

Answer on Question #70374, Math / Topology

Let $X = \{a, b, c, d\}$ with the topology $T = \{\emptyset, \{a\}, \{a, b\}, \{a, b, c, d\}\}$. Find close set.

Solution. Note that a subset A of a topological space X is closed, if $X \setminus A$ is an open subset of X . If T is a topology of X , then A set A is open if and only if $A \in T$

So, since $T = \{\emptyset, \{a\}, \{a, b\}, \{a, b, c, d\}\}$, then $X \setminus \emptyset = X$, $X \setminus \{a\} = \{b, c, d\}$, $X \setminus \{a, b\} = \{c, d\}$, $X \setminus \{a, b, c, d\} = \emptyset$.

Hence, subsets \emptyset , X , $\{c, d\}$ and $\{b, c, d\}$ are closed in X and only they.