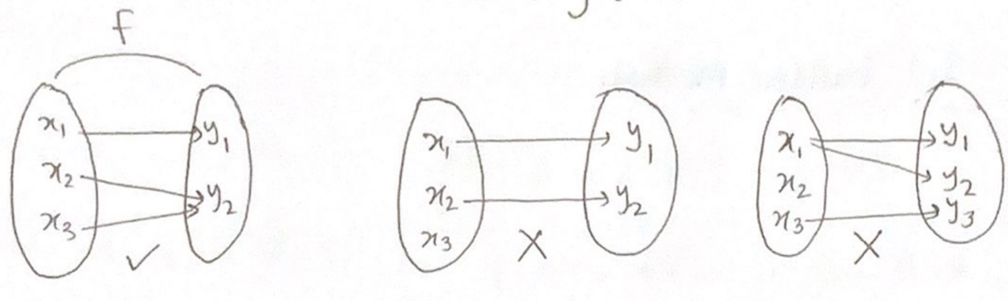
Function:

Let A and B be any two non-empty sets. Then a function from A to B is a rule that asigns each element of A to one and only one element of set B



Real life example:

1. computer program
2. Height of a tree depends on the age of the tree
3. Vending machine
4. Supply and demand.

Set:

A set is a collection of well defined object.

Notation of sets:

- each element seperated by comma.
- put curly brackets around the whole thing

Example: i) the items you wear to go out:

S = { shirt, Shoes, pants, socks, watches }

ii) types of fingers

S = { thumb, index finger, middle finger, ring finger, Pinky finger }

Roster method:

Set of even numbers : $\{\ldots -4, -2, 0, 2, 4 \ldots\}$

Set of odd " : $\{\ldots -3, -1, 1, 3 \ldots\}$

Set builder method:

$D = \{x \mid x \text{ is a digit}\}$

* A set is called empty set if it has no elements.

It is denoted by ϕ.

Subset:

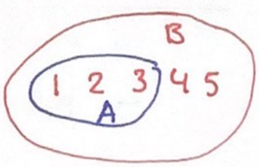
If every element of set A is also an element of set B, then A is called subset of B

In other words, when we define a sets if we take pieces of that set, we can form what is called a subset.

Example:

$A = \{1, 2, 3\}$ is a subset of B.

Even $\{4, 5\}$ is also a subset of B



Proper Subset:

A is a proper subset of B if and only if every element of A is also in B and there exists at least one element in B that is not in A.

Example:

$A = \{1, 2, 3\}$ is a subset of $B = \{1, 2, 3\}$ but not proper subset. But $A = \{1, 2, 3\}$ is a proper subset of $B = \{1, 2, 3, 4\}$ because the element 4 is not in A.

Equal set:

If two sets A and B have the same elements then we say that A equals B and we write $A = B$.

Example: $A = \{1, 2, 3\}$, $B = \{3, 2, 1\}$

* In sets, it doesn't matter what order the elements are in.

Union:

The union of A and B denoted as $A \cup B$ is the set consisting of elements that belong to either A or B or both.

Example: $A = \{1, 3, 5, 8\}$ $B = \{3, 5, 7\}$

$\therefore A \cup B = \{1, 3, 5, 7, 8\}$

Intersection:

The intersection of A and B denoted as $A \cap B$, is the set consisting of elements that belong to both A and B

Example: $A = \{1, 3, 5, 8\}$, $B = \{3, 5, 7\}$

$A \cap B = \{3, 5\}$

Universal set:

The universal set is the set that has everything or the set consisting of all the elements that we wish to consider.

Complement set:

If A is a set then the complement of A is the set consisting of all the elements in the universal set that are not in A.

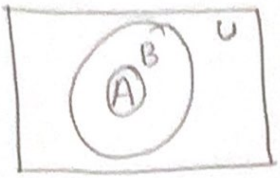
Example:

$U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ $A = \{1, 3, 5, 7, 9\}$

$A^c = U - A = \{2, 4, 6, 8\}$

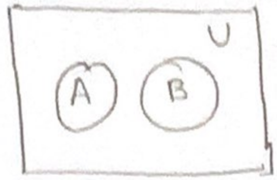
$A \cup A^c = U$ and $A \cap A^c = \varphi$

Using ven diagram:

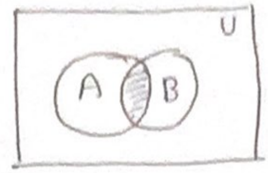


$A \subset B$

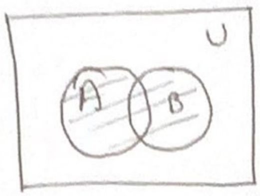
subset



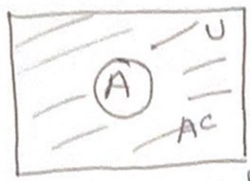
$A \cap B = \varphi$



$A \cap B$



$A \cup B$



complement

Exercise:

$U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $A = \{1, 3, 4, 5, 9\}$

$B = \{2, 4, 6, 7, 8\}$, $C = \{1, 3, 4, 6\}$. Find

1. $A \cup B$ 2. $A \cap B$ 3. $A \cup C$ 4. $A \cap C$ 5. $(A \cup B) \cap C$

6. A^c 7. $(A \cap B)^c$ 8. $(B \cup C)^c$ 9. $A^c \cup B^c$ 10. $B^c \cap C^c$