$\{12, 18, 36\}$

Exercise 6-1)

1) $A = \{x : x \in N \text{ and } 3 < x \leq 6\}$
$B = \{x : x \in w \text{ and } x < 4\}$.

Ans) $A = \{4, 5, 6\}$
$B = \{0, 1, 2, 3\}$

i) sets A and B in roster form

Ans) $A = \{4, 5, 6\}$
$B = \{0, 1, 2, 3\}$

ii) $A \cup B = \{0,1,2,3,4,5,6\}$

iii) $A \cap B = \{\phi\}$

iv) $A - B = \{4,5,6\}$

v) $B - A = \{0,1,2,3,4\}$

2) $P = \{x : x \in W \text{ and } 4 \leq x \leq 8\}$
$Q = \{x : x \in N \text{ and } x < 6\}$

Ans) $P = \{4,5,6,7,8\}$
$Q = \{1,2,3,4,5\}$

i) $P \cup Q$ and $P \cap Q$

Ans) $P \cup Q = \{1,2,3,4,5,6,7,8\}$
$P \cap Q = \{4,5\}$

ii) Is $(P \cup Q) \supset (P \cap Q)$?

Ans) Yes, because $(P \cap Q) = \{4,5\}$, $(P \cup Q) = \{1,2,3,4,5,6,7,8\}$

3) $A = \{5,6,7,8,9\}$, $B = \{x : 3 < x < 8 \text{ and } x \in W\}$ and
$C = \{x : x \leq 5 \text{ and } x \in N\}$.

Ans) $A = \{5,6,7,8,9\}$
$B = \{4,5,6,7\}$
$C = \{1,2,3,4,5\}$

i) $A \cup B$ and $(A \cup B) \cup C$

Ans) $A \cup B = \{4,5,6,7,8,9\}$

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

ii) $B \cup C$ and $A \cup (B \cup C)$

Ans) $B \cup C = \{1,2,3,4,5,6,7\}$

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

iii) $A \cap B$ and $(A \cap B) \cap C$

Ans) $A \cap B = \{5,6,7\}$

$(A \cap B) \cap C = \{5\}$

iv) $B \cap C$ and $A \cap (B \cap C)$

Ans) $B \cap C = \{4,5\}$

$A \cap (B \cap C) = \{5\}$

Is $(A \cup B) \cup C = A \cap (B \cap C)$?

Ans) LHS $= (A \cup B) \cup C$

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

RHS $= A \cap (B \cap C)$

$= \{5\}$

$\therefore$ LHS $\neq$ RHS

$\Rightarrow (A \cup B) \cup C \neq A \cap (B \cap C)$

Is $(A \cap B) \cap C = A \cap (B \cap C)$?

Ans) LHS $= (A \cap B) \cap C$

$= \{5\}$

RHS $= A \cap (B \cap C)$

$= \{5\}$

$\therefore$ LHS = RHS

$\Rightarrow (A \cap B) \cap C = A \cap (B \cap C)$