angles are formed when two lines intersect.

In this lesson, you will learn about the different kinds of angles based on their measures. The first activity will allow you to explore and discover the different kinds of angles which the hour and minute hands of a clock form. The succeeding activities, in turn, will help you describe and illustrate the different kinds of angles.

At the end of this module, you should be able to:

- Identify the kinds of angles (right, acute and obtuse).
- Describe the different kinds of angles.
- Illustrate the different kinds of angles.

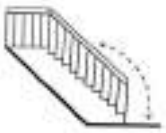
REMINDER: *In all of the activities, please write your answers on a separate sheet of paper.*

What I Know

A. Match the descriptions listed in the second column with the angles in the first column. Write the letter of the correct answer on your answer sheet.

A	**B**
___ 1. Acute angle	a. Measures between 90^0 and 180^0
___ 2. Right Angle	b. Measures between 0^0 and 90^0
___ 3. Obtuse Angle	c. Measures exactly 90°
	d. Measures exactly 180°

B. Match the different kinds of angles listed in Column B with the angles shown or represented by the pictures in Column A. Write the letter of the correct answer on the blank provided in your answer sheet.

Column A	**Column B**
_____1. 	A. Right Angle
_____ 2.	B. Obtuse Angle
_____ 3.	C. Acute Angle
_____ 4.	

C. Draw an example of each kind of angle.

1. acute angle
2. right angle
3. obtuse angle

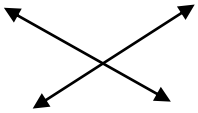
If you got 8 or higher, that is VERY GOOD. The lesson in this module will be easy for you. If you got lower than 8, you have to study carefully the lesson and the exercises given.

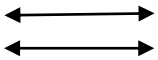
Lesson 1 Kinds of Angles

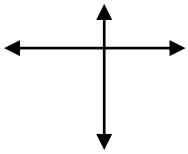
What's In

Activity 1

Identify each as parallel, intersecting or perpendicular lines.

1.  _____

2.  _____

3.  _____

Activity 2

Draw examples of parallel, perpendicular and intersecting lines.

1. Parallel lines
2. Intersecting lines
3. Perpendicular lines

What's New

To maintain their healthy bodies, Lola Remy, Lola Inday and Lola Nancy drink their vitamins everyday. Lola Remy drinks her vitamins at exactly 9:00 in the morning, Lola Inday at 2:00 and Lola Nancy at 5:00 in the afternoon.

a. Who drink their vitamins everyday? Why do they drink their vitamins everyday?
b. At what time do they drink their vitamins?
c. Draw the positions of the hour and minute hands of the clock at those times given below.

1. 9:00
2. 2:00
3. 5:00

What is It

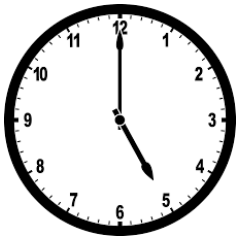
Let's take a look at the clocks showing the respective times Lola Remy, Lola Inday and Lola Nancy take their vitamins.

Lola Remy

- At 9:00, the minute and hour hands of the clock form an angle which measures 90˚. This angle, like all angles which measure 90˚, is called a **right angle.**

Lola Inday

- At 2:00, the minute and hour hands of the clock form an angle which measures 60˚. This is between 0˚ and 90˚ The angle here, like all other angles which measure between 0˚ and 90˚, is called an **acute angle**.

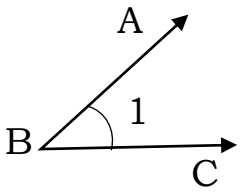


Lola Nancy

- At 5:00, the minute and hour hands of the clock form an angle which measures 150˚. This is between 90˚ and 180˚ The angle here, like all other angles which measure between 90˚ and 180˚, is called an **obtuse angle**.

An angle is formed by two rays with a common endpoint.

In the figure below, Rays BA and BC have B as their common endpoint and they form angle ABC. Using symbols, we write ∠ABC, which is read as "angle ABC". The angle may also be called ∠CBA.

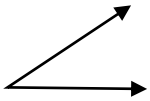


The angle above may also be named as ∠1, or simply ∠B.

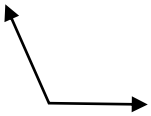
What's More

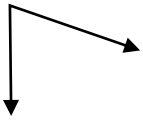
Activity 1

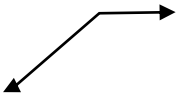
Identify each angle as acute, right or obtuse.

1.  _____

2. _____

3.  _____

4.  _____

5.  _____

Activity 2

Draw the required angle.

1. acute angle NOP
2. right angle PQR
3. obtuse angle HIJ
4. right angle ABC
5. acute angle JKL

What I Have Learned

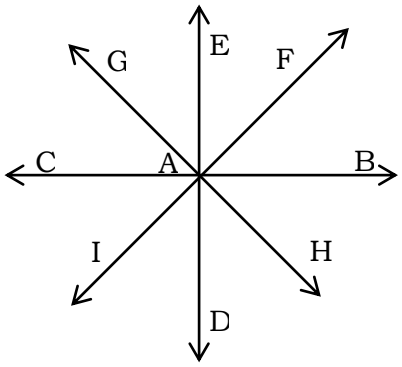
Remember:

A **right angle** measures exactly 90˚.
An **acute angle** measures between 0^0 and 90^0.
An **obtuse angle** measures between 90^0 and 180^0.

What I Can Do

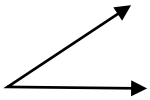
Direction: What kind of angles are the following?

1. ∠EAB _____
2. ∠ GAC _____
3. ∠CAH _____
4. ∠DAI _____
5. ∠GAB _____

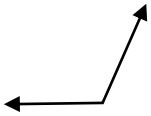


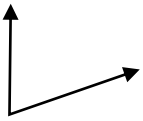
Assessment

I. Identify each of the following by writing acute, right or obtuse angle in the blank.

1.  _____

2. _____

3.  _____

4.  _____

5. _____

6. _____

7. _____

II. Describe the following angles.

1. acute angle
2. obtuse angle
3. right angle

Additional Activities

What kind of angles are the following?

1. 48˚	_____	6. 89˚	_____
2. 125˚	_____	7. 96˚	_____
3. 90˚	_____	8. 167˚	_____
4. 105˚	_____	9. 179˚	_____
5. 64˚	_____	10. 77˚	_____

Please check your answers with the ANSWER KEY on page 10.

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.

Answer Key

Additional Activities

1. Acute Angle
2. Obtuse Angle
3. Right Angle
4. Obtuse Angle
5. Acute Angle
6. Acute Angle
7. Obtuse Angle
8. Obtuse Angle
9. Obtuse Angle
10. Acute Angle

What I Can Do

1. Right Angle
2. Acute Angle
3. Obtuse Angle
4. Acute Angle
5. Obtuse Angle

Assessment

I.
1. acute angle
2. right angle
3. obtuse angle
4. acute angle
5. right angle
6. acute angle
7. right angle

II.
1. Acute angle measures between 0^0 and 90^0.
2. Obtuse angle measures between 90^0 and 180^0.
3. Right angle measures exactly 90^0.

What's More

Activity 1

1. Acute angle
2. Right angle
3. Obtuse angle
4. Acute angle
5. Obtuse angle

Activity 2

What's New

A. Lola Remy, Lola Inday and Lola Nancy. To maintain their healthy body.
B. 9:00 in the morning, 2:00 and 5:00 in the afternoon.
C. 9:00, 2:00, and 5:00

What's In

Activity 1

1. Intersecting Lines
2. Parallel Lines
3. Perpendicular Lines
4.

Activity 2

1. 2.
3.

What I Know

A. B. C.

1. b 1. b 1.
2. c 2. c
3. a 3. b 2.
4. a

3.

References

Electronic Sources:

Department of Education. "DepEd Order No. 12, s. 2020. Adoption of the Basic Education Learning Continuity Plan for SY 2020-2021 In Light of the Covid-19 Public Health Emergency". Accessed June 19, 2020. p. 342. https://www.deped.gov.ph/2020/06/19/june-19-2020-do-012-2020-adoption-of-the-basic-education-learning-continuity-plan-for-school-year-2020-2021-in-the-light-of-the-covid-19-public-health-emergency/

Mathisfun. "Angles". https://www.mathsisfun.com/angles.html

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4

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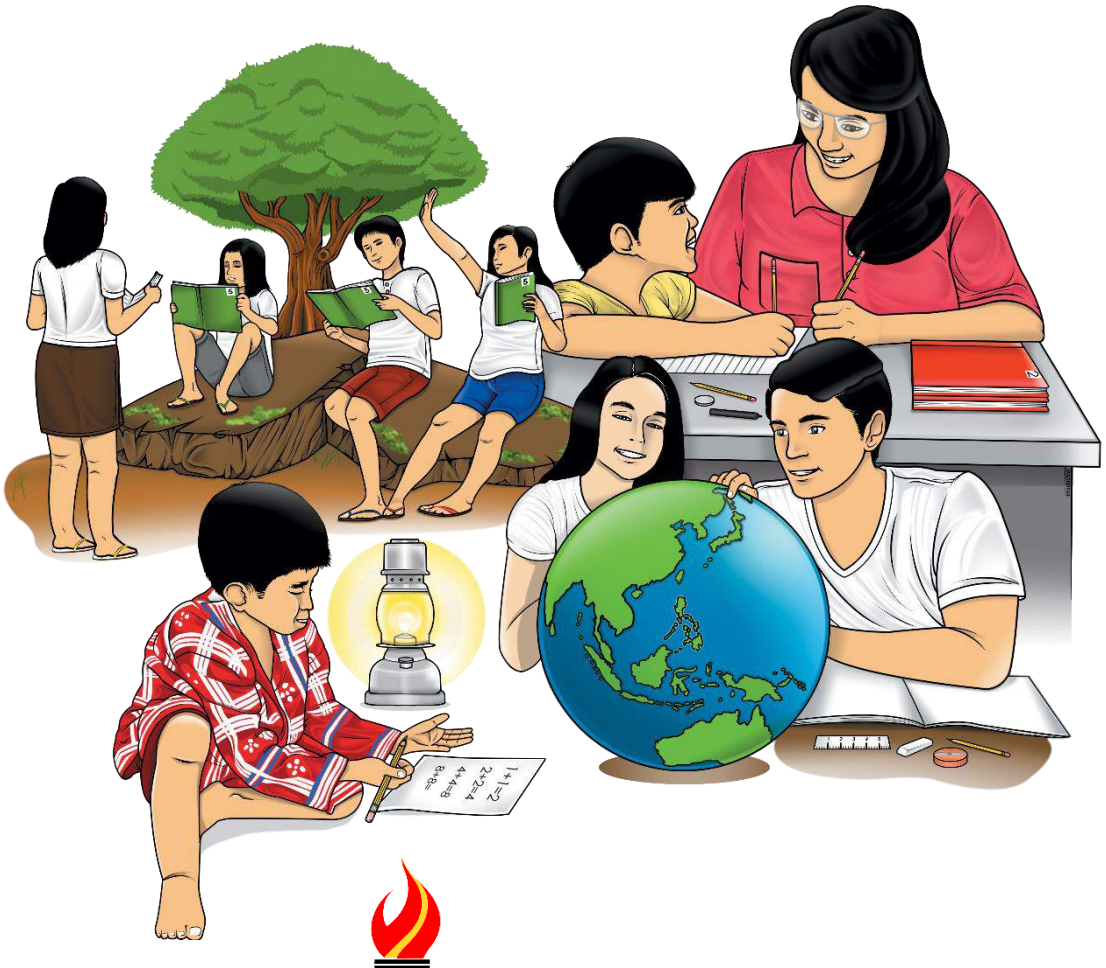
Mathematics

Quarter 3 – Module 3:
Triangles and Quadrilaterals



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Quarter 3 – Module 3: Triangles and Quadrilaterals
First Edition, 2020

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Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by _____

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4

Mathematics

Quarter 3 – Module 3:
Triangles and Quadrilaterals

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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

This module was designed in order to assist you to learn the different kinds of triangles and quadrilaterals.

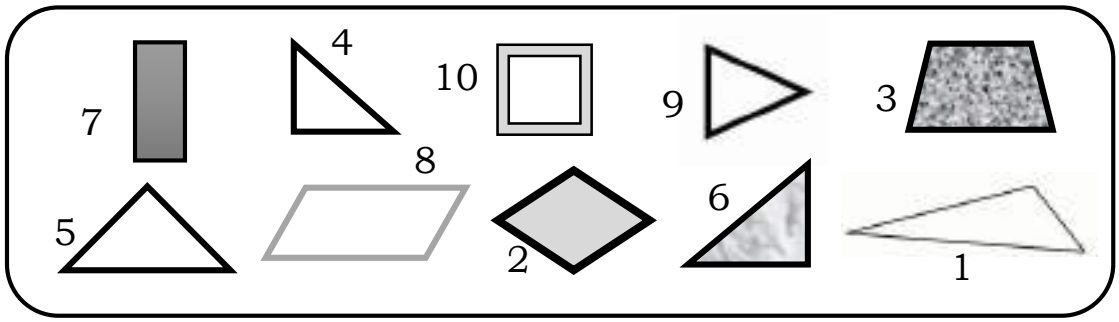
In this lesson, you will learn about the different kinds of triangles according to sides and angles and identify and describe the different kinds of quadrilaterals: square, rectangle, parallelogram, trapezoid, and rhombus. You will also describe the different attributes/properties of triangles using concrete objects/models. The learning activities will allow you to explore, discover and appreciate the different kinds of triangles that can be seen in different objects around us. You will also be taught on how to describe and illustrate the different kinds of triangles in the succeeding activities.

After going through this module, you are expected to:

1. describe the attributes/properties of triangles and quadrilaterals using concrete objects or models;
2. identify and describe triangles according to sides and to angles; and
3. identify and describe the different kinds of special quadrilaterals: square, rectangle, parallelogram, trapezoid, and rhombus.

What I Know

Group the figures below into triangles and quadrilaterals by writing the figure number in the correct column of the table. Write your answer on a separate sheet of paper.



Triangles	Quadrilaterals

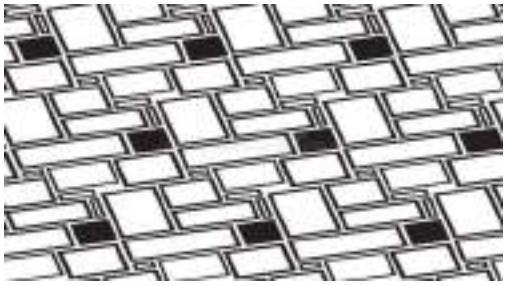
Go to the Answer Key to check your answers.

CONGRATULATIONS! If you got a score of 9 or 10, you should not have any difficulty studying the lesson in this module.
If you got a score of 8 or below, you may need to study the lesson more carefully and do all the given activities.

Lesson 1 Attributes of Triangles and Quadrilaterals

What's In

https://wallhere.com/en/wallpaper/852616



https://www.dreamstime.com/illustration/quadrilaterals.html

Do you like patterns? Look at the patterns above. Which one do you prefer? What shapes do you see in the first pattern? What about in the second? How many sides and corners does each shape in the first pattern have? What about in the second?

What's New

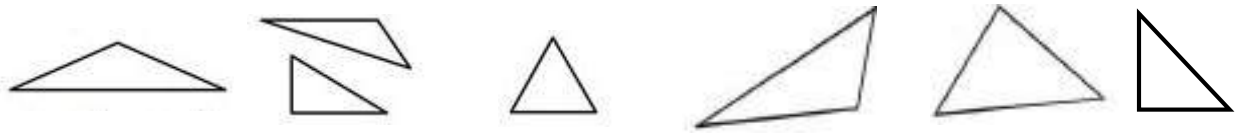
https://www.zazzle.com/black_and_white_checkered_patterns_stylish_elegant_all_over_print_t_shirt-256805711310915313

Twin brothers Larry and Garry bought shirts out of their savings. Although they were twins, they have their own favorite designs. Larry bought the one on the left while Garry bought the one on the right. What do you think is Larry's

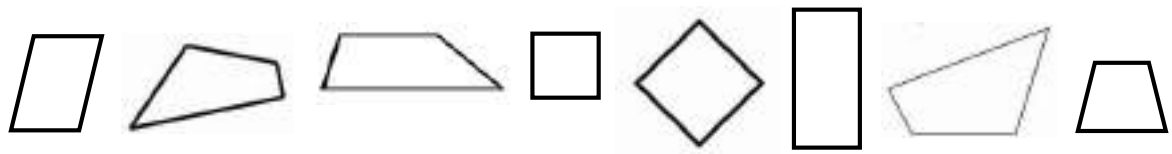
What is It

The shirt Larry bought shows a pattern consisting of 3-sided polygons. These 3-sided polygons are called **triangles**. Triangles also have three corner points.

Below are some examples of triangles with different sizes and shapes.



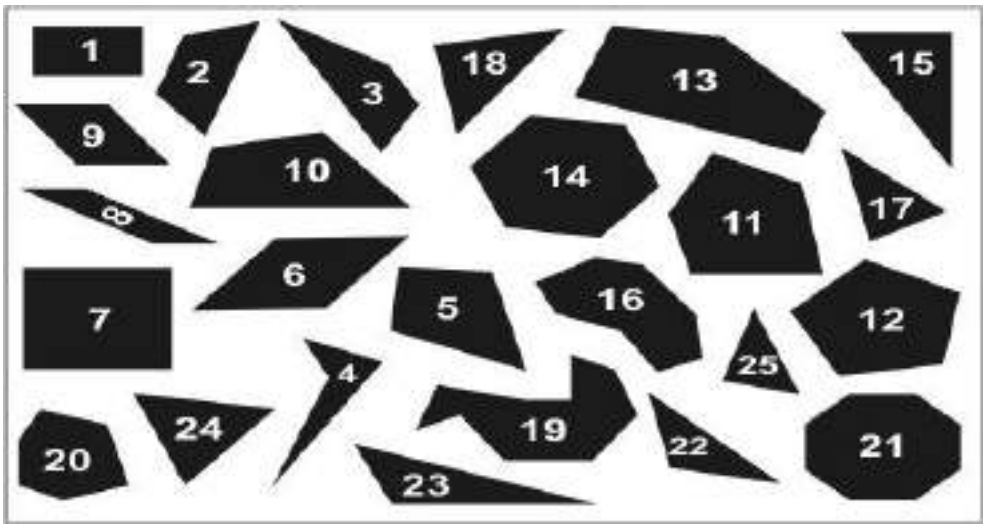
The pattern in the shirt Garry bought shows four-sided polygons. Four-sided polygons are called **quadrilaterals**. Quadrilaterals also have four corners. There are different kinds of quadrilaterals. Here are some more examples.



What's More

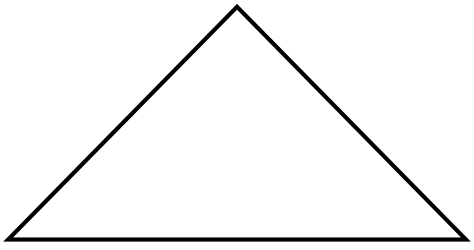
Activity 1. "TriQuad"

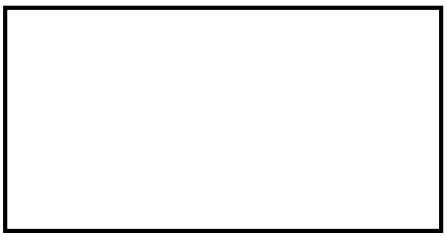
The polygons inside the box below include triangles and quadrilaterals.



https://www.nctm.org/Classroom-Resources/Illuminations/Lessons/Sorting-Polygons/

Which of the polygons in the box are triangles and which are quadrilaterals? Group the triangles together and the quadrilaterals together by writing their polygon numbers in the correct figure below. Write your answer on a separate sheet of paper.





Activity 2. "Draw Up"

Draw 5 objects which show triangles and 5 objects which show quadrilaterals. Write your answer on a separate sheet of paper.

What I Have Learned

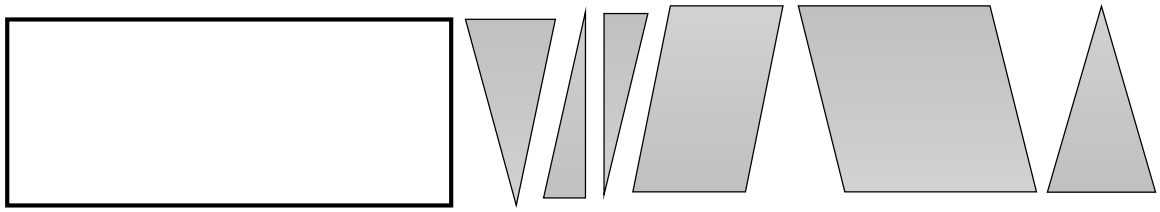
Let us remember that:

TRIANGLES are three-sided polygons with three corners. Some triangles have two equal sides, while others have three. But some have no equal sides at all.

QUADRILATERALS are four-sided polygons with four corners. Some quadrilaterals have sides which are equal while some do not. Still others have sides which are parallel, while some have sides which are perpendicular.

What I Can Do

Arrange the polygons inside the box so that it is completely covered and no shapes overlap. Write your answer on a separate sheet of paper.



Assessment

I. Fill in the blanks. Write your answer on a separate sheet of paper.

1. Triangles are _____ with ___ sides and ___ corners.
2. Quadrilaterals are _____ with ___ sides and ___ corners.

Additional Activities

Draw a design of your own wall decor using triangles and quadrilaterals. You may use different colors for a more interesting design. Write your answer on a separate sheet of paper.

What I Know

You need a sheet of paper for the activities.

I. Fill in the blanks with the correct words from the box below.

obtuse	equilateral	isosceles	acute	scalene
equiangular	right	angles	triangle	sides

_____1. It has a 90° angle.
_____2. All of its angles are less than 90°.
_____3. It has an angle greater than 90°.
_____4. It has three equal angles, each having a measure of 60°.
_____5. It has two equal sides.
_____6. It has no equal sides.
_____7. All its three sides are equal.
_____8. It is a three-sided figure.
_____9. Triangles are named according to the measures of their _____,
_____10. and according to the lengths of their _____.

Go to the Answer Key to check your answers.

CONGRATULATIONS, if you got a score of 8 or higher, you will find the lesson very easy. If your score is 7 or below, kindly study the lesson and activities carefully.

Lesson 2 Kinds of Triangles

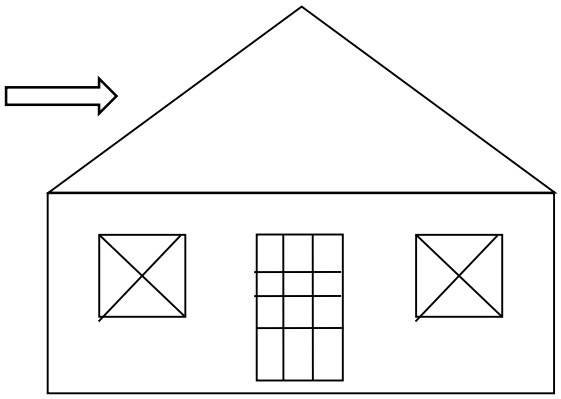
What's In

Let us recall the properties of triangles and quadrilaterals.

Triangles are polygons with three sides and three corners. Their sides may be of equal or of different lengths.

Quadrilaterals are polygons with four sides and four corners. There are different kinds of quadrilaterals. Some quadrilaterals have two or more equal sides. Also, some quadrilaterals have one or two pairs of parallel sides.

What's New



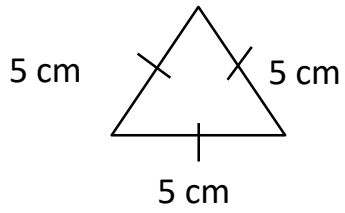
Let us look at the top part of the house above. How many sides does it have? What is its shape? Yes, it has three sides and is in the shape of a triangle.

Let us look at the windows this time. How many triangles in all do you see in the two windows?

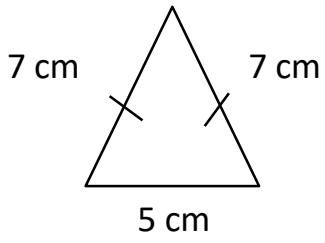
Do you know how triangles are classified? Today, we will learn about how triangles are classified. We will also learn about the different kinds of triangles.

KINDS OF TRIANGLES ACCORDING TO SIDES

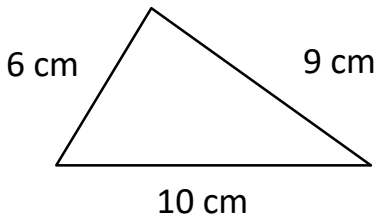
Equilateral triangle – a triangle which has **three** equal sides



Isosceles triangle – a triangle which has **two** equal sides

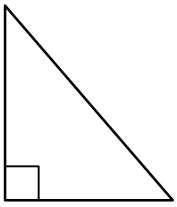


Scalene triangle – a triangle which has **no** equal sides

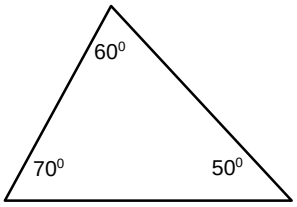


KINDS OF TRIANGLES ACCORDING TO ANGLES

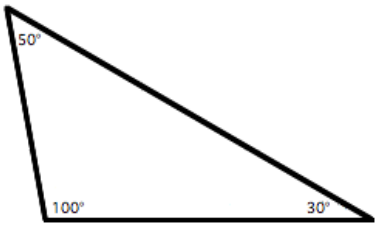
Right triangle – a triangle which has a right or 90˚- angle



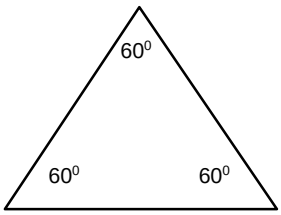
Acute triangle – a triangle which has three acute angles or angles measuring less than 90˚



Obtuse triangle – a triangle which has one obtuse angle or an angle measuring greater than 90˚



Equiangular triangle – a triangle which has three equal angles each measuring 60˚.



What is It

Let us try to have a clearer understanding of how triangles are classified as we get to know the different kinds of triangles.

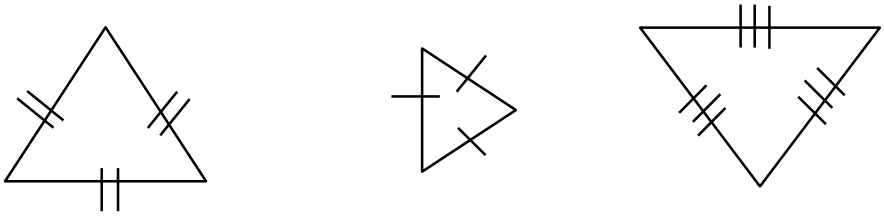
KINDS OF TRIANGLES ACCORDING TO SIDES

Triangles may be classified according to their sides. The kinds of triangles according to their sides are the equilateral, isosceles and scalene triangles.

Equilateral triangles

An **equilateral triangle** is a triangle with three equal sides.

The triangles below are all equilateral triangles. They have three equal sides.

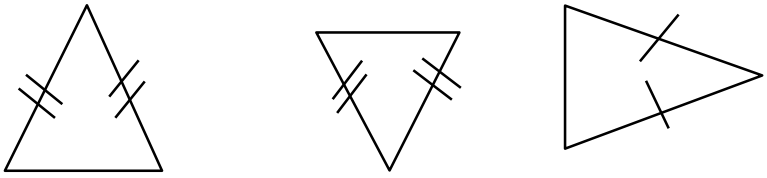


The symbols “I”, or “II”, etc. are used to mark parts of figures. When parts of the same or of different figures are marked using the same symbols, that means those parts have equal measures or are congruent.

Isosceles triangles

An **isosceles triangle** is a triangle with two equal sides.

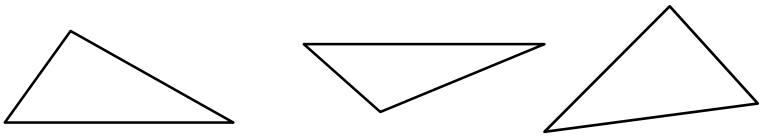
The triangles below are isosceles triangles**.** They have two equal sides.



Scalene triangles.

A **scalene triangle** is a triangle with no equal sides.

The triangles below are scalene triangles**.** They have no equal sides.



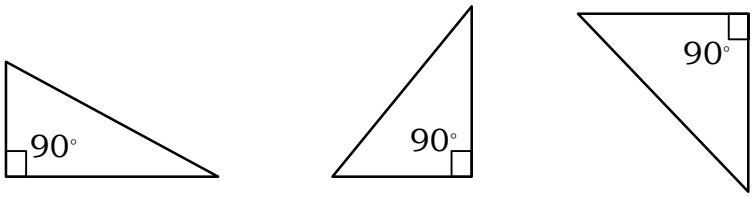
KINDS OF TRIANGLES ACCORDING TO ANGLES

Triangles may also be classified according to their angles. The kinds of triangles according to their angles are the right triangle, the obtuse triangle and the equiangular triangle.

Right triangle

A **right triangle** is a triangle with a right angle or an angle which measures 90˚.

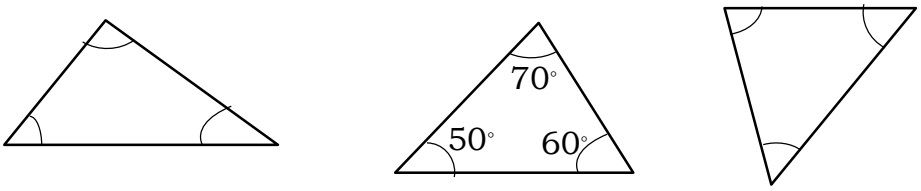
The triangles below are all right triangles**.** They all have a right angle.



Acute triangles

An **acute triangle** is a triangle with three acute angles or angles each measuring less than 90˚.

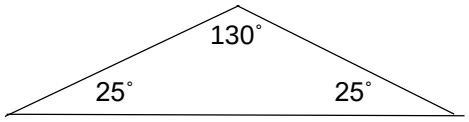
The triangles below are all acute triangles. All their angles are acute or measure less than 90˚.

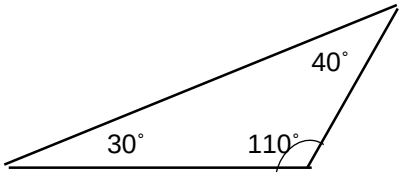


Obtuse triangles

An **obtuse triangle** is a triangle with an obtuse angle or an angle which measures greater than 90˚.

The triangles below are all obtuse triangles. They all have one obtuse angle or an angle which measures greater than 90˚.

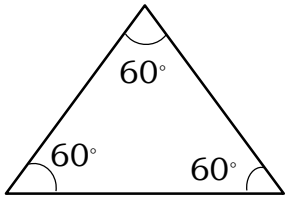


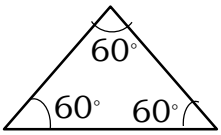


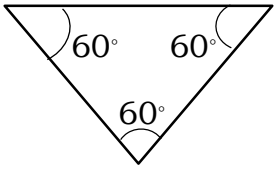
Equiangular triangles

An **equiangular triangle** is a triangle with three equal angles each measuring 60˚. An equiangular triangle is actually a special kind of an acute triangle.

The triangles below are all equiangular triangles**.** All their angles are equal and each measure 60˚.







It is important to know that all **equilateral triangles are equiangular triangles.**

NOTE:
The total measure of the three angles of a triangle is equal to 180˚.

What's More

Activity 1. "Match Me Up"

Match the figure with the correct description. Write the letter of the correct answer on the blank provided. Write your answer on a separate sheet of paper.

A	B
_____1. scalene triangle	a. all its angles measure less than 90˚
_____2. isosceles triangle	b. all its three sides are equal
_____3. equilateral triangle	c. it has no equal sides
_____4. acute triangle	d. all its three angles are equal and measure 60˚
_____5. equiangular triangle	e. it has two equal sides
	f. exactly two angles are 60˚

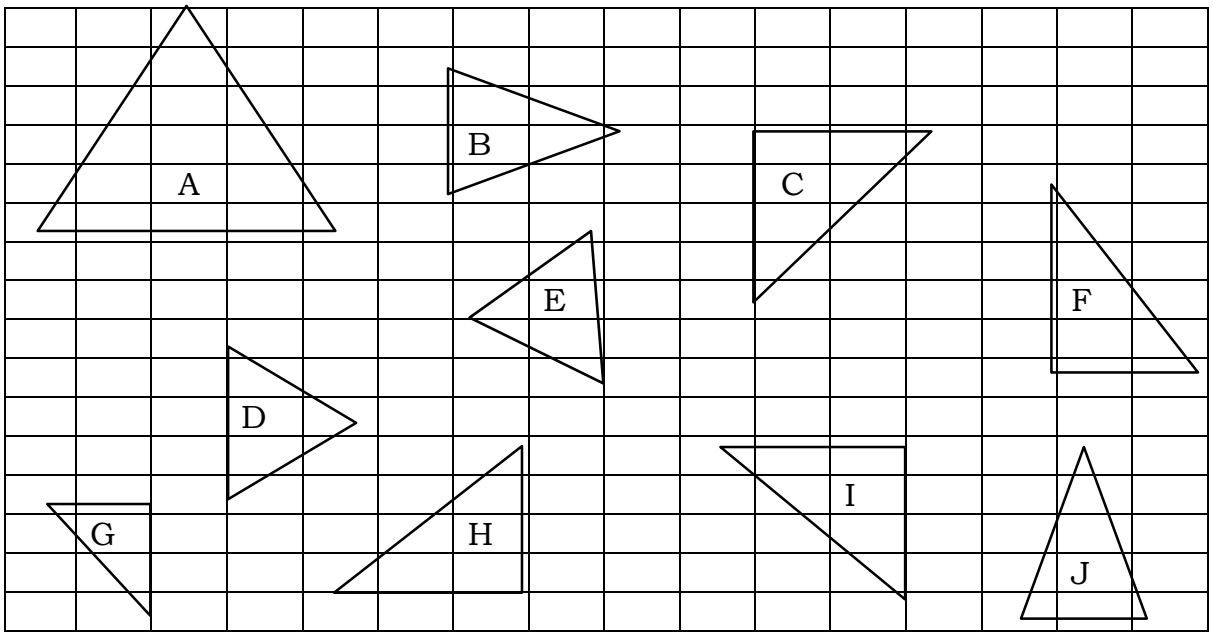
Activity 2. "Name It"

Fill in the blanks with the kind of triangle described given the measurements of its angles below. Write your answer on a separate sheet of paper.

1. $m\angle A = 125^\circ$, $m\angle B = 30^\circ$, $m\angle C = 25^\circ$ _____
2. $m\angle A = 60^\circ$, $m\angle B = 60^\circ$, $m\angle C = 60^\circ$ _____
3. $m\angle A = 90^\circ$, $m\angle B = 45^\circ$, $m\angle C = 45^\circ$ _____
4. $m\angle A = 110^\circ$, $m\angle B = 40^\circ$, $m\angle C = 30^\circ$ _____
5. $m\angle A = 48^\circ$, $m\angle B = 57^\circ$, $m\angle C = 75^\circ$ _____

Activity 3. "Right Me"

List all the letters that are inside right triangles. Write your answer on a separate sheet of paper.



Check your answers with the Answer Key of the module.

A score of 13 -15? GREAT! You understood the lesson well.

Got a score of 10 - 12? Study carefully the lesson and the activities given.

A score below 10? You may need somebody to assist you.

What I Have Learned

Let us recall. There are different kinds of triangles. They are classified according to the lengths of their sides and also according to the measures of their angles.

KINDS OF TRIANGLES ACCORDING TO SIDES

Equilateral - all three sides are equal

Isosceles - two sides are equal

Scalene - no sides are equal

KINDS OF TRIANGLES ACCORDING TO ANGLES

Right triangle - one angle is right or has a measure of 90˚

Acute triangle - all angles are acute or have measures less than 90˚

Obtuse triangle - one angle is obtuse or has a measure greater than 90˚

Equiangular triangle - all three angles are equal or have measures of 60˚.

What I Can Do

Using different kinds of triangles, draw a kite or a toy that you would want to play with. Write your answer on a separate sheet of paper.

Assessment

I. Fill in the blanks with the correct word from the box below. Write your answer on a separate sheet of paper.

isosceles	equilateral	right	obtuse
equiangular	acute	corners	scalene
triangle	three angles	quadrilateral	

_____ 1. I am a triangle with three 60° angles.
_____ 2. I have two equal sides.
_____ 3. One of my angles measures 90°.
_____ 4. I have no equal sides.
_____ 5. I am a triangle with an angle greater than 90°.
_____ 6. All my angles are less than 90°.
_____ 7. All my three sides are equal.
_____ 8. A triangle is a polygon with _____ sides and
_____ 9. three _____.
_____ 10. I am a three-sided polygon.

Additional Activities

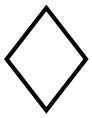
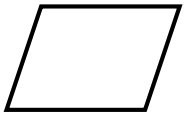
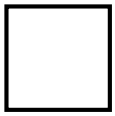
Who am I? Identify the kind of triangle and draw an example of each. Write your answer on a separate sheet of paper.

1. I am a triangle with no sides equal.
2. I am a triangle with 3 equal sides.
3. I am a triangle with an obtuse angle.
4. I am a triangle with 2 equal sides.
5. I am a triangle with a 90^0 angle.

What I Know

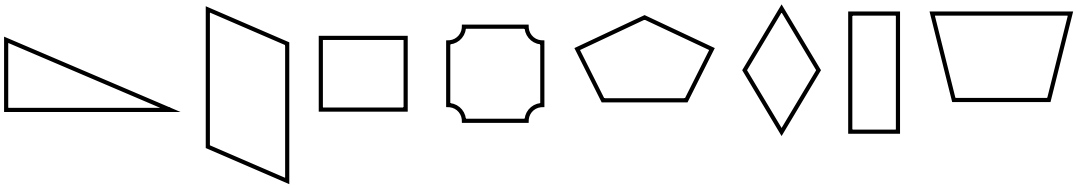
You need a sheet of paper for the activities.

I. Which word inside the box gives the name of the figures below? Write your answers on your answer sheet.

1. 2. 3.  4.  5. 

rhombus	kite	rectangle	parallelogram	square	trapezoid

II. Which of the figures below are quadrilaterals? Copy the quadrilaterals on your answer sheet.



Refer to the Answer Key to check your answers.

You're EXCELLENT if you got a score of 8 -10. You already have a clear understanding of the lesson in this module.

If your score is 7 or below, kindly study carefully the lesson and the activities.

Lesson 3 Kinds of Quadrilaterals

What's In

Hello kids. Do you recall your lesson on triangles? How do we classify triangles? What are the different kinds of triangles? How do they differ from one another?

Match the items in column A with the correct descriptions in column B. Write the letter of the correct answer. Write your answer on a separate sheet of paper.

	A	B
____	1. Equilateral triangle	a. All its angles are less than 90˚
____	2. Acute triangle	b. All its three sides are equal
____	3. Scalene triangle	c. It has no equal sides
____	4. Isosceles triangle	d. All its three angles measure 60˚
____	5. Equiangular triangle	e. It has two equal sides

Check your answers with the Answer Key.
If you got a score of 5, then you are ready to study this module.
If not, you need to study the lesson on triangles.

What's New

The prices of basic commodities are continuously increasing. Even prices of vegetables are going up. Knowing that they have to eat vegetables to keep their family healthy, Mr. and Mrs. Manalig decided to have a vegetable garden in their backyard.

With their own backyard vegetable garden, the Manalig family will not only stay healthy, they will also be saving money. They can also be very sure that the vegetables they would be eating are free of harmful chemicals as they also plan to go for organic gardening.

What vegetables does the Manalig family have in their garden. They have celery, saluyot, eggplant seedlings, pepper and lettuce. Do you also eat vegetables? Do you think it is good to have our own vegetable garden at home?

Let us look at the containers the Manaligs used in their garden. Observe the shape of the containers.

What is It

All the containers used in the garden of the Manalig Family are rectangles in shape. They all have four sides and four corners. These shapes are also called quadrilaterals.

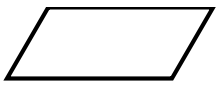
All four-sided figures or polygons are called quadrilaterals. Some of them have two or more equal sides. Quadrilaterals may also have one or two pairs of parallel sides.

Although all quadrilaterals have four sides, we can see that they vary in sizes and shapes. Let us now look at the different kinds of special quadrilaterals.

KINDS OF QUADRILATERALS

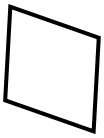
This is a **square**. It has four equal sides and opposite sides are parallel. All its four corners are right angles or measure 90˚.

This is a **rectangle**. Opposite sides are equal and parallel. All its four corners are right angles or measure 90˚.



This is a **parallelogram**. Opposite sides are equal and parallel. Angles at opposite corners have the same measurements.

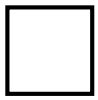
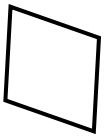
This is a **trapezoid**. It has one pair of parallel sides.



This is a **rhombus**. Its four sides are equal. Opposite sides are parallel and opposite angles are equal.

All four-sided figures are **Quadrilaterals**. They are classified according to the lengths of their sides and the measures of their angles.

Let us have a clearer understanding of the kinds of quadrilaterals.

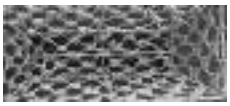
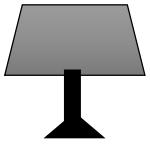
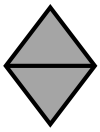
Figure	Name	Description/Properties
	Square	▪ All sides are equal. ▪ Opposite sides are parallel. ▪ All of the four corners are right angles.
	Rectangle	▪ Opposite sides are equal and parallel. ▪ All four corners are right angles.
	Parallelogram	▪ Opposite sides are equal and parallel. ▪ Opposite corners have the same measure.
	Trapezoid	▪ Has one pair of parallel sides.
	Rhombus	▪ All sides are equal. ▪ Opposite sides are parallel. ▪ Opposite angles are equal.

I hope you now understand what a quadrilateral is and know its different types.

What's More

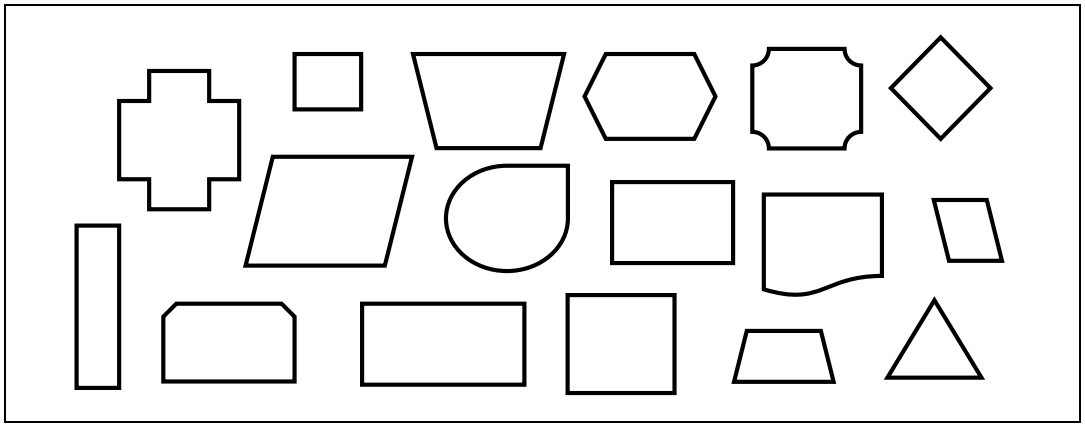
Activity 1. "Match Us Up"

Match the quadrilateral with the object having its shape. Write your answer on a separate sheet of paper.

A	B
___ 1. square	A. 
___ 2. rhombus	B. 
___ 3. rectangle	C. 
___ 4. parallelogram	D.
___ 5. trapezoid	E.

Activity 2. "Find Me"

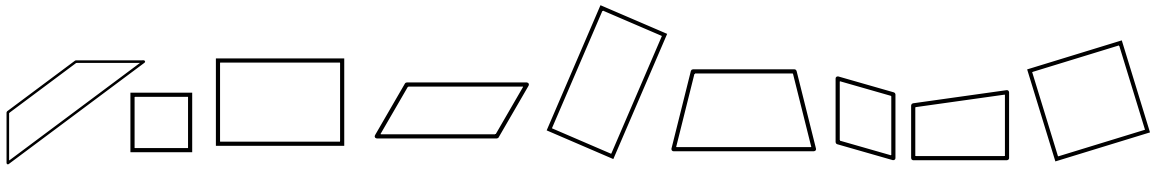
Identify the quadrilaterals and copy them on your answer sheet.



Activity 3.

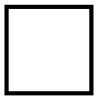
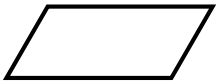
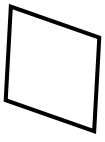
Group the objects according to their shapes. Copy them in the correct quadrilaterals. Write your answer on a separate sheet of paper.

Square	Rectangle	Rhombus	Parallelogram	Trapezoid



What I Have Learned

Let us remember the following:

Four-sided polygons or figures are called **Quadrilaterals.** There are different kinds of quadrilaterals. Some quadrilaterals have special properties and have been given special names. These are the square, the rectangle, the parallelogram, the trapezoid and the rhombus.	
	A **square** has four equal sides and opposite sides are parallel. All four corners are right angles or measure 90^0.
	A **rectangle** has two pairs of equal and parallel sides. All its four corners are right angles ore measure 90^0.
	A **parallelogram** has two pairs of equal and parallel sides. Angles at opposite corners have the same measurements.
	A **trapezoid** has one pair of parallel sides.
	A **rhombus** has four equal sides. Its opposite sides are parallel and opposite angles are equal.

What I Can Do

Using the different kinds of quadrilaterals, design your own backyard vegetable garden. Write your answer on a separate sheet of paper.

Assessment

I. Select the correct answer from the box. Write your answer on a separate sheet of paper.

rhombus	rectangle	parallelogram
square	trapezoid	

1. I have two pairs of equal and parallel sides. The angles at my opposite corners have the same measure. What am I?
2. I have four equal sides. All my four angles measure 90˚. What am I?
3. I have only one pair of parallel sides. What am I?
4. I have two pairs of equal and parallel sides. All of my corner measure 90˚.
5. I have four equal sides. My opposite sides are parallel, my opposite angles are equal.

II. Draw objects showing the different kinds of quadrilaterals. Write your answer on a separate sheet of paper.

1. square
2. rectangle
3. parallelogram
4. rhombus
5. trapezoid

Additional Activities

Draw a toy using a combination of the different quadrilaterals. Write your answer on a separate sheet of paper.

Answer Key

LESSON 1

What I Know

What's More

Activity 1

1	2	3	4	5
6	7	8	9	10

Activity 2

Answers may vary.

What I Can Do

Assessment

1. Triangles are polygons with three sides and three corners.
2. Quadrilaterals are polygons with four sides and four corners

Additional Activities

Answers may vary.

LESSON 2

What I Know

1. right
2. acute
3. obtuse
4. equiangular
5. isosceles
6. scalene
7. equilateral
8. triangle
9.-10 angles, sides

What's More

Activity 1

1. c
2. e
3. b
4. a
5. d

Activity 2

1. obtuse
2. equiangular
3. right
4. obtuse
5. acute

Activity 3

C, G, F, H, I

Assessment

1. equiangular
2. isosceles
3. right
4. scalene
5. obtuse
6. acute
7. equilateral
8. three
9. corners
10. triangle

What I Can Do

Answers may vary.

Additional Activities

1. scalene triangle

2. equilateral triangle

3. obtuse triangle

4. isosceles triangle

5. right triangle

What's In

1. b
2. a
3. c
4. e
5. d

What's More

Activity 1

1. d 2. c 3. a 4. e 5. b

Activity 2

What I Can Do

Answers may vary.

What's More

Activity 3

Square	Rectangle	Rhombus
Parallelogram		Trapezoid

Additional Activities

Answers may vary.

Assessment

I.

1. Parallelogram
2. Square
3. Trapezoid
4. Rectangle
5. Rhombus

II.

Answers may vary.

What I Know

I.

1. rectangle
2. trapezoid
3. rhombus
4. parallelogram
5. square

II.

LESSON 3

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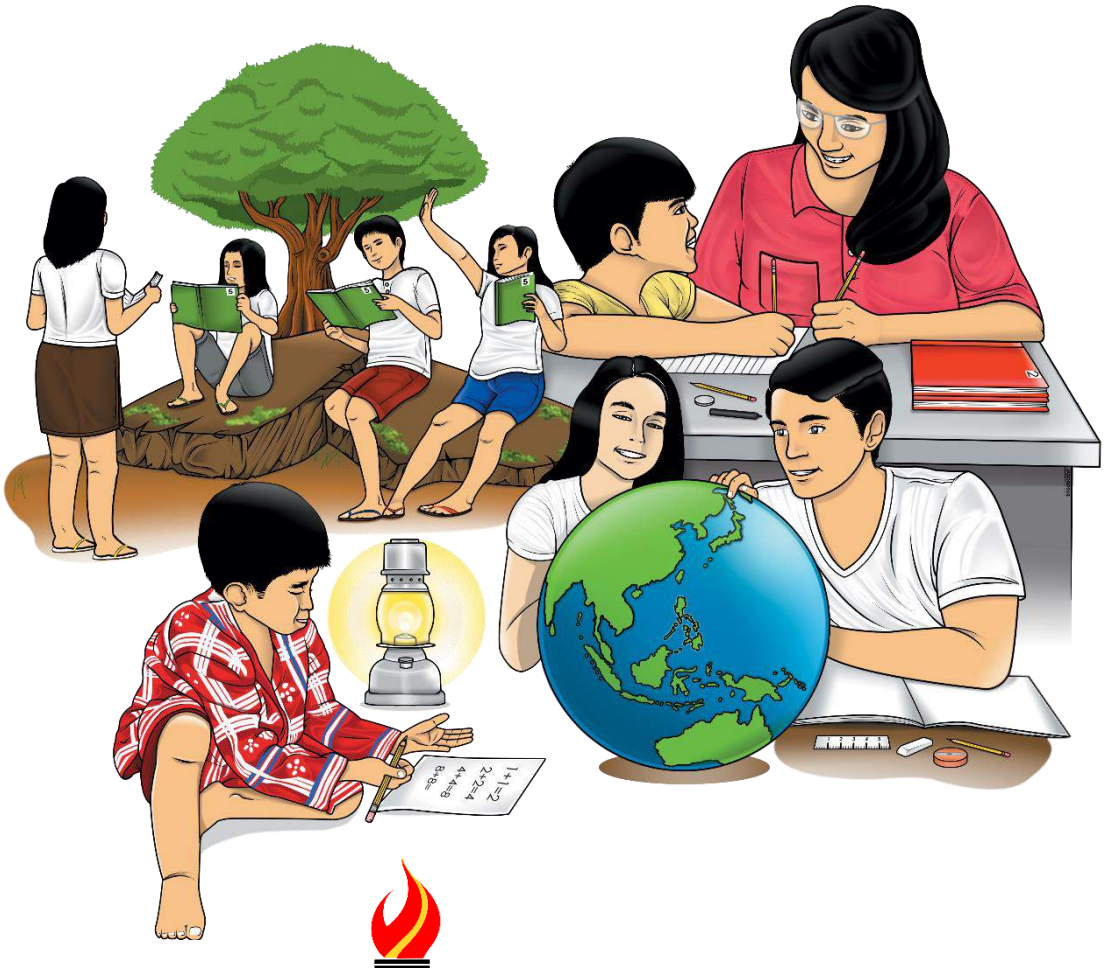
4

DepED
DEPARTMENT OF EDUCATION

Mathematics

Quarter 3 – Module 4: Relationships of Quadrilaterals to Triangles and Other Quadrilaterals



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First Edition, 2020

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Published by the Department of Education
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Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by _____

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Mathematics

Quarter 3 – Module 1: Relationships of Quadrilaterals to Triangles and Other Quadrilaterals

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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

In the previous lessons, you learned about triangles and quadrilaterals. Can you describe the difference between triangles and quadrilaterals? Can you also explain their relationship?

In this module, we will further discuss and describe the properties of triangles and quadrilaterals to identify their relationship.

After going through this module, you are expected to:

1. relate triangles to quadrilaterals;
2. relate one quadrilateral to another quadrilateral (e.g. square to rhombus); and
3. explain the relationships among quadrilaterals.

What I Know

Direction: Choose the letter of the correct answer. Write your answer on a separate sheet of paper.

1. Which describes a triangle?
   a. 2-sided polygon
   b. 3-sided polygon
   c. 4-sided polygon

2. Which describes a quadrilateral?
   a. 4-sided polygon
   b. 3-sided polygon
   c. 2-sided polygon

3. What figures are formed when a diagonal is drawn in a quadrilateral?
   a. triangles
   b. squares
   c. parallelograms

4. Which is **TRUE** about the sides of a parallelogram?
   a. 1 pair of sides are parallel and equal
   b. 2 pairs of sides are parallel and equal
   c. 4 sides are equal

5. If two diagonals are drawn in a rhombus or in a square, which of the following will be formed?
   a. 2 triangles of the same size
   b. 2 pairs of triangles of the same size
   c. 4 triangles of the same size

6. Which of the following describes the sides of a square or of a rhombus?
   a. no sides are equal
   b. two sides are equal
   c. all sides are equal

7. Which quadrilateral will have different sizes of triangles if a diagonal is drawn connecting its opposite corners?
   a. rectangle
   b. square
   c. trapezoid

8. How do a triangle and a parallelogram differ?
   a. They differ in the number of angles only.
   b. They differ in the number of sides only.
   c. They differ in the number of sides and angles.

9. Which quadrilateral has only one pair of parallel sides?
   a. parallelogram
   b. trapezoid
   c. rhombus

10. Which figure cannot be a trapezoid?
   a. parallelogram
   b. quadrilateral
   c. polygon

Check your answers with the Answer Key.

CONGRATULATIONS, if you got a score of 8 - 10, you would find this lesson easy.
If your score is below 8, kindly study carefully the lesson and the activities.

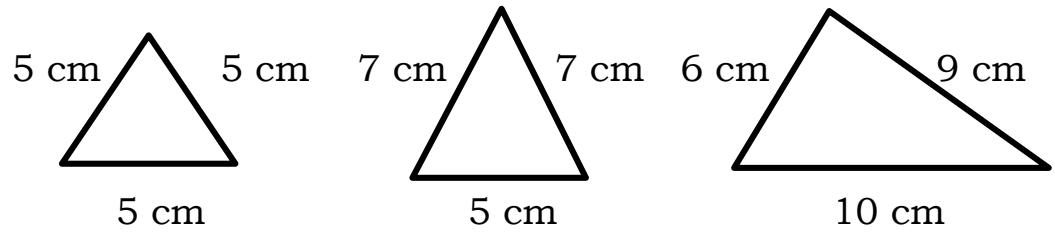
Lesson 1 Relationships of Triangles to Quadrilaterals

What's In

Let us recall our previous lessons on triangles and quadrilaterals. What is a triangle? What is a quadrilateral? How do they differ from one another?

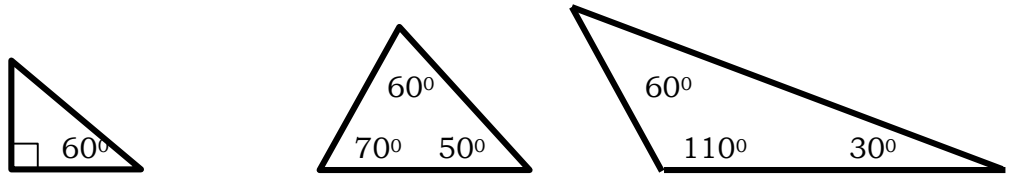
Any **three-sided polygon** is called **triangle**.

KINDS OF TRIANGLES ACCORDING TO SIDES

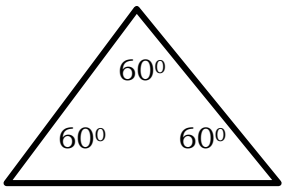


Equilateral triangle **Isosceles triangle** **Scalene triangle**

KINDS OF TRIANGLES ACCORDING TO ANGLES

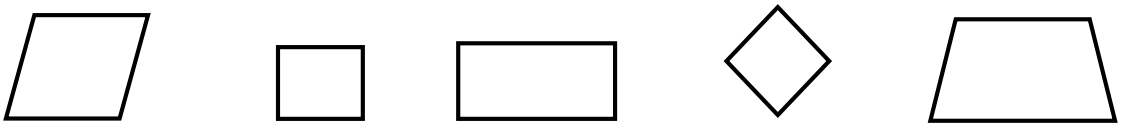


Right triangle **Acute triangle** **Obtuse triangle**



Equiangular triangle

Quadrilaterals are **polygons with 4 sides and 4 angles.** Below are the kinds of quadrilaterals.

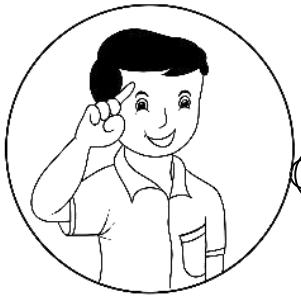


parallelogram square rectangle rhombus trapezoid

How do triangle and quadrilateral differ? They have different number of sides. ***Tri*** means 3 and ***quad*** means 4. So, a triangle has 3 sides while a quadrilateral has four sides. Also, a triangle has 3 angles while a quadrilateral has 4 angles.

What's New

Now that we understand what triangles and quadrilaterals are, let us know their relationship. Let us start with this story.



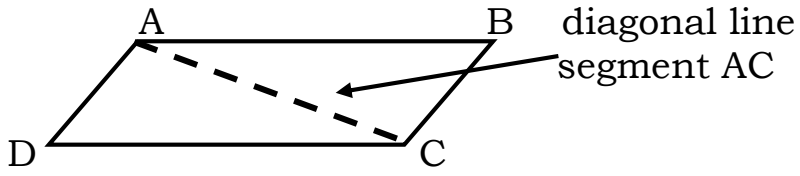
Rene has a cloth in the shape of parallelogram. He would like to make two triangular flaglets that are of the same size. What is the best thing for him to do with the cloth?

If you are Rene, how will you divide the parallelogram to have two triangular flaglets with the same size?

What is It

Consider the parallelogram below to represent Rene's cloth. Each corner is named by a letter as shown. A quadrilateral is named using the consecutive letters in its corner. When naming a quadrilateral, it is important that the consecutive vertices are in the correct sequence, either clockwise or counterclockwise. Thus, the parallelogram below can be named as parallelogram ABCD. This can also be called as parallelogram BCDA, CDAB, DCBA, etc.

A diagonal line segment is drawn from corner A to its opposite corner C. This line segment AC is called a diagonal of parallelogram ABCD. What shapes can we see? Yes, by drawing a diagonal line segment connecting the two opposite corners, we divided the quadrilateral into two triangles of equal sizes.



For our discussion, let us use the name parallelogram ABCD (▱ ABCD).

A **parallelogram** has two opposite sides that are parallel and of equal lengths. In parallelogram ABCD,

the length of side AD is equal to the length of side BC

$$AD = BC$$

the length of side AB is equal to the length of side DC

$$AB = DC.$$

The two triangles formed by diagonals can be named in many ways using the letters representing the corners. The vertices are named in consecutive order either clockwise or counterclockwise.

Triangle 1: ΔABC, ΔACB, ΔCBA, ΔCAB, ΔBAC, ΔBCA

Triangle 2: ΔACD, ΔADC, ΔCAD, ΔCDA, ΔDAC, ΔDCA

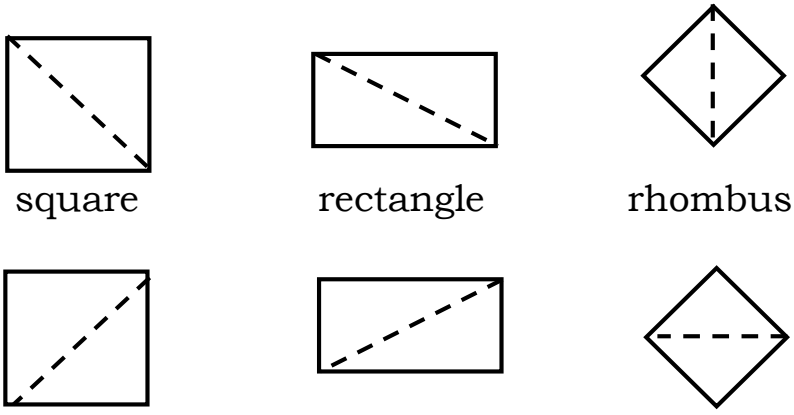
These two triangles have equal sizes.

We say that triangle ABC is congruent to triangle ACD. This is written as

$$\Delta ABC \cong \Delta ACD$$

Now, Rene has two triangles of the same size which he can use as flaglets. These are ΔABC and ΔACD.

Look at these other kinds of quadrilaterals. They are divided in two ways by drawing a diagonal line segment connecting the two opposite corners.



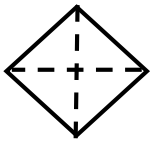
square rectangle rhombus

What shapes were formed out of the parallelogram when a diagonal line segment was drawn connecting the two opposite corners?

Yes, two triangles are formed when a diagonal line segment is drawn connecting the two opposite corners of a parallelogram. So, if a parallelogram is divided by a diagonal, two triangles of the same size can be formed.

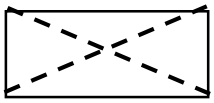
If a rhombus or a square is divided by two diagonals, four triangles of the same size will be formed.

square

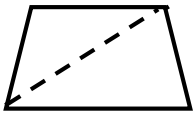


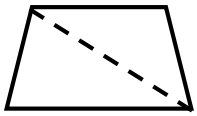
rhombus

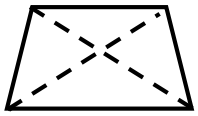
If two diagonals are drawn in a rectangle, the opposite triangles formed are of equal size.



For a trapezoid, if a diagonal line is drawn connecting its two opposite corners, it is divided into two triangles of different sizes. If two diagonals are drawn, four triangles are formed with different sizes.







REMEMBER

All three-sided polygons are called triangles.

All four-sided polygons are called quadrilaterals.

If one diagonal of a parallelogram is drawn, two triangles of the same size are formed.

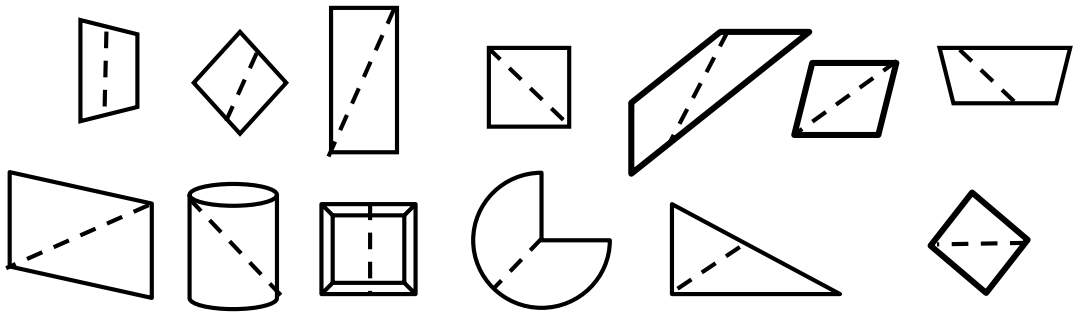
If two diagonals are drawn in parallelograms with four equal sides (square and rhombus), four triangles of the same size are formed.

For a trapezoid, different sizes of triangles will be formed when diagonals are drawn.

What's More

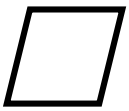
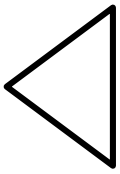
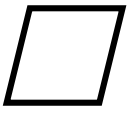
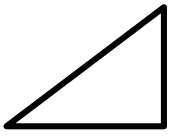
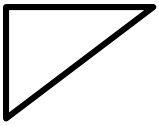
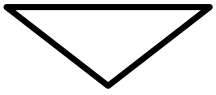
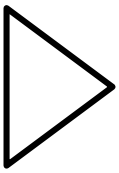
Activity 1 – "Pick Me Up"

Identify the quadrilateral that has two triangles of the same size. Write your answer on a separate sheet of paper.



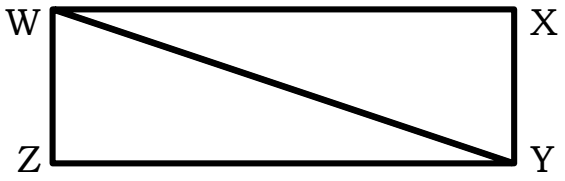
Activity 2 – "Patch It Up"

Match the figure in Column B that when combined with the figure in Column A will form a parallelogram. Write your answer on a separate sheet of paper.

A	B
1.	a. 
2. 	b.
3. 	c.
4. 	d. 
5. 	e. 

Activity 3 – "Name It"

Refer to the given parallelogram and answer the questions below. Write your answer on a separate sheet of paper.



1-2. Give the two pairs of parallel sides that are equal in length:

_____ and _____

_____ and _____

3-6. Name the parallelogram in at least four ways.

_____, _____, _____, _____

Name the two triangles in at least three ways:

7-9. Triangle 1 _____, _____, _____,

10-12. Triangle 2 _____, _____, _____,

SUPERB, if you got a score of 18 and above. You are now ready for the assessment.

If your score is below 18, kindly study again the lesson and the activities.

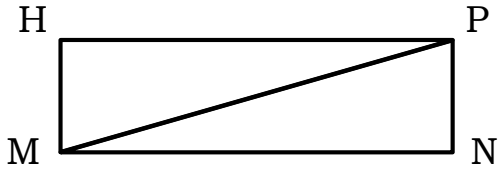
What I Have Learned

Let us remember the following:

1. All three-sided polygons are called triangles.
2. All four-sided polygons are called quadrilaterals.
3. If one diagonal is drawn connecting opposite corners of parallelograms (parallelogram, square, rectangle, rhombus), two triangles of the same size will be formed.
4. If two diagonals are drawn in parallelograms with four equal sides (rhombus and square), four triangles of the same size are formed.
5. If two diagonals are drawn in a rectangle, the opposite triangles formed are of equal size.
6. If a diagonal or two diagonals of a trapezoid are drawn, the triangles formed are of different sizes.

What I Can Do

Using the parallelogram below, fill in the blanks. Write your answer on a separate sheet of paper.



1. Name the parallelogram in at least four ways.
   _____, _____, _____, _____
2. Name the two triangles in at least three ways.
   Triangle 1 - _____, _____, _____
   Triangle 2 - _____, _____, _____
3. Name the two pairs of parallel sides.
   _____ and _____
   _____ and _____

Assessment

I. Fill in the blanks with the correct answers from the box. Write your answer on a separate sheet of paper.

1. A _____ is a 4-sided polygon.
2. If a diagonal is drawn connecting the two opposite corners of a parallelogram, 2 _____ are formed.
3. Triangle is a polygon with ____ sides.
4. The triangles formed by drawing a diagonal in a parallelogram have _____ sizes.
5. Different sizes of triangles will be formed when a diagonal is drawn connecting two opposite corners of a _____.
6. If two diagonals are drawn connecting the opposite corners of a rectangle, the two _____ triangles formed are of equal size.
7. If we will divide a parallelogram into two triangles of the same size, we have to draw a _____ connecting the two opposite corners.
8. If two diagonals are drawn in parallelograms with _____ equal sides, four triangles of the same size are formed.
9. Parallelograms and triangles are named using the _____ in their corners.
10. Parallelogram and triangle differ in the number of _____ and _____.

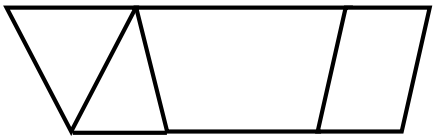
equal	quadrilateral	opposite
triangles	diagonal	letters
rectangle	angles	three
four	trapezoid	sides

Got a score of 8 -10? EXCELLENT! You already understood the lesson. You are now ready for the next module.

If your score is below 8, kindly study again the lesson and the activities.

Additional Activities

Draw a quadrilateral using a combination of different triangles and quadrilaterals. Write your answer on a separate sheet of paper.

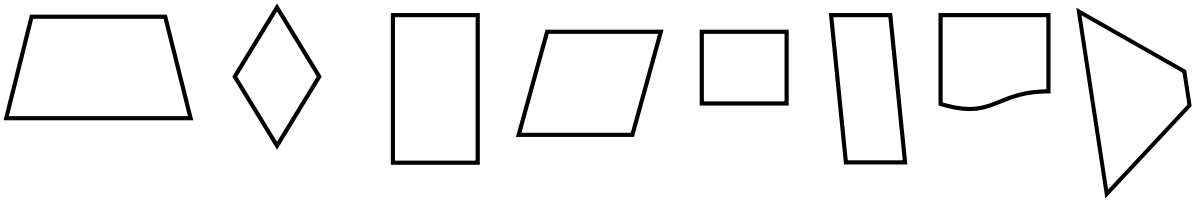
Example: 

What I Know

I. Choose the correct answer. Write your answer on a separate sheet of paper.

1. Which describes a quadrilateral?
   a. 4-sided polygon
   b. 3-sided polygon
   c. 2-sided polygon
2. Is a square a parallelogram? ____ Yes ____ No
3. Is a rectangle a parallelogram? ____ Yes ____ No
4. Is a rhombus a parallelogram? ____ Yes ____ No
5. Is a trapezoid a parallelogram? ____ Yes ____ No

II. Identify the parallelograms and copy them in your answer sheet.



Look at the Answer Key to check your answers.

VERY GOOD, if you got a score of 8 -10. This module is easy for you to learn. If your score is 7 or below, kindly study the lesson carefully and do the activities diligently.

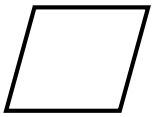
Lesson 2 Relationships of Quadrilateral to Another Quadrilateral

What's In

Let us review what quadrilaterals are.

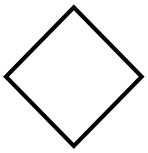
Based on the previous lesson, *quadrilateral* is defined as *a polygon with four sides*. The prefix "**quad**-" means "**four**," and "**lateral**" is derived from the Latin word for "**side**." So, a quadrilateral is a **four-sided polygon**.

A quadrilateral can have parallel opposite sides**.** The following polygons are quadrilaterals with one pair or two pairs of parallel opposite sides.


parallelogram

square

rectangle

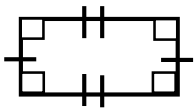

rhombus

trapezoid

What's New

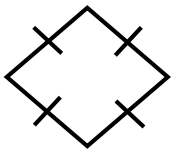
A parallelogram, square, rectangle, rhombus and trapezoid are all quadrilaterals. They are all four-sided polygons and have four corners. However, not all of them have two pairs of parallel opposite sides.

All polygons with **two pairs of parallel opposite sides** are called ***parallelograms***. Parallel lines will never meet or intersect with each other. **Square, rectangle, and rhombus are all parallelograms.** All of them have two pairs of opposite sides that are parallel.



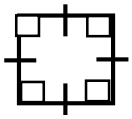
rectangle

A rectangle is a parallelogram with two pairs of parallel sides. Its opposite sides are congruent. Its four corners form right angles.



rhombus

A rhombus is a parallelogram with two pairs of parallel sides. All of its sides are equal. Opposite angles are equal.



square

A square is a parallelogram with two pairs of parallel sides that are of equal lengths. Its four corners are right angles. Therefore, a square is a type of rhombus and rectangle.

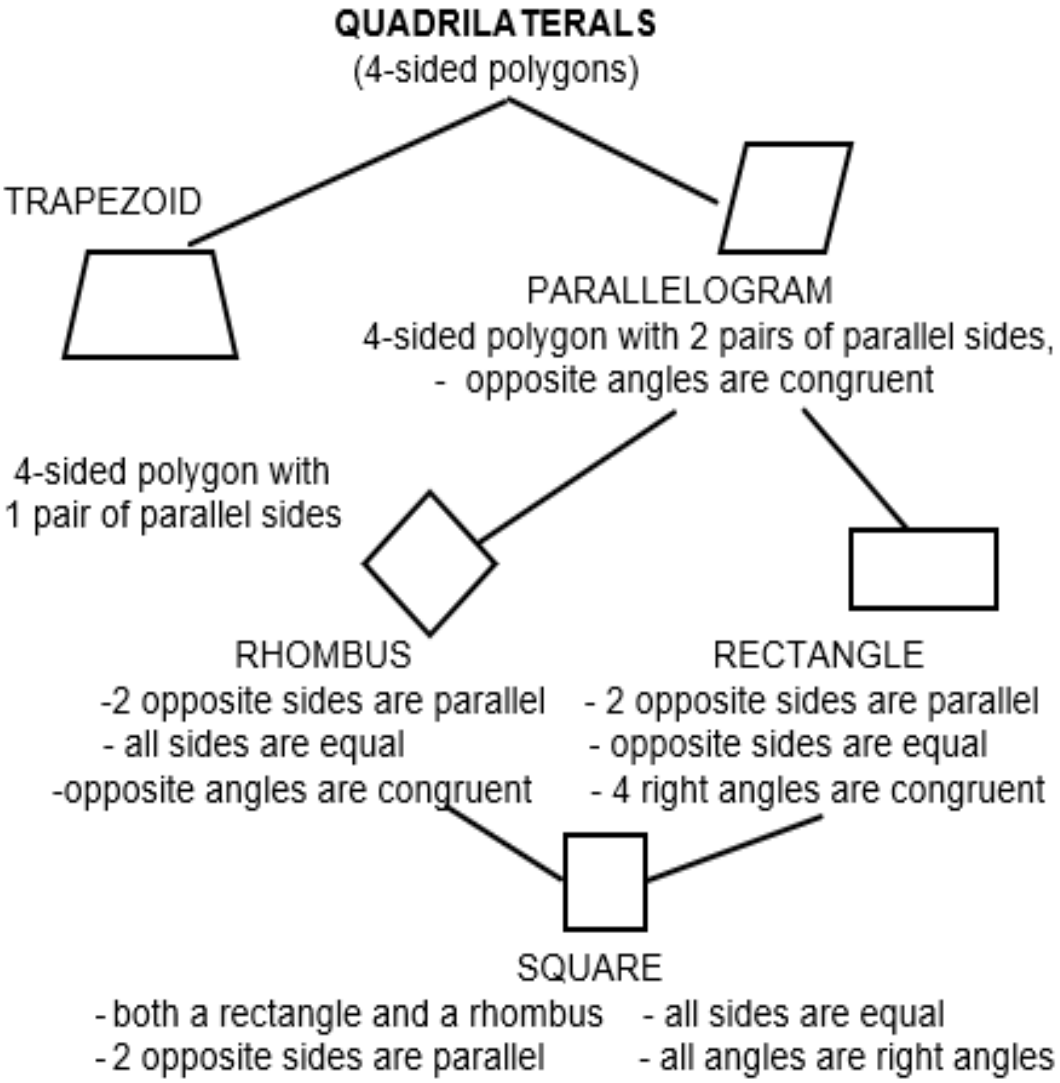
On the other hand, a quadrilateral that has exactly one pair of parallel sides is called a trapezoid. A trapezoid is not a parallelogram.

trapezoid

All four-sided polygons are **quadrilaterals**. All polygons with two parallel opposite sides are called ***parallelograms.*** Square, rectangle, and rhombus are all parallelograms since their opposite sides are parallel. Square is both a rectangle and a rhombus.

What is It

Let us study the diagram on properties of quadrilaterals.



What's More

Activity 1 – "My Properties"

Identify the quadrilateral with the given properties. Select the answer from the box. Write your answer on a separate sheet of paper.

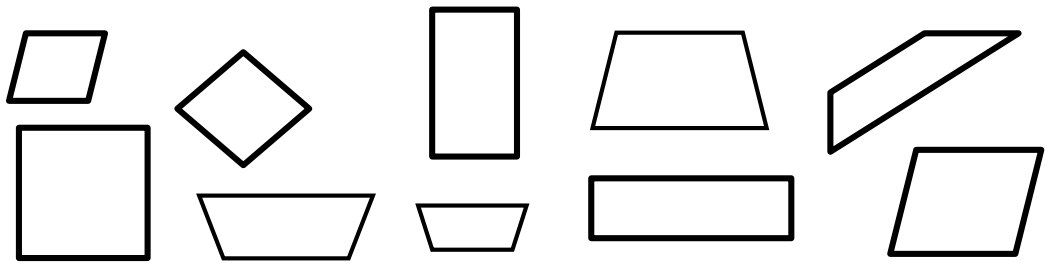
rhombus	rectangle	trapezoid
square	parallelogram	quadrilateral

1. I have 2 pairs of parallel sides. All my sides are equal. My four corners form right angles. I am both a rectangle and a rhombus.
2. My sides are all equal. My opposite sides are parallel. My opposite angles are congruent.
3. I am a 4-sided polygon.
4. My opposite sides are equal.
   I have four right angles.
5. I am a 4-sided polygon with 2 pairs of parallel sides.

Activity 2 – "Where Do I Belong?"

Group the objects based on their properties. Write your answer on a separate sheet of paper.

With 2 pairs of parallel sides and all sides are equal	With only one pair of parallel sides	With 2 pairs of parallel sides and opposite sides are equal



Activity 3 – "Describe Me"

Describe the properties of each quadrilateral. Write your answer on a separate sheet of paper.

1. square
2. rectangle
3. trapezoid
4. rhombus
5. parallelogram

If your score is 18-20, GREAT JOB! You are now ready to answer the assessment.

If your score is below 18, kindly study again the lesson.

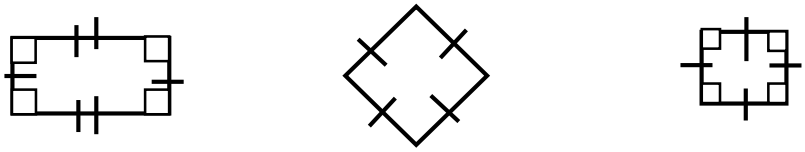
What I Have Learned

Let us remember the following:

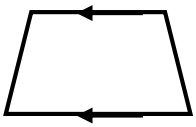
These polygons are **quadrilaterals** because all of them have **four sides.**

parallelogram square rectangle rhombus trapezoid

Quadrilaterals with two pairs of parallel opposite sides are called **parallelograms**. Square, rectangle and rhombus have two pairs of parallel sides. Therefore, they are all parallelograms.



Square is always a rectangle because it is a parallelogram with 4 right angles. Square is also a rhombus because it has 2 pairs of parallel sides that are of equal lengths.



trapezoid

However, one quadrilateral has exactly one pair of parallel sides and is called trapezoid. Since it does not have 2 pairs of parallel sides, a trapezoid is not a parallelogram.

What I Can Do

Using the different kinds of quadrilaterals, make a design of cabinets in your bedroom. Write your answer on a separate sheet of paper.

Assessment

I. Write the letter of the best answer on a separate answer sheet.

1. Which best describes a quadrilateral?
   a. 2-sided polygon
   b. 3-sided polygon
   c. 4-sided polygon

2. Why is a square a rhombus?
   a. It has 4 equal sides.
   b. It has two pairs of parallel sides.
   c. It has two pairs of parallel sides and 4 equal sides.

3. What property makes a square a rectangle?
   a. It has 4 equal sides.
   b. It has 4 right angles.
   c. It has two pairs of parallel sides and 4 right angles.

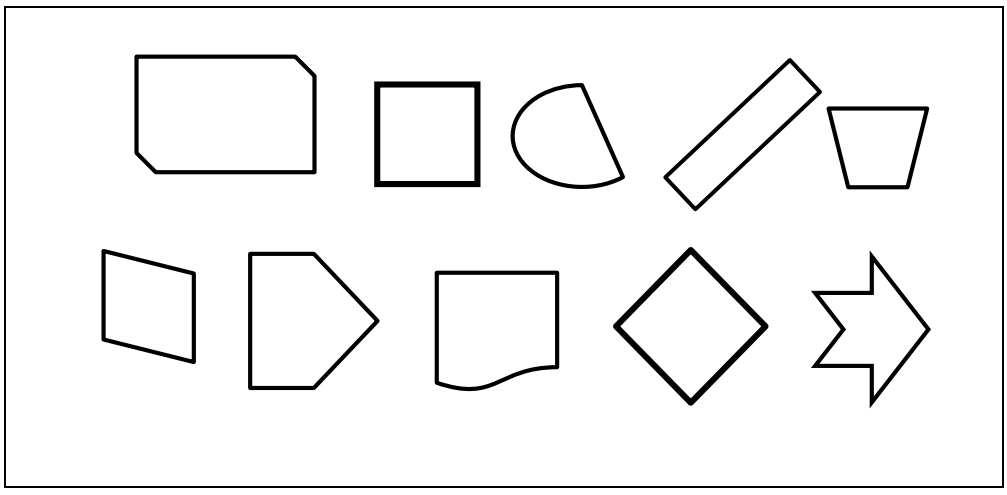
4. What property makes a rhombus a parallelogram?
   a. It has 4 right angles.
   b. It has only 1 pair of parallel sides.
   c. It has 2 pairs of parallel sides.

5. Why is a trapezoid not a parallelogram?
   a. It has 4 right angles.
   b. It has only 1 pair of parallel sides.
   c. It has 2 pairs of parallel sides.

II. Explain how the following quadrilaterals are related. Write your answer on a separate sheet of paper.
1. square and rectangle
2. square and rhombus
3. quadrilaterals and parallelogram
4. rhombus and parallelogram
5. trapezoid and parallelogram

Additional Activities

Identify and copy the parallelograms found in the box. Write your answer on a separate sheet of paper.



Answer Key

Assessment

1. quadrilateral
2. triangles
3. three
4. equal
5. trapezoid
6. opposite
7. diagonal
8. four
9. letters
10. side and angles

Additional Activities

Some examples only.

What I Can Do

1. Possible names of the parallelogram
▱HPNM, ▱HMNP, ▱PNMH, ▱PHMN, ▱MNPH, ▱ MHPN, ▱NPHM, ▱NMHP

2. Possible names of the triangles

Triangle 1 - ΔHMP, ΔHPM, ΔPHM, ΔPMH, ΔMHP, ΔMPH
Triangle 2 - ΔPNM, ΔPMN, ΔNPM, ΔNMP, ΔMPN, ΔMNP

3. HP and MN, HM and PN

LESSON 1

What I Know

1. b
2. a
3. a
4. b
5. c
6. c
7. c
8. c
9. b
10. a

What's More

Activity 1

Activity 2

1. c
2. e
3. a
4. d
5. b

What's More

Activity 1

1-2 side WX and side ZY; side WZ and side XY

3-6 possible names of parallelogram

▱WZYX, ▱WXYZ, ▱XWZY, ▱XYZW, ▱YXWZ, ▱YZWX, ▱ZYXW, ▱ZWXY

7-9 Possible names of triangle 1

△WZY, △WYZ, △YWZ, △ZYW, △YZW, △ZWY

10-12 Possible names of triangle 2

△WXY, △WYX, △YWX, △YXW, △XWY, △XYW

What's More

Activity 3

1. It has 2 pairs of parallel sides.
   Its 4 sides are qual.
   It has 4 right angles.
2. It has 2 pairs of parallel sides.
   The opposite sides are equal.
   It has 4 right angles.
3. It has only 1 pair of parallel sides.
4. It has 2 pairs of parallel sides.
   Its 4 sides are equal.
   Its opposite angles are congruent.
5. It is a polygon with 2 pairs of parallel sides.

What I Can Do

Answers may vary.

Assessment

II.

1. Square is always a rectangle because it has 4 right angles.
2. Square is a rhombus because it has 2 pairs of parallel sides that are of equal length.
3. Both quadrilaterals and parallelograms have 4 sides.
4. Rhombus and parallelogram have two parallel sides and equal opposite angles.
5. Trapezoid is not a parallelogram because it has only 1 pair of parallel sides.

Additional Activities

Assessment

I.

1. c
2. c
3. b
4. c
5. b

LESSON 2

What I Know

I.

1. c. 4-sided polygon
2. Yes
3. Yes
4. Yes
5. No

What I Know

II.

What's More

Activity 1

1. square
2. rhombus
3. quadrilateral
4. rectangle
5. parallelogram

What's More

Activity 2

With 2 pairs of parallel sides and all sides are equal	With only one pair of parallel sides	With 2 pairs of parallel sides and opposite sides are equal

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DepEd Order No. 12, s. 2020.Adoption of the Basic Education Learning Continuity Plan for SY 2020-2021 In Light of the Covid-19 Public Health Emergency. June 19, 2020. p. 342.

toppr.com. 2021. *Triangles and Quadrilaterals*. [online] Available at: <https://www.toppr.com/guides/maths/basic-geometrical-ideas/triangles-and-quadrilaterals/> [Accessed 23 March 2021].

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4

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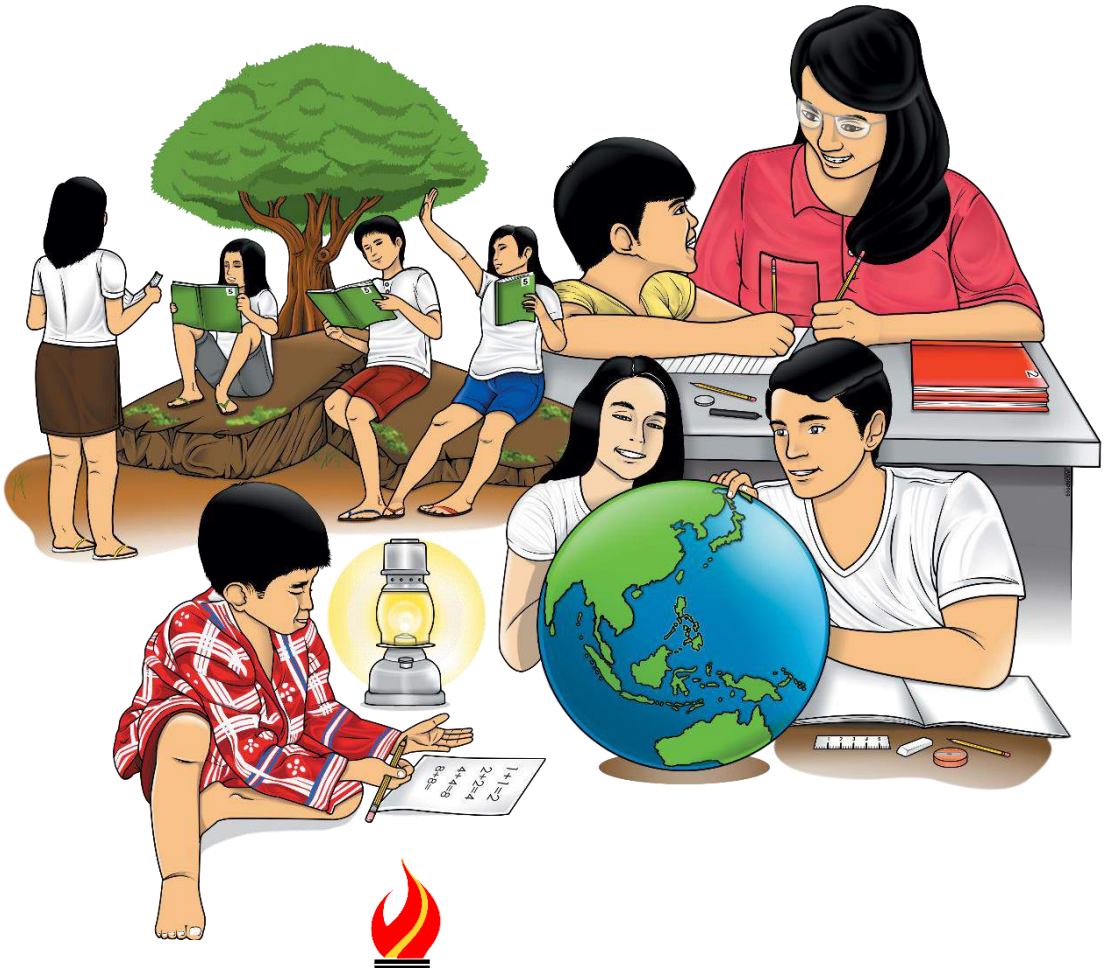
Mathematics

Quarter 3 – Module 5:
Determining the Missing Terms in a Sequence



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Quarter 3 – Module 5: Determining the Missing Terms in a Sequence
First Edition, 2020

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Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by _____

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4

Mathematics

Quarter 3 – Module 5:
Determining the Missing Terms in a Sequence

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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

This module was designed in order to assist you learn how to determine the missing term/s in a sequence of numbers.

In this lesson, you will be guided on how to find or give the rule in determining the missing term/s. The learning activities allow you to explore, discover and appreciate the beauty of patterns that can be seen in different objects around us. You will also be taught on how patterns are created in the succeeding activities.

After going through this module, you are expected to:

1. determine the missing term/s in a sequence of numbers, etc.; and

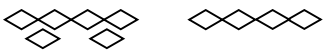
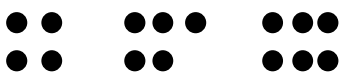
2. give/state the rule in determining the missing term/s in a sequence.

What I Know

Let us check first your knowledge about patterns.

You need a sheet of paper for the activities.

A. Fill in the blank with the missing term.

1. A B C A B C A B _____
2. 1 2 3 4 5 _____
3. 0 00 000 0000 _____
4.  _____
5.  _____

B. Identify the applicable rule for each pattern. Choose the answer from the box.

1. 3 5 7 9 _____
2. 1 2 3 4 _____
3. 8 6 4 2 _____
4. 5 10 15 20 _____
5. 9 8 7 6 _____

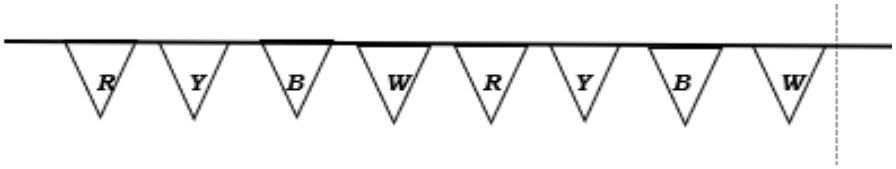
Add 5	Subtract 1	Add 1
Subtract 2	Subtract 5	Add 2

Check your answers with the Answer Key on page 14.

If you got a score of 8-10, you're GREAT. This lesson will be very easy for you.

If your score is 7 or below, you need to study carefully the lesson and the activities.

What's In

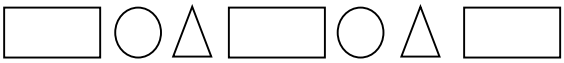


Every community celebrates fiesta. During fiesta we see *banderitas (flaglets)* hanged along the streets. If you notice, these *banderitas* are of different colors and are arranged alternately such as red, yellow, blue, white, red, yellow, blue, white and this arrangement of colors continues until the end of the rope. This arrangement shows pattern.

Let us see if you can look for the pattern in each activity.

I. Study the pattern and fill in the next term on the line provided.

1. _____

2.  _____

3. _____

4. A B C D _____

5. A1 B2 C3 D4 _____

Please check your answer at the last page of this module. Did you get the right answer? If yes, then you know already what pattern is.

What's New

I am Hana. Every Saturday and Sunday I help my mother sell flowers in the market. For each day of helping her, mother gives me ₱ 10.00. I save this amount in my piggy bank so that I could buy a gift for her on her birthday. It's been one month now since I started saving. How much do I have now? How about on the next Saturday and Sunday?

If you were Hana would you also help your parents earn a living? What would you do with the money given by your parents?

If you are given an allowance daily, will you save part of it?

Is saving important?

Let us help Hana compute her savings.

What is It

Let us compute Hana's savings using this table.

	For one month								**For next month**	
	Sat	**Sun**	**Sat**	**Sun**	**Sat**	**Sun**	**Sat**	**Sun**	**Sat**	**Sun**
Saving	₱ 10	₱ 10	₱ 10	₱ 10	₱ 10	₱ 10	₱ 10	₱ 10	₱ 10	₱ 10
Total	10	20	30	40	50	60	70	80	?	?

Let us add the Hana's savings.

10 + 10 = 20 20 + 10 = 30 30 + 10 = 40 40 + 10 = 50

50 + 10 = 60 60 + 10 = 70 70 + 10 = 80

Her savings for one month amounted to ₱ 80.00. In order to know her savings for the next Saturday and Sunday of the following month, we will add again ₱10 for each day.

Saturday ➡ 80 + 10 = 90 Sunday ➡ 90 + 10 = 100

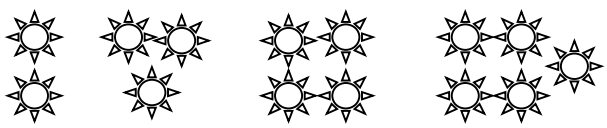
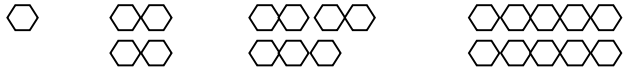
So, her savings for the next Saturday will be ₱ 90.00 and the next Sunday will be ₱ 100.00.

Why were we able to give the next total amount of Hana's savings? Do you see any pattern in the amount saved?

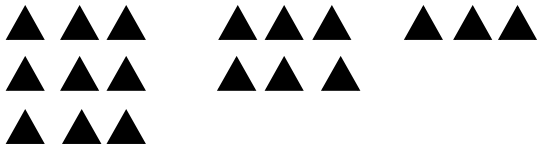
Yes, there is a pattern of adding ₱ 10.00 so, it is easy to give the next total amount of savings.

This is called **Number Pattern**. Number pattern is ***a pattern or sequence in a series of numbers***. This pattern establishes a common relationship between all numbers. The difference between consecutive numbers helps us understand their relationship.

In early grades, learners are already taught about patterns starting from illustrations up to numerals. Let us study these patterns and their rule:

Pattern	**Rule**
	Add one
	Add three

Subtract two



Subtract three

In order to know the next term, you have to study the patterns and know the rule.

First, see if the objects are getting more or getting less. If it gets more, then it is being added. If it gets lesser, then it is being subtracted.

In numerals, we can easily find the rule by looking into the next term and subtracting the term before it if it is in increasing order. The difference is what is being added to the existing numeral in order to get the numeral next to it.

2, 4, 6, 8, ____ , ____ 4 - 2 = **2** , 6 - 4 = **2** , 8 - 6 = **2**

Rule ➡ Add 2 to find the next term
So, the missing terms are **10** and **12**

5, 10, 15, 20, ____ , ____ 10 - 5 = **5** , 15 - 10 = **5** , 20 – 15 = **5**

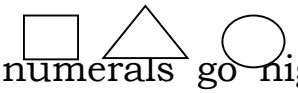
Rule ➡ Add 5 to find the next term
So, the missing terms are **25** and 30

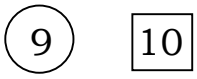
If it is in decreasing order, subtract the previous term from the new term. The difference is what is being subtracted from the existing numeral to get numeral next to it.

33, 30, 27, 24, ____, ____ 33 -30 = **3** , 30 - 27 = **3** , 27-24 = **3**

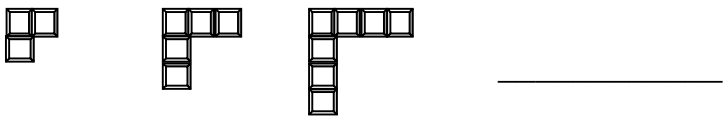
Rule ➡ Subtract 3 to find the next term
So, the missing terms are **21** and **18**

Sometimes the pattern is a combination of sequence of illustrations and numerals like the following:

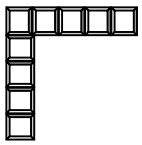
As what we can see, the three shapes  are drawn repeatedly and sequentially as the numerals go higher. Therefore, the missing terms will be:



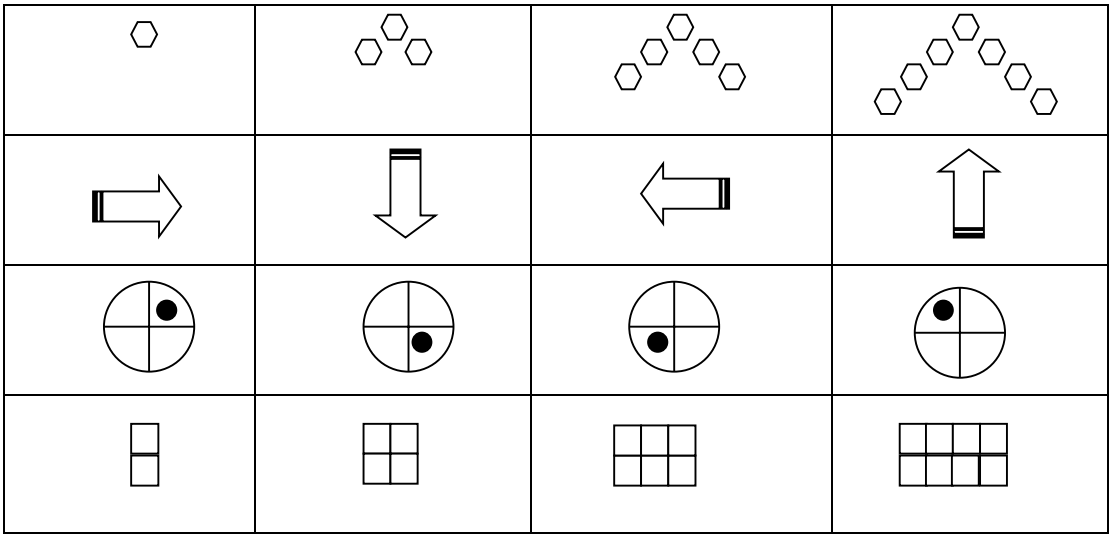
In some instances, **patterns of figures** are used. We just need to observe the series of sequence of objects or illustrations in order to get the next terms.



Looking carefully into the pattern as to how the objects or figures have been arranged, we can see that a is being added to both ends so, the next term will be:



Here are some examples:



Let us have some more examples of finding patterns.

Rico's Uncle Rudy is in the hospital. He plans to visit him every other day. His first visit was on Monday. What days will be his second, third and fourth visits?

Let us list down the days of the week and identify the days that Rico will visit his uncle. Every other day means that there is a day in between that he will not be in the hospital.

Monday	Tuesday	Wednesda	Thursday	Friday	Saturda	Sunday
1st visit		2nd visit		3rd visit		4th visit

Therefore, Rico's second, third and fourth visits will be on Wednesday, Friday and Sunday.

If you will look at the 2021 calendar, you will see that February has only 28 days. But every leap year, February has 29 days. Leap years are years where an extra day is added to the shortest month, February. It occurs every four years. Year 2020 was a leap year. When will be the next three consecutive leap years?

With the pattern that leap year happens every four years, this will be the next three consecutive leap years:

$2020 + 4 = \boxed{2024}$ $2024 + 4 = \boxed{2028}$ $2028 + 4 = \boxed{2032}$

Did you find it easy?

Just carefully study the pattern and sequence of numbers and figures in order for you to give the next term/s or the missing term/s.

What's More

Let us check what you have learned from the lessons.

Activity 1 – "Next Please"

Study the patterns and fill the missing term on the blank.

1. 3 , 6 , 9 , 12, _____
2. 4 , 8 , 12, 16, _____
3. 65, 60, 55, 50, _____
4. 36, 30, 24, 18, _____
5. 1 , 3 , 5 , 7 , 9 , _____

.

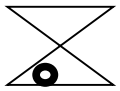
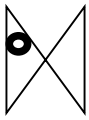
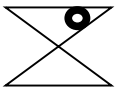
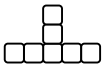
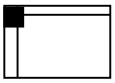
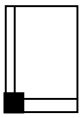
Activity 2 - "Rule Me Up"

State the rule for each pattern.

1. 10, 20, 40, 80, 160 _____
2. 22, 33, 44, 55, 66 _____
3. 50, 40, 30, 20, 10 _____
4. 36, 33, 30, 27, 24 _____
5. 41, 35, 29, 23, 17 _____

Activity 3 - "Draw The Next"

Draw the next pattern.

1.				
2.				
3.				
4.				
5.				

Score of:

12 – 15 → **EXCELLENT**! You can proceed to the assessment.

8 – 11 → **THAT'S GOOD**! You are almost there. Review the lessons where you find difficulty.

Below 8, kindly study carefully the given examples and explanations and you may ask help from someone who knows the lesson such as your teachers or parents.

What I Have Learned

Let us keep in mind what pattern is.

Pattern is a design or arrangement that repeats continuously.

- **Number pattern** is *a pattern or sequence in a series of numbers*. This pattern establishes a common relationship between all numbers. The difference between consecutive numbers helps us understand their relationship.
- **Patterns of Figures** *refer to a pattern or sequence in a series of figures or illustrations* showing common relationship.

In finding the rule, study closely how the sequence of numbers and/or figures are formed.

What I Can Do

Make at least 3 series of patterns using the following rules.

1. Starting from 3 balls, add 4 more
2. Starting from 10 boxes, subtract 2
3. Starting from numeral 1, multiply it by 3

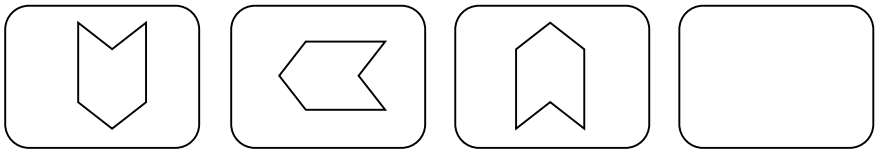
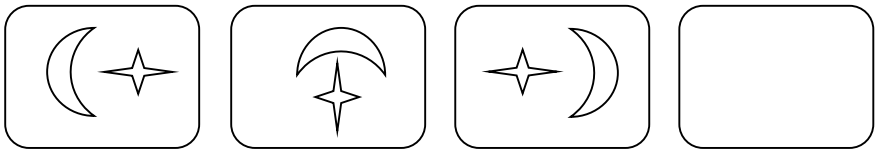
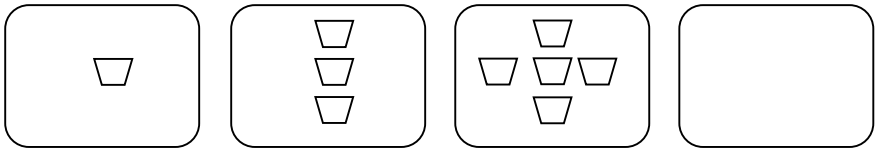
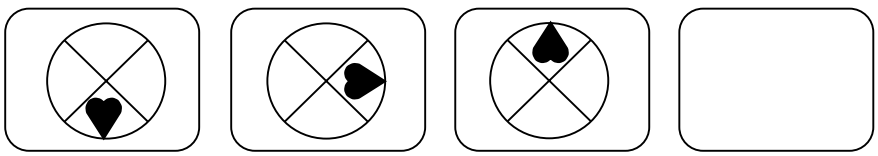
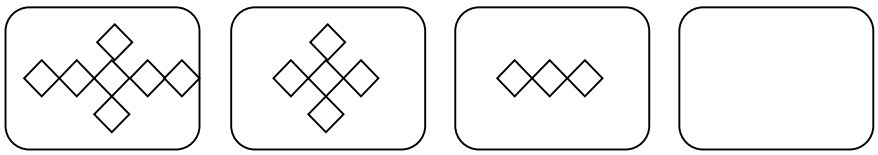
Check your answers with the Answer Key on page 14. If you got it right, you may go to assessment. If not, go back and review the examples and the activities.

Assessment

I. Match the pattern to its rule. Write the letter of the correct answer on your notebook.

A	**B**
___ 1. 8 , 14, 20, 26, 32	a. Add 10
___ 2. 35, 28, 21, 14, 7	b. Multiply by 2
___ 3. 11, 22, 44, 88, 176	c. Subtract by 5
___ 4. 33, 43, 53, 63, 73	d. Subtract by 7
___ 5. 90, 85, 80, 75, 70	e. Add 6

II. Study the figures and fill in the box with the missing term.

1. 
2. 
3. 
4. 
5. 

You're a **SUPER KID** if your score is 8-10. You are now ready for the next module.

With a score below 8, go back and study carefully the examples and explanations.

Additional Activities

Using what you have learned in patterns, make a design of what you would like to have in the walls of your bedroom.

Answer Key

What I Know

A.
1. C
2. 6
3. ●●●●●
4. ◇◇
5. ●●●●●●●

B.
1. Add 2
2. Add 1
3. Subtract 2
4. Add 5
5. Subtract 1

What's In

1. ⓘⓘⓘⓘⓘ
2. ◯
3. ☾

4. E
5. E5

What's More

Activity 1 – "Next Please"
1. 15
2. 20
3. 45
4. 12
5. 11

Activity 2 – "Rule Me Up"
1. Multiply by1 2
2. Add 11
3. Subtract 10
4. Subtract 3
5. Subtract 6

Activity 3 – "Draw the Next"

1.
2.
3.
4.
5.

What I Can Do

1. ⓘⓘⓘⓘ	ⓘⓘⓘⓘⓘⓘⓘⓘ	ⓘⓘⓘⓘⓘⓘⓘⓘⓘⓘⓘⓘⓘⓘⓘⓘ
2.		
3. 1	3	9

Assessment

I.
1. **E**
2. **D**
3. **B**
4. **A**
5. **C**

II.

1. 2. 3. 4. 5.

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DepEd Order No. 12, s. 2020.Adoption of the Basic Education Learning Continuity Plan for SY 2020-2021 In Light of the Covid-19 Public Health Emergency. June 19, 2020. p. 342.

https://www.toppr.com/guides/maths/can-you-see-the-pattern/pattern-in-figures-and-numbers/

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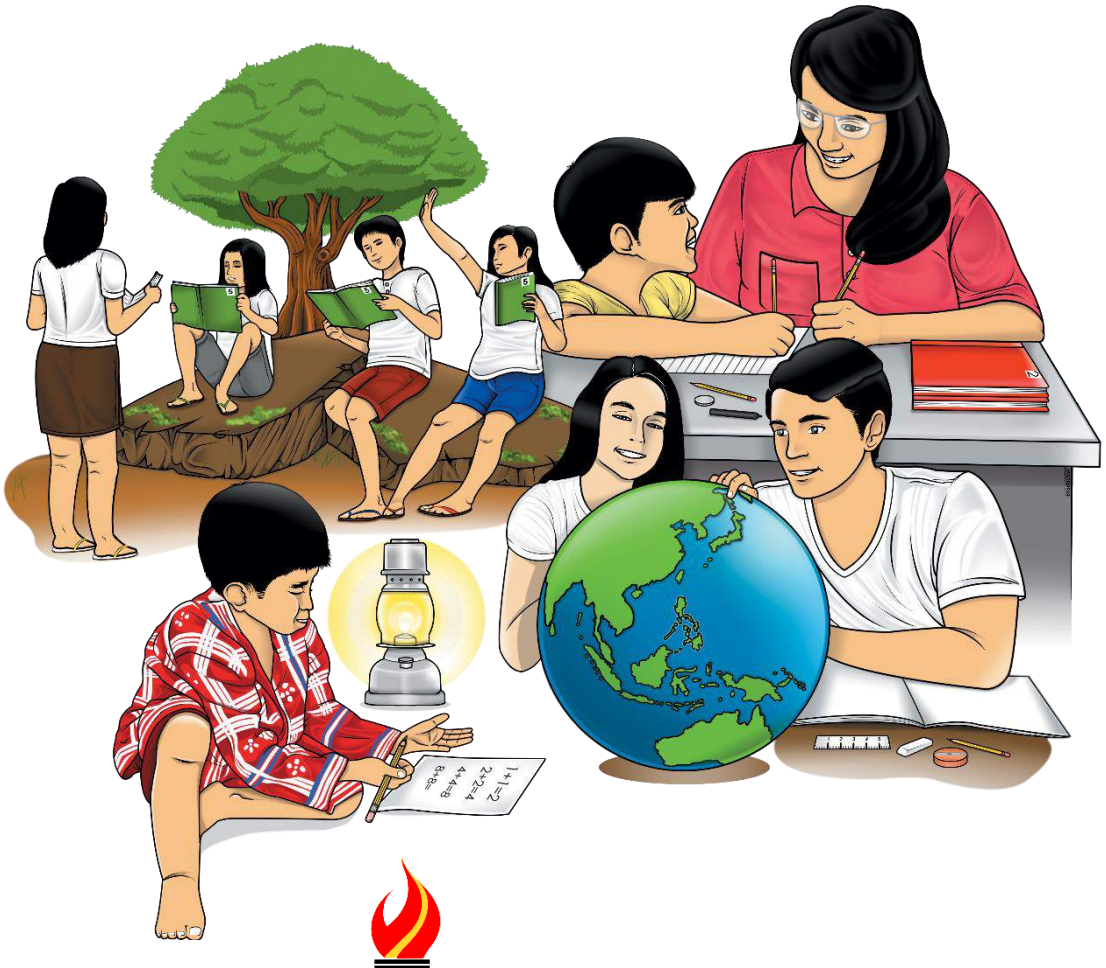
Mathematics

Quarter 3 – Module 6:
Finding the Missing Number in an Equation



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Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by _____

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4

Mathematics

Quarter 3 – Module 6:
Finding the Missing Number in an Equation

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Thank you.

What I Need to Know

From the previous quarter, you have already learned how to find the missing term/s in a sequence of numbers/figures and give/state the rule in determining the missing term/s in a sequence.

As you explore this new lesson, you will learn about finding the missing number in an equation involving properties of operations. Read on and explore to see how your knowledge in the properties of operations would help you solve the equations in every activity in this module.

At the end of this module, you should be able to:

- find the missing number in an equation involving properties of operations.

What I Know

Find the missing number in a number sentence involving operations of whole numbers.

1. 5 + ___ = 55
2. ____ - 12 = 20
3. 3 + ___ + 5 = 15
4. 15 x 3 = ____
5. ___ + 7 = 13

What's In

What property of operation is expressed in the following equations? Choose your answer from the box on the side.

1. 0 x 1 = 0
2. 2 x 3 = 3 x 2
3. 1 x 5 = 5
4. 2 + (4 + 5) = (2 + 4) + 5
5. 3 x (2 + 4) = (3 x 2) + (3 x 4)

Commutative Property
Associative Property
Zero Property
Identity Property
Distributive Property of Multiplication over Addition

What's New

An **equation** is a mathematical sentence that states the equality of expressions.

Look at these equations. Could you give the missing number/s?

A. (10 x 2) + (10 x 5) = ___ x (__ + 5)

B. (40 + 5) + (___+ 15) = (___+ 15) + (40 + 30)

How will you make each equation correct? **Try to evaluate each equation.**

In the first equation, you will use the ***Distributive Property of Multiplication over Addition:***

A. (10 x 2) + (10 x 5) = **10** x (**2** + 5)
20 + 50 = 10 x 7
70 = 70

In the second equation, you will use the ***Commutative Property*** *and* ***Associative Property of Addition:***

B. (40 + 5) + (**30** +15) = (**5** + 15) + (40 + 30)
45 + 45 = 20 + 70
90 = 90

Note:

The properties of operations help us find the missing numbers in an equation. We can evaluate an equation by performing the operations in each expression.

What is It

READ AND LEARN MORE

Let us take a look at some other examples.

Example #1:

(8 x 5) x 4 = **8** x (5 x **4**)
40 x 4 = 8 x 20
160 = 160

Here, we use the **Associative Property of Multiplication** which provides that you can multiply numbers regardless of how they are grouped and get the same product.

32 + **59** + 8 = 32 + **8** + 59
99 = 99

Here we use the **Commutative Property** which states that the order in which the numbers are added does not affect the sum.

Example #2

Filipinos are known for being resilient. That is why, even if many people lost their jobs during this pandemic, many have find ways to earn a living for their family to survive. Francisco family thought of raising chickens as their source of income, so they gathered 48 big bamboos and 28 small bamboos for their poultry house. How many bamboos did they gather? Show the addition sentence in two ways.

- How many big bamboos did they gather? How about the small bamboos?
  - They gathered 48 big bamboos and 28 small bamboos.

- Number sentence
  - 48 + 28 = 76
  - 28 + 48 = 76

- Does the sum changes? Why?
  - No, because based from the Commutative Property of Addition, changing the order of the addends does not change the sum.

Example #3

Brgy. Katipunan distributed facemasks in three different *Puroks* namely Magalang, Masigasig, and Matapang. If the first two *Puroks* received 9 and 8 boxes of facemasks, respectively, how many boxes of facemasks will *Purok Matapang* gets if the total number of boxes of facemasks is 45? Write the number sentence in two ways and solve it.

- How many boxes of facemasks did *Purok Magalang* receive? How about *Purok Masigasig*?
  - *Purok Magalang* received 9 boxes of facemasks while *Purok Masigasig* received 8 boxes.
- Write the number sentence.
  - 9 + (8 + **<u>28</u>**) = 45
  - (9 + 8) + **<u>28</u>** = 45
- Does the sum changes? Why?
  - No, because based from the Associative Property of Addition, changing the grouping of the addends does not change the sum.

Example #4

Rene earns ₱120.00 per day by working every morning as a dishwasher at Linda's Café and ₱250.00 a day by working every afternoon as a cook at Gloria's Diner. If he works for 5 days a week in both places, how much is his earning in a week?

- What are the jobs of Rene?
  - Dishwasher and Cook

- How much does he earn as a dishwasher? As a cook?
  - He earns ₱120.00 per day as a dishwasher and ₱250.00 per day as a cook.

- How many days does he work in a week?
  - 5 days

- What is the number sentence?
  - (5 x 120) + (5 x 250) = 1 850
  - 5 x (120 + 250) = 1 850

- What property is used to solve the problem?
  - Distributive Property of Multiplication Over Addition

What's More

Find the missing number/s that would make the equation correct then identify the properties of operation involved. Write your answer in your notebook.

1. 12 + 24 + 34 = 34 +12 + ___

2. 2 x (15 +20) = (__ x 15) + (2 x ___)

3. 8 x 7 = ___ x 8

4. 24 + ___ = 5 + ___

5. (__ x 5) x 4 = 8 x (__ x 4)

If you are done answering the activity, please go to the ***Answer Key*** and check if your answers are correct.

Thank you for your honesty in answering and checking your work. Hope you will do this until the end of this module.

What I Have Learned

What is an equation? What should you remember in finding the missing numbers in an equation? Is there a need to evaluate an equation?

An **equation** states equality of two expressions separated by an equal sign. The **Properties of Operations** help us find the missing numbers in an equation. We can evaluate an equation by performing the operations in each expression.

What I Can Do

On a separate sheet of paper fill in the blank with the missing number/s that will make the equations true using the properties of operations.

1. ___ x (4 + 8) = (2 x __) + (2 x ___)
2. 6 + 10 + 12 + 24 = (___ + ___) + (6 + 24)
3. (7 x 1) + 0 = ___ x (1 + ___)
4. 12 x ___ = ___ x 15
5. ___ + 240 = 460 + ___

If you are done answering the activity, please go to the ***Answer Key*** and check if your answers are correct.

Thank you for your honesty in answering and checking your work. Hope you will do this until the end of this module.

Assessment

Give the property of operations used in each equation. Then, write the missing number/s.

1. (6 + 12) + (5 + 7) = (5 + ___) + (___ + 12) _____
2. (7 x 6) x 5 = ___ (6 x ___) _____
3. 20 + ___ = 40 + ____ _____
4. 24 + (36 + 50) = (___ + ___) + 50 _____
5. 7 x (10 +5) = (___ x 10) + (7 x ___) _____

Check your answer with the answer key. If you get…

4- 5 Excellent! You may now proceed to the next lesson.
2- 3 You need to review the processes you missed.
0-1 You need to repeat the whole process. Ask your teachers or parents to help you.

Additional Activities

In a separate sheet of paper, fill in the blank with the missing number/s to make the equations correct. Use the hint provided.

1. (3 + 2) + 20 = ___ + (___ + 20) (Associative)
2. 6 x (5 + 10) = (___ x 5) + (6 x __) (Distributive)
3. (45 + 0) + (1 x 50) = (__ +0) + (1 x __) (Identity/Zero)
4. 9 x __ = 5 x ___ (Commutative)
5. (8 x __) x 5 = ___ x (6 x 5) (Associative)

Check your answers with the **Answer Key**.

If you get all the items correctly, you may now proceed to the next module.

Otherwise, review the lessons and ask the guidance of your teachers or parents.

Answer Key

What I Know

1. $5 + \underline{50} = 55$
2. $\underline{32} - 12 = 20$
3. $3 + \underline{7} + 5 = 15$
4. $15 \times 3 = \underline{45}$
5. $\underline{6} + \underline{7} = 13$

What's In

1. Zero Property
2. Commutative Property
3. Identity Property
4. Associative Property
5. Distributive Property of Multiplication Over Addition

What's More

1. $12 + 24 + 34 = 34 + 12 + \underline{24}$ - Commutative Property
2. $2 \times (15 + 20) = (\underline{2} \times 15) + (2 \times \underline{20})$ - Distributive Property of Multiplication Over Addition
3. $8 \times 7 = \underline{7} \times 8$ - Commutative Property
4. $24 + \underline{5} = 5 + \underline{24}$ - Commutative Property
5. $(\underline{8} \times 5) \times 4 = 8 \times (\underline{5} \times 4)$ - Associative Property

What I Can Do

1. $\underline{2} \times (4 + 8) = (2 \times \underline{4}) + (2 \times \underline{8})$
2. $6 + 10 + 12 + 24 = (10 + 12) + (6 + 24)$
3. $(7 \times 1) + 0 = \underline{7} \times (1 + \underline{0})$
4. $12 \times \underline{15} = \underline{12} \times 15$
5. $\underline{460} + 240 = 460 + \underline{240}$

Assessment

1. $(6 + 12) + (5 + 7) = 95 + \underline{7}) + (\underline{6} + 12)$ - Associative Property
2. $(7 \times 6) \times 5 = \underline{7} \times (6 \times \underline{5})$ - Associative Property
3. $20 + \underline{40} = 40 + \underline{20}$ - Commutative Property
4. $24 + (36 + 50) = (\underline{24} + \underline{36}) + \underline{50}$ - Associative Property
5. $7 \times (10 + 5) = (\underline{7} \times 10) + (7 \times \underline{5})$ - Distributive Property of Multiplication Over Addition

Additional Activities

1. $(3 + 2) + 20 = \underline{3} + (\underline{2} + 20)$ - Associative Property
2. $6 \text{ X } (5 + 10) = (\underline{6} \text{ X } 5) + (6 \text{ X } \underline{10})$ - Distributive Property
3. $(45 + 0) + (1 \text{ X } 50) = (\underline{45} + 0) + (1 \text{ X } \underline{50})$ - Identity/Zero Property
4. $9 \times \underline{5} = 5 \times \underline{9}$ - Commutative Property
5. $(8 \times \underline{6}) \times 5 = \underline{8} \times (6 \times 5)$ - Associative Property

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Tabilang, Alma R. et. al, 2015, **Mathematics 4 Teacher's Guide** pp. 304-307, Department of Education

Tabilang, Alma R. et. al, 2015, **Mathematics 4 Learner's Material** pp. 171-172, Department of Education

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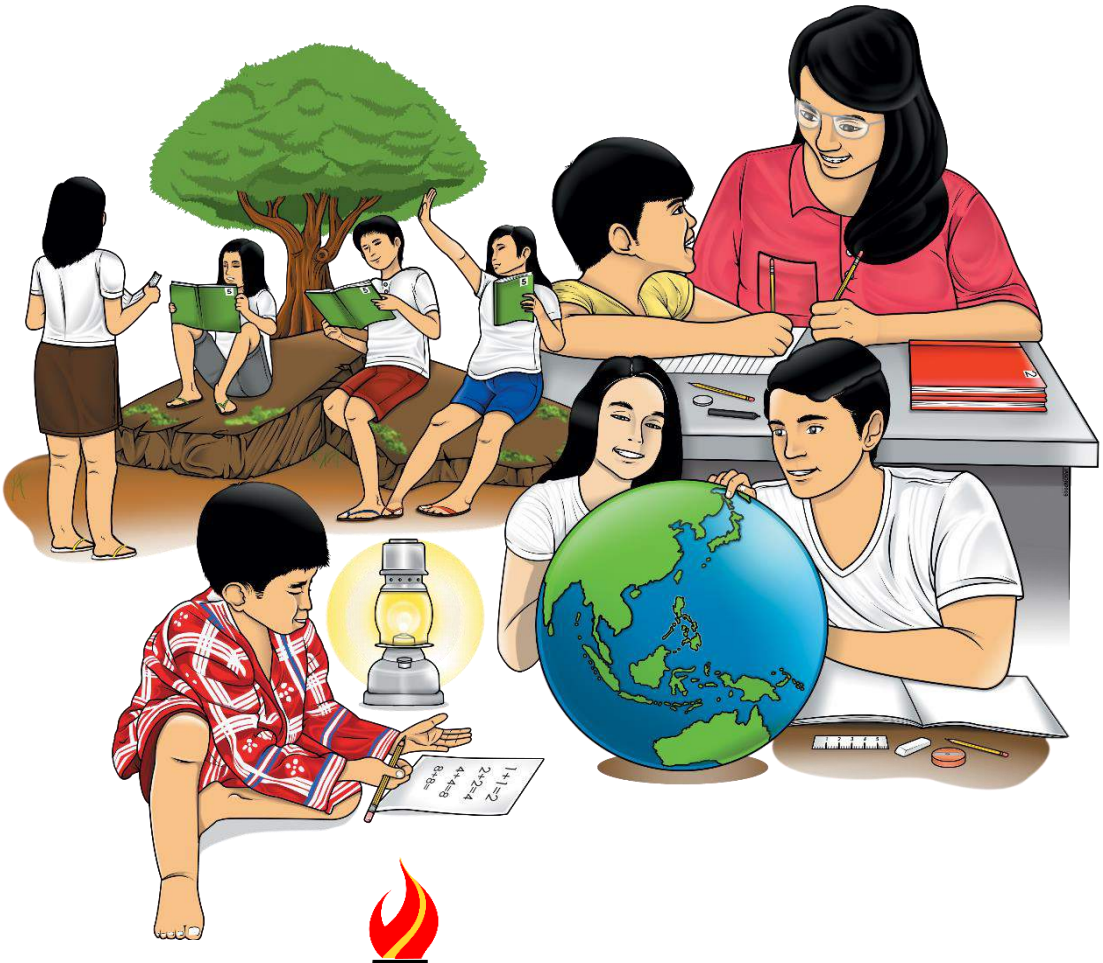
Quarter 3 – Module 7:
Elapsed Time



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Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by _____

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Mathematics

Quarter 3 – Module 7:
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Thank you.

What I Need to Know

Good day to you! Do you know how to read time in minutes or seconds? Reading time is necessary for you to be able to find the length of time that an event occurred. This is called elapsed time. **Elapsed time** identifies how long you had been doing an activity like reading, cooking, browsing the internet, cleaning, etc. You will also learn to estimate elapsed time in minutes and seconds which is an essential skill in telling time. Real-life problems are also presented for you to know how important elapsed time is.

Finding elapsed time is different from just adding or subtracting numbers because in here, hours, minutes and seconds are all different units. So, GOODLUCK! Enjoy this module and remember that "Time is gold!"

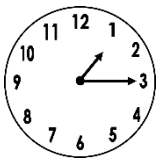
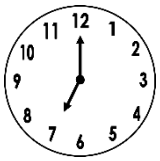
After going through this module, you are expected to:

1. find the elapsed time in minutes and seconds;
2. estimate the duration of time in minutes; and
3. solve problems involving elapsed time.

What I Know

Read the following items carefully and provide what is asked. Write your answers on your answer sheet.

A. The following items show the start and end times for particular events. Determine the elapsed time in each item. (*You can use an improvised clock or the wall clock in your home.)*

	Start Time	**End Time**	**Elapsed Time**
1.			a. 25 minutes b. 15 minutes c. 30 minutes
2.			a. 6 minutes b. 30 minutes c. 10 minutes

B. Find the elapsed time.

3. Time ended: 10 : 35
   Time started: 10 : 20
   ☐

4. Time ended: 9 : 14
   Time started: 8 : 40
   ☐

C. Determine the time difference. Round off to the nearest tens of minutes and then estimate the elapsed time.

5. 8 : 47 →
   5 : 32 → ☐

6. 10 : 54 →
   9 : 43 → ☐

7. 6 : 09 →
   4 : 03 → ☐

8. 42 : 46 →
   39 : 49 → ☐

D. Read and solve each problem.

9. Beatrize started answering one of her modules in Mathematics 4 at 8:30 in the morning and finished it at 9:25 a.m. How long did she spend answering her module?

10. Mother went to a grocery store to buy some necessities. She entered the store at 7:45 a.m. Because there were many customers in the store, she went out at 9:36 a.m. How long did it take her in the grocery store?

To check, please go to page 15 and check the ***Answer Key***. If you got a score of 8 – 10, VERY GOOD! The lesson will be easy for you. If you got a score of 7 or below, study carefully the discussion and examples in this module.

Lesson 1 Elapsed Time

What's In

Activity A

Use the table of equivalence below to answer the following. Write your answers on your answer sheet.

1 hour = 60 minutes
1 minute = 60 seconds

1. 3 hours = _____ minutes

2. 4 minutes = _____ seconds

3. 300 seconds = _____ minutes

Activity B

4. What is 15 minutes before 10:00 a.m.? _____

5. What is 8 minutes after 5:00 p.m.? _____

6. What is 3 minutes before noon? _____

If you are done answering the activity, please go to the answer key of this module on page 15 and check if your answers are correct.

What's New

Do you make your school projects yourself with minimal to no help from others? What do you do if your project is difficult? Do you submit them on time? At an average, how much time do you spend per project.

Read the problem below and figure out how you can estimate the answer and determine the exact answer**.**

> *Steve helps his sister in making a project out of recycled plastic bottles. They started making the project at 5:32 p.m. If they finished the project at 6:25 p.m., how long did they make the project? About how long did they make the project?*

What is It

You can solve the problem about the time spent by Steve in completing the project by estimating the elapsed time and finding the exact elapsed time.

Let us see if we have the same answer. Read and follow the presentation then let us check if you got the elapsed time and the estimated elapsed time correctly.

There are two questions that we are going to answer:

Question a): How long did they make the project?

Question b): About how long did they make the project?

In Question 1, we need to find the **exact elapsed time**, while in Question 2 we will find the **estimated elapsed time**.

Let us solve the problem by answering the following questions:

1. What are asked in the problem?
2. What are given?
3. What operation will you use?
4. What is the number sentence?
5. How are the solutions done?
6. What are the answers to the problem?

***NOTE**: The six questions follow the 4-Step Plan in Problem Solving introduced in the previous modules (Understand, Plan, Solve, Check and Look Back).*

1. *What are asked in the problem?*
   ANSWERS:
   a. The time Steve and his sister spent in making the project.
   b. The estimated time Steve and his sister spent in making the project.

2. *What are given in the problem?*
   ANSWERS: 5:32 p.m. – time started
   6:25 p.m. – time ended

3. *What operation will you use?*
   ANSWER: SUBTRACTION

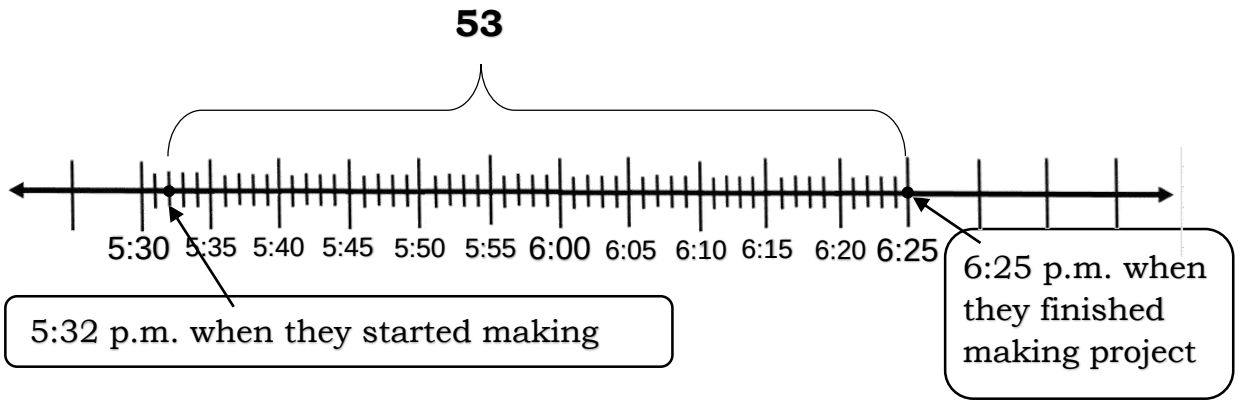
4. *What is the number sentence?*
   ANSWER: 6:25 – 5:32 = N

5. *How are the solutions done?*

SOLUTION FOR QUESTION 1: How long did they make the project?

Let me present to you two methods on how to find the elapsed time.

Method 1: Using Number Line



You noticed that from 5:32 pm to 6:25 pm, the time elapsed is 53 minutes.

Method 2: Subtraction

$$\begin{array}{rl} & 6:25 \longrightarrow 5:\mathbf{60}+25 \\ & 6:25 \longrightarrow 5:85 \\ - & 5:32 \longrightarrow 5:32 \\ \hline & 0:53 \end{array}$$

Subtract the time in minutes. (25 – 32). We cannot subtract the time in minutes because 25 is smaller than 32, so we will regroup by borrowing 1 hour from 6. (6 – 1=5)
Rename 1 hour as 60 minutes.
Add 60 and 25 minutes. (60+25=85)
Subtract again the time in minutes, and then the hours.

So, they made the project for 53 minutes.

SOLUTION FOR QUESTION 2: About how long did they make the project?

Let us find the estimated elapsed time.

Round the times in tens of minutes.

Study this

Actual Times		Estimated Times
6 : 25	⟶	6 : 30
− 5 : 32	⟶	5 : 30
		1 : 00

Subtract the estimated times starting the rounded time in tens of minutes and then hours.

Therefore, they made the project for about one hour.

Compare the actual elapsed time (Question 1) and the estimated elapsed time (Question 2).

Actual Elapsed Time: ***53 minutes***
Estimated Elapsed Time: ***1 hour***

Are the answers close enough? Is the estimated elapsed time reasonable?

Study the following examples in finding elapsed time and estimated time.

ELAPSED TIME

A. (With Regrouping)

1: 60 + 13

$$\begin{array}{r} 2:13 \\ -\ 1:55 \\ \hline \end{array} \longrightarrow \begin{array}{r} 1:73 \\ 1:55 \\ \hline \mathbf{0:18} \end{array}$$

B. (Without Regrouping)

$$\begin{array}{r} 4:48 \\ -\ 4:15 \\ \hline \mathbf{0:33} \end{array}$$

C.(With seconds)

Hour: Minute: Second

$$\begin{array}{r} 0:35:49 \\ -\ 0:21:37 \\ \hline \mathbf{0:14:12} \end{array}$$

ESTIMATED ELAPSED TIME

A. (With Renaming)

Estimated Times 9: 60 + 20

$$\begin{array}{r} 10:24 \\ -\ 9:37 \\ \hline \end{array} \longrightarrow \begin{array}{r} 10:20 \\ 9:40 \\ \hline \end{array} \longrightarrow \begin{array}{r} 9:80 \\ 9:40 \\ \hline \mathbf{0:40} \end{array}$$

B. (Without Renaming)

Estimated Times

$$\begin{array}{r} 2:38 \\ -\ 2:15 \\ \hline \end{array} \longrightarrow \begin{array}{r} 2:40 \\ 2:20 \\ \hline \mathbf{0:20} \end{array}$$

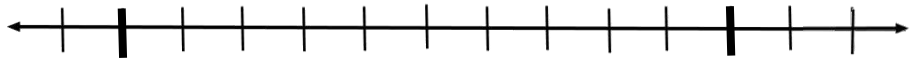
Now, you already learned our lesson on elapsed time. This time you are now ready for more activities. LET'S GO!!!

What's More

Activity A

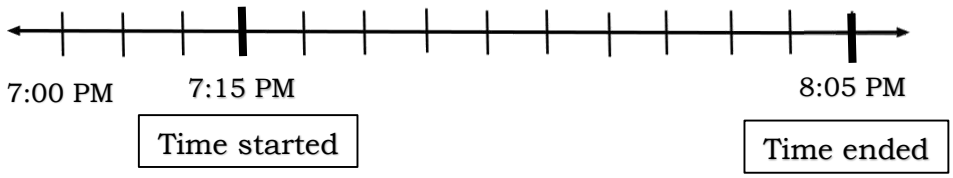
Find the elapsed time shown in each number line.

1.



0 sec 5 sec — 30 sec — 55 sec

Time started — Time ended

2. 

Activity B

Complete the following table by providing the elapsed time.

Start Time	End Time	Elapsed Time
0:03:05	0:03:49	1.
8:05 p.m.	8:54 p.m.	2.
7:36 a.m.	8:12 a.m.	3.

Activity C

Round the given time in tens of minutes and estimate the elapsed time.

1.	Actual Times	Rounded times
Time Ended	11:47	
Time Started	11:34	
Estimated Elapsed Time		

2.	Actual Times	Rounded times
Time Ended	5:42	
Time Started	5:08	
Estimated Elapsed Time		

Activity D

Read the following problem and answer the following questions.

During weekends, Greta helps her mother in washing their clothes. They started washing at 8:10 a.m. and finished at 8:55 a.m. How long did they wash their clothes?

1. What is asked? _____
2. What are the given facts? _____
3. What is the operation to be used? _____
4. What is the number sentence? _____
5. How is the solution done? _____
6. What is the answer? _____

Please check your answers for each activity using the ANSWER KEY on page 15. If you answered more than 80% of them, Great Job! Keep Up the Good Work! If you have some mistakes, go back and review the lesson again and decide which of the solutions presented is easy for you.

What I Have Learned

Always remember the following:

TO FIND THE ESTIMATED ELAPSED TIME:

1. Round the times in minutes.
2. Subtract the rounded times in tens of minutes.
3. Subtract the hours.

Note: Regroup if necessary by borrowing one hour. Rename one hour to 60 minutes and add to the given time in minutes. Then subtract again the time in minutes and hours.

TO FIND THE ELAPSED TIME:

Method 1: Use a number line by counting 5 minutes per unit.

Method 2: Subtract the minutes and then hours.

Note: Regroup if necessary by borrowing one hour. Rename one hour to 60 minutes and add to the given time in minutes. Then subtract again the minutes and hours.

TO SOLVE PROBLEMS INVOLVING ELAPSED TIME:

Use the 4-Step Plan: Understand, Plan, Solve, Check and Look Back

What I Can Do

Teacher Ruby grouped the class into five for a group activity during a Math lesson. She recorded the starting and end times that the groups had for the activity in the table below. Complete the table below by filling in the actual and estimated elapsed time. Answer the questions that follow. (*Remember: The lower the time, the faster the task was finished.)*

Group	Time Started	Time Ended	Actual Elapsed Time	Estimated Elapsed Time
Group 1	8:25 a.m.	8:52 a.m.		
Group 2	8:25 a.m.	8:43 a.m.		
Group 3	8:25 a.m.	8:49 a.m.		
Group 4	8:25 a.m.	8:54 a.m.		
Group 5	8:25 a.m.	8:37 a.m.		

1. Which group finished first? The last?
2. What operation did you use to solve each answer?
3. Which group finished faster, Group 3 or Group 4?
4. Which groups have the same longest estimated elapsed time?
5. If teacher Ruby will give additional points based on their time, which should be her basis, Actual elapsed time or Estimated elapsed time?

Please check your answers for each activity with the ANSWER KEY on page 15.

Assessment

Read the following items carefully and provide what is asked. Write your answers on your answer sheet.

A. Find the elapsed time.

1. Time ended: 8:57
   Time started: 8:35
   Elapsed Time: _____

2. Time ended: 0:25:45
   Time started: 0:25:24
   Elapsed Time: _____

3. Time ended: 12:14
   Time started: 11:36
   Elapsed Time: _____

B. Find the estimated elapsed time.

4. Time ended: 2:46 ⟶
   Time started: 2:12 ⟶
   Estimated Elapsed Time: ____

5. Time ended: 5:39 ⟶
   Time started: 5:28 ⟶
   Estimated Elapsed Time: _____

6. Time ended: 4:19 ⟶
   Time started: 3:42 ⟶
   Estimated Elapsed Time: ____

C. Solve the following problems.

7. The grade 4 pupils of Ms. Analyn took their lunch right after their class at 11:45 a.m. If they finished eating at 12:10 p.m., how long did they take their lunch?

8. Nico wakes up at 5:40 a.m. so that he will have time to prepare himself for school. At 6:10 a.m. he is ready to go to school. How long did it take Nico to prepare for school?

9. Alet started reviewing her lessons at 6:45 p.m. for a quiz the next day. She finished reviewing at 7:17 p.m. How long did she spend reviewing her lessons?

10. An airplane departs from Manila at 8:10 a.m. and arrives in Legazpi at 8:56 a.m. How long is the flight?

Please check your answers with the ANSWER KEY on page 15.

Additional Activities

Reminder: Before answering the following activity, please make a record of the time you started answering.

Solve each problem. Write the number sentence and state the complete answer.

1. The EPP class of Mrs. Fara-on started gardening at 3:45 p.m. and finished at 4:20 p.m. How long did they spend for gardening?

2. Teacher Elsie started telling a story to her kinder pupils at 10:15 a.m. and finished it at 10:35 a.m. How long is the story time?

3. At 6:42 p.m., Jhonabel starts answering her assignments. She finished it at 7:10 p.m. How long did she answer her assignments?

4. Aivan and Arjay went to an internet shop to research for their project in Science. They started researching at 5:25 p.m. and ended at 5:55 p.m. How long is their researching time?

5. After dinner, instead of watching TV, Akira always volunteers to wash the dishes and clean the dining table. She does this from 6:15 p.m. to 6:36 p.m. How many minutes did she spend washing the dishes and cleaning the dining table?

Now, record the time you finish answering the activity, then find the elapsed time. How long did you answer the activity? That is your own actual elapsed time for completing the activity.

To check, please go to page 15 for the ***Answer Key***. Congratulations for reaching this part of the module. You can always review the previous pages of this module if you need to.

Answer Key

What I Know

1.	A	3.	0:15 or 15 minutes
2.	B	4.	0:34 or 34 minutes

5. 8:47 → **8:50**; 5:32 → **5:30**; **3:20**
6. 10:54 → **10:50**; 9:43 → **9:40**; **1:10**
7. 6:09 → **6:10**; 4:03 → **4:00**; **2:10**
8. 42:46 → **42:50**; 39:49 → **39:50**; **3:00**

9. She answered her module for 55 minutes.
10. It took her 1:51 or 1 hour and 51 minutes in the grocery store.

What's In

1.	180 minutes	4.	9:45 AM
2.	240 seconds	5.	5:08 PM
3.	5 minutes	6.	11:57 AM

Assessment

1.	0:22	8.	30 minutes
2.	0:00:21	9.	32 minutes
3.	0:38	10.	46 minutes
4.	0:40		
5.	0:10		
6.	0:40		
7.	25 minutes		

What I Can Do

Group	Time Started	Time Ended	Actual Elapsed Time	Estimated Elapsed Time
Group 1	8:25 a.m.	8:52 a.m.	0:27	0:20
Group 2	8:25 a.m.	8:43 a.m.	0:18	0:10
Group 3	8:25 a.m.	8:49 a.m.	0:25	0:20
Group 4	8:25 a.m.	8:54 a.m.	0:29	0:20
Group 5	8:25 a.m.	8:37 a.m.	0:12	0:10

1. Group 5, Group 4
2. Subtraction
3. Group 3
4. Group 1, 3, and 4
5. Actual Elapsed Time

Additional Activities

1. 4:20 – 3:45 = N
   They spent 35 minutes for gardening.
2. 10:35 – 10:15 = N
   The story time is 20 minutes.
3. 7:10 – 6:42 = N
   She answered her assignment for 28 minutes.
4. 5:55 – 5:25 = N
   Their researching time is 30 minutes.
5. 6:36 – 6:15 = N
   She spent 21 minutes washing the dishes and cleaning the dining table.

What's More

Activity A

1. 50 seconds
2. 50 minutes

Activity B

1. 0:00:44 or 44 seconds
2. 0:49 or 49 minutes
3. 0:36 or 36 minutes

Activity C

1.	Actual Times	Rounded Times
Time Ended	11:47	11:50
Time Started	11:34	11:30
Estimated Elapsed Time		0:20

2.	Actual Times	Rounded Times
Time Ended	5:42	5:40
Time Started	5:08	5:10
Estimated Elapsed Time		0:30

Activity D

1. The time spent washing the clothes.
2. Time ended: 8:55 a.m.
   Time started: 8:10 a.m.
3. Subtraction
4. 8:55 – 8:10 = N
5. 8:55
   - 8:10
   0:45
6. The time they spent washing their clothes is 45 minutes.

References

Tabilang, Alma R. et al. *Mathematics 4 Learner's Material.* Department of Education. 2015.

Tabilang, Alma R. et al. *Mathematics 4 Teacher's Guide.* Department of Education. 2015.

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4

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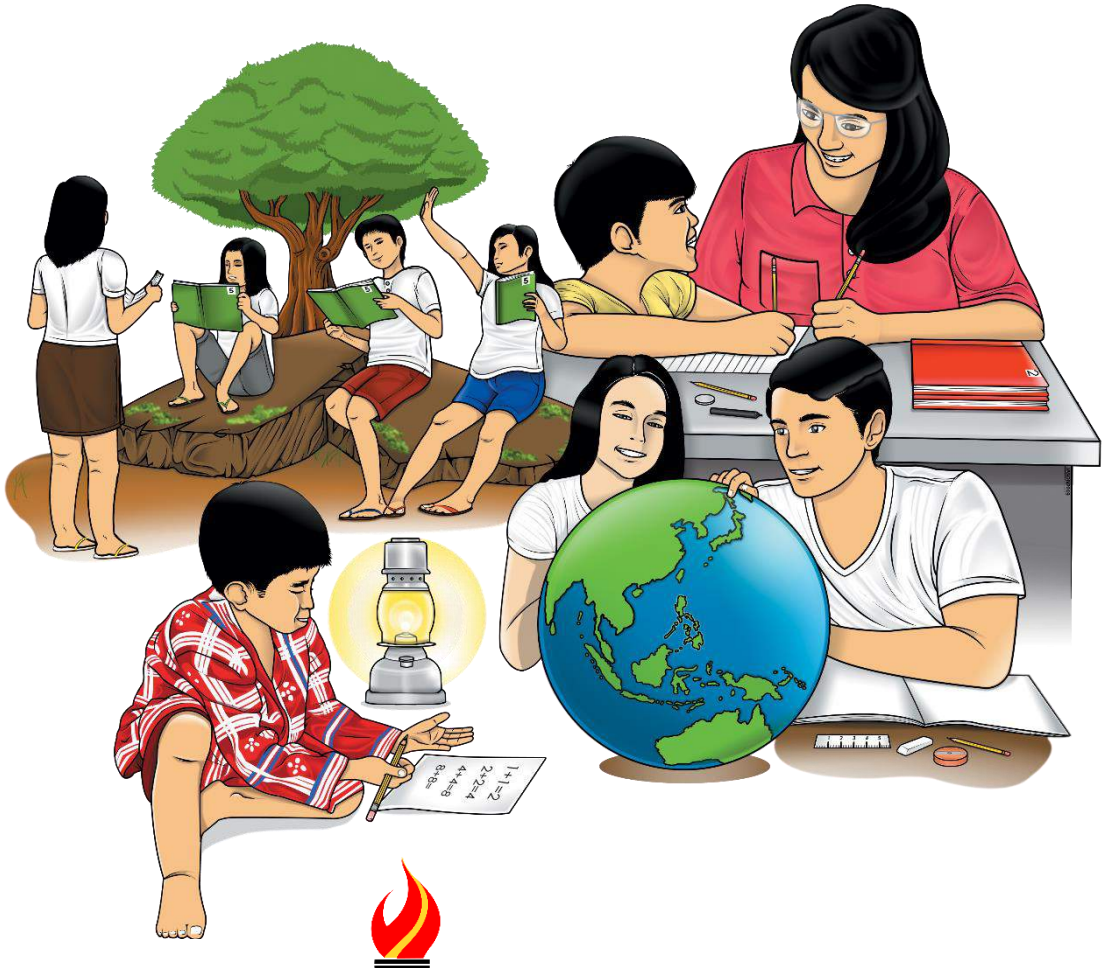
Mathematics

Quarter 3 – Module 8:
Perimeter



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Alternative Delivery Mode
Quarter 3 – Module 8: Perimeter
First Edition, 2020

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Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by _____

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4

Mathematics

Quarter 3 – Module 8:
Perimeter

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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

Have you experienced walking around outside your house? If you have done this, you already have walked the distance of the house's perimeter.

In this module, you will learn how to find the perimeter of a given figure. You can practically apply the things that you will learn from this module in your daily living.

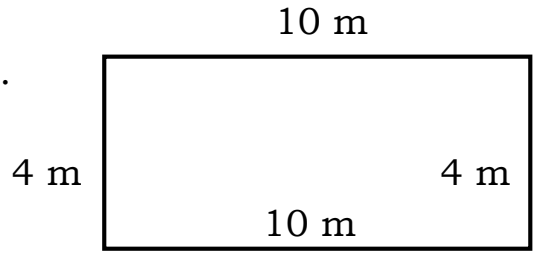
After going through this module, you are expected to:

1. visualize the perimeter of any given plane figure in different situations;
2. measure the perimeter of any given figure using appropriate tools; and
3. find the perimeter of triangles, squares, rectangles, parallelograms, and trapezoids.

What I Know

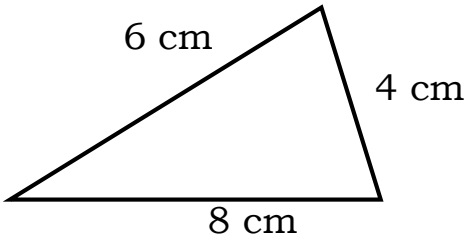
A. Study the figure carefully. Choose the letter of the correct formula/number sentence for finding the perimeter of each polygon.

1.



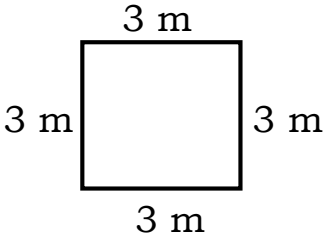
a. 10 m + 10 m + 10 m +10 m = n
b. 10 m + 10 m + 4 m + 4 m = n
c. 10 m - 4 m + 10 m - 4 m = n
d. 4 m + 4 m + 4 m +4 m = n

2.



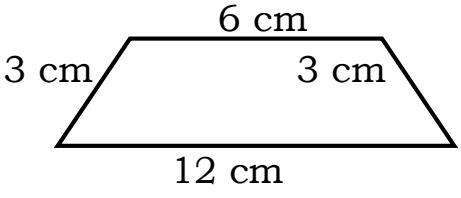
a. 8 cm x 6 cm + 4 cm = n
b. 8 cm - 6 cm + 4 cm = n
c. 8 cm + 6 cm + 4 cm = n
d. 8 cm - 6 cm x 4 cm = n

3.



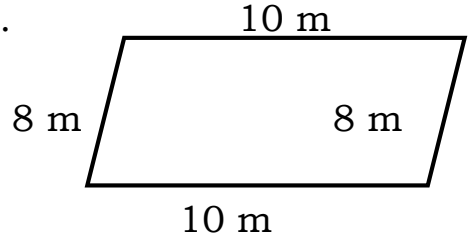
a. 3 m + 3 m + 3 m x 3m = n
b. 3 m x 3 m = n
c. 4 x 3 m = n
d. 3 m x 3 m x 3m – 3m = n

4.



a. 3 cm + 3 cm + 6 cm + 12 cm = n
b. 3 cm x 3 cm + 6 cm + 12 cm = n
c. 12 cm - 3 cm + 6 cm + 3 cm = n
d. 3 cm + 3 cm + 6 cm - 12 cm = n

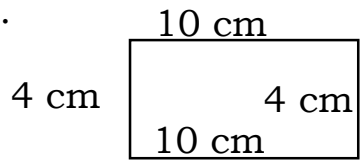
5.



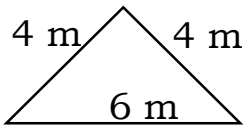
a. 10 m x 8 m = n
b. 10 m + 8 m = n
c. 2 x (10 m + 8 m) = n
d. 8 m + 10 m – 8 m = n

B. Find the perimeter of each figure.

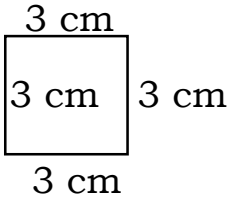
6.



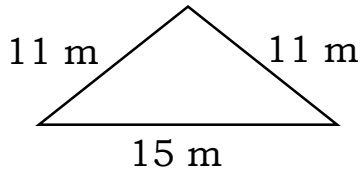
7.



8.



9.



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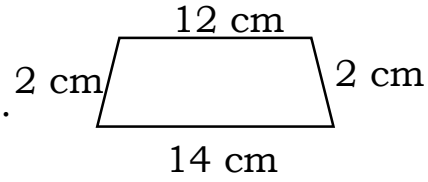


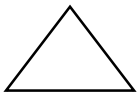
If you are done answering the activity, please go to the ***Answer Key*** on page 15 and check if your answers are correct. Thank you for your honesty in answering and checking your work. Hope you will do this until the end of this module.

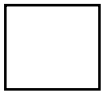
Lesson 1 Perimeter

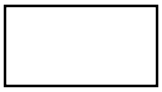
What's In

Let us review first some of the concepts that can help you understand perimeter.

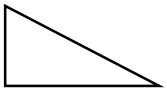
Examine closely the different polygons. Count the number of sides of each polygon and write the answer on the space provided.

1.  _____

2.  _____

3.  _____

4. _____

5.  _____

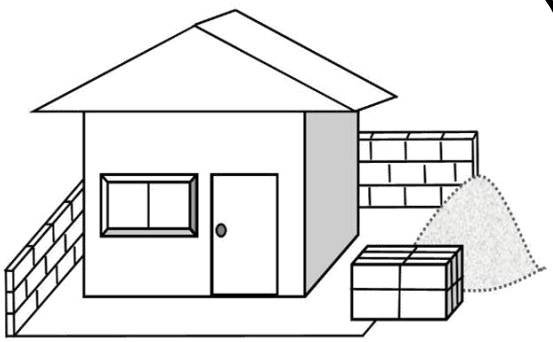
If you are done answering the activity, please go to the ***Answer Key*** on page 15 and check if your answers are correct. Thank you for your honesty in answering and checking your work. Hope you will do this until the end of this module.

What's New

Let us start learning the new concept with the help of this story problem.

Read the story problem.

Narlito is planning to build a fence around their house. The shape of their lot is rectangular with the sides of 12 meters, 10 meters, 12 meters and 10 meters. What is the total length of the fence he needs to build?



What is asked in the problem?

What are the given facts that can help you solve the problem?

What can you say about Narlito?

Try to answer the problem. Have patience and have fun!

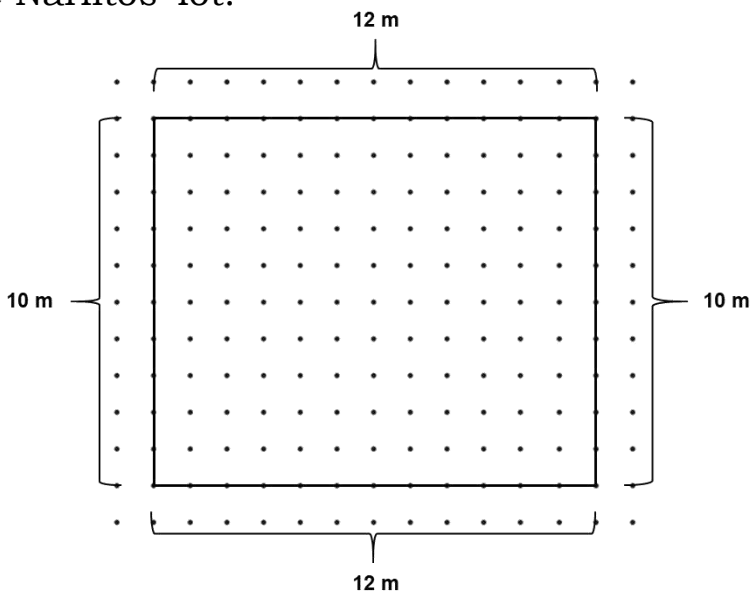
We will find out on the next part of this module whether you answered the problem properly and correctly.

What is It

To solve the given problem, we must find the distance around the lot of Narlito.

The distance around a closed plane figure is what we call ***perimeter.*** To determine the perimeter of the lot Narlito needs to fence, follow these steps:

1. Visualize Narlitos' lot.



2. Derive the formula for the perimeter by adding the measure of each side of a given plane figure. Since the given figure has 4 sides, we say that ***Perimeter = side + side + side + side. Then, P = s + s + s + s***

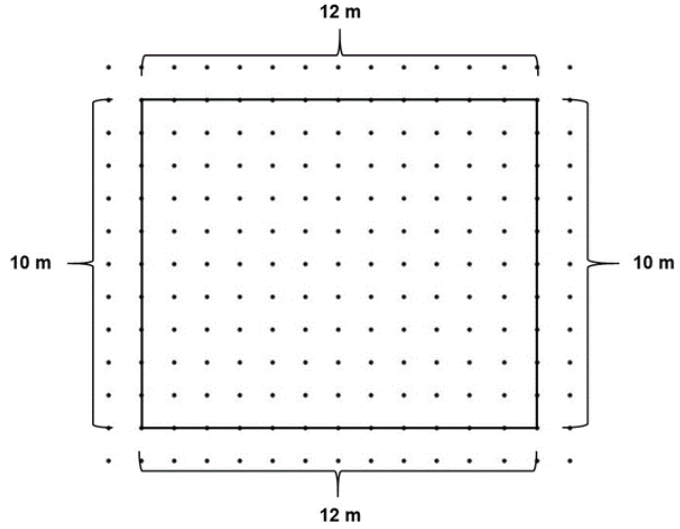
3. Using the formula you developed, substitute the measurement of each side then add.

So, **P = s + s + s + s**
P = 12 m + 12 m + 10 m + 10 m
P = 44 m

Therefore, the perimeter of Narlitos' lot is 44 meters.
Thus, Narlito needs to fence 44 m.

Can you think of other ways to find the length of the fence he needs to build?

Let us try to visualize Narlitos' lot.



Let ***L*** be the length and ***W*** be the width of the rectangle.

Since the opposite parallel sides of a rectangle are equal in lengths, we say that Perimeter = 2 x L + 2 x W or Perimeter = 2 (Length + Width).

Then, Perimeter of a rectangle = 2 (L + W)

Using the formula you developed, substitute the measurement of each side then compute.

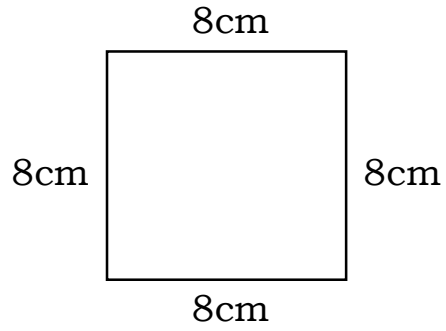
So, P = 2 (L x W)
P = 2 (12m + 10m)
P = 2 (22m)
P = 44 m

Therefore, the perimeter of Narlitos' lot is 44 meters.

Thus, Narlito needs to fence 44 m.

What if Narlito has a square lot? How do we solve its perimeter?

Let us try to solve for the perimeter of a square using this example.



A square has 4 equal sides. We can find its perimeter by following these steps:

1. Aside from adding the 4 sides we can derive a formula for the perimeter of a square. Since the given figure has 4 equal sides, we say that Perimeter = 4 x side.

Then, Perimeter of a square = 4 x s

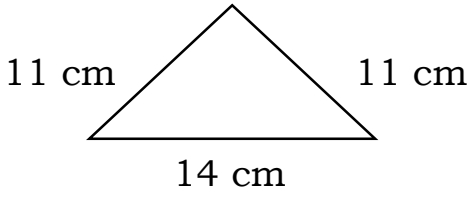
2. Using the formula you developed, substitute the measurement of each side then add.

So, P = 4 x s
P = 4 x 8cm
P = 32cm

Therefore, the perimeter of the square is 32cm.

But what if you will be solving for the perimeter of a triangle? How do we solve for its perimeter?

Let us try to solve for the perimeter of a triangle using this example.



A triangle has 3 sides. We can find its perimeter by following these steps:

1. Derive the formula for the perimeter by adding the measure of each side of a given plane figure. Since the given figure has 3 sides, we say that **Perimeter = side + side + side *(P = s + s + s)***

2. Add the measures of all its sides.
   So, P = 11 cm + 11 cm + 14 cm
   P = 36 m

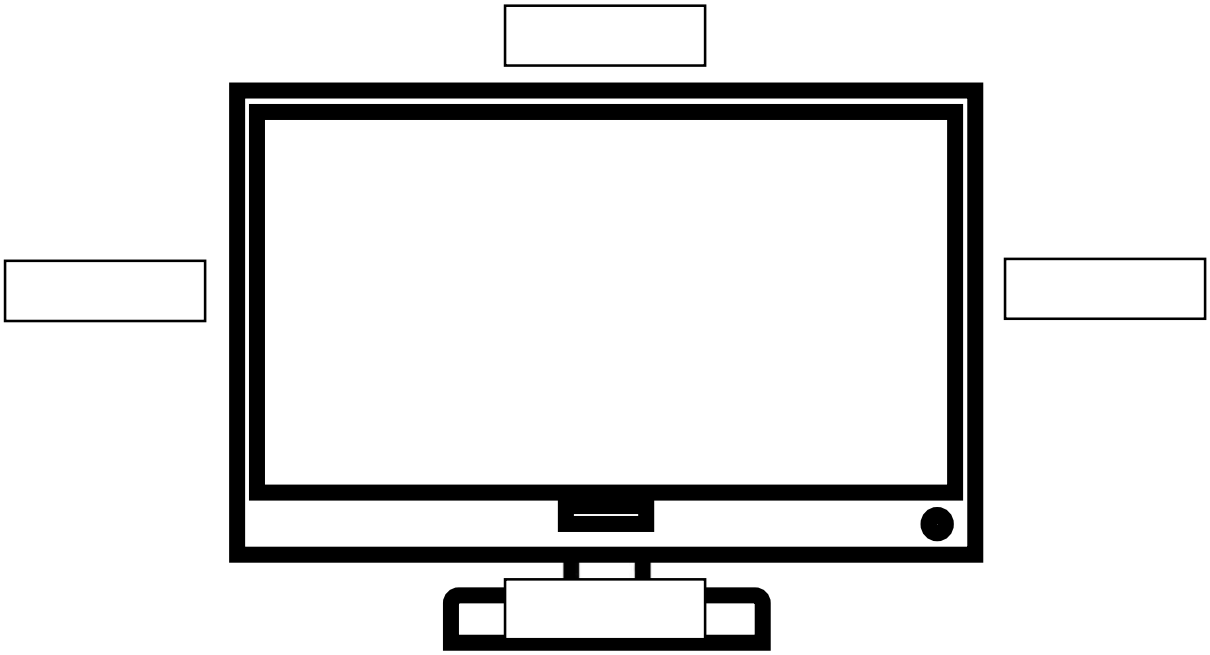
Therefore, the perimeter of the given triangle is 36 cm.

You may follow the given steps in solving for the perimeter of other plane figures.

Just always remember that the ***perimeter*** is the total distance around a closed plane figure.

Let us now try measuring perimeter using an appropriate tool by performing the given task below.

Use an appropriate measuring tool to find the perimeter of the picture shown. Put the measurements in the box provided.



What are the measures of each side? What is the perimeter?
What measuring tool did you use? Why?
What unit did you use for the perimeter? Why?

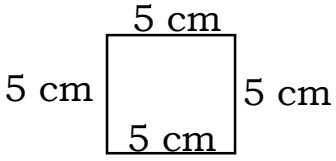
Always remember that when measuring the perimeter of real objects, you need to use the appropriate tool and unit of length for the object.

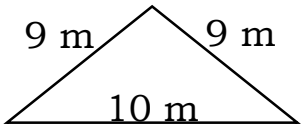
- ☑ Inches and centimeters are used for smaller objects.
- ☑ Meters and feet are used for medium sized spaces and objects.
- ☑ Miles and kilometers are used for really long distances.

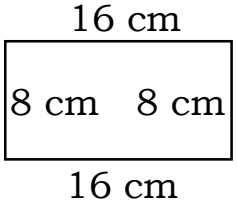
What's More

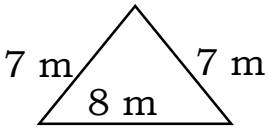
Let us see if you already know how to find the perimeter of closed plane figures.

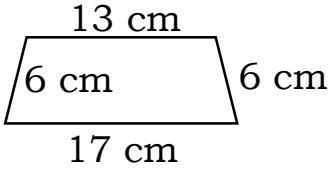
Find the perimeter of each figure.

1. 

2. 

3. 

4. 

5. 

If you are done answering the activity, please go to the ***Answer Key*** on page 15 and check if your answers are correct. Thank you for your honesty in answering and checking your work. Hope you will do this until the end of this module.

What I Have Learned

You are doing great! Just always remember:

The perimeter of a closed figure is the distance around the figure.

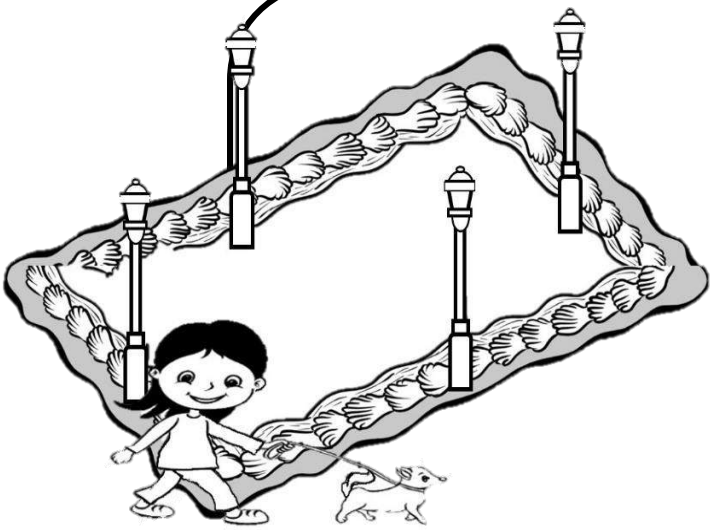
To find the perimeter of a polygon:

- get the sum of the measurements of its sides.

What I Can Do

Let us see if you are now ready to solve this problem.

Read and understand the problem, then answer the questions that follow.



Annabelle, together with her dog walks around the rectangular park every day to stay fit. If the park has a length of 22 m and a width of 17 m, what is the distance that Annabelle walks?

What can you say about Annabelle?

What is asked in the problem?

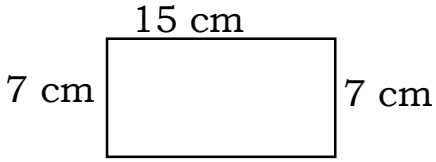
What are the given facts that can help you solve the problem?

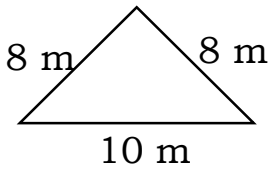
Solve for the distance that Annabelle walks. What is the answer?

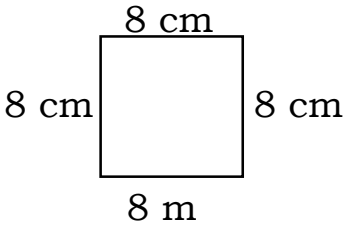
Assessment

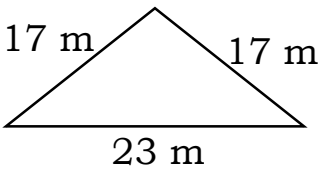
You are now ready for the next activity.

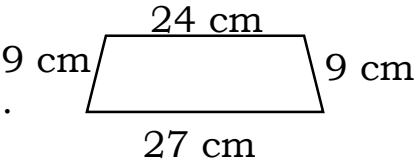
A. Find the perimeter of each figure.

1. 

2. 

3. 

4. 

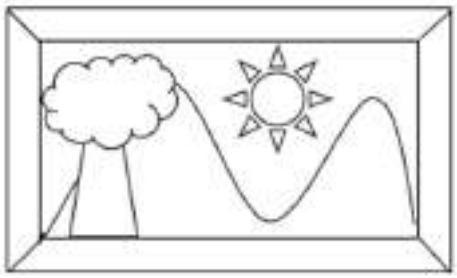
5. 

B. For numbers 6 and 7, follow the following steps:

a. Use a ruler to measure the sides of each figure in centimeters.
b. Write each length in the blank.
c. Compute for the perimeter.

6.

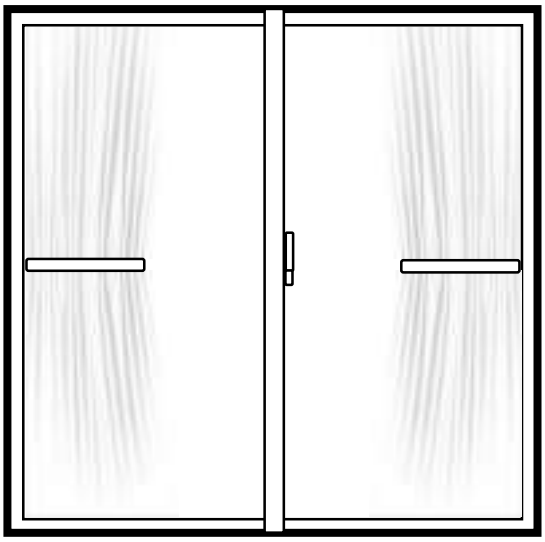
____ cm

____ cm  ____ cm **P = _____ cm**

____ cm

7.

____ cm

____ cm  ____ cm **P = _____ cm**

____ cm

C. Complete the table.

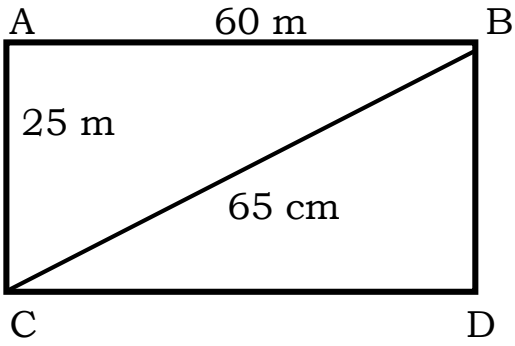
Figure	Length	Width	Perimeter
8. A square garden	12 m		
9. A rectangular table	5 m	2 m	
10. Picture frame	16 cm	12 cm	

If you are done answering the activity, please go to the ***Answer Key*** on page 15 and check if your answers are correct. Thank you for your honesty in answering and checking your work. Congratulations!

Additional Activities

Let us try some more.

A. Find the perimeter in meters.



Rectangle ABCD = _____ m
Triangle ABC = _____ m
Triangle BCD = _____ m

C. Do what is asked.

1. Use a meterstick or a ruler to measure the perimeter of your table at home.
2. Use a ruler to measure the perimeter of one face of a box.

If you are done answering the activity, please go to the ***Answer Key*** on page 15 and check if your answers are correct. Thank you for your honesty in answering and checking your work. Congratulations!

Answer Key

What I Know

A
1. b
2. c
3. c
4. a
5. c

B
6. P= 28 cm
7. P= 14 m
8. P= 12 cm
9. P= 37 m
10. P= 30 cm

What's In

1. 3
2. 4
3. 4
4. 4
5. 3

What I Can Do

1. She is health conscious.
2. The distance that Annabelle walks
3. length of 22m and width of 17m
4. P= 78 m

What's More

1. P= 20 cm
2. P= 28 m
3. P= 48 cm
4. P= 22 m
5. P= 42 cm

Assessment

A
1. P= 44 cm
2. P= 26 m
3. P= 32 cm
4. P= 57 m
5. P= 69 cm

Assessment

B

Assessment

C

Figure	Length	Width	Perimeter
8. A square garden	12 m	12 m	48 m
9. A rectangle table	5 m	2 m	14 m
10. Picture frame	16 cm	12 cm	56 cm

Additional Activities *(pages 13)*

A
1. Rectangle ABCD= 170 m
2. Triangle ABC= 150 m
3. Triangle BCD= 150 m

B
1. Answers may vary.
2. Answers may vary.

References

K to 12 Mathematics Curriculum Guide, August 2016

Tabilang, Alma R. et al. *Mathematics 4 Learner's Material.* Department of Education. 2015.

Tabilang, Alma R. et al. *Mathematics 4 Teacher's Guide.* Department of Education. 2015.

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4

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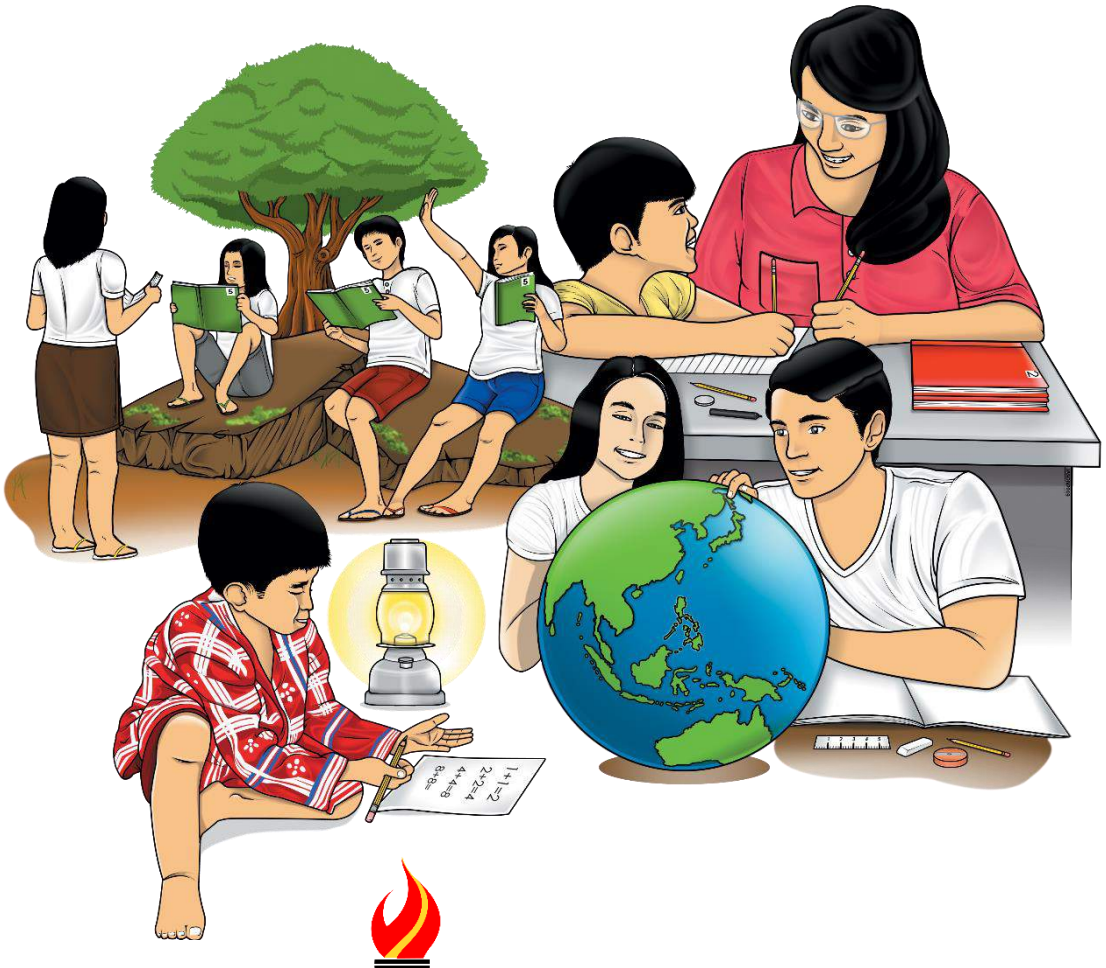
Mathematics

Quarter 3 – Module 9:
Solving Routine and Non-routine Problems Involving Perimeter



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First Edition, 2020

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Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by _____

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4

Mathematics

Quarter 3 – Module 9:
Solving Routine and Non-routine Problems Involving Perimeter

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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

Word problem involving perimeter is just an application of basic math skills but there are also some problems involving perimeter that are complicated. We have to follow a step by step solution, make an illustration, choose a formula and make use of different strategies to come up with the right answer.

After going through this module, you are expected to: solve routine and non-routine problems in real-life situations involving perimeter of squares, rectangles, triangles, parallelograms, and trapezoids.

What I Know

A. Read the following items carefully. Solve each problem and choose the letter of your answer. Write your answers on a separate sheet of paper.

1. One side of an equilateral triangular park measures 20 m. What is the perimeter of the triangular park?
   A. 40 m B. 50 m C. 60 m D. 70 m

2. Francis walked around a small rectangular garden. The rectangular garden is 8 m long and 7 meters wide. What is the perimeter of the rectangular garden?
   A. 38 m B. 30 m C. 23 m D. 15 m

3. Jonel enclosed his vegetable garden with a fence. The four sides of the garden measures 10, 15, 17 and 9 meters. How long will be the fence?

   A. 25 m B. 32 m C. 42 m D. 51 m

4. One side of a square playground of Bacon West Central School in Sorsogon City, measures 35 meters. How many meters of chicken wire are needed to enclose the playground?

   A. 70 m B. 105 m C. 140 m D. 175 m

5. Josel bought a lot whose sides measure 23 m, 18 m, 23 m, and 18 m. What is the perimeter of the lot he bought?

   A. 82 m B. 75 m C. 54 m d. 41 m

B. Read the following items carefully. Solve the following problems by identifying what is asked, the given facts, the needed operation, the solution and the answer.

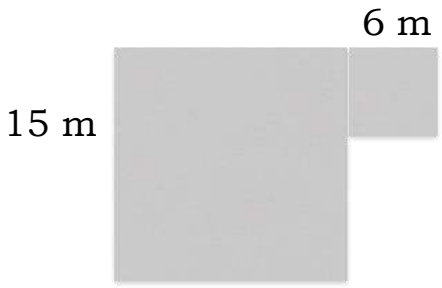
6. Rose will plant tomatoes 1 meter apart along the edges of an 8 m by 7 m rectangular garden. How many tomato plants are needed by Rose?

7. An equilateral triangle has a perimeter equal to the perimeter of a rectangle whose length is 15 cm and whose width is 9 cm. Find the measurement of the sides of the equilateral triangle.

8. The width of a rectangular swimming pool is 15 m. The length is twice the width. Find the perimeter of the pool.

9. A rectangle with a length of 80 cm and a width of 50 cm is to be cut into a square and a rectangle. Find the perimeter of the rectangle.

10. The floor plan of Mr. Cruz' house has the shape of two squares with sides 15 m and 6 m, respectively as shown in the given figure below. What is the perimeter of his floor plan?



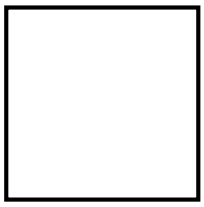
Are you done answering?
If yes, time to check. Please go to page 16 for the ***Answer Key***.

Lesson 1 Solving Routine and Non-routine Problems Involving Perimeter

What's In

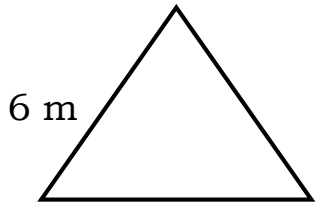
Find the perimeter of each figure. Write your answers on a separate sheet of paper.

1. 10 cm



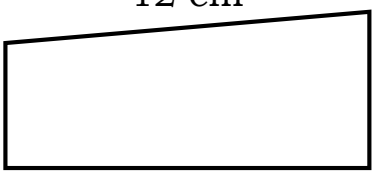
P = _____ cm

2.



P = _____ m

3. 12 cm



10 cm

P = _____ cm

4. 8 m

P = _____ m

5. 7 cm

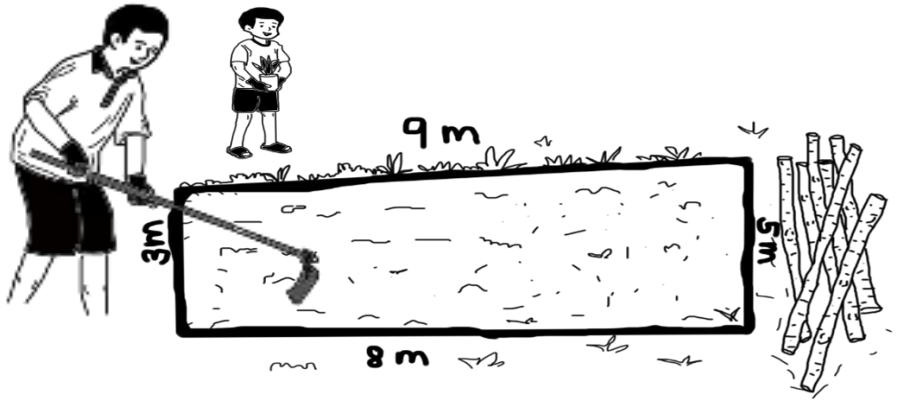
P = _____ cm

Are you done answering?
If yes, time to check. Please go to page 16 for the ***Answer Key***.

What's New

Read the problem below and answer the questions that follow on a separate sheet of paper.

The Barangay Chairman of San Isidro encouraged each household to participate in the Community Project "Clean and Green Program." The Dechavez family decided to convert their vacant lot into a vegetable garden. They decided to surround it with barb wires to protect the plants from stray animals. How many meters of fencing materials will they buy given the measurement of the vacant lot below.



What does the problem ask for?
What shall we do to solve the problem?
What is the answer to the problem?

What is It

The problem presented is an example of a **Routine Word Problem. Routine problems** are simple practical word problems.

To analyze and solve the given problem, we will use the 4-step plan.

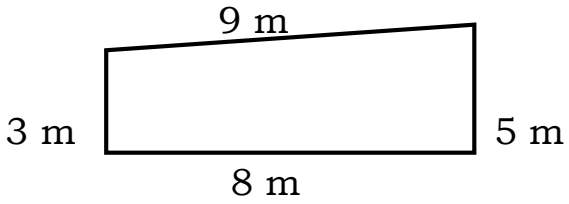
A. Understand the Problem.

1. Know what is asked in the problem.
   The distance around the vacant lot.

2. Know the given facts or data.
   Measurement of the sides: 3 m, 9 m, 8 m, 5 m

B. Plan

1. Draw or illustrate to visualize the problem. *(optional)*



3. Determine the operation or formula to use.
   Formula: P = s + s + s + s

C. Solve to carry out the plan.

Solve using the formula.

P = s + s + s + s
= 3 m + 9 m + 8 m + 5 m
P = 25 m

D. Check and Look back.

What is the final answer to the problem?

Answer: The perimeter or the fencing materials needed is 25 m.

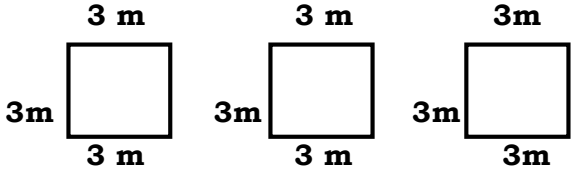
Let us study another example, a non-routine problem.

One side of a square table measures 3 m. If three tables are placed end to end, what will be the perimeter of the new table?

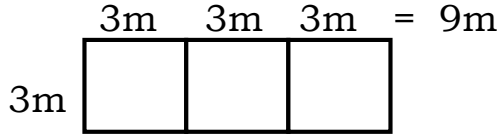
A non-routine problem is any complex problem that requires some degree of creativity to solve. Some routine problems require multiple steps. These problems can also be solved in multiple ways or using different strategies.

Strategies that can be used include: Listing/Table Method, Guess and Check, Drawing/Diagram, Using patterns, etc.

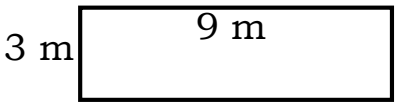
- Let us solve the problem by drawing or illustrating the picture.



- By placing it end to end, it would look like this:



- The new table formed is rectangular in shape, the new dimensions are: length = 9 m, width = 3 m

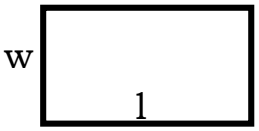
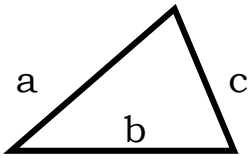
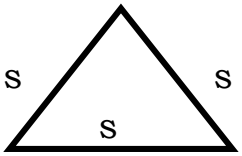
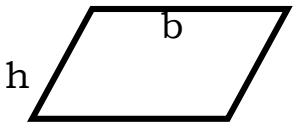


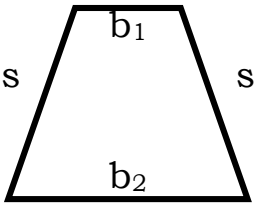
- Let us substitute the given values in the formula:

  P = 2 x (l + w)
  = 2 x (9 m + 3 m)
  = 2 x 12 m
  P = 24 m

Therefore, the perimeter of the new table is 24 m.

Here are the equations/formulas for the Perimeter of different plane figures.

Figures	Formula
Square	P = s + s + s + s or P = 4 x s or P = 4s
 Rectangle	P = l + l + w + w P = (2 x l) + (2 x w) P = 2l + 2w
 Triangle	P = a + b + c
 Equilateral Triangle	P = s + s + s or P = 3 x s or P = 3s
 Parallelogram	P = b + b + h + h or P = (2 x b) + (2 x h) or P = 2b + 2h



Trapezoid

$P = b_1 + b_2 + s + s$

Let's try another sample problem.

Raymund uses his free time in reading books. If his rectangular book has a length of 20 cm and a width of 15 cm, what is the perimeter of the book?

1. What is asked?
   The perimeter of the book.

2. What are the given facts?
   length is 20 cm, width is 15 cm

3. What is the operation or formula to be used?
   Multiplication & Addition: P = 2 x (l + w)

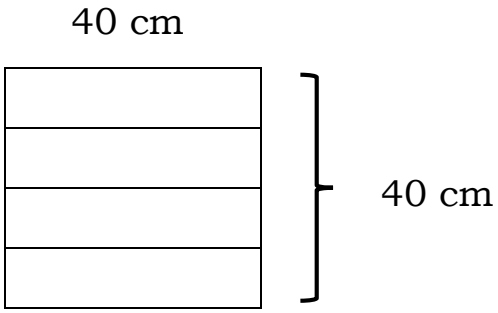
4. Show your solution.
   P = 2 x (l + w)
   = 2 x (20 cm + 15 cm)
   = 2 x 35 cm
   P = 70 cm

5. What is the final answer?
   The perimeter of the book is 70 cm.

Let us solve the next problem using illustration.

A square is formed by 4 identical rectangles. Find the perimeter of each rectangle if the perimeter of the square is 160 cm.

Illustration and Solution:



side of square = 160 ÷ 4
= 40 cm

Width of each rectangle = 40 ÷ 4
= 10 cm

Perimeter of the rectangle = 2 x (l + w)
= 2 x (40 cm + 10 cm)
= 2 x 50 cm
= 100 cm

Answer: The perimeter of each rectangle is 100 cm.

What's More

Solve the following problems. Use the four-step plan to solve the problems. Use a separate sheet of paper for your answers.

1. The four sides of a trapezoid measures 30 cm, 20 cm, 45 cm and 20 cm. What is the perimeter of the trapezoid?

2. Narlyn jogs around a rectangular park that measures 125 m by 80 m. How far is the distance covered by Narlyn if she goes around the park twice?

3. Mr. Reyes puts a rectangular fence around his *kalamansi* orchard to keep stray animals from destroying his plants. The longer side of his fence measures 44 m, while the shorter is 26 m. The posts in the garden fence were placed 2 m apart. How many posts would Mr. Reyes use to put up the perimeter fence?

Are you done answering?
If yes, time to check. Please go to page 16 for the ***Answer Key***.

What I Have Learned

How do we solve routine and non-routine word problems involving perimeter?

To solve **routine problems** involving perimeter of plane figures, we have to follow the four-step plan:

UNDERSTAND
- Know what is asked.
- Know the given facts.

PLAN
- Draw or illustrate to visualize the problem. (optional)
- Determine the operation or formula to use.

SOLVE
- Solve using the formula.

CHECK AND LOOK BACK
- Write the correct answer.

Non-routine problems can be solved by drawing a picture, using a number line, making a table, and others.

What I Can Do

Solve the following problems.

1. Karen has a square cartolina whose sides measure 60 cm each. She cuts the cartolina into two equal rectangles. Find the perimeter of one piece of rectangle.

2. A rectangle has a length of 30 cm and a width smaller by 5 cm. What is its perimeter?

Are you done answering?
If yes, time to check. Please go to page 16 for the ***Answer Key***.

Assessment

Solve each problem by following the correct step.

1. Anna loves chocolates. She ate a rectangular chocolate with a length of 11 cm and a width of 7 cm. What is the perimeter of the chocolate?

2. Johnny plays around a rectangular table. The table is 3 m by 5 m. He runs his toy car around the table five times. What is the distance covered by the toy car?

3. The three sides of a triangle measure 20 cm, 32 cm and 50 cm. What is the perimeter of the triangle?

4. Twelve light posts are placed around a square park. There are 4 light posts along each side of the park. If the distance between the light posts are 10 meters, what is the distance around the park?

5. Tina's garden is shaped like a trapezoid whose sides are 5 meters, 7 meters, 10 meters and 15 meters respectively. What is the measurement of the fence which surrounds the garden?

6. The perimeter of an isosceles triangle is 55 cm. One of the equal sides is 17 cm. How long is the base?

7. A square is cut into 4 identical rectangles. Find the perimeter of each rectangle if the perimeter of the square is 48 cm.

8. Neo and Mike has an equilateral triangular colored paper each whose measures of each side are 15 cm. They want to make a square kite and combine the 2 colored papers. What is the perimeter of the kite?

9. Nine identical small squares were put together to form a bigger square. The perimeter of each small square is 20 cm. Find the perimeter of the big square.

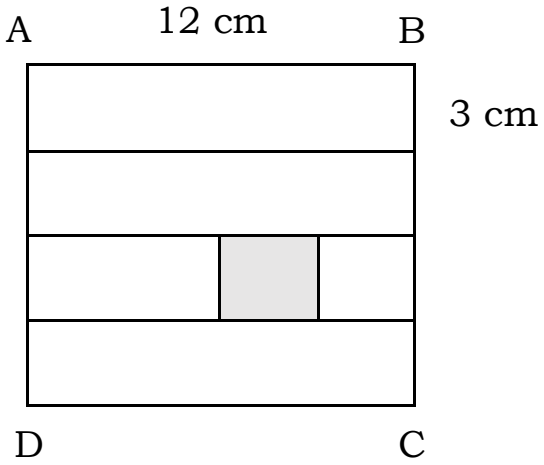
10. Joey bought a square lot. The measurement of the side is 80 m. He divided it into two equal parts. The resulting 2 lots are rectangular. He gave one lot to his brother. What is the perimeter of the remaining lot?

Are you done answering?
If yes, time to check. Please go to page 16 for the ***Answer Key***.

Additional Activities

Read and answer the problem below. Please write your four-step solution and illustration on your answer sheet.

Square ABCD is formed by 4 identical rectangles. The length and width of each rectangle are 12 cm and 3 cm, respectively. Inside of the figure is a rectangle, find the side of the small rectangle and its perimeter.



Are you done answering?
If yes, time to check. Please go to page 16 for the ***Answer Key***.

Answer Key

What I Know

1. C
2. B
3. D
4. C
5. A
6. 30 plants
7. 16 cm
8. 90 m
9. 160 cm
10. 72 m

What's In

1. 40 cm
2. 18 m
3. 31 cm
4. 24 m
5. 22 cm

What's More

1. 115 cm
2. 820 m
3. 70 posts

What I Can Do

1. 180 cm
2. 110 cm

Assessment

1. 36 cm
2. 80 m
3. 102 cm
4. 120 m
5. 37 m
6. 21 cm
7. 30 cm
8. 60 cm
9. 60 cm
10. 240 m

Additional Activities

1. Side of the small rectangle: w =3 cm

1 = 4 cm

2. Perimeter of the small rectangle = 14 cm

References

Tabilang, Alma R. et. Al. *Mathematics 4 Teacher's Guide.* Department of Education. 2015. pp. 248-251.

Tabilang, Alma R. et. Al. *Mathematics 4 Learner's Material.* Department of Education. 2015. pp. 188-191,

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4

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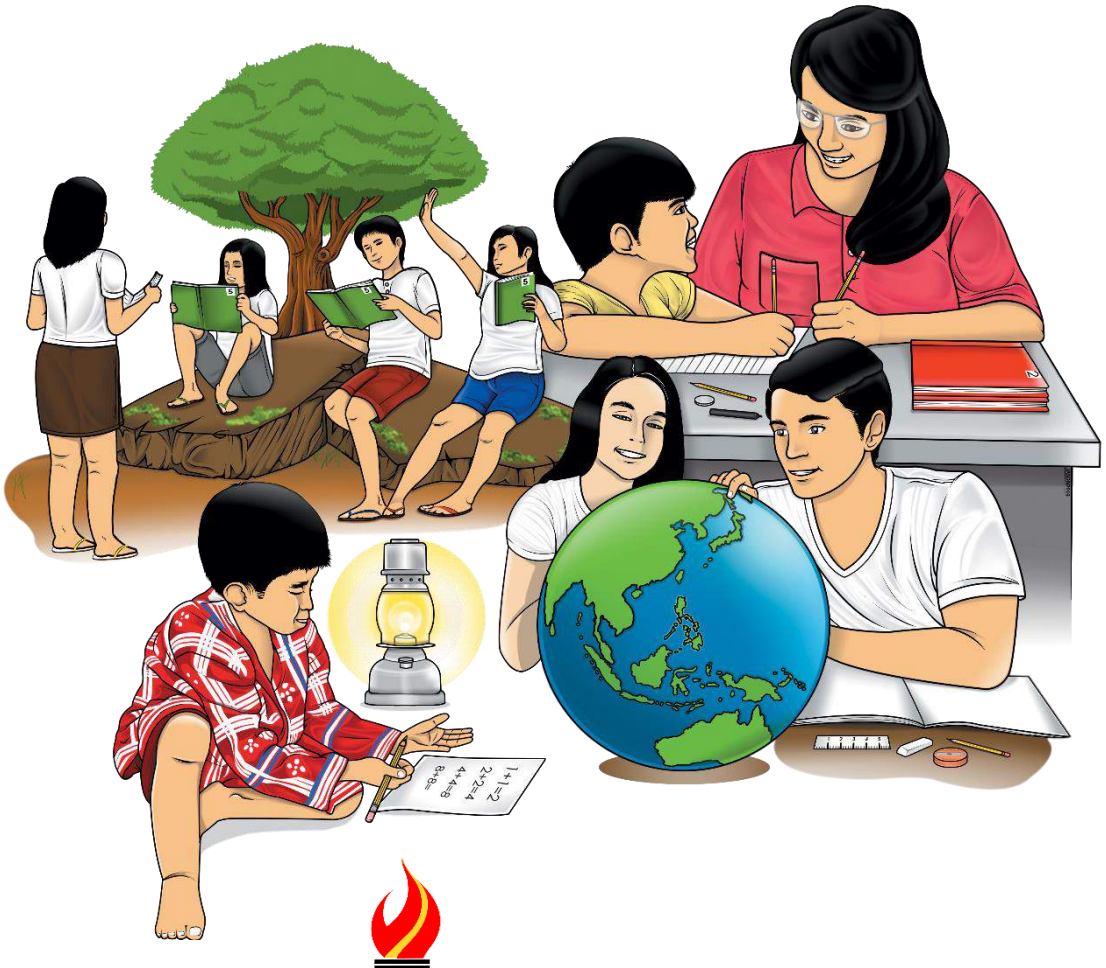
Mathematics

Quarter 3 – Module 10: Differentiating Perimeter from Area



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Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by _____

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4

Mathematics

Quarter 3 – Module 10: Differentiating Perimeter from Area

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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

Area and perimeter are two important concepts in mathematics. Both have practical applications and are used in our day-to-day lives. Perimeter is the distance around a figure while area is the measure of the surface enclosed within a region.

Different shapes may have the same perimeter but different areas, or they may have the same area but different perimeters. Still, there are different shapes having the same area and perimeter.

At the end of this module, you should be able to differentiate perimeter from area.

What I Know

Read and answer each item carefully. Choose the letter of the correct answer.

1. For a closed figure, what do we look at when we want to know its area?
   a. outside the closed figure
   b. its outline
   c. inside the closed figure
   d. either outside or inside the closed figure

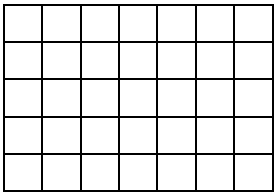
2. If you have to build a fence around your backyard, what will you measure to find the amount of fencing material you would need?
   a. side b. perimeter c. area d. volume

3. For a closed figure, what do we look at when we want to know its perimeter?
   a. its corners
   b. its outline
   c. its inside/surface
   d. either outside or inside the closed figure

4. Mang Ramon wants to surround his rectangular flower garden with a wooden fence. What does he need to measure to find how much wooden fence he needs?
   a. area
   b. volume
   c. perimeter
   d. side

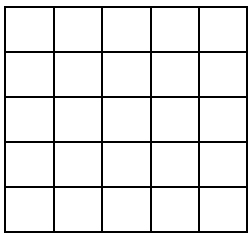
5. Which of the following statements best describes the relation between the number of linear units along the outline of a figure and the number of square units enclosed in its outline?
   a. They are the same.
   b. The number of linear units is greater than the number of square units
   c. The number of linear units is less than the number of square units.
   d. There is no relation as the number of linear units along the outline of a figure may be less than, equal to, or greater than the number of square units enclosed within the outline of the figure.

6. The shape shown has an area of 35 square units. What is its perimeter?
   a. 30 units
   b. 20 units
   c. 25 units
   d. 24 units



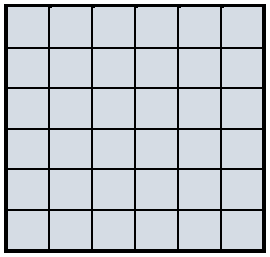
7. What is the area of a square with a perimeter of 20 units?

a. 20 sq units
b. 25 sq units
c. 30 sq units
d. 35 sq units



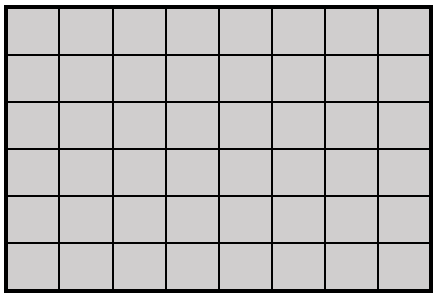
8. What is the area of a square with a perimeter of 24 units?

a. 34 square units
b. 35 square units
c. 32 square units
d. 36 square units



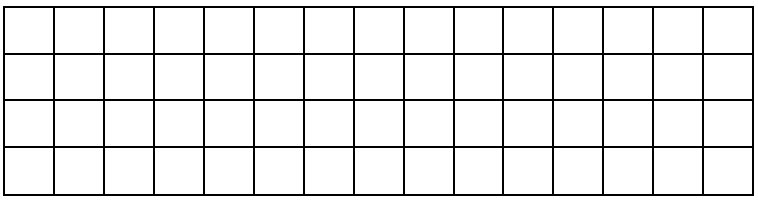
9. The shape shown has an area of 48 square units. What is its perimeter?

a. 26 units
b. 28 units
c. 30 units
d. 36 units



10. What is the perimeter of the rectangle below which has an area of 60 square meters?

a. 38 meters
b. 40 meters
c. 36 meters
d. 42 meters



Are you done answering?
If yes, time to check. Please go to page 14 for the ***Answer Key***.

Lesson 1 Differentiating Perimeter from Area

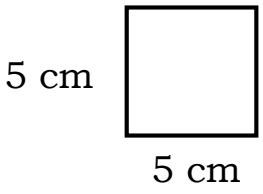
What's In

A. Matching type: Match the terms in Column A with their descriptions in column B. Choose the letter of the correct answer.

A	B
_____1. side	a. the longer side of a rectangle
_____2. length	b. a line that is part of the outline of a geometric figure
_____3. width	c. the shorter side of a rectangle

B. Find the perimeter of each figure. Use the formula.

4.



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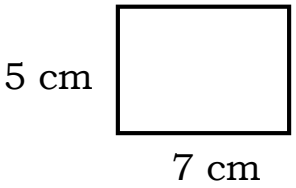
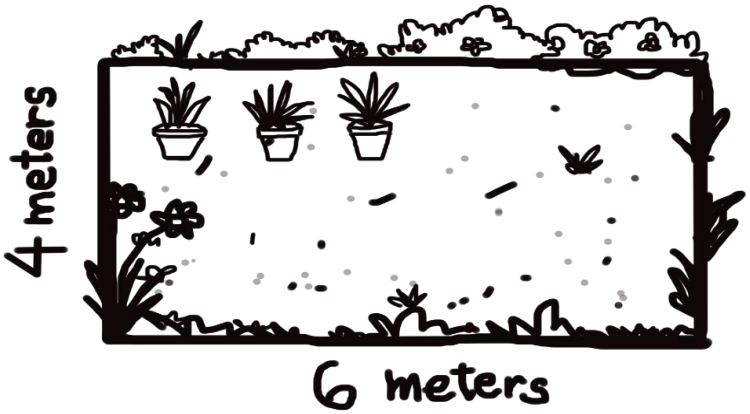


Are you done answering?
If yes, time to check. Please go to page 14 for the ***Answer Key***.

What's New

Teacher Pat wants to know how many square meters of carpet grass will be needed to cover the 6 meters by 4 meters rectangular garden in the school yard and the exact length of fencing materials needed to enclose it. She doesn't want to waste money by ordering more than the materials needed or by ordering too little. She asked Criselda to find the area and the perimeter of the garden. But the problem is, she cannot differentiate perimeter from area.

Below is an illustration of the rectangular garden. Let us help Teacher Pat solve the problem.



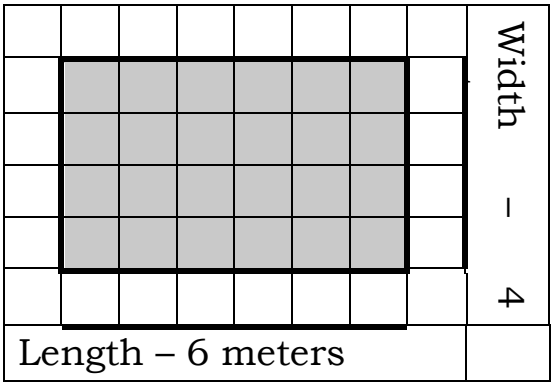
What is It

Before we continue with the discussion, let us first understand the meaning of perimeter and area of a certain shape or plane figure.

Perimeter is the distance around a closed figure. If the figure is formed by straight lines, the perimeter is the sum of all the lengths of these lines. The straight lines are referred to as the **sides** of the figure.

Area is the measure of the region or surface a figure encloses.

To better understand these two concepts and their difference, let's use the figure below.



The figure is a graph/grid sheet representation of the rectangular garden measuring 6 meters by 4 meters.

The outline or border is where Teacher Pat is to put the fence. The shaded portion is the part of the garden that needs to be covered with carpet grass.

The whole length of the outline or the border is the **perimeter** of the rectangular garden and is also the length of the fence Teacher Pat needs to enclose the garden.

To find its perimeter, count the number of linear units along the border or outline of the rectangle. Clearly, there are 20 linear units along the outline of the rectangle. Therefore, the perimeter of the rectangular garden is 20 units or 20 meters.

Observe that we could have gotten the perimeter of the rectangular garden by adding twice the length and twice the width. Twice 6 meters is 12 meters; and twice 4 meters is 8 meters. The sum is, of course, 20 meters.

While we have used the term perimeter here to refer to the distance around the closed figure, it may also be used to refer to the outline or the border of the closed figure.

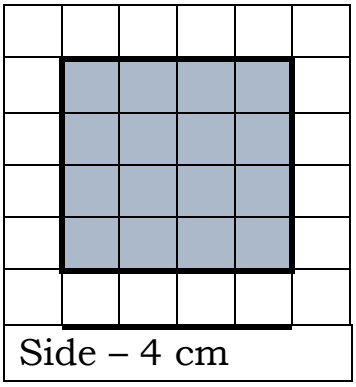
The **area** of this rectangular garden, on the other hand, is the amount of surface enclosed within the rectangle. For Teacher Pat, this is what needs to be covered with carpet grass.

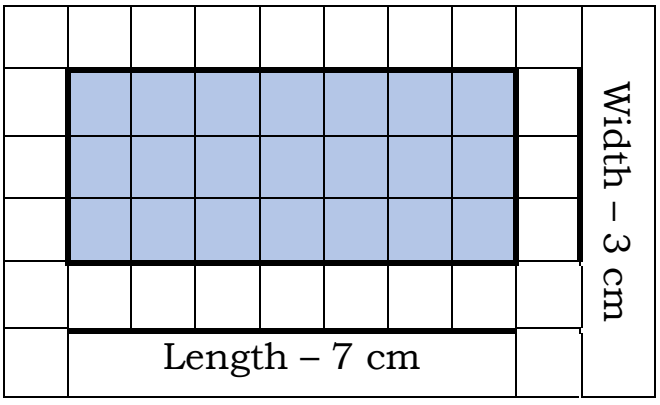
To find the area of the garden, count the number of square units enclosed within the rectangle. We can count 24 square units enclosed within the rectangle. Therefore, the area of the rectangular garden is 24 square units, or 24 square meters.

Observe that we could have gotten the area of the rectangular garden by multiplying its length and width. The product of 6 meters and 4 meters is, of course, 24 square meters.

Teacher Pat therefore needs 20 meters of fence to enclose the garden and 24 square meters of carpet grass to cover it.

Let us look at the square and the rectangle below as we try to observe how their perimeters and areas relate to the length of their sides.





The table below shows us the lengths of the sides of the figures and their perimeter and areas.

Figure	**Side**	**Length**	**Width**	**Perimeter**	**Area**
Square	4 cm	-	-	16 cm	16 cm
Rectangle	-	7 cm	3 cm	20 cm	21 cm

Observe that:

- For the **square:** The **perimeter** is **4 times the length of one side**. This is because all its four sides are of the same length. The **area**, on the other hand, is the **square of the length of one side**.

- For the **rectangle**, the **perimeter** is the **sum of twice its length and twice its width**. This is because the two pairs of opposite sides have the same length. The **area**, on the other hand, is the **product of the length and width**.

Are the above observations true for all squares and rectangles? Why?

What's More

Differentiate perimeter from area by filling-in the table below using the different phrases and statements that follow.

Basis	**Area**	**Perimeter**
Meaning	1.	2.
Unit of measurement	3.	4.
No. of dimensions	5.	6.
Example	7.	8.

a. Amount of surface enclosed within a closed figure.
b. Square units
c. Linear units
d. Distance around a closed figure
e. One
f. Two
g. The number of square units of grass to cover a garden
h. Length of fence required to enclose a garden.

Are you done answering?
If yes, time to check. Please go to page 14 for the ***Answer Key***.

What I Have Learned

The differences between perimeter and area are:

- Perimeter is the distance around a closed figure or the length of the outline of a closed figure. Area is the measurement of the amount of surface enclosed within the closed figure.
- Perimeter is expressed in linear units; area in square units
- Perimeter involves only one dimension; area involves two dimensions.

What I Can Do

Write A if the statement talks about area and P if it talks about perimeter.

1. Aling Juana wants to build a fence around her lemon orchard.

2. Mang Mario covered his living room with wooden tiles.
3. Rissa wants to put some lace around the edges of her neckerchief.
4. The interior decorator painted the entire wall in his favorite color.
5. Darrel surrounded the flower garden with bamboo sticks.
6. She covered the stain on the table with a fresh coat of paint.

Are you done answering?
If yes, time to check. Please go to page 14 for the ***Answer Key***.

Assessment

Read each item carefully. Choose the letter of the correct answer.

1. Which of the following statements best describes the difference between perimeter and area?
    a. Area is the measurement of the surface enclosed within a closed figure while perimeter is the distance around the closed figure.
    b. Area is the distance around a closed figure while perimeter is the measure of the surface enclosed within the closed figure.
    c. Area is measured by counting the linear units along the outline of a closed figure while perimeter is measured by counting the number of square units enclosed in the figure.
    d. Area and perimeter have the same measurement.

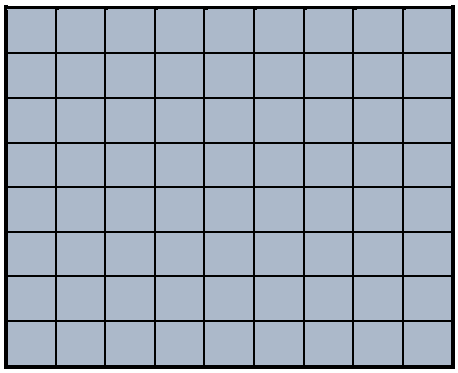
2. How does area differ from perimeter when it comes to measurement?
    a. Measurement of perimeter is expressed in square units while area is expressed in linear units.
    b. Measurement of area is expressed in square units while perimeter is expressed in linear units.
    c. Area, in terms of the number of square units, is always less than perimeter, in terms of linear units.
    d. Area, in terms of the number of square units, is always equal to perimeter, in terms of the number of linear units.

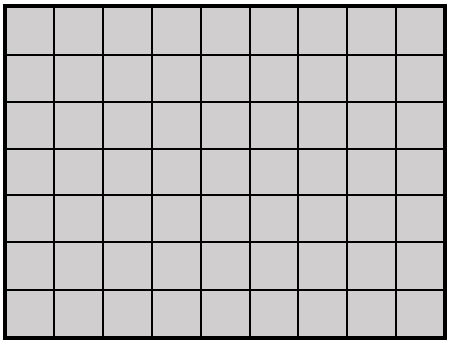
3. How does area differ from perimeter when it comes to dimensions?
    a. Perimeter has two dimensions while area has only one dimension.
    b. Both perimeter and area have two dimensions.
    c. Perimeter has two dimensions while area has no dimensions.
    d. Perimeter has only one dimension while area has two dimensions.

4. Which of the following statements uses the measurement of both area and perimeter?
    a. the capacity of a box and the length of a table.
    b. the length of the stage and the width of the classroom.
    c. space amount of surface covered by the garden and the length of fence required to enclose the garden.
    d. the height of the building and the length of the door.

Find the area and the perimeter of the following figures by counting the corresponding units.

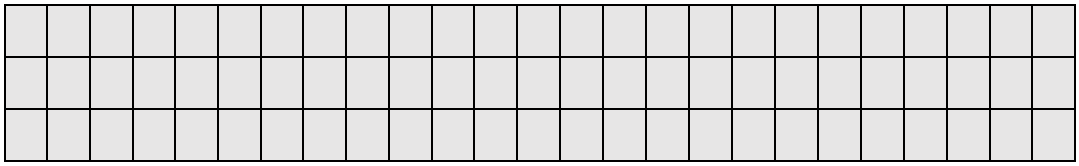
1 linear unit —— 1 square unit ⊣□





5. Area _____
6. Perimeter _____

7. Area _____
8. Perimeter _____



9. Area _____
10. Perimeter _____

Are you done answering?
If yes, time to check. Please go to page 14 for the ***Answer Key***.

Additional Activities

Using a graphing paper,

1. Draw a square which is 11 units on each side and showing the number of square units enclosed.
2. Determine the perimeter by counting the linear units along the outline of the square; and the area by counting the square units enclosed within the outline of the square.
3. Draw any rectangle and indicate its length and width.
4. Determine the perimeter and the area of your rectangle by counting the linear units along its outline and the square units within the outline of the rectangle.
5. Write the relationship between the length of a square and its perimeter and also its area.

Are you done answering? If yes, time to check. Please go to page 14 for the ***Answer Key***.

Answer Key

What I can Do

1. P
2. A
3. P
4. A
5. P
6. A

Assessment

1. a
2. b
3. b
4. c
5. 72 sq m
6. 34 m
7. 63 sq m
8. 32 m
9. 75 sq m
10. 56 m

Additional Activities

1. (Illustration or drawing of a square that has 11 units on each side.)
2. Area = 121 sq units
   Perimeter = 44 units

3-4. (answers may vary)

5. The perimeter of a square is four times the length of a side of the square. The area of a square is the length of a side of the square multiplied by itself.

What I Know

1. c
2. b
3. b
4. c
5. d
6. d
7. b
8. d
9. b
10. a

What's In

1. b
2. a
3. c
4. 28 m
5. 30 m

Basis for Comparison	**Area**	**Perimeter**
Meaning	Amount of surface enclosed in a closed figure	Distance around a figure.
Unit of measurement	Square units	Linear unit
No. of dimensions	Two	One
Example	The number of square units of grass to cover a garden	Length of fence required to enclose the garden.

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4

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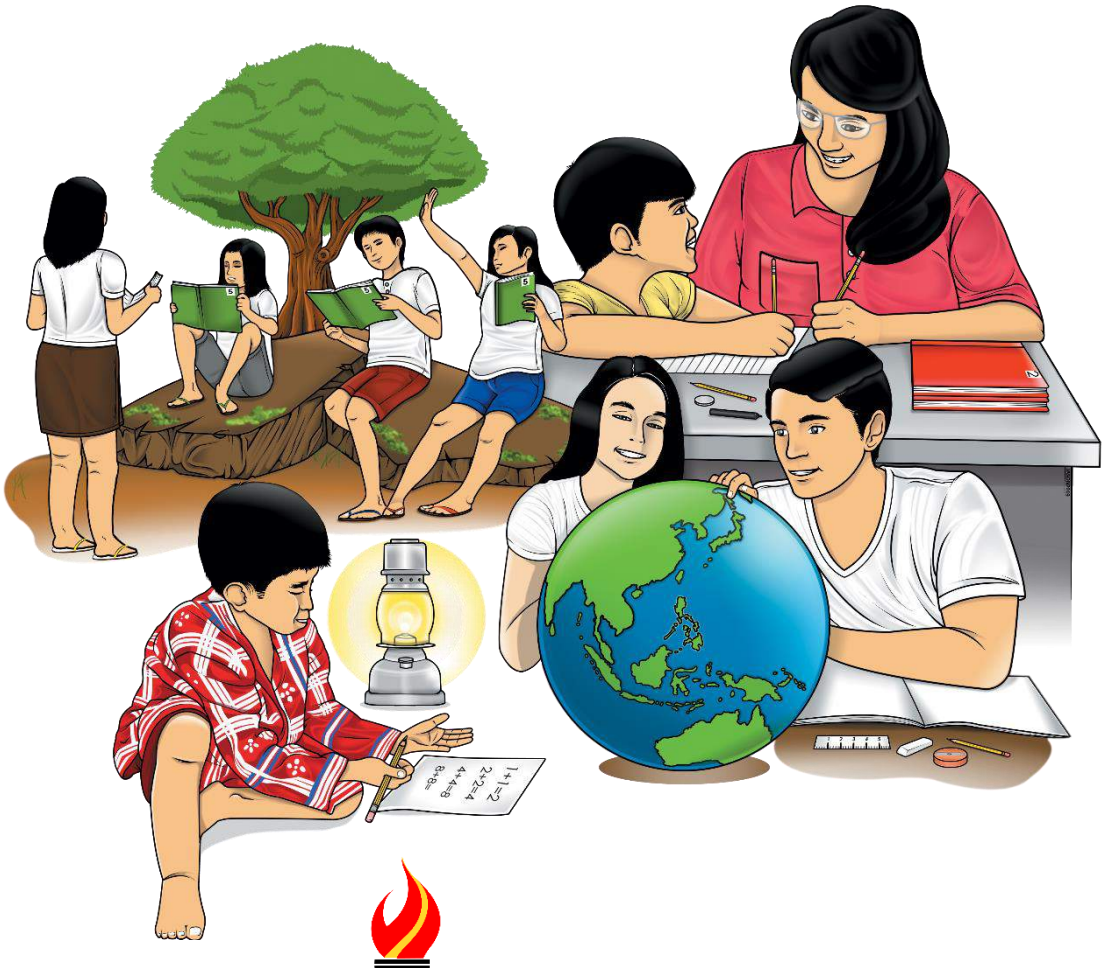
Mathematics

Quarter 3 – Module 11:
Conversion of Square Units



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First Edition, 2020

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Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

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Printed in the Philippines by _____

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5

Mathematics

Quarter 3 – Module 11:
Conversion of Square Units

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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!

In the previous module, you learned about the difference between perimeter and area. Now, you will learn about square units. Square units like cm2, dm2, m2, in2 and ft2, which are read as square centimeters or centimeter square, square decimeters or decimeter square, and so on, are units of areas. Some of these units may be smaller or bigger than the others. You use bigger units to measure big areas and smaller units for small areas.

This module will also help you understand how area measures may be converted from one unit to another, in particular, measures in square centimeters to square meters, and vice versa. We know that you will not only find the lesson in this module useful but fun as well.

Good luck!

After going through this module, you are expected to be able to convert square centimeters (cm2) to square meters (m2) and vice versa.

What I Know

EQUAL or NOT EQUAL

A. Write **=** if the conversion is correct and **≠** if it is not.

1. 20 000 sq. cm	☐	2 sq. m
2. 500 000 sq. cm	☐	500 sq. m
3. 41 sq. m	☐	410 000 sq. cm
4. 7 sq. m	☐	7 000 sq. cm
5. 34 000 sq. cm	☐	3.4 sq. m

B. Convert the following to square meters (m^2).

6. 28 000 sq. cm = _____ sq. m
7. 420 000 sq. cm = _____ sq. m

C. Convert the following to square centimeters (cm^2).

8. 17 sq. m = _____ sq. cm
9. 9 sq. m = _____ sq. cm

D. Solve the problem.

10. The standard outer area of a house in a village is 54 m^2. What is this in square centimeters (cm^2)?

To check, go to page 17 for the ***Answer Key***. If you got a score of 8 – 10, VERY GOOD! The lesson will be easy for you. If you got a score of 7 or below, study carefully the discussion and examples in this module.

What's In

Look at the example below and do as directed in the exercises that follow.

Example: $\frac{40\,000}{10\,000} = 4$

A. Simplify the following.

1. $\frac{70\,000}{10\,000}$ 2. $\frac{230\,000}{10\,000}$ 3. $\frac{100\,000}{10\,000}$ 4. $\frac{4\,550\,000}{10\,000}$

B. Find the product.

5. 12 x 10 000 6. 51 x 10 000 7. 721 x 10 000

C. Convert the following using the equivalence:

100 cm = 1 m

8. 800 cm = _____ m
9. 7 m = _____ cm
10. 45 m = _____ cm

While there are other units in the metric system of measurement, millimeters (mm), centimeters (cm), meters (m), and kilometers (km) are the more common ones used for measuring lengths or distances. The meaning of the prefixes is shown below:

milli – 1/1 000 centi – 1/100 kilo – 1 000

You therefore have,

$1\,mm = \frac{1\,m}{1\,000}$; $1\,cm = \frac{1\,m}{100}$; *and* $1\,km = 1\,000\,m$

Please check your answers with the ANSWER KEY on page 17.

What's New

How big is your classroom? How do you maintain the cleanliness of your classroom?

Read the problem below.

Gabriel and Joseph go to school early everyday. When they reach school, instead of playing, they sweep the floor of their classroom. One day, they measured the length and width of the floor and they found it to be 9 m long and 8 m wide. Using these, they computed for its area and got 72 sq. m. They wanted to find out the equivalent of 72 sq. m in sq. centimeters. Can you help them?

What Is It

How do you get the equivalent of 72 square meters in square centimeters?

Remember, **1 m = 100 cm**. Using this, you may now get the equivalent of 1 sq. m in sq. cm as follows,

$$1\ sq.m = 1\ m \times 1\ m = 100\ cm \times 100\ cm$$

You therefore have this equivalence:

$$\mathbf{1\ sq.m = 10\ 000\ sq.cm}$$

Since 1 sq. m is equal to 10 000 sq. cm, if you divide one by the other, you get 1 either way. And so, you have,

1. $\dfrac{\mathbf{1\ sq.m}}{\mathbf{10\ 000\ sq.cm}} = \mathbf{1}$ 2. $\dfrac{\mathbf{10\ 000\ sq.cm}}{\mathbf{1\ sq.m}} = \mathbf{1}$

Remember that 1 is the identity element for multiplication. Multiplying a number by 1 does not change its value even if there may be a change in its form.

You can now then get the two conversion factors below:

1. $\mathbf{sq.cm \rightarrow sq.m}$	2. $\mathbf{sq.m \rightarrow sq.cm}$
$\dfrac{\mathbf{1\ sq.m}}{\mathbf{10\ 000\ sq.cm}}$	$\dfrac{\mathbf{10\ 000\ sq.cm}}{\mathbf{1\ sq.m}}$

Going back to the question: How do you get the equivalent of 72 sq. m in sq. cm?

Using conversion factor number 2, you have,

$$72\ sq.m\ =\ 72\ sq.m\ \times\ \frac{10\ 000\ sq.cm}{1\ sq.m} = \frac{72\ sq.\ m\ \times\ 10\ 000\ sq.cm}{1\ sq.\ m}$$

$$72\ sq.m\ =\ \frac{72\ sq.\ m}{1\ sq.m} \times 10\ 000\ sq.cm = 72 \times 10\ 000\ sq.cm =\ 720\ 000\ sq.cm$$

You can get the same result using what is called **cancellation**. Using the same problem above, we have,

$$72\ sq.m\ \times\ \frac{10\ 000\ sq.\ cm}{1\ sq.\ m} = 72\ \cancel{sq.m}\ \times\ \frac{10\ 000\ sq.cm}{1\ \cancel{sq.m}} =\ 720\ 000\ sq.cm$$

Therefore, Joseph and Gabriel's classroom floor has an area of 720 000 sq. cm.

But let us look at why cancellation works. First, on why units get "cancelled". Examine the fraction: $\frac{2\ sq.\ m}{1\ sq.\ m}$.

You are dividing 2 sq. m by 1 sq. m. What do you understand by this?

When you are dividing, you are really asking yourself how many of the divisors there are in the dividend. For example, when you are dividing 10 by 2, you are really asking yourself how many 2s there are in 10. Your answer is of course 5 since there are five 2s in 10.

So, when you are dividing 2 sq. m by 1 sq. m, you really want to know how many 1 square meters there are in 2 square meters. Your answer is, of course, just 2, without units. Why?

It would be different if we were to divide, for example, 4 square meters by 2. Here, the answer would be 2 square meters, with units. Why?

Second, on why we can "cancel" the 0s.

Let us use the number 1.234 and see what happens when we multiply this by 10, 100, 1 000, 10 000, and so on.

$$1.234 \times 10 = 12.34$$
$$1.234 \times 100 = 123.4$$
$$1.234 \times 1\,000 = 1234$$
$$1.234 \times 10\,000 = 12340$$

You can see that when you multiply a number by 10, you can also get the product by just moving the decimal point of the other factor one place to the right, adding the 0 digit, when needed.

Multiplying by 100, 1 000, 10 000, and so on, is just like multiplying by 10 twice, three times, four times over, and so on. So, you just move the decimal point 2, 3, 4 and so on places to the right, again adding 0 digits when and as may be needed.

You just count the number of zeros to know how many places to move the decimal point to the right.

So, in converting square meters to square centimeters, instead of actually multiplying by the conversion factor $\frac{10\,000\ sq.\ cm}{1\ sq.\ m}$*, we may just* ***move the decimal point four places to the right, adding 0 digits when and as needed.***

Examples: 42 sq. m = 420 000 sq. cm = 420 000 sq. cm
56.1 sq. m = 561 000 sq. cm = 561 000 sq. cm

This time, let us use the number 432.1 and see what happens when you divide this by 10, 100, 1 000, 10 000, and so on.

$$432.1 \div 10 = 43.21 = 43.21$$
$$432.1 \div 100 = 4.321 = 4.321$$
$$432.1 \div 1\,000 = 0.4321 = 0.4321$$
$$432.1 \div 10\,000 = 0.04321 = 0.04321$$

You can see that when you divide a number by 10, you can get the quotient by just moving the decimal point of the dividend one place to the left, and again also adding a 0 digit, when and as needed. Dividing by 100, 1 000, 10 000, and so on, is just like dividing by 10 twice, three times, four times, and so on. So, you just move the decimal point 2, 3, and so on places to the left, also adding 0 digits when and as may be needed.

Again you just count the number of zeros in the divisor to know how many places to move the decimal point to the left.

Therefore, in converting square centimeters to square meters, *instead of using the conversion factor* $\frac{1\ sq.\ m}{10\ 000\ sq.\ cm}$, *you may just* ***move the decimal point four places to the left, adding 0 digits when and as needed.***

Examples: 32 000 sq m = 32 000 sq. cm = 3.2 sq. m
374.2 sq. cm = 0.03742 sq. m = 0.03742 sq. m

Now, read the problem below.

> Hannah and Jannah were cleaning their bathroom which had a rectangular floor. They measured the floor and found it to be 200 cm long and 150 cm wide. Using the formula for the area of a rectangle which is L x W, they got 30 000 sq. cm. What is the area of the bathroom floor in

Using conversion factor no. 1, we have,

$$30\ 000\ sq.cm = 30\ 000\ sq.cm \times \frac{1\ sq.\ m}{10\ 000\ sq.\ cm} = \frac{30\ 000\ sq.\ cm \times 1\ sq.\ m}{10\ 000\ sq.\ cm}$$
$$= \frac{30\ 000\ sq.\ cm}{10\ 000\ sq.\ cm} \times 1\ sq.m = 3 \times 1\ sq.m$$
$$= 3\ sq.m$$

If you use cancellation, you get the same result as you can see below,

$$30\ 000\ sq.cm = 3\cancel{0\ 000\ sq.cm} \times \frac{1\ sq.m}{\cancel{10\ 000\ sq.cm}} = 3\ sq.m$$

So, Hannah and Jannah's bathroom had a floor area of 3 sq. m.

NOTE: Area units may be written in different ways.

square centimeter → centimeter square → sq. cm → cm^2
square meter → meter square → sq. m → m^2

Study the following examples:

Converting sq. cm to sq. m

a. 60 000 square centimeters = 6 square meters
b. 580 000 cm^2 = 58 m^2
c. 47 000 sq. cm = 4.7 sq. m

Converting sq. m to sq. cm

a. 3 square meters = 30 000 square centimeters
b. 71 sq. m = 710 000 sq. cm
c. 4.2 m^2 = 42 000 cm^2

Now that you already know how to convert sq. m to sq. cm, and vice versa, you are now ready for some activities. LET'S GO!

What's More

Activity 1

A. Convert the following to square meters.

1. 590 000 sq. cm = _____ sq. m
2. 20 000 sq. cm = _____ sq. m
3. 850 000 sq. cm = _____ sq. m

B. Convert the following to square centimeters.

1. 48 sq. m = _____ sq. cm
2. 5 sq. m = _____ sq. cm
3. 70 sq. m = _____ sq. cm

Please check your answers for each activity with the ANSWER KEY on page 17. If you answered all of them correctly, Great job! Keep up the good work! If you have some mistakes, review the lesson and decide which of the two solutions presented is

Activity 2

Complete the table with the correct square units.

Area in cm^2	**Area in m^2**
320 000 cm^2	1.
2.	8 m^2
820 000 cm^2	3.
4.	12 m^2
60 000 cm^2	5.
6.	57 m^2
27 000 cm^2	7.
8.	2.4 m^2

Please check your answers with the ANSWER KEY on page 17. If you got 6-8, Excellent job! If you got below 6, it's okay. You can always review the lessons and examples given.

What I Have Learned

How do you convert square centimeters to square meters and vice versa?

Recall the equivalence,

10 000 sq. cm = 1 sq. m

A. To convert sq. cm to sq. m:

1. multiply by the conversion factor:

$$\frac{1\ sq.m}{10\ 000\ sq\ cm}$$

2. and, to simplify,
   a. move the decimal point 4 places to the left,
   b. cancel sq. cm, and
   c. express the result in sq. m.

B. To convert sq. m to sq. cm:

1. multiply by the conversion factor:

$$\frac{10\ 000\ sq.\ cm}{1\ sq.\ m}$$

2. and, to simplify,
   a. move the decimal point 4 places to the right,
   b. cancel sq. m, and
   c. express the result in sq. cm.

What I Can Do

Solve the following problems.

1. Mang Emong is painting his 420 000 sq. cm wall. What is its area in sq. m?

2. A bathroom floor has an area of 8 sq. m. What is the floor area in square centimeters?

3. An 81 sq. m floor of Dina's house is to be tiled. What is this in square centimeters?

Please check your answers with the ANSWER KEY on page 17.

Assessment

Convert the following to sq. cm or to sq. m, as required.

1. 920 000 sq. cm = _____ sq. m
2. 15 sq. m = _____ sq. cm
3. 760 000 sq. cm = _____ sq. m
4. 100 000 sq. cm = _____ sq. m
5. 37 sq. m = _____ sq. cm

Please check your answers with the ANSWER KEY on page 17.

Additional Activities

Solve the following problems.

1. Rye has a broken 30 000 cm^2 - sliding door. He will temporarily replace it with plywood. How many m^2 of plywood does he need?

2. Miguelito volunteers to clean their two chalkboards. Both chalkboards are of the same size. The two chalkboards have a total area of 4 sq. m. What is the area of each chalkboard in sq. cm?

3. A 56 sq. m - wall is to be covered with wall paper. Would 570 000 sq. cm of wall paper be enough to completely cover it? Why?

4. If 1.5 m^2 = 15 000 cm^2, how many m^2 are there in 23 000 cm^2?

5. One sheet of *manila paper* is given to each group for a group activity in Mathematics. One sheet is 1.08 m^2. What is this in cm^2?

To check, turn to page 17 for the ***Answer Key***. Congratulations for reaching this part of the module.

You can always review the previous pages of this module if you need to.

Answer Key

What I Know

A.
1. =
2. ≠
3. =
4. ≠
5. =

B.
6. 2.8
7. 42

C.
8. 170 000
9. 90 000

D.
10. 540 000 sq. cm

What's In

1. 1. 7
2. 23
3. 10
4. 455
5. 120 000
6. 510 000
7. 7 210 000
8. 8
9. 700
10. 4 500

What's More

Activity 1:

A.	B.
1. 59	1. 480 000
2. 2	2. 50 000
3. 85	3. 700 000

Activity 2:
1. 32 m^2
2. 80 000 cm^2
3. 82 m^2
4. 120 000 cm^2
5. 6 m^2
6. 570 000 cm^2
7. 2.7 m^2
8. 24 000 cm^2

What I Can Do

1. 42 sq. m
2. 80 000
3. 810 000 sq. cm

Assessment

1. 92
2. 150 000
3. 76
4. 10
5. 370 000

Additional Activities

1. 3
2. Octagon - Irregular
3. Heptagon – Irregular sq. cm
4. 2.3
5. 10 800 cm^2

References

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