Introductory Logic: Worksheet 3

September 24, 2025

1 Problem 1

Show the following using both of the strategies below: $P \to (Q \vee R) \vdash (P \to Q) \vee (P \to R)$.

Strategy 1: Assume negation of the conclusion, apply DeMorgans.[1] The result is two negated conditionals, which are equivalent to conjunctions.

[1] Prove DeMorgans, rather than using it as a rule.

Strategy 2: Derive $P \vee \neg P$, then argue by cases. Recall that $\neg P \vdash P \to Q$.

2 Problem 2

What does it mean for an argument to be semantically valid? What are soundness and completeness?