Homework 13

Due Tuesday, November 24, 11:59 PM

Definitions

(a) State:

(i) The definition of one-point compactification of a space X.

(ii) The definition of closure of a subset of a topological space X.

(iii) The definition of interior of a subset of a topological space X.

(iv) The definition of what it means for a subset of a topological space X to be dense.

(v) The definition of a base (or basis) of a topology.

Proof(s)

Prove that S^n is homeomorphic to the one-point compactification of $\mathbb{R}^n$.

Canvas True/False Questions:

Indicate whether each of the following statements is true or false:

1. If X is compact and Hausdorff and connected, then X^+ is connected.

2. If X is not Hausdorff, then X^+ is Hausdorff.

3. $\mathbb{Q}$ is a dense subset of $\mathbb{R}$ when $\mathbb{R}$ is given the standard topology.

4. $\mathbb{Q}$ is a dense subset of $\mathbb{R}$ when $\mathbb{R}$ is given the discrete topology.

5. $\mathbb{Q}$, given the subspace topology inherited from $\mathbb{R}$ with the standard topology, is connected.

6. $\mathbb{Q}$, given the subspace topology inherited from $\mathbb{R}$ with the standard topology, is path-connected.