Homework # 1 Due Tuesday 2/4/2020 start of class.

We have a subset A of a topological space X. Recall the closure, $\overline{A}$, is the union of A and its limit points.

We make two new definitions. Define the interior of A, $int\, A$, to be the union of all open sets (of X) contained in A. Define the boundary of A, $Bd\, A$ to be $\overline{A} \cap \overline{(X - A)}$.

1. Show $\overline{A}$ is the intersection of all closed sets containing A.

2. Show $\overline{A} = int\, A \cup Bd\, A$.

3. Show $int\, A \cap Bd\, A = \phi$.

4. Show $Bd\, A = \phi \Leftrightarrow$ A is both open and closed.

5. Show U open $\Leftrightarrow Bd\, U = \overline{U} - U$.