6) $U = \{a, b, c, d, e, \ldots y, z\}$, $A = \{a, b, c, d\}$

$C = \{d, e, f\}$, $B = \{c, d\}$

a) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

L.H.S $= A \cup (B \cap C)$

$= A \cup (\{c, d\} \cap \{d, e, f\})$

$= A \cup \{d\}$

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

R.H.S $= (A \cup B) \cap (A \cup C)$

$= (\{a, b, c, d\} \cup \{c, d\}) \cap (\{a, b, c, d\} \cup \{d, e, f\})$

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

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

6. (d) $(A \cup B)' = A' \cap B'$

L.H.S $= (A \cup B)'$

$= (\{a, b, c, d\} \cup \{c, d\})'$

$= (\{a, b, c, d\})'$

$= \{e, f, g, \ldots z\}$

R.H.S $= A' \cap B'$

$= (\{a, b, c, d\})' \cap (\{c, d\})'$

$= \{e, f, g, h \ldots z\} \cap \{a, b, e, f, g, h \ldots\}$

$= \{e, f, g, h \ldots z\}$

(e) $A - (B \cup C) = (A - B) - C$

L.H.S $= A - (B \cup C)$

$= A - (\{c, d\} \cup \{d, e, f\})$

$= A - \{c, d, e, f\}$

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

$= \{a, b\}$

R.H.S $= (A - B) - C$

$= (\{a, b, c, d\} - \{c, d\}) - \{d, e, f\}$

$= \{a, b\} - \{d, e, f\}$

$= \{a, b\}$

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

$B = \{1, 3, 5, 15\}$

$C = \{1, 2, 4, 5, 10, 20\}$

(d) $\overline{A \cap B}$

$= \overline{\{1, 2, 3, 4, 6, 12\} \cap \{1, 3, 5, 15\}}$

$= \{1, 3\}$

$= \{2, 4, 5, 6, 7, 8 \cdots 20\}$

(e) $A \cup C$

$= \{1, 2, 3, 4, 6, 12\} \cup \{1, 2, 4, 5, 10, 20\}$

$= \{1, 2, 4\}$

(f) $A \cap (B \cup C)$

$= A \cap (\{1, 3, 5, 15\} \cup \{1, 2, 4, 5, 10, 20\})$

$= A \cap \{1, 2, 3, 4, 5, 10, 20, 15\}$

$= \{1, 2, 3, 4, 6, 12\} \cap \{1, 2, 3, 4, 5, 10, 20, 25\}$

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

9)

a) $A \cap (B \cup C) = \{a, b, c, d, e\} \cap (\{c, d, f, g, h\} \cup \{d, e, i, j, f, g\})$

$= \{a, b, c, d, e\} \cap (\{c, d, e, f, g, h, i, j\})$

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

9. c) $(B \cap C)' \cap A$

$= (\{d, f, g\})' \cap \{a, b, c, d, e\}$

$= \{a, b, c, e, h, i, j\} \cap \{a, b, c, d, e\}$

$= \{a, b, c, e\}$

9. e $(A - B) \cup C$

$= \{a, b, e\} \cup \{d, e, f, g, i, j\}$

$= \{a, b, d, e, f, g, i, j\}$

11. a) $A := \{1, 4\}$

Subsets of A are:-

a) $\emptyset$
b) $\{1\}$
c) $\{4\}$
d) $\{1, 4\}$

11. b c) $C = \{x : x \text{ is a prime no. less than } 7\}$

$C = \{2, 3, 5\}$

$\Rightarrow \emptyset$
$\Rightarrow \{2\}$
$\Rightarrow \{3\}$
$\Rightarrow \{5\}$
$\Rightarrow \{2, 3\}$
$\Rightarrow \{2, 5\}$
$\{3, 5\}$
$\{2, 3, 5\}$

8) $n(A \cap B)\text{ only} = n(A \cap B) - n(A \cap B \cap C)$
$= 99 - 56$
$= 43$

$n(A \cap C)\text{ only} = n(A \cap C) - n(A \cap B \cap C)$
$= 62 - 56 = 6$

$n(B \cap C)\text{ only} = n(B \cap C) - n(A \cap B \cap C)$
$= 103 - 56$
$= 47$

$n(A)_o = n(A) - n(A \cap B \cap C) - n(A \cap C)\text{only} - n(A \cap B)\text{only}$
$= 150 - (56 + 43 + 6)$
$= 45$

$n(B)_o = n(B) - n(A \cap B \cap C) - n(B \cap C)\text{only} - n(B \cap A)\text{only}$
$= 195 - 56 - 43 - 47$
$= 195$

~~A(B)o~~ $n(C)_o = n(C) - n(A \cap B \cap C) - n(B \cap C)\text{only} - n(A \cap C)\text{only}$

$= 170 - 56 - 6 - 47$
$= 61$

Trick:→ $(n_o(A))$ → For determination.
- minus with intersection part, in which A is taking part