

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

Chapter 05

SETS

Exercise 5.1

1. For each of the following sets, show all the elements of the set.

(i) A is the set of positive integers between 5 and 9.

Ans. $A = \{6, 7, 8\}$

(ii) B is the set of common multiples of 2 and 3.

Ans. $B = \{6, 12, 18, 24, \dots\}$

(iii) C is the set of factors of 66.

Ans. $C = \{1, 2, 3, 6, 11, 22, 33, 66\}$

or $\{2, 3, 11\}$

2. For each of the following sets, describes the set by listing all its elements.

(i) $P = \{\text{names of the days of the week}\}$

Ans. $P = \{\text{Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday}\}$

(ii) $Q = \{\text{colours of a rainbow}\}$

Ans. $Q = \{\text{blue, green, red, violet, indigo, orange, yellow}\}$

(iii) $R = \{\text{odd numbers between 10 and 26}\}$

Ans. $R = \{11, 13, 15, 17, 19, 21, 23, 25\}$

3. If $A = \{1, 2, 3, 4, 5\}$, write down the value of $n(A)$.

Ans. $n(A) = 5$

4. Given the sets:

$E = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$A = \{1, 2, 3, 4, 5, 6, 7\}$

$B = \{3, 4, 5\}$

$C = \{4, 5, 6, 7, 8\}$

State true and false in each case.

(i) $B \subset A$

Ans. $\{3, 4, 5\} \subset \{1, 2, 3, 4, 5, 6, 7\}$

True since all elements belong.

(ii) $C \subset A$

Ans. $\{4, 5, 6, 7, 8\} \subset \{1, 2, 3, 4, 5, 6, 7\}$

False since 8 is not belong.

(iii) $C \subset B$

Ans. $\{4, 5, 6, 7, 8\} \subset \{3, 4, 5\}$

False since $\{6, 7, 8\}$ are not belong.

5. Given $A = \{2, 4, 6, 8\}$ and

$B = \{\text{even numbers less than } 10\}$,

Which of the following statements is true and which is false?

$A = \{2, 4, 6, 8\}$ $B = \{2, 4, 6, 8\}$

(i) $A \subseteq B$

Ans. $\{2, 4, 6, 8\} \subseteq \{2, 4, 6, 8\}$

True

(ii) $A \subset B$

Ans. $\{2, 4, 6, 8\} \subset \{2, 4, 6, 8\}$

False

(iii) $A \not\subset B$

Ans. $\{2, 4, 6, 8\} \not\subset \{2, 4, 6, 8\}$

False

(iv) $A \neq B$

Ans. $\{2, 4, 6, 8\} \neq \{2, 4, 6, 8\}$

False

(v) $B \not\subset A$

Ans. $\{2, 4, 6, 8\} \not\subset \{2, 4, 6, 8\}$

False

(vi) $B \subseteq A$

Ans. $\{2, 4, 6, 8\} \subseteq \{2, 4, 6, 8\}$

True

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6. List all subsets of the following sets.

(i) $P = \{3, 4\}$

Ans. $\{\}, \{3\}, \{4\}, \{3, 4\}$

(ii) $Q = \{\text{pen, book, bag}\}$

Ans. $\{\}, \{\text{pen}\}, \{\text{book}\}, \{\text{bag}\}, \{\text{pen, book}\}, \{\text{pen, bag}\}, \{\text{book, bag}\}, \{\text{pen, book, bag}\}$

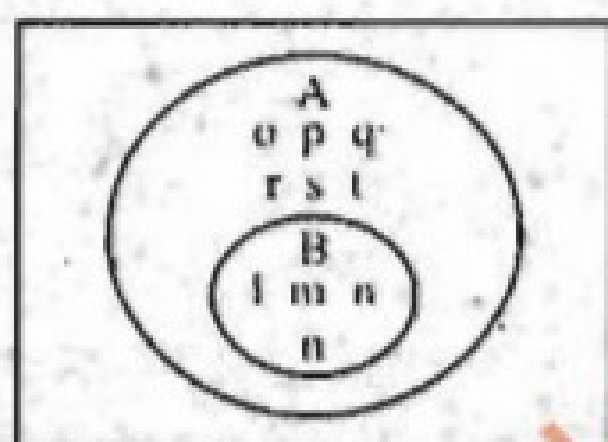
(iii) $R = \{\text{Lahore, Islamabad}\}$

Ans. $\{\}, \{\text{Lahore}\}, \{\text{Islamabad}\}, \{\text{Lahore, Islamabad}\}$

(iv) $S = \{a, i, r\}$

Ans. $\{\}, \{a\}, \{i\}, \{r\}, \{a, i\}, \{a, r\}, \{i, r\}, \{a, i, r\}$

7. The Venn diagram shows the elements in A and B.



(i) List all the elements in A and in B.

Ans. $A = \{o, p, q, r, s, t\}$, $B = \{l, m, n\}$

(ii) Is A a proper subset of B? Explain.

Ans. No.

Because the elements of A are not in B.

8. If $A = \{w, x, y, z\}$, $B = \{s, t, w\}$, $C = \{x, y, z\}$, then which set is subset of A?

Ans. $A = \{w, x, y, z\}$, $B = \{s, t, w\}$, $C = \{x, y, z\}$

C is subset of A.

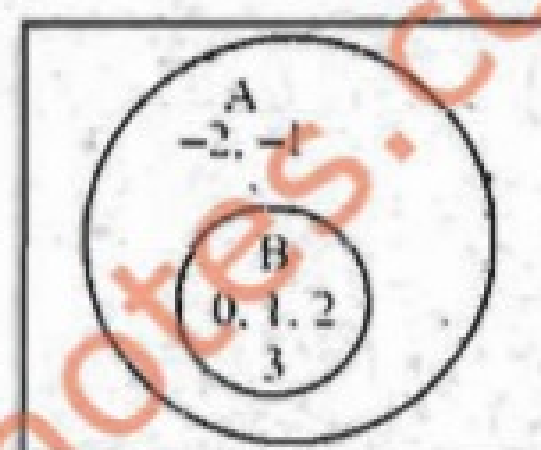
$$\{x, y, z\} \subset \{w, x, y, z\}$$

Since all elements of set C belong to set A.

9. If $A = \{-2, -1, 0, 1, 2, 3\}$ and $B = \{0, 1, 2, 3\}$

(i) Draw a Venn diagram to represent the sets A and B.

Ans.



(ii) Is B a proper subset of A? Explain.

Ans. Yes B is a proper subset of A. Since all members of set B belong to set A and $B \neq A$.

10. Are the following sets equal?

(i) $A = \{8, 6, 4, 2\}$, $B = \{6, 4, 8, 2\}$

Ans. Equal because they have exactly the same elements. (True)

(ii) $A = \{r, a, t, e\}$, $B = \{e, t, a, f\}$

Ans. No, because they have not same elements. (False)

(iii) $A = \{\text{set of letters of the word "mango"}\}$

$B = \{a, g, m, n, o\}$

Ans. Equal because they have exactly the same elements.

(iv) $A = \{\text{letters of the word "tea"}\}$

$B = \{\text{letters of the word "eat"}\}$

Ans. Equal because they have exactly the same element.

(v) $A = \phi$, $B = \{0\}$

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Ans. Not equal because set A is empty and set B has a member 0.

11. If $A = \{\text{even numbers less than 12}\}$

$B = \{\text{odd numbers less than 12}\}$

$C = \{\text{the first 10 natural numbers divisible by 2}\}$

$D = \{\text{multiples of 3 less than 20}\}$

Verify which of the following statements are true or false?

Ans. $A = \{2, 4, 6, 8, 10\}$

$B = \{1, 3, 5, 7, 9\}$

$C = \{2, 4, 6, 8, 10\}$

$D = \{3, 6, 9, 12, 15, 18\}$

(i) A and B are equivalent sets.

Ans. A and B are equivalent sets because $n(A) = 5$ and $n(B) = 5$. (True)

(ii) A and C are equivalent sets.

Ans. A and C are equivalent sets because $n(A) = 5$ and $n(C) = 5$

(iii) A and C are equal sets.

Ans. Equal because $A = \{2, 4, 6, 8, 10\}$ and $C = \{2, 4, 6, 8, 10\}$. True

(iv) B and D are equivalent sets.

Ans. Not equivalent because $n(B) = 5$ and $n(D) = 6$ (False)

(v) B and D are equal sets.

Ans. Not equal because $B = \{1, 3, 5, 7, 9\}$ and $D = \{3, 6, 9, 12, 15, 18\}$ (False)

12. Identify equivalent and equal sets in the following:

(i) $A = \{a, e, i, o, u\}$

(ii) $B = \{1, 2, 3, 5, 7\}$

(iii) $C = \{\text{The set of vowels in English alphabets. } \{a, e, i, o, u\}\}$

(iv) $D = \{\text{The set of letters of the word "remember"}\}$

(v) $E = \{\text{The set of letters of the word "member"}\}$

Ans. Equivalent sets

A and B are equivalent sets

$n(A) = 5$ and $n(B) = 5$

Equal Sets

A and C are equal sets because they have same elements.

Exercise 5.2

1. Find union and intersection of each of the following pairs of sets.

(i) $A = \{4, 8, 12, 16\}$ $B = \{8, 10, 12\}$

Ans. $A \cup B$

$\{4, 8, 12, 16\} \cup \{8, 10, 12\}$

$= \{4, 8, 10, 12, 16\}$

$A \cap B$

$\{4, 8, 12, 16\} \cap \{8, 10, 12\} = \{8, 12\}$

(ii) $C = \{e, f, g, h\}$ $D = \{q, r, s, t\}$

Ans. $C \cup D$

$\{e, f, g, h\} \cup \{q, r, s, t\} = \{e, f, g, h, q, r, s, t\}$

$C \cap D$

$\{e, f, g, h\} \cap \{q, r, s, t\} = \{\}$

(iii) $E = \{\text{apple, mango, grapes}\}$

$F = \{\text{watermelon, mango}\}$

Ans. $E \cup F$

$\{\text{apple, mango, grapes}\}$

$\cup \{\text{watermelon, mango}\}$

$= \{\text{apple, mango, grapes, watermelon}\}$

$E \cap F$

$\{\text{apple, mango, grapes}\}$

$\cap \{\text{watermelon, mango}\} = \{\text{mango}\}$

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(iv) $G = \{b, n, j, z\}$ $H = \phi$

Ans. $G \cup H$

$\{b, n, i, z\} \cup \{ \} = \{b, n, i, z\}$

$G \cap H$

$\{b, n, i, z\} \cap \{ \} = \{ \}$

2. It is given that

$A = \{r, s, t, u, v, w, x\}$ and

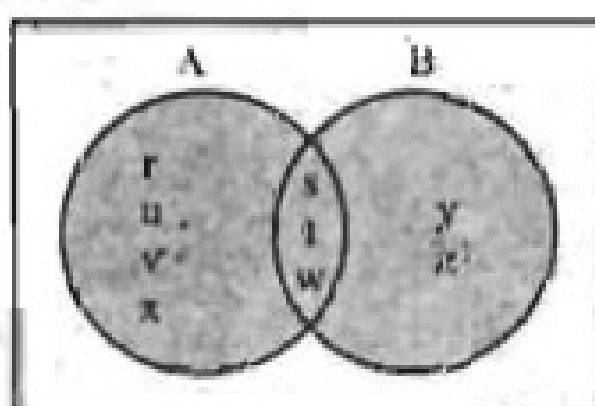
$B = \{s, t, w, y, z\}$

(i) List all the elements of $A \cup B$ in set notation.

Ans. $A \cup B = \{r, s, t, u, v, w, x, y, z\}$

(ii) Draw a Venn diagram to represent the set $A \cup B$.

Ans. $A \cup B$



3. It is given that $A = \{1, 2, 3, 4, 7\}$ and $B = \{2, 4, 8, 10\}$.

(i) List all the elements of $A \cap B$ in set notation.

Ans. $A \cap B =$

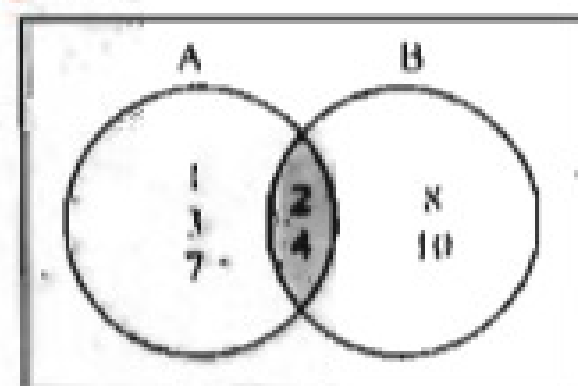
$\{1, 2, 3, 4, 7\} \cap \{2, 4, 8, 10\} = \{2, 4\}$

Set notation = ?

$A \cap B = \{x \mid x \in \text{even number} \wedge x \leq 4\}$

(ii) Draw a Venn diagram to represent the set $A \cap B$.

Ans. $A \cap B$



4. Find $A - B$ and $B - A$ if

(i) $A = \text{set of natural numbers,}$

$B = \text{set of even numbers}$

Ans. $A - B = \{\text{set of natural numbers}\}$

$- \{\text{set of even numbers}\}$

$= \{\text{set of odd numbers}\}$

or $\{1, 3, 5, 7, \dots\}$

$B - A = \{\text{set of even numbers}\}$

$- \{\text{set of natural numbers}\}$

$= \{ \}$

(ii) $A = \{a, b, c, d, e\},$

$B = \{a, e, i, o, u\}$

Ans. $A - B = \{a, b, c, d, e\} - \{a, e, i, o, u\}$

$= \{b, c, d\}$

$B - A = \{a, e, i, o, u\} - \{a, b, c, d, e\}$

$= \{i, o, u\}$

5. $E = \{p, q, r, s, t, u\}$ and

$Y = \{p, r, v\}$. List the members of Y' .

Ans. $E = \{p, q, r, s, t, u\}, Y = \{p, r, v\}$

$Y' = E - Y$

$= \{p, q, r, s, t, u\} - \{p, r, v\}$

$= \{q, s, t, u\}$

6. $E = \{1, 2, 3, \dots, 20\}$. P is the set of prime numbers in E .

$E = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

(i) List the element of P

Ans. $P = \{2, 3, 5, 7, 11, 13, 17, 19\}$

(ii) List the element of the set P' .

Ans. $P' = E - P$

$= \{1, 2, 3, \dots, 20\}$

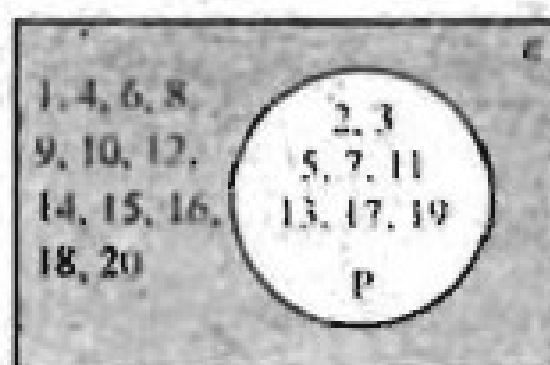
$- \{2, 3, 5, 7, 11, 13, 17, 19\}$

$= \{1, 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20\}$

(iii) Draw the Venn diagram for P' .

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Ans.



7. Given that the universal set is set of all integers.

What is the complement of the set of negative numbers?

Ans. Universal set = all integers

Let A = set of negative numbers

$$A' = \varepsilon - A$$

$$A' = \{0, 1, 2, 3, \dots\}$$

8. The universal set ε and the set A and B are given by:

$$\varepsilon = \{2, 3, 4, 5, 6, 8, 11\},$$

$$A = \{2, 4, 6, 8\}, B = \{3, 4, 6\}$$

List the elements of the following sets:

(i) $A \cap B$

$$\text{Ans. } \{2, 4, 6, 8\} \cap \{3, 4, 6\} = \{4, 6\}$$

(ii) $A \cup B$

$$\text{Ans. } \{2, 4, 6, 8\} \cup \{3, 4, 6\} = \{2, 3, 4, 6, 8\}$$

(iii) A'

$$\text{Ans. } A' = \varepsilon - A$$

$$A' = \{2, 3, 4, 5, 6, 8, 11\} - \{2, 4, 6, 8\} \\ = \{3, 5, 11\}$$

(iv) B'

$$\text{Ans. } B' = \varepsilon - B$$

$$B' = \{2, 3, 4, 5, 6, 8, 11\} - \{3, 4, 6\} \\ = \{2, 5, 8, 11\}$$

(v) $A' \cap B'$

$$\text{Ans. } \{3, 5, 11\} \cap \{2, 5, 8, 11\} = \{5, 11\}$$

(vi) $A' \cup B'$

$$\text{Ans. } \{3, 5, 11\} \cup \{2, 5, 8, 11\} \\ = \{2, 3, 5, 8, 11\}$$

(vii) $A \cup A' = ?$

$$\text{Ans. } = \{2, 4, 6, 8\} \cup \{3, 5, 11\} \\ = \{2, 3, 4, 5, 6, 8, 11\} \\ = \cup = \varepsilon$$

(viii) $A \cap A' = ?$

$$\text{Ans. } = \{2, 4, 6, 8\} \cap \{3, 5, 11\} \\ = \emptyset$$

9. It is given that

$$\varepsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\},$$

$$A = \{2, 4, 6, 8, 10\},$$

$$B = \{1, 2, 3, 4, 6\}$$

Find $(A \cup B)'$ and $A \cap B'$.

$$\text{Ans. } \varepsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

$$A = \{2, 4, 6, 8, 10\}, B = \{1, 2, 3, 4, 6\}$$

$$A \cup B = \{2, 4, 6, 8, 10\} \cup \{1, 2, 3, 4, 6\}$$

$$A \cup B = \{1, 2, 3, 4, 6, 8, 10\}$$

$$(A \cup B)' = \varepsilon - (A \cup B) \\ = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} \\ - \{1, 2, 3, 4, 6, 8, 10\} \\ = \{5, 7, 9\}$$

$$A \cap B'$$

$$B' = \varepsilon - B \\ = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} \\ - \{1, 2, 3, 4, 6\} \\ = \{5, 7, 8, 9, 10\}$$

$$A \cap B' = \{2, 4, 6, 8, 10\} \cap \{5, 7, 8, 9, 10\} \\ = \{8, 10\}$$

10.(i) It is given that

$$\varepsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9\},$$

$$A = \{1, 3, 5, 7, 9\}, B = \{3, 6, 9\}$$

Find $(A \cap B)'$ and $A \cup B'$.

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(ii) Verify $(A \cap B)' = A' \cup B'$

Ans. (i) $\epsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$
 $A = \{1, 3, 5, 7, 9\}$, $B = \{3, 6, 9\}$
 $A \cap B = \{1, 3, 5, 7, 9\} \cap \{3, 6, 9\}$
 $= \{3, 9\}$

$(A \cap B)' = \epsilon - (A \cap B)$
 $= \{1, 2, 3, 4, 5, 6, 7, 8, 9\} - \{3, 9\}$
 $= \{1, 2, 4, 5, 6, 7, 8\}$

$A \cup B'$
 $B' = \epsilon - B$
 $= \{1, 2, 3, 4, 5, 6, 7, 8, 9\} - \{3, 6, 9\}$
 $= \{1, 2, 4, 5, 7, 8\}$
 $A \cup B' = \{1, 3, 5, 7, 9\} \cup \{1, 2, 4, 5, 7, 8\}$
 $= \{1, 2, 3, 4, 5, 7, 8, 9\}$

(ii) $(A \cap B)' = \{1, 2, 4, 5, 6, 7, 8\}$ L.H.S.

$A' \cup B' = ?$

$A' = U - A$
 $= \{1, 2, 3, 4, \dots, 9\} - \{1, 3, 5, 7, 9\}$
 $= \{2, 4, 6, 8\}$

$B' = U - B$
 $= \{1, 2, 3, \dots, 9\} - \{3, 6, 9\}$
 $= \{1, 2, 4, 5, 7, 8\}$

$A' \cup B' = \{2, 4, 6, 8\} \cup \{1, 2, 4, 5, 7, 8\}$
 $= \{1, 2, 4, 5, 6, 7, 8\}$ R.H.S.

L.H.S. = R.H.S.

$(A \cap B)' = A' \cup B'$

Review Exercise 5

1. Encircle the correct option for the following statements.

(i) Elements that are in the universal set but not in the set A , are members of the set called _____ of A .

(a) subset (b) proper subset

✓(c) complement (d) disjoint

(ii) _____ is the subset of every set.

(a) universal set ✓(b) null set

(c) finite set (d) singleton set

(iii) Common elements of two sets A and B are denoted by:

(a) $A \cup B$ ✓(b) $A \cap B$

(c) $A \subseteq B$ (d) $A \not\subseteq B$

(iv) _____ express the idea includes or contains.

✓(a) $\subset$ (b) $\subseteq$

(c) $\not\subset$ (d) $\not\subseteq$

(v) The set of elements which are in A , or in B , or in both A and B is called:

✓(a) union (b) intersection

(c) complement (d) subset

(vi) It is given that $A = \{h, i, p\}$ and $B = \{h, o, p\}$ then $A \cap B$ is equal to:

(a) $\{h, o\}$ (b) $\{h, i\}$

(c) $\{i, o\}$ ✓(d) $\{h, p\}$

(vii) Union of a set A with itself is:

✓(a) set A (b) universal set

(c) empty set (d) none of above

(viii) Intersection of a set A with an empty set is:

(a) set A (b) universal set

✓(c) empty set (d) none of above

(ix) Set B is a subset of A can be denoted by:

✓(a) $B \subseteq A$ (b) $B \supseteq A$

(c) $B \cup A$ (d) $B \cap A$

2. It is given that

$\epsilon = \{3, 4, 5, 6, 7, 8, 9, 10\}$,

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$A = \{\text{set of factors of } 12\}$,

$B = \{\text{set of even numbers}\}$

Ans. $\epsilon = \{3, 4, 5, 6, 7, 8, 9, 10\}$

$A = \{1, 2, 3, 4, 6, 12\}$,

$B = \{2, 4, 6, 8, 10\}$

(a) $n(A)$

Ans. $n(A) = 6$

(b) $n(A \cap B)$

Ans. $n(A \cap B) = \{1, 2, 3, 4, 6, 12\}$
 $\cap \{2, 4, 6, 8, 10\}$
 $= \{2, 4, 6\} = 3$

(c) $n(A \cup B)$

Ans. $n(A \cup B) = \{1, 2, 3, 4, 6, 12\}$
 $\cup \{2, 4, 6, 8, 10\}$
 $= \{1, 2, 3, 4, 6, 8, 10, 12\}$
 $= 8$

(d) $n(B')$

Ans. $n(B') = 1$

$B' = \epsilon - B$
 $= \{3, 4, 5, 6, 7, 8, 9, 10\}$
 $- \{2, 4, 6, 8, 10\}$
 $= \{3, 5, 7, 9\}$

$n(B') = 4$

3. List all the subsets of $\{2, 3, 5\}$.

Ans. $\{\}, \{2\}, \{3\}, \{5\}, \{2, 3\}, \{2, 5\}, \{3, 5\}, \{2, 3, 5\}$

4. It is given that: $F = \{10, 20, 30, 40\}$,

$G = \{11, 13, 17, 19\}$,

$H = \{10, 11, 12, 13\}$,

$J = \{11, 13\}$

(a) List (i) $G \cap H$ (ii) $F \cup H$

Ans.

(i) $G \cap H$

$\{11, 13, 17, 19\} \cap \{10, 11, 12, 13\}$

$= \{11, 13\}$

(ii) $F \cup H$

$\{10, 20, 30, 40\} \cup \{10, 11, 12, 13\}$
 $= \{10, 11, 12, 13, 20, 30, 40\}$

(b) J is a subset of two of the sets. Which are the two sets?

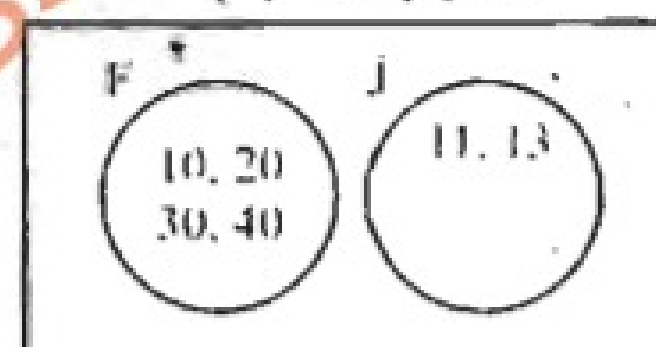
Ans. J is a subset of set G and H .

(c) Suggest a suitable universal set for F, G, H and J .

Ans. $\epsilon = \{10, 11, 12, 13, 17, 19, 20, 30, 40\}$

(d) What can you say about $F \cap J$ and represent it through Venn diagram?

Ans. $F = \{10, 20, 30, 40\}$, $J = \{11, 13\}$
 $F \cap J = \{10, 20, 30, 40\} \cap \{11, 13\}$
 $= \{\}$ - empty set



5. $\epsilon = \{3, 4, 5, 6, 7, 8, 9\}$, $A = \{4, 5, 6\}$,
 $B = \{\text{odd numbers between } 2 \text{ and } 8\}$,
 $C = \{\text{square numbers } \leq 10\}$

(i) List

Ans. $\epsilon = \{3, 4, 5, 6, 7, 8, 9\}$
 $A = \{4, 5, 6\}$, $B = \{3, 5, 7\}$,
 $C = \{1, 4, 9\}$

(a) B

$B = \{3, 5, 7\}$

(b) $A \cap B$

$A \cap B = \{4, 5, 6\} \cap \{3, 5, 7\} = \{5\}$

(c) $A \cup B$

$A \cup B = \{4, 5, 6\} \cup \{3, 5, 7\}$
 $= \{3, 4, 5, 6, 7\}$

(d) A'

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$$A' = \varepsilon - A$$

$$= \{3, 4, 5, 6, 7, 8, 9\} - \{4, 5, 6\}$$

$$= \{3, 7, 8, 9\}$$

(e) *the complement of B*

$$B = \varepsilon - B$$

$$= \{3, 4, 5, 6, 7, 8, 9\} - \{3, 5, 7\}$$

$$= \{4, 6, 8, 9\}$$

(f) $A' \cap B$

$$A' \cap B = \{3, 7, 8, 9\} \cap \{3, 5, 7\}$$

$$= \{3, 7\}$$

(g) $(A \cap B)'$

$$A \cap B = \{4, 5, 6\} \cap \{3, 5, 7\} = \{5\}$$

$$(A \cap B)' = \varepsilon - (A \cap B)$$

$$= \{3, 4, 5, 6, 7, 8, 9\} - \{5\}$$

$$= \{3, 4, 6, 7, 8, 9\}$$

(ii) *List the intersection of B and C.*

$$B \cap C = \{3, 5, 7\} \cap \{1, 4, 9\} = \{ \}$$

(iii) *List the union of A and C.*

$$A \cup C = \{4, 5, 6\} \cup \{1, 4, 9\}$$

$$= \{1, 4, 5, 6, 9\}$$

(iv) $n(C) = 3$

(v) *Find $n(A \cup C)$.*

$$n(A \cup C) = \{1, 4, 5, 6, 9\} = 5$$

(vi) *Find $n(B')$.*

$$n(B') = \{4, 6, 8, 9\} = 4$$

6. *If $A = \{\text{mango, banana, apples}\}$*

and $B = \{\text{mango, grapes, apples, strawberry}\}$.

Find $A \cup B$ and $A \cap B$ and represent the intersection through Venn diagram.

Ans. $A = \{\text{mango, banana, apples}\}$

$B = \{\text{mango, grapes, apples, strawberry}\}$

$A \cap B = \{\text{mango, banana, apples}\}$

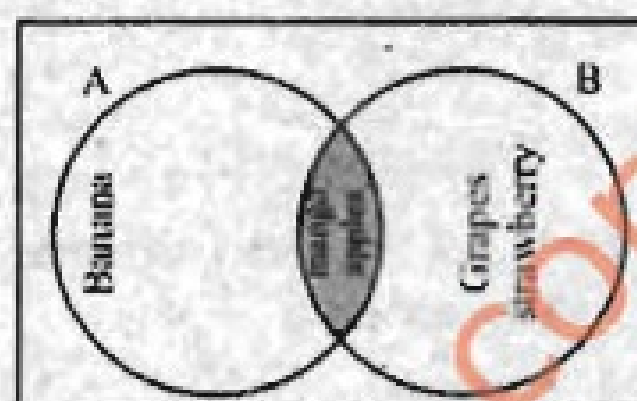
$\cup \{\text{mango, grapes, apples, strawberry}\}$

$= \{\text{mango, banana, apples, grapes, strawberry}\}$

$A \cap B = \{\text{mango, banana, apples}\}$

$\cap \{\text{mango, grapes, apples, strawberry}\}$

$= \{\text{mango, apples}\}$



7. *Find pairs of disjoint and overlapping sets.*

(i) $A = \{3, 6, 9, 12\}$ and $B = \{6, 8, 9\}$

Ans. A and B have 6, and 9 as the common elements. Therefore set A and B are overlapping sets.

(ii) $C = \{a, b, x, y\}$ and $D = \{m, n, o, p\}$

Ans. C and D sets have no common element. Therefore set C and D are disjoint sets.

(iii) $E = \{\text{monkey, goat, lion}\}$

and $F = \{\text{tiger, goat}\}$

Ans. E and F sets have goat as the common factor. Therefore set E and F are overlapping sets.

(iv) $G = \{q, r, s, t\}$ and

$H = \{u, v, w, x, y, z\}$

Ans. G and H sets have no common factors. Therefore set G and H are disjoint sets.

8. *If $\varepsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$,*

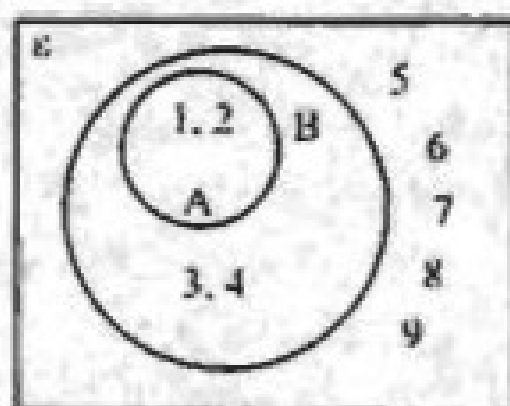
$A = \{1, 2\}$

and $B = \{1, 2, 3, 4\}$, draw a Venn diagram to represent the above sets and to illustrate their relationship.

Ans. $\varepsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

$$A = \{1, 2\}, B = \{1, 2, 3, 4\}$$



9. List all proper subsets of the following sets.

(i) $X = \{g, h\}$

Ans. $\{ \}, \{g\}, \{h\}, \{g, h\}$

(ii) $Y = \{5, 7, 9\}$

Ans. $\{ \}, \{5\}, \{7\}, \{9\}, \{5, 7\}, \{5, 9\}, \{7, 9\}, \{5, 7, 9\}$

(iii) $Z = \{Ali, Amna\}$

Ans. $\{ \}, \{Ali\}, \{Amna\}, \{Ali, Amna\}$

10. Identify the following pairs as disjoint sets, overlapping sets or neither.

(i) $A = \{S, U, N\}$ $B = \{S, T, A, R\}$

Ans. Overlapping

(ii) $C = \{\text{factors of } 24\}$

$D = \{\text{factors of } 33\}$

Ans. $= \{1, 2, 3, 4, 6, 8, 12, 24\}$

$= \{1, 3, 11, 33\}$

Overlapping

(iii) $E = \{p, q, r, s\}$ $F = \{2, 3, 4, 5\}$

Ans. Disjoint

(iv) $G = \{11, 21, 31, 41\}$

$H = \{15, 25, 35, 45\}$

Ans. Disjoint

(v) $I = \{2, 4, 6, 8, 10\}$

$J = \{1, 3, 5, 7, 11\}$

Ans. Disjoint

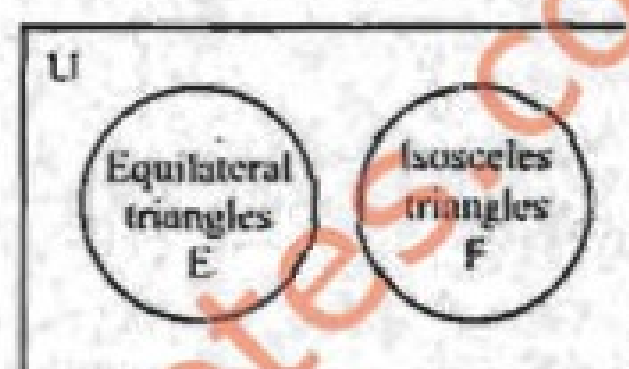
11. U is the set of triangles, E is the set of equilateral triangles, and F

is the set of isosceles triangles. If U is the universal set, draw a Venn diagram to show the relationship between the sets U , E and F .

Ans. U = Set of triangles

E = Set of equilateral triangles

F = Set of isosceles triangles



12. Find $X - Y$ and $Y - X$ if

(i) $X = \{a, e, i, o, u\}$

$Y = \{a, b, c, d, e, f\}$

(ii) $X = \{1, 3, 5, 7, \dots\}$

$Y = \{2, 4, 6, \dots\}$

(iii) X = Set of integers

Y = Set of whole numbers

(iv) X = Set of natural numbers

Y = Set of positive integers

(v) $X = \{x, y, z\}$

$Y = \{ \}$

Ans.

(i) $X = \{a, e, i, o, u\}$

$Y = \{a, b, c, d, e, f\}$

$X - Y = \{a, e, i, o, u\} - \{a, b, c, d, e, f\}$

$= \{i, o, u\}$

$Y - X = \{a, b, c, d, e, f\} - \{a, e, i, o, u\}$

$= \{b, c, d, f\}$

(ii) $X = \{1, 3, 5, 7, \dots\}$

$Y = \{2, 4, 6, 8, \dots\}$

$X - Y = \{1, 3, 5, 7, \dots\} - \{2, 4, 6, 8, \dots\}$

$= \{1, 3, 5, 7, \dots\} = X$

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

$$Y - X = \{2, 4, 6, 8, \dots\} - \{1, 3, 5, 7, \dots\}$$

$$= \{2, 4, 6, 8, \dots\} = Y$$

(iii) $X =$ Set of integers

$$= \{0, \pm 1, \pm 2, \pm 3, \dots\}$$

$Y =$ Set of whole numbers $= \{0, 1, 2, 3, \dots\}$

$$X - Y = \{0, \pm 1, \pm 2, \pm 3, \dots\}$$

$$- \{0, 1, 2, 3, \dots\}$$

$$= \{-1, -2, -3, \dots\}$$

$$Y - X = \{0, 1, 2, 3, \dots\}$$

$$- \{0, \pm 1, \pm 2, \pm 3, \dots\}$$

$$= \{ \}$$

(iv) Set of natural numbers $\{1, 2, 3, 4, \dots\}$

$Y =$ Set of positive integer

$$= \{+1, +2, +3, \dots\}$$

$$X - Y = \{1, 2, 3, 4, \dots\} - \{+1, +2, +3, \dots\}$$

$$= \{ \}$$

$$Y - X = \{+1, +2, +3\} - \{1, 2, 3\}$$

$$= \{ \}$$

(v) $X = \{x, y, z\}$

$$Y = \{ \}$$

$$X - Y = \{x, y, z\} - \{ \}$$

$$= \{x, y, z\}$$

$$Y - X = \{ \} - \{x, y, z\}$$

$$= \{ \}$$