

## Ch-1 Sets

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1. Write down the set of all natural numbers which are multiple of 8 in roster form and set builder form.
2. Write down the set of all natural numbers that are divisible by 8 in roster form and set builder form.
3. Write A and B in roster form, where  $A = \{x: x \in \mathbb{N} \text{ and } 2x + 1 \text{ is odd}\}$  and  $B = \{x: x \in \mathbb{N} \text{ and } 2x + 1 \text{ is even}\}$ .
4. Mark True or False. Justify your answer.
  - i)  $\{a, b, c\} \subset \{b, c, d\}$
  - ii)  $\{x: x \text{ is a student of Class XI of your school}\} \subset \{x: x \text{ is a student of your school}\}$
  - iii)  $\{x: x \text{ is an integer}\} \subset \{x: x \text{ is an even natural number}\}$
  - iv)  $\{1, \{1\}, \{\{1\}, 1\}\} = P(\{1, \{1\}\})$
  - v) If A and B are two sets such that  $A \subset B$  and  $B \subset A$ , then A and B are null sets.
5. Explain all the operations on sets (union, intersection, disjoint, difference, complement) with the help of Venn diagrams. Write all the properties of above operations.
6. The set  $A = \{x : 1 \leq 2, x \in \mathbb{Z}\}$  is:
  1. a null set
  2. an infinite set
  3. a singleton set
  4. a subset of rational numbers
7. Write De Morgan's laws.
8. A survey shows that 73% of Indians like Apples, whereas 65% like oranges. What percentage of people like Both fruits?
9. In a group of 425 students it was found that 115 like coke, 160 like orange juice, 80 like both drinks. How many like neither of the drinks.
10. In a group of 850 students, 600 can speak Hindi and 340 can speak Tamil. Find how many can speak both the languages. How many can speak only Hindi? Find how many can speak only Tamil.
11. There are 260 persons with a skin disorder. If 150 had been exposed to the chemical A, 74 to the chemical B and 36 to both the chemicals A and B. Find the number of persons exposed to chemical A but not chemical B. How many were exposed to only chemical B? How many were exposed to chemical A or chemical B?

12. A class has 175 students. The following description gives the number of students studying one or more of the subjects in this class.
- Mathematics: 100; Physics: 70; Chemistry: 46; Mathematics and Physics: 30; Mathematics and Chemistry: 28; Physics and Chemistry: 23; Mathematics, Physics and Chemistry: 18. Find how many students are enrolled in Mathematics alone; Physics alone and Chemistry alone. How many students who have not taken up any of these subjects?
13. In a 150 students class, the number of students passing in Mathematics, Statistics and Economics were 50, 40 and 47 resp. 15 students passed in Mathematics and Statistics, 14 passed Stats and Eco. 13 passed Eco. and Maths. 5 passed all three subjects. How many students failed all 3 subjects?
14. In a group of 65 people, 42 people read Hindustan Times, 18 read Times of India, 23 read Nav Bharat Times, 4 read all three newspapers. How many read exactly 2 of these newspapers?
15.  $A = \{2, 4, 6, 8, 10, 12, 14, 16, 18\}$ ,  $B = \{3, 6, 9, 12, 15, 18, 21\}$  Find:  $A \cap B$ ,  $A \cup B$ ,  $A \cap B^c$ ,  $A^c \cap B$ ,  $A - B$ ,  $B - A$ ?
16. What is an ordered pair ? what is a Cartesian Product of sets? What is a relation? give an example of a relation

**De Morgan's laws**

$$\overline{A \cup B} = \bar{A} \cap \bar{B},$$

$$\overline{A \cap B} = \bar{A} \cup \bar{B}$$