

M421, Introduction to Topology I

Assignment 7

Drew Robertson

July 9, 2008

Page 40, number 8.

Let $X = \mathbb{R}$, and let $\mathcal{T} = \{U \subseteq X : 1 \in U \text{ or } U = \emptyset\}$. Describe the closed sets of X . Find $\text{Cl}(\{1, 2\})$. Is $\{1, 2\}$ dense in $(\mathbb{R}, \mathcal{T})$?

Solution

The closed sets of X are best described as $\{V \subseteq X : 1 \notin V \text{ or } V = X\}$.

$\text{Cl}(\{1, 2\}) = X$, since $1 \in \{1, 2\} \in \text{Cl}(\{1, 2\})$, and because of this and closure is the intersection of closed sets, and is hence closed; $\{1, 2\}$ can't be in its closure, if its closure isn't X .

Since $\text{Cl}(\{1, 2\}) = X$, $\{1, 2\}$ is dense in \mathcal{T} .

Page 44, number 1.

Let $X = \{a, b, c\}$ and $\mathcal{T} = \{X, \emptyset, \{a\}, \{a, b\}\}$. Let $A = \{a, c\}$. Find each of the following sets.
Closed sets = $\emptyset, X, \{b, c\}, \{c\}$.

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

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

(c) $\text{Cl}(A) = X$