# math 464

First Homework

Due Date Friday 17 / 5 / 1437, at 11:59 Pm.

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**Name:** **Number:**

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Always try to justify your answer ( SHORT PROOF ).

**Q1:** (2 point)

Prove or disprove:

1. $\tau = \{\mathbb{R}, \phi, (0, a); a \in \mathbb{R}, a > 0\}$ is a topology on $\mathbb{R}$.

2. $(A \cup B)^o \subset A^o \cup B^o$

3. $(A \cup B)^o = A^o \cup B^o$

4. If $(\mathbb{R}, CC)$ be the countable complement topological space, and $A = \mathbb{Q}$ ( the set of rational numbers), then $\overline{A} = A$.

**Q2:** (2 points)

If $(X, \tau_1)$ be a topological space, $Y \neq \phi$ and $f : (X, \tau_1) \to Y$ is a function.

Show that $\tau_2 = \{u \subseteq Y : f^{-1}(u) \in \tau_1\}$ is a topology on $Y$.

**Q3:** (1 point)

Consider the usual topology $\mathcal{U}$ *on* $\mathbb{R}$.

Describe the relative topological space $(\mathbb{Z}, \mathcal{U}_{\mathbb{Z}})$ where $\mathbb{Z}$ is the set of all integer numbers.

Good Luck :)