Problem 1.

Winnie likes drinking beer and watching TV. He can choose between the following two cable TV packages. He can have the 1 national channel for free or he can buy many channels from Space-Turner Cable. However, in the latter case, he has to pay for the national channel as well. Space-Turner charges p_x per channel. His utility function is described by $u(z, y) = zy$, where z is the number of channels he has and y is the amount of beer he consumes. His wealth is w.

    a. Argue that one can rewrite his utility function as $u(x, y) = \max\{1, xy\}$, where x is the number of channels Winnie bought from Space-Turner.

    b. Find Winnie's market demand functions/correspondences and calculate his indirect utility function.

    c. Does the demand for TV channels depend on the price of beer? Explain.

    d. What is the minimum number of channels Winnie is going to buy from Space-Warner if he buys any? Explain why this number is strictly larger than 1.

    e. Calculate the Hicksian demand functions and the expenditure function.

Problem 2. *True or False?*

Determine whether the following statements are true or false. Support your answer with a proof, counter-example, or rigorous reasoning.

    a. The Slutsky equation must be wrong because it asserts that a fall in the price of houses has the same effect on the sale of doorbells as a fall in the price of doorbells has on the sale of houses.

    b. Suppose we observe a consumer's behavior at under two price systems $\boldsymbol{p}^0 = (1, p)$ and $\boldsymbol{p}^1 = (p, 1)$, where $p > 0$. Assuming that Walras' Law holds, Leontif preferences are the unique rationalizing preferences for this consumer's behavior.

    c. Let $\succsim$ be a rational preference relation on $\mathbb{R}_+^L$. If the indifference sets $I_x = \{y \in \mathbb{R}_+^L : y \sim x\}$ are closed, then $\succsim$ is continuous.

    d. Suppose there are utility functions u and v defined over $\mathbb{R}_+^2$. If $\mathrm{MRS}_u(x) = \mathrm{MRS}_v(x)$ for all $x \in \mathbb{R}_+^2$, then u and v describe the same preferences.