

Reading

Read pp. 25–30 in Smullyan for Tuesday, February 15.

Read pp. 30–36 in Smullyan for Thursday, February 17.

Read pp. 36–40 in Smullyan for Tuesday, February 22.

Questions

(1) Translate the following arguments into propositional formulas and prove them right or wrong:

(a) If either wages or prices are raised, there will be inflation. If there is inflation, then either Congress must regulate it or the people will suffer. But if the people suffer, then congressmen will be unpopular. However, Congress does not regulate inflation and congressmen are not unpopular. Therefore, wages do not rise.

(b) Jones has filed a lawsuit against Rogers because of a contract. Jones will win the lawsuit if and only if Rogers has entered into the contract, the contract is legal, and Rogers has not performed the contract. Rogers has entered into the contract only if he has accepted Jones' offer. But, in fact, Rogers has not accepted Jones' offer. Therefore Jones will lose the lawsuit.

(2) Prove the following propositional formulas using the tableau method

(a) $(P \supset Q) \supset (\sim Q \supset \sim P)$

(b) $(P \supset Q) \supset (\sim P \vee Q)$

(c) $\sim(\sim P \vee \sim Q) \supset (P \wedge Q)$

(3) State the tableau rules for the *choice operator* | (c.f. homework 1) and prove that they give a correct and complete proof system for propositional logic.

(4) Show that any upward closed set S (Smullyan page 23) satisfying the condition

$$\text{for all signed formulas } X, X \in S \text{ iff } \bar{X} \notin S$$

is a truth set.