Math3 (814013) – Spring 2007

Worksheet 1

Question (1): List the elements of each of the following sets:

1. $\{x : x \text{ is a digit in the number } 203224001\}$
2. $\{x : x \text{ is an even natural number}\}$
3. $\{x : -5 \le x < 0 ; x \in W\}$
4. $\{t : t + 4 = 3 ; t \in N\}$
5. $\{x : -5 \le x < 5 ; x \in N\}$
6. $\{x : x \text{ is an odd natural number and less than } 10\}$

Question (2): Determine whether each number listed in the table below is a member of each set listed on the side of the table.

	$\sqrt[3]{-8}$	$\frac{3^2}{9}$	$4.2314\ldots$	$\pi + 2$	$\frac{-2.1}{7}$	$\sqrt{121}$	$\frac{4}{0}$
Natural							
Real							
Irrational							
Integer							
Rational							

Question (3): State whether each of the following is true (**T**) or false (**F**).

1. An integer is a whole number.
2. All real numbers are rational numbers.
3. If $A \subset B$ then $A \cap B = A$.
4. If $A \subset B$ then $\overline{B} \subset \overline{A}$.
5. Some of rational numbers are natural numbers.
6. $0 \notin \phi$.
7. If $T = \{x : 2x + 4 = 5 ; x \in N\}$ then $T = \left\{\frac{1}{2}\right\}$

Question (4): If R represents a set of all real numbers, Q for all rational numbers, $\overline{Q}$ for all irrational numbers, Z for all integers, W for all whole numbers, and N for all natural (counting) numbers then find the following:

1. $(W \cup N) \cap Q$
2. $(R \cap \overline{Q}) \cup (R \cap Q)$
3. $(Q \cap Z) \cap W$
4. $(Z \cup W) \cap N$
5. $(Q \cup \overline{Q}) \cap R$
6. $(N \cup \phi) \cap \overline{Q}$

Question (5): Given $A=\left\{x:-3<x\le\frac{11}{2};x\in Z\right\}$ a universal set. Let $B=\{x:x^2=4\}$, $C=\{x:x \text{ is a positive odd number in } A\}$ and $D=\{-2,0,1,5\}$. Find:

(a) A , B , C

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

(c) $C\cup D$

(d) $B\cap D$

(e) $\{x:x\in A \text{ or } x\in B\}$

(f) $\{x:x\in B \text{ and } x\in D\}$

(g) Write all the subsets of set C.

(h) Write all the subsets of set B.

Question (6): Show that the following numbers are rational:

1. c = 0.232323…
2. x = 3.744444…
3. a = 0.8121212…

Question (7): Locate (Plot) the following numbers on the real number line:

$$3,\sqrt{8},-\frac{12}{5},-1.75,2\pi,0,|-4|,|-2\times5-(-7)|$$