**373 Math Problems**

**Sheet #2**

**From Text book:**

2.3:1, 2, 3, 4, 5, 6, 7, 8, 9, 13.

2.4: 1, 2, 3, 4, 5, 6, 7, 10, 13, 14, 15, 16, 17,

**Additional Problems:**

1. In $\left(R,U\right)$, do rationals form an open set? Closed set? Neither? Both? Justify your answer.
2. Consider $A=\left\{x:0<x<2\right\}∪\{10\}$. Find Cl(A) in $\left(R,U\right)$.
3. Give an example of a collection of open sets whose intersection is not open.
4. Give an example of two sets A and B of In $\left(R,U\right)$such that A and A\B are both open but B is not closed.
5. Give an example of a countable set in In $\left(R,U\right)$ that is not closed.
6. Give an example of a countable set in In $\left(R,U\right)$ that is closed.
7. Prove that $A is open iff A∩Bd\left(A\right)=∅$
8. Prove that $A is closed iff Bd\left(A\right)⊆A.$
9. Prove that $Bd\left(A\right)=∅ iff A is both open and closed.$
10. Prove that $Cl\left(A\right)=A∪Bd\left(A\right)=int\left(A\right)∪Bd\left(A\right).$
11. Prove that $Ext\left(A\right)=X-Cl\left(A\right)and Cl\left(A\right)=X-Ext\left(A\right).$
12. Prove that $Bd\left(A\right)=Cl\left(A\right)∩Cl\left(X-A\right).$