Topology

Edition: 1

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Show that the set of interior points of a set is always open in a formal way, rather than arguing that set of interior points contains only interior points and is thus open.

We want to prove that every point in the set of interior points of a set is its self interior point. Since $x \in \mathring{B}$, B is a neighborhood for x, then there is an open set O in B containing x. We take $O \cap \mathring{B}$ which is also an open set, but this time it is contained in $\mathring{B}$. So $\mathring{B}$ is a neighborhood of x, and x is an interior point of $\mathring{B}$.

Show that the interior of B is the union of all open sets contained in B.

Show that the closure of B is the intersection of all closed sets containing B.

Prove that the definition for topological spaces in terms of neighborhood and in terms of closure (The Kuratowski Closure axiom) are equivalent. First understand by what sense we mean two definitions are equivalent.

References