INTRO TO ABSTRACT MATH
FALL 2009

HOMEWORK 3
DUE SEPTEMBER 9

Exercise 6. Let P, Q and R be statements. Use truth tables to answer the following questions.

a. If $(P \to Q) \wedge (Q \to R)$ is true, what can you conclude about $P \to R$?

b. If $(P \to R) \vee (Q \to R)$ is true, what can you conclude about R?

Exercise 7. Suppose you tell a child "If you don't eat your dinner, then you won't get any dessert." The child eats dinner, but gets no dessert. From a logical standpoint, was your original statement a lie?

Exercise 8. Let P, Q and R be statements. Compute the truth tables for the following compound statements.

a. $(R \vee P) \to ((\neg P) \leftrightarrow R)$

b. $(Q \to R) \vee (P \wedge ((\neg Q) \to R))$

Exercise 9. Consider the following argument.

"*If it's sunny and I get up early, then I'll go to the lake. I'll either stay up late or get up early. If I stay up late, then I'll be tired. I'm not tired and it's sunny. Therefore, I'll go to the lake.*"

Assuming that the first four statements are true, explain why the conclusion must also be true.