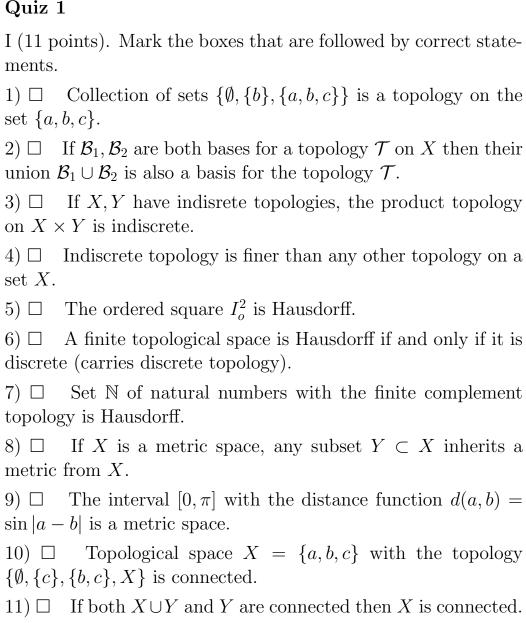
Topology, fall 2022.

NAME:



II (5 points). Mark the square in the *first* column, respectively **second** column, if the corresponding subset of \mathbb{R}^2 with the standard topology is *open*, respectively **closed**.

$$\Box \ \Box \ \{(x,y)|x \ge 0 \text{ or } y \ge 0\}$$

$$\Box \ \Box \ \{(x,y)|x < 0 \text{ and } y \ge 0\}$$

$$\Box \ \Box \ \{(x,y)|x = 1 \text{ and } y \le 2\}$$

$$\Box \ \Box \ \{(x,y)|xy = 1\}$$

$$\Box \ \Box \ \{(x,y)|x^2 + y^2 \ge 1\}$$

III (3 points) Mark the boxes that are followed by correct statements.

- a) \square Sequence $x_n = (\frac{1}{n}, \frac{1}{2n}, \frac{1}{3n}, \dots)$ converges to $\underline{0} = (0, 0, 0, \dots)$ in the uniform topology on $\mathbb{R}^{\mathbb{N}}$.
- b) \square The identity map $\mathbb{R} \longrightarrow \mathbb{R}_{\ell}$ from \mathbb{R} with the standard topology to \mathbb{R} with the lower limit topology is continuous.
- c) \square The identity map $\mathbb{R}^{\mathbb{N}} \longrightarrow \mathbb{R}^{\mathbb{N}}$ from $\mathbb{R}^{\mathbb{N}}$ with the box topology to $\mathbb{R}^{\mathbb{N}}$ with the product topology is continuous. Here each \mathbb{R} in this infinite product carries the standard topology.