700848

Topology Feedback Quiz, week 5: Hausdorffness and compactness

Open books. 10–15 minutes. Not for credit. To be marked in class.

Felix Hausdorff (1868–1942)
a founder of Topology

Question 1 ♣ The closed bounded interval $[10, 20]$ in $\mathbb{R}$ is:

○ Hausdorff compact ○ Hausd. non-comp. ○ non-Haus. comp. ○ non-H. non-comp.

The half-open interval $[0, 1)$ in $\mathbb{R}$ is

○ Hausdorff compact ○ Hausd. non-comp. ○ non-Haus. comp. ○ non-H. non-comp.

The union $[0, 1/3] \cup [2/3, 1]$ is

○ Hausdorff compact ○ Hausd. non-comp. ○ non-Haus. comp. ○ non-H. non-comp.

The set $\bigcup_{n=1}^{\infty}[\frac{1}{2n+1}, \frac{1}{2n}]$ is

○ Hausdorff compact ○ Hausd. non-comp. ○ non-Haus. comp. ○ non-H. non-comp.

The set $\{0\} \cup \bigcup_{n=1}^{\infty}[\frac{1}{2n+1}, \frac{1}{2n}]$ is

○ Hausdorff compact ○ Hausd. non-comp. ○ non-Haus. comp. ○ non-H. non-comp.

$\mathbb{R}$ with cofinite topology is

○ Hausdorff compact ○ Hausd. non-comp. ○ non-Haus. comp. ○ non-H. non-comp.

$\mathbb{R}$ with antidiscrete topology is

○ Hausdorff compact ○ Hausd. non-comp. ○ non-Haus. comp. ○ non-H. non-comp.

Question 2 ♣ Suppose T_{weak}, T_{strong} are topologies on a set X such that T_{strong} is stronger than T_{weak}. What must be true?

○ the function $id_X : (X, T_{strong}) \to (X, T_{weak})$ is continuous

○ the function $id_X : (X, T_{strong}) \to (X, T_{weak})$ is a homeomorphism

○ T_{weak} is Hausdorff implies T_{strong} is Hausdorff

○ T_{strong} is compact implies T_{weak} is compact