

EXERCISE 1.4

1. Find the union of each of the following pairs of sets :

- (i) $X = \{1, 3, 5\}$ $Y = \{1, 2, 3\}$
- (ii) $A = \{a, e, i, o, u\}$ $B = \{a, b, c\}$
- (iii) $A = \{x : x \text{ is a natural number and multiple of } 3\}$
 $B = \{x : x \text{ is a natural number less than } 6\}$
- (iv) $A = \{x : x \text{ is a natural number and } 1 < x \leq 6\}$
 $B = \{x : x \text{ is a natural number and } 6 < x < 10\}$
- (v) $A = \{1, 2, 3\}$, $B = \phi$

2. Let $A = \{a, b\}$, $B = \{a, b, c\}$. Is $A \subset B$? What is $A \cup B$?

3. If A and B are two sets such that $A \subset B$, then what is $A \cup B$?

4. If $A = \{1, 2, 3, 4\}$, $B = \{3, 4, 5, 6\}$, $C = \{5, 6, 7, 8\}$ and $D = \{7, 8, 9, 10\}$; find

- (i) $A \cup B$ (ii) $A \cup C$ (iii) $B \cup C$ (iv) $B \cup D$
- (v) $A \cup B \cup C$ (vi) $A \cup B \cup D$ (vii) $B \cup C \cup D$

5. Find the intersection of each pair of sets of question 1 above.

6. If $A = \{3, 5, 7, 9, 11\}$, $B = \{7, 9, 11, 13\}$, $C = \{11, 13, 15\}$ and $D = \{15, 17\}$; find

- (i) $A \cap B$ (ii) $B \cap C$ (iii) $A \cap C \cap D$
- (iv) $A \cap C$ (v) $B \cap D$ (vi) $A \cap (B \cup C)$
- (vii) $A \cap D$ (viii) $A \cap (B \cup D)$ (ix) $(A \cap B) \cap (B \cup C)$
- (x) $(A \cup D) \cap (B \cup C)$

7. If $A = \{x : x \text{ is a natural number}\}$, $B = \{x : x \text{ is an even natural number}\}$
 $C = \{x : x \text{ is an odd natural number}\}$ and $D = \{x : x \text{ is a prime number}\}$, find
 (i) $A \cap B$ (ii) $A \cap C$ (iii) $A \cap D$
 (iv) $B \cap C$ (v) $B \cap D$ (vi) $C \cap D$
8. Which of the following pairs of sets are disjoint
 (i) $\{1, 2, 3, 4\}$ and $\{x : x \text{ is a natural number and } 4 \leq x \leq 6\}$
 (ii) $\{a, e, i, o, u\}$ and $\{c, d, e, f\}$
 (iii) $\{x : x \text{ is an even integer}\}$ and $\{x : x \text{ is an odd integer}\}$
9. If $A = \{3, 6, 9, 12, 15, 18, 21\}$, $B = \{4, 8, 12, 16, 20\}$,
 $C = \{2, 4, 6, 8, 10, 12, 14, 16\}$, $D = \{5, 10, 15, 20\}$; find
 (i) $A - B$ (ii) $A - C$ (iii) $A - D$ (iv) $B - A$
 (v) $C - A$ (vi) $D - A$ (vii) $B - C$ (viii) $B - D$
 (ix) $C - B$ (x) $D - B$ (xi) $C - D$ (xii) $D - C$
10. If $X = \{a, b, c, d\}$ and $Y = \{f, b, d, g\}$, find
 (i) $X - Y$ (ii) $Y - X$ (iii) $X \cap Y$
11. If \mathbf{R} is the set of real numbers and \mathbf{Q} is the set of rational numbers, then what is $\mathbf{R} - \mathbf{Q}$?
12. State whether each of the following statement is true or false. Justify your answer.
 (i) $\{2, 3, 4, 5\}$ and $\{3, 6\}$ are disjoint sets.
 (ii) $\{a, e, i, o, u\}$ and $\{a, b, c, d\}$ are disjoint sets.
 (iii) $\{2, 6, 10, 14\}$ and $\{3, 7, 11, 15\}$ are disjoint sets.
 (iv) $\{2, 6, 10\}$ and $\{3, 7, 11\}$ are disjoint sets.