

MATHEMATICAL LOGIC — ASSIGNMENT TWO

- (1) Prove $\vdash (A \vee \exists x. B) = (\exists x. (A \vee B))$ with $x \notin \text{FV}(A)$.
Show a counterexample when $x \in \text{FV}(A)$.
- (2) Show that a set Γ is maximal consistent if and only if it is consistent and for every formula A either $A \in \Gamma$ or $\neg A \in \Gamma$.
- (3) Show that every first-order theory T on the signature

$$\langle S; \{\circ: S \times S \rightarrow S\}; \{=: S \times S\} \rangle$$

having as models all the finite groups, has necessarily an infinite model.

Each question is worth 12 points. The points in all the four assignments will be added together and the result will be divided by 4, and this will be the final result. Remember to mark your answer sheet with your name.

Date: April 26th, 2023.