

CHAPTER 1 - SETS**DECEMBER 2020****JANUARY 2022**

- Let $A = \{x : x \text{ is a natural number less than } 3\}$
 - Represent the set A in roster form. (1)
 - Write all subsets of A . (2)
- In a group of 400 students 250 can speak Hindi and 200 can speak English; also each student speak at least one of the languages. How many students can speak both Hindi and English? (2)
 - If $A \subset B$, then $A \cup B = \underline{\hspace{2cm}}$. (1)
- Let $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$
 $A = \{2, 4, 6, 8\}$ and $B = \{2, 4, 8\}$
 - Find A' and B' (1)
 - Find $(A \cup B)'$ (2)
 - Verify that $(A \cup B)' = A' \cap B'$ (1)

SEPTEMBER 2021

- Let $A = \{x : x \text{ is a natural less than } 6\}$ and $B = \{1, 2\}$
 - Write A in roster form. (1)
 - Find $A \cap B$. (1)
 - Find $A - B$. (1)
- In a group of 400 students, 250 can speak Hindi and 200 can speak English. Also each can speak atleast one of these two languages. How many students can speak both Hindi and English? (3)
- Let $A = \{1, 2, 3\}$
 - No. of subsets of A is (1)
 - 3
 - 6
 - 8
 - 9
 - Write all subsets of A having 2 elements. (2)
 - If the given set A is a subset of the universal set $U = \{1, 2, 3, 4, 5, 6\}$, then write A' . (1)

- If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ and $A = \{1, 2, 3, 4\}$
 $B = \{3, 4, 5, 6, 7\}$, find
 - $A \cup B$
 - $(A \cup B)'$ (2)
 - If P and Q are two sets such that $n(P) = 12$, $n(Q - P) = 7$, then which among the following is the value of $n(P \cup Q)$? (1)
 - 12
 - 7
 - 19
 - 5
- If $P = \{1, 2\}$, write all subsets of P . (1)
 - If $M \subset N$, then draw the Venn diagram of $N - M$. (1)
 - If $A = \{x : x \in R, -2 \leq x \leq 5\}$ and $B = \{x : x \in R, 2 < x \leq 6\}$, then which among the following is $A \cap B$? (1)
 - $[2, 5]$
 - $(2, 5]$
 - $[2, 5)$
 - $[-2, 6]$

MARCH 2020

- If $A = \{x : x \text{ is a natural number, } x < 5 \text{ and } x > 7\}$, then $n(A)$ is (1)
 - 1
 - 0
 - 2
 - 3
 - The set builder form of $(6, 12)$ is (1)
 - $\{x : x \in R, 6 < x \leq 12\}$
 - $\{x : x \in R, 6 < x < 12\}$
 - $\{x : x \in R, 6 \leq x \leq 12\}$
 - $\{x : x \in R, 6 \leq x < 12\}$
 - If A and B are two sets such that $A \subset B$, then $A \cup B$ is (1)
 - A
 - Null set
 - B
 - $\{\phi\}$
- In a survey of 600 students in a school, 150 students were found to be taking tea and 225 students were taking coffee. 100 were taking both tea and coffee. Find how many students were taking neither tea nor coffee. (3)

IMPROVEMENT 2019

11. a) If the number of proper subset of a set is 63, then the number of elements of the set is (1)
- b) If $A = \{x : x \text{ is a letter in the word "MATHEMATICS"}\}$ and $B = \{y : y \text{ is a letter in the word "STATISTICS"}\}$, then, find
i) $A - B$ (ii) $A \cap B$ (2)
12. a) In a survey of 600 students in a school 150 students were found to be taking tea and 225 taking coffee, 100 were taking both tea and coffee. Find how many students were taking neither tea nor coffee. (2)
- b) Draw Venn diagrams which represents:
i) $(A \cup B)'$ ii) $A' \cup B'$ (2)

MARCH 2019

13. Let $A = \{x : x \text{ is a prime number less than } 11\}$ and $B = \{x : x \text{ is an integer such that } 2 \leq x \leq 8\}$
a) Write $C = A \cap B$ (1)
b) Find the number of subsets of C which has 3 elements. (1)
c) What is the probability of getting a subset of 3 elements from the power set of C? (1)
14. In a school, a survey among 400 students, 100 were listed as taking apple juice, 150 as taking orange juice, and 75 were listed as taking both apple juice as well as orange juice.
a) How many students take apple juice or orange juice? (2)
b) How many take apple juice alone but

not orange juice? (1)

- c) How many students were taking neither apple juice nor orange juice? (1)

IMPROVEMENT 2018

15. a) If $A = \{2, 3, 4, 5\}$ and $B = \{4, 5, 6, 7\}$, then write:
i) $A \cup B$
ii) $A \cap B$ (2)
- b) Which one of the following is equal to $\{x : x \in \mathbb{R}, 2 < x \leq 4\}$?
i) $\{2, 3, 4\}$ ii) $\{3, 4\}$
iii) $[2, 4]$ iv) $(2, 4]$ (1)
16. Consider the set $A = \{x : x \text{ is an integer, } 0 \leq x < 4\}$
a) Write A in Roster form. (1)
b) If $B = \{5, 6\}$, then write $A \times B$. (1)
c) Write the number of possible relations from A to B. (1)
17. a) If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$; $A = \{2, 4, 6, 8\}$ $B = \{2, 3, 5, 7\}$,
Verify $(A \cup B)' = A' \cap B'$ (3)
b) If A and B are two disjoint sets with $n(A) = 4$ and $n(B) = 2$, then $n(A - B) = \dots$ (1)

MARCH 2018

18. a) If $A = \{a, b, c\}$, then write the power set of P(A). (1)
b) If the number of subsets with two elements of a set P is 10, then find the total number of elements in the set P. (2)

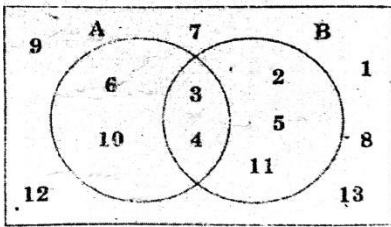
Remesh's Mathematics**[XI MATHEMATICS QUESTION BANK]**

- c) Find the number of elements of the power set of P. (1)

19. Consider a Venn diagram of the Universal set

$$U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13\}$$

- a) Write sets A, B in Roster form. (1)
 b) Verify $(A \cup B)' = A' \cap B'$ (2)
 c) Find $n(A \cap B)$ (1)

**IMPROVEMENT 2017**

20. Let $A = \{x : x \in N, 1 \leq x \leq 5\}$; $B = \{2, 3, 6, 9\}$

$$\text{and } C = \{1, 4, 5, 8, 9, 10\}$$

- a) Find the number of elements of A. (1)
 b) Verify $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ (2)
 c) If X and Y are two sets such that $n(X) = 17$, $n(Y) = 23$ and $n(X \cup Y) = 38$ then find $n(X \cap Y)$. (2)

MARCH 2017

21. a) If U is the universal set and A is any set then $U \cap A = \dots\dots\dots$
 i) U ii) A iii) ϕ iv) A' (1)
 b) Consider the set $U = \{a, b, c, d, e, f, g\}$,
 $A = \{b, c, d, e\}$ and $B = \{a, c, g\}$. Find A' and B' and then verify that $(A \cup B)' = A' \cap B'$. (2)
 c) In a group of 400 people, 250 can speak Hindi and 200 can speak Malayalam. How many people can speak both Hindi and Malayalam? (2)

IMPROVEMENT 2016

22. If $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$, $A = \{2, 4, 6, 8\}$ and $B = \{2, 4, 8\}$, then:

- a) Write A' and B' (1)
 b) For the above sets A and B, prove that $(A \cup B)' = A' \cap B'$ (2)
 c) Check whether $(A \cap B)' = A' \cup B'$. (2)

MARCH 2016

23. a) If A is a subset of the set B, then $A \cap B = \dots\dots\dots$ (1)
 b) Represent the above set $A \cap B$ by Venn diagram. (2)
 c) In a school there are 20 teachers who teach Mathematics or Physics. Of these, 12 teach Mathematics, 12 teach Physics. How many teach both the subjects? (2)

IMPROVEMENT 2015

24. a) $A = \{x / x, \text{ is a prime number}, x \leq 6\}$.
 i) Represent A in roster form. (1)
 ii) Write the power set of A. (2)
 b) Out of 25 members in an office 17 like to take tea, 16 like to take coffee. Assume that each takes at least one of the two drinks. How many like:
 i) Both coffee and tea?
 ii) Only tea and not coffee? (2)

MARCH 2015

25. Let $A = \{x : x \in W, x < 5\}$ and $B = \{x : x \text{ is a prime number less than } 5\}$
 $U = \{x : x \text{ is an integer}, 0 \leq x \leq 6\}$,

Remesh's Mathematics**[XI MATHEMATICS QUESTION BANK]**

- a) Write A, B in roster form. (1)
 b) Find $(A - B) \cup (B - A)$ (2)
 c) Verify that $(A \cup B)' = A' \cap B'$ (2)

IMPROVEMENT 2014

26. a) If two sets A and B are disjoint, which one among the following is true?
 i) $A \cup B = A$ ii) $A \cup B = B$
 iii) $A \cap B = B$ iv) $A \cap B = \phi$ (1)
 b) Find the solution set of the equation $x^2 + x - 2 = 0$ in roster form. (1)
 c) In a group of students, 100 students know Hindi, 50 know English and 33 know both. Each of the students know either Hindi or English. How many students are there in the group? (3)

MARCH 2014

27. Consider the sets $A = \{2, 3, 5, 7\}$ and $B = \{1, 2, 3, 4, 6, 12\}$.
 a) Find $A \cap B$ (1)
 b) Find $A - B, B - A$ and hence show that $(A \cap B) \cup (A - B) \cup (B - A) = A \cup B$ (3)
 c) Write the power set of $A \cap B$. (1)

IMPROVEMENT 2013

28. If A and B are two sets such that $A \subset B$,
 a) $A \cup B$ is (1)
 b) Draw the Venn diagram of $B - A$ (2)
 c) In a committee, 60 people speak English, 30 speak Hindi and 15 speak both English and Hindi. How many speak atleast one of these two languages? (2)

MARCH 2013

29. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$; $A = \{1, 2, 4, 7\}$ and $B = \{1, 3, 5, 7\}$
 a) Find $A \cup B$ (1)
 b) Find A', B' and hence show that $(A \cup B)' = A' \cap B'$. (2)
 c) The power set $P(A \cup B)$ has elements. (1)

IMPROVEMENT 2012

30. i) How many elements has $P(A)$, if $A = \{1, 2, 3\}$? (1)
 ii) $U = \{1, 2, 3, 4, 5, 6, 7\}$; $A = \{1, 4, 6, 7\}$; and $B = \{1, 2, 3\}$. Find $A', B', A' \cap B', A \cup B$. Hence show that $(A \cup B)' = A' \cap B'$. (3)
 iii) If A and B are two sets such that $A \subset B$ then what is $A \cap B$? (1)

MARCH 2012

31. Let $A = \{x : x \text{ is an integer, } \frac{1}{2} < x < \frac{7}{2}\}$
 $B = \{2, 3, 4\}$
 a) Write A in the roster form. (1)
 b) Find the power set of $A \cup B$. (2)
 c) Verify that $(A - B) \cup (A \cap B) = A$ (2)

IMPROVEMENT 2011

32. Let $U = \{x : x \text{ is a integer, } -4 < x < 4\}$ be the universal set.
 $A = \{x : x \text{ is a integer, } 0 \leq x \leq 3\}$ and $B = \{x : x \text{ is a integer, } -3 < x < 1\}$ are the subset of U.
 a) Write A and B in the roster form. (2)

Remesh's Mathematics**[XI MATHEMATICS QUESTION BANK]**

- b) Verify $(A \cup B)' = A' \cap B'$. (2)
 c) Write the power set of $A \cap B$. (1)

MARCH 2011

33. Consider the set A and B given by

$$A = \{x : x \text{ is a prime number } < 10\}$$

$$B = \{x : x \text{ is a natural number which divides } 12\}$$

- a) Write A and B in the roster form. (2)
 b) Find $A \cup B$ and $B - A$. (2)
 c) Verify that $(A \cup B) - A = B - A$. (1)

IMPROVEMENT 2010

34. Which among the following is a finite set? (1)

- a) $\{x : x \text{ is an integer less than } 1\}$
 b) $\{x : x \text{ is an integer, which is divisible by } 7\}$
 c) $\{x : x \text{ is a prime number less than } 9^{10}\}$
 d) $\{x : x \in R \cap Q; R, \text{ set of real numbers}$
 $Q, \text{ set of rational numbers}\}$

35. If $A = \{1\}, B = \{\{1\}, 2\}, C = \{\{1\}, 3\}$

and $U = \{\{1\}, \{2\}, \{3\}, 1, 2, 3\}$, then find

- a) $A \cap B$. (1)
 b) $B \cap C$ (1)
 c) $n \left[(A \cap B)' \cup (B \cap C)' \right]$ (2)

MARCH 2010

36. Consider

$$A = \{x : x \text{ is a natural number, } 2 \leq x \leq 6\}$$

$$B = \{x : x \text{ is a prime number, } x \leq 7\}$$

$$C = \{x : x^2 - 5x + 6 = 0\}$$

- a) Write A, B, C in the roster form. (3)
 b) Verify that $(A \cup B) \cup C = A \cup (B \cup C)$ (2)

IMPROVEMENT 2009

37. Let $A = \{x : x \in R, x^2 - 5x + 6 = 0\}$

$$B = \{x : x \in R, x^2 = 9\}$$

- a) Write A and B in roster form (1)
 b) Find $A \cup B$ and $A \cap B$ (1)
 c) Find $A - B, B - A$ and verify that
 $(A - B) \cup (B - A) = (A \cup B) - (A \cap B)$ (2)

MARCH 2009

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

$$\text{and } B = \{2, 4, 8\}$$

- a) Find A' and B' (1)
 b) Also find $(A \cup B)'$ (1)
 c) Verify $(A \cup B)' = A' \cap B'$ (2)

MARCH 2008

39. i) If $X = \{a, b, c, d\}$ and $Y = \{f, b, d, g\}$,

then find $X - Y$ and $X \cap Y$. (2)

ii) State whether the following is True or

False: If $A \subset B$ then $A \cup B = B$. (2)