Problem 3-1. In your solution, be explicit about where you need Theorem 2.59 (Invariance of the Boundary).

Problem 3-14. After you do this problem, read and think briefly about Problem 3-15; no need to write anything about 3-15.

Problem 3-16. In addition to the problem in the book, do the following.

In lecture we considered the following topological space Y. The underlying set for Y is the disjoint union of $\mathbb{R}$ and a single point not in $\mathbb{R}$; label the single point $*$. You may assume without proof that the following is a basis for the topology on Y: intervals $(a, b) \subseteq \mathbb{R}$, and sets of the form

$$(a, 0) \cup \{*\} \cup (0, b), \text{ where } a < 0 < b.$$

Prove that Y is homeomorphic to the space $X/\sim$ in Problem 3-16. *Hint:* Find a quotient map from X to Y.