

Tender Heart High School, Sec.-33B chd.

Class: VII

Teacher: Deepa

Subject: Mathematics

Topic: Chapter-6: Sets

In this week, we will cover the following topics

- Subsets
- Superset
- Universal set
- Complement of set
- proper subset
- Union / Intersection

Subsets: If A and B are two sets given in such a way that every element of A is in B, then we say that A is a subset of B, $\Rightarrow A \subseteq B$

$\Rightarrow$ If $A \subseteq B$, then every element ($x \in A$) also in $x \in B$

If $A \subseteq B$ then B is called superset.

- There are 2^n subsets of a given set.
- $\emptyset$ is the subset of every element (Set.)
- Every set is a subset of itself.

Proper subset: Let A and B are two set, then A is called proper subset of B if all the element of A is present in B, but there is atleast one element in B which is not in A.

i.e. $\{1, 2\} \subset \{1, 2, 3, 4\}$

So set $\{1, 2\}$ is a proper subset of $\{1, 2, 3, 4\}$

Note: $\emptyset$ has no proper subset.

for e.g

Ques 1. Write all the subsets of $B = \{a, b, c\}$

Sol'n: $\emptyset, \{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}, \{a, b, c\}$

There are $2^3 = 8$, subsets of the given set.

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Ques 2 Write the proper subset of set $A = \{1, 2, 3\}$
Soln: $\emptyset, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}$
There are $(2^n - 1) = (8 - 1) = 7$ proper subset of the given set A

Operations on sets:

1. Union of sets: It is written as $A \cup B$, means containing all the elements of A as well as of B.

for eg:

If $A = \{1, 2, 3, 4\}$ and $B = \{4, 5, 6, 7\}$
then $A \cup B = \{1, 2, 3, 4, 5, 6, 7\}$

2. Intersection of sets: It is written as $A \cap B$, means set of elements common in both the given sets.

for eg:

If $A = \{1, 2, 3, 4\}$ and $B = \{4, 5, 6, 7\}$
then $A \cap B = \{4\}$

→ only the common elements.

* If the sets are disjoint, then $A \cap B = \emptyset$

3. Difference of sets: for any two sets A and B, the difference $A - B$ is the set of all the elements of A which are not in B.

for eg:

If $A = \{1, 2, 3, 4\}$ and $B = \{4, 5, 6, 7\}$
then $A - B = \{1, 2, 3\}$

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4. Complement of a set: Let U or $\mathcal{E}$ be an Universal set and $A \subseteq \mathcal{E}$ then Complement of A i.e. A^c or A' is the Set of elements of U not in A .
Let the Universal set be $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$ and $A = \{4, 5, 6\}$, then
 $A^c = \{1, 2, 3, 7, 8\}$

Points to remember:

(i) $\emptyset' = U$ and $U' = \emptyset$

* Complement of an empty set is Universal set.

* Complement of a Universal set is an empty set.

(ii) $A \cup A' = U$ and $A \cap A' = \emptyset$

* Union of a set and its complement is "Universal set"

* Intersection of a set and its complement is an "empty set"

