MATHEMATICAL LOGIC — ASSIGNMENT ONE

(1) Prove in natural deduction $\vdash ((A \supset B) \supset A) \supset A$.
(2) Show that for each x and y in a lattice, $x \vee (x \wedge y) = x$ and $x \wedge (x \vee y) = x$.
(3) Consider the following inference rule

$$\begin{array}{c} [\neg A] \\ \vdots \\ \bot \\ \hline A \end{array} \bot_c$$

Show that classical propositional logic is equivalent to the calculus without the Law of Excluded Middle plus the $\bot_c$ rule.

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: March 24th, 2026.