Lesson 1: Relation and Function

Supposed you are tasked by your grandmother to group the trees and flowers she ordered online according to their proper categories. This will help her decide where to place each of them to make your garden beautiful. Put an arrow to match each item in **Column X** to each item in **Column Y**.

X		Y
Narra	•	
Tulip	•	
Orchid	•	• FLOWER
Mahogany	•	
Rose	•	• TREE
Molave	•	
Sampaguita	•	

Guided Questions:

1. Which among them are flowers?
2. Which among them are trees?
3. How many ordered pairs can you make using this pattern (Narra, tree) or (rose, flower)?
4. List down all the first elements in the ordered pairs and all the second elements in the ordered pairs.
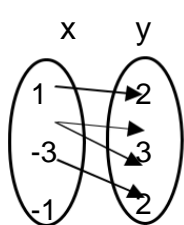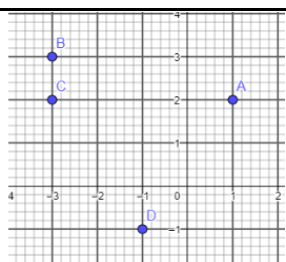5. Do you think there are terms referring to all the possible values of x and y?

Definition of a Relation in x and y

Any set of ordered pairs (x, y) is called a **relation** in x and y.

- The set of first element in the ordered pairs is called the **domain of the relation.**
- The set of second element in the ordered pairs is called **the range of the relation.**
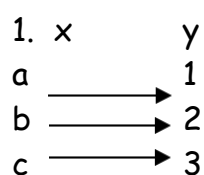
Relations can be **one to one**, **one to many**, or **many to one**.

A **relation** can be represented in different ways: by a **list of ordered pairs**, **mapping diagram**, **table of values, graph**, or by an **equation**.

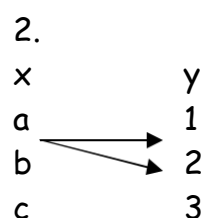| Ordered pairs	Table	Mapping diagrams	Graph
(1,2) (-3,3) (-3,2) (-1,-1)	<table><tr><td>x</td><td>y</td></tr><tr><td>1</td><td>2</td></tr><tr><td>-3</td><td>3</td></tr><tr><td>-3</td><td>2</td></tr><tr><td>-1</td><td>-1</td></tr></table>		

Study the examples:

- **Mapping Diagram**

1.

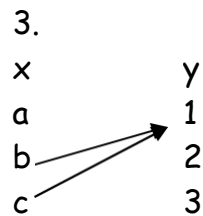| |
|---|
| The ordered pairs are (a,1),(b,2), and (c,3).

We call this as **One-to-One Correspondence** since for every element of x corresponds to an element of y. |

2.

The ordered pairs are (a,1) and (a,2).

We call this as **One-to-Many Correspondence** because an element of x corresponds to 1 or more elements of y.

3.

x	y
a	1
b	2
c	3

The ordered pairs are (b,1) and (c,1).
We call this as Many-to-One Correspondence since more than
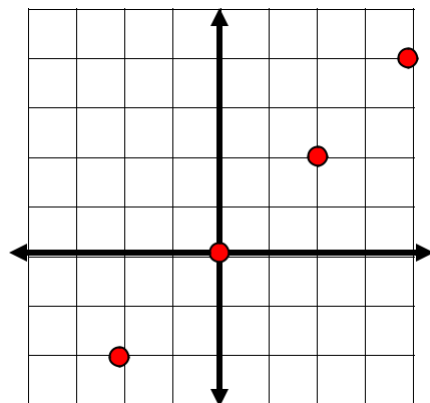1 element of x corresponds to an element of y.

- **Table of Values**

    Example

x	-1	0	1	2
y	-2	0	2	4

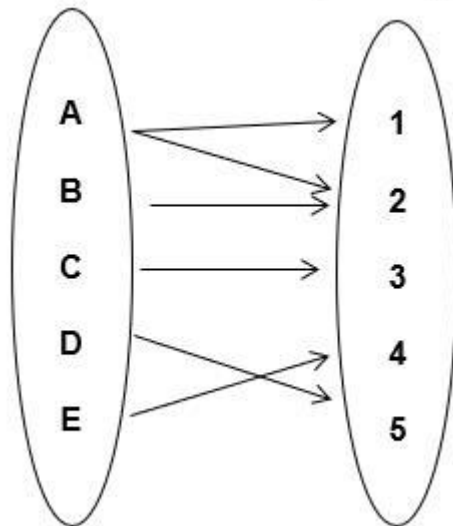The ordered pairs are (-1,-2), (0,0), (1,2), and (2,4).

- **Graphs**

    Example

The ordered pairs are (-2,-2),(0,0),(2,2), and (4,4)

TRY THESE!

A. Write each relation as a set of ordered pairs.

1.

ORDERED PAIRS
(____,____)
(____,____)
(____,____)
(____,____)
(____,____)
(____,____)

2.

X	0	-2	5	-7	-2
y	3	½	10	-1	8

ORDERED PAIRS
(____,____)
(____,____)
(____,____)
(____,____)
(____,____)

3.
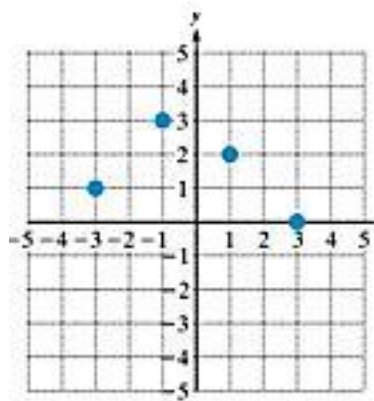
ORDERED PAIRS
(____,____)
(____,____)
(____,____)
(____,____)

B. Using the ordered pairs below, create a mapping diagram.
Identify the correspondence, create a table of values, plot the points, and
identify if it is a function or not a function.

| (0,2) | (-1,3) | (4,1) | (0,-2) | (4,-1) |

MAPPING DIAGRAM   **TABLE OF VALUES**

X   Y

X	Y

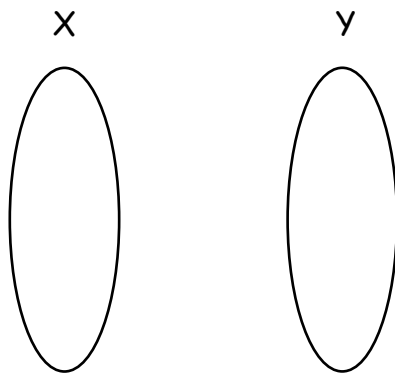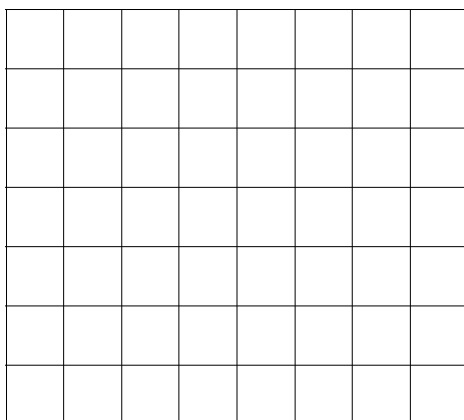**GRAPH**

The Correspondence is _____.

Fill in the blank with the correct word.

A _____ is a set of ordered pairs (x,y), wherein x is related to y.

   Example : (Narre, tree)

The 3 representations are _____, table of values, and _____. In

mapping diagrams, there are 3 correspondences which are _____, one-

to-many, and _____ correspondences.

CREATING AN ORGANIZATIONAL CHART

GOAL: To determine the appropriate way to organize your things in your room.

ROLE: Supposedly you realized the mess you've made in you room. You decided to clean up and organize everything.

ACTIVITY: Make an organizational chart showing how you will arrange your things in your room.

SITUATION: Summer vacation is about to come. You are so excited about it since you really had a very exhausting school year for you are a consistent honor student and has to do her best at all times to maintain your high grades and keep your scholarship. As you went home, she realized how messy your room is! You have forgotten to clean your room since the final exam week is approaching. You decided to clean your room and put things in proper places. Listed below are the things you need to organize. Categorize each according to its group.

scissors	paper clips	pentel pens	laptop
television	ballpens	electric fan	bond papers
bed	glue	flat iron	lampshade
pillows	speakers	charger	

PRODUCT: Organizational Chart

Lesson 2. Relation or Function.

There are relations of objects that show their functions. For example, a chopping board is found in the kitchen because it is used to chop fruits, vegetables, and meats when preparing meals. It is located in a place where it serves its purpose. Try to look for relationships and verify if you can see if there is a function or not.
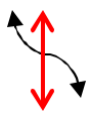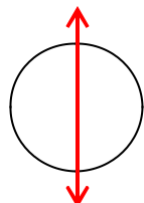
Definition of a Function in x and y

A **function** is a **relation** for which each value from the domain(x) is associated with exactly one value from the range (y). Functions can be either **one to one** or **many to one**.

Study the following examples:

A. Which among these are functions?

1.

3.

2.

4.
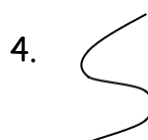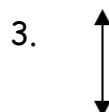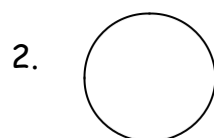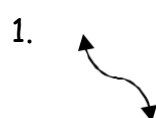
Yes, the graph in number 1 is a function. In this case, we use the vertical-line test to determine if a graph is a function or is simply a relation. If the vertical line touches the graph at only 1 point, then it is a function.

ILLUSTRATION	EXPLANATION
	In graph number 1, the vertical line only touches the graph at 1 point.
	In graph number 2, the vertical line touches the graph at 2 points.
	In graph number 3, the vertical line touches the whole graph, it means it touches all the points.
	In graph number 4, the vertical line touches the graph at 3 points

Lesson 3: Independent and Dependent variables

Identify the independent and the dependent variables in the statements below.

STATEMENTS	INDEPENDENT VARIABLES	DEPENDENT VARIABLES
Sophia measures the length and width of each side of a rectangle. She uses those values to calculate the area.		
Tim works full time as a crew at Jollibee. He earns 50pesos per hour and then an additional 15pesos per hour for each hour over 40 hours that he works per week.		
y = 7x + 2		
Ben works as a sales representativ e. He earns 15,000pesos per month plus a 7% commission on his total sales.		
Louie measures how many inches his calamansi plant grows every week.		

Independent variables are the causes because they can stand alone, while those in the effects are the dependent variables because it can happen if a certain cause has occurred.

Function means the dependent variable is determined by the independent variable(s). The independent variable is denoted by x while the dependent variable is often designated by y. We say y is a function of x. This means y depends on or is determined by x.

Study the following examples:

Example 1:

1. Joan is selling milk tea. The number of cups of milk tea she sells determines how much money she earns.

   Let **m** be the **amount of money Joan earns.**

   Let **c** be the **number of cups of milk tea Joan sells.**

   The **amount of money Joan earns** depends on **the number of cups of milk tea Joan sells**.

   - **Dependent:** *amount of money Joan earns (**m**)*
   - **Independent:** *number of cups of milk tea Joan sells.(**c**)*

2. The table shows the relationship between the age of a plant in weeks, **p**, and the height of the plant in cm, **h**.

   Write an equation to represent this relationship.

P	h
1	9
2	18
3	27
4	36
5	45

   - **Dependent:** *height of the plant (**h**)*
   - **Independent:** *age of a plant in weeks.(**p**)*
   - **Equation:** *h = 9p*

3.

$$x \qquad y$$
$$a \longrightarrow 1$$
$$b \longrightarrow 2$$
$$c \longrightarrow 3$$

   In this example, a, b, and c are the values of x which are the independent variables. Since 1, 2, and 3 are the values of y, they are the dependent variables. As you can see in the illustration, 1 is determined by a; this means that 1 is recognized because of a.