CM 1606 Computational Mathematics

Tutorial No 01

1. Let A = {0,1,2,3} and p(A) is the power set of A. Identify if the following statements are True or False.

$i) 0 \in A$ $\quad$ $vi) 0 \in \phi$

$ii) \{2\} \in A$ $\quad$ $vii) \phi \in P(A)$

$iii) \{2\} \subseteq A$ $\quad$ $viii) \phi \subseteq A$

$iv) \phi \in A$ $\quad$ $ix) \phi \subset A$

$v) \phi \notin A$ $\quad$ $x) A \subseteq P(A)$

2. Express each interval using set builder notation.

$i) (-2, 5]$

$ii) [3, 8]$

$iii) [-5, 3)$

3. Determine if the following statements are True or False.

$i) 2 \notin [-1, 5]$

$ii) 5 \in (5, 8]$

$iii) 2 \in [2, 6)$

$iv) \{a.b\} \subseteq \{a, b, c\}$

$v) \{a, b, c\} \subset \{a, b, c\}$

$vi) (2, 5) \subseteq [2, 5]$

$vii) (2, 5) \subset [2, 5]$

$viii)$ Any proper subset of a set A is a subset of A

4. Sketch the shaded Venn diagram for each following.

$i) A^c \cap B$

$ii) A^c \cap B^c$

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

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

$v) (A \setminus B) \cap (A \setminus C)$

5. Draw the special Venn diagram for each of the following situations.

   i) $A \subseteq B$ and $B \subseteq A$
   ii) $A \subseteq B$ and $B \subseteq C$
   iii) $A \subseteq B \cap C$

6. Prove the given identities by using a Venn diagram.

   i) $A \subseteq B$ if and only if $B^c \subseteq A^c$
   ii) $A \subseteq B$ if and only if $A \cap B^c = \varnothing$
   iii) $A \subseteq B$ if and only if $A \cup B = B$

7. Let A={R,G,U} and I={D,S}

   i)List all the elements of the power sets of A and I.
   ii)Write down the elements of $A \times I$
   iii)Write down the elements of $I \times A$
   iv)Check for the identity $|A \times I| = |I \times A|$
   v)List all the elements of $(A \times I) \setminus (I \times A)$