

Worksheet

- Fill in the blanks.
 - If $A = \{\text{letters of the word INDIA}\}$ and $B = \{\text{letters of the word HINDI}\}$, then $A \cap B = \underline{\hspace{2cm}}$.
 - If $U = \{x : x \in \mathbf{W}, x < 5\}$ and $A = \{x : x \in \mathbf{N}, 1 < x < 5\}$, then $A' = \underline{\hspace{2cm}}$.
 - If $A = \{2, 3, 5, 7\}$ and $B = \{1, 4, 2, 5\}$, then $A - B = \underline{\hspace{2cm}}$.
 - If $n(A) = 10$ and $n(A \cup B) = 17$, then $n(B - A) = \underline{\hspace{2cm}}$.
 - If $n(A - B) = 2$, $n(B - A) = 3$ and $n(A \cup B) = 7$, then $n(A \cap B) = \underline{\hspace{2cm}}$.
- State if the following statements are true or false.
 - $A \cup (B \cap C) = A \cap (B \cup C)$
 - $A' \cap B' = (A \cup B)'$
 - $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
 - $(A \cap B)' = A' \cap B'$
 - If $A = \{\text{factors of } 35\}$ and $B = \{\text{factors of } 20\}$, then $n(A \cap B) = 1$.
- If $A = \{3, 4, 5, 6\}$, $B = \{1, 2, 6, 8\}$ and $C = \{1, 2, 3, 4, 5\}$, then find
 - $A \cup B$
 - $A \cup C$
 - $B \cup C$
 - $A \cup (B \cap C)$
 - $A \cap B$
 - $B \cap C$
 - $C \cap A$
 - $A \cap (B \cap C)$
 - $(A \cap B) \cup C$
- Find the union, intersection and difference $(A - B)$ and $(B - A)$ of the following pair of sets.
 - $A = \{x : -5 < x < 5, x \in \mathbf{Z}\}$ and $B = \{x : -2 < x < 5, x \in \mathbf{Z}\}$
 - $A = \{x : 4 < x < 7, x \in \mathbf{N}\}$ and $B = \{x : 0 < x < 7, x \in \mathbf{W}\}$
- If $U = \{1, 2, 3, 4, \dots, 10\}$, $A = \{2, 4, 6, 8\}$, $B = \{1, 2, 3, 5, 7\}$ and $C = \{1, 2, 3, 5, 7, 8\}$, then find
 - A'
 - B'
 - C'
 - $A \cup B$
 - $(A \cup C)$
 - $(A \cup B) \cup C$
 - $A - B$
 - $(B - C)$
- If $A = \{x, y, z, t\}$, $B = \{z, t, u\}$ and $C = \{x, y, u, v\}$, then show that
 - $(A \cup B) \cup C = A \cup (B \cup C)$
 - $(A \cap B) \cap C = A \cap (B \cap C)$
- If $U = \{1, 2, 3, 4, 5, 6\}$, $A = \{2, 3, 4, 5\}$ and $B = \{1, 2, 3, 5\}$, then verify
 - $(A \cup B)' = A' \cap B'$
 - $(A \cap B)' = A' \cup B'$
- If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $A = \{1, 2, 3, 5, 6, 7, 8\}$ and $B = \{1, 3, 4, 6, 7, 8, 9\}$. Illustrate the following on a Venn diagram.
 - $A \cap B$
 - $A - B$
 - B'
- If $A = \{3, 6, 9, 12\}$, $B = \{2, 4, 6, 8, 10, 12\}$ and $C = \{6, 12, 18\}$, then show that
 - $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
 - $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
- If $n(A) = 14$, $n(B) = 12$ and $n(A \cap B) = 6$, then find
 - $n(A \cup B)$
 - $n(A - B)$
- If $n(A) = 15$, $n(B) = 10$ and $n(A \cup B) = 20$, find
 - $n(A - B)$
 - $n(B - A)$

12. Represent the following using Venn diagram:

$$U = \{a, b, c, d, e, f\}, A = \{a, b, c\}, B = \{b, c, e\}$$

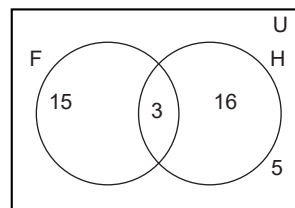
13. The given Venn diagram illustrates the following information:

U = number of students in a class

F = number of students who play football

H = number of students who play hockey

Find:



- the number of students who play football.
- the number of students in the class.
- the number of students who play football and hockey.
- the number of students who play football or hockey.

14. If X and Y are two sets such that $X \cup Y$ has 45 elements, X has 24 elements and Y has 26 elements, how many elements does $X \cap Y$ have?

15. In a group of 20 girls who like coffee or chips, 8 like chips but not coffee and 12 like chips, find

- how many girls like both chips and coffee?
- how many girls like coffee but not chips?

16. In a club, 20 members like hot or cold coffee, 12 members like hot coffee, 6 members like hot and cold coffee both. How many members in the club like cold coffee, if all the members like atleast one drink?

Answers to Worksheet

- $\{I, N, D\}$
 - $\{0, 1\}$
 - $\{3, 7\}$
 - 7
 - 12
- False
 - True
 - True
 - False
 - False
- $\{1, 2, 3, 4, 5, 6, 8\}$
 - $\{1, 2, 3, 4, 5, 6\}$
 - $\{1, 2, 3, 4, 5, 6, 8\}$
 - $\{1, 2, 3, 4, 5, 6, 8\}$
 - $\{6\}$
 - $\{1, 2\}$
 - $\{3, 4, 5\}$
 - ϕ
 - $\{1, 2, 3, 4, 5, 6\}$
- $A \cup B = \{x : x \in \mathbb{Z}, -5 < x < 5\}$, $A \cap B = \{x : x \in \mathbb{Z}, -2 < x < 5\}$,
 $A - B = \{x : x \in \mathbb{Z}, -5 < x < -1\}$; $B - A = \phi$
 - $A \cup B = \{x : x \in \mathbb{N}, 0 < x < 7\}$, $A \cap B = \{x : x \in \mathbb{N}, 4 < x < 7\}$,
 $A - B = \phi$, $B - A = \{x : x \in \mathbb{W}, 0 < x < 5\}$
- $\{1, 3, 5, 7, 9, 10\}$
 - $\{4, 6, 8, 9, 10\}$
 - $\{4, 6, 9, 10\}$
 - $\{1, 2, 3, 4, 5, 6, 7, 8\}$
 - $\{1, 2, 3, 4, 5, 6, 7, 8\}$
 - $\{1, 2, 3, 4, 5, 6, 7, 8\}$
 - $\{4, 6, 8\}$
 - ϕ
- 20
 - 8
- 10
 - 5
- 18
 - 39
 - 3
 - 34
- 5
 - 4
 - 8
 - 14