CHAPTER 1 - SETS

IMPROVEMENT 2018

1. 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 $\{x : x \in R, 2 < x \le 4\}$?
   i) {2,3,4} ii) {3,4}
   iii) [2,4] iv) (2,4] (1)

2. Consider the set $A=\{x : x \text{ is an integer}, 0 \le x < 4\}$
   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)

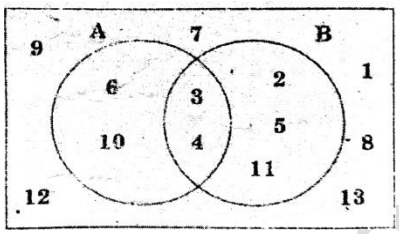
3. a) If U = {1,2,3,4,5,6,7,8,9}; A = {2,4,6,8} B = {2,3,5,7},
   Verify $(A \cup B)' = A' \cap B'$ (3)

   b) If A and B are two disjoint sets with n(A) = 4 and n(B) = 2, then n(A –B) = ... (1)

MARCH 2018

4. 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)
   c) Find the number of elements of the power set of P. (1)

5. 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

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

7. a) If U is the universal set and A is any set then $U \cap A =$ ....
   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

8. 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

9. a) If A is a subset of the set B, then $A \cap B =$..... (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

10. a) $A = \{x / x \text{ , is a prime number}, x \le 6\}$.

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

11. Let $A = \{x : x \in W, x < 5\}$ and

$B = \{x : x \text{ is a prime number less than } 5\}$

$U = \{x : x \text{ is an integer, } 0 \le x \le 6\}$,

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

12. 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

13. 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

14. 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, 30speak Hindi and 15 speak both English and Hindi. How many speak atleast one of these two languages? (2)

MARCH 2013

15. 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

16. 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

17. Let $\{x:x$ 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

18. Let $U=\{x:x$ is a integer, $-4<x<4\}$ be the universal set. $A=\{x:x$ is a integer, $0\le x\le 3\}$ and $B=\{x:x$ is a integer, $-3<x<1\}$ are the subset of U.

a) Write A and B in the roster form. (2)

b) Verify $(A\cup B)'=A'\cap B'$. (2)

c) Write the power set of $A\cap B$. (1)

MARCH 2011

19. Consider the set A and B given by

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

$B=\{x:x$ *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

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

a) $\{x:x$ is an integer less than $1\}$

b) $\{x:x$ is an integer, which is divisible by $7\}$

c) $\{x:x$ is a prime number less than $9^{10}\}$

d) $\{x:x\in R\cap Q;$ *R, set of real numbers* Q, set of rational numbers$\}$

21. 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

22. Consider

$A=\{x:x$ *is a natural number*, $2\le x\le 6\}$

$B=\{x:x$ *is a prime number*, $x\le 7\}$

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

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

23. 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

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

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

25. 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)