Riviera International Academy

Assignment-2077

(Ashwin 20, 2077, Tuesday)

Class: Six

Subject- Mathematics

Source: Photos of exercises are given below.

Work: Read & write all definitions from pages 9, 10, 11, 12, & 13.

Do your work neatly

1.7 Relationships between sets

According to the number of elements and types of elements contained by two or more sets, there are four types of relationships of sets.

(i) Equal sets

In any two sets A and B, where, A = {a, e, i, o, u} and B = {u, i, a, o, e}, the sets A and B have the equal cardinal numbers and exactly the same elements. Therefore, sets A and B are called **equal sets**.

It is written as **A = B**.

Two or more sets are said to be equal if they contain exactly the same elements.

(ii) Equivalent sets

In any two sets P and Q, where, P = {1, 3, 5, 7} and Q = {2, 4, 6, 8}, the elements of the sets P and Q are not exactly the same, however, the cardinal number of both of them is equal. Therefore, sets P and Q are called **equivalent sets**. It is written as **P ~ Q**.

Two or more sets are said to be equivalent if they have equal cardinal number.

All equal sets are equivalent but all equivalent sets may not be equal.

(iii) Overlapping sets

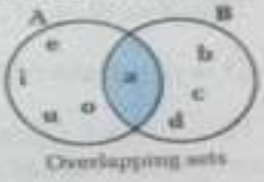
Let's take any two sets A and B, where,

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

Here, the element **a** is common to both sets. Therefore, the sets A and B are called the **overlapping sets**.

Two or more sets are said to be overlapping if they have at least one element common.

The given intersecting circles represent overlapping sets. The shaded region contains the common element.



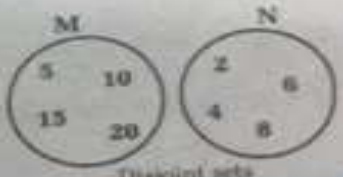
Overlapping sets

(iv) Disjoint sets

Let's take any two sets M and N, where M = {5, 10, 15, 20} and N = {2, 4, 6, 8}.

Here, sets M and N do not have any common element. It means, they are not overlapping. Therefore, set M and N are called **disjoint sets**.

The given non-intersecting circles represent the disjoint sets M and N.



Disjoint sets

6. **Let's write the following membership or non-membership by using set notation symbols.**

Example: (i) 4 belongs to the set W. $4 \in W$

(ii) b is not a member of {a, e, i, o, u}. $b \notin \{a, e, i, o, u\}$

a) 9 belongs to the set N.
b) u is a member of set V.
c) 3 is not an element of Z.
d) 7 does not belong to {2, 4, 6, 8}
e) 'e' belongs to {n, e, p, a, l}
f) 8 is not a member of {1, 3, 5, 7, 9}

7. **Let's describe the following sets in listing method.**

a) W = {the whole numbers less than 6}
b) M = {the first five multiples of 4}
c) A = {the letters of the word 'MATHEMATICS'}
d) P = {x : x is a prime number $x < 20$}
e) B = {y : y is a composite number, $y < 10$}

8. **Let's express the following sets in descriptive method.**

a) A = {१, २, ३, ४, ५}
b) N = {1, 2, 3, 4, 5, 6, 7, 8, 9}
c) P = {2, 3, 5, 7}
d) V = {a, e, i, o, u}
e) F = {1, 2, 7, 14}
f) D = {4, 8, 12, 16}

9. **Let's express the following sets in set-builder method.**

a) W = {0, 1, 2, 3, 4}
b) S = {1, 4, 9, 16, 25}
c) O = {1, 3, 5, 7, 9}
d) A = {a, b, c, d, e}
e) F = {1, 3, 5, 15}
f) M = {3, 6, 9, 12, 15, 18}

It's your time - Project work!

10. a) Let's write the whole numbers upto 20. Select the appropriate numbers to form the following sets in listing and set-builder forms.

(i) Set of composite numbers
(ii) Set of prime numbers
(iii) Set of even numbers
(iv) Set of odd numbers
(v) Set of square numbers
(vi) set of cube numbers
(vii) Set of multiples of 5
(viii) Set of factors of 20

b) Let's observe around your classroom and select any four objects as the members of a set. Then express the set in descriptive, listing and set-builder method.

1.8 Universal set and Subset

Let's take a set of natural numbers less than 11.

$N = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

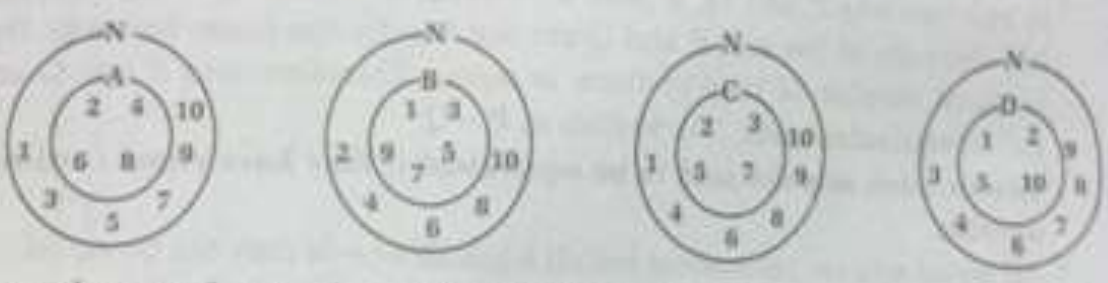
Now, let's select certain elements from this set and make some other sets.

$A = \{2, 4, 6, 8\}$ ⟶ Set of even numbers less than 10.

$B = \{1, 3, 5, 7, 9\}$ ⟶ Set of odd number less than 10.

$C = \{2, 3, 5, 7\}$ ⟶ Set of prime numbers less than 10.

$D = \{1, 2, 5, 10\}$ ⟶ Set of factors of 10 and so on.



Here, the set of natural numbers less than 11 is known as the **universal set**. The sets A, B, C and D are the subsets of the universal set. Every element of the subsets A, B, C and D is also an element of the universal set.

'A is a subset of N' is written as $\mathbf{A \subset N}$.

'B is a subset of N' is written as $\mathbf{B \subset N}$.

'C is a subset of N' is written as $\mathbf{C \subset N}$.

'D is a subset of N' is written as $\mathbf{D \subset N}$.

Thus, a set from which elements are selected to form many other subsets is called **universal set**. It is usually denoted by the capital letter U.

Similarly, the set of students of a school is a universal set, from which the subsets like set of girls, set of boys, set of cricket players, set of singers, etc. can be formed.

We use the symbol $\subset$ to denote **'is a subset of'** the given set.

If a set is not the subset of a given set, we denote it by the symbol $\not\subset$.

EXERCISE 1.2

General Section - Classwork

1. Let's tell and write whether the following sets are empty (null), uni (singleton), finite or infinite.

   a) A = {2, 4, 6, 8, 10, ...} .....

   b) B = {2, 3, 5, 7, 11, 13} .....

   c) C = {Mt. Everest} .....

   d) D = {composite number between 4 and 6} .....

2. Let's tell and write the correct answers in the blank spaces.

   a) If N = {11, 12 ,13, 14}, n (N) = ...

   b) If S = {1, 4, 9, ... 49}, n (S) = ...

   c) If V = {i}, subsets of V are ..... and .....

   d) If A = {teachers} and B = {mathematics teachers}, then universal set is ..... and its subset is .....

3. Let's tell and write whether the following sets are equal or equivalent.

   a) A = {e, L g, h}, B = {g, f, h, e}, A and B are .....

   b) X = {3, 6, 9, 12}, Y = {1, 3, 5, 7}, X and Y are .....

4. Let's tell and write whether the following sets are overlapping or disjoint.

   a) P = {1, 3, 5, 7, 9}, Q = {2, 4, 6, 8}, P and Q are .....

   b) A = {5, 10, 15, 20}, B = {4, 8, 12, 16, 20}, A and B are .....

5. If N = {1, 2, 3, 4, 5, ... 10} and A = {2, 4, 6, 8, 10}, insert $\subset$ or $\not\subset$ in the blank spaces.

   a) B = {2, 3, 5, 7}, B ..... N

   b) C = {4, 8, 12}, C ..... A

   c) {3, 6, 9, 12} ..... N

   d) {4, 6, 8} ..... A

Creative Section

6. Let's list the elements of these sets and write whether they are empty (null), singleton, finite or infinite sets.

   a) A = {prime number between 5 and 7}

   b) B = {multiples of 2 less than 20}

1.5 Cardinal number of sets

Let's study the following illustrations and investigate the idea about cardinal number of sets.

In V = {a, e, i, o, u}, cardinal number of set V = n(V) = 5
In P = {2, 3, 5, 7}, the cardinal number of set P = n(P) = 4
In A = {1, 4, 9}, the cardinal number of set A = n(A) = 3

Thus, the number of elements contained by a set is known as its **cardinal number**. The cardinal number of a set A is denoted by **n(A)**.

1.6 Types of sets

According to the number of elements contained by sets, there are four types of sets.

(i) Empty or null set (ii) Unit or singleton set (iii) Finite set (iv) Infinite set

(i) Empty or null set

An empty or null set does not contain any element. For example:
A = {oceans in Nepal}, B = {natural number less than 1}, and so on.
An empty set is denoted by { } or ϕ (phi, a greek alphabet).
If A = {oceans in Nepal}, then A = { } or ϕ and n(A) = 0.
If B = {natural numbers less than 1}, then B = { } or ϕ and n(B) = 0

(ii) Unit set (or singleton set)

A unit set or singleton set contains exactly one element. For example:
A = {the highest peak of the world}, i.e. A = {Sagarmatha} and n(A) = 1
B = {prime number between 6 and 10}, i.e. B = {7} and n(B) = 1, and so on.

(iii) Finite set

A finite set contains a finite number of elements. It means, the process of counting of it's elements surely comes to an end. For example:
W = {whole numbers less than 10}, i.e. W = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9} and n(W) = 10
S = {square numbers less than 50}, i.e. S = {1, 4, 9, 16, 25, 36, 49} and n(S) = 7

(iv) Infinite set

A set which is not finite is called an infinite set. It contains infinite number of elements and the process of counting of it's elements does not come to an end. For example:

N = {natural numbers}, i.e. N = {1, 2, 3, 4, 5, ...}
P = {prime numbers greater than 1}, i.e. P = {2, 3, 5, 7, 11, ...}, and so on.

c) C = {multiples of 2 greater than 20}

d) D = {square numbers between 10 and 20}

7. **Let's list the elements and write the cardinal numbers of these sets.**

a) A = {Natural numbers less than 10}

b) B = {factors of 18}

c) C = {letters of the word 'apple'}

d) D = {x : x is a square number, $x < 75$}

8. **Let's list the elements and write with reasons whether the following pairs of sets are equal or equivalent.**

a) A = {Whole numbers less than 5} and B = {1, 2, 3, 4, 5}

b) P = {x : x is a prime number, $x < 10$} and Q = {7, 5, 3, 2}

9. **Let's list the elements and write with reasons whether the following pairs of sets are overlapping or disjoint.**

a) A = {factors of 12} and B = {factors of 18}.

b) P = {first five multiples of 4} and Q = {first five multiples of 7}.

10. **Let's write which one is the universal set or subset in the following pairs of sets.**

a) W = {whole numbers less than 20} and O = {odd numbers less than 20}.

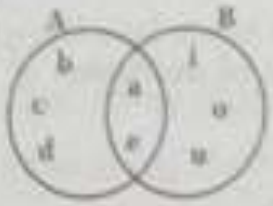
b) A = {2, 4, 6, 8, ..., 20} and E = {even numbers less than 30}.

11. **Let's write all possible subsets of the following sets.**

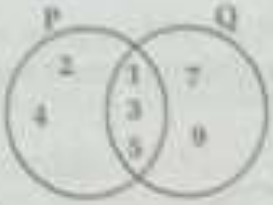
a) {u} b) {a, m} c) {g o d}

12. **Let's list the elements of each pair of overlapping sets. Then make a set of common elements in each case.**

a)



b)



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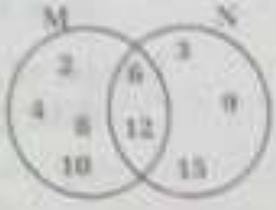


13. **From the given sets, list the common elements in separate sets. Show the elements and the common elements of each pair of sets in diagrams.**

a) A = {1, 2, 3, 4, 5, 6, 7, 8, 9} and B = {2, 3, 5, 7}

b) P = {2, 4, 6, 8, 10} and Q = {4, 8, 12, 16}

It's your time - Project work!

14. a) Let's survey on the following cases among your at least 10 classmates. Then list the name of your classmates and make separate set of these cases.

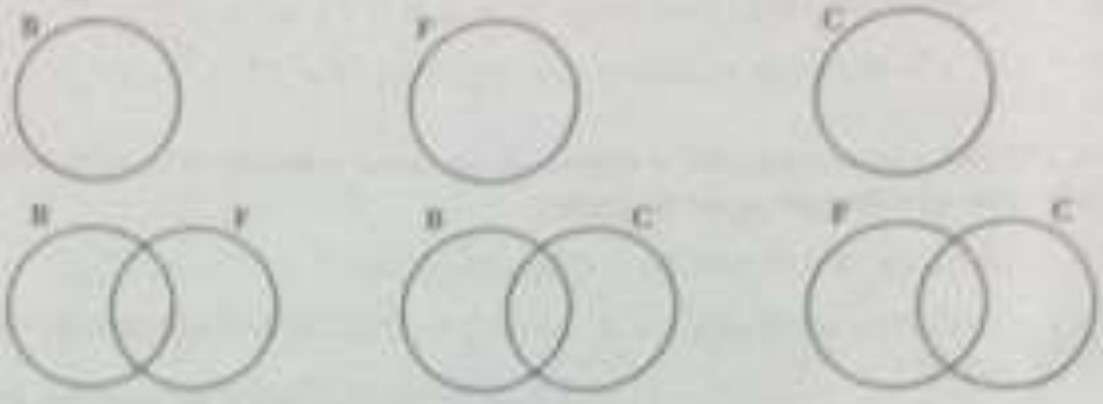
(i) Sets of students who like basketball or football or cricket.

(ii) Set of students who like both basketball and football.

(iii) Set of students who like both basketball and cricket.

(iv) Set of students who like both football and cricket.

Now, draw diagram and show the names of your classmates in the diagrams.



You can draw bigger circles in a chart paper to write the names of your classmates comfortably.

b) Let's write a set of natural numbers upto 10. Then select the appropriate elements to make the following sets.

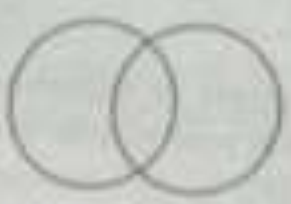
(i) Any two pairs of disjoint sets. (ii) Any two pairs of overlapping sets.

c) Let's write the whole numbers upto 20. Select the appropriate elements to form the following sets. Then copy the given diagrams and show the elements in the diagram.

(i) set of even numbers less than 10 and set of multiples of 4 less than 15.

(ii) set of prime numbers less than 20 and set of multiples of 3 less than 20

(i)



(ii)

Subject- HPE

Answer the following questions:

1. Make a list of activities/habits that help to prevent diabetes.
2. Make a list of activities/habits that help to prevent obesity.
3. What are the types of diabetes? Write down a short note on each of them.

Subject- Science

• Draw neat and clean labelled diagram of animal cell and plant cell.

विषय – नेपाली

पाठ सातको तात्पर्य खुलाऊ पूरा गर।

The End.