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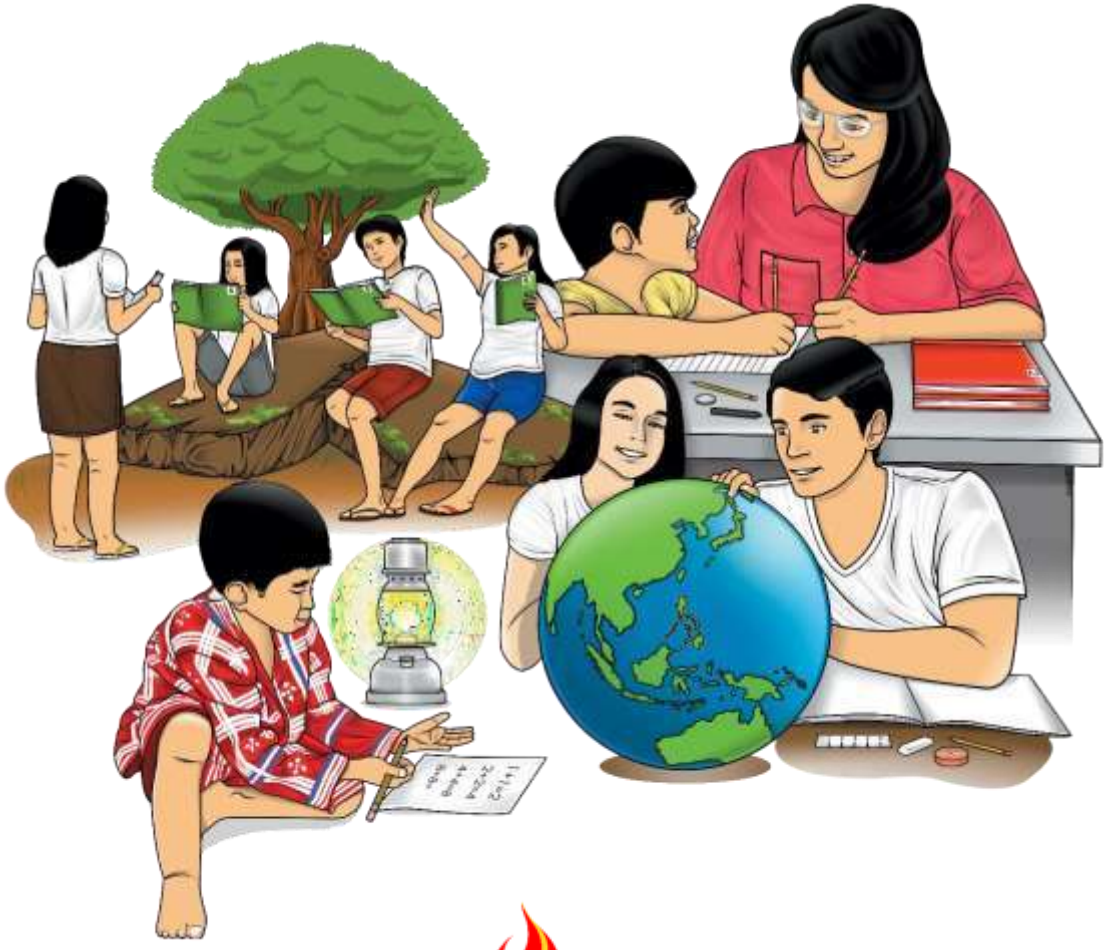
DEPARTMENT OF EDUCATION

Mathematics
Quarter 1 – Module 1:
Sets



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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-test 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 Teachers are also provided to the 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. 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

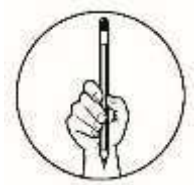
This module was designed and written with you in mind. It is here to help you master the Sets. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module contains lessons on:

- Lesson 1 – Sets
- Lesson 2 - Subset, Universal Sets, Null Set, Cardinality of Sets
- Lesson 3 – Union and Intersection of Sets and the Difference of Two Sets

After going through this module, you are expected to:

1. define a well-defined set;
2. illustrate a subset, universal set, null set, cardinality of set; and
3. analyze union, intersection, and the difference of two sets.



What I Know

Select the correct answer. Write the letter on a separate sheet of paper.

1. Which of the following is a well-defined set?
   a. A set of beautiful sceneries
   b. A set of good basketball players
   c. A set of Philippine Presidents
   d. A set of successful leaders.

2. List all the letters in the word “school”.
   a. {s, c, h, o, o, l}
   b. {s, c, h, o, l}
   c. {s, h, o, o, l}
   d. {s, c, o, l}

3. Which of the following is the symbol of an empty set?
   a. $\cap$ b. $\cup$ c. $\subseteq$ d. $\emptyset$

4. Which of the following is a subset of A= {1,2,3}?
   a. {0} b. {0,1} c. {1,2} d. {2,3,4}

5. Given the set of letters in the word “mathematics”, what is the cardinality of the given set?
   a. 11 b. 8 c. 6 d. 4

6. Which symbol is used to indicate the intersection of two sets?
   a. ∪ b. ∩ c. – d. $\emptyset$

7. Which symbol is used to indicate the union of two sets?
   a. $\emptyset$ b. ∪ c. ∩ d. –

*For numbers 8 – 10, use the following:
A = {1, 2, 4, 5, 6} B = {1, 3, 5, 7}, C = {2, 4, 6, 8}

8. Find A ∪ B
   a. {1, 2, 3, 4, 5, 6, 7} c. {3}
   b. {1, 2, 3, 4, 5, 7, 8} d. {1, 3, 4, 5, 7, 8}

9. Find B ∩ C
   a. {0, 2, 3} c. { }
   b. {0, 2, 3, 5, 6, 7, 8} d. {8}

10. Find A – B
   a. {1,2,4} c. {3}
   b. {5,7,8} d. {2, 4, 6}

11. The following is a subset of R = {n, e, w}, EXCEPT?
   a. {n, e, w} b. {e} c. {0} d. { }

12. Which of the following set has the cardinality equals to 5?
   a. Set A is the set of counting numbers less than 5.
   b. Set B is the set of letters in the word "RACER".
   c. Set C is the set of positive multiples of 5.
   d. Set D is the set of names of the fingers.

13. Given A = {i, c, e} and B = {c, o, l, d}, find AUB.
   a. {c, o, l, d, i, e} b. {i, e} c. {e} d. { }

14. Given A = {5, 10, 15, 20} and B = {25}, find A ∩ B.
   a. {5, 10, 15, 20, 25} b. {5, 10, 15, 20} c. { } d. {0}

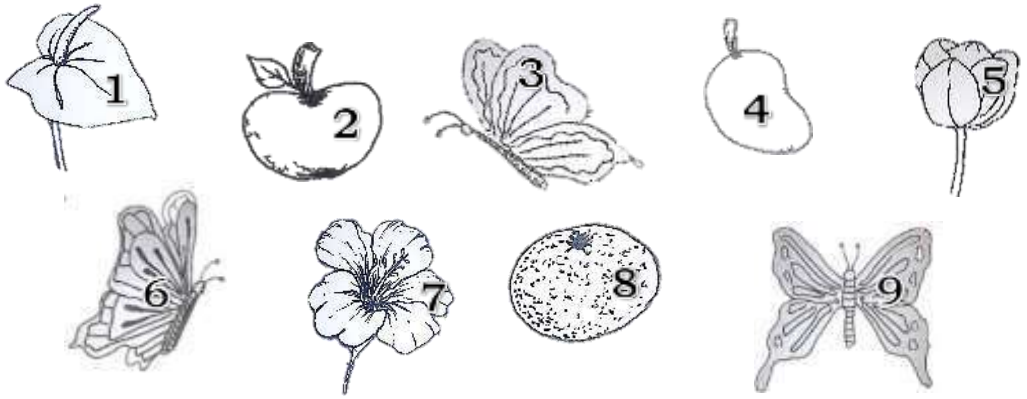
15. Given E = {pig, goat, cow, horse} and F = {chicken, duck}, find E – F.
   a. {pig, goat, cow, horse, chicken, duck}
   b. {pig, goat, cow, horse}
   c. {chicken, duck}
   d. { }

Lesson 1 Sets

In this lesson you will learn how to define and illustrate a well-defined set and to identify the elements of the given set.

What's In

Group and label the objects below according to their characteristics. Write your answer on a separate sheet of paper.



After you label and group the objects, answer the following questions:

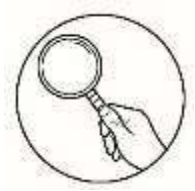
a. Why did you group the object as such?
b. How many groups are there?
c. What are the names of the groups created?

Notes to the Teacher

This activity will guide you to let the students describe and illustrate the set.

What's New

In the collections of objects below, which does not belong to the group?



What is It

Sets

The groups are called sets. Set maybe thought as a collection of objects.

Example:

A set of mountains

A set of books

A set of buildings

WELL – DEFINED SET

In mathematics, **set** is a well-defined group or collection of objects that share common characteristics. The objects contained in the set are called **elements.**

A set can be named using capital letters like A, B, C, D,…Z and we use braces { } to group the elements of set separated by commas.

If a set contains many elements, we often use three dots, …, called **ellipsis**.

*Note: In listing the elements of the set, each distinct element is listed once and the order of the element does not matter.

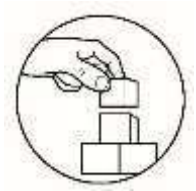
Example of well-defined sets

1. The set of primary colors
   M = $\{red, yellow, blue\}$
2. The set of all even numbers.
   E = { 2, 4, 6, … }
3. The set of all multiples of 5.
   Y = $\{5, 10, 15, \ldots\}$
4. The set of letter in the word "arrange".
   O = $\{a, r, n, g, e\}$

Example of not well-defined sets

1. The set of famous dancers.
2. The set of punctual students in your class.
3. The set of honest people

*Note: The sets given above are not well-defined since people will have different point of views on famous dancers, punctual students and honest people.



What's More

State whether each of the following sets is well-defined or not. Write your answer in the space provided before the number.

_____1. The set of young politicians.
_____2. The set of types of matter.
_____3. The set of versatile actress.
_____4. The set of all oceans of the earth.
_____5. The set of months containing 31 days.
_____6. The set of tasty food.
_____7. The set of planets in our solar system.
_____8. The set of durable bags.
_____9. The set of consonants in the English Alphabet
_____10. The set of even counting numbers.

What I Have Learned

Match the descriptions in column A with word/s being described in column B. Write the letter of your answer in the space provided

Column A	Column B
_____1. The objects contained in the set.	a. capital letters
_____2. A well-defined group or collection of objects that share common characteristics.	b. set
_____3. It is represented by three dots which is use to indicate that a set has many / infinite elements.	c. ellipsis
_____4. A symbol use to group the elements of a set.	d. { }
_____5. A symbol used to represent a set.	e. elements

What I Can Do

1. Which of the following is the set of animals living in water?
   a. A = {dolphin, whale, milk fish}
   b. B = {lion, buffalo, deer}
   c. C = {duck, chicken, turkey}
   d. D = {eagle, parrot, dove}

2. Given: A = {b, i, o, d, e, g, r, a, d, a, b, l, e}, which of the following is INCORRECT?
   a. It uses capital letter to name set.
   b. It does not list the object once.
   c. It uses braces.
   d. It uses commas.

3. The set of provinces in Region 12.
   a. E = {Aklan, Antique, Capiz, Guimaras, Ilo-ilo, Negros Occidental}
   b. F = {South Cotabato, North Cotabato, Sultan Kudarat, Sarangani, General Santos}
   c. G = {Ilocos Norte, Ilocos Sur, La Union, Pangasinan}
   d. H = {Cavite, Laguna, Batangas, Rizal, Quezon}

4. The set of months containing 30 days.
   a. I = {January, March, May}
   b. J = {February, April, June}
   c. K = {June, July, August}
   d. L = {June, September, November}

5. The set of secondary colors.
   a. M = {red, green, yellow}
   b. N = {brown, pink, blue}
   c. O = {green, orange, violet}
   d. P = {white, black, grey}

6. The set of vowels.
   a. Q = {a, e, i, o, u}
   b. R = {c, d, e, f, g}
   c. S = {h, i, j, k, l}
   d. T = {o, s, t, u, v}

7. Which of the following set is multiples of 2 and less than 12?
   a. U = {2, 10}
   b. V = {2, 4, 6}
   c. W = {2, 4, 6, 8}
   d. X = {2, 4, 6, 8, 10}

8. Which of the following is the set of odd whole numbers between 0 and 10?
   a. Y = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9}
   b. Z = {0,2,4,6,8,9}
   c. A = {1,3,5,7,9}
   d. B = {1,3,5,7}

9. Name the next 3 elements of V = {3, 5, 7, 9, 11, ...}.
   a. {12, 13, 14}
   b. {12, 14, 16}
   c. {13, 14, 15}
   d. {13, 15, 17}

10. Name the next 5 elements of E = {2, 4, 6, ...}.
    a. {7, 8, 9, 10, 11}
    b. {7, 9, 11, 13, 15}
    c. {8, 9, 10, 11, 12}
    d. {8, 10, 12, 14, 16}

Lesson 2 Subsets, Universal Sets, Null Sets and Cardinality of Sets

In Lesson 1, you have learned how to illustrate sets. Now, you will learn about Subsets, Universal Sets, Null Sets and Cardinality of Sets.

What's In

MEMORY CHECK!

Identify whether each of the following sets is **well-defined** or **NOT**. Put a check mark (/) if it is well-defined and a cross mark (x) if it is not. Write your answer in the space provided before the number.

_____1. The set of all even numbers from 2 to 10.
_____2. The set of all factors of 18.
_____3. The set of responsible citizens.
_____4. The set of letters in the word "FATHER".
_____5. The set of hardworking front liners.

Notes to the Teacher

This activity will help the students recall the basic concepts of sets.

What's New

Given:

A = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

Find:

1. The set of odd numbers.
2. The set of all factors of 10.
3. The set of multiples of 4.
4. The set of negative integers.

What is It

UNIVERSAL SET

The universal set U is the set that contains all objects under consideration.
Examples:

1. Set U contains the set of whole numbers.
   U= {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, …}

2. Set U contains the set of all letters of the English Alphabet.
   U = {a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z}

3. Set U contains the set of days of the week.
   U = {Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday}

SUBSETS

Given any two sets A and B, *if every element in A is also an element in B, then A is a* subset *of B*. The symbol "**A** ⊆ **B**" is read A is a *subset* of B.

*Note: Every set is a subset of itself and empty set is also a subset of every set.

Example:

1. R = {1, 2}

   The possible subsets are;

Two Elements	One Element	Zero Element
{1, 2}	{1}	{ } or ∅
	{2}	

2. O = {red, blue, yellow}

   The possible subsets of O are;

Three Elements	Two Elements	One Element	Zero Element
{red, blue, yellow }	{red, blue }	{ red }	{ } or ∅
	{red, yellow }	{ blue }	
	{ blue, yellow }	{ yellow }	

3. S = {3, 6, 9, 12}

The possible subsets of set S are;

Four Elements	Three Elements	Two Elements	One Element	Zero Element
{3, 6, 9, 12}	{3, 6, 9}	{3, 6}	{3}	{ } or ∅
	{3, 6, 12}	{3, 9}	{6}	
	{3, 9, 12}	{3, 12}	{9}	
	{6, 9, 12}	{6, 9}	{12}	
		{6, 12}		
		{9, 12}		

4. E = {m, a, t, h}

The possible subsets of set S are;

Four Elements	Three Elements	Two Elements	One Element	Zero Element
{m, a, t, h}	{m, a, t}	{m, a}	{m}	{ } or ∅
	{m, a, h}	{m, t}	{a}	
	{m, t, h}	{m, h}	{t}	
	{a, t, h}	{a, t}	{h}	
		{a, h}		
		{t, h}		

5. G = {0, 2, 4, 6, 8}

The possible subsets of set G are;

Five Elements	Four Elements	Three Elements	Two Elements	One Element	Zero Element
{0, 2, 4, 6, 8}	{0, 2, 4, 6}	{0, 2, 4}	{0, 2}	{0}	{ } or ∅
	{0, 2, 4, 8}	{0, 2, 6}	{0, 4}	{2}	
	{0, 2, 6, 8}	{0, 2, 8}	{0, 6}	{4}	
	{0, 4, 6, 8}	{0, 4, 6}	{0, 8}	{6}	
	{2, 4, 6, 8}	{0, 4, 8}	{2, 4}	{8}	
		{0, 6, 8}	{2, 6}		
		{2, 4, 6}	{2, 8}		
		{2, 4, 8}	{4, 6}		
		{2, 6, 8}	{4, 8}		
		{4, 6, 8}	{6, 8}		

NULL SET

A set with no element is an *empty set* or *null set.* The symbol for empty set is { } or ∅.

Example:

1. Set T is the set of counting numbers between 1 and 2.
T = { } or T = ∅

2. Set I is the set of months with 35 days.
I = { } or I = ∅

3. Set M is the set of cars with 60 doors.
M = { } or M = ∅

4. Set B is the set of flying castles.
B = { } or B = ∅

5. Set E is the set of crying trees.
E = { } or E = ∅

CARDINALITY OF SETS

The cardinal number of set A, denoted by n(A), is the number of elements in set A. Thus, in A = $\{1,3,5,7\}$, n(A) = 4 because set A contains 4 elements.

Examples:

Find the cardinality of the following sets.

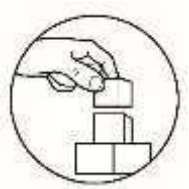
1. Set D is the set of vowels in English alphabet.
   Solution: D = $\{a,e,i,o,u\}$
   Answer: n(D) = **5**

2. Set R is the set of letters in the word "difficulty".
   Solution: R = $\{d,i,f,c,u,l,t,y\}$
   Answer: n(R) = **8**

3. Set M is the set of odd numbers between 1 and 3.
   Solution: M = { } or M = ∅
   Answer: n(M) = **0**

4. Set E is the set of letters in the word "survivor".
   Solution: E = $\{s,u,r,v,i,\}$
   Answer: n(E) = **6**

5. Set K is the set of counting numbers less than 5.
   Solution: K = $\{1,2,3,4\}$
   Answer: n(K) = **4**



What's More

I. Find the cardinality of the following sets.

_____1. Set A is the set of days in a week.
_____2. Set B is the set of letters in the word "recognition".
_____3. Set C is the set of even numbers less than 2.
_____4. Set D is the set of odd numbers between 3 and 9.
_____5. Set E is the set of factors of 12.

II. Tell whether each statement is True or False.

_____1. $\{3,5,7\} \subseteq \{1,2,3,\dots\}$
_____2. $\{b,h,r,q\} \subseteq \{h,r\}$
_____3. $\{3,12,5,19\} \subseteq \{19,3,5,12\}$
_____4. $\{4\} \subseteq \{2,4,6,10\}$
_____5. $\emptyset \subseteq \{1,3,5,7\}$

What I Have Learned

To sum it up, let us complete the statements. Choose your answer from the box that best completes the statements below.

universal set	subset	cardinality of set
null set	{ } or ∅	union of set

1. A set with no element is an empty set or_____.
2. The number of elements in the set refers to_____.
3. The_____ U is the set that contains all objects under consideration.
4. If every element in A is also an element in B, then A is a _____of B.
5. The symbol for empty set or null set is_____.

What I Can Do

I. TRUE or FALSE: Given the sets below, write **true** if the statement is correct and **false** if it is wrong. Write your answer in the space provided before the number.

$S = \{0, 1, 2, 3, 4, \ldots, 10\}$ V = {5, 10, 15, 20, 25}
O = {d, a, y} I = {r, o, s, e}
$L = \{3, 6, 9, 12\}$ N = {roots, stem, leaves, flowers, fruits }
G = {Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune}

_____1. The cardinality of Set G is 8.
_____2. {5, 15, 25} is a subset of Set V.
_____3. {8} is a subset of Set L.
_____4. The cardinality of Set O is 7.
_____5. The number of elements in Set N is 5.
_____6. {s, u, n} is a subset of Set G.
_____7. An empty set or { } is a subset of Set N.
_____8. The cardinality of Set I is 10.
_____9. {5, 6, 7, 8, 9} is a subset of Set S.
_____10. One of the subsets of Set N and Set G is a ∅.

II. IDENTIFICATION: Identify the cardinality and the subsets of the following sets. You can use extra sheet of paper in listing the subsets of the given set.

1. Set A = {1, 8}
   n(A) =_____Subsets: _____
2. Set B = {sun, moon, stars}
   n(B) =_____Subsets: _____
3. Set C = {g, l, a, d}
   n(C) =_____Subsets: _____
4. Set D = {2, 4, 6, 8}
   n(D) =_____Subsets: _____
5. Set E = {green, orange, purple}
   n(E) =_____Subsets: _____

Lesson 3 Union and Intersection of Sets and the Difference of Two Sets

In Arithmetic, we have learned the four fundamental operations that help us combine numbers. In sets, we are going to learn union and intersection of sets and the difference of two sets.

What's In

Identify if each statement is true or false. Write your answer in the space provided.
Given: U= {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

_____1. The universal set is {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}.
_____2. {2, 4, 6, 8, 10} is a subset of U.
_____3. {0, 10} is a subset of U.
_____4. Empty set { } is a subset of U.
_____5. The cardinality number of set U is 10.

Notes to the Teacher

This activity will help the learners recall the concepts on Subsets, Universal Sets, Null Sets and Cardinality of Sets.

What's New

Select your answer/s from the words inside the box.

What animals can live on land? Name them.
What animals can live in water? Name them.
What animals can live both in land and water?

dog	cat fish
frog	milk fish
cow	turtle

What is It

OPERATION OF SETS

Name	Symbol	Definition
Union	∪	Is the set containing all elements that are in A or in B.
Intersection	∩	The set that consist of all elements that are both in A and B.
Difference	-	Is a set of elements in A that are not in B.

UNION OF SETS

The union of sets A and B, written as A ∪ B, is the set of elements that are members of A, or members of B, or members of both A and B.

Example:

1. If A = {1, 2, 3} and B = {1, 2, 4, 5, 6},
   then A ∪ B = {1, 2, 3, 4, 5, 6}

2. If A = {a, b, c, d, e} and B = {a, e, i, o, u},
   then A ∪ B = {a, b, c, d, e, i, o, u}

3. If A = {Monday, Tuesday, Wednesday, Thursday, Friday} and
   B = {Saturday, Sunday}, then AUB = {Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday}

INTERSECTION OF SETS

The intersection of two sets A and B, written as A ∩ B, is the set of all elements common to both sets A and B.

Example:

1. If A = {1, 2, 3} and B = {1, 2, 4, 5, 6}, then A ∩ B = {1, 2}

2. If A = {a, b, c, d, e} and B = {a, e, i, o, u}, then A ∩ B = {a, e}

3. If A = {Monday, Tuesday, Wednesday, Thursday, Friday} and B = {Saturday, Sunday}, then A∩B = { } or ∅

DIFFERENCE OF TWO SETS

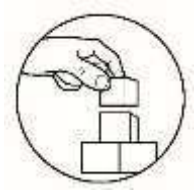
The difference of set A and B, written as A – B, is a set of elements in A that are not in B.

Example:

1. If A = {1, 2, 3} and B = {1, 2, 4, 5, 6}, then A – B = {3} while, B – A = {4, 5, 6}.

2. If A = {a, b, c, d, e} and B = {a, e, i, o, u}, then A – B = {b, c, d}, while B – A = {i, o, u}.

3. If A = {Monday, Tuesday, Wednesday, Thursday, Friday} and B = {Saturday, Sunday}, then A – B = {Monday, Tuesday, Wednesday, Thursday, Friday} while B – A = {Saturday, Sunday}.



What's More

I. Perform the following operations on sets.

Given:

A = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
B = {2, 4, 6, 8, 10}
C = {1, 3, 5, 7, 9}

1. A ∩ C = _____
2. B ∩ C = _____

3. A ∩ B = _____
4. A U B = _____
5. B U C = _____
6. A U C = _____
7. A – C = _____
8. B – C = _____
9. A – B = _____
10. C – A = _____

II. Answer the following:

Given:

Set X is the set of months in a year.
Set Y is the set of months that ends in "ber".
Set Z is the set of months that has 31 days.

Find:

1. X ∩ Y = _____
2. Z ∩ X = _____
3. Z U Y = _____
4. Y U Z = _____
5. X – Z = _____

What I Have Learned

Fill in the blank with the correct word or symbol to make the statement **TRUE**.

1. The_____of sets A and B, written as A U B, is the set of elements that are members of A, or members of B, or members of both A and B.

2. The_____of two sets A and B, written as A ∩ B, is the set of all elements common to both sets A and B.

3. The_____of set A and B, written as A – B, is a set of elements in A that are not in B.

4. If A = {m, a, t, h} and B= {a, m}, then_____= {a, m}.

5. If C = {English, Math, Science, Filipino, Values Education, TLE, Mapeh, Araling Panlipunan} and D = {Math, Science, English}, then_____= {English, Math, Science, Filipino, Values Education, TLE, Mapeh, Araling Panlipunan}.

6. If O = {10, 20, 30, 40, 50} and P = {20, 40}, then_____= {10, 30, 50}

What I Can Do

Here is another activity that allows you to apply what you learned about the operations on sets. Write your answer in the space provided.

1. If A = {a, b, c, d, e} and B = {a, c, f, g, h, i}, find:
   (a) A ∪ B = _____
   (b) A ∩ B = _____
   (c) A – B = _____

2. If A = {2, 3, 4, 5}, B = {4, 5, 6, 7}, and C = {6, 7, 8, 9}, find:
   (a) A ∪ B = _____
   (b) B ∩ C = _____
   (c) C – A = _____

3. If A = {4, 6, 8, 10, 12}, B = {8, 10, 12, 14}, C = {12, 14, 16} and D = {16, 18}, find:
   (a) B ∪ D =_____
   (b) A ∩ B = _____
   (c) A – B = _____

4. Let X = {ballpen, crayon, pentel pen, pencil}, Y = {pencil, ballpen}, Z = {crayon}
   Find:
   (a) X ∪ Y = _____
   (b) X ∩ Z = _____
   (c) X – Y = _____

5. Given: Set R is the set of letters between a to j.
   Set S is the set of vowels.
   Set T is the set of letters from a to e.
   Find:
   (a) R ∪ S = _____
   (b) S ∩ T = _____
   (c) T – S = _____

Assessment

Select the correct answer. Write the letter on a separate sheet of paper.

1. Which of the following is a well-defined set?
   a. A set of good writers
   b. A set of factors of 3.
   c. A set of honest students in grade seven
   d. A set small numbers

2. Which of the following is the symbol of a null set?
   a. U b. ∩ c. ⊆ d. ∅

3. Michelle listed the set of all letters in the word "serendipity" as shown below. What is wrong with this set?
   A = {s, e, r, e, n, d, i, p, i, t, y}
   a. It uses commas.
   b. It uses braces.
   c. The objects in this set are not listed once.
   d. A capital letter is used to represent this set.

4. Given the set of letters in the word "LOVE". What is the cardinality of the given set?
   a. 11 b. 8 c. 6 d. 4

5. What is the cardinality of {10, 20, 30, …, 80}?
   a. 8 b. 10 c. 12 d. 14

6. The following are subsets of U= {5, 10, 15, 20, 25, 30, 35, 40, 45, 50}, EXCEPT?
   a. {10, 20, 30, 50} c. {5, 10, 25}
   b. {5, 10, 15, 20, 25, 37, 40} d. { }

7. How many subsets does G = {t, e, a, m} have?
   a. 4 b. 12 c. 16 d. 20

8. Given A= {s, e, a, t} and B= {s, t, a, n, d}, find AUB.
   a. {s, e, a, t, n, d} b. {s, a, t} c. {n, d} d. {e}

9. Given F = {o, r, a, n, g, e} and G = {y, e, l, o, w}, find F∩G.
   a. {o, r, a, n, g, e, y, l, w} c. {y, e, l, o, w}
   b. {o, r, a, n, g, e} d. {e, o}

10. Given X = {bus, jeepney, taxi, tricycle} and Y = {tricycle}, find the difference of Y and X.
    a. {bus, jeepney, taxi, tricycle} c. {tricycle}
    b. {bus, jeepney, taxi} d. { }

11. List all positive even numbers less than or equal to 10.
    a. {2, 4, 6, 8} c. {2, 4, 6, 8, 10}
    b. {1, 3, 5, 7} d. {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

12. Which of the following is a subset of F = {c, a, n, d, y}?
    a. {c, a, n, d, y} b. {c, a, n, e} c. {0} d. {e}

    *For numbers 13 – 15, use the following:
    A = { 0, 1, 2, 3, 4 } B = { 3, 5, 7, 8 }, C = { 0, 2, 6, 8}

13. Find A U B
    a. {0, 1, 2, 3, 4, 5, 6, 7, 8, 9} c. {3}
    b. {0, 1, 2, 3, 4, 5, 7, 8} d. {0, 1, 2, 3, 4,3, 5, 7, 8}

14. Find B ∩ C
    a. {0, 2, 3} b. {0, 2, 3, 6, 7, 8} c. {8} d. { }

15. Find A – C
    a. {0, 1, 2, 4} b. {1, 3, 4} c. {3} d. { }

Additional Activities

Activity 1.1 Give what is asked

Do the following exercises.

I. Tell whether each of the following sets is <u>well-defined</u> or <u>not</u>.
_____1. The set of admiring places.
_____2. The set of all counting numbers
_____3. The set of workaholic teachers.
_____4. The set of letters in the word “father”.
_____5. The set of all factors of 36.

II. Give the <u>cardinality</u> of the following sets.
_____1. The set of counting numbers from 5 to 25
_____2. The set of letters in the word “seven”
_____3. D = {1, 2, 3, 4, 5}

_____4. A = {m, o, d, u, l, e}
_____5. Y = {4, 8, 12, …, 36}

III. Let B = {2, 6}. List all the possible subsets of B.

IV. Answer the following. Write your answer in the space provided.

Given: If P = {1, 2, 3}, Q = {2, 3, 4}, R = {3, 4, 5}, and S = {4, 5, 6}

Find:

1. P ∪ Q
2. P ∪ R
3. Q ∪ R
4. Q ∪ S
5. P ∩ Q
6. P ∩ R
7. S ∩ P
8. Q – P
9. P – S
10. R – S

Answer Key

Lesson 2: What's More I. 1. n (A) = 7 2. n (B) = 8 3. n (C) = 1 4. n (D) = 2 5. n (E) = 6 II. 1. True 2. False 3. True 4. True 5. True	Lesson 2: What's In Memory Check! 1. / 2. / 3. x 4. / 5. x	Lesson 1: What I Know 1. c 2. b 3. d 4. c 5. b 6. b 7. b 8. a 9. c 10. d 11. a c 12. d 13. a 14. c 15. b
Lesson 1: What I Have Learned 1. e 2. b 3. c 4. d 5. a	Lesson 1: What's More 1. not 2. well - defined 3. not 4. well - defined 5. well - defined 6. not 7. well - defined 8. not 9. well - defined 10. well - defined	

Lesson 2: What I Can Do I. 1. true 2. true 3. false 4. false 5. true 6. false 7. true 8. false 9. true 10. true II. 1. n(A) = 2 Subsets: { 1, 8 }, { 1 }, { 8 }, { } **or** ∅ 2. n(B) = 3 Subsets: {sun, moon, stars} {sun, stars} {sun, moon} {moon, stars} {sun} {moon} {stars} { } **or** ∅	Lesson 2: What I Have Learned 1. null set 2. cardinality of set 3. universal set 4. subset 5. { } **or** ∅

Lesson 3:
What's More

I.

1. {1, 3, 5, 7, 9}
2. { }
3. {2, 4, 6, 8, 10}
4. {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
5. {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
6. {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
7. {2, 4, 6, 8, 10}
8. {2, 4, 5, 6, 8, 10}
9. {1, 3, 5, 7, 9}
10. { } or □

II.

1. {Sept, Oct, Nov, Dec}
2. {Jan, March, May, Jul, Aug, Oct, Dec}
3. {Jan, March, May, July, ..., Dec}
4. {Jan, March, May, July, Aug, Sep, Oct, Nov, Dec}
5. {Feb, April, June, Sept, Nov}

Lesson 3:
What's In

1. true
2. true
3. false
4. true
5. true

What I Have Learned

1. union
2. intersection
3. difference
4. $A \cap B$
5. $C \cup D$
6. $O - P$

Lesson 2:
What I Can Do

3. n(C) = 4

Subsets:

{g, l, a, d}	{g, l, a}	{g, l}	{g}	{ }
	{g, l, d}	{g, a}	{l}	
	{l, a, d}	{g, d}	{a}	
	{g, a, d}	{l, a}	{d}	
		{l, d}		
		{a, d}		

4. n(D) = 4

Subsets:

{2, 4, 6, 8}	{2, 4, 6}	{2, 4}	{2}	{ }
	{2, 4, 8 }	{2, 6}	{4}	
	{2, 6, 8}	{2, 8}	{6}	
	{4, 6, 8}	{4, 6}	{8}	
		{4, 8}		
		{6, 8}		

5. n(E) = 3

Subsets:

{green, orange, violet}	{green, orange}	{green}	{ }
	{green, violet}		{orange}
	{orange, violet}	{violet}	

Lesson 3:
What I Can Do

1. a. {a, b, c, d, e, f, g, h, i} b. {a, c} c. {b, d, e}

2. a. {2, 3, 4, 5, 6, 7} b. {6, 7} c. {6, 7, 8, 9}

3. a. {8, 10, 12, 14, 16, 18} b. {8, 10, 12} c. {4, 6}

4. a. {ballpen, crayon, pentel pen, pencil}
   b. {crayon}
   c. {crayon, pentel pen}

5. a. {a, b, c, d, e, f, g, h, i, o, u}
   b. {a, c}
   c. {b, c, d}

Additional Activities

I.
1. not
2. well-defined
3. not
4. well-defined
5. well-defined

II.
1. 21
2. 4
3. 5
4. 6
5. 9

III.

{2,6}, {2}, {6}, {□}

IV.
1. {1, 2, 3, 4}
2. {1, 2, 3, 4, 5}
3. {2, 3, 4, 5}
4. {2, 3, 4, 5, 6}
5. {2, 3}
6. {3}
7. {□}
8. {4}
9. {1, 2, 3}
10. {3}

Assessment

1. b
2. d
3. c
4. d
5. a
6. b
7. c
8. a
9. d
10. d
11. e
12. a
13. a
14. b
15. b

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