Sets Ex 1.6 Q6(i)

Let $A = \{1, 2, 3\}$, $B = \{2, 4, 6\}$ and $C = \{2, 5, 7\}$

Then,

$$A \cap B = \{2\}$$

and $$A \cap C = \{2\}$$

Hence, $A \cap B = A \cap C$, but clearly $B \neq C$.

Sets Ex 1.6 Q6(ii)

Given $A \subset B$

To show: $C - B \subset C - A$

Let $x \in C - B$

$\Rightarrow \quad x \in C$ and $x \notin B$ $\quad$ [by definition of $C - B$]

$\Rightarrow \quad x \in C$ and $x \notin A$ $\quad$ [$\because A \subset B$]

This can be seen by the venn diagram above

$\Rightarrow \quad x \in C - A$ $\quad$ [by definition of $C - A$]

Thus $x \in C - B \Rightarrow x \in C - A$. This is true for all $x \in C - B$

$\therefore \quad C - B \subset C - A$

Sets Ex 1.6 Q7

(i)

$A \cup (A \cap B) = (A \cup A) \cap (A \cup B)$ $\quad$ [$\because$ union $\cup$ is distributive over intersection $\cap$]

$= A \cap (A \cup B)$ $\quad$ [$\because A \cup A = A$]

$= A$ $\quad$ [$\because A \subset (A \cup B)$, as union of two sets is bigger than each of the individual sets]

Hence, $A \cup (A \cap B) = A$ $\qquad$ Proved.

(ii)

$A \cap (A \cup B) = (A \cap A) \cup (A \cap B)$ $\quad$ [$\because \cap$ distributes over $\cup$]

$= A \cup (A \cap B)$ $\quad$ [$\because A \cap A = A$]

$= A$ $\quad$ [using (i)]

Sets Ex 1.6 Q8

To find sets A, B and C such that $A \cap B \neq \phi$, $A \cap C = \phi$ and $B \cap C = \phi$ and $A \cap B \cap C = \phi$

Take $A = \{1, 2, 3\}$

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

and $C = \{3, 4, 7\}$

Then,

$A \cap B = \{2\}$

$\therefore \quad A \cap B \neq \phi$

$A \cap C = \{3\}$

$\therefore \quad A \cap C \neq \phi$

$B \cap C = \{4\}$

$\therefore \quad B \cap C \neq \phi$

However A, B and C have no elements in common,

$\therefore \quad A \cap B \cap C = \phi$

*********** END **********