

Class XI  
Subject – Mathematics  
Topic – Set Theory

Worksheet : 1

1. Write the following sets in set builder form:-
  - i)  $\{5, 25, 125, 625\}$
  - ii)  $\{1/2, 2/3, 3/4, 4/5, \dots\}$
  - iii) Write the power set of A where  $A = \{-1, 0, 2\}$
  - iv)  $U = \{1, 2, 3, \dots, 40\}$  and  $A = \{x : x \text{ is a factor of } 42\}$ . Write  $n(A)$  ?
  - v) If  $A = \{4, 6, 8\}$ , Find all subsets of A.
  
2. Let  $A = \{1, 2, 3, 4\}$ ,  $B = \{2, 4, 6, 8, 10\}$  and the universal set  $S = \{1, 2, 3, \dots, 10\}$ .  
Find  $(A \cup B)'$  and  $(A \cap B)'$
  
3. Given  $A = \{1, 3\}$ ,  $B = \{3, 5\}$  and  $C = \{5, 10\}$ .  
Verify the following relations:-
  - i)  $A \times B \neq B \times A$
  - ii)  $A \times (B \cup C) = (A \times B) \cup (A \times C)$
  - iii)  $A \times (B \cap C) = (A \times B) \cap (A \times C)$
  
4. If  $A = \{2, 3, 5, 7, 8\}$ ,  $B = \{1, 5, 9\}$  and  $A' = \{1, 4, 6, 9\}$ , verify that:-
  - i)  $(A \cup B)' = A' \cap B'$
  - ii)  $B - A = A' \cap B$
  
5.  $n(U) = 30$ ,  $n(A') = 15$ ,  $n(B) = 5$ ,  $n(A \cap B) = 3$

Find:-

- i)  $n(A)$
- ii)  $n(A \cup B)$
- iii)  $n(A - B)$

6. If  $n(U) = 60$ ,  $n(A) = 35$ ,  $n(A \cap B) = 15$  and  $n((A \cup B)') = 20$ ,

Find:-

- i)  $n(B)$
- ii)  $n(B - A)$

7. Prove that :  $A - (B \cup C) = (A - B) \cap (A - C)$  by applying properties.

8. If  $B \subseteq A$  then prove that  $B - A = \phi$

9. It is known that in a group of people , each of whom speak at least one of the language English, Hindi and Bengali; 31 speak English, 36 speak Hindi and 27 speak Bengali. 10 speak both English and Hindi, 9 both English and Bengali, 11 both Hindi and Bengali. Using a Venn diagram or otherwise , prove that the group contains at least 64 people and not more than 73 people.

10. In a group of people, 50 people read newspaper A, 20 read newspaper B and 10 read both newspapers. How many people read atleast one of the two newspapers?

11. In class XI of a certain school, 50 students eat burger and 42 students eat noodles in lunch time. If 24 students eat both burger and noodles, find the number of students who eat:-

- i) Burger only
- ii) Noodles only
- iii) Any of the two food items

12. In a survey of 600 students in a school, 150 students were found to be drinking tea and 225 drinking milk and 100 students were drinking both tea and milk. How many students were drinking neither tea or milk?